

# Unless We Are Robots, Classical and Quantum Theories Are Fundamentally Inadequate

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## ABSTRACT

In classical physics, all change in nature is believed to take place in an unbroken chain of cause and effect. In quantum physics, change is believed to be irreducibly probabilistic, and perhaps even fundamentally random. Neither classical determinism nor orthodox quantum indeterminism is consistent with causally efficacious minds. If either is correct, we humans are robots with no free will. For a way out of this meaninglessness, recent progress toward a subtler nonlocal causal wave model of real mind is overviewed. The model is in the direction of Sankhya ontology and Yoga epistemology in the ancient holistic Vedic account, which we will see is rich enough for rational explanation and empirical validation of free will.

**Key Words:** determinism, probabilism, nonlocal causal wave, 3-in-1 Vedic model, free will

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## Introduction

Classical science strengthened our collective belief in universal order through identifying laws of nature. The entire universe was believed to be an unbroken determinate physical causal chain in which prior events cause the next event. It further was believed that learning how these laws work allows us to apply them to improve our lives. But a dark secret lies in this view, and geniuses such as Einstein were on to it. If it is correct, we also are bound in the chain—with no way out. To be consistent, then we really aren't *intentionally* improving our lives through applying scientific laws; we are just links in the closed causal chain that began long before we existed. To make it personal, you are a meaningless robot with no free will.

However, this classical view of physical determinism did not address the initial cause of the chain of events. Today this issue can be related to differences between 'consensus' reductive big bang cosmology and holistic unified field theory, discussed later. Maybe it provides a way out.

Before going all the way back to the initial cause, however, we need to examine quantum theory because it posits limits to the determinism and predictability of nature. Some prominent quantum theory interpretations hold that determinism in the macroscopic layers of nature does not extend to lower-order microscopic layers. In the past century, considerable thought has been directed at trying to comprehend how nature reflects precise order in classical mechanics but only probabilistic order in quantum mechanics.

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Arguing against quantum indeterminism and irreducible *probabilism* because it undermines foundational pillars of classical science, Einstein quipped that ‘God does not play dice with the universe’ (Herbert, 1985). But the closed *objective* physical causal chain he believed in allows no possibility to unlink the chain and insert a causally efficacious *subjective* mental intention, which means no free will, apparently consistent with Einstein’s beliefs.

On the other hand, if nature is *fundamentally* random as posited in some quantum theory interpretations, again there would be no way for us to choose what happens. Fundamentally random events would be independent of each other, with no continuity or memory across them. It is unclear how orderly systems could be maintained at all in this view. Fortunately a coherent view is emerging in holistic models in the direction of unified field theory, rather than reductive models. As discussed later, it has room for our minds and free will to be real (Boyer, 2009).

Neither classical determinism nor quantum indeterminism allows for our intentions to change the course of nature, which would mean free will is illusory. However, to assert that we should not waste time on such foundational issues and rather focus on practical applications is not just inconsistent. It disregards the massive cost to human society of existential meaninglessness, social fragmentation, and nihilism—even pushing toward a *post-human* era—for which the reductive physicalist paradigm has given rationale. This perilous state of affairs is significantly due to ignoring the reality of conscious mind in ill-formed, fragmenting attempts to be *objective*.

Theories about mind and consciousness in psychology—and modern science generally—have been shaped by the objectified reductive physicalist worldview. In these theories consciousness is defined as the ability to be *aware of* some object of experience. It is described as fading out during sleep and coma, restricted by brain damage or malfunctioning, and ceasing when the physical body no longer sustains life. In this view conscious mind is at most an emergent epiphenomenon of complex functional organization in cellular and molecular processes of the brain. At elemental, atomic, subatomic, and quantum levels, physical systems follow invariant laws of nature

that are thought essentially to be a product of random disorder. The signifiers of sentient life—intelligence, meaningful information, intentionality, selective attention, the survival instinct—have not been found at these basic inert levels and neither have mind and consciousness. While classical science strengthened belief in universal order, curiously now this belief does not extend to the most fundamental levels identified in modern science (quantum randomness), or to the inner subjective domain (unreliable subjectivity) (Boyer, 2008).

### Progress beyond the Physical

But wait. Some quantum field theories are now progressing beyond the physical and the local ‘billiard ball’/particle interaction model of causality. Recent interpretations of quantum theory posit an underlying nonlocal, interdependent, entangled information space or field. This theorized subtler-than-the-physical information field could mediate nonlocal interactions underneath the physical chain of cause and effect and the known fundamental forces within light-speed. This might reveal the physical causal chain that appears on ‘coarse-grained’ layers to be closed is not completely closed on ‘finer-grained,’ subtler levels of nature—a possible opening for free will?

In this direction, one of the most challenging lessons of orthodox quantum theory is the necessity to include the conscious observer to account for even the physical world. It represents progress toward a less fragmented view of nature; but major inconsistencies remain.

This section of the paper discusses how a logically consistent quantum theory requires real levels of nature beyond the physical where real minds could exist. Orthodox, many mind-worlds, decoherent objective reduction, Bayesian quantum probability, quantum information field, and neorealist interpretations of quantum theory are briefly overviewed with the intention to highlight progress toward this expanded view. These interpretations are discussed here in order to help build recognition that mind must be phenomenally real in order to connect with real matter and causally influence it via real mental intentions—which is necessary for free will to be real (Boyer, 2012).



## Orthodox Interpretation

In the classical physics of Newton and Einstein, matter particles are represented as mathematical points with no extension in space. But as wave potentials in a conceptual mathematical space in quantum field theory, they have 'infinite extension.' How conceptual imaginary unbounded wave potentials appear as bounded real physical objects is a great mystery. Now called the 'measurement problem,' it is a new version of the old mind-body problem. It concerns the gap between the real objective world of physics in terms of empirical experience and the subjective imaginary world of mathematics in terms of reasoning. Experience and reason are the two primary means to gain knowledge in modern science, which as applied have led to the existentially dead-end view that you are a robot.

In considering how to get from a conceptual, imaginary mathematical quantum wave function to real physical objects, the initial orthodox interpretation associated largely with Bohr, Heisenberg, and Born posited an instantaneous collapse of the quantum wave function in making an observation. But what is this process of observing that can fill in the dualistic subjective-objective gap between an imaginary mathematical model and a real physical object?

Some physicists suggested that the act of making a record—a film recording, needle mark on a scroll, or any automated scoring system—constitutes a measurement or observation. In this view wave function collapse can occur with simply a measuring device making the measurement, without an observer. But would binoculars sitting on a table, a ruler for measuring distance, a clock for measuring time, or a thermostat 'create' wave function collapses on their own? If any event can be 'measured' or 'observed' even if no observer is involved, then how come all events don't 'cause' wave function collapse? Certainly a physical object doesn't gain special power to collapse the wave function just by being identified as a measuring device. And without an observer, what could possibly determine which wave function collapses into what object? Physical measuring devices are non-sentient and cannot 'observe' or 'attend' to anything. Also, a classical physical measuring device already would be 'collapsed,' with no other 'uncollapsed' quantum wave function in it that could collapse upon measurement. Most relevant, if the wave function is an imaginary

mathematical model, where does it exist apart from an observer? What ontological substance or epistemic relational structure is it? And whose imagination would it be anyway?

Analyzing further where wave function collapse might occur, mathematician and theoretical physicist John von Neumann (1932; Herbert, 1985) concluded that the only place it would have to occur is where the chain of events stopped. That is the observer's consciousness. The collapse is said to be needed to get real objects, and there was no other necessary place for it.

But this interpretation needs to be consistent with other notions of the mind in the overall view. The orthodox interpretation is tacitly associated with the view that conscious mind is nothing other than the physical brain, because only the physical exists and there is no other *reality*. Despite voluminous research and fervent assertions of many scientists, however, conscious mind has not been found in the physical brain, and it is increasingly recognized that only its physical correlates are there. In the physicalist worldview, this means subjective conscious mind must be non-existent or epiphenomenal; and without real existence it could not have real causal power. How then could it play any necessary role in quantum wave function collapse? When the orthodox interpretation is considered in the larger context of its tacit view of conscious mind, the implication is that the quantum wave mathematical function—as nothing other than processes in the physical brain because there is no other level of nature that exists—somehow instantaneously 'causes' another classical object to appear in the physical environment. In this light, it is a rather confusing and magical view, in part because it doesn't explicitly acknowledge the reality of mind and consciousness with an actual role in quantum wave function collapse.

Perhaps even more inconsistent in this view is to believe classical objects require wave function collapse upon observation by a conscious observer and also at the same time to believe conscious observers first appeared only much later in the evolution of the physical universe. If quantum wave function collapse upon observation by a conscious observer is necessary to get to classical discrete physical objects, then how could physical objects such as stars, planets, and molecules have existed and interacted classically before physical brains necessary for conscious observers evolved?



Further, *instantaneous* collapse with no possible explanation because there is no additional information in nature due to quantum indeterminism precludes any causal explanation. This contrasts with the pursuit of logical explanations of causal relationships between events that has characterized the entire history of empirical science.

Notwithstanding other concerns, these issues render the orthodox view of instantaneous quantum wave function collapse due to conscious observation quite inadequate. Central to this interpretation of quantum theory was involvement of a conscious observer in somehow bringing classicality to the quantum mechanical description of nature. But ontological implications of this important recognition in order to transition from a conceptual, imaginary mathematical quantum wave function to a real classical discrete object seem not to have been examined.

Another related explanation is that there is only one consciousness in the universe. This view is summarized by physicist Amit Goswami (1988, p.88): “*Quantum collapse is a process of choosing and recognizing by a conscious observer; there is ultimately only one observer.*” This might seem to suggest that any conscious observation collapses the wave function for all observers. If consciousness per se collapses the wave function, then wouldn't all wave functions automatically be collapsed, whether any particular individual observer was involved or not? How could any wave function not collapse?

But there is another important distinction in this view, namely between consciousness per se and specific intentional individual attention. In this view it is not consciousness per se that collapses the probability wave function, but the intentional conscious attention of a particular observer. If an individual observer made an observation and another individual had not, however, how would information of the collapse have been transmitted so the second individual somehow spontaneously knows the discrete outcome of the probabilistic collapse without having observed the outcome?

Still another angle is that it isn't an individual conscious observer or consciousness per se that triggers wave function collapse, but rather some form of ‘nonlocal cosmic observer.’ This suggests that a nonlocal conscious cosmic mind collapses the quantum wave function in

order for physical interactions to occur when an individual conscious observer is not present—necessary for individual observers to have a consistent experiences of discrete physical nature. But this certainly requires a causal ontology far beyond anything reasonably attributable to orthodox quantum theory.

For purposes here, major implications of orthodox interpretations are that nature is not accounted for by the local particle interaction causal model, but rather requires abstract quantized nonlocal wave-field mechanics; and further that conscious mind is necessary in a coherent scientific model of nature. But the reality of quantum waves and conscious minds—as well as instantaneity of wave function collapse and fundamental randomness that both preclude causal explanations—were not addressed enough to be consistent.

### **Many-Worlds Interpretation**

The many-worlds interpretation of quantum theory, and its clarification as many mind-worlds, tried to re-establish *objective* physics by eliminating altogether the subjective concept of quantum wave function collapse involving an observer. This interpretation has been described as a ‘no-collapse’ model, but also sometimes as a literal interpretation of quantum mechanics. It is drawn from initial ideas of Everett (1958), elaborated by Albert, Loewer, Zeh, Lockwood, and others. It is a deeply fragmenting view, and it is inconsistent with continuity across events in nature that has been fundamental to science.

In quantum field theory, the quantum wave function represents all possible states of a ‘potential’ physical object, superposed on each other as mathematical probabilities. In the many-worlds interpretation, rather than collapsing to a discrete physical state, each mathematical possibility branches into its own parallel world. This was said to resolve the measurement problem by eliminating quantum wave function collapse and the role of the process of observing and observer in it. Remarkably, using this irreparably fragmenting view it is sometimes speculated that there is a vast multitude of parallel copies of *you* created with each event (but for better or worse, *you* never get to know the other ones of *you*, or even which one *you* now really are).

Further, this attempt at an *objective* interpretation brings subjectivity even more into the picture. New parallel worlds with new



minds are created automatically, *instantaneously*, out of nothing, with no mechanics for their creation. Rather than actual physical worlds (which would violate the law of conservation of energy, just for one issue), the worlds would need to be mind-worlds in conceptual, imaginary mathematical space. Each observer in his or her own mind-world cannot experience the other parallel worlds, or verify anything as physically real in any of them. No explanation is given of what conscious mind is; and while tacitly using the concept of conscious mind as if it exists, the interpretation doesn't explain how objective reality investigated through empirical physics becomes real. Nature consists of incessantly multiplying imaginary mind-worlds with no explanation of where or how they exist, and no way to find out. It is important to recognize a core inadequacy of this fragmenting interpretation is that it doesn't allow for the sense of continuous identity—the sense of 'I'—in the world-branching. There is no information linking one event to the next to maintain continuity of an observer's experience. There is no way to experience other worlds and not even the same minds across any of them.

For purposes here, the key contributions of this interpretation are that there is no quantum wave function collapse in the manner posited in orthodox interpretations, and that it further indirectly implies that conscious minds are real. But it is a mathematical conjecture dissociated from empirical physics and objective realism—better classified as subjective idealism (and mind-world multiplication rather than reduction). And like in orthodox interpretations, *instantaneous* branching of mind-worlds also precludes causal explanation.

### **Objective Reduction Interpretation Associated with Decoherence**

This next interpretation is sort of in the opposite direction to get rid of wave function collapse, the process of observing, and the observer in order to retain *objective* physics. In this view there is quantum wave collapse in the sense of reduction of possibilities toward discrete outcomes, but it is independent of the process of observing and observer—and thus can be identified as *objective reduction*. It applies the principle of decoherence, according to which wave interference due to quantum coherence is disrupted by environmental influences (Greene, 2004). This decoherent effect breaks down the quantum wave

interference pattern. Quantum wave reduction through decoherence doesn't involve an observer, and would not be instantaneous if it occurs in conventional time and space. A potential grain of ordinary dust interacting with molecules, sunlight, and microwaves in the physical environment would decohere in a fraction of a micro-second (Greene, 2004).

Decoherence has been argued to be consistent with orthodox and many-worlds interpretations (e.g., Zurek, 2011). But in these other interpretations, quantum waves are mathematical probabilities or energy potentials that are not identified as real objects in nature. For objective reduction via decoherence, quantum waves must be real in order to interact with the real physical environment independent of observers. They cannot be just imaginary mathematical wave functions in an epiphenomenal conscious mind that in some inexplicable way bypass the ontological gaps to interact directly with the real physical environment.

Also, decoherence is not consistent with *instantaneous* collapse or *instantaneous* branching of mind-worlds. Objective reduction requires a real place for quantum waves and real interactions with the physical; and in these other interpretations there is no such real place identified where they could possibly exist.

A major dilemma of decoherence models, however, is that if decoherence takes place through the interaction of quantum waves and classical physical objects, then the quantum waves themselves also would need to function in conventional space and time. But on the other hand, if quantum waves have real existence outside of ordinary space and time, such as evidenced by their nonlocality, and also interact with classical objects in conventional local physical space and time, then the link between these real levels—that is, conventional space-time limited to light-speed and the additional unspecified level where nonlocal quantum waves exist—needs to be addressed.

The additional principle of *consistent histories* sometimes associated with decoherence (Smolin, 2001) brings the observer back into the picture, but not via wave function collapse or world-branching. Rather, it is in terms of the continuity of experience across events—crucially missing in the many mind-worlds interpretation and not explicit in orthodox interpretations. The context serves as



a selection process that decoheres or spontaneously narrows down 'objects' to a few quantum possibilities, independent of observers. But further, from the perspective of an observer these processes must be consistent across events in time.

Questions about the world addressed through measurements need to be logically consistent with the answers. This key principle recognizes that consistent experience by a real observer is necessary for an empirical science that involves an experiencing scientist. The consistency must be within an observer, and also between observers for consensual validation basic to *objective* science. But as in classical and quantum views, it tacitly assumes mind is real while also not accounting for how it is real or where it exists. Strangely, the fact that physics and mathematics require real conscious minds of physicists and mathematicians seems ignored once again.

Another way to describe the principle of consistent histories is that the world 'I' get depends on the questions 'I' ask, such as the experimental setups. This directly involves the observer from initial questions to logical answers (Smolin, 2001). Though not directly involved in wave reduction or collapse, an observer must be involved in the process of observing that links questions to answers for *consistent histories*. Decoherence and consistent histories also are consistent with the asymmetric direction to time—arrow of time—and the 2nd law of thermodynamics that nature tends toward entropy, not addressed in the other interpretations.

Of major significance is that context dependence and consistency through change ultimately get back to the initial conditions. The entire history of the universe that gives logical answers to measurement questions needs to be consistent with the initial conditions in order to have a comprehensible world that can be known through empirical investigation. This point suggests that the initial conditions must include all possible consistent answers to questions about nature (Smolin, 2001), and even further that the initial universe was orderly—a profound and crucial implication. It supports Einstein's opposition to the belief in quantum theory that nature is *fundamentally* random; and as discussed soon, it rather is consistent with a unified field model of nature with inherent order.

To summarize, the key implication of decoherence is that quantum waves cannot be just imaginary mathematical quantum *wave functions*, but rather real quantum *waves* that are independent of observers. However, the consistent histories component requires real observers in logically consistent non-random outcomes that match empirical experience, which means that the physical is in some sense mind-dependent, not mind-independent. Most important, it implies that the initial conditions of the universe were fundamentally orderly. Tacit in the classical scientific method as an *objective* approach is consistency within and across subjective observers, but in attempts to remain *objective* these essential points were overlooked or ignored. The next interpretations represent further progress toward a deeper *quantum reality* underlying physical reality.

With respect to objective reduction, it seems appropriate to bring up a model which specifically uses the term, proposed by neurophysiologist Stuart Hameroff and mathematician/cosmologist Sir Roger Penrose. Called the 'Orch-OR' model (Orchestrated Objective Reduction), it combines neurobiology and quantum physics in an attempt to address how consciousness emerges in the brain. The neurobiology aspect concerns where consciousness is generated, theorized to be cytoskeletal microtubules. The physics aspect concerns how it arises, associated with an interpretation of quantum wave function collapse in which microtubule activity '*orchestrates*' or '*tunes*' quantum oscillations. Under special conditions in which a 'quantum system' is isolated from random environmental (decoherent) effects and remains coherent until a threshold is reached, it is theorized to '*self-reduce*' or collapse in a non-random *objective* fashion due to a special interpretation of gravitational processes to account for this view of collapse. It further is said that this process "...creates an instantaneous 'now' conscious event..." (Hameroff & Penrose, 2000, p. 187)."

This model extends a little beyond reductive physicalism via a non-reductive, non-computable 'self-reduction' to a conscious moment. Hameroff and Penrose (2000) have likened this theorized aspect to the 'Platonic Realm'—but for Plato this was a real level of universal thought forms in addition to the physical. They have likened the collapse to a conscious moment, as in Whitehead's notion of an 'occasion of experience,'—a moment of



proto-consciousness. In the sense that it is spontaneous self-reduction when a threshold is reached and not due to conscious observation, it can be described as *objective reduction*. But the proto-conscious moments are said to ‘cascade’ into some kind of conscious experience. How these ‘moments’ bind into a unitary experience of a subjective *experiencer* seems not yet explained (binding problem). Also, how *local* microtubule structures could isolate *nonlocal* ‘quantum processes’ to protect them from decoherent physical influences and causally ‘tune’ them for spontaneous self-reduction also seems not adequately explained—and even if more field-like, still quite a *local* interpretation of *nonlocality*.

We are still far from a real conscious, unitary experiencing self that bridges the subjective/objective gap and consciously directs unitary behavior in top-down causation. Also, conscious mind still doesn’t seem to have real existence that would allow it to input a mental intention into the closed physical causal chain. As Hameroff (2014) recently acknowledged: “The mechanism by which quantum superpositions reduce to classical states (“collapse of the wave function,” “measurement problem”) remains enigmatic.”

### **Bayesian Quantum Probability Interpretation (QBism)**

The interpretation based on Bayesian probability is said to be a fundamental recasting of quantum theory that gives a central role to the probabilistic nature of knowledge, associated with Caves, Fuchs, and Schack. Like orthodox interpretations it emphasizes the wave function as a calculation tool, but unlike orthodox interpretations it doesn’t *objectify* wave function collapse onto the physical. The ‘collapse’ is a change in the subjective knowledge state of the observer, not in the ‘object’ which becomes observed in the physical world. Physicist Christopher Fuchs explains:

When a quantum state collapses, it’s not because anything is happening physically, it’s simply because this little piece of the world called a person has come across some knowledge, and he updates his knowledge.... So the quantum state that’s being changed is just the person’s knowledge of the world, it’s not something existent in the world in and of itself (In Folger, 2001, p.42).

When the quantum wave function mathematical model is superimposed on the objective physical world, it seems to compel the conclusion—at least in orthodox quantum physicists—that instantaneous wave function collapse is needed to get from the mathematical model to objects we ordinarily experience. The inner subjective updating of the knowledge associated with a probability wave function is *objectified* as an ‘instantaneous collapse’ onto the objective world. This is typical of the engrained habit throughout the objective approach of reluctance to examine the reality of conscious mind, which has led to its major paradoxes. In contrast, this new interpretation emphasizes the epistemic view that the wave function is just probabilistic knowledge useful for calculations. The probability wave function represents degrees of belief about the state of nature, updated with new knowledge through observation (Schlosshauer, 2011). It tries to avoid complicating the issues with attempts to identify what is ontologically real, because we may never know anyway. It reflects deeper recognition that our knowledge is subjective and probabilistic. The ‘collapse’ is a reduction of probabilities with new information from observation. From a different angle, it can be viewed as a helpful contribution to disembody objects in the objective world from ideas in the subjective mind of the observer.

This *subjective* interpretation of collapse emphasizes the process of knowing in the observer rather than the known or objects observed. The ‘collapse’ as pertaining to changing knowledge states in the observer, and not the observed, makes it a little more explicit that the observer’s mind is in some sense real, the quantum wave function as probabilistic knowledge in the observer’s mind is in some sense real (but per Fuch’s quote above, apparently not physical), and as well the classical macroscopic world is real. This view is returning to matter-mind duality, but addresses neither the gap between them nor the mind as real. Doesn’t ignoring the reality of mind while using it to question or doubt its existence seem quite irrational? Using a sharper ‘Occam’s Razor,’ shouldn’t we first recognize directly experienced conscious mind as real, before assuming something outside as real? But if mind is real and not just epiphenomenal, then what and where is it if it cannot be located in the physical?



We have now outlined three major interpretations of quantum wave function ‘collapse:’ 1) instantaneous collapse of a mathematical quantum wave function to a real object when observed by a conscious observer (orthodox); 2) collapse as an objective observer-independent reduction of a real quantum wave via decoherence (decoherent reduction); and 3) collapse as simply a change in the subjective knowledge state of the observer from probabilities to discrete knowledge with observations (QBism). We also considered a special interpretation of ‘collapse’ to proto-conscious moments that cascade into some subjective conscious state of an experiencing self of unclear ontological status, whereabouts, and yet apparently with top-down causal power. Although each view makes a useful contribution, the transition from a conceptual, imaginary mathematical probability wave function to a discrete physical object is not explained with adequate consistency in any of these interpretations of quantum wave function collapse or quantum wave reduction.

### Quantum Information Field Interpretation

In pursuit of where conscious mind might exist if not epiphenomenal, non-existent, or physical, further steps toward an underlying *quantum reality* are interpretations that posit a real information space in addition to real physical matter/energy. These interpretations carry forward Wheeler’s (1990) ‘it from bit’ notion that abstract ‘bits’ of information underpin concrete ‘its’ of tangible matter.

Models of an abstract information field that is the underlying basis of conventional space-time are emerging. One such model is loop quantum gravity theory, associated with black hole thermodynamics. In this view, classical physical space is created from topological relationships in a dynamically evolving network of intersecting loops called a spin network, with similarities to Penrose’s twistor theory (Smolin, 2001). Spin networks are described as a *pure geometry* that generates conventional physical space-time, elaborated on by physicist Lee Smolin (2001):

If a surface can be seen as a kind of channel through which information flows from one region of space to another, then the area of the surface is a measure of its capacity to transmit information.... In practice, the greatest amount of

information that may be stored behind a horizon is huge—1066 bits of information per square centimeter. No actual experiment so far comes close to probing this limit. But if we want to describe nature on the Planck scale, we shall certainly run into this limitation, as it allows us to talk about only one bit of information for every four Planck areas.... This new limitation tells us there is an absolute bound to the information available to us about what is contained on the other side of a horizon. It is known as Bekenstein’s bound... (pp.103-105).

This model directly links bits of abstract information and bits of physical space-time in a formal mathematical relationship: Bekenstein’s bound. It is an important additional step of abstraction that almost goes beyond classical local space-time; but it doesn’t quite make it, because it remains within the context of the ordinary local physical space-time metrics of the Planck scale.

Further, in this model the notion of information is *objectified*, like classical matter and energy. In ordinary parlance, information connotes semantic meaning, intention, recognition of significance, and answers to questions about relationships in nature. A real information field that generates conventional space-time is a gigantic step toward real mind. But we don’t yet have a model of mind with subjective meaning and intentions causally affecting the world (though our daily lives and entire society are structured as if we have such power, including the lives and practical admonitions of Einstein and others who apparently didn’t believe in free will).

Continuing to work toward a coherent basis for free will with actual casually efficacious choice in nature, we now progress to a model that posits real mind and a real place for it to exist. Importantly, this model also extends causal determinism beyond the physical, and beyond the other quantum theory interpretations. It posits that nature is determinate, both in our ordinary physical universe and in a subtler real information field underlying it that includes real minds.

### Neorealist Interpretation

As noted earlier, a major concern for Einstein was his doubt about a fundamentally random component or irreducible indeterminacy at the



very heart of nature (Greene, 1999). Relevant experiments conducted beginning in the 1980s based on Bell's Inequality (Herbert, 1985) have verified quantum entanglement: highly correlated behavior of theorized elementary particles after they interact and separate. The key point of quantum entanglement is that particle relationships occur even when the speed of light would have disallowed any causal effects between them. Rather than testing if nature is *fundamentally* random, however, results of these tests were interpreted as demonstrating that the conventional belief in objects interacting only locally within light-speed is inaccurate (Greene, 1999).

The classical view was that all action is a continuous chain of physical events within the local causal nexus of the light cone. In dramatic contrast, experimental tests of Bell's theorem are interpreted as evidence that nonlocal interconnections must be a fundamental feature of nature. Objects are not just localized, as long believed in both Newton's and Einstein's classical models associated with physical realism. These findings also can be interpreted as experimental support for a real background to the space-time gravitational field. The many practical applications of quantum mechanics in recent years further support models positing an underlying *quantum reality*.

The interpretation described now is a major step toward *quantum reality* in addition to physical reality that actually attempts to apply nonlocality in an expanded ontology of levels of nature. But this interpretation does not include quantum wave collapse as due to the process of observing. Rather, it posits a real, nonlocal field that underlies and causally affects physical matter. Associated mostly with mathematician and physicist David Bohm (1981; Bohm & Hiley, 1993), it is sometimes called *neorealism* because it recovers both the fundamental principles of objectivity independent of the observer and of nature as determinate. It can be viewed as a *new realism*, consistent with Einstein's 'hidden variables' notion but not constrained to the physical or to locality as were his theories.

The neorealist interpretation is a mathematical theory (like other interpretations, not worked out in all details) of the motion of particles in which the path of a real, local matter particle is guided by a real but more abstract nonlocal wave. In this interpretation both elementary particles and the underlying waves

are real, which means that orthodox quantum theory is incomplete, as Einstein believed. In further contrast to some orthodox interpretations, elementary particles are real whether measured or not (in other words, a tree falling in the forest creates a sound whether or not anyone is there to hear it). Their dynamic attributes of motion are guided in part by a nonlocal guiding wave, sometimes called the *psi wave*. To match the behavior of objects according to quantum probability predictions, the psi wave must be connected to every particle in the universe, classically invisible, in some sense faster than light-speed, and common in nature (Bohm, 1980)—a highly interdependent, more integrated medium or field of nature than the physical level. The psi wave carries 'active information' that reflects the totality of the experimental arrangement (Bohm, 1980). The path of a particle is influenced by the physical forces in their environmental contexts, and also by the 'active' information of the nonlocal psi wave subtler than and permeating the physical.

The conscious observer is brought back into the picture via the psi wave as an intentional influence in an underlying nonlocal field that includes mind. This nonlocal field including nonlocal mind is in the brain in the sense of permeating and causally influencing it. But it is both smaller than (permeating) and bigger than (encompassing) the entire physical universe. In other words, gross real *matterstuff* is embedded in subtle real *mindstuff*. For the first time in modern science, this allows at least a logically consistent model of how your brain and arm, for example, actually could be guided by your mind (that is, a mind which is not epiphenomenal, and not physical).

However, nonlocal mind as subtler than and permeating the brain does not mean something like group mind with no individuality. As an analogy, an individual molecule of water is 'localized' as part of a less localized wave of water; or an individual wave of water is 'localized' as part of the much less 'localized' expanse of the ocean. But further, the texture of the nonlocal medium underlying and permeating the physical has both more specificity and more interdependence *at the same time*. It has substance as an ontologically real medium and also epistemologically real structural relations, with individualized fluctuations or waves that interact in a much more abstract and subtle way than any object in our physical world modeled as built of local



particles interacting via the known fundamental forces within light-speed.

In this neorealist interpretation, the gross surface classical physical level is the *explicate* order. It is the familiar world of local interactions of the known fundamental forces within light-speed and the billiard ball/particle interaction model of causality, dominated by the appearance of independent discrete objects. The subtler *implicate* order is a highly interconnected, entangled, enfolded nonlocal field of much more abstract wave impulses (Bohm, 1980; Bohm & Hiley, 1993). Action in this subtler field can cause motion in physical space-time by mental intentions of individual conscious minds. Further, both the finite gross level (*explicate* order) and the finite subtle level (*implicate* order) exist in the infinite universal plenum (*super-implicate* order).

The major contributions of this interpretation are an expanded ontological model with three levels, unifying the levels into a single wholeness that actually applies nonlocality, and identifying a real level of nonlocal quantum mind with causal dynamics that link it to matter. However, like all the other interpretations, it conflates mind and consciousness. It does not clearly associate the super-implicate order with consciousness itself in addition to the level of nonlocal mind, an important stage in the completely holistic Vedic account discussed soon.

### Levels of Space-Time

The notion of subtlety generally refers to being more refined or delicate. It also connotes a quality of being less tangible, less concrete, less rigid—sort of a gradient of perceptual abstraction. For example, we can say that water is in some sense subtler than earth (dirt, rocks), fire subtler than water, air subtler than fire, and space subtler than air. Space is the subtlest because it permeates the others. Increasing subtlety also can be associated with smaller time and distance scales. For another example, there are finer-grained layers such as cells, molecules, chemicals, elements, atomic particles, and sub-atomic particles. This can be taken all the way down to the Planck scale, held to be the smallest possible time and distance scale of any physical object. But all of these layers can be said to be on the same ontological level of nature, the gross physical level, because they are *localized* in the sense of restricted by light-speed, relativistic gravity, Planck-size

quantization, and generally the model of particle-interaction causality.

The ‘subtle level’ (*implicate* order) in contrast to the ‘gross level’ (*explicate* order) is a more abstract, more interdependent, *nonlocal* level. It is not characterized by the particle interaction model of causality, Planck-scale quantization, and classical relativistic gravity. Whereas physical space used to be thought of as empty, now it can be understood as containing and comprising everything in the gross physical universe, extending general relativity theory in classical physics. In turn the subtle nonlocal level encompasses the gross local level, a key point embedded in quantum physics. And in turn these levels are encompassed in the universal plenum or super-implicate order, a key recognition emerging in unified field physics.

For another analogy, the entire physical universe can be likened to an iceberg world in an ocean. The iceberg world (gross, local, physical, *explicate* order) has emergent phenomena in it, but they are all local. This gross level is influenced by the subtler flowing waves and currents (nonlocal, nonphysical, *implicate* order), ultimately within the unbounded (infinite eternal super-implicate order) expanse of the ocean (unified field). The gross iceberg world and subtler nonphysical wave world both exist in the ocean of water (in this analogy, all are states of H<sub>2</sub>O).

Identifying a subtle, entangled, nonlocal fabric or medium of nature contributes to the understanding of space-time in terms of different levels of existence. The gross *explicate* level is our familiar space and time with relative object independence. The subtle *implicate* level is not as limited, but still finite and relative, phenomenally with both object independence and interdependence. Defining the limits of this non-physical, nonlocal field involves developing subtler means to probe beyond the tiniest time and distance scale of the physical—the Planck scale. It also requires additional dimensions and ‘metrics’ for interdependence or entanglement. Most important, it requires more direct means to gain knowledge than the objective, indirect third-person experimental methods in ordinary conventional time and space that have characterized modern science.

Many physicists assume that space and time break down at the Planck scale. But an expanded model of levels beyond the physical



would mean that just ordinary conventional notions of space-time break down. Our knowledge is expanding to deeper, more integrated views that include a more abstract but real nonlocal space-time field not accountable for within classical notions of distance and duration.

Similar to the important recognition of the relativistic space-time gravitational field as a medium comprising everything in the physical universe (emerging in supergravity theory), there is a subtler medium with its own fabric of nonlocal space-time, more fundamental than the gross medium of the physical universe. Again, this nonlocal field permeates conventional space-time: subtler concentric fields encompass and permeate grosser fields. The fragmented gross physical model of independent objects is a more limited sub-set of the subtle interdependent level, both emerging from the universal plenum or self-interacting infinite (space), eternal (time) unified field.

This view is consistent with the completely holistic 3-in-1 Vedic account, enumerated in the Sankhya Darshana discussed soon. (It also is discussed in the related Vedic model of *koshas* or sheathes that progressively objectify subjective and objective levels of nature, such as e.g., in Boyer, 2008; 2012.) Again, the intention of this part of the paper is to summarize scientific progress toward a logically consistent model of nature that is rich enough to include free will as real.

### Nonlocal Causality

Correspondingly, an expanded *nonlocal* causal model is needed to describe the dynamics of the subtle medium of nonlocal space-time. Causal events are wave-like, more spread out and less discrete in space and time than in local billiard ball/particle interaction models. The underlying subtle field of nonlocal mind can be viewed as individualized in the sense of waves, vibrations or pulsations, but not as particles that are subject only to local particle interaction causality. Real mental intentions affect local physical matter via *nonlocal causal waves* of mental intentions not composed of particles or Planck-size units of physical space-time (Boyer, 2008; 2013).

Although we ordinarily sense events in the physical as discrete in space and time, we may also have some intuitive sense of the unseen converging precedents that shape the

events. We further may have some sense of the continuing aftereffects of perceived discrete events that shape subsequent processes and events—a richer view of interdependence, entanglement, or ‘synchronicity’ both spatially and temporally than surface discrete local sensory experience. The nonlocal causal wave model means there is ‘active’ information in the nonlocal interdependent medium that precedes and shapes upcoming discrete local events. Ordinary discrete local events with particle interaction causal mechanics are embedded in a larger, subtler field of nonlocal causal dynamics—which we might be able to attune to with more refined perceptual functioning. This may be at least a little more tangible in such phenomena as presentiment or precognitive processes.

Presentiment relates to anticipatory responses to a local event prior to decisions that select the event, presumably based on subtle nonlocal information not apparent in the physical causal chain. It can be likened to the spreading out of space-time dilation in relativity theory as light-speed is approached (Radin & Borges, 2009).

To tie this expanded ontological model to our own experience, perceptions match the medium from which objects in it are built. Our ordinary sensory attributions of events in physical space-time correspond to limitations of the gross explicate level of nature and linear causality. Not only do objects and events change at the subtle implicate level but also space-time, objects and events, and experiences of them match this more abstract subtler medium. If the mind is subtler than the physical, then a subtler, more direct first-person experiential method than the gross, indirect third-person experimental method is needed to address the foundational issues of determinism and probabilism. This calls for an expansion of scientific epistemology, discussed soon in the context of the Vedic epistemology of Yoga.

The view in physical realism is that there is no place for real mind and no ability to insert into the closed causal chain a mental intention to change nature. This view is also closely identified with the belief that conscious minds somehow randomly happened to evolve as epiphenomena of the physical brain, with non-random instincts for survival (but no purpose to survive), emerging in the physical from random quantum field potentials. Ultimately all this emerged in a big bang from *literally nothing*.



Hopefully inconsistencies in this view are becoming clearer, and the next sections further point to some of the biggest ones.

### **Reductive Big Bang Cosmology vs Holistic Unified Field Theory**

One strategy to help understand the ultimate unified origin of nature is to think back in time to events immediately following the theorized big bang. In recent decades a major focus has been to model earlier stages of the emerging universe toward the initial conditions and initial cause. This involves unification of the theorized fundamental forces, aided by the mathematical principle of symmetry. In this view the emerging universe broke from its unified potential state through spontaneous sequential symmetry breaking into the fundamental force fields. This process is theorized to have occurred spontaneously as the extreme levels of energy and temperature dropped, after the universe hyper-inflated.

The mathematical principle of symmetry has been important for developing theories that posit how—at about  $10^{-16}$  cm—the electromagnetic and weak nuclear forces unify into the electroweak force. This level is electroweak unification, and it relates to the Standard Model. Current interpretations of research on the Higgs particle is providing additional experimental support for this model. There is also some evidence that at even higher energy and smaller scales—about  $10^{-27}$  cm—the electroweak and strong nuclear forces unify into the strong-electroweak force, Grand Unification. This purportedly brings everything down to two fundamental forces.

The principle of super-symmetry emerging in the 1970s supported theories attempting to unify matter particles and exchange or force particles, a major step toward unifying the remaining two forces (strong-electroweak and gravity). It requires that super-symmetric partners with matching opposite properties be found for all the 'known particles.' This is in addition to the particle symmetry of dark matter proposed to explain how galaxies hold together, which requires more matter than appears to be available in the 'visible' universe. The additional concept of dark energy was proposed in part to explain evidence that the universe hyper-inflated. However, symmetric and super-symmetric partners of the 'known particles' are yet to be found in current research efforts. Another way to say this is that relativity

theory and quantum theory still need to be unified in a theory of quantum gravity.

Einstein's theories of relativity allow for the universe either to expand continually, or expand and then shrink. The estimated total mass/energy of all visible objects such as stars, planets, and nebulae fits an expansion model. However, the latest cosmological models suggest that the universe is starting to shrink, or might have cyclic expansions and collapses over vast eons of time—closer to the ancient Vedic account.

Obviously the big bang could not start from a certain spot in space and time if space-time didn't exist *before* it. In the reductive view associated with inflationary big bang theory, everything emerged spontaneously with no precedents from *nothing*. But *literally* nothing means no potential for anything; no energy or temperature *at all*, and no quantum fields to fluctuate randomly and eventually cause a 'big bang.' Importantly, in unified field theory consistent with ancient holistic views, everything started from the all-encompassing, super-symmetric unified field. The universe could not have 'blasted out' in a big bang, because everything remains in it. All things, including finite space-time, remain in the infinite eternal source and container of everything. Though so abstract as to seem like nothing, the unified field would be something; indeed, it would be everything. We might call it *nothingness* because from the perspective of our ordinary phenomenal world it transcends all finite things, but it would not be *literally nothing*. The unified field would be the initial cause of all change, beyond cause and effect. The only way out of the causal chain would be somehow to go beyond to its source and our source in the all-encompassing unified field.

Recognizing that the fragmented one-level (physical monism) and the two-level (physical and unified field) ontologies don't yet account for real mind is leading to three-level ontologies. The additional level is placed in-between the physical and the unified field, and is where real subjective minds could exist. Recent quantum theory interpretations just described reflect progress toward this expanded ontology. The subtle level underlying and permeating the gross physical level is thought to be determinate (not indeterminate and random); nonlocal (not just local); wave-like (not just particle-like); includes mind as *real* (not epiphenomenal); includes mind as subtler



than matter (not emerging as a product of the brain); includes mind as causally efficacious (we are not robots); and includes nature as both subjective and objective (not subjectivity independent of objectivity in irreconcilable dualism with no causal links for mind over matter).

### **Emergence Theories and Ontologically Real Levels of Nature**

Examining these issues from a different angle, reductive physicalism relates to what is sometimes called epistemological emergence. This refers to higher-order emergent properties being reducible to and caused entirely by their lower-order bottom-line physical constituents—even though it may be quite hard to derive them. The emergent properties do not have real causal power over the parts from which they emerge, being entirely due to the parts. This is consistent with the view that conscious mind *supervenies* on brain biology, which would mean that mind is fundamentally non-existent and has no causal power, such as in *eliminativist* theories in cognitive science, as well as modern science generally.

A primary body of evidence to support this view is that specific cognitive functions are lost when their corresponding neural correlates are damaged or anesthetized. But the evidence has been over-extrapolated to conclude that higher-order mental functions are thus products of lower-order physical processes. It doesn't eliminate the possibility that the connection between them is broken and the higher-order functions are just no longer accessible through the physical body. This is exemplified in the well-known analogy that destroying a radio doesn't destroy the transmitter and signal, though the signal can no longer be heard via the radio. A similar rationale is applied in cutting edge research on deeper ontological levels of nature. Physical research has not found mind in or as a product of the brain; and now deeper, more integrative quantum field explanations are being vigorously investigated. This suggests that the bottom-line of the physical is non-physical, and conscious mind doesn't emerge from the physical.

Starting to 'fudge' a bit on the physicalist worldview, in recent years an alternative to epistemological emergence sometimes called ontological emergence has become popular in scientific accounts. It refers to properties emerging into a super-ordinate unitary whole

not completely reducible to its underlying parts or their relationships, while also attributing to it causal power to direct the underlying parts. In this meaning of emergence, the non-reductive whole emerging from the parts is more than the sum of the parts and somehow can control lower-order physical parts.

But the emergent whole is not attributed independent real existence apart from the underlying collection of physical parts said to generate it. In this view the higher-order whole of unitary conscious mind has just epiphenomenal status. It thus seems to be a misnomer, because no real emergent ontology is posited. It is an attempt to account for a real, causally efficacious role for conscious mind within reductive physicalist monism. But it is logically inconsistent because the causal chain that creates the emergent whole has no breaks in it to insert a new causal influence. It is not *ontologically real* emergence because no new and real level where the whole might exist is created. Rather, it could be called *epiphenomenal* emergence—again, with no real mind, no real causal power, and no free will.

The emergent whole can be said to be greater than the sum of its parts in the sense that new capabilities and behaviors emerge from increasing complexity and integration of the parts. But this doesn't mean that a complex collection of interconnected parts creates a higher-order ontologically real level of nature in addition to the physical that could have super-ordinate, top-down power to direct behavior of a unitary organism (again, the 'binding problem'). Regarding brain function, neural complexity allows new behaviors; but no new level of nature with causal power over brain and behavior emerges inside or outside of neurons.

In the physical, the collected whole influences the parts via the same mechanics through which the parts influence each other. For a global influence of the whole directly on each part, or for each part to influence directly the whole, physical connections between them are necessary in a causally closed physical network. Complexity increases rapidly with more integration between the parts of a physical system. At some point smaller time and distance scales or finer-graining of lower-order parts is needed to implement interaction between all parts of the system. This is the current direction in building microstructures that allow more powerful computational functions in information science, such as nano-



technologies, potentially enhanced by more interconnected holographic systems. But real causally efficacious conscious minds that can direct unitary organismic behavior don't magically appear with increasing physical complexity and interaction at finer-grained time and distance scales.

For concrete analogies, the conception of several mountains as a mountain range doesn't empower the mountain range to control each mountain in it. A forest similarly doesn't control the trees in it, though the collection has ecological effects in addition to each tree. Four hands from two different individuals may allow greater breadth and efficiency of task performance, but don't automatically create a real third mind. Correspondingly, a network of computers can increase capacity for problem solving, but no super-ordinate conscious mind—physical or non-physical—is created. Importantly, in this view the Internet is not, and does not create, an ontologically real mind.

In information field theory noted earlier, and the even more integrating theories overviewed next, models are being proposed of levels beyond the physical that include real nonlocal minds, which logically could cause changes in the physical causal chain. But this requires that the physical causal chain be open; it just has not looked open from the gross, coarser-grained physical perspective within the limitations of physical measurement processes.

These cutting edge theories relate to a third meaning of emergence, consistent with a holistic unified field-based perspective as the orderly source of everything in nature—especially the completely holistic ancient Vedic account. In this meaning the whole precedes the parts, and the parts emerge as limitations of the whole. Instead of the reductive physicalist worldview that consciousness and mind are epiphenomenal and fundamentally non-existent, they are the basis of matter and direct its expressions all along. Non-physical mind underlies physical parts and intentionally guides unitary physical behavior at every stage. Recent progress in *quantum biology* reflects the continuing pursuit of causal mechanisms in the direction of more abstract nonlocal field dynamics underlying and subtler than concrete local physical mechanics.

This third meaning of emergence relates to the *consciousness→mind→matter* model, opposite of the *matter→mind→consciousness*

model of physical monism in which conscious mind is an epiphenomenon of the brain. This third view is the only theory of emergence that logically supports the causal power of mental intentions. And it means that the physical causal nexus is not completely closed as it appears to be on the grosser physical level (explicate order). This holistic, unified field-based understanding of emergence refers to detailed and diverse expressions of capabilities already inherent in the whole. The ultimate wholeness is the unified field as the bottom-line source of order in nature. This type of what could be called *phenomenal emergence* is more consistent with ancient views, including Plato's model as well as the ancient holistic Vedic account to be discussed once additional progress beyond the physical is overviewed.

These more advanced but more abstract theories extend into an underlying background to the physical relativistic space-time gravitational field. In other words, the field of relativistic space-time emerges from an even subtler substance, medium, or field. The theories include more expansive conceptions of space-time, in which nonlocal mind with thoughts and feelings really does exist, toward a coherent theory of the infinite space and eternal time of the unified field which condenses to finite subtle nonlocal and then to finite gross local levels of space-time.

We will now discuss how the model of nature as fundamentally orderly and non-random is consistent with emerging unified field theory, as well as ancient models of unity. Long-standing gaps between modern and ancient views, matter and mind, reductivism and holism, and science and spirituality are beginning to be bridged via this expanded ontology (Boyer, 2008). This is getting us closer to a real way out.

### Three-Level Ontological Models

As described earlier, the neorealist interpretation identifies the concrete local explicate order as permeated by and generated from the subtler nonlocal implicate order; and both levels exist within the ultimate universal plenum or super-implicate order (Bohm, 1981; Bohm & Hiley, 1993). Thus the neorealist interpretation is a non-dual or monistic account with three interconnected and concentric levels: physical reality (explicate order), quantum reality (part of the implicate order), and their source in the unified field (super-implicate



order). This three-level model has some correspondence with a model by Penrose. In the context of a discussion of mathematical forms associated with a *Platonic realm* in nature, Penrose (2005, p. 17, 22- 23) also outlines a model with three realms or worlds:

I have schematically indicated all of these three forms of existence—the physical, the mental, and the Platonic mathematical—as entities belonging to three separate ‘worlds’.... There may be a sense in which the three worlds are not separate at all, but merely reflect, individually, aspects of a deeper truth about the world as a whole of which we have little conception at the present time.

Another recent model that appears to have three real forms of existence has been outlined by physicist Henry Stapp (2000, 2007). In the following quotes about quantum wave function collapse, three real forms of existence are used to explain how objective and subjective aspects of nature might interact. Stapp (2000, p. 213) states that consciousness is needed in wave function collapse because:

...the local-reductionistic laws of physics, regarded as a causal description of nature, are incomplete.... The physical part of reality represents merely the possibilities for an actual experience, not the actually experienced reality itself.

[F]rom the purely physical standpoint the [wave function] collapse seems to come from nowhere, as an unpredictable and undetermined ‘bolt from the blue.’ Something is needed to...bring ‘classicality’ into the dynamics, and it needs a ‘cause’ for the collapse, and it needs a reality to complement the ‘potentia’... It must be something that exists, and the only thing that we know exists, besides the physical part of reality...is the experiential part... (p. 212).

This model includes physical reality, experiential reality, and all-possibility Hilbert space. The concept of all-possibility Hilbert space as used in Stapp’s model has some similarity with the universal plenum (super-implicate order) in Bohm’s neorealist interpretation of quantum theory. It further has similarities with Penrose’s use of the ‘Platonic realm’ in his statement just quoted. These three-aspect models also have some correspondence with the unified field as the

source and container of everything, local and nonlocal.

Another model with three levels, by unified field theorist John Hagelin (1987, 1989), applies further the abstract mathematical *Lagrangian* formulation. It also associates the unified quantum field with Hilbert space, a complex vector space of infinite dimensions that comprises all states of a quantum mechanical system. Hagelin uses this formulation to present a unified theory that more explicitly includes principles identifiable with the concepts of the knower or observer and the process of knowing—not just the known as in classical physics. The *knower* or observer quality of the field is interpreted as the property of the Hilbert *space* of states to be a non-changing, unmanifest background for all possible unitary transformations or states of the field, while itself remaining completely unchanged. The *process of knowing* quality of the field is related to quantum mechanical *observables* that serve as quantum mechanical operators in Hilbert space, generating changes of one state into another in unitary transformations. The *known* is interpreted as the stable quantum mechanical *states* themselves. Importantly, this model goes beyond classical and quantum theories in the sense that it more explicitly incorporates in mathematical terms the knower or observer and process of knowing or observing along with the known or observed—not just the observed as in physical realism. It leads directly to the completely holistic 3-in-1 model described by Vedic proponent and educator Maharishi Mahesh Yogi in his fundamental re-clarification of the ancient Vedic tradition of knowledge as *Maharishi Vedic Science and Technology*.

### **The Completely Holistic Vedic 3-in-1 Model**

Vedic literature has long focused on the ultimate unity of matter, mind, and consciousness. In contemporary terms, it can be interpreted as including 1) the ordinary finite, local physical level of classical physics; 2) the subtle finite, nonlocal, nonphysical level including mind that is beginning to be identified in some aspects of quantum physics; and 3) the transcendent source of everything in unified field physics, within which are the other two levels—the completely holistic Vedic 3-in-1 account. This quote of Maharishi (1963) summarizes the three levels:



“Certainly, in his attempts to scientifically establish the unified field theory, Einstein seems to have been clearly aware of the possibility of one ultimate basis of all diversity.... If and when physical science arrives at what Einstein was trying to pinpoint by his unified field theory, one element will be established as the basis of all relative creation.... It may be given a different name but the content will establish the principle of unity in the midst of diversity.... The discovery of the field of this one basis of material existence will mark the ultimate achievement in the history of development of physical science. This will serve to turn the world of physical science to the science of mental phenomena. Theories of mind, intellect, and ego will supersede the findings of physical science. At the ultimate or the extreme limit of investigation into the nature of reality in the field of the mind will eventually be located the state of pure consciousness, the field of the transcendental nature lying beyond all relative existence of material and mental values of life.... The Science of Being transcends the science of mind which in its turn transcends the science of matter which, again, in turn, transcends the diversity of material existence.... Everything in the universe is of a relative order, but the truth is that eternal Being, the ultimate life principle of unmanifested nature, is expressing itself in different forms and maintaining the status quo of all that exists. The absolute and relative existence are the two aspects of eternal Being; It is both absolute and relative (pp. 32-33).”

The aspect of Vedic literature of *Sankhya* further enumerates levels in the Vedic 3-in-1 account. The gross physical level is made up of five constituents reflecting fundamental dynamic principles—sometimes simplistically translated as earth, water, fire, air, and space (*mahabhutas*). These five constituents likely will be shown in future research to have a direct correspondence with the fundamental force fields identified in the physical level of nature (Hagelin, 1989; Boyer, 2008; 2012).

The physical level extends from the tiniest bit of space-time at the Planck scale to galactic clusters and the vast expanse of the entire

physical universe (range of the *mahabhutas*). The subtle non-physical level is much vaster, but still finite. It also includes five even more abstract qualities (*tanmatras*) that can be described as subtler versions of the five gross constituents, along with levels of mind. The gross physical body (*mahabhutas* level) connects with a *subtle nonphysical body* made of the five subtle qualities (*tanmatras*), which through the senses (*indriyas*) connect to the even subtler levels of mind (*manas*, *ahamkara*, *mahat*). These levels of mind connect to the infinite unified field (*Prakriti*), which ultimately is consciousness itself or transcendent universal Being (*Purusha*) (Maharishi Mahesh Yogi, 1967). These terms from Sankhya include subtler-than-matter levels of nature. Causal relations extend into the subtler levels and directly relate to the power of mental intention to initiate and direct action. These intentional causal influences are virtually undetectable using only the grosser objective, third-person experimental methodology that has characterized modern science.

### **What about Neurobiological Evidence against Free Will?**

It may be helpful here to discuss briefly neurobiological research frequently interpreted as strong evidence against free will—within reductive physicalism. For example, neuropsychologist Benjamin Libet’s milestone EEG research in the 1980s has been interpreted as showing that the beginning of the readiness potential for physical action occurs about a half second prior to the conscious decision to take action (Koch, 2012; Pykkanen, 2013). This and other related research support the thesis that the body acts prior to the conscious intention or will to choose action, as interpreted in physicalism. Also, direct electrical stimulation of particular brain areas can produce reports of intentional feelings to take action such as a hand movement (Koch, 2012).

In the physicalist view of the local chain of cause and effect, all conscious mental activity has to be preceded by (and nothing other than) local physical processes in the brain/body. The entire species-specific genetic histories, as well as the entire behavioral learning history of the individual, precede a particular action and can be said to determine the action. The brain/body can be said to be hard-wired for certain behaviors, especially when directly related to survival. In reflexive action to a perceived



survival threat, the body certainly would move as fast as it can, even prior to reported conscious experience in humans as currently understood. How could there be conscious free will if neural signals to act occur before conscious decisions to act; or, as in other research, if outside brain stimulation causes feelings attributable to conscious intention?

However, it is generally understood that reflexive survival mechanisms can be overridden. The complex hierarchical system of unitary organismic behavior extends from subordinate, lower-order, instinctual reflexive processes to super-ordinate, higher-order cognitive processes associated with sentience and conscious decisions. The human biological system has considerable neuroplasticity and potential for adaptation to deal with new threats from changing living conditions within the general instinct for survival. Indeed, it further seems to have the flexibility for action not in the cause of only biological survival as commonly interpreted.

The key point here is that evidence for neurophysiological processes preceding apparent conscious intentions doesn't necessarily mean they cause the intentions. Extensive psychological research using many different experimental strategies supports a top-down model in which at least humans have intentions that in some instances might be viewed as even more important than biological survival. These intentional impulses supersede and can override reflexive survival instincts, such as when an individual risks life to protect another from harm. And there seems to be no evidence longer-term conscious intentions with sustained motivation associated with the power of will—such as to become a mathematician or ballet dancer—can be produced entirely by electrode stimulation of the brain.

As specific examples of alternative research suggesting mind over matter, Schwartz and Begley (2002) summarize a series of empirical studies on attentional processes in which two human faces and two houses were presented at the same time, and subjects were cued to take note either of the faces or houses. Even though the four stimuli were exposed to sensory receptors and the visual system, directed attention toward a face increased activation of the specialized cortical area for face recognition. The functioning of the face recognition cortical area was not fully determined by the stimulus input, but also

depended on the allocation of voluntary attentional resources via mental intentions. Similar results occur when invoking a memory of a face, without external stimulus input. They interpret such studies to suggest that top-down mental attention can control sensory processing and contribute to the experienced perception, in addition to bottom-up sensory input:

“Since attention is generally considered an internally generated state, it seems that neuroscience has tiptoed up to a conclusion that would be right at home in the canon of some of the Eastern philosophies: introspection, willed attention, subjective state—pick your favorite description of an internal mental state—can redraw the contours of the mind, and in so doing can rewire the circuits of the brain, for it is attention that makes neuroplasticity possible. The role of attention throws into stark relief the power of mind over brain, for it is a mental state (attention) that has the ability to direct neuroplasticity.” (p. 339)

“The mind creates the brain. We have the ability to bring will and thus attention to bear on a single nascent possibility struggling to be born in the brain, and thus to turn that possibility into actuality and action. The causal efficacy of attention and will offers hope of healing the rift, opened by Cartesian dualism, between science and moral philosophy. It is time to explore the closing of this divide, and the meaning that it has for the way we live our lives.” (p. 364)

Another approach includes the extensive research program of psychologist Dean Radin and the work of Marilyn Schlitz and other colleagues associated with the Institute for Noetic Sciences. The considerable body of research accumulated in this area from these and related research programs indicates that the findings are small but robust, and don't disappear even with attempts to debunk them.

One interesting example is the investigation of *presentiment*, the anticipatory sense of future events. Studies on this topic appear to document the ability to anticipate and respond differentially to particular emotionally-charged compared to non-charged or 'calm' stimuli, indicated through measures such as pupil dilation and other eye movements. The important point is that the anticipatory



responses show up *even before* random selection of and presentation of an emotional picture is made. The effects have been found with unselected volunteers using standard picture sets, controlling for sensory and statistical cues as well as other ordinary information gathering methods about upcoming events (Radin & Borges, 2009).

Another example of a body of findings that has advanced to be worthy of consideration is the research on near-death experiences (NDEs) and out-of-body experiences (OBEs). Research on NDEs has accumulated from several prominent laboratories, including work of Sam Parnia and colleagues at the Horizon Research Foundation ([www.wholescience.net](http://www.wholescience.net)), Pim van Lommel and colleagues at the Division of Cardiology, Hospital Rijnstate, Arnhem, Netherlands (van Lommel, 2010) and Jeffrey and Jody Long at the Near Death Experience Research Foundation (Long, 2010).

A large-scale research initiative called AWARE is now underway as part of the Human Consciousness Project, a multidisciplinary investigation of the consciousness-brain relationship, attempting to examine rigorously the phenomenon of mind over matter ([www.mindbodysymposium.com/Human-Consciousness-Project/](http://www.mindbodysymposium.com/Human-Consciousness-Project/)). A major focus of this research is clinical death/resuscitation and related NDEs. This research is now employing carefully designed protocols with advanced neuroimaging and other measurement tools. In clinical death the heart, lungs, and brain stop functioning. About 10-20 % of individuals undergoing this state who later are resuscitated have reported in detail on events documented to have occurred during the state and that reasonably are understood to require conscious perception, memory, and mentation. These projects reflect growing interest and legitimacy of scientific investigations on mind over matter.

A more practical approach is reflected in the growing body of research supporting the hypothesis that a mental technology must be quite fundamental in order to produce the wide range of physical and social benefits found, for example, in studies on the Transcendental Meditation (TM)® program (Dillbeck, 2011; Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Programme—Collected Papers, Vols. 1-5, 1977-90). These findings include improved performance on a wide range of measures of intelligence and academic performance,

cognitive and memory processes, sensorimotor coordination and other physical behaviors as well as social skills; and also improved health as evidenced by healthcare utilization (Orme-Johnson & Barnes, 2013; Barnes & Orme-Johnson, 2012; Orme-Johnson, 2008; 1997; 1987). This research is corroborated generally by voluminous research in mind-body medicine and preventive healthcare.

The point here is that the mental practices precede behavioral changes (certainly changes in physical behavior have not been shown to compel individuals to engage in the mental practices). Though by themselves not definitive with respect to causal relations of mind over matter, the research is consistent with this thesis. These findings in the field of the development of human potential provide a link to views of higher states of consciousness and empirical means to validate the reality of free will in the ancient Vedic account now discussed.

But if nature is deterministic even if only probabilistically determinable, the issue of how a free choice is possible has not yet been resolved. Extending nature beyond the physical, and extending causality beyond local particle mechanics to nonlocal wave dynamics, and including real causally efficacious conscious minds, we still don't have a way out of this now gross and subtle causal chain. The need remains to provide a rational explanation of free will and actual freedom of intentional choice in this expanded deterministic three-level ontology of the gross, the subtle, and the transcendent unified field. But at least we now have a model with real minds that could causally influence real matter. In case we do have free will, we need a logically consistent model of how our choices can make a real difference in the world.

## Experiencing Free Will

*The only way out is in (Jarvis, 1972).*

To summarize in preparation for taking another approach, the current belief in mainstream science is that the mind is an epiphenomenal emergence of the physical brain/body, with no power to alter the causal chain. However, the causal chain is interpreted only in terms of local physical processes; and now nonlocal, non-physical processes are beginning to be recognized. In this expanded ontology, change in the physical could be guided by a subtle,



underlying real mental level. Because this mental level is theorized to be nonlocal and more interdependent, it is even more evident that the factors determining outcomes might well be only probabilistically calculable. Determinism would apply; and probabilism would also apply due to unfathomable complexity, but not *fundamental* randomness. The unified field as a field of inherent order that is not *fundamentally* random is consistent with the completely holistic Vedic 3-in-1 account.

Free will is an empirical, experiential issue that directly concerns how we gain and apply knowledge. To make the discussion personally meaningful to our own experience, we will add to the indirect objective approach discussed so far in this paper a perspective that emphasizes the direct subjective approach in the epistemology of Yoga (Maharishi, 1967).

In this Vedic approach matter, mind, and consciousness can be viewed as *phenomenally real* levels. Gross and subtle levels are encompassed by mind; mind is encompassed by the unified field of consciousness, universal Being. Individual consciousness is based in universal consciousness, directly accessed via the systematic subjective means of gaining knowledge in Yoga. As we will see, this actually gives us a way out of the gross and subtle determinate causal chain, by virtue of a holistic understanding of nature rich enough for a rational, logically consistent account of free will.

On the personally meaningful inner experiential level, we experience a free choice when the decision is not thrust upon us from outside. The external context constrains the options available, as does the internal context. Both external and internal contexts theoretically can be traced back in a continuous chain of causes and effects. Where *I* am now is determined to a large degree by where *I* was a moment ago, earlier today, yesterday, by *my* birth, *my* parents, their parents, ancestors, and so on. What *I* experience as options in a free choice is also influenced by *my* intelligence, education, past experiences, state of mind, what *I* have eaten, how rested *I* am, and so on. What *I* choose is linked to *my* personal history in an unbroken causal chain of the entire history of the universe, gross and subtle, objective and subjective.

If all these precedents were taken into account, the degrees of freedom for a free choice would be narrowed down considerably.

They would include everything *I* could think of at the time, as well as everything else contributing to who, what, and where *I* am—including both local particle mechanics and nonlocal wave dynamics. Even if *I* were able to include everything from *my* personal past, on what basis would the choice *I* make be consistent or inconsistent with it? If *I* feel it is inevitably consistent, then where is the freedom if *I* end up having to choose in a manner that is completely destined by my past? If *I* feel it is inconsistent, then am *I* in a dysfunctional state and unable to make a free choice, in which case again the choice was not freely made by *me*?

Perhaps it would all come down to an almost inevitable choice consistent with *my* history, with the last bit or degree of freedom a random quantum jitter. It might then be free in the sense of not completely determined, but it would not be a choice that *I* freely make. *I* have the inner sense that *I* can choose to submit to random chance; but it is not accompanied by the sense that *I am choosing* the specific outcome that results from randomness. There is a difference in *my* inner experience of random chance versus free will. In free will, *I* have the inner sense of choosing or deciding the particular action to take. A core aspect of free will is that it *feels like* a choice *I* consciously make, coming from deep inside *me*.

Any choice that *I* attribute to *myself* would seem to be a choice *I* am aware of intending to make. *I* can discriminate actions *I* take that *I* do and don't attribute to *me*. In the example of a reflexive action to brush away a fly, *I* can think *I* am choosing to do it or can think it is happening as an automatic reaction not accompanied by *my* sense of intentional choice. In either case *I* attribute that *I* am doing it (at least *my* body is doing it), but only in the first case do *I* attribute that *I* (*my* inner self) *freely chooses* to do it. In both cases, however, *I* still don't experience the mechanics of the choice. It is just a choice *I* feel *I* am consciously making, and that aspects of *my* mental and physical functions implement as if *my* brain/body system was a robot *I* control and direct in some automatic way.

In addition to *my* choice involving an act *I* am conscious of taking, it involves *my* inner sense of agency. *I* identify with the choice as something that *I* have the power to make and am making. The choice comes from something deep inside *me* that is part of *my* own conscious experience. And *I* attribute agency to *myself*, as



opposed to any other causes. Free will thus involves a sense of being conscious, being aware of some subtle process of thinking and choosing in *me*, attributing agency to *myself*, and being able to exercise conscious individual agency (even if the detailed mechanics are automatic and *I'm* not privy to them).

*I* can do only the things that *I* am capable of doing given who and what *I* am. If *I* somehow do something *I* am not capable of doing on *my* own given who or what *I* am, then the doing would not be *my* choice. Rather, something controlling *me* from outside would be determining the action *I* take. If *I* attribute agency to *myself*, however, then that which makes the choice has to be within *me*, not outside. That is, the subjective past and present factors that influence *my* choice, and *my* power to choose, will have come from within *me*, if *I* correctly attribute agency to *me*. This brings up the issue of who *I* am.

Considering that *I* refers to *me* as just an *individual* conscious being, then *I* am a product of everything that has made *me* who *I* am. If *I* act according to universal determinate laws of cause and effect that influence *me*, they also have to be within *me*, rather than just outside of *me* and imposing their determination from outside, if *I* accurately attribute choice to *me*. Embedded somehow in *my* individual consciousness as at least part of who *I* am are the laws of nature and the consistent history of all existence, if *my* choices and actions are consistent with them and also are accompanied by *my* veridical attribution of choice to *me*. Am *I* also more than this?

That which computes the entire history of the universe including *my* history—which Maharishi sometimes calls the cosmic computer, or *Smriti* in Vedic literature (Maharishi Mahesh Yogi, 2003; 2004; 1996)—would be part of *me* and *I* part of it. This understanding is crucial for a completely holistic view of nature that includes free will.

In the Vedic account, *my* physical brain/body is made of the five gross constituents of nature (mahabhutas that have correspondence with the fundamental physical force fields). But *I* am more than the physical brain/body. *I* also have a *subtle nonphysical body* composed of the five subtle qualities (tanmatras), which relate to the subtle organs of sense and action (indriyas). But *I* am also more than the nonphysical subtle body. *I* have an

even subtler nonphysical mind (*manas*), intellect (*ahamkara*, sometimes called *buddhi*), and self (*mahat*, sometimes called *ahamkara*), existing in increasingly subtle concentric levels.

These levels (again, called *koshas* or sheathes) include *me* as an individual being, as well as all other individual beings and objects that phenomenally exist outside of *me* as an individual. All this is within the unity of Nature (*Prakriti*), and all its activity is in accord with universal natural laws (Maharishi, 1963; 1967; Boyer, 2008; 2012).

But *I* am also more than all this. The bottom-line of *my* individual self is *my* individual consciousness, and the bottom-line of *my* individual consciousness is universal consciousness, universal Being (*Purusha*). All of nature is within universal Being. As consciousness itself, universal Being is also *my* consciousness.

In this account the principle of *Karma* (action) concerns universal cause-effect relations. There is free choice of action, but the consequences are set by and implemented automatically by the laws of nature. Regarding this point, Maharishi (1967) refers to a verse from the Bhagavad-gita: “You have control over action alone, never over its fruits....” (p. 133). Thus *I* can choose an action; and then the laws of nature automatically compute the inevitable consequences.

The consequences might not be exactly what *I* thought *I* was choosing to happen, because *I* didn't—and couldn't as an individual human being—consider all past and present contributing factors. In some instances, outer influences may seem to predominate in the present so that *I* don't see how they are due to *my* past choices. *I* may feel *I* am not choosing what is happening presently (such as being put in jail against my will for not paying a past forgotten bill). In such cases, my power of choice in the present concerns how to deal with the strong influences from forgotten past choices *I* made that are inevitably shaping current events in *my* life.

Added to the principle of *Karma* is the principle of *Dharma*, which refers to action in accord with the *evolutionary* direction of nature. It can be associated with the arrow of time—the principle that time is unidirectional in the forward direction from past to present to future. But in addition to temporal direction, it implies a direction (predisposition or inherent



value) toward evolution as fundamental to nature that counters the 2<sup>nd</sup> law of thermodynamics toward increasing entropy. It can be associated with the 3<sup>rd</sup> law of thermodynamics: decreased activity associated with decreased temperature in physical systems, which results in decreased entropy or increased order, a fundamental negentropic process in nature. However, this principle is applied to the inner subjective domain in addition to the outer objective domain.

In Maharishi's completely holistic re-clarification of the Vedic account, the purpose of change in nature is the expansion of happiness, and the natural tendency of life is toward increasing happiness (Maharishi, 1963; 1967; see also Dalai Lama & Cutler, 1998). The universal laws of nature foster the expansion of happiness through progressive stages toward realization of the total potential of nature reflected in individual life. Choices of actions in accord with the progressive evolutionary direction of nature—Dharma, also called the force of evolution (Maharishi Mahesh Yogi, 1967)—naturally result in the expansion of happiness. Correspondingly, choices resulting in actions in a less evolutionary direction inevitably result in reduced happiness.

In other words, the universal laws of nature apply to all of nature, objective and subjective, and an evolutionary direction is built into them. It is determined that action will lead eventually to complete realization of the infinite value of happiness reflected in the individual: "Karma according to Dharma (Maharishi, 2005)." To what degree this is occurring depends on choices freely taken and reactions to their inevitable consequences. Choices relate to the individual's state of consciousness. In higher states there is more freedom from restrictive old habits and conditioning, allowing actions leading to increased happiness toward realization of full potential in permanent enlightenment.

For free will, conscious mind has to be real, nonlocal, and determinate through subtler dynamics that permeate the presumed to be closed local causal chain. Mind influences matter in the same natural way that we have felt all along it happens, but in subtler causal dynamics than ordinary physical causation we ordinarily observe on the surface level of daily life.

Still, there must be some aspect of *my* self beyond even the subtle, determinate, nonlocal causal dynamics. If *I* have to act in the universe subject to universal laws of nature in an unbroken chain of gross and subtle causes and effects, what is it that allows *me* a sense of freedom of choice? Is *my* sense of choice an epiphenomenon of universal determinism? Is it that the universal laws of nature have determined that *I* as an individual would falsely attribute agency to *myself*? Or perhaps it is that the laws of nature inside and outside of *me* somehow also allow free will. If so, how is this consistent with universal determinism? If *I* am really free to choose, and the freedom is not due to chance, and *I* correctly attribute the choice to *me*, then from whence does it come within *me*? What more am *I*, beyond all this?

Maharishi (1971) has pointed out that determinism relates to the past and the future, and free will relates to the present—the eternal *now*. Computation of the unbroken chain of causal events that brings continuity to past and future—*Smriti*, the cosmic computer, cosmic memory—occurs in the present. In order to accomplish such an immense computational task, the cosmic computer would need to be infinitely correlated, infinitely self-interacting. But as *infinitely* self-interacting, it computes all finite boundaries while also being beyond them.

The eternal present or *now* is the field of all possibilities, and it is forever free to create whatever actualities phenomenally exist. It contains both instantaneous freedom and sequential determinism at the same time. It is beyond individual mind and intellect, deeper inside them—and deeper inside all objects in phenomenal nature as well. *Smriti*, the cosmic computer, is both in *my* individual subjectivity and in the objective universe outside *my* individual subjectivity. *I* am in the eternal present; and the eternal present is in *me*. Computation of cause-effect relations is conducted within *Smriti*, the universal memory of all change in nature, the self-interacting unified field that is *my* self-referral consciousness.

Functioning of the physiology is the demonstration of the outside functioning, but the *actual* functioning takes place within the self-referral field of consciousness (Maharishi, 2004).

The Vedic epistemology in Yoga as re-clarified by Maharishi provides systematic means for direct experience of consciousness itself. The common experience in which the mind is more coherent in a settled but alert state is systematically extended to its most coherent, settled, and alert ground state, transcendental consciousness (turiya, samadhi), the eternal present—associated with the fourth state of consciousness in addition to the ordinary three states of waking, dreaming, and sleep. Maharishi makes it particularly clear that, although not appreciated in many long-standing traditions, settling down mental activity and transcending the individual self to refer back to the universal Self is a natural, effortless capability of all humans. According to Maharishi (1963; 1967), this ancient Vedic technology to transcend mental activity, including reasoning and empirical experience, has been the missing ingredient in scientific epistemology.

If the laws of nature are universal laws that don't change, and they apply to *me* as well as the choices *I* make, then *I* cannot violate the laws. They are fundamental to who and what *I* am, and are part of *my* own nature, inherent in *my* individual conscious self. But in some way *I* also must be *more* than all the laws and their phenomenal expressions. In this completely holistic account, the individual can transcend individual mind and intellect to experience his or her universal basis in consciousness itself (Maharishi, 1963). *I* can experience *myself* as more than all the laws of nature and all its expressions. In *that* 'direct experience,' *I* can access the total potential of nature. Individual memory is not sufficient to compute the continuity of past, present, and future. But the infinite organizing power of the unified field of consciousness—which ultimately *I am*—does it automatically.

Repeated direct experience of consciousness itself through transcending all mental activity naturally refines mind and body to develop action in accord with the totality of nature—Dharma. This results in increasing freedom and ability to make choices in accord with the evolutionary direction toward higher states of consciousness. In the highest state of unity, there is total freedom of choice, all possibilities. Then *I* am beyond all boundaries, even while as an individual being *I* am living in all the ordinary boundaries, gross and subtle.

The field of all possibilities is beyond the relative field of cause and effect in which nature automatically computes action in accord with individual and universal intentions. It is *simultaneously* a completely free choice beyond all limiting values, ever new in its phenomenal expression, and automatically consistent with the past, present, and future of the universe—ancient and never new. The extremely subtle crucial point here is the direct experiential unity of individual and universal, boundaries and unbounded.

Thus we can say that free will involves *will* in the sense of the agency or power to utilize the laws of nature in the evolutionary direction, and *freedom* in the sense of increasing possibilities toward all possibilities beyond all boundaries. Increasing alignment with the totality of the laws of nature brings increasing freedom. Ultimately we can associate free will with the unified coexistence of opposites of infinite silence (complete freedom) and infinite dynamism (infinite self-interaction in accord with total natural law). *I* have free will because *my* individual conscious self is in the unbounded field of all possibilities of the universal Self. *I* have some degree of ability to choose at each stage of progress toward complete freedom of will, because *my* conscious self also is universal consciousness, universal Self.

When completely established in the universal value of *my* Self, *I* am the eternally free, uninvolved silent witness of nature (Purusha) and at the same time the source of cause-effect relationships throughout nature (Prakriti), the total potential of the laws of nature computed by the cosmic computer or cosmic memory—Smriti. *I* am these levels at the same time, individual and universal.

Then *I* no longer identify *my* individual self as primary but rather *my* universal Self as primary—the superposition of individuality and universality. *I* spontaneously experience universal freedom and also freedom to act in accord with the totality of the laws of nature *simultaneously*. *I* have *both* universal determinism and free will—ever bound to be ever free. Then *I* have direct experience of mastery of laws of nature as the simultaneity of part/whole, reductivism/holism, individual/universal in permanent enlightenment. That is simply and profoundly expressed in the Vedic statement:

*Aham Brahmasmi* (Brihad-Aranyak Upanishad, 1.4.10)

I am totality (Inaugurating Maharishi Vedic University, 1996, p. 181).

### Summary and Conclusion

In the interpretation outlined in this paper of the completely holistic 3-in-1 Vedic account, the gross finite relative field of nature is characterized by particle-like interactions and discrete local cause-and-effect mechanics within the limitations of relativistic gravity, the Planck scale, and the speed of light. Its corresponding experience is in terms of object-subject duality and discrete tangible independent objects and events in the ordinary waking state of consciousness. This has been the focus of the physical sciences—now progressing to deeper levels.

The deeper subtle finite relative field of nature is characterized by more refined and abstract wave-like nonlocal cause-and-effect dynamics. Its corresponding experiences emphasize interdependence and entanglement of objects and events. Objects and events are determinate and individualized, but causal interactions are less localized—nonlocal causal wave, vibration or pulsating dynamics in a subtler medium of space-time. For the most part, faith in this level of nature has been the focus in historical religious studies when there were no reliable systematic and widely available means to go beyond the gross to the subtle levels and to ‘direct experience’ of unity.

In this completely unified monistic view, both gross and subtle relative levels are permeated by the unified field of pure Being, within which all interdependent subtle and independent gross determinate actions occur. That is the field of all possibilities, free of all limitations. It is the totality of all the laws of nature, experienced with increasing clarity in higher states of consciousness. It is the source of all boundaries, and beyond all boundaries—the essence of *my* own consciousness. That has been the focus of Vedic science, but systematic means of effortless transcending had been lost in interpretations of this approach also. Maharishi has re-established natural, reliable transcending as an *effortless* practice.

The *free* part of free will is *my* connection to the unbounded universal Self; and the *will* part is *my* connection to the totality of the laws of nature which direct all evolution and change.

The completely unified coexistence of these apparently opposing values is the ‘essential nature’ of consciousness. We have freedom of choice, and are determined to choose increasing happiness to establish ultimate fulfillment and freedom. Our choices determine when.

The ultimate confirmation of free will is in the highest state, unity consciousness. In that state, *I* am both inside and outside of the determinate causal chain. Nature is determinate, and in this sense robot-like. But its essence is infinite unbounded consciousness itself, the essence of *my* own consciousness

“The only way out is in” (Jarvis, 1972) refers to going deeper into oneself and transcending to the source of individuality, like an individual wave settles back into its source in the unbounded ocean. That is a state of complete freedom from all boundaries, while also simultaneously existing as an individual within all subtle and gross boundaries. The natural process of transcending as a systematic means to gain knowledge, described for its practical value in the Vedic Darshana of Yoga, has been missing in modern science, and more generally in both secular and non-secular traditions (Maharishi, 1963; 1967). It directly facilitates clarity in the experience of free will.

In unity consciousness, *I* am the field of all possibilities, and *I* have complete freedom of choice. How *my* choice becomes expressed is automatically determined to be consistent with all of nature. With simple profundity, Maharishi (1971) characterizes the unity of free will and determinism as ‘two sides of the same coin.’

This quote from Maharishi (1963) contains the essential points in this paper:

“In determining the full potential of man, it has been found that, whereas the individual personality of man apparently seems to be bound by time, space, and causation, the boundaries of the individual life actually touch the unlimited horizon of eternal life.... It has also been seen...that it not only lies within the capacity of each individual to contact and live absolute Being in his day-to-day life, but that it is simple and easy for everyone to do so. And it has been seen...that it is easy for every individual to place himself at the control switchboard of all the laws of nature and make use of the almighty power of nature...” (p. 92).



As summarized in this paper, a logically consistent account of free will, determinism, and probabilism requires expanding the model in modern science to the completely holistic 3-in-1 Vedic account. Further, it is directly validated by expanding the objective means of gaining knowledge in modern science to the

epistemology of Yoga in the ancient science of Veda (Maharishi, 1967). Fortunately, we are making intellectual progress on the forefront of modern science in that direction. Systematic practical application of regular, effortless transcending of mental activity as described in Vedic Yoga needs to be added.

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