

## Article

# How Vedanta Explains Conscious Subjective Experience

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### ABSTRACT

What is consciousness? Why does a purely physical lifeless system never seems to exhibit consciousness whereas human beings (and probably some other living beings) do? Can we explain subjective experience in objective (scientific) terms? These are some of the questions being debated by modern researchers of consciousness coming from both physical and social disciplines and philosophies. The modern philosopher Chalmers says that answering why some physical processes in the brain (body) are accompanied by experience, and why a given physical process generates a specific experience for example, experience of red or green is the “hard problem” of consciousness. Consciousness, the mind, the body, and their relations were thoroughly analyzed in the Indian philosophy (Vedanta) of ancient times. In this article, we describe how Vedanta explains occurrence of conscious subjective experience in living beings.

**Key Words:** Consciousness, Vedanta, subjective experience, mind and matter, Indian philosophy.

## 1. Introduction

What is consciousness? How do physical processes in the brain (body) give rise to the subjective “conscious” experience of human beings (probably some other living beings as well)? These are among the important questions being debated by modern researchers of consciousness coming from both physical and social disciplines and philosophies. There has been an explosion of research and results in neuroscience over the last three decades with emphasis on understanding and explaining consciousness. Some neuroscientists believe that the “hard problem” (Chalmers 1996) is not hard any longer and some computer scientists believe that they are very close to building a conscious computer. In spite of the many seminal and outstanding accomplishments in this field, it seems that there remain some fundamental questions which need to be addressed when one tries to provide a scientific explanation of consciousness.

Consciousness, the mind, the body, and their relations were thoroughly analyzed in the Indian philosophy (Vedanta) of ancient times. While Vedanta’s main objective is to teach how to progress spiritually in order to be relieved from worldly miseries and attain eternal happiness, this philosophy believes that the way to eternal bliss is by realizing what Reality is, and what the Real source of life and the world it experiences is. As such, Vedanta may contain concepts which can lead to answers to some of the questions that modern researchers come across in their attempts to explain consciousness in scientific terms. Vedanta asserts the existence of a Supreme Consciousness (God) that is omnipresent, omniscient, and omnipotent and that every living being

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is a spark of that infinite Consciousness called *Jiva* (translated as soul), which draws to itself a mind and a body with senses all of which are constituents of *prakriti*, the insentient Nature. Being part of the eternal Consciousness, the soul is eternal also and survives the death of the physical body. The soul is said to be distinct from the mind which is a collective name for cognitive and psychological aspects such as ego, intellect, thoughts, desires, and experiences of living beings. A major difference of Vedanta from Western philosophies is that although the mind as defined here is subtler than the body, it is also part of the insentient Nature and not conscious just like lifeless matter. In this article, we give an account of Vedanta's answer to the difficult question of how subjective experience occurs in living beings.

At first, we take a look at the first problem in consciousness research, which is defining consciousness itself. We find that one step in understanding consciousness is to distinguish between two kinds of components of observed human (living) beings' behaviors, one involving consciousness and the other not. In section 3, we see that the "easy problems" of Chalmers (1996) are easy because they are of the not-involving-consciousness kind. Here, we note that outside a living body, information (meanings) is inseparable from, but not identical with any of its physical means of communication and storage, and therefore that inseparability of information (mental contents) from its physical representation (neural correlates) need not imply their identity inside the living body either. This point is worth noting because scientists are sometimes tempted to overlook the distinction and think that the "hard problem" (Chalmers 1996) is solved. In section 4, we present a brief summary of Vedanta's characterization of Consciousness, mind, body, and their relations. We then describe the *chidabhasa* phenomenon, which is Vedanta's solution to the "hard problem". In section 5, we see that Vedanta's explanation of occurrence of subjective experience in living beings agrees with modern neuroscience. We do so by recognizing that awareness of an object (physical or mental) can be defined and that the definition is consistent with findings from current neuroscience although consciousness cannot be defined precisely. In section 6, we introduce an analogy between the living being and the computer by comparing body, mind, and Consciousness as described in Vedanta, respectively with the computer's hardware, software, and its operator. The analogy brings out Vedanta's view of the dualistic nature of the body-mind interactions and also explains how subjective experience is created in living beings and why it does not occur in lifeless matter. Finally, we conclude that the body-mind dualism in Vedanta is not inconsistent with its monistic view that the universe is a manifestation of the one and only one universal Consciousness. We also suggest that the same body-mind dualism is not Cartesian dualism and need not violate laws of physics, which violation is considered to be unavoidable even in Eccles's dualism according to many scientists of today.

## 2. Defining consciousness in modern science

The first problem of consciousness is to define it. As Searle (1999) says, "by consciousness we usually mean those states of sentience or awareness that typically begin when we wake up in the morning from a dreamless sleep and continue throughout the day until we fall asleep again". Since science requires precise definitions, scientists would like to define consciousness but find that it is not easy. Since our wakeful states are associated with various mental activities such as experiencing, paying attention, executive control of action (free will), and sense of self,

consciousness is an ambiguous term. Acknowledging the difficulty of arriving at a scientific definition, Searle (2000) recommends working with a “common sense definition” sufficient to identify the target of the investigation. But our “common sense” can be very confused about what consciousness is.

For example, consider the ability to do arithmetic. We usually consider lifeless things such as rocks as not conscious and think that birds, animals, and other living beings have various degrees of intelligence and of course, that a human being is more intelligent than all the other species because people do arithmetic whereas animals usually cannot. Interestingly, our pocket calculators can do arithmetic always accurately and much faster than we can. However, we do not think calculators are intelligent! At the same time, if a person does arithmetic like a calculator (and we hear about such people occasionally), he/she would be called a genius! Do we know what we mean by intelligence or consciousness? In fact, common sense can be so confused that sometimes even prominent researchers seem to be misled by the illusive nature of consciousness. An example is the argument of Crick and Koch (2001) that consciousness is a puzzling state-dependent property of certain types of complex, adaptive systems and that the best example is a healthy and attentive human brain because consciousness ceases if the brain is anaesthetized. However, it turns out that a healthy brain (or some other living being) is the only example because a complex and adaptive lifeless system that exhibits consciousness is not yet found. In other words, adaptivity to environment or self-organization does not imply the ability to be conscious. Similarly, McFadden (2006: p 390), who developed an Electromagnetic theory of consciousness said: “an unconscious mind cannot read, write, or do arithmetic”; of course, this is our daily experience because we cannot do these tasks while sleeping. The implication of his statement is that these functions require consciousness. However, as we saw before, the calculator, which does not even have a mind, clearly does it all! So why does the brain require consciousness to do them? It does not. That is exactly why the calculator is able to do them.

**Today’s computers can tell us what consciousness is not!** Nowadays, machines can do more than arithmetic; they can see, hear, talk, walk, and even solve mathematical problems! They play music as well! Herbert Simon's statement that there are no discernible limits to the range of things that computers can be programmed to do (Simon 1983) has come true. So, today's machines perform many activities of intelligent and conscious human (living) beings but of course, the machines are not conscious. How are they able to exhibit such intelligent behaviors? We are able to prepare a computer to PRETEND such intelligence because information residing in our brains (at least some of it) can be mapped into languages, then words can be mapped into the states of some hardware units, and therefore mappings of information from the brain can be stored in the computer’s memory. The computer is then able to carry out all the operations of receiving input data, storing, retrieving, and processing them, and finally giving some answers to questions, solutions to problems, results, or judgments but none of these activities clearly requires consciousness because the machine does them all! Sometimes, the computer’s abilities to do these functions are collectively referred to as “intelligence” (short for “machine intelligence”), in the computer science, artificial intelligence, and engineering disciplines. The above examples show that an intelligent behavior of human beings such as reading, writing, doing arithmetic, learning, etc. has two components: one that does not involve consciousness and the other, which does. The computer performs the former. The latter component has two aspects: (1) *initiating the whole process, which is done by an external command in the case of a computer*

*but by the brain itself (by its mind) in the case of a wakeful brain, and (2) create the experience of accomplishing the task (Hari 2012).*

### 3. The Hard Problem named by Chalmers

A precise definition of consciousness being unavailable, researchers assume that consciousness is something associated with various mental activities such as experiencing, paying attention, executive control of action (free will), and sense of self. Chalmers (1997) thinks that experience is central to consciousness and recognizes that trying to define conscious experience in terms of more primitive notions is fruitless. He argues that the really “hard problem” of consciousness is to explain how conscious experience arises from a physical basis. It is the problem of explaining why there is “something it is like” for a subject in conscious experience, and why conscious mental states present their content only to the subject but not to any other living being or physical device. He then distinguishes “awareness” from “consciousness” by introducing “easy problems” as opposed to the “hard problem”.

Easy problems of consciousness are those in which the phenomenon being investigated is usually associated with consciousness but can be explained in terms of computational or neural mechanisms. So what is awareness? Chalmers says that awareness is a functional notion different from subjective experience but it is nevertheless intimately linked to subjective experience. Actually, so far, what is explained in the “easy problems” of a phenomenon by means of neural and computational mechanisms turns out to be its functional aspect whereas the hard problem, namely, why subjective experience accompanies that/those function/s is not solved. As seen in the examples of computer behaviors described above, the functional aspect does not depend on consciousness but it is accompanied by conscious experience in the case of human beings but not in any lifeless physical system. Interestingly, although it is difficult to define consciousness, it is possible to precisely define awareness of an object (physical or mental); we will do so in a subsequent section. Since a conscious subjective experience necessarily includes awareness of something, this definition serves as a criterion for the occurrence subjective experience.

**The mental and the physical are inseparable but not identical:** While arguing against the so called strong Artificial Intelligence, Searle (1980) asserted that “cognition is not solely a matter of formal symbol manipulation” using his well-known Chinese room analogy for illustration. This fact can also be seen from the following observations: A word in any language is not identical with its meaning because the same meaning may be conveyed by different words in different languages. Sometimes language is not even used to communicate information. For example, a right signal flashing from a car is an indication to others that it is about to make a right turn. Animals also convey some feelings by making sounds or movement of their bodies. Thus information can be conveyed in many ways: in the form of words, sounds, electrical signals, and so on; in any means of communication, human (living) beings assign meaning or information to structures of matter or material energy but the material/energy structures themselves are not identical with the information they convey. A language is a mapping of information into words (symbols) which become sound energy when pronounced, particles of matter when written on paper, and become electrical energy when transmitted over a telephone

line, and so on. A computer stores only a mapping of some information that exists in the programmer's head. The digital computer has a bunch of memory cells, each of which can exist in either of two states denoted by '0' and '1'. What information is represented by bytes of '0's and '1's is decided by the programmer and not by the computer. In a quantum computer, the representation is in terms of states of qubits which are quantum objects; still, meaning is assigned to the qubit states '0' and '1' by the computer programmer. Thus, "real information" which is in our brains is different from the language or energy signals that are used for its storage and communication just like water is different from its container without which it cannot be taken from place to place.

Although it is our common understanding that there is no cognition in a purely physical process, being accustomed and forced to use physical means to communicate information, often, we overlook the distinction between the meaning and its vehicle of delivery because their inseparability overshadows their distinction. There is often an inclination to confuse inseparability with identity as seen from the following excerpt from Bohm (1989): "Meaning is inseparably connected with information. The operative notion here is that information has to do with form. Literally, "to inform" means "to put form into" something. First, information has to be held in some form, which is carried either in a material system (e.g. a printed page) or in some energy (e.g., a radio wave). - - - what is essential for a form to constitute information is that it shall have a *meaning*. For example, words in a language that we cannot read have no meaning, and therefore convey no information to us." - Not quite. A Chinese word conveys information to a person who understands Chinese although it does not convey any information to others who do not know Chinese. In the minds of the latter, looking at the word creates the thought "I do not know what this pattern of symbols means", which is the meaning of the word, nonsense. Does it not? In the above quote, the unknown word is unable to convey a meaning which is already known to the reader. Once the reader is told what that word means to a Chinese person, the same reader will get the correct meaning of the Chinese word whenever he/she reads it again. Thought, or information, or meaning is only in the brain of the reader. *No form of matter or energy outside the brain (or living being) has meaning when it is created. We assign some meaning to it. Even then the meaning does not become a part of the form used to convey the meaning.*

That the mental and the physical are inseparable although distinct is the basic axiom of the so called dual-aspect theories in modern consciousness research. The dual aspect theory of the well-known physicist Bohm says that the brain is a quantum system and that thought and the brain's quantum potential are dual aspects of one reality like for example, a quantum particle and its associated wave are. Bohm (1990) proposed: "the quantum potential is active information that is simultaneously physical and mental in nature .... These two sides are inseparable, in the sense that information contained in thought, which we feel to be on the 'mental' side, is at the same time a related neurophysiological, chemical, and physical activity (which is clearly what is meant by the 'material' side of this thought)". This proposal however, does not address the question: *there is no mental aspect in any physical process in which the brain (a living being) is not involved. There is no mental aspect in any lifeless quantum system as the dual aspect of its quantum potential. Why should there be a mental activity inseparable from its physical activity in the brain? Why does the brain's physical activity not require somebody else to assign some meaning to it?* (Hari 2012).

Another dual-aspect theory is that of the well-known neuropsychologist Pribram who claims (Pribram 2004): “Gabor function provides a good description of the architecture of activity in cortical dendritic fields to sensory stimulation. Thus, the same mathematical formulation describes an elementary psychological process, communication, and an elementary material process in the brain. The Gabor quantum can, therefore, serve the same function for the wetware/mind relationship that the bit serves for the hardware/software relation.” - It is true that the bit in a digital computer or the qubit states in a quantum computer are both software elements and they are both mapped to hardware units in the respective computers but we already saw that they are not the same as their meaning in the programmer’s head because the programmer assigns meaning to the bit/qubit. Similarly, in the brain, the Gabor quantum may be associated with an elementary wetware process but that does not necessarily imply that the elementary wetware process is the same as an elementary psychological process. For example, *in the design of an optical hologram, Gabor function describes a material process but it does not describe any psychological process and there is none in the optical hologram.* Hence Pribram’s theory does not answer the question: *why does a Gabor description of dendritic activity in the brain have a corresponding psychological activity?* (Hari 2012). The phrase “the hard problem” sums up the existing inability of science to answer questions such as mentioned above.

#### **4. Vedantic Explanation of How Subjective Experience occurs in Living Beings but not in Lifeless Matter**

When scientists connect scientific theories with experimental data, they implicitly rely upon the postulate that only matter consisting of atoms, or ultimately, elementary particles is real and every phenomenon in the universe is a phenomenon only of matter. (This philosophy is called material realism.) Similarly, Vedanta relies upon a postulate about the Reality underlying the universe to explain proximity in space, succession of time, and interdependence in the chain of cause and effect. According to Vedanta, one needs to admit the reality of pure being as the unchanging ground of creation (Swami Nikhilananda 2003). Kenopanishad (Swami 1920) says that there is Absolute Existence, which it calls Brahman and which is omnipresent, omniscient, omnipotent, and unchanging; the mind and senses are able to perform their respective functions willed and initiated by Brahman and without It, the senses and the mind cannot function. This Universal Consciousness is said to manifest Itself by Its own will, as all the various beings in the universe and to be present in the hearts of all living beings as the Self (Atma). Hereafter, It is denoted by Consciousness with a big C in front, to distinguish It from the fragmented consciousness of living beings which exists only in wakeful and dreaming states and differs from one living being to another.

Vedanta discusses at length the rationale for this belief using arguments such as the following: Our experience of change is always of something being transformed into something else but never of something coming into existence out of nothing. Unless there exists one continuous permanent principle equally connected with the past, the present and the future, or an absolutely unchangeable Self which cognizes everything, we cannot account for recollection, recognition, which are subject to mental impressions dependent on place, time and cause (Krishnanda 2008). Just as a mirage cannot be seen without the desert, which is unrelated substratum, so also the universe cannot exist without Brahman. It has to be noted that Vedanta asks its readers not to

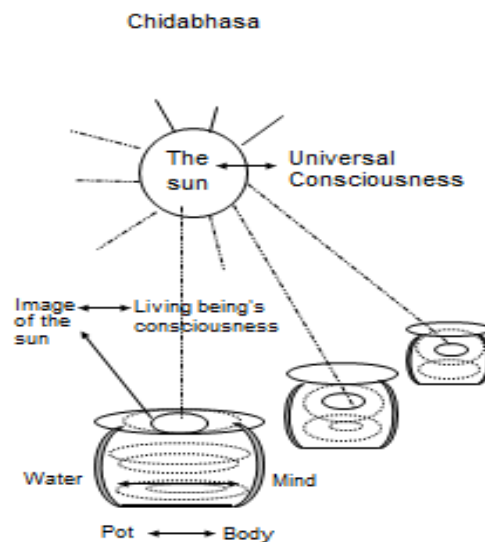
consider the existence of Brahman/Consciousness/Atma as a mere belief or postulate but says that it is possible for anyone to actually see for oneself this Reality if only one attempts to do so in a right way (there being many right ways). However, any right way to see has to be spiritual and strictly not scientific because the philosophy emphasizes that Consciousness is beyond space, time, logic, and mind and that Its existence cannot be predicted by any scientific theory, nor can Consciousness be detected by scientific experiments (Kenopanishad). Consciousness can only be known by those who can still their minds by keeping them completely free of thoughts!

As said before, consciousness perceived in living beings differs from Universal Consciousness in that the former is fragmented. An individual's consciousness exists only in wakeful and dreaming sleep states and knows only one thing at a time and in general, one individual does not know the conscious experience of another whereas Consciousness knows everything everywhere all the time!

**Brief summary of Vedanta's characterization of Consciousness, mind, body, and their relations:** The Upanishads are the primary source of Vedanta and Bhagavad Gita (Mukherjee 2002) is the essence of Upanishads. Upanishads describe Consciousness as immortal, all-pervading, blissful, merciful, incomprehensible, free willed, and as the source, sustainer, absorber, and ruler of this body, mind, and everything in the world. Gita describes *jiva* (translated as soul), the embodied individual being, as an infinitesimal spark from Consciousness/God Himself and therefore eternal as well. *Jiva* draws to itself the body, the senses, and the mind that are constituents of *prakriti*, the insentient Nature. Being eternal, *jiva* survives physical death. The Self which is confined to the body-mind complex is sometimes called *Jivatma* to distinguish it from the unattached and unbounded Self which is called *Paramatma*. Chapter 13 of Gita called *Shetra Shetrajna Vibhaga Yoga* describes the distinctions between the body mind complex and the one who 'knows' them (*shetrajna*). The Field of activity (*shetra*) consists of the five elements, the ten organs, sense objects, the ego (*ahankara*), desires, aversion, emotions, experiences (*manas* and *chitta*), and intellect (*buddhi*). The five elements are the earth, water, fire, air and the sky. The five objects of the senses are sound, touch, form and color, taste, and smell. All contents of the Field, namely, the body, its environment, and the mind are not conscious. Mind is called the eleventh sense (five senses of cognition: seeing, hearing, touch, taste, and smell and five senses of action: speech, grasping or working, moving, excretion, reproduction). The knower of the Field is Consciousness who has projected Himself and assumed this function within this body. As to the interaction of the body and the mind, in the chapter called *Karma Yoga*, Gita says that the senses influence the body, and *manas* and *chitta* influence the senses; *buddhi* influences the *manas* and *chitta*, and *jiva* influences *buddhi*. Thus Vedanta accepts mind's action upon the body.

**Appearance of consciousness:** If the mind is not conscious, how is it that we have conscious experiences in our lives? Vedanta's answer to this question is a phenomenon called *chidabhasa* meaning "appearance of consciousness" and explains it by means of the following analogy: When sun light falls in a pot containing water, the light is reflected by the water creating an image of the sun. The image has some brightness but its origin is in the sun light and not in the pot nor in the water. If the pot is broken, water is scattered, the reflection is gone but the sun and his rays are all still there. In this analogy, a living being is a body with a mind and similar to a pot containing water; the mind is like water and the body is like the pot. The consciousness

appearing in a living being is like the image of the sun in water. If there are more than one pot with water, images of the sun appear in all the different pots. The Supreme knower, Consciousness who manifests Himself as consciousness of each individual living being is like the sun light; there are no distinctions in sun light, it is all one but the reflections are many and distinct. The quality of reflection varies with the quality of water, for example, if the water moves the reflection shakes; if the water is muddy then the reflection is not as bright. Just as there is no reflection in an empty pot, there is no appearance of consciousness in lifeless matter but only in living beings because they have minds. Again, just as the water needs a pot to hold it, and the reflection is gone if the pot is broken, the mind cannot exhibit the apparently conscious behavior after the death of the physical body although some of the subtler contents of the mind may still survive and do not simply vanish. Sankhyakarika (Swami 1995) states that the world can only be experienced when both *sthula sarira* (the gross body) and *sukshma sarira* (the subtle body same as the mind) are present together (interacting). Thus Vedanta recognizes that both the mind and the body are required to create conscious experience of a living being. Vedanta further proposes that the subtlest aspects of the mind, the accumulated latent impressions of all past experiences, and desires called *vasanas* are carried by *Jiva* who survives the death of the physical body and enters them into another body for fulfilment of desires. The new life gives *vasanas* another chance for expression. This is the principle of reincarnation believed in all major Eastern philosophies and religions and not found in Western philosophies and religions.



## 5. Vedantic explanation of occurrence of subjective experience agrees with modern neuroscience

**Awareness of a physical or mental object:** In an earlier section we saw that a human being's intelligent or talented behavior has two components, one which does not involve consciousness and another which does. The latter is to experience, to desire to do things, to initiate appropriate action, and to be aware of doing actions besides simply doing them. Today's machines can realize the former component, which is to perform actions but not the latter. Chalmers recognizes



this distinction between performance of a function and the accompanying experience. He says that “awareness” is different from “consciousness” and that awareness is a functional notion different from subjective experience but it is nevertheless intimately linked to subjective experience. However, he is not clear about how awareness is associated with functions and how it is linked to conscious experience. It turns out that it is not difficult to see the intimate link between experience and awareness because in any experience one is aware of something. It is also possible to define awareness of an object (physical or mental) in terms of the specific function of creation of physical and mental records of information as follows. What does to be aware of something or to know something whether physical or mental, or briefly, awareness of an object mean? Nowadays, while working with computers we often use expressions like “the computer knows”, or “it does not know”, “it remembers”, “it understands”, “it thinks”, etc. In fact, we can precisely define what we mean when we say any of these expressions.

*A computer behaves as if it knows an object (a data item or a program instruction), when a representation of that object exists in its memory as bytes of "0"s and "1"s in a digital computer or qubit states in a quantum computer, that is, as a sequence of states of some hardware elements, in other words, when a hardware correlate of the object exists in its memory.*

Once such a mapping is entered into a computer's memory, the computer can do almost anything that a person can do with that object and behave as though it “knows” the object without really knowing the meaning of anything it stores or it does! On the other hand, whenever it receives a sensory input, the brain not only creates a neural record in its memory but also creates a meaning associated with that neural record. Hence we expect the brain to be aware of an object according to the following definition:

*The mind-brain system is aware of an object (which may be a physical object, or a past event, or a sensory experience in the present, or a future goal) when a physical representation (neural correlate) of that object and its associated “meaning” reportable to the outside world, both exist in its memory.*

This definition implies that for any conscious experience to occur, whether it is awareness of a sensory stimulus or of a thought, emotion, desire, etc., a correlating neural record or activity (a pot) and the corresponding mental record or information (water in the pot) should be present in the brain-mind system. Indeed, in the sensory-stimulus-and-response experiments by Liber et. al (1979), experience of stimulus required acquisition of neuronal adequacy representing the stimulus. In the case of volitional acts, cerebral activity started at least 350 msec before the conscious wish to act appeared (Libet 1999), again suggesting that neuronal adequacy representing the intention needs to be achieved for awareness of intention to appear. According to modern neuroscience, every phenomenal, subjective (conscious) state such as a conscious intention or conscious emotion has a correlating neural process; each state has its associated neural correlates of consciousness: one for seeing a red patch, another one for seeing grandmother, yet a third one for hearing a siren, etc. (Mormann and Koch 2007). Thus these findings are consistent with the above definition of “awareness of an object” and with Vedanta. In neuroscience, the neural and mental records are considered identical and it is not known why the neural record appears to be conscious whereas in Vedanta, while both neural and mental

records are not conscious, the experience's quality of being conscious is due to the underlying all-pervading Consciousness.

## 6. Interaction of mind and body in Vedanta - Living being-computer analogy

The sunlight-and-pots-with-water analogy does not model the interaction between the mind and the body. So, let us recall the roles of the soul, the mind components (*manas*, *chitta*, *buddhi*, and *ahankara*), the senses, the body, and the outside world summarized from Vedanta earlier. Then, in the sunlight-and-pots-with-water analogy, replace the pot with a computer's hardware and water with the computer's stored information; replace the sun whose light originates the reflection with the computer operator. Information /software cannot exist outside the hardware like water cannot stay in one place outside a pot. Similar to an empty pot that cannot show reflection, the hardware of the computer cannot display any intelligent interactive behavior unless it is loaded with some software. We now have the living being-computer analogy which models mind-brain interaction.

**A thinking process is an interaction of the mind with the body and is similar to a running computer program.** Information stored in a computer is of two kinds: data and programs. The former are passive. Any one of the latter, namely, any program is passive until it is activated. Any stored program is an algorithm in the programmer's head translated into a code and entered into the computer. It has to be initiated into execution either by an external input, or an already running program. Once activated, the program runs and creates outputs which are new records in the memory. To do even the simple task of creating a record of any input, the computer needs to have a "WRITE" instruction, a program, already in its memory. The input activates the stored program, which then runs in the hardware (i.e., the hardware goes through a dynamic process) and creates the record, which is a passive data item. After the activity is over, the program goes back to its passive state. Artificial Intelligence programs produce both new data and new programs. So, activity of the software, that is, running programs in the hardware creates more records/information in the computer's memory.

Similarly, any new experience requires activation of a thinking process which already exists in the living being's memory in a passive state, and any thinking activity is an interaction of already existing thoughts with the biological matter and produces new mental records as a result. (Indeed, for awareness of a sensory stimulus to occur, while the brain (body) creates the neural representation of an external stimulus, the mind should already be paying attention to create the corresponding mental representation; paying attention involves what Vedanta describes as mind's influence on the body and the senses.) The activity may be initiated by a desire/purpose (thoughts), or by sensory inputs, the soul or by Consciousness. Again, similar to a computer program, at the end of a thinking activity which involves both body and mind, those mental contents which participated in the activity still remain passively in the memory. For example, a violinist has the ability to play violin but he/she does not play violin all the time. The ability to play violin is stored in the musician's memory in a passive state and he/she activates it to perform. He/she enjoys the music while playing violin and remembers the experience even afterwards. After the performance is done, the ability to play violin is still there and no one else knows about the musician's talent unless he/she performs.

In the living being-computer analogy, Consciousness is like the computer operator. Just like a computer's hardware and software do not know what they are doing, their own existence, and the meaning of their memory contents, both the body and the mind of a living being also do not "really know" anything. Only Consciousness (the operator) "really knows" everything that is going on in the living being's life. As said before, similar to a computer program, any thinking process needs to be activated by an external agent, which is often, a desire/purpose (thoughts), or sensory inputs. The soul as a part of the omnipotent Consciousness, or Consciousness Itself can also initiate and intervene in mind-brain interactions and thinking processes just like a computer operator can intervene in the operations of the computer.

We have seen that subjective experiences are created in living beings by body-mind interactions similar to the way new information records are created in a computer memory by running already existing programs. To understand why conscious experience does not occur in lifeless matter, note that the computer's memory contents carry only a mapping of some information that is in the head of the operator but not the actual information; so they are not exactly the "water" in the sunlight-and-pots-with-water analogy. Hence there is a fundamental difference in the natures of outcomes of a thinking activity and those of a computer program execution. A thinking activity produces not only new neural records but also their corresponding meanings or mental records whereas a computer program's execution produces new records in the hardware but not their meanings; meanings are assigned to hardware elements by the computer operator. A computer can be programmed to produce music like the violinist mentioned above but it neither knows that it is performing nor enjoys music because it is like a pot without "real water". A program running in the computer produces new physical patterns in its memory but no new "real information".

The above analogy suggests feasibility of reincarnation often mentioned in Vedanta. In the case of a computer, we know that the stored information is not "real information" but a mapping of some "real information" existing in the programmer's head. Hence the information in the computer in a way, exists independently of the computer. When the hardware of a computer is broken and software cannot work in it, the same software can be loaded into the hardware of another computer and can run again if the software was copied and stored on a storage device. The reincarnation principle conveys a very similar scenario for beings that have mind. The mind which is subtle and not present in lifeless matter survives the death of the physical body, which is then entered into another physical body at rebirth by *Jiva* for fulfilment of desires and continues to express itself in the new life.

## 7. Conclusion

Clearly, Vedantic theory of the mind is interactive dualism in that the body and the mind have independent existence although they interact with each other under suitable conditions. It recognizes mind's action upon the body as well as the converse that the brain (body) creates experience in mind by interacting with already existing mind. Often Vedanta is referred to as a

monist<sup>1</sup> theory of consciousness because it emphasizes that Consciousness alone appears as the various forms in the universe, mind, matter, and all. The well-known analogy given is that Consciousness is like gold and all objects in the universe are like jewels made out of gold. Since the philosophy also declares that Consciousness is beyond space, time, matter, and mind and claims that Its existence cannot be detected by any physical or logical means and therefore by any scientific means, the monistic part of the philosophy does not conflict with its dualistic part for the purposes of science. The dualistic part of this philosophy is not Cartesian Dualism because the supreme Consciousness and individual *Jiva* are said to be immaterial and beyond the mind and its ego (the I-feeling called *ahankara*) which are not conscious. Moreover, not only the individual soul (*Jiva*) but the subtle mind also are said to survive physical death. Hence neither *Jiva* nor the ego is the 'I' of Descartes who presumes that the mind, the 'I', and soul are more or less the same thing and that it is conscious.

Critics of dualist theories of mind-brain interaction (for example, Eccles's (1994) approach) are materialists who believe that a non-material mind having effect on the activity of the material brain would necessarily violate conservation of energy, an established law of science. Interestingly, it happens that in the Beck and Eccles (1992) quantum mechanical model of exocytosis, a zero energy tachyon can precisely accomplish the task of an Eccles's psychon (a unit of volition) without violating energy conservation (Hari 2008). (Tachyons were defined by Bilaniuk et al. (1962) and Feinberg (1967)). This theoretical observation, led to the suggestion (Hari 2008, 2011) that thought and experience in the brain may consist of tachyons. Using the definition of awareness given above and assuming mind-brain interaction as tachyon interaction with a nonrelativistic quantum brain, it was also shown that subjective experience is created in the form of tachyons if the mind consisting of tachyons pays attention to the brain (Hari 2011, 2014). These theoretical developments agree with Vedanta's frequent characterization of mind as being very fast, faster than the senses and faster than anything in the physical world. It is possible that by repeatedly emphasizing the mind's restless, fast, and unstoppable nature when one is awake (it is a common experience that thoughts keep arising one after another when we are awake), the ancient authors may be implying that mind is faster than matter and material energy (hence faster than light). According to Einstein's relativity theory, existence of tachyons and those with zero energy is possible theoretically although so far tachyons have not been detected experimentally; on the other hand, matter with zero energy cannot and does not exist. Thus it seems Vedanta's dualistic approach to mind-body interaction may be consistent with modern science and Vedanta's characterization of relations among Consciousness, mind, and body may throw light on answers to some of the difficult questions that modern scientists pursuing consciousness research are concerned with.

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<sup>1</sup> One school of Vedanta called Advaita is known as monism because it explains elaborately that Consciousness alone appears as the various forms in the universe, mind, matter, and all. Other schools of Vedanta called Vishishtadvaita (translated as qualified monism) and Dvaita (dualism) agree with Advaita that Consciousness is the source of creation and all three schools believe that every individual living being is associated with its own *Jiva* (translated as soul) which is also immortal just like Consciousness. Whereas Advaita says that the soul is under the delusion that it is distinct from Consciousness as long as it identifies itself with a body-mind complex, but that the soul realizes oneness with Consciousness once the delusion is gone (by suitable spiritual practices when the body is alive), the other two schools believe that all souls remain distinct and distinct from Consciousness (God) and from Nature forever. However, since all schools agree that the soul is not the mind, that mind is insentient, fast and restless, and that some part of the mind survives death of the physical body, and believe in reincarnation, all schools of Vedanta agree on mind-body interactive dualism.

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