



‘Consciousness’ and Brain Functions: A Re-look from Functionalist Perspective

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Abstract: Consciousness is very fundamental to human existence. It is one of the basic necessities for all the living creatures of the universe. It does not only assist human beings to experience both gross (table, chair, etc.) and subtle objects (hunger, thirst, feelings, etc.) of the world but also assist in acquiring knowledge about worldly affairs. Human beings acquire knowledge due to their mental representation of objects and concepts of the world. In this regard, the notion of ‘consciousness’ and the concept of ‘mental representation’ are interrelated with each other. The functionalists (computer scientists, cognitive scientists, neuroscientists, and others) suggest that a person’s body and brain are interrelated with each other due to the presence of consciousness in every part of body and brain. But they could not answer an important question, that is, in what ways body and brain of a person are connected to each other? This paper attempts to answer this question from a functionalist perspective. While answering this question, it argues that the emergence of consciousness in a person is not due to his/her brain functions, but due to the presence of ‘self’ in a person from birth to death.

Keywords: Brain, Body, Consciousness, Intentionality, Representation, Self

1. Introduction

Human beings differ from non-human creatures due to subjective conscious experience. Any conscious experience gained by a person is called an event. Each and every event is important to a person because he/she gains conscious experience about the event. There are two types of events found in the philosophy of mind discourse; mental events and physical events. Mental events are those to which only an agent (subject/experiencer) has the privileged access. One’s mental event is not accessible to others. Swinburne explains that mental events are unique in nature and they do not include any physical events in it [1]. Mental events are beliefs, thoughts, intentions, desires, sensations and so on to which an agent is often conscious of. Swinburne argues that mental events are caused by brain events but certain mental events (intention) those are caused by brain events come under the category of physical events, thereby causing bodily movements (actions). Mental events and physical events can be considered two aspects of an agent’s experience. Mental events are private and physical events are public in nature. In every occasion, mental events and physical events share some common features, i.e.,

states of consciousness. The link between mental events and physical events is possible due to the existence of consciousness in a person, which is regarded as a vital entity of an agent (a person). Consciousness is the key of an agent’s life. It is the consciousness that assists an agent to experience hunger, thirst, feelings, music, happiness, etc.

Questions arise, how does an agent’s brain capture images of an object that is external to the body and brain of the agent? [2] How does the brain of an agent engender a ‘self’ in the act of knowing? The first question addresses the issues regarding how the brain constructs images (sound images, tactile images, etc.) of object of the world. To address the first problem is to discover how the brain makes neural patterns in its nerve-cell circuits and manages to turn those neural patterns into the explicit mental patterns which are nothing but images.

As to the second question, which I might call as the problem of ‘self’, it may be noted that in every experience, an agent is the owner of his/her experiences and also owner of his/her brain images acquired/ obtained through experience. The ownership gives rise to a feeling of ‘own(one)self’ in every experience. In this regard, a question may arise, how does an agent’s brain create ‘I-ness’ in him/her?

Now, turning again to the first question, Damasio states that brain is the substratum of all experiences and knowledge [2]. It contains information, instructions, codes, etc. Functionalists would argue that functions of the mind are nothing but the functions of the brain [3, 4]. They claim that once we discover the neurobiological functions of the brain completely and able to map them, we may be successful in discovering the locus and functions of mental processes and images. According to Behaviorists, what we can be sure of is human behaviors and existence of human brain, but the notion of mind remains a mystery [5]. Functionalists, in this regard, do not agree with behaviorists.

An agent's body and brain are closely related to each other. The relation between body and brain sustains because of agent's consciousness. Consciousness is the most fundamental prerequisite entity to sustain the relation between body and brain. Due to an agent's consciousness, his/her brain functions and it is true that without consciousness an agent's brain does not function. An agent's brain and body are inseparable from his/her 'self'. According to Searle, functions of the brain cause mental events [6]. Honderich uses the expression 'conscious occurrents' for mental events. He states that any given conscious occurrent of an individual is having a law-like connection with a specific set of physical processes of that individual [7].

It is well accepted philosophically that there is a significant role of body in giving rise to the feeling of 'agency' to the agent. Because of the agency feeling, there is a conscious feeling in the agent that he/she does an act, let us say A. In this paper, I argue that mental events cannot exist in isolation of brain events and there is correlation between mental and physical events. I would also argue that all mental events are associated with an agent's consciousness and there is correlation between brain functions and mental events of an agent that is realized in the experience of selfhood.

2. A Concise and Critical Overview of Brain

A comprehensive and exhaustive data about brain functions, the relation between brain functions and emergence of consciousness, the correlation between an agent's actions and his/her brain functions are yet to be explored. Emerson Pugh evokes that "If the brain were so simple that we could understand it, we would be so simple that we could not" [8]. To explain in simple words: if human brains were simple enough to understand, we, the human beings would be too simple to understand them. But we could not. How is it possible that a brain coordinates thousands of muscles when we jump or walk? How does the brain coordinate the data from eyes and ears? How does the brain retain all the symbols and words that an agent encounters every day in his/her life? There are individuals who could speak more than ten languages. What does their brain do to systematize and retain all these symbols of languages? Even in a huge crowd of billions, we are able to recognize a familiar face of our loved

ones. How is it possible? [9]. If we look at the brain at micro-level, it has trillions of ultra-thin nerve fibers which are almost impossible to be classified and studied. Till date, the electromagnetic systems of the brain functions are not quite clear to neuro-scientists, biologists, cognitive scientists, and so on. One can attempt to understand the complexities involved in a brain function at organ level (e.g. eye, ear, etc.) to some extent. A brain's functions may be epistemologically comprehended, as scholars discussed about how consciousness operates in an agent to obtain experiences of the worldly affairs in the literature.

2.1. Brain: A Philosophical Debate

The brain guides the body to involve in different actions. There are many unifying theoretical principles to find out and locate bodily organs, e.g. eyes, heart, kidney, etc. but why are we not succeeding in finding a theoretical principle of the brain? Further, if we consider 'brain' as a biological and physical organ known through its neuronal network systems and may be observed and cognized by any agent, then would it be possible to differentiate neuronal states from mental states?

Mental states cannot be detected within the neuronal states of the brain. It is so because mental states seem to be independent from the brain states. However, mental states are absent when brain states are absent. Although psychological aspect of 'brain' and physiological aspect of 'brain' can be distinguished from each other ontologically, yet they do not necessarily exclude each other. Both mind and brain co-exist with each other.

Northoff proposes the concept of *embedment* as a solution to fix the empirical, epistemic and ontological dilemmas pertaining to 'brain'. The term 'embedment' can be defined as an intrinsic relation between brain, body and environment. It encapsulates two components: embodiment and embeddedness. Embodiment refers to the intrinsic relationship between brain and body. Embeddedness refers to the intrinsic relationship of the brain/body with the environment. In the case of embodiment, both body and brain are necessary conditions for each other for their functions and sustenance. In the case of embeddedness, brain/body and environment are necessary conditions for each other for information sharing and interaction. This bilateral dependency is needed to understand the notion of 'brain' philosophically [10].

2.2. Feelings and Emotions

The study of human brain is intrinsically related to the notion of an agent's feelings and emotions. Damasio makes a distinction between emotions and feelings [11]. Emotions are outwardly directed and publicly observable responses, whereas feelings are inwardly directed and private mental experiences [12]. Panksepp affirms that emotions are aroused in human beings through various external events and those are designed to respond to various types of real-world situations [13]. We can characterize an agent's feelings as his/her bodily events in relation to environmental events. Epistemically, feelings are subjective because these are related to the agent

alone whereas, emotions are objective as these are observed by anyone. Feelings are considered as first-person's experience whereas emotions need not be considered as first-person's experience alone. Churchland [14] and Damasio [11] consider emotions as a necessary tool for cognitive processing such as reasoning, imagining, postulating, thinking, etc. Nielson states that emotions play a pivotal role to explain human being's creativity [15]. Levine [16] and Taylor [17] affirm that study of emotions is important to explain neural network models of consciousness.

A question arises, how does a brain of an agent produce emotions and feelings in him/her? Damasio [11] conveys that feelings are created by 'somatic markers' [18] that produce feelings and emotions through bodily changes. LeDoux expresses that amygdala is the cause for the arousal of emotions and feelings in an agent [19]. Amygdala receives inputs from the sensory thalamus and sensory areas of the cortex. Amygdala is also getting information from higher areas of the cortex that may deal with conceptual information and from the hippocampus, which is involved in spatial context and long-term memory [20, 21]. Amygdala receives numerous inputs, and then it produces respective responses for the concerned emotions. Feelings emerge from the intrinsic neuro-dynamics of emotional command systems interacting with neuro-symbolic 'virtual body' depicted in the brain, which may constitute a primordial representation of the 'self' [13].

2.3. Feelings and Intentionality

Emotions have two facets: intentionality and feelings [22]. Intentionality refers to a subject-object relation whereas feeling refers to the subject's own state of mind. Intentionality refers to 'being about something' because it is related to objects of the world (things, events, concepts, other bodies, one's own body). It involves cognitive ability to separate one's own mental state from the surrounding stimuli so as to create a meaningful subject-object relation. Here, intentionality refers to objects of the world, those are known through perception, memory, thought, dreams, imagination, desires, and emotions of a conscious being.

'Feeling' is associated with an agent's state of mind. In case of feelings, an agent only feels it or may overpower it through his/her reasoning but in case of intentionality, the agent plays an active role. Emotions with intentionality can be interpreted in three ways: cognitive, evaluative, and motivational [23]. The cognitive perspective states information about a given situation. The evaluative perspective assesses information to find out its significance to the agent. The motivational perspective addresses an agent's desires or readiness to act in a given situation. These perspectives do not exist independent of the others, but they bind together.

A human being's mental states consist of both intention and feeling. The relationship between intention and feeling varies in kind and degree. Intention and feeling are central to human being's emotions, but in case of human being's mental state, one is dominant. For example, when an agent experiences toothache, his/her feeling is dominant, whereas when an agent

perceives an object presented before him/her, his/her intention is dominant.

Each emotional state has mental and physical components. The mental component is 'cognition' of something. Emotions depend on the cognition of an object or a state of affairs of the world that affects the subject. The physical component is a physiological change in the organism. For example, when an organism is in fear or anger, there is a change in blood pressure and galvanic skin response.

Emotions as mental states have wide range of feelings, mild to intense. A question arises, how do we understand an emotional experience cognized by an agent? Tye makes a distinction between primary and secondary emotional experiences [24]. In the case of primary emotional experiences (anger, fear, happiness, sadness and disgust), emotions are directed on things or state of affairs of the world in two ways: either via perceptual experiences or via thoughts. Here, thoughts need to be understood as mere beliefs and the agent entertains those beliefs without accepting as true. For example, an agent may be reading a journal on a fine morning and suddenly comes across information about eating half-baked potatoes as dangerous for heart, and then the agent remembers that he/she has eaten a large portion of half-baked potatoes last night for dinner and feels suddenly fear within. This emotional experience of fear is due to a thought about some information, which the agent is not certain about its truth-value. With regard to secondary emotional experiences, these are variations of primary emotional experiences. Damasio [11] notes euphoria and ecstasy as variations of happiness; melancholy and wistfulness as variations of sadness; panic and shyness as variations of fear. Tye points out that primary and secondary emotional experiences have both conceptual and non-conceptual contents [24]. But whether these contents are intentional or not becomes controversial. Searle finds that confusion arises about the intentionality of emotions when "many conscious states are not intentional, e.g. a sudden sense of elation..." [25].

2.4. Pain

Pain is an emotional experience of a conscious person. It is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage [26]. A question arises, how is the tissue damage or tissue trauma communicated to the brain? The neuro scientists and biologists found that the transduction [27] of tissue trauma into neural signals is done through sensory end organs known as nociceptors [28, 29]. The nerve endings of thinly myelinated [30] A δ fiber function as thermal and/or mechanical nociceptors, conducting impulses at 4-44 m/s. In addition, certain unmyelinated C fibers that conduct slowly (around .5-1 m/s) act as polymodal nociceptors, responding to various high-intensity mechanical, chemical and thermal stimuli. Both types of fiber (A δ and C) spread across skin and in deep tissue. Repetitive stimulation of these receptors produces pain. A δ fibers produce sharp, pricking pain lasting in short duration and C fiber typically generates burning sensations [31].

Emotions are resulted due to brain functions. An agent's pain, feelings, intentions are modulated through brain functions. Questions arise, how does a brain function? Does a brain function similar to a computer system?

2.5. Representations in the Brain

Things in the world do not appear to us as they are. Rather, what we are aware of is only representations of objects and facts of the world. Human beings experience different objects of the world and accumulate knowledge about the worldly affairs. Experiencing objects are mediated through sense data. Human brains translate sense data into mental images and form mental concepts. Mental images relate to the objects and concepts of the phenomenal world. Mental images are essential components of mental states. Mental states represent living and non-living objects (entities) of the world.

Here, the term 'representation' refers to 'something' that itself could not be presented before human beings but could be brought into existence by 'something' else [8]. Kelso uses an allegory to explain representations [32]. According to him, it is like a little person inside a person's head making sense of the meaningless sensations that impinge on the eyes, ears, nose, head, etc. The sensory system of human beings serves as the mediatory to inform the brain of what is happening in the external world and within one's body [33]. Mental representation of an object or a concept can be logically presented through the following statement:

Mental state M has the content P.

Mental state M refers to a brain state that analyzes and synthesizes images, thoughts, concepts, etc. of the worldly affairs. P refers to either an object or concept of the worldly affairs that may have direct reference to the physical world. Kriegel brings the distinction between subjective and objective mental representation [34]. Objective mental representation refers to a brain state, where the object or concept can be known ostensively. For example, I see a red bus outside through the windowpane. Here, my objective mental representation is a red bus on the road. Subjective mental representations are those that are dependent on the individual person (agent) and those are neither referred to nor verified in the empirical world. For example, toothache of a person. Here the acute pain in the tooth is a subjective mental representation of the agent. Steiner discusses about three styles of mental representations: explicit, implicit and tacit [35]. Explicit mental representation refers to the objects of the world. Implicit mental representation refers to an agent's idea about worldly affairs that includes the idea of bearer himself/herself. In this case, the agent's idea may be expressed through language. Tacit mental representation refers to the image of 'I' for an agent. The word 'I' may include one's behavior, attitude, religious beliefs, reasoning compatibility, emotions, etc. In case of tacit mental representation, one knows about something but can't express through language or through other means. Quine considers acquiring knowledge through mental representations is essentially a biological phenomenon, that is something human brains do [36].

When we equate human brain functions with a computer system functions, we consider only quantitative descriptions of the brain function, such as, autobiographical memory, symbol manipulation, etc. [8]. Computers can store memories quite well far beyond any human brain could. In the computer, the connectionist systems still rely on representation, unambiguous and context-independent inputs and syntactic operations. Edelman and Tononi explain human brain is characterized by non-representation, ambiguous, context-dependent inputs and semantic, i.e. meaningful organization [37]. An important difference between human brain and computer lies on the retrieval pattern of memory. Though both brain and computer rely on the realization of stimulation, the stimulation in the human brain is context-dependent or goal oriented, where an agent (a person) remembers certain events or information clearly and vividly. It all depends on the context and the purpose for which the brain functions.

With regard to a computer, it performs very well through symbol manipulation but these symbols remain meaningless. Searle argued in his Chinese room argument that a computer's symbol manipulation program is a meaningless phenomenon whereas human brain functions are a meaningful organization [38]. Computer programs perform symbol manipulation in a purely syntactical way in accordance with predefined and fixed rules. A human brain, in contrast, functions through semantic operation only. Computers perform actions without understanding them. Collins and Kusch call such actions as *mimeomorphic* actions, which cannot account for context dependent and meaning [39]. On the other hand, human brains direct actions, which are called as *polymorphic* actions that are due to the understanding of 'why...so?' and 'how...so?'

A human brain can differentiate one's own image from others' images. The brain can experience itself through mental states and events. It can also observe others' minds through their physical states and stimuli. The computer can neither experience itself nor has mental states to observe others' physical states and stimuli.

The computer may be characterized as 'stimulus coding' machines, not 'event coding' machines. Computers are able to recognize their own computational states because they do not suffer from 'autoepistemic limitation' [40]. Autoepistemic limitation is a condition that is necessary and required for the possession of one's own mental states. The absence of autoepistemic limitation in the computers shows the unavailability of mental states in the computer. Due to the brain's event coding system, there is autoepistemic limitation found in human being, which proves the existence of mental states in human brain.

Eliasmith proposes control theoretic descriptions to explain the human brain functions [41]. He says that memory and navigation are cognitive phenomena and locomotion respectively. The reflexes are sensory-motor phenomena. Control theory explains the overall neuron behavior that applies to cognitive phenomena and sensory motor phenomena. It also suggests that unlike human brain function, computations in a computer system are due to partial behavior

of neurons in terms of computer system. Clark argues that the study of brain as a computer system functions would not suffice to understand the complete functions of a brain [42]. Human brain functions deal with mental world of a person (agent) whereas computations in a computer system deal with physical world of a machine.

3. Consciousness and Brain Functions

Is 'consciousness' a product of brain functions? Edelman states that, "there is now a vast amount of empirical evidence to support the idea that consciousness emerges from the organization and operation of the brain" [43]. Crick and Koch proposed 40-hertz oscillations in the cerebral cortex resulting in consciousness [44]. According to Creutzfeldt, there are three important areas in the brain those are responsible for the arousal of consciousness in an agent [45]. The areas are: Cerebral cortex, Basal ganglia, and mid-brain systems. *Cerebral cortex* is the area where cortical functions take place; as a result, perception, cognition, memory, language learning, and understanding become a possible phenomenon. *Basal Ganglia* is an area that is responsible for 'integrating' output targets of the cerebral cortex. The basal ganglia area and its connections with other areas of the brain are considered as a necessary mechanism for the arousal of consciousness. *Mid-brain Systems* area brings the cyclical order between sleep and awaking state of an agent. The cyclical order is believed to be the cause of consciousness.

Baars [46] in his Global Workspace Theory and Morsella in his Supramodular Interaction Theory [47] argued that neural networking processes in the human brain responsible for the arousal of consciousness. These two theories affirm that brain functions are to be considered as the arousal of consciousness. A question arises, if consciousness emerges from brain functions then, how is it the case that human beings are aware of something and not aware of other things at a given time and space? Why in deep sleep state, we are not aware of anything even though our brain functions in every second? If brain functions are the cause of consciousness then what is the cause of our sub-conscious state? How does a person's consciousness towards an object differ from time to time while his/her brain functions remain unchanged? Can we say a lunatic person is conscious of his/her action due to his/her brain functions? These questions remain unanswered by the functionalism as of today.

Prof. V. S. Ramachandran, a neuroscientist points out that 'consciousness' can't be studied independent of the notion of 'self' [48]. He argues that one would not know 'self' if one is not conscious of it and one would not be conscious, if one were not aware of his/her self. Storeig states that the feeling of 'self' is necessary for episodic memory and consciousness [49]. From the above analyses, we may conclude that consciousness is a fundamental entity like space and time. It may not be resulted from the brain functions; it may be caused by the metaphysical self, which is embedded in human beings from birth to death.

4. Conclusion

In this paper, I argued that mental events and physical events are linked to each other due to the existence of consciousness in human beings. It is so because a conscious person is aware of his/her physical world through mental representations. The transition of physical objects into mental representations establishes the interconnection between an agent's (a person) brain and body. The functionalists discuss the functions of brain to produce consciousness in human beings but their arguments and justifications fail to prove that brain functions produce consciousness. I have raised many questions against functionalists' findings and proposals on brain functions and emergence of consciousness from brain functions, but these questions remain unanswered by the functionalism till date. What about Behaviorist response to the above raised queries? They are not in a position to address these issues as they are devoted only to behaviors and their allied manifestations.

I argued that there are multiple layers of consciousness found in human beings including self-consciousness (qualia), whose source could not be the human brain functions alone. I submit that a person's consciousness is caused by his/her 'self', which is embedded in him or her from birth to death. Consciousness comes into human lives along with their birth and goes out from them along with their death. Here, the notion of 'self' is considered as the minimal self, not narrative self.

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