

Chapter 2

Brain and the Self

Human experience is a dance that unfolds in the world and with others. You are not your brain. We are not locked up in a prison of our own ideas and sensations. The phenomenon of consciousness, like that of life itself, is a world-involving dynamic process. We are already at home in the environment. We are out of our heads.

—Alva Noë, ‘Out of Our Heads: Why You Are Not Your Brain, and Other Lessons from the Biology of Consciousness’, 2009, p. 8

The brain is inarguably the most important organ of the human body studied to understand the working of sensations, emotions and consciousness. The single unit of information and experience that connects sensations and emotions to consciousness is the ‘self’. Brain and the self are the common life threads that are used today by neuropsychiatry, neuropharmacology and philosophy to get a conceptual hold on one of the most intractable problems of humankind, namely, ‘consciousness’.

Discussion on the self follows two major streams. Self is debated as a cognitive concept that helps find the missing ends between physical and psychological functions. Self is also viewed as the locus of conscious experience. However different the arguments for these two positions are, it is accepted that human behaviours, attitudes and emotions are intricately tied to the discrete neural structures on one side, and the indivisible experiential self on the other.

2.1 Brain’s Profile

An average brain weighs about 1,300–1,400 g and accounts for about 2 per cent of the body weight. The human brain has passed through several phases of evolutionary history to reach its present complexity. It took 13,000 years for the skull to

grow into the present size. It took 3.5 billion years for the human nervous system to form the present complex specializations. It took a hundred thousand years for humans to have the mental capabilities that we have today.

The human brain contains over 80 billion neurons and many times as many supporting cells. The components of the brain and spinal cord are the 10,000 distinct varieties of neurons, trillions of supportive cells and synaptic connections, about 100 neurochemical regulators and miles of axons and dendrites. Neuronal networks transmit information via synaptic junctions through electrochemical processes and together present a seamless sensory and mental experience.

About 15–20 per cent of the blood flow from the heart is dedicated for the brain. In biological terms, the body enables one's brain with the adequate quantities of oxygen, glucose, minerals and other nutrients, and deprivation of these for more than a few seconds result in unconsciousness or irreversible change in brain functions. Such is the biological profile of the delicate brain. At the same time what makes brain the most complex biological organ is its ability to direct and be influenced by a self and his or her personal experiences. Brain is not a finished organ but flexible for betterment of its structures and functions, and adaptation to new environments and challenges. And this is why it is an 'intelligent' organ that learns through networks built by culture, experiences and new needs.

The classical idea about brain with strictly designated cortical areas and assigned functions is not much in vogue. The view that supersedes is that the brain is a flexible organ with capacities to survive even with less cortical areas. There is growing interest in looking at the brain from a functional perspective than structural, since it is increasingly understood that the brain organizes itself functionally. There are medical cases where patients seem to live 'almost normally' in spite of frontal lobotomy or cortical lesions due to psychiatric conditions (Feinberg 2001). It is suggested that perhaps the limbic system, the seat of emotion, is the most important part of the brain without which normal functioning is impossible (Damasio 1994). There is renewed attention on the subcortical areas of the brain whose roles are still not understood in detail.

The capacity of the brain to switch areas of function when the designated cortical area becomes impaired, termed as neuroplasticity, is finding great interest amongst neuroscientists and philosophers. It is now known that the brain has immense capacity for growth and renewal and its function is modifiable by experience. The synapses change because of new experiences.

The primary output of the brain is experience. In terms of brain function an experience means firing of a cluster of neurons. Firing involves the passage of electrical current away from the cell body down to its axonal length of a neuron. The passage of electric current also activates transference of neurochemicals which function as messengers for the whole body system. Apart from its pervasive electrochemical information system the neural cortex is also structurally divided to integrate different kinds of information. There are different cortical areas that are seemingly demarcated for highly specialized functions. Several brain areas work in unison and harmony to facilitate various sensations. In effect the brain constructs, updates and follows various functional maps.

Several different kinds of topographic maps of the body are stored in the brain cortex, which alter according to new experiences, changing environment and responses. The brain starts forming maps of the body from early in life. With age and experience our brains would have created and stored several complex maps. Brain maps primarily function as bidirectional feedback and feedforward systems. Our experiences change brain maps, and with reorganized maps our experiences also alter. Body maps help us to respond to simple and complex problems whether they are cognitive or affective. Body maps are continuously updated and reorganized as we live our lives. With the change in our physical disposition, life styles, mental attitudes and emotional responses brain maps are updated. We are able to keep track of our movement, position and sense the extremities of the body through the brain maps.

2.2 The Mutual Challenge

Is there a common challenge in brain and self studies that appear over and again? Yes. That is the attempt to explain the unity, continuity, and adherence of our experience, whether it is sensory or mental. To address the unity, adherence and continuity of experience is to address the place of the self in the brain, or the role of the brain in presenting a self.

One of the most central and important phenomena a theory of consciousness must explain is the sense of unity we have in respect of our conscious mental states. It seems that, for mental representations to be mine, they must, as Kant put it, 'all belong to one self-consciousness'. Indeed, it was just such mental unity to which Descartes appealed in Meditation VI in arguing for the real distinction between mind and body. Whereas the geometrical essence of body guarantees its divisibility, the unity of consciousness ensures that mind is indivisible (Rosenthal 2003, p. 325).

A major challenge to this effort is the fact that, though we tend to commonly address a static unit by calling it 'self', it is a changing phenomenon as a result of our interactions with nature outside (social and biological) and nurture inside (cultural and moral). In the process of its emergence the boundaries of the self seem to change, creating havoc for some (in the case of psychiatric challenges) and peace for others (in the case of spiritual experiences). Where is that self without which we cannot make sense of anything that goes around however physiologically backed up it is? While the skin beautifully covers up all the anatomy and chemistry of a biological system without any spillouts, the self covers up the body too while giving us a feeling of being embodied. Is my self detachable from my body? Is my body inside my self, or is my self inside my body?

We have asked the mind-body question for centuries. But this question becomes even more complex when it comes to the place and function of self. Philosophically, we continue to ask about the mind-body unity—how mind and body, which are qualitatively different, connect and give rise to meaning and purpose of life. The binding problem and the Chalmersian hard problem (Chalmers

1995)¹ showcase the age-old mind–body divide in the context of consciousness. Both demand functional mechanisms and conceptual frameworks for mutual influence. The ‘hard problem’ is more about a ‘mind’ than about a ‘self’. The ‘harder problem’ is to delineate the wirings that will tell us how quantitative, discrete, physical, neural processes bind and give rise to qualitative, unitary, subjective conscious experience. In short, how do parts add up and give rise to a sum which is more than the parts put together? The harder problem of consciousness is about the subjectivity of experience.

The ‘alter ego’ of the brain is known through the person’s self. On the one hand the brain is all about its chemistry and cortical structures, and on the other it is about a subtle self that often stays behind, and endures the brain through different experiences. To a great extent the brain influences the way we think and behave. But interestingly, the self in return can influence and reverse engineer behaviour in certain ways. The soft and hard questions on consciousness point to the binding of biochemical mechanisms for a physiological function such as sensation, and to the relevance of such a sensation for the subjective experience of a person. The interconnections between the brain and the self are hence used in neuropsychiatry.

Consciousness is projected by some to be a distinct quality—an emergent product of brain processes (Cabanac et al. 2009). For others all of our personal experiences are reducible to an algorithm, and the brain is a sophisticated computational model (Churchland and Sejnowski 1994). There are also theories that uphold that the majority of the mental processes that control and contribute to our conscious experience happen outside our conscious awareness (Gazzaniga et al. 2002). Another proposal is that all that which constitutes the self can be reduced to the synaptic connections—the neural pathways. To that effect Joseph LeDoux writes:

People don’t come preassembled, but are glued together by life. And each time one of us is constructed, a different result occurs. One reason for this is that we all start out with different sets of genes; another is that we have different experiences. What’s interesting about this formulation is not that nature and nurture both contribute to who we are, but that they actually speak the same language. They both ultimately achieve their mental and behavioral effects by shaping the synaptic organization of the brain. The particular patterns of synaptic connections in an individual’s brain, and the information encoded by these connections, are the keys to who that person is (LeDoux 2002, p. 3).

Of the many attempts to define the locus of consciousness in the brain, a successful one has been the effort to trace the neural correlates of consciousness (NCC). The NCC approaches serve two functions: (1) to establish identity relations between the neural correlate and the conscious experience; and (2) to find the causal relations between the two. Interestingly, the founders of NCC theory themselves were sceptical about the complete success of the attempt. They wrote:

Everyone has a rough idea of what is meant by consciousness. We feel that it is better to avoid a precise definition of consciousness because of the dangers of premature definition.

¹ See Chaps. 1, 3 (3.2.1) in this volume. Easy problems are problems that relate to physiological processes to explain sensory experiences. Hard problem is how discrete, physical, quantitative processes bind together to give a unitary, subjective and qualitative conscious experience.

Until we understand the problem much better, any attempt at a formal definition is likely to be either misleading or overly restrictive, or both (p. 264).

2.3 NCC and Unconscious Perceptions

A stronger position to NCC is the replacement of the causal relation between neural correlate and the conscious experience by an identity relation—that there is nothing other than the neural process. The neural process is the conscious experience.

A position that favours functionalism would question the need of consciousness to have sensations and perceptions. Do we need the self to respond to what we perceive? One of the strong proponents of the unconscious processing that happens in the brain is Nicholas Humphrey. He believes that the self is not made entirely of conscious or explicit events. Many perceptual processes are implicit and we are not conscious of them. With his training in primatology, psychology and cognitive science, Humphrey nonchalantly dismisses the subjective nature of consciousness and the ontological reality of self.

In his book, *Seeing Red* (2006), Humphrey investigates the traditional mind-body problem in the context of consciousness. How are conscious experiences related to the physical brain? Adhering to Rylean behaviourism and identity theory,² Humphrey suggests that instead of finding a causal explanation for consciousness we need to find the neural correlate for each conscious mental experience. It is to be shown that the NCC is identical with the content of the brain.

Consciousness is nothing other than sensations. We cannot talk about consciousness without sensations. He argues that all perceptions are unconscious and all sensations are actions. According to Humphrey, in the case of seeing a red object, there are two red things—the red object projected and the red sensation (visual experience). The perceiver sees the object, but they do not see the visual experience of the object. They consciously see real things in the real world and not their experiences of those things. Perception of the red object and sensation of it are independent. We have the illusion that sensation and perception are linked because they occur at the same time. Sensation and perception, although they are triggered by the same event, are essentially independent and occur not in series but in parallel, and only interact, if they ever do, much further down the line (Humphrey 2006, p. 50). Visual experience is a form of action. For Humphrey, having a red sensation, waving your hand, and shouting at someone—all the three are actions.

Consciousness is made of a certain kind of physical activity inside the subject's head. And this activity, we can assume, has been designed by natural selection, using nothing other than the resources of a biologically evolved nervous system (Humphrey 2006, p. 75).

² Gilbert Ryle criticized the Cartesian mind-body dualism and mocked the notion of the 'ghost in the machine', suggesting that the workings of the mind are not different from bodily acts; rather, they are identical.

Humphrey supports his claim that perceptions are unconscious, with several arguments. In the case of blindsight, some kind of visual perception takes place. But there is no conscious, visual experience. Perception of the object exists without the ‘sensation’ of seeing. Another example he mentions is that of subliminal perception whereby an advertiser gets a message across so rapidly that we are unconscious of seeing it on the television screen. Just as there can be perception without sensations, there can be changes in sensation without corresponding changes in perception. When a person is under the influence of LSD and other hallucinogens they may have the sensation that a chair has become gigantic while still perceiving the regular chair. The general argument that Humphrey makes is that there are various instances in which the conscious visual experience and the unconscious perception come apart.

One of the best criticisms for Humphrey’s position, and the maintenance of the qualitative nature of experience, is given by Searle (2006). Searle considers mind and brain as belonging to different dimensions. Humphrey attempts to place conscious experience and the physical brain in the same space: Mind has qualitative subjectivity. Brain does not have it. The experience of seeing red has a qualitative subjectivity, but the neuron firings that produce this do not have this. Seeing red is a first-person phenomenon. Neuron firings are third-person objective phenomena which look theoretically similar.

2.4 Body and the Conspiracy of Experience

Just because some perceptions can take place without the subject’s conscious awareness we cannot conclude that perception is unconscious. Blindsight only suggests that there are several perceptual visual pathways in the brain, and not all of them are conscious. We cannot say that the only form of consciousness one can have is sensation. It is possible that we can have no sensations at all. Consciousness is not seeing alone or just a bunch of sensations. The mystery of consciousness lies in its eluding but ever-present subjective self that reveals through experiences.

Experience is the crux of the problem for both brain sciences and self studies. Relying on self reports one might say that what an experience entails cannot be described clearly and in exhaustive words. But then there are few invariable components and processes that are involved in any experience such as a person, unitary awareness, relevance to past events and future expectations, and essentially a subjective feel of belonging and owning the uniqueness of that experience. Therefore, experience tells us that it is not just ‘having a self’ but ‘being a self’. It makes a tremendous effort to understand, and even before that, to design the methodology, for knowing what is *being a self*.³ That experience brings with it a person on whom the

³ For a discussion on ‘being a self’, see [Chap. 9](#).

content of experience adheres has been a metaphysical problem for classical philosophy in the east and the west. This is demonstrated by the discussions on relations between self, mind and origins of knowledge. While classical traditions have looked at experience with more or less an archived tone, as something that *was there* at some point of time, phenomenological schools focus on lived experience that continue in time primarily because of its embodiment. Phenomenology considers body to be central in requiring the experience to be explained in a diachronic manner. Our experiences have relevance not only in this moment, but also in the subsequent moment. And most importantly, there is continuity and fluidity between the two moments, and it is that which makes experience stick to us in an intimate way.

In the Western world, the significance of the body in conceptualizing and defining the self, inspired by the works of Husserl and Merleau-Ponty, was initiated by Varela et al. (1991). Varela extended the limits of the body from an object to an action. Not only that our mind, cognitions and mental objects are embodied, but also our actions and ensuing capacities are embodied. In the ancient eastern world the views on body have been mostly pluralistic and not overshadowed by metaphysics in order to establish the non-corporeality of body. Eastern traditions of philosophy and medicine conceptualize body as a generic term, and its specifics known in relation with its situatedness in the respective world.

Embodiment has today become a darling concept for many cognitive scientists and philosophers to ground consciousness (in body) and still retain its transcending power. The liberation sought is for the body that is no more, or not just physical but an intricate representation without which our ability to use language, hold objects, enjoy coffee, love another, be creative and all such potencies become unaffordable. Gibson's concept of 'affordance' (Gibson 1986) has helped cognitive scientists to extend behaviours from the body to an environment, and from non-human animals to the humans. The social brain theorists argue for a social process, distributed across brain, body and the environment, which is responsible for the emergence of consciousness. The incidents of the use of tools in bonobos monkeys have extended the significance of 'social tool use' to 'social cognition'. But if we doubt whether the idea of embodied behaviour is yet another version of behaviourism, at least some respond in the negative.

... embodied behavior is not a return to *behaviorism*. This is because perception and action form 'oopy structures' where action generates perceptual feedback that, in turn, generates further action, so that outward behavior becomes an important co-contributor to the processes, including neural processes, which generate further behavioral response (Barrett et al. 2007, p. 571).

2.4.1 Why Embodiment?

The physicality of the body is insufficient to explain the complex attributes it possesses, and hence cannot be the common cauldron for containing the elements of transcendence that are non-corporeal. In effect, embodiment is best appreciated in

the context of non-embodied consciousness. The concept of the body as well as the experience of the body, even if it is extended beyond its physicality, is limited and will not be able to take the rush of consciousness in the long run. To equate the self with the body, and, the human body with the animal body, might serve a purpose to eliminate the Cartesian substance dualism. But the irony is that 'persons' still survive as organic and unique entities. On the heightened interest in embodiment and body identity theories Shoemaker made a perceptive comment way back in 1999, which is valid today as well. He writes:

... philosophical enthusiasm for the body has reached such pitch, in recent years, that those who deny that persons are their bodies are likely to find themselves stigmatized as 'Cartesians'.

... whatever else persons are, they are subjects of mental states. And as subjects of mental states, they had better have the persistence conditions that go with this. It had better be the case that when mental states generate their appropriate successor states, or their appropriate behavioral expressions, those successor states belong to the person who had the states that generated them, and those behaviors are on the part of that person (Shoemaker and Strawson 1999, pp. 287, 300).

Let us bring back the question earlier posed: What are the elements in a typical simple experience? To begin with we may question whether any experience can be marked as 'simplistic'. Even seeing a flower, or hearing a sound, or feeling the soft texture of a rose petal, or any such sensation comes with an accompanying barrage of memories, desires, feelings and associated goals. The immediate correlate of experience is a self-sense that inheres in the various components of an experience, and also unites them to give meaning and continuity synchronically and diachronically. A typical experience (such as a visual sensation) involves thoughts, sensations, feelings and moods associated with it and perhaps unique to it. This means that all experiences are already placed in a context and can also invoke new contexts. There is a grand narrative in and around every experience, contributed by the history, dreams and hope of the person.

Any experience is held tight for the experiencer through a self-concept, which at any point gives an idea of who one is, which acts as the conceptual filter, governs habits and behaviours, and also makes self-transcendence possible. What gives relevance to the experience is the experiencer who owns it and is influenced by it. We are able to move from one experience to another, or collate different experiences, and archive them in memories because of the self-concept. To understand self-sense is to also see how the self-concept is continually updated or transformed. Self-concept is fed by the 'me and other' divide we form, the way we reflect upon oneself and the other, and our theory of mind to design our decisions and actions according to the assumptions of what the other mind is going through. The self-sense that we experience every moment and over time is invariably tied to body-sense and a core-self that is not ideated but which presents the possibility to be reflected in various levels and complex depths.

As we explain complex and deep capabilities that humans possess such as pointed reflection, detached watching, enduring calmness and unconditional

contentment, the body becomes a poor and insufficient concept to accommodate the onslaught of its possibilities. Even the master trainer the world has seen of the entangled body-mind complex, Patanjali, does not endorse the body, mind, and the body-mind complex to have a lasting ontology. *Samadhi*, the highest state of consciousness, according to Patanjali's yoga, is the tasting of *kevalatva*, the oneness, of pure consciousness. The body mediates experience. The notion of pure consciousness and its non-intentional nature does not fit within the framework of any embodied experience.

2.5 Harder Problem of Experience and the Easy Problem of the Body

The idea of a core-self and its existence have been differently theorized and interpreted by scientists and therapists. I use core-self to mean the deep organic self that is not influenced by the physical, mental or social self. Core-self is a space of consciousness without forms and names and is the source of self-healing. Much of the discussions on body and embodiment have hijacked the possibility and presence of the core-self which is non-embodied and non-ideated. Core-self is not an emergent or minimal entity that is dependent on the body and bodily functions, though it expresses through them.

The larger question that arises from the curious behaviour of the body-sense is twofold. One, what is that sense which recognizes that there is an absence of a body-sense? Second, what is that sense which feels the sensation of the body part which is physically absent? In other words, how or to whom is the sense of the body-absence and the body-sense felt?

Two philosophical problems that arise from a straight jacketed analysis of experience is the inherent subject-object divide, and the amount of the 'other' in 'me', and amount of 'me' in the 'other'. Are the 'other' and 'me' intrinsically different? What stuff are they made of?

We may have an intuitive sense of the other, but it is very difficult to have a clear, articulated description of oneself. The central problem that underlies the first-person nature of consciousness is the entanglement of the body-sense and the self-sense in it. Studies on body-schema and body-image attempt to delineate the body-sense from the self-sense in first person experience. It is important to examine both these senses: are they distinct, and if distinct how? If not, where and how they are entangled? What constitutes these basic, everyday senses?

There are fundamental phenomenological and philosophical questions that are absolutely necessary even to attempt an enquiry into the twilight space where the brain and the self stay in embrace creating a magnificent world of experience. Apart from the basic discipline of philosophy, neurobiology and neuropsychiatry help us to ground questions on matters of experiential concern.

According to the Eastern philosophical tradition of Advaita Vedanta,⁴ consciousness is self-luminous. Consciousness not only illuminates an object but is also self-luminous. Both sensation and introspection are available for conscious agents. What Humphrey does not consider is the self-luminous nature of consciousness. In his approach, consciousness is more or less a cognitive function that leads to (visual) sensation. The qualitative nature of consciousness in the form of an experiencing self is not of much consequence according to this theory. What the reductive approaches to explain experience in terms of cognitive functions miss is the flowing, rich nature of the self.

2.6 What is the Self? Can it be Defined by its Characteristics and Functions?

Centuries have passed since the connections between matter and consciousness, the body and the self, have been debated with unflinching vigour but without any clear solution to comprehend the nature of this relation. Any definition of the self has been problematic since historic times.

The discussion on the subjective nature of experience, qualia, stays incomplete without bringing in the role of self. Ramachandran (2003, p. 113) considers qualia and the self as two sides of the same coin though he reduces both to neural processes. Ramachandran, in his five list attributes for self (2003, pp. 113–14) talks about embodiment, agency, and the ability to be self-aware as the important features of self. We have a sense of belonging or ownership to the body. We exercise free will. We self-reflect.

According to Dennett (1989) the self is a ‘non-minimal selfy self’. It is the abstract centre of narrative gravity (Dennett 1991). Strawson (1997) considers self as a cognitive ‘distinctively mental’ phenomenon. Gazzaniga (2006) finds ‘brain’s left hemisphere interpreter’ to be responsible for the ‘ongoing narrative of our self-image’. But according to Gallagher (2000) it is a distributed and decentred self. For Damasio (1999), the self is core and autobiographical.

For many developmental psychologists the self is important because it can be situated in the brain. Whether the self is an emergent phenomenon, or is identical with the brain processes, what makes the self interesting is its relation with the brain in order to explain its existence. Cognitive neuroscience has become successful because of its exciting and impossible agenda to understand all human expressions with the help of a biological organ and its

⁴ Advaita Vedanta is the philosophical tradition propounded by Adi Sankaracharya in the 8th century AD. According to its epistemology, unlike other objects of experience, ‘consciousness’ does not need another external source of illumination. Consciousness is self-manifest and self-luminous. For further elucidation on this topic, see <http://www.iep.utm.edu/adv-veda/>.

number and symbol crunching abilities. In short, the project of mainstream trends in cognitive neuroscience is to find how the brain creates the self and its experience.

Cognitive neuroscience has been driven by the idea that by reductionist analysis of mechanisms within a solitary brain one can best understand how the human mind is constituted and what its nature is. The brain thus came to appear as the creator of the mind and the experienced world (Fuchs 2011, p. 196).

The tendency to biologically situate the self in the brain has faced scepticism. A notable comment is from Shaun Gallagher. He writes:

The project rather should be what happens in the brain when self-as-subject is engaged in the world, in specific actions and in specific social contexts. This requires not only the sophisticated tools of the neuroimaging lab, and the brilliant experiments of neuropsychology, but also the subtly conceptual tools of philosophy (Gallagher 2011, p. 130).

It is essential to engage with the world to learn about the self not as one other idea but as a living, intimate phenomenon in our experiences. There is a continuity in all our experiences which brings forth the past, present and future at the same moment. In that continuity we experience a unity of discrete psychological phenomena that is presented to us seamlessly, binding our memories, perceptions, cognitions, imagination, emotions and sensations. We are capable of thinking using information from the past and expectations about the future. Memories are closely connected and contiguous to all our experiences. Such continuity is felt adhering to a single unit of consciousness which we call as my-self. Contrary to the Cartesian dictum 'I think, therefore I am', in our daily life we first *are*, and therefore are able to do many things which are mental and physical. Otherwise all our physical and mental acts would not have a place to adhere to and would be floating around. Cartesian dualism is more a theoretical construct to distinguish the complex functions that the human self performs. And the dual and split existence are not experientially true.

If so, what do we understand by 'experience'? The meaning of an experience is the value given to that experience by way of responding to it in terms of a physical and mental action, attitude, emotive valence, memory evoking, consequential thinking and value system, all assimilating to contribute to the perception of purpose. Every experience leaves a mark from the past and carries forward a mark to the future. It is our ability to move forward with identified expectations and plans for future that gives directions to the purpose, and finally making an experience meaningful. Every experience contributes to the purpose of living in body and mind. But the realm of perceiving the purpose and thereby creating a meaning itself need not be a result of sensory and cognitive capabilities but the result of our innate relation with the inner core self that can be identified with a space of possibilities.

We are able to give interconnected meanings to our experiences, learn from our mistakes, form beliefs, cherish hopes, have insecurities, express emotions, reflect upon the faux pas we make in life—all these rich forms of experiences with an unwavering unity and coherence. The first and foremost features of self

are being (to put it more experientially, the ‘am-ness’), continuity, adherence, coherence and unity. All through these several features of self what runs is that at any point we are capable of different degrees of awareness and reflection. Perhaps in the evolutionary scale what marks the distinctness of the human self is our capacity to be self-aware in multiple, complex and deeper levels. The ability to be self-aware and self-reflect emerges from the ‘am-ness’ or the ‘being’ nature of the self. All noble and reified values such as freedom, goodness and health are intricately tied to the ‘being’ nature of the self, and if well-integrated these contribute to the wellbeing of the individual. *Being* helps the self to self-heal and to lead to its wellbeing.

For all of us, the boundaries of self shift and shrink when challenged by personal, social, emotional, and cultural elements. Spiritual traditions tell us how the smaller, egotistic actor-enjoyer self can be transcended to realize finer planes of consciousness. Self’s capability for expansion and non-dual inclusion seems to be vital for Vedantic and similar spiritual traditions. Neuropsychiatry gives us narratives and confabulations of subjects, with brain impairments due to amputations, lesions or psychiatric reasons, who find it hard to stay with a coherent self.⁵ Neuropsychology tells us about curious challenges the brain give to the self and the self give to the brain,⁶ causing disturbances to our otherwise natural intuition for proprioception—the feeling and knowledge of the position of the body in space. The first acquaintance to the immediate expression of our self, that is our body, itself is presented to as a unified psychophysical whole thanks to many mappings that the brain has devised in collaboration with the feedback received from our daily encounters with the world.

Both neuroscience and spiritual traditions are replete with mind-boggling accounts of challenges and possibilities for the self, literally and figuratively. Both acknowledge the mutual challenge between the body and the spirit, the brain and the self. The conundrum of consciousness continues to stay for the sciences, psychology and philosophy.

Boundaries of self-sense are flexible, contributing to better or worse existences. Nevertheless, that the boundaries shift is no evidence for establishing that there is no self. All the while in and through different experiences an overall value of the self-sense stays that carries forward the agenda of seeking purpose and thereby achieving meaning. Disruption in the body–sense is not tantamount to the absence of a core-self.

Any theory of self will have to also accommodate the wellbeing of the individual so that we never forget that what we theorize is a living, breathing, talking, loving, individual with emotions, and not an automaton who is not subject to the frailties of human living such as love, jealousy, hope and a feeling of collective comradeship.

⁵ For instance, see (Ramachandran and Blakeslee, *Phantoms in the Brain* 1998).

⁶ For instance, see (Lenzenweger 2011, p. 272).

2.7 Agency, Emotions and Altered Self

The flexible nature of the brain is accompanied by the enigma—the self is somehow able to make sense of the neural changes and create corresponding changes in sensations and personal identity. Self-effort, will power, positive thinking, love, compassion, spiritual quietude and such qualities are found to enhance brain functioning in the case of patients who face mental and physical challenges. Until now we have concerned ourselves with the neural correlates of consciousness. The stories of personal strength in coping, role of empathy and altruism, and meditative realms of consciousness, encourage us to find if there are *self-correlates* of consciousness. Self-correlates seem to alter the functions of neural correlates and neural pathways in curious ways.

A fascinating development in brain studies and cognitive sciences in recent time is the alteration in perceptions about reason, its superiority and cognitive closedness. Rationality that is considered as the hallmark of human expression is complemented by the affective face of the individual. How our emotions are felt, expressed and used, will also determine effectiveness in the way we make decisions. Both affective neurosciences and emotion theorists project biological markers of health to be decided by those traits that would favour prosocial behaviour, interpersonal relations, situational mastery, life satisfaction, and discovering meaning and purpose in life.

Mainstream studies in cognitive science focus on reason-driven qualities of consciousness. When even a subject matter such as feeling is studied in an exclusively rational fashion, Damasio's and LeDoux (2002) approach to integrate emotion into the study of self is noteworthy, though the bias is mostly biological. Damasio considers consciousness and emotions as states of the body, more specifically, the immune system. He uses the Cartesian dualism as a point of departure and argues based on neuroscientific research that reason and emotion are closely linked. He distinguishes feelings from emotions (Damasio 1999). Emotion is physical. Feeling is mental. For Damasio, emotions are neural processes that respond to a stimulus. Emotion is the reaction for a stimulus to choose flight-or-fight options. It is also responsible for the homeostatic regulation in the body. Here too a similar question arises as in the case of qualia. If all that is meant by qualia is to automatically provide organisms with survival-oriented behaviours, then why a subjective feel is involved in emotion? Can homeostasis and response to stimulus happen without generating a subjective emotion and an agent who owns it?

Despite the complementing and at times contradicting theories, have we progressed in revealing the mysteries of consciousness? Perhaps we have taken a significant alternate route. The discussion on mind that prevailed in the earlier part of this century is now passed on to the idea of 'self'. To understand the functional nature of consciousness, mind, its cogitations and cognitions are important. But to see through the subjective qualities that consciousness delivers for human experience, self as a whole is to be considered. We all agree that the ultimate puzzle of consciousness is not even the subjective nature of the experience, but the subject itself who seems to weave the beautiful tapestry of rich, colourful, complex experiences.

The recent shift in focus from the mind to the self is accompanied by new trends in biology and psychology. Biology has moved on from the excitement about ‘sociobiology’ to incorporating counterintuitive ideas, such as empathy, compassion, altruism, and most importantly, emotion. Psychology has marked a detour from the deterministic evaluation rooted in behaviourism, and the repressed, pathological orientation of a patient, to the subjective wellbeing and life satisfaction of a healthy, choice-making individual. And, Libet’s experiments (1985) though influenced a few philosophers to make hasty theories about the absence of free will, informed explanations about electrochemical activities that occur in the brain has shown it to the contrary.

2.8 Dual Worlds: Biology and Philosophy

The conceptual questions that the flexible nature of the brain have brought out are twofold. One is more biological and the other philosophical. The biological question is to find out that area of the brain which is indispensable for consciousness without which regeneration of neural cells will not have relevance. The philosophical question brings up the ancient but yet unsolved issue of human identity, and asks if the brain itself is an agent. The progress in science from a ‘homunculus’⁷ to a ‘conscious automaton’⁸ to the ‘philosophical zombie’⁹ to ‘single neuron’¹⁰ studies has helplessly carried over the mystery of consciousness to this day. The history of brain studies spans from phrenology to the use of highly sophisticated brain scanning techniques to understand various functions of consciousness. The frustrating but enchanting mystery about consciousness is that every time we find a neural correlate or a new theory, the central concern looms large, which is, how to account for the wholesome subject who owns consciousness. But this does not mean that the eye of the puzzle—consciousness—is an illusion or that it is only a commentary of language or that it cannot be defined at all. To this effect, Damasio writes:

The argument that consciousness is impossible to define is equally weak. It is certainly true that the definition is not easy and that unless special care is taken to define, at the outset of any investigation or presentation, what is really being meant by the term, a considerable confusion will ensue. In the end, most of us have a sense of what

⁷ Dennett mockingly describes Descartes’ idea of the immaterial soul as the ‘homunculus’ in his theory of the Cartesian theatre (Dennett 1991).

⁸ Thomas Huxley in 1874 suggested that animals (and human beings) are conscious automata, meaning the mind is a product of the neural functions of the body.

⁹ A philosophical zombie is a human being bereft of conscious experiences or feelings. It is a common concept in thought experiments in consciousness studies.

¹⁰ Recent studies suggest that single neurons can influence human behaviour and action, contrary to the older belief that it is a collection of neurons that contribute to behaviour. For an elucidation on ‘single neuron studies’, see <http://www.nature.com/news/2007/071219/full/news.2007.392.html>.

is meant by consciousness. Most of us, if pressed, produce a definition of consciousness that is patently recorded in the appropriate entry of any quality dictionary: consciousness is that which permits 'awareness of self and surroundings'; or permits 'the awareness of one's own existence, sensations, thoughts, surroundings'. No dictionary fails to present such a definition, usually at the top of the list of definitions (Damasio 1998, p. 1880).

The entangled nature of the brain and the self, its free will, and the enigma of personal uniqueness is the mystery of consciousness, which was likened to the 'unaccountable appearance of the djinn when Alladin rubbed his lamp' by Thomas Huxley,¹¹ 125 years back. The lamp is the electrochemically complex organ called the brain. The mystery continues not because of the philosopher's adamant metaphysics, but because of the neurologist's advanced techniques that fail to uncover the hidden djinn. The final frontier of consciousness reminds us that the challenging philosophical issues that are at the root of human identity are inconspicuously tied up with the way humans are biologically and culturally endowed.

The Platonic dual world theory, Cartesian mind-body dualism, and the Chalmersian easy problems and the hard problem divide, imply Cartesian dualism and exclusivity of the *res extensa* (that which is extended in space) and *res cogitans* (that which is purely mental). The idea of the body in much of the cognitive science literature is skewed and restricted, being mostly limited to functional representation-alism. The Vedantic notion of three bodies (such as the physical, subtle and causal bodies) and embodiment of *Jiva* (the experiential self) breaks through the either-or aporia. For Vedanta the dualist perspective is a transactional tool from the point of view of the body and not a valid one from the point of view of the *Atman* (the pure self). The inside-outside view is from the point of view of the body and not of pure consciousness. This does not mean that the hierarchy is real or that pure consciousness is at the top of the hierarchy. The emphasis is on a subjectivity that is embodied by a liberated person. Embodied liberation, *jivanmukti*, according to Vedanta is centring the body in pure consciousness, and not squeezing consciousness to fit into undersized notions of the body. Vedanta's take on subjectivity retains the somatic expressions of the body, while invoking a 'pure subjectivity', going beyond personal identity which is framed exclusively by life-sustaining bodily functions.

Today, though phenomenology-inspired cognitive sciences have saved the 'body' from being just a tissue-muscle physical thing to something more subjective, cognitive science is still stuck with the notion of a discrete, disconnected, and deconstructed body whose agency is defined around exclusive cognitive functions rather than organismic expressions. And in the process, the brain itself becomes the agent for action. For instance, Galen Strawson describes the project of phenomenology as follows:

The central task of phenomenology, when it comes to the problem of the self, is to analyze the complex, cognitive experience-determining element self that is active in self-experience and that gives it its distinctive character. Once one has determined the content of this experience-structuring element, one can go on to ask the ontological question 'Is there anything in reality to which it applies?' (Strawson 2009, p. 3).

¹¹ See McGinn, *The Mysterious Flame: Conscious Minds in a Material World*, 1999, p. 17.

A central concern that arises from the recent interest in perceiving brain as a ‘conscious agent’ is our very concept of agency and choice-making. Are we confounding the function of a subjective, conscious agent with a biological organ that aids in making decisions and choices?

2.9 Puzzles for Another Decade

The change in perceiving the brain as a biological organ, and human capacities as emergent outpourings of neural processes, poses before us several million-dollar questions: Where and how in the brain is the ‘self’ housed? How does the self make adaptive changes in one’s personality corresponding to the changes in the brain? How does the self influence and alter neurochemical functions of the brain? How is that we can verbalize and report our internal states through self-reflection and introspection? How does the brain integrate information from physiological and mental sources in order to control behaviour and inner states? Can the brain address its structural and functional challenges without the recourse to the self? Can there be a self without the interface of the brain and the limbic system? Are the brain and self constantly challenging each other? How does the brain and the self together create subjective experience? In other words, how does the brain and self conceive their role-play and create the conspiracy of experience where the physicality of the brain is lost in the subjectivity of the self?

These and similar questions may not give immediate answers considering the complex ways in which both our brain and self are cross-wired. They are difficult to answer also because we are yet to design better philosophical conceptual frameworks that are conducive to scientific reductionism as well as humanism. There are fewer consensus in including the subject and the object, the first-person and the third-person data in a manner that is inclusive. Several medical cases studied by neuropsychiatrists show that the way the patient behaves before and after a cure is not even amenable to arrive at straightforward causal relations between the brain and the self. The subject-object distinction itself is shadowed when the brain behaves in ways not true to its essential physical neural structure. Can the brain be described as distinctly objective and physical when it defies the laws of medicine? How does subjectivity intervene into the predictable physical behaviours of the brain and create medical miracles?

When David Chalmers published the fascinating puzzle of conscious experience and showcased the ‘hard problem’ of consciousness in the late nineties, little did we realize that the mystery will only double in another decade. Today, with path-breaking studies in neurology, neuropsychiatry, neuropharmacology, and brain scanning techniques, we have covered more distance, and moved further from the puzzle of the conscious experience to the mystery of the self who interplays with brain to facilitate an experiencer, a person in all her glory. The self is the ‘harder problem’ for the next decade, and perhaps for a distant future. The greatest challenge is to trace the route of the passage, if any, from the brain to the self and its trajectories.

The ‘harder problem’ is to trace the ways in which the brain challenges the self, and the self challenges the brain. To understand the brain is to gain access to the inherently private and subjective space of the self. It is important to continue the classic mind-body debates that favour functional identity and dualism. But equally significant is to understand the emergence and the placement of the self in the context of an evolving brain which has the capacity to change and adapt. Greater insights into the nature of the self—neural and ontological—will arrive if we focus our research on the challenges that the brain and the self give each other. The brain and the self are the final frontiers of consciousness, not as independent puzzles, but as complexly cross-wired phenomena that will persist to stay magical for human imagination. We will have to wait for the day when the door that intermediates the physical world and the personal world opens and let us in, to appreciate the twilight space with better sight and insight.

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