JOY: The Journal of Yoga
Fall 2004, Volume 3, Number 6

In Search of the Self:

Notions of Identity in Buddhist Psychology and Contemporary Neuroscience

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One of the perennial philosophical questions of human thought and reflection pertains to our notions of self and identity. Socrates enjoins us to above all 'know thyself'. Yet, what precisely is the self? Who are we? What is the nature of personal existence and consciousness? Does our personal identity survive the death of the body? I will attempt to address these questions by examining the insights flowering out of two epistemologically rich traditions, namely, Buddhist psychology and contemporary neuroscience. Each perspective approaches questions of self and identity from quite different foundations and we will explore how both traditions come to the similar conclusion that a permanent self does *not* reside within the confines of either our mind or body.

Introduction to Contemporary Neuroscience

The 1990's were declared as the 'decade of the brain' as more noble prizes were awarded in the neurosciences than in any other scientific discipline. Over the past 20 years, the scientific investigation of the brain has exploded as imaging technologies became available for neuroscientists to employ in their research into the mysterious mechanisms of consciousness. The use of PET (position electron tomography), fMRI (functional magnetic resonance imaging), and traditional MRI scans has led to

breakthroughs in our understanding of brain anatomy and neurological function. With the use of such imaging technologies, coupled with invasive brain surgeries, the study of the intricate nature of consciousness began to shift away from purely subjective modes of inquiry into scientifically empirical, and arguably objective, methods of investigation. Scientists are now able to identify distinct regions of the brain where particular kinds of thinking occur and where our perceptions of the external world take place.

Let's start with a few of the basic findings of neuroscience. The brain is one of the most complex living organisms in existence coordinating the activity of approximately one trillion cells and about 100 billion of these cells are what neuroscientists refer to as neurons (Kirby and Goodpaster, 2002). Each of these neurons are connected to a nexus of 10,000 adjoining neurons. As depicted in the diagram below, the neuron is composed of a nucleus, dendrites, soma, axon and terminal buttons. The dendrites receive incoming messages from cells in the brain, the neuron translates the information and passes it on through the axon and terminal buttons. There is a space between nearby neurons where neurotransmitters are released and absorbed called the synapse. The exchange of information between neurons is electrical and chemical in nature. Each neuron sends and receives messages up to 1,000 times a second (Kirby and Goodpaster, 2002).

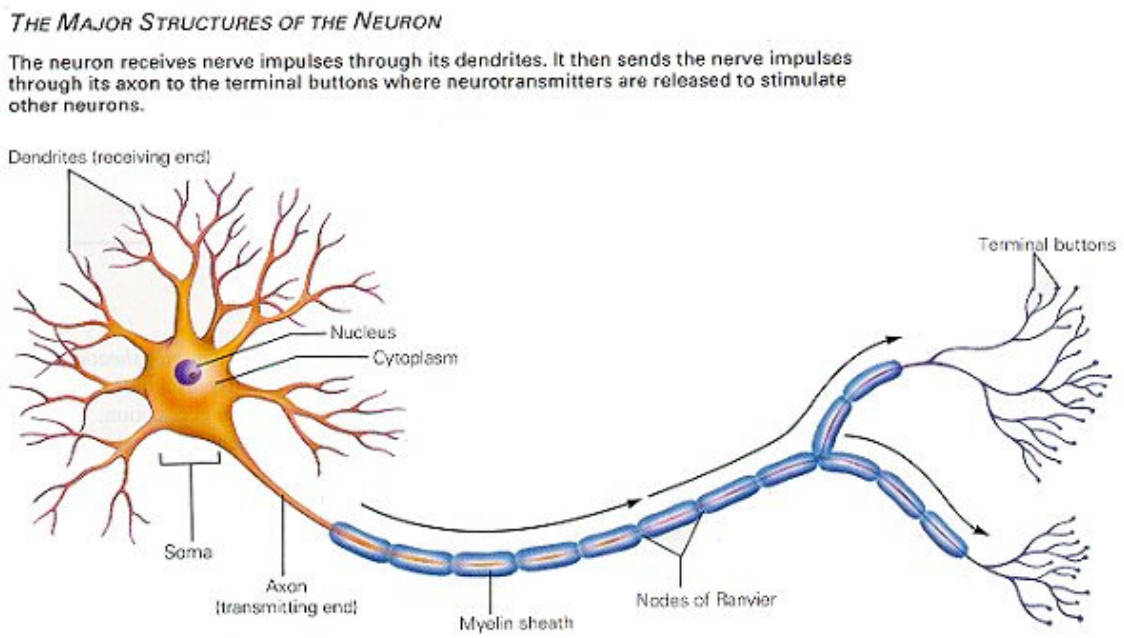

Figure 1: The Major Structures of the Neuron

image source: http://inside.salve.edu/walsh/intro_unit_three.html

The brain is typically divided into four lobes: frontal, temporal, occipital, and parietal (see figure 2). Each of the lobes performs different functions according to the kinds of thoughts and perceptions we are having at any given particular moment. The parietal lobe allows us to receive sensations and make fine discriminations between them. The temporal lobe decodes and interprets what we see and hear. The occipital lobe registers impulses concerned with vision and relays them to the temporal and parietal lobes. And finally, the frontal lobe is associated with complex thinking tasks including our future goals and desires, speech, willed actions, and highly abstract thinking (Austin, 1999).

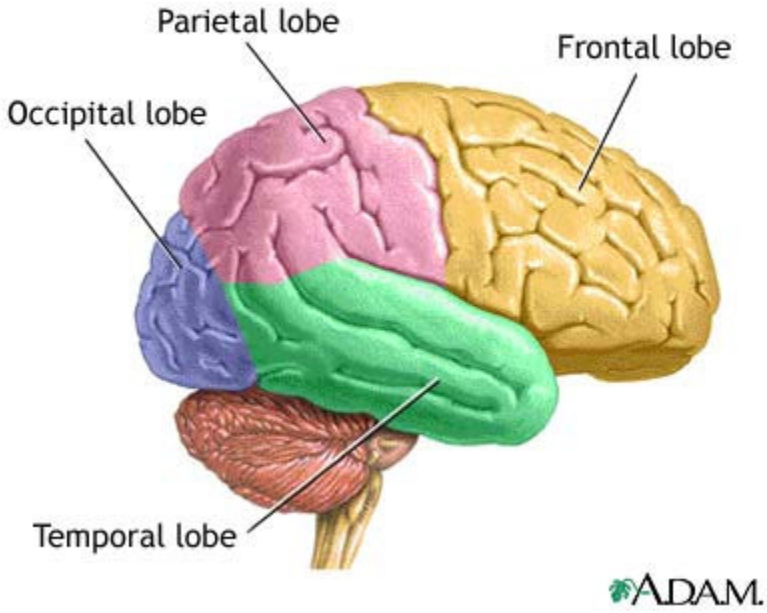

Figure 2: The Primary Lobes of the Brain

image source: http://www.nlm.nih.gov/medlineplus/ency/imagepages/9549.htm

The region connecting the spinal chord to the cerebrum is referred to as the brain stem consisting of the medulla oblongata, pons, raphe nuclei, reticular system, thalamus and cerebellum (see figure 3). The medulla oblongata controls critical body maintenance functions like the regulation of blood pressure, heart rate, and breathing (Ramachandran, 1998). The medulla oblongata is connected to the pons (a bulging structure at the base of the brain) which helps carry out coordinated movements in concert with the cerebellum (Ramachandran, 1998). The reticular activating system alerts and orients us to important external stimuli. The brain stem is also critical in regulating our sleep patterns. The thalamus processes sensory messages arising from our various bodily structures. Deep within the thalamus lies the hypothalamus, which assists us in seeking food when we are hungry and something to drink when we are thirsty (Austin, 1999). The hypothalamus is also involved with hormone production and basic drives such as aggression, fear, and sexuality (Ramachandran, 1998, pg. 10).

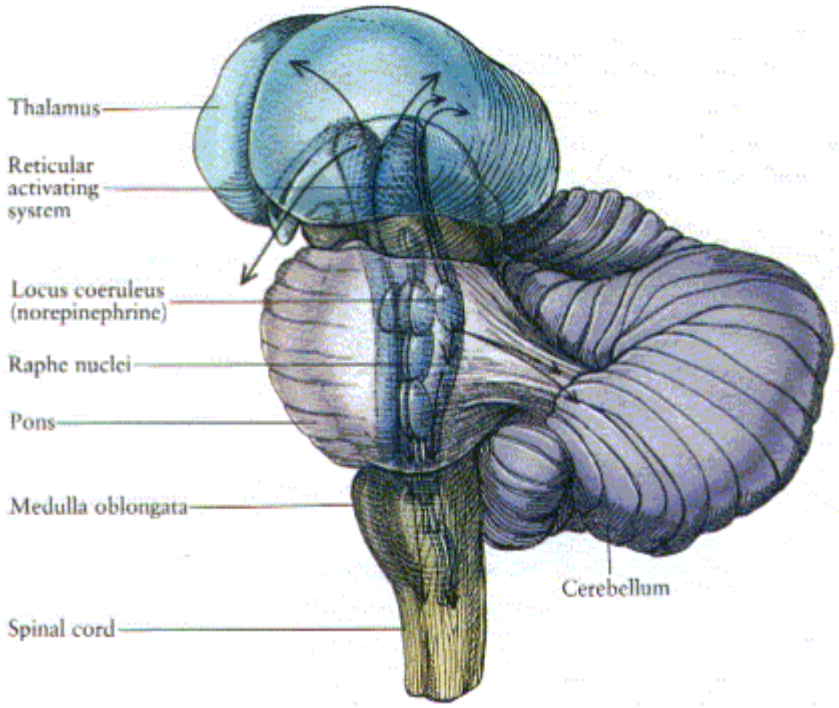

Figure 3: Lower Brain Anatomical Structures

image source: http://www.laxtha.com/bhbae/brainstem/brainstem.htm

Notions of Self in Contemporary Neuroscience

While the field of neuroscience remains in relative infancy and many more questions than definitive answers have emerged in the course of its short history, neuroscientists are reluctant to ascribe a permanent and enduring self to the processes carried out by the brain. Instead, any notions of self that we may entertain are in fact chemical and neurological epiphenomenona. As case studies have shown with patients with Alzeimer's and brain damage of various degrees, whatever concepts of self we may hold at a particular junction in time are subject to severe change and alteration.

For example, an individual with Alzeimer's often fails to recall details of their historical existence. The laying down of memories appears to be related to the

functioning of the hippocampus. In a well-documented case, the patient known as H.M., suffered from an acute form of epilepsy. His physicians decided to remove tissue from both sides of his brain including the hippocampus. After the surgery, H.M. could no longer form new memories, but he was able to remember everything that occurred before the surgery. This has led Ramachandran and other neuroscientists to conclude, "the hippocampus is absolutely vital for laying down new memory traces in the brain (even though the actual memory traces are not stored in the hippocampus)" (Ramachandran, pg.17). If the hippocampus is responsible, at least in part, to the manner in which we store memories, then we are left with the perplexing conundrum whether there is an observing self in the brain, or elsewhere, capable of recording events of historical significance.

As we plumb deeper into the case studies of various patients who have suffered one kind of brain injury or another, we seem to get closer to what neuroscientists refer to as the 'modular approach' of understanding the brain and consciousness. This perspective asserts that the brain is akin to a machine whereby when a specified part breaks or malfunctions, the corresponding function of that part is inhibited. Our perceptions, linguistic ability, notions of self and a host of other mental phenomena are directly attributable to various regions of the brain. If and when such critical structures are damaged, according to the modular approach, the mental phenomena tied to the brain organ in question will cease. For example, a person with speech impairment is likely to show signs of frontal lobe lesions or damage. A patient with vision problems may have suffered deterioration in parts of the occipital lobe. Each structure of the brain contributes to the overall experience of consciousness we have at any particular moment

in time. If regions of the brain are 'turned off' due to structural damage, our perceptions of both ourselves and the world will be altered.

The understanding of the brain, its functions, and abnormalities emerging from the neurosciences flies in the face of many traditional conceptions of the psyche and psychology. Freudian notions of subconscious drives and infantile regressions, while perhaps meaningful given the complexity of brain functions occurring under the radar of conscious control and will, appears to be a largely inadequate paradigm for understanding the workings of consciousness and perception. What may have once been attributed to the possession of demons, spirits, or other supernatural powers upon the workings of one's own comprehension of self and the world, is equally fallacious in lieu of contemporary neuroscience. Furthermore, Jungian psychology with its appeal to archetypal influences and transpersonal domains in terms of a collective unconscious is not likely to convince the staunch materialist who relies solely upon empirical evidence in support of his or her claims. Since there is not clear and compelling evidence for the existence of forces beyond the material world impinging upon the mind, neuroscientists of a strong materialist persuasion are unlikely to give much credence to theories of mind that cannot be subjected to repeatable testing and analysis. If clear evidence does not exist for a hypothesis, then one is not at liberty to create alternate theories as explanatory principles due to a lack of adequate information.

Neuroscience appears to argue for an understanding of the mind that is reductionistic in overall character. The mind is a confluence of reducible parts. If a structure or part of the brain's intricate web of neuronal relationships is interrupted or has become deteriorated by some natural process, corresponding functions shall too be

impaired. Traditional labels of persons as 'crazy', 'hysterical', 'schizophrenic', or 'possessed' begin to take on quite different connotations in this context. As Ramachandran points out,

> psychiatrists often invent ad hoc theories for curious syndromes, as if a bizarre condition requires an equally bizarre explanation. Odd symptoms are blamed on the patient's upbringing (bad thoughts from childhood) or even on the patient's mother (a bad nurturer) (1998, pg. 2).

If a patient begins to exhibit unusual behaviors or thought processes, especially after injury to the brain, we ought not assume that they have now become 'crazy.' Instead, the damage incurred by the brain is the primary cause for the resultant changes and not repressed childhood memories or supernatural entities imposing themselves upon the soul of the individual.

The ramifications of neuroscientific research upon psychological treatment and therapy is rather significant. When a person is behaving 'abnormally', having 'delusional' thoughts, or experiencing 'psychotic' episodes, we ask ourselves what can be done to help bring about a cure. According to contemporary neuroscience, simply talking to a psychiatrist or psychological counselor is not likely to effectuate significant change unless the underlying structure of the brain is thereby transformed. No matter how long one attends counseling or works through their problems conversationally, there is still the matter that the patient's brain has experienced trauma. Merely talking about one's problems may not do anything significantly to the damaged brain. Yet, there is evidence to suggest that the mind-body connection is rather unique in the fact that as one changes one's persona, the body becomes malleable. Physicians working with patients experiencing multiple personalities have observed various states of health depending upon which persona is active. For example, a near-sighted person can become far-

sighted when a significant shift in persona has occurred (Ramachandran, 1998, pg. 6). Psychologists may be able to assist patients re-orient their personalities along healthier and more constructive lines, but neuroscientists will still insist that alterations will also need to occur at the level of individual neural pathways.

Perhaps one of the most intriguing findings emanating from contemporary neuroscience concerns the brain's ability to regenerate itself, suffer cell death, and change considerably over the course of an individual's life. The brain is not a fixed entity that stays forever constant throughout the duration of one's existence. Rather, the brain is beginning to be understood more as an adaptive system subject to considerable change in lieu of alterations in both external and internal environments. As an organ, the brain goes through typical life stages: birth, growth, maturation, and finally death. Yet, as was mentioned earlier, the connections embedded in the brain are in constant flux. Cell death and regeneration are in perpetuity. Consequently, the state of our brain is different than it was yesterday or a year ago and likely to be much different a year from now or a decade in the future.

Neuroscientists have concluded that the first few years of the brain's development are optimal for neuronal growth and the establishment of synaptic connections due to the massive and accelerated growth of cells throughout the brain. We observe a set of quite different environmental influences on the adolescent and adult brain. As the brain matures as a biological system, new chemicals, hormones, and electrical circuits are introduced into the system, which facilitate learning, adapting, and fundamental change. Furthermore, a genetic process is also underway throughout the brain's maturation. The brain begins to develop in accordance with its genetic make-up and inheritance. While

neuroscientists and other theorists continue to debate the significance of genetic factors in the development of personality and intelligence, most recent studies suggest that genetics may account for as much as 50% of such attributes. Meanwhile, the environment may contribute the additional 50% of the brain's complex associational system.

Yet, we need to get some clarity and specificity by what is meant by 'environment' before we can adequately establish its significance in the brain's development. The environment in which we find ourselves can take on a variety of contexts. In terms of the brain, the environment can range from the stimuli originating from a mother's eyes to the quality of oxygen in the air to the types of toys a newborn plays with at home. Ideas concerning the environment of an embedded brain system must assess the total range of internal and external influences. Such influences can and do include the complexity of interpersonal relationships, one's experience of the natural world, and exposure to a host of stimuli originating from culture. Our perceptions about the world are limited, and to a certain extent determined, by what is in the immediate environment. Our ability to learn languages, for instance, is attributed significantly to the language of our elders and those close to us who are communicating to us through a particular language. Additionally, the acquisition of language is made possible by the anatomy of the brain and the structures that support language. The environment can help facilitate the brain's potentials.

Exposure is essential to learning and the brain's development. If we are not exposed to a particular stimulus or environment, we are not likely to learn or know about the content or nuances of such an environment. While this may seem fairly obvious and commonsense, the manner in which the developing brain is impacted by our environment is quite startling. The quality and nature of the stimuli in which we immerse ourselves

dramatically affects the contours and structure of our consciousness. A deleterious environment can and does have a negative impact upon the brain. If the quality of the air we breathe, food we consume, and the culture we live in is toxic, then the brain is likely to suffer and potentially die. On the other hand, if we nurture the brain with proper nutrition and exercise, a healthy intellectual and cultural environment, and a diverse array of stimulating and compassionate interpersonal relationships, the brain will thrive and reflect the health of the immediate environment.

When we adequately take into consideration the complexity of environmental influences upon brain development, we can begin to see how the notion of self is altered in the midst of recent neuroscience. We briefly discussed the role of genetics in the developing brain, but how does this relate to our understanding of personal identity and conceptions of self? Further, if our brain is contingent upon the environment for its enervation, what are we to make of ideas suggestive of a unique, and largely independent personal self? Much of contemporary neuroscience appears to suggest that an isolated, static self is nowhere to be found in the brain based upon what we have reviewed so far. The differentiation between self and other, or self and environment becomes more and more tenuous the further we investigate the seeming distinctions. Rather, our brains are ever-changing processing systems in constant interplay with our environment. Our genes, instead of personal choice, help to determine our possibilities and what we may become as individuals. While our genetic make-up does *not* definitively determine our identities, the DNA embedded in each of our cells plays an important role in helping to create each of our organs, including our brains.

Our environments of influence and genetics certainly play key roles in the development of the brain, but we are still perplexed by the experience of self-consciousness and the feeling of 'I'. Kai Vogeley and Gereon Fink (2003) tease out the fundamental question for neuroscientists in this regard:

> With respect to cognitive neuroscience, the question of the self can be reformulated as: which neural ensembles underlie (and may thus be responsible for) the 'subjective' nature of those mental and bodily states that are candidates for self-consciousness?

The contents of our consciousness are felt, lived experiences, but by whom? Is there a person behind the *qualia* of conscious phenomena? Is there an observing self experiencing the world around us? Is the notion of self that we have of ourselves merely an illusion presented by and to our brains? And perhaps a question of particular interest to neuroscientists: are there neurological correlates that provide for the presentation of self-consciousness? If such correlates of self-consciousness can be identified, what happens to the understanding of self when the neurological structures are damaged? Each of these questions present perplexing possibilities and are unlikely to be definitively resolved in the near future, but neuroscientists have made considerable progress in identifying the neurobiology of self-consciousness in just the last few decades.

We noticed earlier that the hippocampus is instrumental in the formation of memories and that damage in this area of the brain can prevent the laying down of new memories. Recent studies suggest that along with the hippocampus and our ability to remember and recall a sense of personal identity over time, the frontal lobes of the brain may help towards the creation of personality and our sense of self. Baars, Ramsey, and Laureys (2003) suggest that the prefrontal regions of the brain may be responsible for our ability to contextualize abstract aspects of experience, such as social, emotional, and self

evaluation. The authors base their theory of frontal lobe personality attribution on studies of patients who have experienced severe prefrontal cortex damage. The classic example of Phineas Gage and many similar patients lends credence to the notion that our personalities may be localized in a relatively distinct region of the brain.

Figure 4: Depiction of the injury suffered by Phineas Gage by attending physician John Martyn Harlow (1819-1907)

image source: http://home.earthlink.net/~electrikmonk/Neuro/artGage.htm

On the fateful date on September 13th, 1848, Phineas Gage was working as a foreman for a railroad construction company inserting metal rods into the ground with the help of explosives (Macmillan, 1999). During one of the explosions, a three foot and seven inches long tamping iron was propelled through the air. The rod entered through Phineas' lower left cheekbone and exited through the top of his skull, eventually landing approximately thirty yards away from where Phineas was standing. Remarkably, Phineas

remained conscious throughout the ordeal and was eventually taken to see Dr. John Harlow of Cavendish, Vermont. After only 10 weeks of treatment, Phineas was able to return home and resume work. However, co-workers noticed a rather significant change in Phineas' personality. Before the accident, Phineas was admired by his colleagues, responsible, kind, and level-headed. Despite very little, if any, diminishment of his intellectual abilities, friends later described Phineas as "no longer Gage." Phineas had turned into a hostile, openly offensive and crude individual. He eventually lost his job and apparently never again worked in a position of authority and responsibility.

The story of Phineas Gage, and many like him, have led neuroscientists to the notion that our personalities and sense of self are localized phenomena manifesting within specific regions of the brain. The frontal lobes appear to be of particular importance to help regulate our social interaction with others including the choice of words we use, the selection of conscious thoughts to make verbal, and our emotional assessment of our social contexts (Baars, *et al*, 2003). The sense of an enduring self that we derive from our neurological functions may be illusory and misleading. As Joseph Le Doux remarks in his recent book, *The Synaptic Self*, "The self is not static. It is added to and subtracted from by genetic mutation, learning, forgetting, stress, aging, and disease"(2002). As we grow older, experience life's vicissitudes and joys, acquire knowledge, and meet new people, our sense of self is altered. The tissue of our brains is in constant flux and the connections between neurons are changing moment by moment. Recent studies suggest that actin filaments in dendrites can need replacing within 40 seconds, the post-synaptic density (PSD) which is the protein powerhouse of synaptic

activity is replaced almost by the hour, and that the entire brain is recycled about every other month (McCrone, 2004). Our brains appear to be in constant flux.

Introduction to Buddhism

Siddhartha Gautama, the man who would later be identified as the Buddha, was born in Southern Nepal in 563 B.C.E. As the son of the leader of the noble Shakya clan, Siddhartha was raised in an environment of wealth and circumstance. For much of his early life, Siddhartha was protected against the harsh realities of everyday existence including sickness, death, and old age. As he began to mature and his curiosities about the world began to widen in scope, Siddhartha ventured outside the palacious grounds of his youth where he encountered the vicissitudes and suffering of common life. These visions of the outside world were in stark contrast to his royal upbringing and planted a seed of contemplation in the mind of the young Siddhartha. He began to question the plights of those he encountered and ruminated deeply upon the nature of their suffering. Eventually, at the age of 29, Siddhartha began a quest in search of enlightenment and understanding.

Siddhartha left behind the riches he would surely inherit, a wife and a son to become a wandering ascetic. After approximately six years of intense dedication to the ascetic path, Siddhartha ventured to the city of Guaya in northeast India. For some time, he apparently sensed that the ascetic path to enlightenment was not what he was after and an inadequate means to achieving the state of mind he sought. While still in Guaya, Siddhartha came to rest under a pipal tree where he meditated intensely for six days without much rest. On the seventh day, the Buddha nature awakened in the young

Siddhartha whereupon he received penetrating insights into reality and existence. His enlightenment experience provided the foundations for a philosophy he would end up spending the next forty years of his life articulating, developing, practicing, and teaching to others. The philosophy he espoused emphasized moderation in all things and would later be known as the 'middle way'. Neither the self-negating path of the ascetic, nor the voluptuous way of the glutton, proved to be of significant virtue to Siddhartha. He had by now experienced both extremes in the brief course of his life and sensed that a life of balance, restraint, and compassion to all forms of sentient being held the keys to truth and wisdom.

Figure 5: Painting entitled "*The Medicine Buddha,*" copyright © Robert Beer

image source: http://www.cancerlynx.com/large_healing_buddha.html

Fairly early in his career as a teacher and wandering contemplative, Siddhartha espoused upon the Four Noble Truths. His first noble truth asserts the fact of suffering in human existence. Siddhartha realized that we are subject to a plethora of both psychological and physical ailments that culminate finally in the experience of death. The second noble truth suggests that our passions and desires are the root causes of most of our suffering. Thirdly, Buddha argues that there is a path to rid ourselves of our self-centered desires which bring about pain and suffering. Finally, Siddhartha contends that the Eightfold Path to enlightenment is our most adequate solution to the problem of suffering. This eightfold path consists of right seeing, thought, speech, action, vocation, effort, mindfulness, and meditation. The 'middle way' of Siddhartha's teaching compliments the eightfold path by infusing our daily lives with moderation and compassion towards all forms of sentient life.

The Buddha's eightfold path of enlightenment is of particular interest when considered side by side the insights drawn from contemporary neuroscience. We are presented with a holistic appreciation of the human condition in its myriad forms and phenomenological depth throughout the history of Buddhist psychology. Siddhartha was able to adequately address each of the stages upon which we base self-knowledge and the surrounding environment that we are intrinsically embedded within. By beginning with our sense perceptions, and perhaps particularly with what enters our minds through the eyes, Siddhartha shows that our sense experience is often colored (and too often distorted) by what occurs higher up in the eightfold hierarchy of mental events. If we do not see the world around us adequately and appropriately, neither will we be likely to

formulate thoughts that are free from attachment. The Buddha points out that we do not see the world around us objectively. Rather, we subject the objects, experiences, and persons in our environment to the various desires to which we cling.

For example, if I have a particular attachment to a person, whether it is a girl I am passionate about or even a close friend I am fond of, I am likely to split the world into three fairly distinct parts. Those people and objects that help me secure the persons of my desires will be the ones I love and attracted towards. However, I will feel resentment towards people and various external objects that do not assist me in keeping or maintaining the relationships I desire. And finally, there is the possibility of neutrality where particular persons and objects do not either deter or assist me in fulfilling my desires. Neutral forces will not be of any particular importance to me in this regard because they do not infringe, whether positively or negatively, upon the attachments that I hold dear. The Buddha helps make clear that the mind, and correlatively the brain, is not an objective apparatus. Instead, the sense impressions we have of the world around us are filtered through our minds before they acquire meaning and significance. We have subjective experiences of external phenomena based upon the perspectives and attachments we have cultivated.

Yet, as the Buddha suggests, the eightfold path goes beyond the connection between our sense impressions and the thoughts we conjure about such sense data. Our thoughts will spill over into our speech and conversation with others. Based upon what we think we have gleaned from our sense experiences, we are likely to share those insights and perspectives with others. Returning to the example above, my attachment to a particular person and the manner in which I have subsequently divided the world will

influence the way I talk about those objects that assist, deter, or are neutral to my self-centered desires. I may use hateful language either directly or indirectly towards people who are getting in my way of fulfilling my longing for a particular girl. In contrast, I may speak highly of those individuals who appear to be helping me attain or maintain my relationship with the girl of my desires. The severity of language employed is likely to be in direct proportion to the strength of the attachments I have chosen to accept. If I am extremely attracted to this girl and my attachments to her have surpassed any reasonable degree of proportion, I may lash out verbally at those who are threatening my chances of a relationship with her. Conversely, I may speak adoringly of those people who are in some way appearing to help me in my endeavors to secure the relationship.

Siddhartha takes it a step further. The self-centered attachments we inculcate are likely to orient our actions in the world as well. Based upon how we have divided up the world in regards to our desires, we tend to behave a certain way. If I am passionately attracted to the girl of my dreams, I may take various actions in an attempt to win her adoration. Once again, depending upon the relative strength of my desires for her, my actions are likely to correspond fairly closely to my attachment. Not only might I speak poorly of a person who gets between me and the girl I desire, but I may want to physically harm anyone who I do not perceive is assisting me get what I want. In the worse case scenario, I may actually threaten or take the life of another person based upon my inordinate attachments. On the other hand, I may be friendly, pleasant and nice, evidenced through my actions, towards those who appear to contribute to my efforts in acquiring a relationship with the girl of my passions.

Siddhartha argues that our self-centered attachments are illusions that we create based upon a false sense of self. Our desires are likely to dictate how we perceive, speak about, and act in the world around us. If our attachments are especially inordinate, so will the kinds of speech and actions we choose to employ to get what we want. We saw earlier with Phineas Gage that a change of personality was inaugurated by a brain injury. He became crass and rude towards his friends and family after the accident. How might a Buddhist respond to his case? Did his desires change? Did he become angry towards those around him based upon what he suffered? Or is it merely a physical reaction to a brain abnormality? Here is where we begin to cross the lines of explanatory assessments in what is occurring in an individual's mind.

Buddhist Notions of Self

Of considerable intrigue and quite profound potential implications, is the Buddhist suggestion that the self is *emptiness*. Buddhist psychology denies the existence of a fundamental self behind the contours of awareness. Instead, the Buddhists argue that there is simply awareness itself:

> Buddhists don't accept that there is a soul. There is a reductionist approach used in Buddhism in which you do not find the self, that is, you find only *emptiness*. The absence of an intrinsic self *is* emptiness, and emptiness is something to be realized. It is not designed to reintroduce a soul. But we do designate a self. There is a conceptual designation of the self, which relates to the body and to the mind. But it is not something you can localize through reductionist analysis (Houshmand *et al*., 1999).

These words from the Dalai Lama are perplexing to the Western intellect. How can a person essentially be *emptiness*? What precisely is *emptiness*? Since we cannot definitively locate *emptiness* in the world of phenomenal objects, where might we say

that it exists? Is *emptiness* nothing at all? Or everything? How can *emptiness* be realized?

The vast history of Buddhism seems to be a journey of self-understanding. Buddhist psychological texts, such as the Abhidharma, go into tremendous detail about the different mental states we are each capable of entertaining in our mental landscape. Tarthung Tulka Rinpoche says that, "the Abhidharma systematizes Buddha's teachings and is one of the best ways we have of knowing ourselves"(Guenther and Kawamura, 1975). As a spiritual tradition, Buddhism is rich in analysis on the emotional contours of the human psyche. By closely taking a look at both our positive and negative mental states, the types of thought underlying mental instability, and our basic emotions, Buddhism far surpasses contemporary neuroscience in its sensitivity to even the slightest alterations of consciousness. However, creating maps of our mental territories is not merely an academic exercise. Instead, through close scrutiny of our various thought processes, we are able to arrive at a clearer and more thorough understanding of self.

Perhaps of utmost import in regards to the self is the Buddhist notion that *emptiness* goes hand in hand with *compassion*. The conception of emptiness held by many Buddhists is not a pure *nihil*. While emptiness may be envisioned as a no-thing and not among any of the objects we find in the external world, emptiness has a definitive character nevertheless. The intuition of emptiness appears to lie at the heart of Buddhist ontology. The experiences of Nirvana and Enlightenment attest to the fundamental reality of emptiness. Yet, instead of attributing a diminished sense of reality to emptiness, the Buddhist understanding of emptiness seems to suggest that emptiness is in fact the most real of any existent in the known universe. Especially in the Western world,

where we are accustomed to equate reality with materiality or reductionist particulars, the Buddhist appreciation of emptiness is foreign to our sensibilities, but as we take a close look at the history of philosophy and psychology emanating from what is considered the Western world, we find the concept of *Being* itself. Our concepts of *being* are akin to the Buddhist idea of *emptiness*. Being is not a thing in the world, but rather, encompasses the totality of both subjects and objects. Being, like emptiness, is an inter-subjective reality. This emptiness, the Buddhists argue, is what we fundamentally are.

Despite the similarities between the Buddhist's emptiness and the Western ontological concept of being, the identification of emptiness with compassion is of considerable significance. Buddhist psychology maintains that the state of compassion is our normal and natural orientation towards life. When we are driven by our self-centered attachments instead of the emptiness in which we fundamentally are, we lose touch with our compassionate sense of self and balance. This is a key insight to Buddhist psychology and a perspective we find absent in many of the Western conceptions of mind. Compassion is the true state of both the universe and our own being. When we adequately plumb the depths of the self we find compassion, according to the Buddhists. Essentially, the self is compassion. This is in stark contrast to the idea of self that is ego-dependent and concerned primarily with what benefits an illusory chimera conjured up by the mind.

Conclusion

Now that we have taken a brief sojourn through the precepts of both contemporary neuroscience and Buddhist psychology, we can begin to take a look at the

similarities and differences between the two traditions. As Christopher deCharms points out in his delightful book *Two Views of Mind: Abhidharma and Brain Science*, the self may be the point at where the two traditions are in greatest agreement with one another. He says,

> Neuroscientists have attempted to demonstrate through mechanistic analysis and theoretical models that there is no need for any little homuncular pilot guiding the brain, no need for any ghost soul operating the machine. They too are faced with the criticism: "I see all of the mechanisms, but where am I?" The two systems seem to offer different sides to the same essential answer: "There is no need for a belief in the self, there is only a process taking place which is our individual experience."(deCharms, 1998, pg. 229)

Convincing evidence for the idea that there is an 'I' orchestrating our mental symphony is absent from both contemporary neuroscience and Buddhist psychology. While neuroscientists are still perplexed with the experience of seeming self-consciousness, and while most would agree that there are executive brain functions occurring throughout each moment of awareness assisting conscious selectivity, neuroscientists are likely to stand alongside Buddhists in the idea that there is no soul to be found anywhere in the mind or brain.

The renowned neuroscientist V.S. Ramachandran delineates the various characteristics of our definitions of self in his superb book, *Phantoms in the Brain*. He differentiates between seven modalities of the self (Ramachandran, 1998):

1. *The embodied self*- is the self anchored to a single body with a consistent body image. It is the self that feels pain and pleasure in relation to external influences.
2. *The passionate self*- is the self capable of determining meaning and significance. This mode of self-awareness is directly linked to the amygdala and the limbic system where our emotions are mediated.
3. *The executive self*- is the seat of our decisions and the locale of our free-will. The executive self helps us determine what we shall do in virtually any situation and helps us to be motivated in our actions.

4. *The mnemonic self*- is the sense we have as persons with a historical autobiography. This self endures through space and time and is cognizant of personal identity. As we saw earlier, the hippocampus plays a key role in the formation of memories helping to ensure continuity in our daily existence.
5. *The unified self*- is where it all comes together and where coherence between the various attributes of our self are integrated into a consistent whole.
6. *The vigilant self*- is dedicated to the fulfillment of our deepest hopes and dreams, our aspirations and the self able to overcome obstacles.
7. *The conceptual self and the social self*- are the inter-relational and inter-dependent contextual identities we help formulate in our communication with others. This is the self that fulfills a social role or occupation, concerned with honor and fame, and the part of ourselves we most often want to protect from the threat of death.

Each of these dimensions of the self help us to define who we are and what we aspire to become. They regulate our social affairs with others and embed us within our surrounding environment. As Ramachandran points out, each of these selves can be traced to physiological correlates in the brain. If one of the regions of the brain is damaged where a particular function is altered, our sense of self is subject to change.

While Buddhist philosophers and psychologists may be willing to grant a certain reality to each of these notions and compartments of selfhood, they are more likely to show how our attachments are the primary source of our identifications. Although in fundamental agreement with neuroscientists that a soul does not reside behind the mental states of awareness and perception, Buddhists take the analysis of the self into discussions upon the nature of emptiness and compassion. The concept of emptiness is not part of the lacuna of neuroscientists and perhaps a bit awkward to the scientific method of observation. But this gets us to one of the key distinctions between the two traditions. Both traditions are using observation as a device to uncover truth about mental reality. Buddhism relies heavily on introspection and an internal analysis of

diverse mental states. Meanwhile, the neurosciences are primarily concerned with the modules that make different kinds of consciousness possible. Neuroscience uncovers the external anatomy of mental life and Buddhism explores the internal territories of conscious affectation.

The ongoing dialogue between neuroscientists and Buddhists ought to continue in an attempt to help bring greater clarity and acumen to the nuances of consciousness, and not as a debate to determine who is right and who is wrong. Each tradition of insight and analysis has much to offer the other in terms of furthering our understanding of the profound mysteries of the mind. Perhaps neuroscientists will more fully appreciate and study the roots of compassion as the science of the brain continues to mature. Equally instructive, Buddhists may be able to further their own understanding of the mind by exposing themselves to anatomically derived explanations for mental phenomena. As we witness this discussion transpire in the global milieu of the 21st century and beyond, may we all be open to the fascinating insights that both of these traditions offer into the knowledge of who we are. And if we're lucky, we might just find out that we all participate in Buddha nature.

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