

A Journey into Chaos: Creativity and the Unconscious

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ABSTRACT

The capacity to be creative—to produce new concepts, ideas, inventions, objects, or art—is perhaps the most important attribute of the human brain. We know very little, however, about the nature of creativity or its neural basis. Some important questions include: how should we define creativity? How is it related (or unrelated) to high intelligence? What psychological processes or environmental circumstance cause creative insights to occur? How is it related to conscious and unconscious processes? What is happening at the neural level during moments of creativity? How is it related to health or illness, and especially mental illness? This presentation will review introspective accounts from highly creative individuals. These accounts suggest that unconscious processes play an important role in achieving creative insights. Neuroimaging studies of the brain during “REST” (random episodic silent thought, also referred to as the default state) suggest that the association cortices are the primary areas that are active during this state and that the brain is spontaneously reorganizing and acting as a self-organizing system. Neuroimaging studies also suggest that highly creative individuals have more intense activity in association cortices when performing tasks that challenge them to “make associations.” Studies of creative individuals also indicate that they have a higher rate of mental illness than a noncreative comparison group, as well as a higher rate of both creativity and mental illness in their first-degree relatives. This raises interesting questions about the relationship between the nature of the unconscious, the unconscious, and the predisposition to both creativity and mental illness.

Key words: Creativity; complexity; Self-organizing systems; Consciousness; The Unconscious, *Functional imaging, Resting state, Default mode,*

INTRODUCTION

Creativity is one of our most valued human traits. It has given human beings the ability to change the world that they live in; and it has also, paradoxically, given them the ability to adapt to changes in the world over which they have no control. Our highly-developed capacity to develop and implement new ideas arises from our highly-developed human brain. Understanding how creative ideas arise from the brain is one of the most fascinating challenges of contemporary neuroscience.

WHAT IS CREATIVITY?

The first step in studying creativity is to define what it is. One of the first issues that must be addressed is the relationship between creativity and high intelligence. Since the same word, genius, is often used to refer to people who

are highly creative and also to people who are highly intelligent, a common assumption is that creativity and high intelligence are the same thing. This is, however, a misconception.

Perhaps the strongest demonstration of the difference between these two mental capacities comes from the work of Lewis Terman (Terman, 1925-1959). Beginning in 1921, Terman conducted a landmark longitudinal study of children born in California in 1910 and after, who had IQs in the 135-200 range. He evaluated them at regular intervals for the next few decades, and the study was continued by his successors so that they were followed into middle and late middle age. These individuals, who came to be known as the “Termites,” were thoroughly studied; variables included information about general health, mental health, age at puberty, height and weight, social skills, educational

achievement, marriage and divorce, occupation, public recognition, and many others. Contrary to popular beliefs at the time, the Termites were not undersized, socially inept, or badly adjusted. Instead, they enjoyed better general and mental health than their comparison group, and they were also more successful in their later lives and careers. Somewhat surprisingly, however, they were not found to have made highly creative contributions after reaching adulthood. When the cohort of 757 individuals available for follow-up at mid-life were evaluated, only three were engaged in creative activities (one Oscar-winning film director and two successful writers). Additional confirmation that creativity and high intelligence are different mental capacities comes from approaching the question from a different direction: the study of highly creative people who have been IQ-tested. Several studies have shown that groups of highly creative people (e.g., well-known writers, successful architects) have mean IQs in the 120 range (Andreasen, 1987; Mackinnon, 1965). An IQ in this range is considered to be “superior,” but it is not in the “genius” range.

If creativity is not equivalent to a high IQ, then how else might it be defined and measured? Several different approaches have been taken to address this question. One has been to develop tests specifically designed to measure creativity and to designate people who achieve high scores on these tests as creative. The basic assumption behind most such tests is that creativity can be defined as having a capacity for achieving a high level of *divergent thinking*. Divergent thinking is defined as the ability to come up with a large number of responses to an open-ended probe; it is contrasted with *convergent thinking*, which tends to apply a sequential series of steps to answer a question that has only one possible solution. (Runco and Marz, 1992) An example of a probe used to assess divergent thinking is asking: *How many uses can you think of for a brick?* A series of similar questions can be asked and then used to create a score that is a continuous measurement of divergent thinking. (Torrance, 1998) This approach is favored by some psychologists as a way of achieving an objective measure of creativity.

An alternative approach is to define creativity operationally. That is, people who have produced some type of creative output are designated as creative based on their achievements. When this method is used, it is typically in conjunction with an approach known as the “case study method.” People are selected because they have achieved a high level of success and recognition in fields such as architecture, writing, mathematics, physics. Often a specific criterion of success is used, such as having won a major prize or award (e.g., Fields Medal, Nobel Prize, Pulitzer Prize, Lasker Award). These people are then assessed using structured interviews about their work habits and thought processes, personality tests, and measures of cognition. The commonalities that they share are considered to be characteristics of creative people and their cognitive

style. An important recent spin-off of this approach is to conduct neuroimaging studies of such people in order to examine the neural basis of creativity.

The Interface between Creativity and Unconscious Processes

One entry into understanding the neural basis of creativity is to listen to people as they describe how their ideas come to them. The most famous example is perhaps Archimedes, who was confronted with the challenge of determining whether a irregularly-shaped golden crown was made of pure gold or an alloy. The solution came to him in a flash of insight as he got into a bathtub, sat down, and suddenly realized that he could measure its density by measuring the amount of water it displaced divided by its weight, just as water was displaced by his body in the tub. As legend has it, he shouted “Eureka!” (Greek for “I have found it!”) and ran out of the house naked because he was so excited that he forgot to dress.

This archetypal story has been echoed over and over by creative individuals as they describe how they get their ideas and inspiration. The creative process moves through stages. It begins with *preparation*, a time when the basic information or skills are assembled. It continues on to *incubation*, a relaxed time during which the person does not work consciously to solve the problem, but when connections are unconsciously being made. This then leads eventually to *inspiration*—the eureka experience when the person suddenly sees the solution. It ends with *production*, a time when the insights are put into a useful form. The specifics of this basic process will vary depending on the type of creativity; writing a novel is different from identifying a new chemical synthesis. But the basic process and principles are the same across many different types of creativity. Describing their subjective experiences, creative people say the same things repeatedly:

“I can’t force inspiration. Ideas just come to me when I’m not seeking them—when I’m swimming or running or standing in the shower.” “It happens like magic.” “I can just see things that other people can’t, and I don’t know why.” “The muse just sits on my shoulder.” “If I concentrate on finding the answer it never comes, but if I let my mind just wander, the answer pops in.” (Andreasen, 2005)

Here, for example, is Poincare’s description of how he discovered Fuchsian functions:

One evening, contrary to my custom, I drank black coffee and could not sleep. Ideas rose in crowds; I felt them collide until pairs interlocked, so to speak, making a stable combination. By the next morning I had established the existence of a class of Fuchsian functions, those which come out from the hypergeometric series; I had only to write out the

results, which took but a few hours. (Poincare, 2001, p 220.)

If we try to understand these descriptions using the framework provided by our understanding of the mind and brain, then we are led to the conclusion that the creative process arises from the unconscious rather than occurring as a conscious process. The person is typically in some type of reverie or dissociative state, when the mind wanders freely and thoughts and images float around without censorship. During this fluid time the brain is probably working feverishly, despite the subjective sense of reverie and relaxation. As Poincare says, "ideas rose in crowds." At the neural level, it is as if the association cortices are working actively, throwing out feelers for possible connections between unrelated capacities—verbal and visual spatial associations, abstract and concrete associations, colors, images, concepts...a veritable primordial soup of thought. Then, within this primordial soup, ideas "collide until pairs interlock....making a stable combination." As we think about this process using the terminology of mind and brain, then the primordial soup is the unconscious and process of making connections must arise from the efforts of the association cortex.

Random Episodic Silent Thought and the Default Mode Network: Visualizing the Unconscious with Functional Imaging Techniques

Although the subjective state of allowing the mind to wander freely has been recognized as a discrete mental activity for many years, few tools have been available to understand how these thoughts actually arise in the mind or brain. The development of functional imaging technologies has changed that. Using the tools of Positron Emission Tomography (PET) and functional Magnetic Resonance (fMR) imaging, we are now able to visualize and measure *how the brain thinks*.

Our group in fact conducted the first empirical examination of intrinsic neural activity during "free association," as inferred from regional cerebral blood flow (rCBF) during the early era of PET research. During this early era of functional imaging research the basic study design involved a comparison between two tasks. One, the experimental task, was the cognitive ability being studied—verbal fluency, remembering lists of words, recognizing faces, or focusing attention. The experimental task was usually compared with a neutral or "baseline" task; frequently this baseline task was the "resting state," during which subjects were instructed to relax or rest. In essence, they were being given the same instructions as often occur during free association: relax and simply think about whatever comes into your mind.

The expectation that the "resting state" would be a neutral or quiet activity seemed ludicrous to our imaging research group. Arguing that the brain never "rests," we used PET to examine

which brain regions were more active during the "resting state" in healthy normal volunteers—a condition during which the subjects were allowed to let their minds wander freely (Andreasen, 1995). In other words, we treated the "resting state" as an experimental condition in its own right. When we did this, the results were not surprising. We found activations in multiple regions of association cortex, including frontal, temporal, and parietal, as well as the retrosplenial cingulate. Essentially, we demonstrated that the process of "free association" allows the association cortices of the human brain to converse with one another in a free and uncensored manner! When we systematically debriefed the subjects about their mental activity during this condition, we learned that they were engaged in random free-floating self-referential thoughts about the past, present, and future—what is conventionally termed "episodic memory" (as contrasted with "semantic memory") in the field of cognitive science or free association in the field of psychoanalysis. Therefore, we suggested with a touch of irony that the "resting state" should be referred to as random episodic silent thought, for which REST is an appropriate acronym. We were not visualizing a passive silent brain during the "resting state," but rather a brain that was actively connecting thoughts and experiences.

This observation lay relatively dormant for a number of years, but the study of REST has now emerged as one of the "hot topics" of contemporary cognitive neuroscience. Its study has been facilitated by the increasing use of fMR, a functional imaging technique that is more widely available and less invasive than PET because it requires no radiation exposure. In this more recent literature, REST has been renamed the default mode, and its associated network is now referred to as the default mode network (DMN) (Buckner et al., 2008; Raichle and Snyder, 2007). The coherent low frequency fluctuations in fMR BOLD activity are now thought to be an inherent property of the human brain and to reflect intrinsic connectivity networks.

A Journey into Chaos: How Do Ideas Arise from the Unconscious?

Recognizing that the association cortices are active during unconscious thought is a beginning, but it does not tell us how the connections themselves are made. It tells us the "where," but not the "how." What process occurs when ideas arise in crowds and then collide "until pairs interlock"? How does a random process eventually lead to something meaningful? *How does the brain think?* This is one of the deepest questions in modern neuroscience.

An outdated answer would be that the prefrontal cortex acts as the executive that supervises the process. This answer is not adequate, however, because it is based on an outdated localization model that imputes differing responsibilities to different brain regions. More modern and current models of the brain conceptualize it as comprised of

distributed circuits comprised of nodes that mutually share the responsibility for creating its outputs.

But who decides what the outputs will be, if there is no executive? To answer this question we must turn to the concepts of self-organizing systems and chaos theory. Chaos theory, also known as complexity theory, is the study of dynamic and nonlinear processes and of self-organizing systems (Gleick, 1987). Self-organizing systems can be seen all around us, once we begin to look for them. We see them in the flocking of birds, the schooling of fish, and the changing global ecosystem. All these things produce a form of organization in which the control is not centralized, but rather is distributed throughout the entire system. The system is dynamic, and changes arise spontaneously and frequently produce something new. Seen within this context the human brain is the ultimate self-organizing system, and creativity is one of its most important emergent properties.

Genius and Insanity: The First Iowa Study of Creative Genius

An initial study of highly creative individuals was conducted at the University of Iowa during the 1970s and 1980s (Andreasen, 1987). This study was facilitated by the fact that a pool of creative people was readily available locally; the University of Iowa is the home of the Writers' Workshop, the oldest and most famous creative writing program in the United States, and perhaps in the world. Founded in 1936, it has been home to many of America's most distinguished writers at some point in their careers. Among them: Kurt Vonnegut, John Irving, Robert Lowell, Phillip Roth, John Cheever, Flannery O'Connor, and many more. Tennessee Williams was also a student in the Iowa Drama Workshop. Because I was a faculty member in the English Department prior to changing careers to study medicine, I knew many workshop writers. When I decided to conduct a study of the relationship between creativity and mental illness during the 1970s, the study was relatively easy to conduct because of the rich trove of available subjects.

The working hypothesis behind this study was that there was a relationship between creativity and psychosis, particularly schizophrenia. The empirical evidence driving this hypothesis consisted of several famous cases. James Joyce had a daughter with schizophrenia and had many schizotypal traits. Albert Einstein had a son with schizophrenia and was also somewhat schizotypal and eccentric. Bertrand Russell had many family members with schizophrenia or psychosis: his aunt, uncle, son, and grand-daughter. There were also good theoretical reasons for expecting an association between creativity and schizophrenia. Psychotic individuals often display a capacity to see the world in a novel and original way — literally, to see things that others cannot. Might not the

cognitive traits possessed by people with psychosis have something in common with those possessed by creative people, who also can sometimes see things that others cannot?

While the hypothesis had a good empirical and theoretical basis, it was not confirmed in this early study. Instead, the writers had a high rate of mood disorder. Furthermore, their first degree relatives also had a high rate of mood disorder, as compared with an educationally and IQ-matched control group. Why was there such a mismatch between hypothesis and results? One possibility is that the hypothesis was simply wrong. Another, however, is that limiting the sample to novelists and poets may have biased the results. Two of the three people who influenced the initial hypothesis, Einstein and Russell, were scientists...and scientists who inhabited a world shaped by the arcane abstractions of mathematics. Would the findings have been different if scientists had been studied instead of artists?

Adding Neuroimaging and “Seeing” the Brain: The Second Iowa Study of Creative Genius

These thoughts percolated for several decades, and more questions were added as well. The tools of structural and functional neuroimaging became available during the 1980s and 1990s, offering a window into understanding creativity that opened vistas unreachable through introspection and structured interviews. What would we find if we studied the brains of highly creative people and compared them to a noncreative comparison group? Would they differ in brain structure? In functional activity? Would artists and scientists differ in their functional brain activations or in their brain structure? The second Iowa Study of Creative Genius was finally initiated in order to address these questions.

The design of the study is a classic case-control comparison. When it is completed, the subjects will include thirty highly creative artists, thirty highly creative scientists, and thirty non-creative comparison subjects. The definition of “highly creative” is operational. Individuals are recruited for the study if they have won a major award in their field — Fields Medal for mathematics; Nobel prizes for chemistry, physics, or physiology or medicine; Pulitzer Prizes or National Book Awards; National Medal of Science; and other similar high levels of recognition for creative achievement.

The approach involves the “intensive case study” method. Individuals come to Iowa City, where they spend two days participating in interviews and tests. A special structured interview is used to evaluate their family history, early life and personal history, their history of creative accomplishments, their work habits, the ways they develop their ideas and complete their work, and their personal and family history of mental illness. They are evaluated with a WAIS-III (conceptualized as a way to assess different facets of intellectual

ability rather than as a test of intelligence) and a Temperament and Character Inventory (as an evaluation of multiple facets of personality). They are also evaluated with 3T structural and functional MR scans.

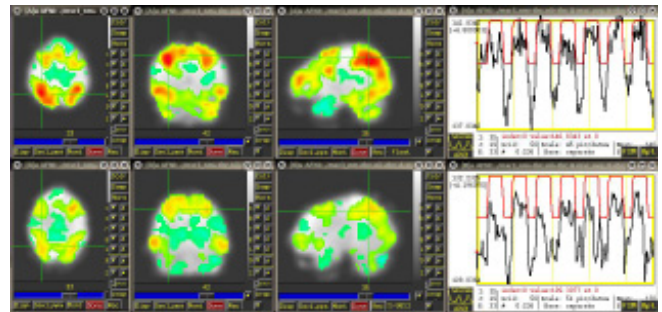
The selection of a design for the functional MR (fMR) studies was challenging. As described above, the core component of the creative process is usually a flash of insight that leads to a new idea or the solution of some problem. It cannot be forced. Furthermore, the very nature of fMR study design runs counter to the nature of the creative process. Because fMR has a very poor signal to noise ratio, tasks must be performed repeatedly in order to extract a signal. The most powerful way to deal with the poor signal to noise ratio is to use an on-off block design, during which an experimental task ("on") is alternated with a control task ("off"); depending on the task, the on-off repetitions occur 7-10 times in a run, and the run is repeated two to three times. How can a creative person be expected to come up with a "creative idea" when lying in an MR scanner and being confronted with such a repetitive and tedious series of tasks?

The challenge of designing a suitable group of fMR tasks was resolved by finally deciding that expecting subjects to repeatedly come up with "creative thoughts" was impossible. On the other hand, conceptualizing the tasks in terms of assessing brain networks involved in creativity was highly feasible.

As described above, the brain regions most likely to be involved in the creative process are the association cortices — those brain regions that are most active during REST when a person is engaged in free-ranging and uncensored thought. Therefore, a simple and logical solution to the challenge of designing a functional imaging study of creativity was to select mental tasks that would engage the association cortices. Consequently, two tasks are used in the study to tap into the activity of association cortex. One is a word association test, during which the subject silently reads a word and then responds with the first word that comes to mind. The other is a picture association test, during which the subject looks at a picture and responds with the first thought about the picture that comes to mind. These two tasks tap into the process of making verbal and visual associations. A third task was selected in order to examine brain activity during abstract pattern recognition, a process similar to that occurring during some aspects of scientific creativity. This task is based on the Raven Progressive Matrices. Finally, we also collect two sessions of REST, in order to examine activity in the default state network.

This study is still in its early stages, because recruitment is challenging, funding is limited, and the study of each subject is very time-consuming. However, some conclusions are already beginning to emerge. *First*, it is now clear that the choice of tasks and the implementation of the block design

for the fMR component of the study was well-reasoned and well-implemented. The tasks all produce robust activations in plausible regions. During word association, activations occur in left and right middle and inferior frontal regions, anterior cingulate, and left middle temporal gyrus; these are the association cortex



A creative subject (above) and a control subject (below) during an fMR task using a boxcar design

regions used for language. During picture association activations occur in primary visual cortex, bilateral fusiform gyri, left and right angular gyri, and bilateral middle and inferior frontal gyri; these are regions used for making visual associations. During pattern detection activations occur in bilateral fusiform gyri, anterior cingulate, bilateral precuneus, bilateral superior parietal lobes, and bilateral insula; these are regions used for visual-spatial perception. *Second*, it is also clear that the creative individuals have stronger activations in these regions than do the control subjects. And *third*, the activations are quite similar in artists and scientists, suggesting that the brain may know no dichotomy between these two disciplines. Sample size is still too small to make inferences about different patterns of mental illness in the two groups.

TAKE HOME MESSAGE

The creative process is characterized by flashes of insight that arise from unconscious reservoirs of the mind and brain. Imaging studies indicate that these reservoirs reside in association cortices. During the creative process the brain works as a self-organizing system.

CONFLICT OF INTEREST

None

DECLARATION

This is my original unpublished contribution, not under consideration for publication elsewhere.

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QUESTIONS THAT THIS PAPER RAISES

1. Are there structural brain differences between creative and non-creative people?
2. What are the personality traits that characterize creative people?
3. Is the creative process for performing artists similar to that described for other artists and for scientists?

About the Author



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Consciousness, Cognition and Cognitive Apparatus

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ABSTRACT

A human being is a complex entity consisting of the Self (also known as Consciousness), mind, senses, and the body. The Vedanta tradition holds that the mind, the senses and the body are essentially different from the Self or Consciousness. It is through consciousness that we are able to know the things of the world, making use of the medium of the mind and the senses. Further, the mind, though material, is able to reveal things, borrowing the light from consciousness. From the phenomenological point of view, we have to answer the following questions: how does one know the mind/the mental operations/the cogitations of the mind? Does the mind know itself? Is it possible? There is, again, the problem of the intentionality of consciousness. Is consciousness intentional? According to Vedanta, consciousness by its very nature is not intentional; but it becomes intentional through the mind. The mind or the ego is not part of the consciousness; on the contrary, it is transcendent to consciousness. It is difficult to spell out the relation between consciousness and the mind. How is consciousness, which is totally different from the mind, gets related to the mind in such a way that it makes the latter capable of comprehending the things of the world? The Vedanta tradition provides the answer to this question in terms of the knower-known relation. Consciousness is pure light, self-luminous by its very nature, i.e., while it reveals other objects, it is not revealed by anything else. When Sartre describes it as nothingness, bereft of even ego, it is to show that it is pure light revealing objects outside it.

Key-Words: Consciousness, Self; Vedanta tradition; Mind; Self; Intentionality

1. BASIC PROBLEM

The concept of the enworlded subjectivity is problematic as it involves two notions, worldliness or embodiedness on the one hand, and subjectivity on the other, which do not go together and create a tension in our understanding. Consciousness is the subjectivity; having no relation with any object, it is transempirical, transrelational, and, therefore, disembodied. It means that there is the dichotomy between consciousness (subjectivity) and the world of objects presented to it. However, there is the involvement of consciousness in the objects of the world, i.e. consciousness becomes worldly. The important question that we have to ask is: “How is it possible that consciousness, which is essentially different from everything else presented to it as its object, gets itself involved in the objects of the world surrounding it, losing

its identity in such a way that it is not even reckoned as an entity in its own right along with other objects?” This is the problem of the enworlded subjectivity. At the commencement of his commentary on the *Brahma-sūtra*, Śaṅkara draws our attention to this problem of the enworlded subjectivity. The dichotomy between consciousness and what is presented to consciousness shows that the latter is ātranscendentā to it and is, therefore, an *object* of consciousness, whereas consciousness which reveals whatever is presented to it is the *subject*. The distinction between consciousness and what is presented to consciousness is what Śaṅkara calls the distinction between “*asmad*” and “*yuṣmad*”, the subject and the object, the Self and the not-Self. Absorbed as we are in the transactional world, we fail to notice the radical distinction between the subject and the object, and confuse and mix up the one with the other. The naive and natural mode of thinking and its resultant activity are due to our ignorance of the Self, the pure consciousness, the transcendental Subjectivity. What Husserl calls the life-world, the lived experience (*Lebenswelt*), is spoken of as *loka-vyavahāra* by Śaṅkara. One could notice the natural attitude fully manifest in

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the activities-cognitive, affective, and conative-of our daily life.¹

2. FOUNDATIONAL CONSCIOUSNESS AND FUNCTIONAL CONSCIOUSNESS

According to Advaita, the inquiry that is needed for unravelling the mystery of the enworlded subjectivity is facilitated by the principle of consciousness; in other words, the inquiry is phenomenologically grounded. Advaita holds that the evidence of consciousness is apodictic. If we say that something is such-and-such and that something else is not such-and-such, it is on the basis of the evidence of consciousness. How the principle of consciousness regulates our knowledge-claims can be formulated in two ways, positively as well as negatively. What is affirmed by consciousness through its intentional performance cannot be denied; and what is denied by consciousness through its intentional performance cannot be affirmed. There is no other principle for the acceptance or denial of anything. Consciousness by its very nature is revelatory. It reveals the mental states and the cogitations of the mind on its own; it also reveals the external objects through the mind and the senses. According to Advaita, though consciousness by its very nature is not intentional, it nevertheless becomes intentional through the functioning of the mind. It is in this connection that we have to make the distinction between foundational consciousness and functional consciousness. While the former is non-relational, the latter is relational. It is the association with the mind that makes it relational, and so we speak of the intentionality of consciousness.

The empirical journey of the transcendental Subjectivity to the world horizon passes through the landmarks of the mind, the senses, and the body. As it moves from its non-dual, non-relational state, there is progressive entanglement with the objects transcendent to it until it emerges as the enworlded subjectivity in all its completeness. We have seen that there is a need for a rigorous regressive analysis of the objects presented to consciousness for the purpose of catching hold of the inward Self, the transcendental Subjectivity, as the phenomenological residuum; and in this regressive analysis, the homecoming starts from the outer world to the inner world, and then from the inner world to the Self, which ultimately remains alone.

The internal organ (*antaḥkāraṇa*), what is commonly called the mind, is the first entity with which consciousness comes into relation. The association of consciousness with the internal organ gives rise to the

emergence of the “I” or ego. Though the ego or “I” is transcendent to it, and is, therefore, different from it, it nevertheless identifies itself and appears as “I”. In the words of Sureḍvara, it is as though it has put on the mask of the “I”. It is this “I” that is commonly spoken of as the “empirical I”, as the “ego-consciousness”, as the “factual I”; it is the *epoche*-performing ego of Husserl. The relation between the transcendental Self and the empirical “I” is the relation of the revealer and the revealed (*avabhāsa-avabhāsa-sambandha*). Once the ego or “I” emerges at this level, that is to say, once the transcendental Self puts on the mask of the “I”, then it begins to function through its intentional acts, taking advantage of the senses and the body. In this process it identifies itself with the mind, with the senses, and then with the body. This identification is evident in the claims that we make in our daily life such as “I am happy”, āI am blindā, “I am stout”, and so on. Functioning through the mind-sense-body complex, the “I” comes into relation with the objects of the external world, develops pragmatic attitude towards them through its intentional acts, considers those objects which are helpful to it as good and those which are not helpful as bad, and behaves as if it were helped or hindered by them. The transcendental Subjectivity which provides meaning and validity to the objects is now thrown into the world as the embodied subjectivity as if it were an entity in need of sustenance from the very objects which are “constituted” or “accomplished” by it. Nothing is more tragic, more poignant, than this existential situation, in which the source becomes the supported, and the helper, the helped. Such is the entanglement of the Self as the embodied subjectivity functioning as a being-in-the-world, overwhelmed by the natural attitude of āThat I amā, and “That is mine”. The journey of the Self is one of progressive “fall”. Sureḍvara sums up, in a language which is terse, the emergence of the enworlded subjectivity as follows.

The internal organ, being delimited by the “I”-notion, becomes an object directly to the reflected consciousness (i.e. *cidābhāsa*), of which the immutable, inward Self is the cause. Now, except the relation of the revealer and the revealed, no other relation is tenable between the “I” and its knower. Appropriating the internal organ as its own and putting on the mask of the “I”, the Self becomes fit enough for the helped-helper relation, and comes to be related to the external objects, helpful or harmful as the case may be, claiming them its own.²

3. REGRESSIVE ANALYSIS

The phenomenological reflection through a rigorous regressive analysis helps us to remove the coverings of the Self, including the mask of the “I”, which are external to it and know the Self as it is. If the transcendental Subjectivity is the real Self (*mukhyātmā*), the “I”, the empirical self, which functions through the mind-sense-body complex, is the false self (*mithyātmā*).³ Since the “I” brings together the Self and the objects of the world, its role is crucial. So long as there is the “I”, there is the world; and when the āIā goes away, there is no more the familiar world horizon.

Advaita holds that the evidence of consciousness is the only evidence that is certain and apodictic for any claim that we make to the effect that we know something or that we do not know something. Every source of knowledge is dependent on consciousness; whatever be the source of knowledge, be it perception, or inference or scripture, it presupposes consciousness as its ultimate source. That which is the presupposition of every kind of knowledge and every source of knowledge cannot be validated by any other principle. When we say that something is the case or that something is not the case, it is on the basis of the evidence of consciousness that we say so. In the language of William James, Advaita may be characterized as “radical empiricism”. Advaita maintains that whatever is shown or revealed by consciousness cannot be rejected, and that whatever is not shown or revealed by consciousness cannot be accepted. In fact, it goes to the extent of saying that even the claim that something is not known presupposes the evidence of consciousness, just as the claim that something is known presupposes the evidence of consciousness. There are two kinds of seeing or vision (*dṛṣṭi*), real (*pāramārthikī*) and actual (*laukikī*), according to Śaṅkara.⁴ The former is the seeing or vision of consciousness, while the latter is the seeing or vision of the mind, or through the mind. This distinction between the two kinds of seeing is of great significance, as it highlights the role of consciousness as the witnessing or the knowing principle. When I say, “This is a table,” and “That is a tree,” I have the knowledge of the object through the mind. It is what is called “modal cognition”, i.e. cognition through the mode of the mind (*vṛtti-jñāna*). In these cases, consciousness reveals things through the mind; and in the absence of consciousness, mind by itself, which is material, cannot give us knowledge of anything. It is not the case that every case of seeing or knowing is through the mind. There are cases where consciousness

without the medium of the mind or any other medium, directly reveals the object. The case of the ego or “I” is a standing example in this regard. We have already pointed out that the ego which is revealed by consciousness is transcendent to consciousness. Though the ego or “I” may appear to be the knower (*jñātā*) in respect of objects external to it, the real position is that it is an object in relation to consciousness. Advaita holds that the ego or “I” is directly revealed by consciousness (*kevala-sākṣi-bhāsyā*) without the intervention of the mind. Similarly, when I say, “I am ignorant of something,” “That is unknown to me,” it is on the basis of the direct evidence of the witnessing consciousness. In short, every kind of claim that we make that something is *known*, or that something is *unknown* is on the basis of the transcendental consciousness which reveals objects directly, or through the intentional performance of the mind. The evidence of the transcendental consciousness is intrinsically valid. It is, therefore, considered to be the principle of all principles, the source of all of our claims-claim to knowledge as well as claim to ignorance.

4. METAPHYSICAL THESIS

On the basis of the phenomenological method, Advaita maintains that whatever is cognized must be admitted to be existent. Every cognition has a cognitum. And this is as much true without regard to what is called erroneous cognition as it is true in respect of veridical cognition. In the well known example of the rope-snake error, a person first of all cognizes the object in front as a snake and gives expression to his cognition by saying, “This is a snake.” Subsequently on a closer view he cognizes it as a rope, corrects the mistake he has committed, and says, “This is not a snake, but a rope.” While the initial cognition affirms the existence of a snake, the subsequent cognition, which sublates the earlier cognition, denies it by affirming the existence of the rope. Negation presupposes affirmation: that is to say, what is initially affirmed alone can be denied subsequently.⁵ The fact is that “snake” was presented to consciousness as an object, and it was cognized as such by the person concerned at that time, in that place. What is cognized cannot be dismissed as non-existent.⁶ At the same time, since the subsequent cognition has sublated it, it cannot be said to be existent.⁷ On the basis of the evidence of the intentional acts of consciousness, we have to say that the rope-snake has a peculiar ontological existence such that it can be characterized neither as non-existent nor as existent. Advaita, therefore, says that the rope-snake

has to be accorded some kind of reality, what it calls phenomenal reality (*prātibhāsika-sattā*), in the world horizon. Advaita examines the objects of the external world such as the table and the tree by applying the same phenomenological method. These objects, like the rope-snake, are not only cognized, but also suffer sublation. While they are affirmed by our waking experience, they are denied by our dream experience, just as what is affirmed by the dream experience is denied by the waking experience. What is seen in the daily waking experience gets sublated when someone is fortunate enough to realize the transcendental Self as the sole reality. As in the case of the rope-snake, the objects of the external world must be accorded some reality, since they have been cognized and sublated. Noticing the difference between an object of erroneous cognition and an object of normal waking consciousness,⁸ Advaita says that objects such as the table and the tree have empirical reality (*vyāvahārika-sattā*). The transcendental consciousness is not an “object” like the rope-snake or a tree, which can be cognized. Since it is self-luminous, it is always known; or, as Śaṅkara would put it, it does not remain unknown. Nor is there any possibility of its sublation. What is other than consciousness is “object” which is dependent on consciousness for its meaning and validity; and so the question of sublation of consciousness by “object” does not arise. Consciousness, according to Advaita, possesses absolute reality (*pāramārthika-sattā*). The phenomenological method which Advaita pursues results in the theory of the levels of reality—what is phenomenally real, what is empirically real, and what is absolutely real. The transcendental consciousness which is autonomous and absolutely real, is one and non-dual. There is nothing else, similar or dissimilar to it, which is autonomous. It is homo-geneous and indivisible. It cannot be seen; nor can it be sublated. It is, therefore, unique. Its nature being what it is, Advaita, following the Upaniṣadic lead, characterizes it as “one only without a second” (*ekameva advitīyam*).⁹ The rigorous pursuit of transcendental phenomenology to its logical end consummates in the metaphysics of non-dualism to which Advaita is committed.

5. THE THREE WORLDS AND BEYOND

There are at least two models of the three worlds. One is the Upaniṣadic model which speaks of the world of waking experience (*jāgrat*), the world of dream experience (*svapna*), and the world of deep sleep experience (*susupti*). Every normal human being not only

experiences, but also is aware of, these three worlds. The Upaniṣadic tradition also mentions the Fourth (*caturtha*) as what is beyond these three worlds, and gives us the assurance that it is possible for everyone to experience the Fourth, the Beyond, by transcending the three worlds. In recent times Karl Popper and following him, John Eccles, speak of three worlds constituting the whole reality. They call them World 1, World 2, and World 3. They do not, however, speak of what is beyond these three worlds.¹⁰ Let us first consider the Upaniṣadic model.

6. THE UPANIṢADIC MODEL OF THREE WORLDS

Advaita may be characterized as radical empiricism as it examines every aspect of our experience at all levels—waking, dream, and sleep—for the purpose of ascertaining the nature of consciousness. The three states of experience constitute the three worlds in which all the *jīvas* live and move about. Unlike other animals, the human being not only experiences the three worlds, but is also aware of these worlds and knows the similarities and differences among them. The foundational consciousness which is present in all of them becomes functional through its association with the mind, the senses, and the body, which serve as the media for its functioning. When it is thus associated with the mind-sense-body complex, it becomes functional, relational, and manifold. It may be pointed out in this connection that in the Vedānta tradition the two words “consciousness” and “experience” are used as synonyms both in the absolute and the relative sense. When we speak of the foundational consciousness as one and non-dual, we use the term *ānānāśā* in the absolute sense, whereas when we refer to functional consciousness, we use it in the relational sense. What is really one appears to be many because of the objects with which it is related. The same is the case with *ānānāśā*, which can be used both in the absolute and the relative sense.

The analysis of the triple stream of experience of the *jīva* helps us to understand the concept of the Self-in-the-body, i.e. consciousness in its embodiment, both epistemically and metaphysically. Though consciousness by its very nature is not intentional, it becomes intentional through the mind which plays an important role in the states of waking and dream. The following diagram contains the salient features such as the contextual names and conditioning factors of the functional consciousness in the triple stream of experience (*avasthā-traya*):

Triple Stream of Experience
(*avasthā-traya*)

| Its functional names when conditioned by avidyā | Its states of Experience | Its cognitive organs | | Outer physical outfit | Objects of experience | Experiencer |
|---|--------------------------|----------------------|--------|-----------------------|-----------------------|--------------------|
| SELF or ĀTMAN | → waking | mind | senses | body | gross | <i>sthūla-bhuk</i> |
| | → dream | mind | - | - | subtle | <i>sūkōma-bhuk</i> |
| | → sleep | - | - | - | bliss | <i>ānanda-bhuk</i> |

7. INTENTIONALITY OF CONSCIOUSNESS

Let us first consider the epistemological problem of the intentionality of consciousness. The theory of the intentionality of consciousness which plays an important part not only in the phenomenology of Husserl, but also in the phenomenological ontology of Sartre deserves careful consideration. Husserl assigns to consciousness not only an important place in his system, but also makes it the starting point of philosophical investigation. Sartre does not disagree with Husserl on this issue, though he was thoroughly unhappy with the latter’s formula of “turn to the subject”, which replaced the earlier formula of “turn to the object”. To both Husserl and Sartre, consciousness is intentional. However, the theory of intentionality of consciousness takes a new dimension in the Sartrean phenomenological ontology; for, Sartre, unlike Husserl, rejects the transcendental “I”, but clings to the intentional consciousness and the intended objects, and makes consciousness a non-substantial and impersonal being, a “free spontaneity”, a “great emptiness”, a “wind blowing towards objects”. Consciousness, Sartre says, is always consciousness *of* something. It is always pointing toward that which is beyond it. There is no consciousness, according to Sartre, which is not related to a transcendent object. Following Husserl, Sartre maintains that intentionality is essential to consciousness; consciousness, that is to say, is defined by intentionality. He considers this to be “the fruitful definition”¹¹ of consciousness. Sartre thus accepts Husserl’s theory of the intentionality of consciousness. There is, however, an important difference between Husserl and Sartre even here: while for Husserl intentionality is *one* essential feature of consciousness, for Sartre intentionality is consciousness. For the present we can ignore this difference between them, as it does not in any way affect the problem of the intentionality of consciousness which we are now considering.

Advaita Vedānta which is transcendental phenomenology is also interested in the question of the intentionality of consciousness. Keeping to the distinction between the pure consciousness and ego-consciousness, Advaita raises the question whether consciousness *per se* is intentional or whether the ego-consciousness is intentional. This question is important in the context of Husserl inasmuch as the distinction between “the pure I” and “the empirical I” is accepted by him. Is it the pure consciousness, “the phenomenological residuum”, that is intentional? Or, is it the *epoche*-performing ego that is intentional? This question need not be asked in the case of Sartre, because he not only holds that consciousness *per se* is intentional, but also accounts for the origin of the ego in terms of the intentionality of consciousness. Advaita maintains that consciousness *per se* is not intentional, but it becomes intentional because of the ego. Is there any evidence to say on the basis of a thoroughgoing application of the phenomenological method that consciousness is always and necessarily consciousness *of* something? Advaita answers this question in the negative. I shall argue this point on the basis of the phenomenological analysis as given in Advaita Vedānta which undoubtedly throws a new light on this problem.

It is unquestionably true that consciousness in our waking experience is always consciousness *of* something. In our waking experience, we do not have access to consciousness as such apart from the object which it reveals and to which it is related. When we reflect on our consciousness, we know it to be intentional; we know it as the consciousness of this or that object. The intended object at this level may be physical like a table or a tree. Or, it may be a psychological state like pleasure or pain. In short, waking-consciousness is intentional. It must have transcendent objects related to it at this level. Being awake means being awake *to*. As in the case of waking experience, in dream experience also consciousness is

intentional as it is always related to “objects” My reflection on dream experience tells me that I was aware of many “objects” at that time.

As distinguished from waking and dream experience, there is the experience of sleep which is free from dream. When a person wakes up from dreamless sleep and reflects on the nature of experience he had, he says that at that time he was not conscious of anything whatsoever, objective or subjective. Nevertheless, there was consciousness at that time, though there were no objects, no phenomena, related to it. If consciousness were also absent at that time, recollection to the effect, “I was not conscious of anything then” would be impossible. The point is that consciousness reveals objects if they are present; and when there are no objects to be revealed, consciousness remains alone. It is, therefore, wrong to say that intentionality, as Sartre would put it, is consciousness, or that consciousness by its very nature is intentional. According to Advaita, consciousness becomes intentional only as a result of its association with the mind; and it has this connection with the mind in waking and dream experience. But in deep sleep experience, mind as mind is absent with the result that consciousness remains alone without being intentional. Advaita maintains that intentionality is not essential (*svābhāvika*), but only adventitious (*aupādhika*), to consciousness. While it is true that there is no phenomenon without consciousness, there is no phenomenological evidence to say that there is no consciousness without the phenomenon.

On the basis of the distinction between consciousness and the ego, Advaita holds that not only the intentional act, but also the work of objectivation, identification, fulfilment, and constitution mentioned by Husserl belong to the ego or the mind, which is transcendent to consciousness. It justifies this position on the ground that these cogitations are known in the same way as the external objects and their qualities are known, and that what is known must be transcendent to the knower. In other words, since consciousness is aware of these cogitations as they occur from time to time, as they appear and disappear in the mental horizon, they cannot belong to, or be part of, consciousness. For example, when someone sees an object, the object seen is transcendent to the seer. When someone perceives the whiteness, or the tallness, or the movement of an object, the quality or the action that is perceived cannot be the quality or the movement of the perceiver, but must be the quality or the movement of the object in which it inheres. The same principle holds good in the case of the cogitations which one is aware of. These cogitations or mental operations

too are objects of consciousness, but are not consciousness itself. It is relevant in this connection to refer to an Upaniṣadic text which says: “Desire, resolve, doubt, faith, want of faith, steadiness, unsteadiness, shame, intelligence, fears—all these are but the mind.”¹² What this text emphasizes, though mentioning only a few of the mental operations in a suggestive way, is that all cogitations or mental operations are but states of the mind and that they are not, just because consciousness is aware of them, constitutive of consciousness.

It should be pointed out in this connection that what is commonly called the ego or the “I” is not consciousness, but the object of consciousness. If it were identical with, or part of consciousness, it could not be known by consciousness. We find that the ego or the “I” appears only during our waking and dream experience. In our waking experience, there is the *ālā* which functions as knower (*jñātā*), as doer (*kartā*), as experiencer (*bhoktā*); it functions, that is to say, as the subject of knowledge, as the agent of action, and as the experiencer of the consequences of action. In support of this there is the evidence of the statements that we make from time to time with the first person singular such as “I know this”, “I do this”, “I reap the rewards of my actions”, and so on. This is equally true in our dream experience which is very significantly on a par with our waking experience. The “I” is as much prominent in our dream experience as it is in our waking experience. A person perceives objects, performs deeds, and suffers for his actions in dream experience, and is also aware of them. The dream world parallels the waking world, though there are also significant differences between them. The “I” which is present both in the waking and dream experience is absent in the state of sleep. Just as there is consciousness of the presence or absence of something, even so there is consciousness of the presence or absence of the ego or the “I” as the case may be. It follows that the ego or “I” which is known as sometimes present and sometimes absent is transcendent to consciousness.

If the ego or the “I” were identical with consciousness and not something transcendent to consciousness, then what is it that is aware of it? Is it aware of itself? Or, is there anything else which could be aware of it? The first alternative is untenable, as it amounts to saying that one and the same entity is both the subject and the object at the same time in the same act of cognition. When we say that it is aware of itself, does it mean that this ego which is consciousness divides itself into two parts such that one part of it is the knower and the other part is the known? This is impossible, as consciousness is one and homogeneous and does not admit of division into two

parts, viz. the subject-part and the object-part. There is also another difficulty. If the ego which is known is identified with consciousness, then consciousness can never be the knower, or the seer, or the witness, to which everything is presented: that is, not being different from the ego, it becomes the known; if so, there will be no knower at all. Nor can it be said, with a view to overcome the above difficulties, that consciousness which is the knower at one time becomes the known at another time. A thing is what it is, and it cannot become something different. It is impossible for a thing to change its nature. Consciousness by its very nature is the seer all the time. And to say that it becomes the known is to assume a knower other than consciousness. And what is that which knows it? This question will now take us to the second alternative.

If the ego which is identical with consciousness is known by something else, that “something else” cannot be the “object”, for an “object” is always what is known by, and what derives its meaning from, consciousness. On the contrary, that “something else” must be consciousness and not an object. It follows from this that one consciousness is known by another consciousness. If we persist in the same kind of questioning, we have to say that the second consciousness is known through a third one, and so on, leading to the fallacy of infinite regress. This difficulty apart, there is the unwarranted assumption that there is a plurality of consciousness. What is the evidence to show, Advaita asks, that there is more than one consciousness? To establish the existence of a plurality of consciousness, we require not only the differentiating features in terms of which we could say that one consciousness is different from another consciousness, but also a consciousness as the witnessing principle of these differentiating features. The features which help to distinguish one object from another are configuration (*avasthā*), place (*deśa*), time (*kāla*), and qualities (*guṇa*). Two objects, we say, are different from each other because of their difference in configuration, their location in different places, their existence in different periods of time, and the difference in their qualities. The question is whether differentiating features such as configuration, place, time, and qualities can be associated with consciousness for the purpose of proving the existence of a plurality of consciousness. Every differentiating feature, it must be borne in mind, has to be noticed by consciousness. In that case it becomes what is seen or witnessed (*sākṣya*) by consciousness, and so it cannot belong to the latter. On the contrary, it must be transcendent to consciousness for the simple reason that it is seen or noticed by consciousness. It means that the

existence of more than one consciousness cannot be proved. Therefore, the ego or the “I” which is transcendent to consciousness should not be identified with consciousness. There is nothing *in* consciousness, no content, no structures, no qualities, no parts, by which it can be identified and marked off from other things. All that can be said about consciousness is that it is revelatory of things presented to it; and it is by this nature that it is differentiated from the objects which it is aware of and which are, therefore, transcendent to it.

8. NON-EGOLOGICAL CONSCIOUSNESS: SARTRE AND ŚĀṄKARA

It will be helpful in this connection to consider the non-egological theory of consciousness which Sartre formulates by placing the ego outside consciousness. According to Sartre, consciousness is non-substantial. Consciousness is “all lightness, all translucence”.¹³ It is not a container; it does not contain anything—no images, no representations, no contents. By its very nature it transcends itself in order to reach an object, and exhausts itself in this transcendence.¹⁴ When there is consciousness of a tree, the tree is not in consciousness—not even in the capacity of a representation.

In order to understand the impersonal nature of consciousness, it is necessary to start with the distinction introduced by Sartre between pre-reflective consciousness and reflective consciousness. The former is also referred to as a non-positional or non-thetic self-consciousness, while the latter is also called positional or thetic consciousness. The consciousness with which we start is the consciousness of something; it is the consciousness which is turned towards something other than itself. There is consciousness of a table, of a portrait, and so on. Sartre maintains that consciousness of an object is at the same time consciousness of being consciousness of an object. For example, when there is consciousness of a table, there is consciousness of being aware of the table. Consciousness not only reveals something, but also reveals itself. It means that at the time of the consciousness of the table there is non-reflective awareness of consciousness. If this is not the case, it would be, Sartre argues, a consciousness which is ignorant of itself, that is to say, an unconscious being which is absurd.¹⁵

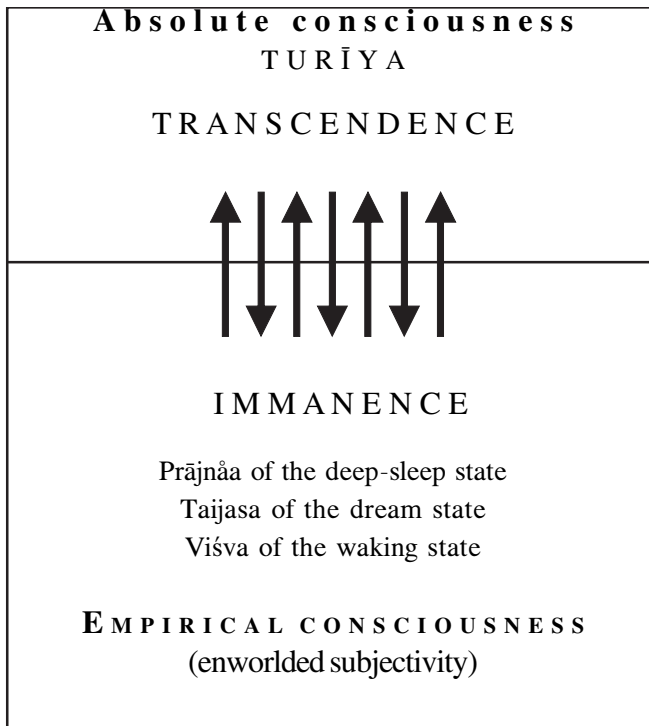
It is Sartre’s contention that the “I” or ego arises only at the reflective level. There is, first of all, let us say, consciousness of a tree. By reflecting subsequently on my intentional act and the intended object, I say, “I am

conscious of the tree.” There is no place for the “I” or ego in the unreflected consciousness. Here is one of the examples given by Sartre supposed to be based on the phenomenological analysis of the problem: “I was absorbed just now in my reading. I am going to try to remember the circumstances of my reading, my attitude, the lines I was reading. I am thus going to revive not only these external details but a certain depth of unreflected consciousness, since the objects could only have been perceived by that consciousness and since they remain relative to it. That consciousness must not be posited as object of a reflection. On the contrary, I must divert my attention to the revived objects, but without losing sight of the unreflected consciousness, by joining in a sort of conspiracy with it and by drawing up an inventory of its content in a non-positional manner. There is no doubt about the result: while I was reading, there was consciousness of the heroes of the novel, but then I was not inhabiting this consciousness. It was only consciousness of the object and non-positional consciousness of itself. I can now make these a-thetically apprehended results and object of a thesis and declare: there was no “I” in the unreflected consciousness.¹⁶ Just as there is no content in consciousness, even so there is no ātā or ego in it. Consciousness is, therefore, non-substantial and impersonal.

Sartre’s theory of non-egological consciousness is acceptable to the Advaitin. Sartre’s explanation of consciousness as impersonal and non-substantial, as “a great emptiness”, is a reiteration of the Advaita view that consciousness is not a substance possessing attributes, that it is not a whole consisting of parts, that it is not an entity which can be specified as such-and-such, as it is free from class feature, qualities, action, and relation. The view that the ego or “I” which is transcendent to consciousness arises only at the reflective level of consciousness is the echo of the Advaita view which holds that the ego (*aham*) arises when there is *cidābhāsa*, i.e. consciousness reflected in the internal organ; and this consciousness associated with the internal organ, which alone is capable of reflection, may be characterized in the terminology of Sartre as consciousness in the second degree. Sartre does not deny the existence of the ego, but only denies that it is in consciousness. He says that the ego which is transcendent to consciousness is the unity of subjective states and actions known through reflection. There is, Sartre observes, something mysterious, irrational about the ego.¹⁷ We cannot apprehend the ego apart from states and actions. If we take away one by one all the states and actions, the ego would disappear. According to Sartre, spontaneity is what

characterizes consciousness. If the ego appears to have spontaneity, it is because consciousness projects its spontaneity into the ego. This account of the ego as a mystery and a problem, as that which functions through the borrowed light (spontaneity) of consciousness, is fully amplified in all the major works of Advaita. The difficulty arises only when Sartre denies the role of the transcendental consciousness as the unifying principle of the intentional acts. Sartre argues that the transcendent object intended by consciousness gives unity to the different intentional acts. His argument is not convincing. It appears that Sartre who banishes the transcendental “I”, the permanent factor underlying all our acts of consciousness, by the front door brings it back inside through the back door. At every stage in his explanation he tacitly assumes the existence of such a permanent consciousness in all our acts of consciousness. Sartre thinks of consciousness as something individualized and particularized by the objects to which it is related. He also thinks in terms of a flux of consciousness.¹⁸ Very often he uses the expression, “fleeting consciousness.”¹⁹ Though there are innumerable acts of consciousness (i.e., intentional consciousness) coming one after another in a regular procession, whether they are related to one object or different objects, it is quite possible, according to Sartre, to connect all of them in reflection as if there were a common identical factor running through them. I shall focus attention on two examples given by Sartre.

We have already said that the transcendental consciousness is renamed empirical consciousness when it is in the embodied condition. With the empirical dress it puts on followed by its involvement in the world, it is called the enworlded subjectivity. The point to be noted here is that the absolute consciousness is immanent in its empirical appearance and all that it does in that condition without being exhausted by it. That is because it is also at the same time transcendent to it. The following diagram brings out the immanent Òtranscendent dimension of the absolute consciousness.



Though empirical consciousness at every stage of its functioning reveals what it is and how it is related to the objects which are transcendent to it, it does not show the *absoluteness* of its real nature. Absorbed as we are in the things of the world revealed to us by the consciousness, we do not normally probe into its real nature. Even though it is the source of the world, it remains concealed in the latter in the same way as clay, which is the source or ground of the pot made out of it, remains concealed therein. The manifestation of the pot is the concealment of clay, which is its cause; and the revelation of clay is the concealment of pot. There is thus the mysterious play of hiding and showing by consciousness. What is true of clay and pot in this example is true of the absolute consciousness and the empirical consciousness.

Now, the important question we have to consider is whether it is correct to characterize the absolute consciousness as both transcendent and immanent. The answer is both yes and no. We claim that we are rooted in the world, subjective and objective. The mind, the senses, and the body which we possess, we claim, are real; and so is the external world of space, time, and causality. It is but natural for us to begin to think of the cause of the world and search for it as we are already deeply entrenched in the world accepting its reality. Our

philosophical reflection on this problem is the first attempt to overcome the naïve and natural attitude towards the world, both subjective and objective. Again, as we try to know the truth of the mind-sense-body-world through a process of transcendence from one level to another—from the bodily to the vital, from the vital to the sensory, and then to the mental and the intellectual, and finally to the self-conscious—we will discover the Self or consciousness which remains hidden supporting the entire mind-sense-body complex and which is the transcendental *a priori* of all that we do as the subject of knowledge, as the agent of action, and the enjoyer of the consequences of our action. Being of the nature of consciousness, the Self, though immanent in the mind-sense-body complex, is not only different from it, but is also transcendent to it. Similarly, if we probe into the external world by subjecting the things therein to a rigorous causal inquiry, then we can *dis-cover* the primal Being, which the Upaniṣads call Brahman/Ātman, which is absolute consciousness, as not only the final cause of the world, but also its ground. What is identified as the final cause is really its ground. Brahman/Ātman, as the cause of the world, is immanent in it, and so from the perspective of the world, the theory of the immanence of Brahman/Ātman is justified. The concept of “*tajjalān*” which is formulated in the Upaniṣad in the process of the causal inquiry also shows that what really exists is Brahman/Ātman and that the entire manifested world which has a dependent origination and existence is *kalpita*. If so, Brahman/Ātman, the absolute consciousness, which is real, is other than the world, and is transcendent to it. It means that the concept of the transcendence of Brahman/Ātman, or the absolute consciousness, is intelligible only on the presupposition of the existence of the world. It must be borne in mind that Brahman and Ātman are one and the same entity. The two terms, “Brahman” and “Ātman”, have the same referent. In the absence of the world, there is neither the immanence nor the transcendence of Brahman/Ātman, though for the purpose of instruction (*upadeśa*) the Upaniṣad speaks of it as immanent as well as transcendent. Gauḍapāda’s declaration, “*upadeśād-ayam vādaḥ*” and “*jñāate dvaitam na vidyate*”,²⁰ is relevant in this context.

There are two questions to be considered in this

connection. First, even though the absolute consciousness, the Fourth (*turīya*) as it is called in the context of the triple stream of experience, is beyond the grasp of the senses and the mind, why is it that it cannot be spoken about? Second, if it is, as stated earlier, unperceivable and unseen, uninferable, beyond thought, and beyond empirical dealings, then how is it known? Both the questions are important, and we will consider them one by one.

There is a fundamental distinction between the empirical and the transempirical. Any object which is empirical is a limited entity, and whatever is limited is necessarily relational. An object which is empirical and therefore relational will have class feature (*jāti*), or quality (*guṇa*), or action (*kriyā*), or relation (*sambandha*); or, it may be signified by a conventional word (*rūḍhi*) used only with reference to it. For example, an object which possesses the class feature, viz. cowness, is signified by the word “*go*”. An object which possesses the quality, viz. white colour, is spoken of as “*śuklaḥ*”. Similarly, we call the cook a “*pācakaḥ*” as he performs the act of cooking. One who possesses wealth, i.e. one who has relation with wealth, is called a “*dhani*”. An object which provides space is conventionally called “*ākāśa*”. So there are reasons such as the class feature, quality, action, relation, and conventional usage for the application of words to objects. Since none of these features are present in the transempirical Self, it cannot be directly signified by a word. It is for this reason that śruti says that the Self is “that from which speech returns.”²¹ However, it can be secondarily signified, according to Sureśvara, by the words “I” and “thou”, because the primary sense of these words is the knower (*pramātā*), and the Self, being its witness, is connected with it. A note of caution is necessary at this stage. We resort to the secondary sense when the primary sense does not hold good, or does not convey the intended meaning of a sentence, oral or written. However useful the negative scriptural texts like “*neti neti*” may be, still they have their own limitations. Though they tell us what the ultimate reality is not by denying every predication that we make, they do not and cannot tell us what its real nature is. One may urge the same argument against the adoption of the secondary sense for construing the meaning of a text about the

ultimate reality. Since an empirical object falls within the scope of language, there is justification for adopting the secondary sense in lieu of the primary sense when the context needs it. The use of pronouns such as “I” and “thou” is restricted to the empirical realm of ordinary discourse. The functional consciousness falls within the scope of ordinary empirical discourse, and so it may be signified by pronouns such as “I” and “thou” as required by the context. But there is no scope for śabda, both secular and sacred, in respect of the ultimate reality which is transempirical and transrelational. The Upaniṣadic declaration that speech returns without reaching the Ultimate restricts the scope of language to the empirical, and does not admit of any compromise in its operational scope. “The boundaries of my language,” says Wittgenstein, “are the boundaries of my world.” Then he goes on to say: “What we cannot think, we cannot think; and we cannot say what we cannot think,” and “What one cannot speak about, one must pass over in silence.”²²

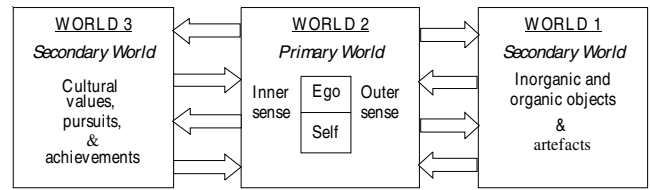
We will now take up the second question. The Self or consciousness, being self-luminous, is self-established. A brief explanation will be helpful to understand this point. It is through consciousness that everything, whether it is an object in the external world, or one’s own body, whether it is a mental state like pleasure or pain, or mind itself, is known. By itself the internal organ (*antaḥkaraṇa*) which is material cannot cognize or reveal anything, much less consciousness on which it is dependent. If it gets the status of a knower (*jñātā*), it is because of the fact that the foundational consciousness, i.e. the Self, is reflected therein. The internal organ, carrying the reflection of consciousness, knows itself as “I” (*aham*). In the same way, it knows other objects which are presented to it as “this” (*idam*). Starting from the internal organ which is material and which is other than the Self or consciousness, every object is known only through consciousness. Further, the internal organ is never constant. It is subject to modifications. The mental modes, i.e. the changes of the internal organ, which appear and disappear one after another, are known only through the Witness-consciousness (*sākṣi-caitanya*), which alone is eternal and self-luminous. The reason for this is obvious. The mental modes form a series; and a

series can never be aware of itself as a series, but can be known only through another factor outside it, which is both permanent and a witness to it.

It is of no use to invoke the help of a *pramāṇa* in this regard. A *pramāṇa* can function as a *pramāṇa* and generate knowledge of anything only through the help of consciousness. We can go one step further. The very distinction between *pramāṇa* and *apramāṇa* presupposes the work of consciousness. If we say that something is a *pramāṇa* and that something else is not a *pramāṇa*, it is because of the Witness-consciousness. In the same way it is only through the Witness-consciousness that we are able to distinguish a valid cognition (*pramā*) from an erroneous one (*ābhāsa-jñāna*). Consciousness which is presupposed in all acts of knowing is the basis of all knowledge. While other objects are established through consciousness, the latter is self-established (*svataśiddha*), for it is self-luminous by its very nature. Consciousness is self-luminous in the sense that, while it is not revealed by any other means or agency, it reveals other objects. That is why it is said to be the transcendental *a priori*. That which is presupposed by all *pramāṇas* and all acts of cognition cannot be proved by them; nor does it require any proof. It is as good as proved.

9. THE POPPERIAN MODEL OF THREE WORLDS

The Popperian theory of three worlds, which has been adopted by John Eccles, is substantially the same as the Upaniṣadic theory of three worlds. Assigning the central place to the pure Ego or the Self in the life-world of the human person, Karl Popper and John Eccles speak of World 1, World 2, and World 3. Of these, World 2 which is characterized as the world of consciousness is designated the primary reality whereas World 1, which is the external world of matter and energy, and World 3 which is the world of culture, are given the status of secondary realities. The following tabular form, which is adapted from the one given by Eccles, gives a picture of the three worlds and the interaction among them.²³



In the above classification, World 1 comprises the entire cosmos of matter and energy, the biological structure and actions of all living beings including human brains, and the artefacts that are creations of human beings. It is the external world of space, time, and causality. The interaction between the *jīva* and the external world is through the outer senses and the brain. According to Eccles, the brain which is viewed as a part of World 1 provides the communication line between World 1 and World 2. It is, therefore, characterized as the “liaison brain”. Since the interaction between the self-conscious mind and the external world takes place through the brain, Eccles holds that the brain is “necessary, but not sufficient for World 2 existence and experience”.²⁴ There are three segments in World 2. All our sensations of sound, heat and cold, colour and light, taste and smell belong to the area of the outer senses whereas our thoughts and memories, feelings and imaginations, intentions and volitions constitute the inner level. The pure Ego or the Self is in the centre stage, supporting, controlling, and unifying the functioning of the outer senses and the inner mind. Just as the Upaniṣads say that the Self or the foundational consciousness is the invariable factor in all our experience connecting one state of experience with another, even so Popper and Eccles speak of the Self or the Ego as the bridge connecting the different states of experience. To explain the functioning of the Self in the day-to-day-life of a human person, Eccles quotes the following passage from Sherrington:

Each waking day is a stage dominated for good or ill, in comedy, farce or tragedy, by a *dramatis persona*, the “Self”. And so it will be until the curtain drops. This Self is a unity. The continuity of its presence in time, sometimes hardly broken by sleep, its inalienable “interiority” in (sensory) space, its consistency of viewpoint, the privacy of its experience, combine to give it status as a

unique existence.²⁵

It may be noted that in the Popperian analysis of the conscious experiences of World 2, the subtle distinction between the Self and the mind, or foundational consciousness and functional consciousness that has been highlighted earlier during the explanation of the triple stream of experience does not emerge. However, both Popper and Eccles speak about mental phenomena or subjective states of which a human being is conscious. The expression “self-conscious mind” occurs frequently in the writings of Eccles. If we follow the Upaniṣadic tradition, it has to be emphasized here that, even though there is the mind-brain interaction, the mind is as much material as the human brain which is admitted to be a part of World 1. In fact, according to the Upaniṣadic tradition, everything in the human being excepting the Self or consciousness is material (*jaḍa*). So, if the mind which is material becomes self-conscious, it must be due to the presence of an extraneous factor which helps it to become self-conscious, to develop an awareness of itself. It may be added that the mind which is the beneficiary in this process must be dependent on this extraneous factor which is its benefactor. We have already stated that the proximity of the mind to the Self makes it an instrument of cognition as a result of the reflection of the power of consciousness of the Self in it. Carrying the reflection (*pratibimba*) or semblance (*ābhāsa*) of consciousness, the mind becomes a sentient entity as it were, is endowed with the power of cognition of other objects, develops the sense of “I” and “mine”, and also becomes self-conscious when the need arises. Consider the following functions of the self-conscious mind as enumerated and explained by Eccles on the basis of the hypothesis of a strong dualism:²⁶

(1) The self-conscious mind is an independent entity, a World 2 existence, which has a status in reality equivalent to that of the brain with its World 1 existence.

(2) It acts upon the neural centres modifying the dynamic spatiotemporal patterns of the neural events. It means that the self-conscious mind exercises a superior interpretative and controlling role upon the neural events.

(3) It alone provides the unity of conscious

experience and not the neural machinery of the liaison areas of the cerebral hemisphere.

The work that the self-conscious mind does is marvellous. It elevates the status of the *jīva* from the animal level to that of a human person. What is called the “*self-conscious mind*” is not a simple entity, but a complex of three factors according to Advaita. It is a blend of the mind, the foundational consciousness that supports the mind, and the reflection of the consciousness in the mind.²⁷ It has, therefore, to be distinguished from the Self or foundational consciousness. It means that there are in the present context two different categories, viz. the Self and the mind, which should not be mixed up with each other. Eccles seems to be aware of the distinction between the pure Ego and mental phenomena or conscious experiences which would include all mental episodes including self-consciousness, and this is evident from his statement that, while the conscious experiences are perceived by the Ego or the Self, the latter is experienced, not perceived. In support of this, he quotes Polten who, following Kant, draws the distinction between them:

The ontological basis for the difference between apperception and perception is that the pure Ego is a mental thing-in-itself, whereas the mental phenomena of inner and outer sense are appearances. For that reason, too, subject and object merge in the act of the pure ego’s self-observation, while inner and outer data are the pure ego’s objects.²⁸

The epistemological distinction between perception and apperception points to the ontological distinction between the mental phenomena and the mental thing-in-itself; and if the mental phenomena are appearances, then the mental thing-in-itself must be the reality. The latter is what the Advaitin would call the Self or the foundational consciousness.

While the human being is moulded and shaped by the world of culture, the latter in its turn is shaped and sustained by the human beings. The producer of culture is at the same time the product of his culture. It means that they influence each other. The transition from a human being to a human person is due to the development of self-consciousness, which is facilitated

by the world of culture. Eccles gives a graphic picture of the contents of the world of culture after raising the question, “What is World 3?”

It is the whole world of culture... World 3 was created by man and that reciprocally made man. The whole of language is here. All our means of communication, all our intellectual efforts coded in books, coded in every artistic and technological treasures in the museums, coded in every artefact left by man from primitive times-this is World 3 right up to the present time. It is the world of civilization and culture. Education is the means whereby each human being is brought into relation with World 3. In this manner he becomes immersed in it throughout life, participating in the heritage of mankind and so becoming fully human. World 3 is the world that uniquely relates to man. It is completely unknown to animals.²⁹

He goes on to say:

This World 3 provides the means whereby man's creative efforts live on as a heritage for all future, so building the magnificent cultures and civilizations recorded in human history.³⁰

10. IS KNOWING WITHOUT MENTAL OPERATION POSSIBLE?

The distinction between foundational consciousness and functional consciousness is required for the purpose of epistemological and metaphysical analysis. Since consciousness is one and only one, it may appear that there is no justification for such a distinction. However, the need for such a distinction arises because our philosophizing starts from the given world, the world of our everyday experience; and consciousness which is involved in, or associated with, the objects of the world, is characterized by its worldliness. Its relation with the objects is twofold: on the one hand, it is involved in the mind-sense-body complex of the individual such that it becomes embodied consciousness; it is also associated with the objects of the world as the principle responsible for the manifestation and meaning of the entire world,

on the other. The concept of “constitution” plays an important part in the Husserlian phenomenology. According to Husserl, we have to understand the sense and being of the objects only in terms of the work of constitution by consciousness. He explains “constitution” sometimes as sense-bestowing, sometimes as “producing”, as “making” as “creating”, and so on. There is no need to go into the details about the work of constitution by consciousness. However, the point to be noted here is that the kind of objectivity which the things of the world has is bestowed on them by consciousness, and the object is un-thinkable apart from consciousness. In the words of Dermot Moran:

Constitution is a universal feature of conscious life; all meanings are constituted in and by consciousness. Everything experienceable in both the natural and cultural world is constituted, as Husserl argues in *Ideas II*... Husserl speaks of the living body constituted by its kinaesthetic functions.... also, he talks of the constitution of social and cultural entities. This last is more familiar, particularly since, throughout the twentieth century, there has been much talk of the “socially constructed” nature of social entities such as families, institutions, banks, money, and so on. In this sense, constitution can be considered as similar to social construction. However, Husserl goes much further than social constructionists in that, for him, even things of nature are constituted.³¹

Following the Upaniṣads, Advaita holds that consciousness is the support (*adhiṣṭhāna*) of the objects of the entire world; that is to say, the objects, which are totally different from consciousness, have no existence of their own, no status of their own, no nature of their own, with the result that they are dependent on consciousness. What is inexplicable is that consciousness which has no relation with anything-for there is no other entity which can be reckoned as real to come into relation with-comes to be related with the objective phenomena. There is no objective world which exists independently of consciousness; and what appears as the objective world conditioned by space, time, and causality, is the

manifestation of the foundational consciousness. Advaita holds that consciousness is the transcendental *a priori* of all objects, both for the purpose of their existence and knowing. The point to be noted here is that Advaita does not deny the existence of the objective world; what it denies is the independent existence of the objective world. The standpoint of the Husserlian phenomenology is surprisingly the same. In the words of Aron Gurwitsch:

From the phenomenological point of view, consciousness cannot be regarded as one mundane realm among others. To whatever mundane realm an object belongs, it necessarily involves, implicates, and in this sense, presupposes consciousness, namely, those acts through which the object in question appears and displays itself as that which it represents in our life. Consciousness thus reveals itself as the universal domain or medium of presentation of all objects, a domain to which every mundane realm necessarily refers. Herein consists the privilege and the priority of consciousness to every mundane realm. The mundane nature of a realm purports its insertion as a part into the whole of the total reality. In this sense, mundane nature must not be ascribed to consciousness.³²

NOTES

- 1 See his “*adhyāsa-bhāṣya*”, the introductory portion of his commentary on the *Brahma-sūtra* (hereafter *BS*).
- 2 See R. Balasubramanian, ed. and tr. *The Naiṣkarmya-siddhi of Sureśvara*. RIASP, University of Madras, Chennai, 1988, Sambandhokti to 3.60, pp. 283-4.
- 3 See Śaṅkara’s commentary on *Brahma-sūtra*, 1.1.4 (end-portion).
- 4 See Śaṅkara’s commentary on the *Bṛhadāraṇyaka Upaniṣa*, 3.4.2.
- 5 The principle is stated as follows: “*prasaktasya pratiṣedhah*”
- 6 *Pratīyamānatvāt na asat.*
- 7 *Bādhyamānatvāt na sat.*
- 8 For example, a dream-lion is “private” whereas an object like table seen in the waking experience

is “public”. Gauḍapāda mentions other differences as well in his *Māṇḍūkya-kārikā*, 2.4, 13-15.

- 9 *ChĀndogya Upaniṣad*, 6.2.1.
- 10 Habermas also speaks of three worlds—the objective world, the subjective world, and the social world.
- 11 Jean-Paul Sartre, *The Transcendence of the Ego*, tr. F. Williams and R. Kirkpatrick. The Noonday Press, New York, 1957, p. 72.
- 12 *Bṛhadāraṇyaka Upaniṣad*, 1.5.3.
- 13 *The Transcendence of the Ego*, op. cit., p. 42.
- 14 Jean-Paul Sartre, *Being and Nothingness*, tr. H.E. Barnes. Philosophical Library, New York, 1956, p. li.
- 15 *Ibid.*, p. lii.
- 16 *The Transcendence of the Ego*, op. cit., p. 42.
- 17 The Advaitin tries to bring out the irrationality of the ego as follows: (1) Though by itself, it is material (*jaḍa*), it appears to be non-material, i.e. sentient, when it is associated with consciousness. (2) Though it is only an “object”, it also plays the role of a knower, the subject, when it carries the reflection of consciousness.
- 18 *The Transcendence of the Ego*, op. cit., p. 60.
- 19 *Being and Nothingness*, op. cit., p. liii.
- 20 *Māṇḍūkya-kārikā*, 1.18.
- 21 *Taittirīya Upaniṣad*, 2.4.1.
- 22 *Tractatus*, 5.6, 5.61, and 7.
- 23 John Eccles, ed. *Mind and Brain*. Paragon House Publishers, New York, 1985, p. 261.
- 24 *Ibid.*, p. 90.
- 25 *Ibid.*, p. 260.
- 26 *Ibid.*, p. 56.
- 27 For this explanation, see Vidyāraṇya, *Panācadaśī*, 4.11.
- 28 Eccles, *Mind and Brain*, op. cit., pp. 260-62.
- 29 *Ibid.*, pp. 259-60.
- 30 *Ibid.*, p. 268.
- 31 Dermot Moran, *Introduction to Phenomenology*, Routledge, London, p. 166.
- 32 Aron Gurwitsch, *The Field of Consciousness*. Duquesne University Press, Pittsburgh, PA, Second impression, 1964, p. 159.

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What Should be the Roles of Conscious States and Brain States in Theories of Mental Activity?

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ABSTRACT

An early science of consciousness was rejected by behaviorists on the identification of a causally active consciousness with an ontologically immaterial substance acting with “free will” in the sense of indeterminism. This is, however, a confusion of theoretical assertions that can be empirically examined with metaphysical assertions that cannot be within our science. Nevertheless a legacy within computational and information processing views of mind rejects or de-emphasizes a role for consciousness. This paper sketches a mentalistic metatheory in which conscious states are the sole carrier of symbolic representations, and thus have a central role in the explanation of mental activity and action—while specifying determinism and materialism as useful working assumptions. Following an illustration of conscious states in theory and experimental evidence with phenomenal reports, questions are examined: Are there common roles for phenomenal reports and brain imaging? Is there defensible evidence for unconscious brain states carrying symbolic representations? Are there interesting dissociations within consciousness?

Keywords: Mentalism; Consciousness; Symbols; Deliberative, evocative, neural networks; Phenomenal reports; Brain imaging

INTRODUCTION

The very title suggests controversy, one that has shaped the aims of psychological science from its founding to the present (Dulany, 2009). I bring a particular perspective, a mentalistic metatheory that I have variously described, e.g. Dulany (1997, 2004, 2009).

On that perspective I will say what I think the roles of conscious states should be in our theories of mental activity and then ask if brain states should have the same or different roles. Mental activity is the succession of mental states involved in a range of common phenomena, from perception of the physical and social worlds, through forms of learning and remembering, to problem solving and reasoning—with infusions of emotions and a sense of self. For any of these, or others (Dulany, 2008), a theory of mental activity would abstract an orderliness among mental states, an orderliness to be empirically evaluated.

HISTORICALLY SIGNIFICANT METATHEORIES

Early science of consciousness

This controversy over roles for conscious states and brain

states started with a critical period in the history of psychology, a period with the enduring influence of a confusion of the theoretical with the metaphysical—which can be seen as a source of methodological biases. Psychology was established as a science of consciousness, with the *structuralists'* analysis of conscious states (Titchener, 1898), a “mental chemistry” that would identify a table of mental elements and the formulas that would yield any conscious experience, from a sunset to an apple bite. *Functionalists* turned their focus to the adaptive utility of consciousness, and were strongly guided by the classical work of William James (1890), laying out problems placed within the “stream of consciousness”. *Gestaltists* (Koffka, 1935/1946) focused on the organizational properties of consciousness states, from perception to problem solving. On what today would be called a version of NCC, their principle of “psychophysical isomorphism” held that conscious states and their underlying brain states had a common “functional ordering”—common roles.

The behavioral revolution—its enduring legacy

Simply put, consciousness was vigorously rejected as a proper subject for science. As John B. Watson put it,

This suggested elimination of states of consciousness as proper objects of investigation in themselves will remove the barrier from psychology which exists between it and the other sciences (Watson, 1913/1994; p.253).

Why?

Behaviorism claims that 'consciousness' is...merely a word for the 'soul' of more ancient times. The old psychology is thus dominated by a kind of subtle religious philosophy (Watson, 1924, p.3).

Then for a mechanical metaphor, a dominant machine of the time was selected: a Bell Telephone Switchboard. Stimulus "dialing" could produce a muscular "ring", and so psychological theory could simply be Stimulus-Response Behavior theory.

With this core commitment, B.F. Skinner (1974) in his most systematic—and currently enduring—treatment of Radical Behaviorism, called for the rejection of the person as agent, identified with an introspected and nonphysical world. Behaviorists then focused their experimental inquiry on rats and pigeons unequipped to report anything behaviorism rejected. Just rid the science of what Skinner called "the inner man"—and there would be no reason to fear an ontological non-materialism or free will in the sense of indeterminism.

That was the enduring confusion. Theoretical assertions are subject to empirical evaluation. Within the science as we know it, metaphysical assertions are not.

The cognitive revolution

That legacy, Roediger (2004), writing his column as President of Association of Psychological Science, argued that behaviorism is still very much with us, in journals and societies and behavior therapy, and in the manipulation-response style of experimental studies throughout psychology. It won. The cognitive revolution was not a renewed focus on consciousness. The relevant legacy has been a rejection of, or de-emphasis upon, a causal role for conscious states and a focus instead on loosely labeled "cognitions" and on claims for complex unconscious processing—claims with experimental support that has been challenged on conceptual and methodological grounds, e.g. (Dulany, 2003).

Significant factors in the emergence of cognitive metatheories were two things: (a) A wide-spread challenge to S-R Behavior Theory, and (b) the emergence of a computer metaphor for mind—the dominant machine of *our* time. Just think of the mind as a computer and the mind is still a machine after all.

On the *computational view*, e.g. (Jackendoff, 1987), mind and a computer are both instances of a Universal Turing Machine, and so we have the famous analogy: Mind is to brain as

software is to hardware. Most importantly, it is *cognition* said to run like a program in the brain, with consciousness only a sometime and non-causal emergent—epiphenomenalism, though monistically material. So if consciousness is non-causal, *eliminative materialists*, e.g. (Churchland, 1993), can dismissively consign it to "folk psychology"—reminding us of dismissively consigning a "consciousness-soul" to religion.

On the *information processing view*, mind is viewed as a *system* with *subsystems* like those of the computer, and so consciousness is represented as a limited attentional sub-system within a working system—RAM—connected to a LTM and input and output systems, e.g. (Posner, 1994). So we "store" information in that LTM and then unconsciously "search" and "retrieve"—and unconsciously "compute" outside that attentional subsystem. This metatheory makes a place for consciousness, but it also provides a common commitment to, and emphasis upon, a "cognitive unconscious" (Kihlstrom, 1987).

By far most influential for a revival of interest in consciousness has been the Global Workspace view of Baars (1997), using the closely analogous theater metaphor. Consciousness may be "stage center", but "In the audience are a vast array of intelligent unconscious mechanisms", (p430). Then with computational modeling of that neurally "global" work-space-system, e.g (Baars & Franklin, in press), the two cognitive metatheories and the newer neuro-cognitivism blend. The legacy extends.

Mentalistic Metatheory and Roles for Conscious States

Viewed more analytically, however, consciousness is a succession of states, in various modes and contents, that have lawful, causal orderliness—to be specified in empirically supportable *theoretical* assertions that in no way entail *metaphysical* assertions of non-material status or free-will in the sense of indeterminism. Materialism and determinism are useful *working assumptions* for theorists and experimentalists.

Mental contents. Most significantly, the mentalistic metatheory is set apart in holding that *conscious states are the sole carriers of symbolic representation*—permitting its explanatory power and providing its adaptive explanation. In consciousness we represent a present in perception, a past in forms of remembrance, and a future in expectations, intentions, hopes or fears. With higher order representations we may even represent our own conscious states and mental episodes. Thus as we learn what consciousness explains we gain the explanation of consciousness.

Symbols are functionally specified: They may (a) activate other symbols, (e.g. 'café' activates 'latte', and (b) serve as subjects or predicates of propositional contents, (as in "A latte is on my desk"). They may (c) participate in the special proposition, "

'This' represents 'that'", e.g (this "'latte' refers to content of 'that cup'.") and (d) and in the intention controlling actions that warrant the preceding proposition, ('I grasp that cup and sip'.)

Symbolic contents may be *identity symbols*, attentional identifications of things as such, or *literal symbols* that precede and surround that attentional identification. We attentionally hear what a solo instrument plays from how it sounds and the surrounding accompaniment.

Symbolic contents may be *propositional*, with *subject* values such as the relation of what named to what considered or scored correct, and with *predicate* values, such as the likelihood of a certain outcome give the occurrence of what is named in the subject. They may also be *non-propositional* such as a perception of a trumpet or oboe.

Modes are the familiar carriers of conscious contents and vary quantitatively in many experiments. They may be *propositional* modes such as "perceive, or believe, or intend *that* ___", each carrying a propositional content. Or they may be *non-propositional* modes such as .a "feeling or only sense of ___ " for non-propositional content.

For mental mode and content, we can speak of a sense of *agency*, of possession that may vary in strength and frequency in normalcy, or be diminished in neurosis, and even missing or erroneously attributed in a psychotic syndrome.

Mental episodes. Mental activity consists of mental episodes—conscious contents interrelated by non-conscious mental operations. In *deliberative mental episodes*, propositional contents are interrelated by deliberative operations; they are decisions or inferences. In *evocative mental episodes*, non-propositional contents are interrelated by associative-activational operations. We can think of these operations as simply the relations among these conscious states,

$Cs\ State_{in+1} \leftarrow Ncs\ Op\ (Cs\ State_{jn}, \dots, Cs\ State_{kn-m}),$

sometimes represented by a mathematical function within a model,

$Cs\ States_{in+1} = f(Cs\ States_{jn}, \dots, Cs\ States_{kn-m})$

—or as the neural processes interrelating the mental states' coordinate brain states. On this analysis of the commonly but too loosely termed "explicit" or "implicit" (learning or memory), these processes are not distinguished by being "conscious" or "unconscious", but by deliberative and evocative mental episodes (Dulany, 1997).

The domain for mental episodes lies between the final output of *sensory transduction* and the final input to *motor transductions*.

Forms of *mental episodes are interrelated*. For someone learning to drive, for example, "Red means Stop" can with associative repetition become the evocative episode, "Red" activates 'Stop'. And later one can readily represent that evocative episode in higher order awareness with the proposition, "Red means Stop."

Higher order awareness. By virtue of the extraordinary capability of symbols to represent beyond themselves, higher order awareness may symbolically represent a past, or even future, conscious state or mental episode ("metacognitively") by imperfect operations of memory, prediction, or inference. But contrary to Higher Order Thought theories, no mental state on this metatheory must be graced by a higher order state to acquire a "property" of consciousness. That mental state *is* a conscious state.

The non-symbolic. *Nonconscious memories* are non-symbolic neural networks—consistent with that part of connectionism. What we "know", "believe", or "intend", despite a loose vernacular, does not have the same functional specification in inactive memory as in consciousness. Memories in those networks are constructed by experience, not "stored", and remembering is a process of activation and construction, not "search, identification, and retrieval".

Automaticity. . In a simple form, one conscious state directly activates another—an evocative episode. Or a conscious intention may be the higher node of a hierarchical structure, activating lower order responses, providing non-propositional feedbacks for an evocative episode. With automatization, deliberative thought *drops out not down* to an unconscious (Dulany, 1997), consistent with diminished fMRI activity for the controlling network e.g., (Chein & Schneider, 2005). Consider a diagnosis that comes automatically to mind from presentation of a familiar set of symptoms.

Some have used aspects of this metatheory explicitly, for example, Carlson (2002), Perruchet & Vinter (2002), and Tzelgov (1997), and others less explicitly in the many studies that examine the roles of conscious states in a range of mental activities—or methodologically challenge various claims for unconscious perception, learning, thinking, etc.

Mentalistic Theoretical and Experimental Example

A mentalistic theory of propositional learning describes deliberative inferences among a network of conscious beliefs. The learning of causal beliefs was described in a theory refined by a quantitative model (Dulany, 1979), and experimentally applied to identifying the suspect cause of a murder effect in Carlson & Dulany (1988). Subjects were presented two mysteries, each with 12 trials of clues with different suspects provided 4 different ratios of incriminating and exonerating clues. On each trial they *reported the theory's belief states*, varying

from Certain Yes to Certain No ($\beta = +1$ to -1).

- (a) From degree of belief a clue is associated with a suspect, β_A - which can vary over suspects, and degree that this clue implies guilt or innocence, the “forward implication”, β_F , one infers subjective evidence, β_E , its implied guilt or innocence for this suspect. That product strongly predicted the subjective evidence:
- (b) “Convincingness” of that evidence for that suspect, however, should be the product of subjective evidence for that clue, β_E , and the degree of belief that it would be true or false *only* of the true murderer, the “backward implication”, β_B . Then from prior belief in this suspect’s guilt-innocence and convincingness of that evidence for this suspect one may infer a revised belief:

$$\beta H_{n+1,i} = \beta H_{ni} + / \beta E_{nij} \times \beta B_{nij} / (1 - \beta H_{in}), \text{ if } \beta E_{nij} > 0$$

$$\beta H_{n+1,i} = \beta H_{ni}, \text{ if } \beta E_{nij} = 0$$

$$\beta H_{n+1,i} = \beta H_{ni} - / \beta E_{nij} \times \beta B_{nij} / (1 + \beta H_{in}), \text{ if } \beta E_{nij} < 0.$$

Over all subjects and trials, correlation of predicted and reported causal beliefs was .91, slope of .98, and near zero intercept—with the predictions closely tracking reports over trials for the 4 different ratios. There was an explanatory role for conscious states in a causal network. Examples examining implicit and explicit learning, with no need for mathematical modeling, are Dulany, Carlson, & Dewey (1984), and Dulany & Pritchard (2007).

Comparable Roles for Brain States Underlying Conscious States?

On the assumption that conscious states and brain states are coordinate in some way, underlying brain states could have comparable roles in theories of mental activity. For the question I raise, however, where does brain imaging with humans stand at its present state of technological development—compared with the utility of phenomenal reports?

One example is the search for the neural *mechanisms* underlying symptoms in schizophrenia, e.g. Wibble, Preus, & Hahimoto (2009). Also well known is fMRI evidence revealing brain areas underlying *classes of conscious states*, e.g. the fusiform face area for facial recognition (Kanwisher, McDermott, & Chun, 1997), and the parahippocampal area for place recognition (Epstein & Kanwisher, 1998).

And the *specific* brain states underlying those specific conscious states? To some degree “pattern analyzers” facilitate distinguishing these more specific states, at least when stimulus control provides the specific state identification—for example,

vertical or tilted grating, leftward or rightward motion, or blue jay or sparrow in Kamitani & Tong (2005). Then further tests were directed at distinguishing which of competing stimuli were attended—with orientation predicted by activation of sensory areas, V1-V4, and objects by activation of higher areas.

Methodological challenges. Despite recognition of significant contributions, Poldrack (2009) also points to specific limitations that challenge claims of strong association of specific mental activities with specific areas identified with fMRI—with interesting examples from psychiatry and advertising.

In addition, Vul, Harris, Winkielman, and Pashler (2009) identify a large number of studies in which there were unrealistically high correlations between fMRI indices and various personality, emotion, and social cognition measures, unreasonably high given the modest reliability of both measures. Although measures from a subset of voxels may be appropriately selected for some anatomical locale, they identified many studies in which voxels were selected if the correlations of their own indices— amount of deoxygenated hemoglobin in the blood (the BOLD signal)—with the personality measure met some correlational criterion. The selected voxel signals artificially reduced unreliability of the fMRI measures, thereby inflating the overall correlations—a statistical violation. Vul & Kanwisher (in press) identify more cases and elaborate the problem, including an especially revealing concluding section entitled “Why the non-independence error is prevalent in fMRI.”

The challenge of specific states. Could there be a “dictionary” of imaging outputs, something that calls for numerous *identifications* over and above the few demonstrated in studies with pattern analyzers? Discriminating the few with specific training is not equivalent to identifying the many in many contexts over persons, controlling for wandering thoughts. We can also report abstract concepts—“justice” or “energy”—but are they *identifiable* with neuroimaging? I think, too, that propositional forms, those central to deliberative thinking, present a particular problem—with the extraordinarily large combinations of subjects and predicates and degrees of belief or asserted likelihood, as well as the sense of ownership of those thoughts.

Viewing these various challenges, I believe a fundamental question for neuroimaging technology today is this: Is there any noninvasive brain imaging method for humans—from ERP and MEG and to the most commonly used fMRI—with the rich variability of output that can *validly* reflect the rich variability of electrochemical activity in the neural networks that must underlie the rich variability of the *specific* states within our mental activity? Magnitude of positive or negative action potentials over a few 100ms? Distinctive magnetic fields?

BOLD signal measures for a selected pattern of voxels, with the unusual number of complicated steps, sometimes arbitrary parameter setting—as described in Vul & Kanwisher (in press)? And averaged over subjects and trials in order to produce those graphs and pictures? *Or must other processes be identified to be tapped in humans with other technological developments?*

Methodological strategy for phenomenal reporting and neuroimaging. On a more positive note, brain imaging may reveal brain mechanisms underlying or predisposing various *mental episodes*—those categorized as symptoms, for example, or as deliberative or associative-activational in general. There could even be a place for imaging of processes underlying specific conscious states with pattern analysis—especially when identified with antecedent stimuli. Brain imaging could also have a particular utility where private reports of those states are unavailable or untrustworthy.

Confidence in the validity of phenomenal reports and brain images must rely on the same logic within the philosophy of science—a logic elaborated in Dulany (2009). Reports and brain images would be reported in *data* language, and conscious states and brain states in *theory* language. As we know, theory and mapping hypotheses are examined in tandem. When validity of neuroimaging is challenged, researchers must ask whether there is now a rich enough theory of interrelations among specific brain states, or whether they should rely on theories of interrelations among conscious states—mentalistic theories.

Neuroimaging of Unconscious, Non-Symbolic States in This Metatheory. Here, too, there are large and growing literatures on the neural networks underlying *inactive memories*, as well as *sensory and motor transductions*, to and from conscious states.

A Challenge From Reported Evidence of Unconscious But Symbolic States?

Most fundamentally, do these states exist, with consciousness epiphenomenal—thus challenging the adequacy of the mentalistic metatheory? Could there then be brain imaging of such states? This cannot be a review of these large literatures, and for space limitations here I must only list failures of replication and what I believe are *methodological and conceptual biases* underlying these claims—the legacy—although this has been elaborated for the talk and later paper.

Unconscious implicit learning? (a) Neglect of correlated and explanatory conscious contents. (b) What is not conscious knowledge must be unconscious knowledge—even if effect is fully explained by conscious states. (c) Failure to recognize implicit learning in sense of establishment of associative-activational relations apart from rules.

Unconscious Volition?: With the “*Libet lag*”, the “readiness potential” interpreted as index of unconscious intention rather

than state of *readiness* to form an intention and respond. (d) Belief that causal control of action by intention entails “free will” in sense of indeterminism. (e) Failure to recognize possibility of coordinate causal models, at level of consciousness and at level of neural processes—implied by neural states coordinate with conscious states.

With the *Wegnerian leitmotif*, erroneous inference that cleverly engineered volitional illusion demonstrates general absence of veridical awareness of volitional control.

Unconscious thinking? (a) Popular claims for unconscious creation of the Fuschian function and benzene ring—discounted by scholarly analyses. (b) Neglect of set of biases in experimental studies “incubation” of problem solving. (c) Failures to replicate more recent evidence of unconscious decision-making.

Unconscious perception? (a) Identification of “subliminal perception,” a disparity between measures, with “unconscious perception”, a theoretical interpretation. (b) Adoption of subjective reports, with demonstrated bias, as reliable indices of conscious perceptual state. (c) Imperfect masking and insensitivity of some objective measures of perceptual awareness. (d) Uncontrolled role of unassessed literal awareness in producing “subliminal effects.”

Some More Positive Implications: Dissociations Within Consciousness

Consistent with prevailing metatheoretical views, two well-known syndromes have been interpreted as cases of chronic unconscious perception, but the phenomena may be more confidently and productively interpreted within mentalistic theory as dissociations within awareness.

Prosopagnosia. With damage to a region of the fusiform gyrus, the patient may be unable to recognize faces consciously, yet nevertheless responds systematically in various ways to the person’s face. For example, Tranel & Damasio (1985) found greater GSR to familiar than unfamiliar faces. Furthermore, DeHaan, Bauer, and Greve (1992) even found that classifying names as politician or non-politicians was slowed when the face was accompanied by a face from the opposite category. On the standard explanation, e.g. Young (1994), this is *unconscious facial recognition*, a dissociation between consciousness and a facial recognition system.

The key to a mentalistic explanation is recognition of a role for literal awareness dissociated from identity awareness. Identity awareness is blocked when activation fails to reach temporal areas, but literal awareness of the face activates other neural networks, producing a GSR to a familiar face, as in Tranel & Damasio (1995), and activating various occupational associations incompatible with the erroneous labels, as in Damasio et al. (1992). Is the mentalistic explanation more

tenable and promising? Literal facial forms are definitely represented in the patient's awareness, as shown in their normal ability to match facial photos, familiar or not (DeHaan, Young, and Newcombe, 1987). With Farah (1994), this agrees that the recognition system is damaged, and the parts remaining produce these effects.

"Blindsight". What has spawned this Oxonian oxymoron? With damage to striate cortex, V1, some subjects, most famously the Oxonian subjects DB and GY, show significant discrimination of stimuli presented to the scotoma despite lack of, to quote Weiskrantz (1997), "any awareness whatsoever of a visual event," (p. 65)—and I would emphasize the last two words. In the more advanced procedures (Weiskrantz, 1997), the subjects significantly label the direction of a moving figure, to the right or left, and report Yes or No with what is termed a "commentary key"—non significantly, as to whether this experience is something they would characterize as visual, as seeing. On the standard interpretation, this is compelling evidence of a dissociation of consciousness from perception—unconscious perception.

The key to a mentalistic explanation is in recognizing that lower order awareness may be dissociated from a higher order awareness. We need first to recognize two biases in the standard interpretation.

- (a). What is said to tap the unconscious perception is simply what has long been recognized, from SDT and Merikle & Reingold (1998), as the most sensitive measure of awareness of a stimulus—the direct objective. A significant d' for that index is obtained when clearly conscious assertions as to the direction of movement are significantly associated with actual direction of movement.
- (b). Furthermore, with use of the "commentary key", the subject categorizes that just prior experience as visual, as seeing, or not—a content of a higher order awareness. In a revealingly entitled paper, "Varieties of residual experience," Weiskrantz (1980) wrote of EY that "when he was asked to report when he *saw* the light coming into his field—he was densely blind by this criterion, but when he was asked to report merely when he was *aware* of something coming into his field, the field was practically filled", (p. 378). Working with another subject, GR, Overgaard, Fehl, Mouridsen, Bergholt, & Cleeremans (2009) recently report an interesting continuous relationship between accuracy of her discrimination and a Perceptual Accuracy Scale, a scale of that higher order awareness.

Awareness too degraded to be categorized as "seeing", or varying in degree to which it could be so categorized, could be explained by residual activation of V1 or transmission from

the retina that by-passes the dorsal lateral geniculate route to V1, going instead via the superior colliculus to other parts of the visual system, V2, V3, V4—alternative routes that Weiskrantz (1997) discusses, (p. 128).

More generally, we can recognize the variety of ways we characterize our conscious experience in higher order awareness—and this yields a variety of questions.

CONCLUSIONS

Although a science of psychology was founded as a science of consciousness, the behaviorist revolution rejected that subject matter on two intellectual confusions: Theoretical assertions including consciousness entail ontological immaterialism and "free will" in the sense of indeterminism.

With the cognitive revolution, the computational view of mind accorded consciousness the role of an epiphenomenon, and the information processing view emphasized intelligent symbolic, but unconscious processing.

A mentalistic metatheory, however, holds that conscious states are sole carriers of symbolic representation, and mental episodes interrelate propositional and non-propositional contents with nonconscious operations, deliberative and associative-activations.

Brain imaging can be very useful, but phenomenal reporting and brain imaging would serve somewhat different roles in its present state of technological development.

In studies of learning, volition, thinking, and perception, I do not find methodologically acceptable evidence that would challenge a mentalistic metatheory. In fact, some evidence coming out of that work offers the promise of studying dissociations within consciousness.

DECLARATION

In writing this, there is no conflict of interest, and this is original unpublished work, not submitted for publication elsewhere.

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Neuroscience and values: a case study illustrating developments in policy, training and research in the UK and internationally

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ABSTRACT

In the current climate of dramatic advances in the neurosciences, it has been widely assumed that the diagnosis of mental disorder is a matter exclusively for value-free science. Starting from a detailed case history, this paper describes how, to the contrary, values come into the diagnosis of mental disorders directly through the criteria at the heart of psychiatry's most scientifically-grounded classification, the American Psychiatric Association's DSM (Diagnostic and Statistical Manual). Various possible interpretations of the prominence of values in psychiatric diagnosis are outlined. Drawing on work in the Oxford analytic tradition of philosophy, it is shown that, properly understood, the prominence of psychiatric diagnostic values reflects the necessary engagement of psychiatry with the diversity of individual human values. This interpretation opens up psychiatric diagnostic assessment to the resources of a new skills-based approach to working with complex and conflicting values (also derived from analytic philosophy) called 'values-based practice'. Developments in values-based practice in training, policy and research in mental health are briefly outlined. The paper concludes with an indication of how the integration of values-based with evidence-based approaches provides the basis for psychiatric practice in the twenty-first century that is both science-based and person-centered.

Key-words (not appearing in title): Evidence-based practice; Values-based practice; Diagnostic and Statistical Manual (DSM); Diagnosis; Classification; Psychosis, Schizophrenia; Spiritual experience; Religious experience

INTRODUCTION

A significant practical spin-off from the recent upsurge of cross-disciplinary work between philosophy and psychiatry (Fulford et al., 2003) has been the development of a new skills-based approach to working with complex and conflicting values called values-based practice (Woodbridge and Fulford, 2004).

That there should be a need for *values*-based practice in psychiatry's 'decade of the brain' came to many at best as something of a surprise, at worst, with its implications for a more equal role for service users alongside clinicians and researchers, as a positive threat to the emerging sciences of the field (Spitzer, 2005). Yet, as I will outline in this paper, values and science, at least as reflected in psychiatric diagnostic

classifications, are neither incidental nor inimical to each other, but twin and complementary components of a psychiatry that as a medical discipline is both science-based and person-centered.

CASE STUDY: SIMON

Simon (40) was a senior, black, American lawyer from a middle-class, Baptist family. Before the onset of his symptoms, he reported sporadic, relatively unremarkable, psychic experiences.

Around four years before the first interview, his hitherto successful career was threatened by legal action from his colleagues. Although he claimed to be innocent, mounting a defense would be expensive and hazardous. He responded to this crisis by praying at a small altar which he set up in his front room. After an emotional evening's 'outpouring', he discovered that the candle wax had left a 'seal' (or 'sun') on several consecutive pages of his bible, covering certain letters and words. He described his experiences thus. "*I got up and I saw the seal that was in my father's bible and I called X and I said,*

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you know, 'something remarkable is going on over here.' I think the beauty of it was the specificity by which the sun burned through. It was ... in my mind, a clever play on words."

Although the marked words and letters had no explicit meaning for anyone from his own Baptist background, Simon interpreted this, and a series of subsequent similar events, as a direct communication from God which signified that he had a special purpose or mission as "... *the living son of David ... and I'm also a relative of Ishmael, and ... captain of the guard of Israel*".

He expressed these beliefs with full conviction and when confronted with scepticism, commented, "*I don't get upset, because I know within myself, what I know*".

Simon in the ICD

Simon's story was first published by the British psychologist, Mike Jackson (1997), in a study of delusion and spiritual experience. Simon, it would seem, had a delusional perception (the revelations in his 'suns' or wax seals) which in the ICD (International Classification of Diseases, World Health Organization, 1992) suggests a diagnosis of schizophrenia or other psychotic illness. Yet Simon (along with many others in Jackson's study) was much *empowered* by his experiences; he won his court case; went on to become a successful lawyer; and always considered his experiences to be deeply spiritual in nature.

Simon in the DSM

If Simon's own understanding of his experiences is in conflict with the ICD, it is consistent with the DSM (the Diagnostic and Statistical Manual, American Psychiatric Association, 1994). Thus, the DSM includes, in addition to traditional symptom-based diagnostic criteria, what it calls 'criteria of clinical significance'. For a diagnosis of schizophrenia in the DSM, therefore, Simon would have to show not only the relevant symptoms (to satisfy Criterion A), but also a *deterioration* in social and/or occupation functioning (to satisfy Criterion B, the relevant criterion of clinical significance (p285). To the extent, then, that Simon's occupational functioning was actually *enhanced* by his experiences, he *failed* to satisfy Criterion B and hence did not, despite satisfying Criterion A (the symptom-based criterion), have schizophrenia at all according to the DSM, but a spiritual experience.

Facts and Values in the DSM

It might be thought that the success of the DSM in providing a more face-valid interpretation of Simon's experiences than the ICD reflects its more explicit evidence-base (American Psychiatric Association, 1994, p XV). Closer inspection, however, suggests to the contrary that the key to the DSM interpretation is its more explicit *values*-base. Consider Criterion B: it requires both a *change* in functioning (a matter of fact) and a change for

the worse (which is a matter of values).

DSM thus makes explicit what many have argued is implicit in psychiatric diagnostic concepts generally, namely that they are deeply value laden (ref Sadler, 2005). The question that arises, then, is what interpretation should be placed on this.

Interpretations various

The value-laden nature of psychiatric diagnostic concepts is capable of a number of different interpretations (Fulford, 1989). In the psychiatry/anti-psychiatry debates of the 1960s and 1970s, for example, psychiatrists such as R.E. Kendell (1975) argued that the relevant values would disappear with future scientific advances; whereas so-called anti-psychiatrists, by contrast, claimed that these same values showed mental disorders to be a matter of 'morals not medicine' (Szasz, 1960); and in the now very large literature on concepts of disorder, there have been many subsequent attempts to find a middle ground between what I have called elsewhere the 'values in *versus* values out' extremes of these early positions by delineating, in one way or another, what is taken to be a value-free element of their meanings (Fulford, 2000).

I do not have space here to do justice to these different interpretations (but see Fulford, 1989, chapter 1). A very different interpretation, and one that underpins the practical tools of values-based practice, is suggested by the work of a former White's Professor of Moral Philosophy in Oxford, R M Hare.

Hare on Values

As an analytic philosopher, Hare was interested in the logic (the meanings and implications) of value terms (Hare, 1952, 1963). This sounds rather abstract. Yet, as we will see, Hare's work, and that of others in the analytic tradition (Austin, 1956-7), goes to the heart of the theoretical difficulties raised by concepts of disorder and thereby to the corresponding problems that we face in day-to-day practice.

Strawberries



Pictures





Agreement
over what makes
a good strawberry
(= sweet, clean skinned, etc)

Hence
The term “good strawberry”
has acquired the factual
meaning “sweet,
clean skinned”, etc!

Parallels
Concepts of bodily disorder in
general medicine



No agreement
over what makes
a good picture
(= ??????)

Hence
The meaning of “good
picture” has acquired
no consistent factual
meaning

Parallels
Concepts of mental disorder
in psychiatry

Good Strawberry versus Good Picture and the Parallels with Concepts of Bodily and Mental Disorder

The key point to take from Hare’s work in the present instance can be summed up in the slogan ‘*visibility* of values equals *diversity* of values’. The essence of Hare’s argument, as the Figure illustrates [Fig 1], is that *all* value term, including such generic value terms as ‘good’ and ‘bad’, may come to appear value-free and thus more like factual terms, where the values they express are largely agreed or settled upon.

Hare’s example, shown in the left-hand side of the Figure, was of ‘good strawberry’, this being a use of the value term ‘good’ in which it carries largely factual meaning, namely that the strawberry in question is red, sweet and grub-free, etc. This is essentially because most people have shared values when it comes to strawberries, i.e. that strawberries should be red, sweet and grub-free, etc., and, hence, this *factual* meaning has become attached by association to the use of the value term ‘good strawberry’. Conversely, ‘good’ used of pictures, as in the right-hand side of the Figure, over which people’s values vary widely, has no shared factual meaning and thus retains overtly evaluative connotations.

Returning now to the medical concepts, an exactly parallel argument explains the relatively value-laden nature of psychiatric diagnostic concepts compared with concepts of bodily disorder. Again, this is illustrated by the Figure. In a direct parallel with Hare’s argument about value terms in general, we see that psychiatric diagnostic concepts are relatively value-laden, neither because psychiatry is a matter of ‘morals not medicine’ (as the anti-psychiatrists suggested, as above), nor because of the supposed under-development of psychiatric science (as Kendell and others believed), but because the values involved in diagnostic judgments in psychiatry, in contrast with the corresponding judgments in bodily medicine,

are *particularly diverse* (Fulford, 1989, chapter 5).

Thus, the criteria for good and bad heart functioning, for example, paralleling ‘good strawberries’, are largely settled and agreed upon: and this is true by and large of all the areas with which (acute) bodily medicine is primarily concerned. By contrast, however, the areas with which psychiatry is primarily concerned – emotion, desire, belief, motivation, sexuality and so forth – are all areas in which our values, paralleling ‘good pictures’, are highly diverse.

Again, I do not have space here to go into the arguments for and against this interpretation in detail. At the level of theory, Hare’s analysis itself is far from universally accepted: it falls within a 200-year debate in philosophy about the logical relationship between factual and evaluative meaning, a debate that continues to this day (see for example, Putnam, 2002). At the level of practice, however, the interpretation, building further on the work of Hare and others on the logic of values, leads directly to the skills-based approach of values-based practice.

Values-Based Practice

Values-based practice is one of a growing number of new disciplines contributing to more effective ways of working with values in medicine (Fulford, 2004). A distinctive feature of values-based practice, and one that makes it particularly relevant to tackling problems involving diversity of values, is that it starts from and celebrates the importance of the uniqueness of the individual. Unlike ethics, therefore, which seeks to determine ‘right outcomes’, values-based practice relies on ‘good process’, in particular good clinical skills, as the basis of balanced decision-making where values conflict.

There are ten key elements of the process of values-based practice (Fulford and Woodbridge, 2004). As just noted, values-based practice is primarily skills-based (see below). But also important are, 1) an appropriate service model (values-based practice depends on a person-centered and multi-disciplinary service structure), 2) strong links between values-based and evidence-based approaches, and 3) partnership between service users and service providers in clinical decision-making. A full account of these ten elements together with a detailed case history, of ‘The Artist who Couldn’t See Colours’, is given in my (1994) *Ten Principles of Values-Based Medicine*.

The development of values-based practice in mental health

As I describe in detail elsewhere (Fulford, 2008), values-based practice has been actively developed in mental health through a number of initiatives involving national and international partners representing its three key stakeholder groups - patients, professionals and policy makers – and there are now

substantial resources to support values-based policy, training and service development.

The first training manual for values-based practice, called 'Whose Values?' (Woodbridge and Fulford, 2004), which was developed and piloted with front-line mental health staff, was launched by the UK Minister of State in the Department of Health, Rosie Winterton, at a conference in London in 2005. 'Whose Values?' is built around a series of training exercises in the four skills areas of values-base practice:

- 1) Increased *awareness* of values and of the often surprising *diversity* of values – this is the foundation and starting point for effective values-based practice
- 2) The ability to reason about values using a variety of different methods (principles reasoning, utilitarianism, deontology, etc)
- 3) Knowledge of values derived using not only standard empirical methods [Petrova et al., forthcoming] but also other sources: personal narratives of patients and family carers, and a number of powerful philosophical methods, including phenomenology, hermeneutics and discursive philosophy (Fulford et al., 2003).
- 4) Enhanced communication skills – vital not only for exploring values and differences of values but also in such areas as conflict resolution and shared decision-making (Hope et al., 1996).

Values-based practice has been combined with policy and service development in two recent Department of Health initiatives. The first is a training package developed to support implementation of a revised Mental Health Act Care Services Improvement Partnership (CSIP) and the National Institute for Mental Health in England (NIMHE, 2008). The second example, which takes us back directly to the diversity of values at the heart of the problems illustrated by the Story of Simon, is a wide-ranging consultation on best practice in assessment in mental health National Institute for Mental Health in England (NIMHE) and the Care Services Improvement Partnership, 2008. Consistently with the principles of values-based practice, service users and practitioners alike agreed that assessment should be, 1) strengths-based (covering individual strengths and aspirations as well as needs and difficulties), 2) multi-disciplinary (drawing where possible on more than one disciplinary perspective), and 3) participatory (involving a shared 'project of understanding' between service user and practitioner).

CONCLUSIONS

Starting with the story of a real person, Simon, this paper has drawn on analytic work from the 'Oxford school' on the logic of value terms, to show that the prominence of values in

psychiatric diagnostic categories is a reflection, neither of mental disorders being a matter of 'morals not medicine' (as the anti-psychiatrists claimed), nor of psychiatry's (supposed) under-development as a science (as some of its supporters have argued), but rather of the essential engagement of psychiatry with the full diversity of individual human values.

It is important to be clear that, in terms of the slogan noted earlier, this is a 'values *in*' rather than a 'facts *out*' conclusion. What it implies, that is to say, is that good practice in psychiatry depends on pulling together - integrating, if you will – science and values, evidence-based and values-based approaches.

The need for this arises in part from the fact that, as noted earlier, psychiatry is concerned with areas of human experience and behavior where, in addition to the relevant *evidence* being complex and conflicting (driving the requirement for evidence-based practice), the relevant *values* are also complex and conflicting (driving the requirement for values-based practice). But the need for an integrated approach also arises from the fact that, as the American neuroscientist and psychiatrist, Nancy Andreasen (2001), has argued, psychiatry is unique among medical disciplines in being irreducibly concerned, not with bodily or even mental subparts and systems, but with whole persons. And persons, as the Oxford philosopher, P F Strawson (1997, p 102) graphically put it, are '... a type of entity such that *both* predicates ascribing states of consciousness *and* predicates ascribing corporeal characteristics ... are equally applicable...'. Is it too fanciful to believe that something similar may be true of science and values?

Take Home Message

Neuroscience and values need to be integrated into psychiatry as a uniquely person-centred branch of scientific medicine through the complementary processes of evidence-based and values-based practice.

CONFLICT OF INTEREST

None

DECLARATION

This is my own unpublished work, not submitted for publication elsewhere

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Questions for the Reader to think about

- 1) What are values? Are they just ethical values or do they extend to needs, wishes, etc?
- 2) How do values and evidence come together in medical decision making? Can you think of *any* decision (not just in medicine) that does not depend on combining evidence and values in some way?
- 3) Do values come into diagnostic decisions in areas of medicine other than psychiatry? If so, why are they more explicit in psychiatry?
- 4) If psychiatry needs values-based as well as evidence-based processes today (reflecting the complexity of the values as well as evidence with which it is concerned clinically), do you think other areas of medicine are likely to have the same requirement (i.e. for values-based as well as evidence-based processes) in the future? (Think about the way in which science and technology are already opening up new choices (and hence more complex values) for patients, families and clinicians, for example in reproductive medicine.)

About the Author



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The Neuro-Endocrine System and Stress, Emotions, Thoughts and Feelings

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ABSTRACT

The philosophy of mind is intimately connected with the philosophy of action. Therefore, concepts like free will, motivation, emotions (especially positive emotions), and also the ethical issues related to these concepts are of abiding interest. However, the concepts of consciousness and free will are usually discussed solely in linguistic, ideational, cognitive (i.e. “left brain”) terms. Admittedly, consciousness requires language and the left brain, but the aphasic right brain is equally conscious, but what it “hears” are more likely to be music and emotions. Joy can be as conscious, as the conscious motivation produced by the left-brain reading a sign that says, “Danger mines!!” However, look in the index of a Western textbook of psychology, psychiatry or philosophy for positive emotions located in the limbic system. Notice how discussion of positive spiritual/emotional issues in consciousness and motivation are scrupulously ignored. For example, the popular notions of “love” being either Eros (raw, amoral instinct) or agape (noble, nonspecific valuing of all other people) miss the motivational forest for the trees. Neither Eros (hypothalamic) nor agape (cortical) has a fraction of the power to relieve stress as attachment (limbic love), yet until the 1950s attachment was neither appreciated nor discussed by academic minds. This paper will point out that the prosocial, “spiritual” positive emotions like hope, faith, forgiveness, joy, compassion and gratitude are extremely important in the relief of stress and in regulation of the neuroendocrine system protecting us against stress. The experimental work reviewed by Antonio Damasio and Barbara Fredrickson, and the clinical example of Alcoholics Anonymous, will be used to illustrate these points.

Key Words: Positive emotions; Limbic system; Spiritual; “Rightbrain”

INTRODUCTION

This talk will suggest that the prosocial, “spiritual” positive emotions like hope, faith, forgiveness, joy, compassion and gratitude are extremely important in the relief of stress and in regulation of the neuroendocrine system. The positive emotions protect us against stress. In so doing I wish to emphasize that there is more to the mind than the scientific and the philosophical. There is the “spiritual”. The Greek citizens of Corinth knew about philosophy from Plato, science from Archimedes and negative emotions from their rather unspiritual religion. However, to learn about faith, hope and love, they had to wait 300 years for a Jewish Pharisee, later named St. Paul. To understand the mind, the Hindus, adept at both science and philosophy had to wait for the *Bhagavad-Gita*.

On the one hand, if in this conference we wish to understand the human organism, consciousness may be the wrong place to start. Consciousness is, perhaps, an illusion of the left-brain language centers. I think (in words) therefore I am. That is to risk being wrong about many things. The fire’s visible flame is merely a phantom of the oxidation going on beneath.

On the other hand, too often, brain scientists dismiss philosophers for indulging in speculation devoid of empirical evidence and hence unjustly accuse them of ‘talking thru their hat’. And so the philosophers rightly worry that the brain research, such as will appear in my paper, will only touch on the fringe of what goes on in the mind and consciousness.

The philosophy of mind is intimately connected with the philosophy of action. Therefore, concepts like free will, motivation, emotions (especially positive emotions), and also the ethical issues related to these concepts are of abiding

interest. However, the concepts of consciousness and free will are usually discussed solely in linguistic, ideational, cognitive (i.e. “left brain”) terms. Admittedly, consciousness requires language and the left brain, but the aphasic right brain is equally awake but what it “hears” are more likely to be music and emotions difficult for our philosophy to encompass.

Admittedly, sometimes right brain activities like joy and music can be just as conscious, as the conscious motivation produced by the left-brain reading a sign that says, “Danger mines!!” But too often, action tendencies, like defense mechanisms or the results of meditation or transference and tantrums, can be unconscious — but very real. Professor Russell D’Souza characterized the dichotomy between the spiritual and scientific mind, “The Buddha’s enlightenment was considered too good to be true, but now Western enlightenment is being seen as too true to be good.” Sociobiologist, Edward O. Wilson (1998) puts it a little differently: “The essence of humanity’s spiritual dilemma is that we evolved genetically to accept one truth and discovered another”(p. 264). With the printing Press and then the Enlightenment positive emotion became subordinated to lexical neocortical science and dogma. However, as the French discovered with their atheistic guillotine, the Enlightenment was too true to be good. Put differently, neocortical science and limbic spirituality both mediate survival, but to do so they depend on different parts of our highly integrated brain. One truth, however, cannot be truer than another.

Let me begin with the example of attachment. The last 200 million years of the evolution of the human mind would have been inconceivable without the concept of attachment. However, until the 1950s, attachment was invisible to philosopher and scientist alike. Autism, a congenital defect of attachment was not even discovered until 1943. It was not recognized in our diagnostic nomenclature until the 1990s. Freud spoke of Eros, neuroscientists talked about hypothalamic motivated sexual behavior, and theologians spoke of Agape. But LOVE is selective and enduring. Eros is not enduring and agape is not selective. Both the scientists and the philosophers were talking thru their hat. It took two ethologists (masters of a brand new science), Harry Harlow and John Bowlby to put attachment on the map.

The popular notions of “love” being either *Eros* (raw, amoral instinct) or *agape* (noble, nonspecific valuing of all other people) miss the motivational forest for the trees. Unlike *Eros*, *attachment* spells *LOVE* — even when your spouse has “a headache”. Attachment has nothing to do with consciousness and everything to do with community and community, as the “East” knows and the “West” forgets, is at the basis of brain evolution. I was raised in an elite American boarding school on Kipling’s mantra, “He travels fastest who travels alone.” But when I became a grandfather, and turned my laboratory over

to a young colleague and retreated to the beaches of Australia to seek the meaning of the mind, I discovered a new mantra from a man, who like Kipling, had cut his literary teeth in India but who had the wit to listen. As they say in AA, E.M. Forster took the cotton out of his ears and put in his mouth. My new mantra was “Only connect. Only connect the prose and the passion and both will be exalted and love will be seen at its height.”

Even in the 21st century, look in the index of a Western textbook of psychology, psychiatry or philosophy for positive emotions. Notice how discussion of positive spiritual/emotional issues in motivation is scrupulously ignored. Ignored is the Saint-Exupery’s little fox warning: Only the heart sees rightly; what is important is invisible to the eye.

Attachment is deeply motivational but is absent to a remarkable degree in brilliant autistics and in the writings of the brilliant Sigmund Freud. And yet attachment and social emotional intelligence is present in low IQ children with Down’s syndrome. Attachment has nothing to do with intelligence and everything to do with community.

Let me offer a list of 8 positive emotions: love, awe, hope, compassion, faith (trust), forgiveness, joy and gratitude to suggest that they are the building blocks of human attachment, community and spirituality.

A *leitmotif* throughout this lecture will be to wonder why religions in contrast to scientists and philosophers find it so much easier to pull the positive emotions up into consciousness. One might even say that Sartre, Wittgenstein, Freud and Skinner did not do positive emotions. In 1956 at Harvard Medical School, the only emotions I learned about were the hypothalamic negative emotions: fight, flight, hunger and lust. All were rooted in time present and all were about ME.

It is *attachment*, a mammalian emotion that even more than consciousness and “free will” is future oriented, not about the self and plays horse to the cart of conscious thought in drawing action forward. It is the limbic positive emotions, not the hypothalamic negative emotions that distinguish humans from reptiles. In contrast to negative emotions, positive emotions are all about the other and all about the future and that is why the mind evolved: so that it could build communities.

So why, in greater detail, did natural selection create positive emotions? Mammalian evolution had begun in the dark to protect little furry insectivores from hungry, sun-loving carnivorous reptiles. At first their sense of smell was as or more important than sight. Thus, these nocturnal mammals possessed a highly developed limbic olfactory system (the rhinencephalon) or smell brain. In order to find food and to remain connected to each other in the dark, a good sense of

smell was a necessity. Some scientists (Panksepp, 1999) have called this smell brain (a.k.a. limbic system) the “seeking system.” The seeking, however, is about connection to one’s fellow insectivores as much as to food or sexual discharge *per se*. Equally important, the brains of mammals, relative to their body size began to grow. Unlike the case for dinosaurs and fish, increasing brain complexity, instead of traits like size, teeth and bright colors, was selected for in mammals.

In time some of these early mammals evolved into light loving creatures for which a stereoscopic visual system and improved hearing reshaped the responsiveness of their smell brain. Primates, and many other mammals, now use their former smell brain to stay in touch with their mates vocally and visually rather than by odor; but the limbic language of attachment still defies translation into English—or Urdu. Instead, humans become quite inarticulate when they try to describe what they smell or whom and why they love. Attachment depends upon body language, scents, vocal timbre and lullabies, not the language of the neocortex. We confabulate when we try to put the scent of an orchid, the nose of a great burgundy wine, or a life altering spiritual experience into words.

Indeed, language, like too articulate religions, often separates human beings. In contrast, emotions, body language, facial recognition, touch, pheromones, and the spirituality of a limbic smell brain often bind us together. Through discriminating audition the kitten’s mew or the human infant’s separation cry evokes unselfish love in almost all of us. Thus, from the limbic system and the temporal neocortex that it serves, comes the very sort of information provided in hymns, psalms, and love letters—emotional, musical, mystically important information. Such information is very different from that contained in almanacs, science journals, and philosophical treatises.

For example, the limbic separation cry, mediated unconsciously by the anterior cingulate gyrus, advertises vulnerability and distinguishes mammals from fish and reptiles. Mammalian evolution has led to an intricate three boned (*malleus, incus, stapes*) apparatus in the inner ear that permits rodent mothers to hear their infants’ high pitched cries inaudible to predator birds and reptiles. The separation cry presupposes a hard-wired emotional trust in a maternal protector who will find you, feed you and protect you—a maternal guardian who unlike a father reptile or mother fish will not just find you and gobble you up.

The nature of human unselfish love becomes still clearer if we reflect upon life in the African savannas one or two million years ago. On those sparsely wooded plains evolved our hairless ancestors who took several years to reach maturity. Although they lived in a land richly endowed with carnivores, our ancestors could not run like the gazelle, burrow like the rabbit, climb trees like the gibbon, fly away like the flamingo,

or fight back like the elephant. If humans did not band together, they perished. Humans do not even have fur like the ape for the young to cling to; instead, the human mother must cling to her young. In order to survive, humans had sometimes to subordinate both hunger and sex *per se* to the development of an inborn altruistic social organization. From such social bonding came lasting attachment and the survival of their young. On the savannah a young gazelle can survive with “selfish genes.” As soon as it is born, it can walk. In contrast, if not born into an unselfish human community, the *Homo sapiens* child is destined to become some predator’s lunch.

The increased brain size and prolonged dependency of evolving humans each catalyzed the other. Unconditional and forgiving love became essential to human survival, but such attachment is not rigid and reflexive as is the gosling’s imprinting on its mother goose or as is a mother bluebird’s stereotyped care of her young. Rather love in primates depends on emotionally motivated decision making and on flexible, if not quite “free,” choice. Thus, unlike geese and blue birds, humans have developed religious memes to reinforce their caretaking behaviors. But all this required an increasingly complex and, thus, a larger brain. And mirror cells in the insula, buried away from the notice of even twentieth century neuroscience and the philosophies of Sartre and Hobbes made us all empathic beings — however buried in the unconscious.

While witnessing a loved one’s pain, our own limbic emotional centers for pain are aroused, but not our neocortical analytical centers that would effect motor avoidance were the pain our own. Put differently, when witnessing another person burning their hand, the “mirror” neurons in our own limbic insula and anterior cingulate “light up” on the neuroimagist’s screen as if the hand were our own. But the cells in our neocortical analytic and motor centers (e.g. “I feel a burning in my left hand that prompts me to pull it away”) remain quiescent (Singer et al., 2004). Of interest is that such neurological brain activation when witnessing another’s pain correlates significantly with the observer’s scores on pencil and paper tests assessing empathy.

The higher apes are also set apart from other mammals by a unique and newly evolved neural component called the spindle cell. Humans have twenty times more spindle cells than either chimps or gorillas. (Adult apes average about 7,000 spindle cells, human newborns have four times as many and human adults almost thirty times more spindle cells.) Monkeys and other mammals are without these special cells. These large cigar shaped “spindle” or “Von Economo” neurons appear central to the governance of social emotions and moral judgment (Allman et al., 2001). These cells may help us to feel human connection and indirectly to reflect upon and act on that feeling. Spindle cells may have helped the great apes and

humans integrate their mammalian limbic system with their expanding neocortices.

In recent imaging tests, spindle cells have been shown to light up in our skulls like summer evening fireflies in response to a variety of different emotional and social stimuli: the picture of a loved one; scenes of others suffering; feelings of personal embarrassment, or guilt, or self-consciousness.

And yet as integral as these specialized neuronal cells seem to be to our very identity as human beings, they aren't even present in our brains at birth. They only begin to emerge at about the fourth month of life and, over the course of the next four years or so, continue to grow and migrate toward their permanent home in the right frontal cortex, weaving themselves into place there in direct concert with our newly emerging sense of self—our feelings of devotion, compassion, and remorse; our sense of right and wrong: the early fabric, in effect, from which we go on to weave our own individuality and personal life story. Spindle cells exist in the anterior cingulate cortex, the prefrontal cortex, and the insula, a still somewhat mysterious region of the limbic system that may facilitate empathy. In brain imaging studies the insula lights up “when people look at romantic partners, perceive unfairness . . . experience embarrassment, or if they are mothers, hear infants cry” (Blakeslee, 2003). In short, the limbic anterior cingulate and insula appear active in the positive emotions of humor, trust and empathy. Neurologically the insula is also closely bound to sensations the heart,

In short, humans have survived by sophisticated social bonding—characterized by unconditional attachment, forgiveness, gratitude, and affectionate eye contact. And both the philosophers and scientists ignore them. Often eye contact is more important than speech in guiding behavior but entirely unconscious. As the popular song goes “Your lips tell me, “No. No!” but there is “Yes, Yes!!” in your eyes. I doubt that Gandhi's passive resistance would have worked with Hitler and Stalin. How did he consciously know that he had read the “eyes” of verbally adamant Churchill's imperialism right? In our deliberations here we need to let our musical right brains in on our conversation.

An interesting bodily reflection of humans' shared intentionality is the sclera, or whites, of the eyes. All 200 or so species of primates have dark eyes and a barely visible sclera. All, that is, except humans, whose sclera is three times as large, a feature that makes it much easier to follow the direction of someone else's gaze. Chimps will follow a person's gaze, but by looking at his head, even if his eyes are closed. Babies follow a person's eyes, even if the experimenter keeps his head still.

True, the negative, but self-consuming, emotions of disgust, anger, fear, and envy have often allowed individual humans to

push our enemies away or to selfishly exploit them. The positive emotions, however, of love, joy, hope, forgiveness, compassion, and trust have allowed humans to draw close to one another and to survive more successfully. Yes, fear draws people together too—but without the sharing.

Evolution has liberated human love from the reflexive neuroendocrine dominance by the hypothalamus and instead has made mate choice and bonding based on relatively flexible motivation. The “moral,” mature, and cause and effect mentalization within the frontal lobes takes over, from adolescent hypothalamic impulse.

With maturity empathic attachment replaces sexual greed. Thus, contrary to current Western fashion, not only have arranged marriages been far more common in human history than “marrying for love”; but follow-up of such arranged marriages reveals them to be as enduring. The elderly widow from a Hindu arranged marriage grieves as deeply at her husband's funeral pyre as does any modern married-for-love London widow at a suburban funeral home. Human attachment takes time.

So how do we learn love? How do we become agents of love? Not through Sunday school, not through the Internet, not ever by words alone. We learn to love through neurochemistry, genes and identification.

In part, enduring selective love is catalyzed by genes. The crippling social limitation of infantile autism is almost wholly genetic. For unknown, but highly heritable, reasons autistic individuals are unable to take love in and thus unable to give love back. However, enduring love in humans is different from that in insects. Insects have genetic communication systems for “altruistic” behaviors that are sometimes impressively sophisticated, but they neither invent them nor teach them to others. The waggle dance of the honeybee and the odor trail of ants contain symbolic elements, but their altruistic performance and meaning are genetically inborn and cannot be altered by learning. Unlike human compassion, the genetically mediated “altruism” of insects is not culturally contagious.

In part, enduring selective love is catalyzed by chemistry. Neurochemistry provides ingenious models of nonverbal communication and catalyzes the involuntary mechanisms of positive emotion. The brain hormone, oxytocin, is released when all mammals give birth. Oxytocin seems to permit mammals to overcome their natural aversion to extreme proximity; and, thus, oxytocin has been rechristened the “cuddle hormone.” If they are genetically deprived of oxytocin, monogamous, maternal, loving *prairie* voles (a species of rodent) turn into another subspecies—the heartless, promiscuous, pup abusing *montane* voles. Without oxytocin, parental cooperation and responsibility vanishes (Shapiro and

Insel, 1990; Insel, 2002). In human newborns there is a short-lived overproduction of oxytocin receptors (Davidson and Harrington 2002, p. 116). Oxytocin goes up in human puberty in parallel with adolescent crushes. Put a newborn baby in a mother's arms or bless a couple's sexual union with mutual orgasm and brain oxytocin levels rise.

The oxytocin rich dopaminergic brain centers are an intimate part of the human limbic system. The nucleus accumbens (in voles), the ventral tegmentum (in rats), the anterior cingulate gyrus (in humans) have all been shown to be closely involved in lasting mammalian attachment. All are heavily dependent on the neurotransmitter dopamine; and, interestingly, these same three brain centers also contain opiate receptors and are linked to heroin addiction—an ersatz and often lethal “love”—that is also selective and enduring. Opiates are the only chemicals that can comfort a baby animal separated from its mother. Or as one chronic addict described it, “You don't really get lonely on smack [heroin]. It's like having a lover” (Edwards, 2004, p. 138).

In part enduring selective love is catalyzed by identification. Unlike honeybees, humans do not come into the world knowing how to dance. If all human love is a dance, it still takes two to tango—and usually at the beginning an experienced tango teacher. Thus, chemistry, genes, and survival of the fittest are only part of the story. True, the evolutionary march from fish to cold-blooded reptiles to Harry Harlow's loving monkeys reflects the power of genes to lay the groundwork for love. However, for enduring mammalian attachment to occur loving environments and identification with others are as critical as chemistry to sculpt the brain.

If as the French planter sings in *South Pacific* “you have to be taught to hate and fear,” you also have to be shown how to love. Thus, the behavioral self-regulation that we associate with love does not come from a solitary brain, but from one brain's evolving and becoming shaped through attachment to a beloved other. Monkeys raised in isolation go on eating binges and cower in corners. Instead of playful roughhousing they fight with their peers unto death; and they never really get the hang of copulation. All their lives such isolated monkeys remain inept “at doing what comes naturally.” In contrast, isolated monkeys who are subsequently raised by mothers or with siblings for even one year can learn to roughhouse—gracefully stopping once social dominance is achieved—and skillfully negotiating the dance steps necessary for successful impregnation. The multiply-orphaned Leo Tolstoy was an impulsive, unempathic narcissist until his wife, Sonya, entered his life.

As the parables, hymns and uplifting narratives of the world's great religions suggest, the biology of love is catalyzed by social example. This was demonstrated in a series of ingenious experiments by University of Virginia psychologist Jonathan

Haidt and his students. By showing new mothers video clips reflecting love and gratitude, they increased the leakage of milk and/or nursing behavior (both evidence of oxytocin release). These effects were much less evident if the mothers were shown humorous or neutral videos. Again, when they showed college students documentaries of heroic altruists and uplifting video segments illustrating displays of gratitude and unselfish love, Haidt and colleagues evoked in the students a sense of calm, a warm feeling in the chest, and an impulse to help others, not in evidence after the same students viewed neutral video clips (Haidt, 2006).

Love, especially unconditional love, also cures people—both those who give it and those who receive it. Love, like the other positive emotions, is religion without the side effects. Healing love, of course, always involves appropriate boundaries. Eye contact and touch, as in mother-child interaction, must always be kept separate from lust and selfish Eros or the other person will feel violated. The good hospice nurse, the committed parish priest, the dedicated caseworker, even a best friend needs to remember that a favorite grandmother, not a charismatic lifeguard, is the proper model for the connectedness, the passion, the commitment, and the wise limits that create therapeutic love. Healing love is often more about witnessing (making the other person feel “seen”) than about rescuing (Herman, 1997).

Moreover, oxytocin, the “cuddle hormone,” in some ways is itself as remarkably healing as the love that it under girds. Over the long-term oxytocin exerts effects opposite to the negative “fight-flight” emotions. During prolonged periods of fear, anxiety and depression pain thresholds are lowered and cortisol levels and blood pressure can be chronically and deleteriously elevated. In contrast, during periods of sustained oxytocin release, cortisol levels and blood pressure are reduced, pain thresholds are increased and a calm non-anxious state results (Uvnas Moberg, 2003). A recent study of the cortisol elevation and post-stress anxiety involved in public speaking found that intranasally administered oxytocin and social supports each buffered the effects of stress, and they were most effective when given in combination (Heinrichs et al, 2003). No wonder love and compassion are valuable at the bedside of the sick.

Let me illustrate this by suggesting that the unconscious heart sees more meaningfully than the conscious eye. The sympathetic nervous system is appealing to the Western mind. Fight, Compete, all blood to the muscles and away from the gut, glucose stores mobilized, Yay! But we are also talking about the roots of the metabolic syndrome (hypertension, hypercortisolemia and secondary diabetes).

Look at the parasympathetic nervous system. Nothing but boring, Buddhist, “rest and digest”. Yes, meditation slows the heart and basal metabolic rate better than sleep. But the

parasympathetic nervous system is also at the root of Barbara Fredrickson's landmark "broaden and build" research. By soothing research subjects with videos of positive emotions (you can do it at home just by cuddling), she could lower pulse rate, speed cardiac recovery, and enhance memory, creativity and social tolerance. Stimulate the sympathetic nervous system with Hobbesian negative emotion and you reverse the process.

Spirituality is the amalgam of the positive emotions that bind us to other human beings—and to our experience of "God" as we may understand her/Him. Love, hope, joy, forgiveness, compassion, faith, awe (Keltner and Haidt, 2003) and gratitude (McCullough et al, 2001; Emmons, 2007)) are the spiritually important positive emotions addressed here.

I have omitted from the list four other positive emotions—excitement, contentment, mirth, and a sense of mastery, as we can feel these latter four emotions alone on a desert island. In sharp contrast, the eight positive emotions that I have selected all involve human connection. None of the eight are all about "me." All stimulate the parasympathetic nervous system.

Let me carry this hypothesis further. Dopaminergic brain tracts can be shown to underlie addictive behavior in mammals and reptiles. A scientist can produce pleasure in the brain by inserting dopamine into the primitive brain circuitry that links the "reptile" brain's addiction center, the nucleus accumbens and the superior tegmentum.

But in mammals these same dopaminergic tracts run from the mid-brain—the reptile brain—to the limbic system—the part of the mammalian brain that serves attachment. Then, the transmission continues to the anterior cingulate gyrus—that part of the mammalian limbic cortex that makes the past emotionally meaningful. In mature humans the same dopaminergic tracts travel to the most recently evolved portions of the orbitomedial frontal lobes that serve planning, empathy, morality, and a mother's smile as she gazes at her baby. Or in the words of Thomas Insel, NIMH Director, "It is also possible that neural mechanisms that we associate with drug abuse and addiction might have evolved for social recognition, reward and euphoria—critical elements in the process of attachment".

In the words of a sensitive observer, social psychologist, Mihaly Csikszentmihalyi, (Csikszentmihalyi, *Flow*, p. 21), religious "practices get overgrown by brambles of meaningless mumbo jumbo. Ritual form wins over substance and the seeker is back where he started." In contrast, mature faith always understands that all spirituality is a journey; and, thus, life remains inherently developmental. One thing becomes another; one never arrives. Developmentally, organized religion provides faith's portal; deep spirituality remains the prize. Like good science, mature faith can distinguish the forest from the trees. As Gandhi commented to an English friend "I don't think much of your

Christianity but I like your Christ."

Let me close with a cheer for consciousness and language - but only when linked with the limbic positive emotions. As a corollary of cortical brain expansion in humans came an increasingly focused consciousness. True, an eagle's sharp eye can instinctively discriminate a distant stone from a distant mouse better than a human eye. But humans can reflect upon the distinction and can bring the question of feelings (Am I hungry?) up into reflective consciousness. Armchair critics can scoff at the follies of modern judicial punishments; but for the last 30 centuries through the conscious reflection upon the long-term consequences of angry retaliation, the deterrence of criminal behavior has become progressively more rational and more loving. We are still learning! We may moan about our urban murder rate especially in the American and Brazilian cities with all their handguns. But in fact since the 13th century the murder rate has gone steadily down until it is only 2% of what it was 700 years ago.

The evidence for convincing positive cultural evolution of *Homo sapiens sapiens* is far more convincing. About 30,000 B.C. the last, physically more powerful and bigger brained Neanderthals expired—not with a bang but a whimper—in remote caves at the tip of Spain. In the place of robust strength came the evolution of successful social organization that depended upon capacity to plan for the future, shared awe through artistic creativity, and an increasing concern for the sick and the lame.

The critical difference was the genetic mutation about 170,000 years ago that gave the Neanderthal African cousins from whom we are all descended the gift of language and thus the capacity for cultural evolution.

Over the past 20,000 years, this inexorable march of spiritual development, artistic skill and culturally mandated unselfish care of the weak has continued to evolve. Evidence of organized religion accompanied evidence of stable settlements seven to twelve millennia ago. However, until the transformative millennium, a millennium extending from 600B.C. to 700 A.D., the world's great cities emerged only to disappear. Ur, Babylon, Mohenjo-Daro, Carthage, Thebes, Machu Picchu, the Mayan metropolis of Tikal, and the early Chinese capitals vanished beneath sand, fields and jungle creepers. Not until the *Bhagavad-Gita*, Buddhism, and Christianity became established, not until organized religions that emphasized love and compassion rather than fear and dominance, did great cities endure. The Benedictine Rule states: "The care of the sick is to be placed above and before every other duty."

Richard Dawkins and Adolf Hitler would call that a really dumb way to pass on one's gene pool. Thus, the selfish but very "fit" and scientifically advanced Third Reich took a dim view of the

sick and believed a society's resources should be devoted only to the genetically healthy and to selfish conquest. In order to decide whether the Nazi or Benedictine faith is better suited to a Darwinian perspective, we must depend not upon softhearted "liberals" battling the sharp wits of the right, but we must depend upon science—upon empirical long-term follow-up. The Nazi order lasted barely a decade, but after 1500 years the Benedictine Order is still alive and well. The brilliantly rational but spiritually challenged French Revolution lasted no longer than the Third Reich. In short, I would conclude that positive emotions of the loving irrational limbic system are just as important to cultural survival as is the ingenious and rational neocortex.

. The evolution of that very Franciscan "instrument of peace"—the universally prestigious Nobel Peace Prize—has taken place only in the last century. In dramatic contrast, over the last two million years the genetic evolution of the human hypothalamus with its capacity for the 4F's—fight, flight, feeding and fornication—is only modestly more sophisticated than an alligator's. Human capacity for time present negative emotions like fear, disgust and attack has probably not evolved much beyond that of a cornered rat. However, our capacity for the future oriented positive emotions like joy, the Samaritan response, hope and forgiveness continues to evolve. Human beings, for better or for worse, remain a work in progress. It took patience and long term follow-up, but Rudyard Kipling studying today's financial news would be astonished to find the India economy buttressed by millennia of deep spirituality was faring better than the Hobbesian British financial establishment.

Another clear example of the survival value of spirituality and positive emotions in the modern world was the decade of 1975 to 1985 in Cambodia. In 1975 the Khmer Rouge gained absolute control of the country and systematically and for most idealistic "Marxist" reasons in the world tried to abolish Buddhism and familial love. Sentimental attachment to a family member or to a temple was believed to impede rational rapid social progress and was punishable by death. Pol Pot's idealistic regime hoped to instill in young children, separated from their

families, an attachment to agrarian simplicity and to create a society without memory of urban decadence, monastic indolence, or even money. Thoreau, Jefferson and Gandhi might have possibly admired Pol Pot's ends—but not his means.

Four years later when the Khmer Rouge regime fell, the Cambodian children, now orphans, remained passionately attached to what remained of their extended families; and Buddhism rapidly asserted itself as a high point of village life. It was not from do-gooder central planning; it is how the human has evolved to work.

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How Does the Brain Produce a Sense of Self? Contribution of Prefrontal Executive Processes to Creating a Sense of Self

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ABSTRACT

According to several current theories, executive processes help achieve various mental actions such as remembering, planning, and decision-making, by executing various operations on representations held in consciousness. I plan to argue that these executive processes are partly responsible for our sense of self because of the way they produce the impression of an active, controlling presence in consciousness. If we examine what philosophers have said about the “ego” (Descartes), “the Self” (Locke and Hume), the “self of all selves” (William James), we will find that it fits what is now known about executive processes. Hume, for instance, famously argued that he could not detect the self in consciousness, and this would correspond to the claim (made by Crick and Koch, for instance) that we are not conscious of the executive processes themselves, but rather of their results.

Key Words: *Executive processes; Self; Consciousness; Sense of self*

INTRODUCTION

The sense of the word “self” employed in this article’s title occurs most clearly in the work of philosophers John Locke and David Hume when they speak of a *Self*, either to assert its existence as Locke did, or to deny it, as Hume did. Rene Descartes is speaking about this sort of self when he uses the Latin term “ego.” William James also uses the word “self” in this sense, which I will call the *psychological sense*. This is the sense of “self” in which it is seen as an internal psychological entity, something at work in the mind, rather than the entire mind. Representations are present in our conscious states, but there is also a robust and enduring sense of something else at work there. As James said, “whatever content his thought may include, there is a spiritual something in him which seems to *go out* to meet these qualities and contents, whilst they seem to *come in* to be received by it” (1890, 297-298). Sometimes thoughts and images just flow through our heads, but other times we actively think: Representations are purposefully brought up from memory, compared with other representations and evaluated in other ways, and used to formulate plans of action. These are the sorts of mental events that give rise to the idea of a psychological self, something in the head summoning representations from memory, comparing them, accepting or rejecting them as real or as important, and finally, using them to plan and execute actions.

This sort of self is not composed of representations, but rather it performs various functions on them.

More recently, the psychological self is showing signs of making a comeback in neuroscience, and specifically in neuropsychology. Crick and Koch say that a good heuristic for understanding the overall functional scheme of the brain’s cortex is “to imagine that the front of the brain is ‘looking at’ the sensory systems, most of which are at the back of the brain” (2003, 120). Baars and his co-authors endorse that quotation, after saying that, “conscious experience in general can be viewed as information presented to prefrontal executive regions for interpretation, decision-making and voluntary control” (Baars, Ramsey, and Laureys, 2003, 673). They also notice the self-like quality of executive processes, saying that they “can be viewed as properties of the subject, rather than the object, of experience—the ‘observing self’” (Baars, Ramsey, and Laureys, 2003, 671).

My purpose here is to elucidate and argue for the claim that the psychological self is real and is embodied in a set of brain processes. If we list the functions of the psychological self as they are described by the classical philosophers, we can see that these functions correspond closely to the functions achieved by what neuroscientists call *executive processes*. The psychological self is embodied in the brain’s executive

processes, according to this view. By showing that the list of executive functions corresponds well to the functions assigned to the psychological self, my hope is to ground this notion of self in existing theory of brain function. My aim is to show that contrary to these skeptics there is a perfectly good sense of “self”—nothing odd or esoteric—that applies straightforwardly to a set of brain processes. I am equating an old idea—that of the self—with a new one: the emerging neuroscientific theory of executive processes.

A second goal of this contribution is to show that we can make sense of a specific part of the philosophical debate about the self. Hume and James argued that we do not have direct conscious awareness of the self. This corresponds closely, I will argue, to what neuroscientists have said about executive processes: we are not directly aware of them, rather we are aware of the changes they effect in our conscious states. Hume complained that he was not able to sense any Self, rather just “some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure” (1739/1987, Book 1, section VI). Hume was not aware of a self, he was only aware of sensations associated with perception, or emotions, or feelings.

Crick and Koch call their version of the psychological self “the unconscious homunculus,” using the phrase somewhat tongue-in-cheek, because they believe that our inability to be conscious of executive processes causes us to believe that they all are to be explained by the actions of a single entity—a homunculus—that has most of the mental abilities of a full-blown human being. They say that we “are not directly aware of inner world of thoughts, intentions, and planning (that is, of our unconscious homunculus), but only of the sensory representations associated with these mental activities” (2000, 109). We are only aware of the representations that the executive processes call up (e.g., from memory) or produce (e.g., in the form of conscious, speech-like thoughts), according to Crick and Koch: “The unconscious homunculus receives information about the world through the senses, thinks, and plans and executes ‘voluntary’ actions. What becomes conscious, then, is a representation of some of the activities of the unconscious homunculus in the form of imagery and spoken and unspoken speech” (Crick and Koch, 2000, 107).

Once we roughly equate the psychological self with the set of executive processes, we can see that the two questions, Are we aware of the psychological self?, and, Are we conscious of executive processes?, are fundamentally the same question. This equation also gives us insight into the homunculus fallacy. A homunculus can be seen as an implausible version of a psychological self, typically because the homunculus accomplishes all of the executive processes and in so doing seem to have all the mental capacity of a full person. What made people attribute all of the executive processes to a single psychological entity was their lack of direct awareness of those processes.

The psychological self is at work in the mind, performing cognitive functions that Descartes groups together under the concept *thinking*:

But what then am I? A thing which thinks. What is a thing which thinks? It is a thing which doubts, understands, [conceives], affirms, denies, wills, refuses, which also imagines and feels. (Second Meditation)

Descartes is clear that by “feels,” he is referring to perception in general: “I am the same who feels, that is to say, who perceives certain things, as by the organs of sense, since it is true I see light, I hear noise, I feel heat.” This “I” he is describing sounds like the psychological self:

Am I not that being who now doubts nearly everything, who nevertheless understands certain things, who affirms that one only is true, who denies all the others, who desires to know more, is averse from being deceived, who imagines many things, sometimes indeed despite his will, and who perceives many likewise, as by the intervention of the bodily organs?

The psychological self encounters perceptual information as it enters via the sense organs. It is what James calls “the *active* element in consciousness” (James, 1890/1950, 297-298).

What are Executive Processes?

In the back half of the brain, large multimodal representations of the world (as it is according to me) are assembled from input derived from each sensory modality. This information has itself already passed through many computational stages. These final multimodal representations are expensive to produce, update, and maintain. It doesn’t make sense to have representations if nothing is done with them. The primary reason for having representations of something is to use those representations in order to understand and affect that thing. There exist processes in the brain’s prefrontal lobes which perform different operations on our representations, the processes we commonly call by the collective name, thinking. Deciding, weighing, reasoning, inferring, examining, resolving, are all things we do with our mind/brains, but they don’t happen out of nowhere, in some non physical medium, they happen somewhere in the brain. Executive processes, typically centered in the prefrontal lobes, perform functions on representations. As a unit, the prefrontal executive processes accept as input perceptions, memories, or emotions, and produce motor activity in one of the motor systems as output. We know which neuron types tend to predominate at each of the cortical levels in the areas thought to house executive functions. We know which sensory modalities each prefrontal area receives—not all of them receive signals from all of the modalities. We also know which of the body’s effector systems each area sends signals to, including the eyes; the hands; the

arms and legs; the mouth, tongue, and throat; and the autonomic system.

The first organisms to evolve and the simplest organisms existing today operate according to a very strict stimulus-response plan. They can detect a few things or properties out there, and respond with a few different behaviors. As organisms get more complex, they develop more and more of these inflexible perception-action cycles. But because the environment's true complexity is much richer than any reasonably-sized set of these cycles can account for, a new more powerful way of responding was developed, one with flexibility. Executive processes come into action when flexibility of the response is needed. When we are engaged in well-practiced activities, such as driving home from work, washing the dishes, watching television, and so on, the brain operates in a more automatic mode. But when something goes wrong, your normal route home is blocked, or the television won't come on, then we need to think, problem-solve, plan and execute more complex, less automatic behaviors, and this means that the executive processes have awakened.

Thus executive processes are needed when there are no effective learned input-output links. When we attempt something new, such as learning how to play tennis, executive processes are required. If they are damaged, the person is simply unable to learn at a cognitive level (lower level behaviors can still be learned via a separate procedural memory system). As we get better at the new task, executive processes pass it to more posterior brain areas that specialize in efficiently performing routine actions without conscious interruption. A large body of brain imaging studies shows that as we become more practiced at something, the brain processes employed switch from networks containing a large prefrontal component, to networks primarily residing in more central and posterior brain regions. Another general situation in which we employ executive control occurs when there is some sort of danger. Executive control produces actions with the highest flexibility and the lowest probability of error. We react more slowly under executive control, but more effectively. Sometimes when a quick action is needed, there is no time for executive processes to work, and our actions are ineffective or unnecessary. If you have ever sat behind the backstop fence at a baseball game, you probably noticed that you cannot stop yourself from raising your hands and flinching when a foul ball heads directly at you, an unnecessary action because there was no time to correct it with executive processes.

Neuroscientists are currently exploring several different classification schemes for the executive processes, such as classification by function (Shallice, 2002; Baddeley, 2002) and classification by cortical areas they occupy (Stuss et al. 2002). Hence in describing them we need to make a fundamental choice between beginning with anatomy and moving to

function, or vice versa. Fortunately, several factors converge here to make this decision easier: The exact nature of the functions is still very much up in the air, from theories according to which there are several specific functions, to theories that posit a few basic functions that are compounded repeatedly to achieve executive functions (Shallice, 2002). The basic anatomy, on the other hand, is clear, at least in terms of what cell types exist at which cortical levels, and how the cortical areas are connected.

If the anatomical separation between the executive processes themselves is fuzzy at the moment, the anatomical separation between these executive processes and the representations they operate on appears to be rather clear-cut. Representations embodied in posterior cortical areas, in particular multimodal areas in the parietal and temporal lobes (especially a region in the posterior superior temporal sulcus) interact with executive processes by way of two-way connections. The temporal and parietal lobes are extensively interconnected with the executive processes in the prefrontal lobes by several different white matter fiber tracts, called association fibers (Schmahmann and Pandya, 2006). These bundles of fibers, also known as fasciculi, are made up of millions of connecting fibers, which are axons protected by an insulating myelin sheath. The fiber pathways are reciprocal. "Thus, these pathways provide particular prefrontal areas with sensory-specific or multimodal information and, at the same time, provide the means by which prefrontal cortical areas can regulate information processing in the posterior cortical areas" (Petrides and Pandya, 2002, 45).

These views of executive processes also mate well with some of the emerging theories of consciousness. Baars has developed a cognitive theory of consciousness according to which consciousness is seen as a global broadcasting system, which different input processors compete for access to. Representations are held in consciousness so that they can be further processed by any of a number of modules. Despite the widely (among philosophers at least) disparaged Cartesian theater, Baars is happy to employ the theater metaphor: "Consciousness in this metaphor resembles a bright spot on the stage of immediate memory, directed by a spotlight of attention under executive guidance. Only the bright spot is conscious, while the rest of the theater is dark and unconscious" (2005, 46). And "behind the scenes, an invisible (unconscious) director and playwright try to exercise executive control over the actor and the spotlight" (Baars et al. 2003, 672). Recently some neuroscientists have suggested that something of the sort Baars posits could be accomplished by the working memory areas located in the dorsolateral prefrontal cortex coupled with multimodal sensory integration areas in the posterior of the cortex (Dehaene and Naccache, 2001).

Concluding Remarks

One interesting consequence of this view is that the desire of meditators to banish the self may be therapeutic in the short term. Given the strong connections between parts of the prefrontal cortex (especially orbitomedial areas) and the autonomic system, the powerful stress reducing effect of meditation is understandable. But a long-term desire to abolish this self, recommended by some sects of Zen Buddhism, might not be desirable, given the amount of cortex given over to it. Perhaps instead we should cultivate efficient and stress free ways of using our executive processes. They also need to be kept in proper proportions to one another. The inhibitory processes rage out of control in obsessive-compulsive disorder; some people so relentlessly plan for the future they ignore the present; others annoyingly attempt to correct whatever anyone else says to them. Often the activation of executive processes brings with it a quick anger, at the sudden effort required, or the jarring effect of plans thwarted. But the executive processes are a vital part of our nature, perhaps the main thing that makes us so much more flexible and adaptable than all the other animals. Dolphins and whales, despite their huge brains (with extremely large cortices, although with fewer layers than ours, typically only three or four) will beach themselves in large numbers, and when freed swim right back to the shore. Our executive processes give us the power to learn quickly, after a single failure, and indelibly.

Take-Home Message

We can unify our philosophical and neuroscientific streams of thought by identifying the self of philosophy with the executive processes of neuroscience. Executive processes produce an active presence in consciousness that is responsible for the philosophical debate on the self. This makes sense of large portions of philosophical history, and helps us to conceptualize our current findings in neuroscience.

Conflict of interest

None declared

Declaration

This is original, unpublished work, not submitted for publication elsewhere.

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Questions that this paper raises:

1. When do we identify with the workings of the executive processes and when do we not? For instance, Socrates seems to have thought that the inhibitory voice of conscience was not his own mind, but the voice of an external god, which he called a daemon/
2. Might dissociative identity disorder be conceptualized as one person having several different executive profiles, in the sense that personality can be captured by 'executive style'?
3. Can a clean separation be made between the executive processes and the representations they operate on?
4. Can mental representations be conscious without interacting with executive areas?

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Understanding brain, mind and soul: contributions from neurology and neurosurgery

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ABSTRACT

Treatment of diseases of the brain by drugs or surgery necessitates an understanding of its structure and functions. The philosophical neurosurgeon soon encounters difficulties when localizing the abstract concepts of mind and soul within the tangible 1300-gram organ containing 100 billion neurones.

Hippocrates had focused attention on the brain as the seat of the mind. The tabula rasa postulated by Aristotle cannot be localized to a particular part of the brain with the confidence that we can localize spoken speech to Broca's area or the movement of limbs to the contralateral motor cortex. Galen's localization of imagination, reasoning, judgement and memory in the cerebral ventricles collapsed once it was evident that the functional units – neurones – lay in the parenchyma of the brain.

Experiences gained from accidental injuries (Phineas Gage) or temporal lobe resection (William Beecher Scoville); studies on how we see and hear and more recent data from functional magnetic resonance studies have made us aware of the extensive network of neurones in the cerebral hemispheres that subserve the functions of the mind.

The soul or atman, credited with the ability to enliven the body, was located by ancient anatomists and philosophers in the lungs or heart, in the pineal gland (Descartes) and generally in the brain. When the deeper parts of the brain came within the reach of neurosurgeons; the brainstem proved exceptionally delicate and vulnerable. The concept of brain death after irreversible damage to it has made all of us aware of 'the cocktail of brain soup and spark' in the brainstem so necessary for life. If there be a soul in each of us, surely, it is enshrined here.

INTRODUCTION

Millennia ago we embarked on a quest for knowledge of the wonderful structure of man. The organ that puzzled earlier observers most was the human brain. Despite our many explorations, we remained in awe of this organ.

The evolution of our knowledge of the structure and function of the brain has been amply documented in volumes ranging from McHenry's revision of Dr. Fielding Garrison's work in 1969 to the more recent *History of Neurology* edited by Finger et al in 2009. Dr. Susan Greenfield's book (1997), intended for the lay person, embodies much useful information. We are now aware of nerve cells, their connections and their modes of communication amongst themselves and with a variety of other structures.

Injury to and disease in the brain often provide dramatic insights on the role of its different parts. A dramatic example

is the injury suffered by American railway foreman Phineas Gage in 1848. Before his accident, Gage was liked by friends and acquaintances who considered him to be honest, trustworthy, hard working, and dependable. A freak accident caused a metal tamping rod to enter under his left zygomatic arch and exit through the top of his skull.

The accident left him with little if any intellectual impairment but after the accident, Gage became vulgar, irresponsible, capricious, and prone to profanity. The company that had previously regarded him as the most efficient and capable of their employees dismissed him from his job. His change in character after the accident made this the index case for personality change due to frontal lobe damage. Subsequent studies have shown a wide spectrum of abnormal behaviour (compulsive and explosive actions, lack of inhibition, unwarranted maniacal suspicion, alcohol and drug abuse) following injuries to and disease in the frontal or temporal

lobes and their pathways to the deeper regions of the brain.

Similar abnormalities also follow chemical derangements in the brain.

Modern marvels such as computerized tomography and magnetic resonance imaging of the nervous system have provided significant additional data. Functional magnetic resonance imaging now allows us to further localize function within the structure of the brain and correlate abnormalities of its structure and function.

Even so, two entities remain enigmatic: the mind and the soul. Where are they located? Do they lie within the brain? Since neurophysicians treat patients with a wide variety of abnormalities of the brain and neurosurgeons lay bare the brain and often work in its interior, can they provide insights?

Neurologists and neurosurgeons rank high among scientists participating in philosophical debates about what might extend beyond the physical world. They are constantly dealing with patients who have fallen into the deep hole of unconsciousness. In their attempts at restoring normalcy to bodies and minds they also grapple with life and death. Inevitably, they ponder about spirituality and the dominion of the soul.

THE MIND

We are embodied spirits and inspirited bodies, (or, if you will, embodied minds and minded bodies). (Anonymous 2003)

Mind has been variously defined as that which is responsible for one's thoughts and feelings; the seat of the faculty of reason or the aspect of intellect and consciousness experienced as combinations of thought, perception, memory, emotion, will and imagination, including all unconscious cognitive processes. The term is often used to refer, by implication, to the thought processes of reason.

Prioreschi (1996) concluded that by the end of the 5th century B.C. the question of whether the heart or the brain was the seat of intelligence remained unresolved in Western medicine. This changed with the works of Hippocrates (ca. 460 BC – ca. 370 BC) - 'a figure of heroic proportions even if dimmed by the mist of time.' Hippocrates' oft-quoted statements show a clear understanding of the role of the brain vis-à-vis the mind:

Men ought to know that from the brain, and from the brain alone, arise our pleasures, joys, laughter and jests, as well as our sorrows, pains, griefs and tears. Through it, in particular, we think, see, hear and distinguish the ugly from the beautiful, the bad from the good, the pleasant from the unpleasant... I hold that the brain is the most powerful organ of the human body... wherefore I assert that the brain is the interpreter of consciousness...' (Hippocrates: On the sacred disease. Quoted by Prioreschi [1996])

In his book *De anima (On the soul)* Aristotle (384 BC – 322 BC)

felt that man is born with a blank slate (*tabula rasa*) on which experiences and perceptions are written to form the mind. 'What it thinks must be in it just as characters may be said to be on a writing tablet on which as yet nothing actually stands written: this is exactly what happens with mind.' Over the centuries that followed Avicenna (981-1037), Ibn Tufail (c. 1105 –1185), Thomas Aquinas (ca. 1225-1274), Thomas Hobbes (1588-1679), John Locke (1632-1704), Sigmund Freud (1856-1939) and others commented on this theme.

Jean Fernel (1496-1558) treated mind and brain together in his *Physiology*. He felt that the brain refined the animal spirits. Purged of all corporeal dross, they became concepts, finally even universal concepts and the ideas of the moral values. (Sherrington 1946)

The British neurophysiologist Charles Scott Sherrington (1857-1952) – 'the scientist's philosopher' (Breathnach 2004) – pondered the location and functions of the mind. He acknowledged the problems encountered in attempting to restrict the mind to the brain. 'It seems ludicrous to range such a paucity of nerve-process alongside the manifold variety of mind.' He was well aware that '...our mental experience is not open to observation through any sense organ ...' He concluded: 'The brain is the provider of mind... The mental action lies buried in the brain ... in that part most deeply recessed from the outside world, that is furthest from input and output...' (Zeman 2007)

Pinker (2003) has recently discussed the role of nature versus nurture in the development of the mind. Dismissing the concept of the blank slate, Pinker wrote: 'The mind cannot be a blank slate, because blank slates don't do anything... The inscriptions (on such a slate) will sit there forever unless something notices patterns in them, combines them with patterns learned at other times, uses the combinations to scribble new thoughts onto the slate, and reads the results to guide behavior toward goals. Locke recognized this problem and alluded to something called *the understanding*, which looked at the inscriptions on the white paper and carried out the recognizing, reflecting, and associating.' He concluded that 'The mind is a complex system composed of many interacting parts.'

Neurologists and neurosurgeons see patients with injured or diseased brains. Neurosurgeons attempt restoration of the internal structure of the brain to normalcy or correct disordered function in select areas by such modes as deep brain stimulation or ablation. Some operations are performed on patients who are awake. Observations on patients provided clues to the functions of the mind in relation to the structure of the brain. 'When a surgeon sends an electrical current into the brain, the person can have a vivid, lifelike experience. When chemicals seep into the brain, they can alter the person's perception, mood, personality, and reasoning. When a patch of brain tissue dies, a part of the mind can disappear: a

neurological patient may lose the ability to name tools, recognize faces, anticipate the outcome of his behavior, empathize with others, or keep in mind a region of space or of his own body... Every emotion and thought gives off physical signals, and the new technologies for detecting them are so accurate that they can literally read a person's mind and tell a cognitive neuroscientist whether the person is imagining a face or a place. Neuroscientists can knock a gene out of a mouse (a gene also found in humans) and prevent the mouse from learning, or insert extra copies and make the mouse learn faster. Under the microscope, brain tissue shows a staggering complexity—a hundred billion neurons connected by a hundred trillion synapses—that is commensurate with the staggering complexity of human thought and experience... And when the brain dies, the person goes out of existence.' (Pinker 2003)

Studies on patients who have suffered brain injury (such as Phineas Gage) have also provided interesting clues on the mind in relationship to the brain. We know now that damaged frontal lobes can no longer exert inhibitory influences on the limbic system with consequent aggressive acts.

The relation between the amount of gray matter in the frontal lobes and intelligence; the inferior parietal lobules and spatial reasoning and intuitions on numbers (as in Albert Einstein) and the third interstitial nucleus in the anterior thalamus and homosexuality (Pinker 2003) are a few more examples of specific areas of the brain linked to characteristics attributed to the mind. Paul Broca showed that damage to the area (subsequently named after him) in the dominant cerebrum results in an inability to talk. Subsequent studies showed several other areas within the cerebrum that govern other aspects of speech.

Bilateral frontal lobotomy and subsequent more sophisticated variants such as stereotaxic amygdalotomies or cingulotomies reduce an aggressive, maniacal individual to docility. (Heller et al 2006)

Dr. Wilder Penfield (1891-1976), Canadian neurosurgeon, was known for his groundbreaking work on epilepsy. He operated on patients with intractable epilepsy using local anaesthesia, ensuring that they remained awake throughout the operation. He stimulated areas of the surface of the brain in these patients in order to demarcate the part producing epilepsy. In many patients electrical stimulation of certain areas of the brain triggered vivid memories of past events. One patient, while on an operating table in Montreal, Canada, remembered laughing with cousins on a farm in South Africa.

Penfield concluded: 'This is a startling discovery. It brings psychological phenomena into the field of physiology. It should have profound significance also in the field of psychology provided, we can interpret the facts properly. We have to

explain how it comes about that when an electrode (producing, for example, 60 electrical impulses per second) is applied steadily to the cortex it can cause a ganglionic complex to recreate a steadily unfolding phenomenon, a psychological phenomenon.

'It is obvious that there is, beneath the electrode, a recording mechanism for memories of events. But the mechanism seems to have recorded much more than the simple event. When activated, it may reproduce the emotions which attended the original experience. What is more, the ganglionic mechanism continues to add to itself the memory of emotions which attend the recollection of the event and the substance of the man's reasoning regarding the significance of the event...

'The neuronal mechanism which we have stumbled upon in the course of neurosurgical operations, and which is probably duplicated in homologous areas of the two hemispheres, seems to have for its function the reproduction of (1) a remembered event or (2) thinking related to that event, and (3) the emotion it evoked.' (Horowitz 1997)

On 1 September 1953, Dr. William Beecher Scoville performed bilateral mesial temporal lobe resections on a patient known as H.M. in the medical records. The inadvertent severe damage to the important limbic structures resulted in permanent loss of memory in this patient (Scoville 1957). H. M. knew his name. He knew that his father's family came from Thibodaux, La., and his mother was from Ireland, and he knew about the 1929 stock market crash and World War II and life in the 1940s. But he could remember almost nothing after that. Dr. Brenda Milner, professor of cognitive neuroscience at the Montreal Neurological Institute and McGill University studied H. M. almost up to his death in 2008 and noted: 'He was a very gracious man, very patient, always willing to try these tasks I would give him and yet every time I walked in the room, it was like we'd never met.' Carey (2008)

Damage to discrete areas within the brain can thus produce a variety of disorders of the mind. 'Taken together, the data from neurology suggests that despite our brain's ability to organize our experience of ourselves and the world into a seamless unity, we are, in fact, made up of several parts, the loss of any of which can have dramatic effects on the whole.' (Craig 2005)

In his Nobel Lecture, Sperry (1981) described the implications on concepts of the mind of the observations made after splitting the corpus callosum. Sperry's experiments – some conducted with R. E. Myers – showed that the cat with divided corpus callosum now had two *minds* either of which was capable of learning on its own – and of responding intelligently to changes in the world around it on its own. Subsequent experiments with rats, monkeys and later with human epileptic patients gave similar results. 'Using *John Doe* as an example

study, doctors examined *John Doe Left* and *John Doe Right*. Psychological tests showed that both John Does had remarkably similar personalities. Except for language ability, they were about as much alike as identical twins. Their attitudes and opinions seemed to be the same; their perceptions of the world were the same; and they woke up and went to sleep at almost the same times. There were differences however. *John Doe Left* could express himself in language and was somewhat more logical and better at [planning...]. *John Doe Right* tended to be somewhat more aggressive, impulsive, emotional - and frequently expressed frustration with what was going on.' (McConnell 1982) Such experiments led Sperry, Ornstein and others to conclude that each of the separated hemispheres has its own private sensations, perceptions, thoughts, feelings and memories – in short, that they constitute two separate minds, two separate spheres of consciousness. (Gross 2005) 'Splitting the brain amounts to nothing less than splitting the self.' (Craig 2005)

In addition to structure, we must consider the chemical processes within the brain. The effects of caffeine, alcohol, marijuana and opium on the mind are common knowledge. Chemicals within the nervous system – such as adrenaline, serotonin, dopamine, the endorphins and encephalins – enable and modify the many functions of mind and body we take for granted. Craig (2005) quotes the statement made by Steven Johnson: 'Our personalities – the entities that make us both unique and predictable as individuals – emerge out of these patterns of chemical release.'

Carter (1998) described modern techniques for mapping the mind. 'It is now possible to locate and observe the mechanics of rage, violence and misperception and even to detect the physical signs of complex qualities of the mind like kindness, humour, heartlessness, gregariousness, altruism, mother-love and self-awareness.' O'Connor et al (2008) studied the nucleus accumbens – the region most commonly associated with social attachment – in persons grieving from the death of a loved one.



'Nucleus accumbens activity in response to grief-related vs neutral words that was significantly greater in the complicated grief group compared to the non-complicated grief group'. I (O'Connor et al., 2008)

Sounding a cautious note, Carter (1998) pointed out that whilst the optimist might wish for a complete understanding of human nature and experience from such studies, others may insist that a map of the brain can tell us no more about the mind than a terrestrial globe speak of Heaven and Hell.

To sum up, whilst the brain is 'a physical mechanism, an arrangement of matter that converts inputs to outputs in particular ways' (Pinker 2003), the manner in which its hundred billion neurones are deployed, the infinite variations in their connections that result in very complex neural networks, the multitude of chemical and electrical reactions within it and the consequent almost unimaginable complexity of structure and function enable it to house the mind just as it does the sources of all the other activities attributed to sentient life.

Where is the mind located?

The brain is the organ of the mind.

How does it function?

Krishnamurthy (2009) uses an analogy based on computers to explain the workings of the mind: 'The mind... is a virtual entity, one that reflects the workings of the neural networks, chemical and hormonal systems in our brain.' The mind cannot be localized to particular areas within the brain though the entire cerebral cortex and deep gray matter form important components. Consciousness, perception, behaviour, intelligence, language, motivation, drive, the urge to excel and reasoning of the most complex kind are the product of the extensive and complex linkages between the different parts of the brain. Likewise, abnormalities attributed to the mind – such as the spectrum of disorders dealt with by psychiatrists and psychologists – are consequences of widespread abnormalities, often in the chemical processes within different parts of the brain.

Two great British masters of neurology summed it up best.

John Hughlings Jackson (4 March 1835 - 7 October 1911) addressed anatomy.

'Self, however, is dependent on the evolution of anatomically new structures. Jackson suggested that the evolutionary development of the prefrontal cortex is necessary to the emergence of self. In this sense it could be called the organ of mind. However, this is not to say that self resides in the prefrontal cortex. Rather, the new structure allows a more

complex coordination of what is anatomically a sensori-motor machine.

'In summary, Jackson conceived of the central nervous system as having a hierarchical organization that reflects evolutionary history. He used the terms lowest, middle, and highest centres...as proper names...to indicate evolutionary levels. Ascending levels show increasing integration and coordination of sensorimotor representations. The highest-level coordination, which allows the greatest voluntary control, depends on prefrontal activity. Self is a manifestation of this highest level of consciousness, which involves doubling. This doubling is established by the reflective capacity that enables one to become aware of individual experience in a way that gives a sense of an inner life.' (Meares, 1999)

Sherrington (1961) addressed function and emphasized the limitations of our means for analysis:

'Integration has been traced at work in two great, and in some respects counterpart, systems of the organism. The physico-chemical produced a unified machine... the psychical, creates from psychical data a percipient, thinking and endeavouring mental individual... they are largely complementary and life brings them co-operatively together at innumerable points... The formal dichotomy of the individual ... which our description practiced for the sake of analysis, results in artifacts such as are not in nature... the two schematic members of the puppet pair... require to be integrated... This integration can be thought of as the last and final integration.'

THE SOUL

INTRODUCTION

The Bhagavad-Gita describes some of the qualities of the soul:
I say to thee weapons reach not the Life;
Flame burns it not, waters cannot o'erwhelm,
Nor dry winds wither it. Impenetrable,
Unentered, unassailed, unharmed, untouched,
Immortal, all-arriving, stable, sure,
Invisible, ineffable, by word
And thought uncompassed, ever all itself,
Thus is the Soul declared!
(Arnold 1900)

* * *

"Socrates – Now do you think one can acquire any particular knowledge of the nature of the soul without knowing the nature of the whole man?"

Phaedrus – If Hippocrates the Asclepiad is to be trusted, one cannot know the nature of the body, either, except in that way. (Plato's Phaedrus quoted by Prioreschi 1996)

* * *

I wrote an essay called The Exact Location of the Soul. (Selzer, 1976) I was being mischievous. I asked, 'Is it under the kneecap or in a fold of the baby's neck? Where is it?' (Selzer Interview, 2005)

The search for the location of the human soul probably dates back to the awareness of such an entity. Termed *atman* by ancient Indian philosophers, *psyche* by the Greek; and *anima* by the Romans, it has been considered resident within but distinct from the human body. Many consider it immortal, postulating death to be the consequence of the departure of the soul from the body.

We use the term soul to denote essence as in the phrase 'prayer is the very soul of religion'. It is not surprising that we continue to enquire into the essence of man.

Several questions arise when considering the soul. Here are some examples. When does the soul enter the human body – as the sperm enters the egg or as they fuse into one cell or at a later stage? Does the soul influence the body, mind and intellect? Is the soul identical with what we term conscience? Since it animates the live person, does it govern functions of the body beyond the control of the mind – functions termed 'vital' by biologists? What happens to the soul during dreams, anaesthesia, trance-like states? What happens to it after the soul leaves the body? Where and how are acquired characters stored in the nebulous soul? Where, in the body, does the soul reside?

Is there any point in searching for the location of the soul?

The answer must be in a resounding affirmative. The efforts over millennia to determine the nature and discover the location of the soul have resulted in a better understanding of the wonderful structure and function of man and his place in the cosmos.

In making this search and noting our findings, we must never lose sight of the cautionary note sounded by Leonardo da Vinci circa 1487: 'With what words O writer can you with a like perfection describe the whole arrangement of that of which the design is here?'

The search and some conclusions

The physician-turned-author, Anton Chekhov (29 January 1860 – 15 July 1904) wrote to his friend Suvorin: (7 May 1889) 'I think that when dissecting a corpse, the most inveterate spiritualist will be bound to ask himself, *Where is the soul here?* And if one knows how great is the likeness between bodily and mental diseases, and that both are treated by the same remedies, one cannot help refusing to separate the soul from the body.' Chekhov echoes the question asked by so many over the centuries.

Hippocrates concluded that madness originated in the brain. Plato (in *Timaeus*) felt that folly was a disease of the soul.

Philistion subclassified folly into madness and ignorance. (Harris 1973)

Pythagoras (c. 570-c. 495 BC) had described the soul as consisting of three parts – intelligence, reason and passion. The seat of the soul extended from the heart to the brain, passion being located in the heart and reason and intelligence in the brain. (Pioreschi 1996).

Leonardo da Vinci (1452-1519) with his uncanny genius, placed the soul above the optic chiasm in the region of the anterior-inferior third ventricle (Santoro et al., 2009).



Leonardo depicted the location of the soul at the point where a series of intersecting lines meet (Santoro 2009).

His summing up will continue to evoke admiration:

“Though human ingenuity by various inventions with different instruments yields the same end, it will never devise an invention either more beautiful... than does Nature because in her inventions nothing is lacking and nothing superfluous and she... puts there the soul, the composer of the body, that is the soul of the mother which first composes in the womb the shape of man and in due time awakens the soul which is to be its inhabitant” (Del Maestro, 1998).

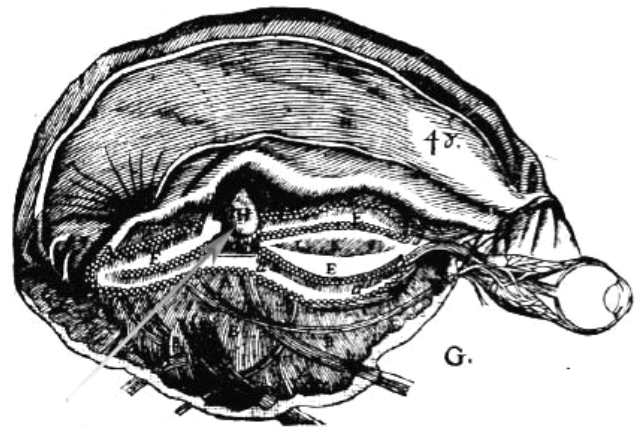
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Portrait of Rene Descartes by Frans Hals 1649

René Descartes (1596-1650) distinguished between the body and the soul but equated the mind and soul:

“There is a great difference between mind and body, inasmuch as body is by nature always divisible, and the mind is entirely indivisible. ...When I consider the mind, that is to say, myself inasmuch as I am

only a thinking being, I cannot distinguish in myself any parts, but apprehend myself to be clearly one and entire; and though the whole mind seems to be united to the whole body, yet if a foot, or an arm, or some other part, is separated from the body, I am aware that nothing has been taken from my mind. And the faculties of willing, feeling, conceiving, etc. cannot be properly speaking said to be its parts, for it is one and the same mind which employs itself in willing and in feeling and understanding. But it is quite otherwise with corporeal or extended objects, for there is not one of them imaginable by me which my mind cannot easily divide into parts. ...This would be sufficient to teach me that the mind or soul of man is entirely different from the body, if I had not already been apprised of it on other grounds.’



The pineal gland according to Descartes. This image from the 1664 edition of the Treatise of man illustrates Descartes' view that the pineal gland (H) is suspended in the middle of the ventricles (Descartes 1664, p 63). (<http://plato.stanford.edu/entries/pineal-gland/>)

Descartes localized the soul in the pineal gland as it lay deep within the brain, in the midline and was unpaired. It is of interest that in neurosurgery journals, Descartes' views are quoted with respect during discussions on surgery on the region of the pineal gland. (Apuzzo, 1996)

Lancisi (1654-1720) agreed that the soul must lie deep within the brain, in the midline and in an unpaired structure but favoured the corpus callosum – especially the *Nervuli longitudinales ab anterioribus ad posteriora excurrentes*, which are still called the medial longitudinal striae of corpus callosum, or nerves of Lancisi. He felt that the vital spirits could flow in the fibers of the medial striae. These formed a pathway for the stream of the soul (or perhaps consciousness) between the anterior part of the corpus callosum and the anterior columns of the fornix and the posterior part of the corpus callosum and the thalami, a sort of connection between the seat of the soul and the peripheral organs, between the soul and the body (Di Ieva, 2007).

Thomas Willis (1621-1675) wrote *Cerebri Anatome* while Professor of Natural Philosophy in Oxford, where he used the anatomy of the brain as a tool to investigate the nature of the soul. In his dedication to *Cerebri Anatome* he stated that the study of anatomy could 'unlock the secret places of Man's Mind and [to] look into the living and breathing Chapel of the Deity'. (O'Connor, 2003) He conceived of 'a middle part of the brain, a kind of interior chamber of the soul... in the innermost part of which images or representations of all sensible things, sent in through the passages of the nerves... are revealed upon the corpus callosum... and so induce perception...' Willis had considered as active powers of the soul 'local motion, memory, phantasy and appetite' which succeeded to 'the passions'. (Clarke and O'Malley 1996)

Albrecht von Haller (1708 – 1777) placed the soul in the medulla oblongata.

Bloom (2004) commented on the refutation of the dualist view differentiating the body and the soul:

'... People often appeal to science to answer the question When does life begin? in the hopes that an objective answer will settle the abortion debate once and for all. But the question is not really about life in any biological sense. It is instead asking about the magical moment at which a cluster of cells becomes more than a mere physical thing. It is a question about the soul... It is not a question that scientists could ever answer. The qualities of mental life that we associate with souls are purely corporeal; they emerge from biochemical processes in the brain...'

Santoro et al (2009) recently reviewed the postulates regarding the nature and location of the soul in the human body. They concluded that there exist two dominant and, in many respects, incompatible concepts of the soul: one that understands the soul to be spiritual and immortal, and another that understands the soul to be material and mortal. In both cases, the soul has been described as being located in a specific organ or anatomic structure or as pervading the entire body, and, in some instances, beyond mankind and even beyond the cosmos.

Rationalists are doubtful. On the death of Harvard's distinguished psychologist, Professor William James (1842 – 1910), Thomas Alva Edison (1847 – 1931) was asked about the human soul. 'Soul? Soul? What do you mean by soul? The brain?' 'Well, for the sake of argument, call it the brain or what is in the brain. Is there not something immortal of or in the human brain – the human mind?' asked Marshall. 'Absolutely no.' said Edison with emphasis,

'There is no more reason to believe that any human brain will be immortal than there is to think that one of my phonographic cylinders will be immortal... No one thinks of claiming immortality for the cylinders... Then why claim it for the brain

mechanism or the power that drives it? Because we do not know what that power is, shall we call it immortal? As well call electricity immortal because we do not know what it is... After death the force or power undoubtedly endures, but it endures in this world, not in the next. And so with the thing we call life, or the soul – mere speculative terms for a material thing which under given conditions drives this way or that. It too endures in this world, not the other. Because we are as yet unable to understand it, we call it immortal. It is the ignorant, lazy man's refuge' (Marshall, 1910).

What were William James' views? He titled Lecture III of the published version of his Gifford Lectures '*The reality of the unseen*' and discussed beliefs in objects that we cannot see. He quoted Immanuel Kant's doctrine about such objects of belief as God and the soul as 'properly not objects of knowledge at all'. James referred to the strange phenomenon of a mind believing with all its strength in the real presence of a set of things of no one of which it can form any notion whatsoever (James, 1902)

In 1907 Dr. Duncan MacDougall of Haverhill, Massachusetts decided to weigh the soul by weighing a human being in the act of death.

'My first subject was a man dying of tuberculosis. It seemed to me best to select a patient dying with a disease that produces great exhaustion, the death occurring with little or no muscular movement, because in such a case the beam could be kept more perfectly at balance and any loss occurring readily noted. 'The patient was under observation for three hours and forty minutes before death, lying on a bed arranged on a light framework built upon very delicately balanced platform beam scales. The patient's comfort was looked after in every way, although he was practically moribund when placed upon the bed. He lost weight slowly at the rate of one ounce per hour due to evaporation of moisture in respiration and evaporation of sweat. During all three hours and forty minutes I kept the beam end slightly above balance near the upper limiting bar in order to make the test more decisive if it should come. At the end of three hours and forty minutes he expired and suddenly coincident with death the beam end dropped with an audible stroke hitting against the lower limiting bar and remaining there with no rebound. The loss was ascertained to be three-fourths of an ounce.' He found the soul in six patients to weigh between 0.5 to 1.5 ounces (MacDougall, 1907).

In 1910, Dr. Max Baff of Clark University, Worcester, USA narrated to the correspondent of *The New York Times* his views on the use of x-ray cinematography to study the soul.

'Even the activities of the so-called soul may be projected on the screen... Photographs might be taken at the moment of death and immediately after. It is the belief that when the heart stops beating the soul leaves the body. Something may

be learned of the soul by observing the changes in its habitat, the marrow-like brain, at the moment when life ceases. I myself do not believe the soul to be a thing without the brain though I am neither an atheist nor an agnostic. However much people may believe that the soul is a separate thing, it must be borne in mind that its activities, thought and action, are confined within the limitations of the brain.' (Baff, 1910)

I am not aware of any success from Dr. Baff's endeavours.

Otto Rank (2002) has summed the situation regards the soul well. He felt that belief in the soul grew out of the need to reassure ourselves of immortality despite our knowledge of the immutable biological fact of death.

'The collision (between our need and the fact of death) created a spark in our individual and social consciousness that through history has become both consolation and inspiration: the immortal soul... The immortal soul, whether fact or fiction, gives comfort.'

V. S. Ramachandran, brain scientist at the University of California, San Diego, is less tactful. He said in an interview, there might be soul in the sense of 'the universal spirit of the cosmos', but the soul as it is usually spoken of, 'an immaterial spirit that occupies individual brains and that only evolved in humans — all that is complete nonsense'. Belief in that kind of soul 'is basically superstition', he said (Dean, 2007).

For scientists who are people of faith, like Kenneth R. Miller, a biologist at Brown University, asking about the science of the soul is pointless, in a way, because it is not a subject science can address. 'It is not physical and investigateable in the world of science', he said. Dr. Miller said he spoke often at college campuses and elsewhere and was regularly asked, 'What do you say as a scientist about the soul?' His answer, he said, is always the same: 'As a scientist, I have nothing to say about the soul. It's not a scientific idea' (Dean, 2007).

If there be a soul, where is it located? Views of neuroscientists

If we accept the existence of the soul and its localization in the brain, we must focus on the brainstem. Christopher Pallis (1983), discussing the definition of whole-brain death, provided a modern concept of the soul. 'The loss of the capacity for consciousness and of the capacity to breathe (after brain death) relate to functional disturbances at the opposite ends of the brain stem while the former is also a meaningful alternative to "the departure of the soul".'

Greenfield's (1997) description is relevant. The soul, like the seat of consciousness (in its neurological sense) lies in 'the cocktail of brain soup and spark' within the deep cerebrum and brainstem, whence dopamine, noradrenaline, acetylcholine are released 'in a fountain-like arrangement on to the more sophisticated regions of the (cerebral) cortex and

immediate subcortical structures' to produce a series of electrical and chemical events.

Neurosurgeons operating within the brainstem are known to tell their postgraduate students: 'I need not emphasise the need for the greatest accuracy and delicacy when operating here — we are now in the abode of the soul.'

We must confess that the existence of the soul remains unproven by tests 'in the acid baths of experiment and logic'. Nor has it 'enjoyed repeated vindication'. (Wilson 1998) Despite all that has been written on the soul, it is difficult to fault Musil's observation published in 1990: '(There is) an abiding miscommunication between the intellect and the soul. We do not have too much intellect and too little soul, but too little intellect in matters of soul.'

Perhaps we shall eventually come to conclusions similar to those reached by Sir Thomas Browne (19 October 1605 – 19 October 1682) in his most famous work, the *Religio Medici*:

'Amongst all those rare discoveries and curious pieces I find in the Fabrick of Man, there is no Organ or Instrument for the rational Soul; for in the brain there is not anything of moment more than I can discover in the crany of a beast, and this is an argument of the inorganicity of the Soul. Thus we are men, and we know not how; there is something in us that can be without us, and will be after us; though it is strange that it hath no history what it was before us, nor cannot tell how it entered in us.' (Browne, 1635)

We remain 'children of Tantalus, frustrated by the failure to grasp that which seems within reach...' (Wilson 1998)

Of course, if you have a hyperactive funny bone, you could paraphrase Woody Allen, who, as so often, has the ultimate comic word on the subject. 'You cannot prove the nonexistence of the soul; you just have to take it on faith.' (<http://cavett.blogs.nytimes.com/2007/02/07/ghost-stories/?page=3>)

CONFLICT OF INTEREST

None declared.

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Sunil Pandya is a neurosurgeon and thinker on medical ethics. He joined the Grant Medical College in 1957 and trained at the Sir JJ Group of Hospitals, Mumbai. He obtained the MBBS (1961) and MS (1965). He joined Dr Homi Dastur at the Department of Neurosurgery, Seth G.S. Medical College and KEM Hospital in 1967 as a Pool Officer and was appointed to the staff as Asst Neurosurgeon in 1968. In 1975, on Prof Dastur's retirement, he was appointed Prof of Neurosurgery. He retired on superannuating in 1998, and has since worked at the Jaslok Hospital and Research Center, Mumbai. He is Editor Emeritus, Indian Journal of Medical Ethics; Journal Ombudsman, Journal of Post graduate Medicine; and on the International Editorial Advisory Board of the Mens Sana Monographs.

Free Will, Freedom of Choice and Frontotemporal Lobar Degeneration

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ABSTRACT

The question of whether humans have free will has been debated by philosophers and theologians for thousands of years; more recently, neuroscientists have applied novel concepts and tools in neuroscience to address this question. We submit that humans do have free will and the physiological substrate for its exercise is contained within neural networks. We discuss the potential neurobiology of free will by exploring volitionally initiated motor activity and the behavioral response to a stimulus-response paradigm. We also submit that the exercise of free will can be affected in patients with the certain neurological disorders such as the behavioral variant of frontotemporal dementia. Clinico- pathological correlation in patients with this disorder provides an opportunity to further elucidate the neural substrate for this fundamental human attribute. We also discuss the clinical correlates of the loss of free will in this population, which is a source of significant distress to patients, significant others and care givers.

Keywords Free will; freedom of choice; behavioral variant; frontotemporal dementia; volitional movement

INTRODUCTION

The question of whether humans have free will and freedom of choice has been debated for thousands of years by countless philosophers and theologians. More recently, neuroscientists have joined the quest for an answer to this most fundamental of humanity's questions. It is beyond the scope of this paper to review the infinite number of arguments both affirming and denying the existence free will proposed by various individuals throughout the ages. In fact, we believe that the question that must be asked is not whether humans have or don't have free will but rather how much free will is present within the confines established by the human and most importantly the individual's particular condition (which we will refer to as relative free will).

This being said, we argue that the mere fact that humans question whether free will exists is relative proof of its existence; this logic is along the lines of Descartes postulate "I think, therefore I am". As a starting premise for this paper the authors do believe that relative free will is indeed a human attribute and that as will all aspects of human cognition, it has

a neurobiological basis. Furthermore, the authors believe that relative free will and freedom of choice are highly dependent on intact neurological function. In addition, certain neurological disorders that cause damage to specific areas of the brain can limit an individual's ability to exercise free will.

One of the essential components of free will is being able to voluntarily initiate actions (defined as any activity that results in a change in the external and internal universe) as well as modulate and choose among a number of potential responses to internally or externally generated stimuli. Frontotemporal lobar degeneration (FTLD) is a neurodegenerative disorder which causes a number of relatively distinct clinical syndromes, although the underlying neuropathology can be quite variable (for review see ^[1]). Patients with the "behavioral variant" of this disorder (BVFTLD) display significant alteration in cognition, behavior and personality ^[2]. While there is significant heterogeneity in the pathological findings, some authors propose that specific neuropathological processes correlate with specific clinical syndromes. For example, Grossman ^[3] has noted that patients with tau-negative FTD have greater social, language, and verbally mediated executive function. Hu et al^[4] reported that patients with behavioral-variant frontotemporal dementia with tau-positive pathology were more likely to display poor planning and/or judgment, while tau-negative patients displayed impaired personal conduct and a paucity of dysexecutive symptoms. However, the greater evidence seems

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to indicate that the clinical phenotype correlates with the anatomical distribution of the pathology. Structural imaging studies in patients with BVFTLD have suggested predilection for involvement of bilateral orbital frontal, insular, and anterior cingulate cortex, as well as the right dorsolateral frontal and left premotor cortex^[5], although the degree and area of involvement may vary by severity of disease^[6, 7].

Disinhibition, impulsivity, as well as altered goal oriented action generation, implementation, and retro-assessment are prominent features of this syndrome. Furthermore, patients with BVFTLD frequently display a rigid and predictable response in situations evoking the stimulus-response paradigm. We argue that frontotemporal lobar degeneration provides an example of a neurological disorder that interferes with an individual's exercise of free will and freedom of choice. Furthermore, clinico-pathological correlation in this population can help clarify the neurological substrate for this most human of attributes.

The exploration of whether and how free will is affected in patients with neurological disease (such as BVFTLD) has important clinical implication. For example, patients often display behaviors that may be hurtful or offensive to family members which can result in social discord. Furthermore, family members and care givers frequently hold the patient responsible for those behaviors. A recent example encountered by one of the authors involved a "normally" faithful and devoted husband who had a number of extra marital affairs and displayed sexually related inappropriate behavior after developing BVFTLD. In counseling caregivers, the clinician must make an assessment of how much control the patient has over his or her own behavior and how much "responsibility" to attribute to the patient. The author has found that a comprehensive discussion with the patient and caregivers regarding these issues may help alleviate destructive tensions aroused in the patient's immediate social environment caused by his or her behavior.

Definition of Free Will

Our first and perhaps most demanding of challenges is the definition of free will. The numbers of perspectives that can be utilized to accomplish this task are numerous. However, for purposes of this discussion we will limit our discussion of free will as it relates to physical actions (rather than including other aspects as thoughts, emotions, etc.). Furthermore, we will approach the subject of free will extracting from a framework utilized by the fifteenth century philosopher Benedictus Spinoza. While Spinoza's theory on pantheism did not allow for free will in humans, he did propose a model which is useful for our discussion. In his magnificent work "Ethics", Spinoza states the following: "That thing is called 'free' which exists solely by the necessity of its own nature, and in which its own nature alone is the cause of its actions.

On the other hand, that thing is necessary, or rather constrained, which is determined to a fixed and definite method of existence or action by something external to itself". (Part I (on God) definition 7)^[8]. Therefore, Spinoza would argue that we exercise freedom when we are the "cause" of our actions.

To illustrate this concept, we will utilize the example frequently alluded to by students of Spinoza's works. Paul and Peter are walking on a narrow bridge; if Paul pushes Peter off the bridge, Paul is the cause of Peter's fall and thus he exercised free will. If the wind pushes Paul against Peter and this results in Peter's fall, then it was not Paul but the wind which caused Peter's fall. Paul did not exercise free will in this situation, as his behavior was caused by something external to him.

We can expand and apply this concept to neurophysiology by the following example. If we were to utilize transcranial magnetic stimulation to stimulate the motor cortex of a subject, we could easily induce movement of a limb. In this case, the subject was not the cause of the particular movement (the cause was the electromagnetic field) and he or she consequently did not exercise freedom of will. In contrast, if the subject voluntarily produced the movement, then he or she would be the cause of the movement and thus would have exercised free will.

Even more, let us translate this further to a neurobiological model. If a neuron or population of neurons depolarize spontaneously, and their depolarization is not caused by inhibitory and/or excitatory signals from other neurons, then those depolarizing neurons are the cause of their own depolarization. Instead, if the depolarization is wholly caused by the influence of additive excitatory and inhibitory signals which stem from other neurons, then the depolarizing neurons are not the cause of their own depolarization. A third scenario is also plausible. If that same neuron or population of neurons receive signals from other neurons which influence, but not totally cause their depolarization, then we can deduce that the depolarizing neurons are a "partial" cause of their own depolarization. This is, we propose, the most plausible explanation for voluntary initiation of movement; however, it is a hypothesis that is yet to be proven.

We will approach our discourse on free will and its neurological substrate from two perspectives; the willful initiation of motor acts and the ability to choose among different options in response to an identifiable stimulus. We will then discuss BVFTD as a model of a neurological disorder which can affect the exercise of one or both of these functions.

The Neurobiology of Volitional Movement;

From a neural perspective, movement is caused by depolarization of brainstem (for the cranial musculature) or

spinal (for muscles in the trunk and limbs) motor neurons. These motor neurons receive signals from neurons in the primary motor cortex, which sends their axons “downstream” along the corticospinal tract to the alpha motor neurons. Other than the poorly understood depolarization of single or small number of neurons resulting in a degree of “background noise”, spontaneous synchronous activation of a large population of neurons in the primary cortex (which would result in movement) is not known to occur under normal conditions. In contrast, epilepsy is an example of an abnormal state that results in spontaneous primary cortex activations and corresponding motor activity.

Instead, the primary cortex becomes active upon receiving inputs from cortical neurons “upstream” in the “motor hierarchy”. The cortical motor system is organized in a hierarchical fashion at the “bottom” of which lies the primary cortex. Components of this hierarchy include the posterior parietal, premotor, pre supplementary, supplementary, and cingulate cortex, as well as subcortical regions. These areas are not only connected serially but also in parallel. Within this hierarchy there are groups of neurons that become active with various steps in the movement process, including the imagination of motor acts, the intention to move, the refrain of movement, the performance of movement, and so forth.

The hierarchical organization of the cortical motor system implies that there are higher order association cortical areas that send “top down” connections to the primary motor cortex. In regards to the neurobiology of volitional movement, several questions must be considered. For example, at what level of this hierarchy does volition act? Reason would lead us to believe that it should be at the top. Thus, if the primary motor cortex were “isolated” from top down connections, voluntary movement would not be possible. But even more importantly, how is it that volition as an “initiator of neural activity” interacts with neuronal elements to bring about the simultaneous and synchronous firing of the large population of neurons required for even the simplest of movement? After all, volition is a metaphysical entity; it can not be expressed or measured through physical means. Therefore, attempting to explain the relationship between volition and neuronal activity evokes the eternal and yet to be satisfactorily deciphered mind-body problem.

To partially address this question we can conceptualize the existence of a population of “source” neurons located at the height of the motor hierarchy, which act as the initiators of impulses traveling down this hierarchy to the primary motor cortex. How is it that those source neurons depolarize initiating the movement cascade? There are a number of potential scenarios. The first is that volition as a force in a different dimension and “outside” of the brain somehow activates the neurons, as does TMS in the example above. This notion is

very much contained within religious thought, which states that the “soul” is outside of the body and somehow drives it to accomplish its mission. The other possibility is that volition is a property contained within the source neurons, which possess the potential to depolarize as “they choose”. This notion is akin to Aristotle’s discussion of the unmoved mover. Aristotle argued that there must logically be a first, unmoved mover in order to explain all other motion; motion cannot begin without the prior existence of something to impart motion to another thing^[9]. His unmoved mover does not itself move, but contains within itself the source of all motion. In order to create an analogy for our discussion, we need to explain volitional movement (as proposed in the second scenario) on the basis of a neuron or population of neurons which itself do not require to be depolarized by other neurons, but is capable of depolarizing other neurons downstream.

However, it would seem that a third scenario, which incorporates features from the first two, is the most plausible theory to explain voluntary movement. Let us conceive a “volitional system” comprised by a population of neurons which receive inputs from multiple other neuron distributed throughout the entire central nervous system. These inputs convey information about a person’s specific needs and wants, personal and social norms for behavior, current environmental status, memories about effectiveness and consequences of past behavior as well as a large body of additional information. The volitional system integrates this information and “comes up” with a behavioral plan which includes the many dimensions of an act, including whether to act or not, as well as the what, when and how aspects of an action. Therefore, utilizing the definitional scheme described above, the volitional system is a “partial” cause of its actions; it contains some “autonomy” but also incorporates “information external to itself”.

The potential structural candidates within the brain for this system are many. For example, the posterior parietal cortex has been shown in monkeys to be involved in action selection and movement preparation^[10]. The left dorsolateral prefrontal cortex (Brodmann’s area 9) has also been implicated^[11]. However, it is likely that components of this system are multiple and further studies are needed to better localize and characterize them.

A discussion on voluntary initiation of motor activity would not be complete without a brief exploration on the relationship between consciousness (or rather awareness) and volition. The extensive scientific debate on this issue was perhaps sparked by a landmark paper published by Libet et al in 1983^[12]. It is beyond the scope of this paper to discuss at length this study and the hundreds of subsequent publications arguing for and against its findings and conclusions, but a brief description seems fitting. Libet recorded a number of parameters including the timing of the “readiness potential”

(RP), the time of perceived intention to move (W) and time of movement as measured by EMG in volunteers instructed to move their wrists at a time of their choosing. Libet found that RP (an unconscious neurophysiological event) preceded W by approximately 300 to 500 milliseconds. The author thus concluded that “cerebral initiation of a spontaneous, freely voluntary act can begin unconsciously, that is, before there is any (at least recallable) subjective awareness that a ‘decision’ to act has already been initiated cerebrally”. Most recently, Soon *et al* ^[13] utilized fMRI to demonstrate that activation of the frontopolar and parietal cortex that occurred 10 seconds prior to awareness of intent predicted the nature of a “volitional” decision. Hallet ^[14] recently wrote an excellent review on the neurophysiology of volitional movement and concluded that freedom of will is a “perception” rather than an “initiating force”. That is, a person believes him or herself to be free because he or she is aware of the intent to move, but that intent is generated at an unconscious level and only reaches awareness at a later stage.

The fact that volitional movement may be initiated unconsciously has brought into question the existence of free will, but in the authors’ opinion, the matter is far from clear. The line separating conscious from unconscious cognitive processes is probably not as “rigid” as suggested by psychoanalytic theory, one of its first proponents. Instead, this line may be quite fluid, allowing cognitive activity to constantly transition between both states. We suggest that volitional activity may arise from a combination of both conscious and unconscious cognitive processes.

Neurological Disease and volitional initiation of movement

Some light into the neurobiological substrate for volitional movement can be shed by the study of neurological syndromes that specifically interfere with the initiation of volitional activity. Such is the case of “abulia” (from the Greek “lack of will”), a syndrome characterized by lack of spontaneity of action or speech, deficiency in initiation, apathy, inertia, mental slowness, reduction in excursion of motion, paucity of motivation, poor attention and easy distractibility^[15].

Patients with BVFTLD frequently display variable degrees of abulia. Patients may become reclusive and fail to initiate or participate in social, recreational, or vocational activities. Some patients fail to initiate conversations. Family members frequently complain that if “left to his or her self” the patient “just sits around the house”. In advanced stages, the patient may fail to initiate or participate in self, home and family care. The authors have also seen extreme cases of inactivity in patients with advanced BVFTLD where the term akinetic mutism can be applied. This refers to a syndrome, initially described in a patient with a third ventricle cyst by Cairns [16] and

characterized by lack of initiation of any type of motor activity, including speech. The affected patient remains motionless and mute, although seemingly aware of the surrounding environment. Lack of activity initiation can be a significant source of distress and frustration in those caring for patients with BVFTLD and it is very much a source of increased burden of care.

If we aim at clinicopathological correlation, we can presume that brain areas involved in patients with BVFTLD have a role in either the volitional initiation of actions or in the transport of impulses from the “volitional source system” to the primary motor areas. However, considering such factors as the relatively large structural involvement, the fact that functional involvement as documented by functional neuroimaging (PET, SPECT and fMRI) can exceed structural involvement, as well as other factors, it is difficult at this time to further identify the structures responsible for voluntary action initiation.

Of course, even being able to estimate the localization of the volition-neuronal interaction would not explain the mechanism for that interaction. Still, we submit that disorders of motor initiation are an example of neurological conditions that interfere with an individual’s voluntary initiation of movement, an important component of free will.

The Neurobiology of Freedom of Choice

The stimulus response paradigm proposes the existence of a “black box” that determines the behavioral, cognitive and emotional response to an extrinsically or intrinsically generated stimulus. In order to perform this task, the black box utilizes a set of cognitive functions grouped together within the “umbrella” term of “executive functions”. The definition of executive functions varies among investigators, but the term is a metaphor for the concept of an executive within a business or administrative setting that manages employees and systems to achieve a specific goal; thus, within a cognitive model, the concept refers to an executive cognitive system that manages other aspects of cognition to “appropriately” achieve goal oriented behavior. Executive functions include initiating, planning, and sequencing behaviors (taking into account past experience and current knowledge), altering behavioral and affective responses according to ongoing changes in circumstances, as well as monitoring and regulating thought, affect and behavior.

The brain areas most frequently implicated in control of executive behavior include, among others, the dorsolateral prefrontal cortex (DLPFC) and the anterior cingulate cortex (ACC) ^[17-20] ^[11], although the role of each continues to be a source of debate..

A fundamental aspect of the executive functions contained within this “black box” is the ability to suppress the “automatic

response” to a stimulus. The automatic response refers to a reaction that fails to take into account situation specific circumstances that may make such response inappropriate. An example may clarify this concept; a patient with BVFTLD became involved in a fight after another individual called him “shorty”. The patient failed to incorporate into his decision to attack the fact that the offending individual was joking and much larger and stronger than the patient, resulting in unfavorable results for the patient.

The term “stimulus bound” has been utilized to denote a state where an individual cannot inhibit or dissociate from the automatic response to a stimulus. The response is only determined solely by the characteristics of the stimulus rather than on the associated circumstances. Clinical correlates of stimulus bound behavior displayed by patients with BVFTLD include impulsiveness, poor tolerance to frustration, angry responses to minor provocation, among others.

A variant of stimulus-bound behavior is utilization behavior. Patients with this disorder cannot suppress the urge to utilize an object in the immediate environment. As described above, it is the stimulus, rather than the circumstances, which guides the response. Such an individual is at “the mercy” of the environment. Examples abound in patients with FTDL; family members report the necessity to hide food, since a patient with this behavior will “eat what he or she sees”. A patient evaluated by one of the authors could not “resist the urge” to utilize the medical examination tools placed in a table a short distance away. He put on the author’s stethoscope, tapped the desk with the reflex hammer and even picked up the telephone receiver in the office and proceeded to make a phone call. Another patient read everything readable in his field of vision (such as street signs or advertisements).

Suppression of the automatic response (which is lacking in stimulus bound and utilization behavior) is a fundamental premise in order to embark on any subsequent response. Without this suppression, any potential ulterior choice is rendered difficult or impossible. Thus, an individual who succumbs to the automatic response frequently loses the freedom to respond otherwise. This is because in order to exercise freedom of choice, at least two options must be available to choose from; if the automatic response is the only one available, then freedom of choice is not attainable.

In fact, some authors have proposed that human freedom is not expressed by action generation but rather by modulating the response to a stimulus which is generated unconsciously. Libet (mentioned in previous paragraphs) suggested that human freedom may be expressed by “free won’t” [21]; while (as discussed above) actions may be initiated subconsciously, an individual retains the conscious decision as to how to respond to that “impulse”. This reasoning is in line with the philosopher John Locke’s position on voluntary behavior and

free will; he argued that the feature defining voluntary behavior is the ability to “*postpone* a decision long enough to reflect or deliberate upon the consequences of a choice”.

Indeed, recent functional MRI studies suggest that the brain contains a network for inhibiting intended actions. Brass and Haggard [22].demonstrated strong activation of specific areas of the fronto-median cortex when an individuals prepares a manual actions but then intentionally cancels its performance, as compared to preparation and completion of that same action. Since these areas are frequently involved in BVFTLD, it is possible that this may play a part in the deficiency of action suppression displayed by patients with this disorder.

Thus, the stimulus response paradigm can be used to propose a possible schematic explanation for the freedom of choice. With a particular internally or externally generated stimulus, one must have an intact “black box” in order to have freedom of choice. Given the prior research mentioned previously, the components of this “black box” may include the dorsolateral prefrontal cortex, the anterior cingulate, and the fronto-median cortex. An intact “black box” allows for intact executive function, leading to the ability to suppress an automatic cognitive, behavioral, and emotional response and to choose a more appropriate one. When this “black box” is compromised as it is with BVFTLD, executive function is impaired, leading to an inappropriate cognitive, behavioral, and emotional response due to the inability to suppress the automatic one. However, more research should be performed in order to see if this proposed schematic holds true.

CONCLUSIONS

In this paper we have argued that free will and freedom of choice are human attributes that have a neural substrate, although the location and characteristics of that substrate remain to be better delineated. Consequently, damage to specific areas of the brain such as occurs in patients with BVFTLD can interfere with the full exercise of this human trait. This brings up a unique dimension to the clinical care of these patients, including the attribution of responsibility for socially inappropriate behavior. Further advances in the understanding of clinico-pathological correlates of patients with BVFTLD may also help characterize the neural mechanisms for free will and freedom of choice.

CONFLICT OF INTEREST

The authors have no financial interests to disclose.

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Bridging the Gap between Philosophers of Mind and Brain Researchers

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ABSTRACT

Philosophers and psychologists have long tried to understand people's irrational behavior, through concepts such as weakness of will, compulsion, and addiction. The scientific basis of the project has been greatly enhanced by advances in cognitive psychology and neuroscience. However, some philosophers have also been critical of the more general conclusions drawn by the scientists. This is especially true when scientific researchers start making claims that go to philosophical issues, such as free will and responsibility. Conversely, some scientists have been critical of philosophical approaches for not understanding the results of recent research. I examine some of the recent history of scientific claims about addiction, and the rise of the claims from scientists to have shown that addiction is a brain disease and that addictive behavior is compulsive. Given the well-confirmed evidence that addicts can modulate their behavior in response to rewards, punishments, and context, it is clear that according to normal definitions of compulsivity, the behavior of addicts is not typically compulsive, which suggests neuroscientists are making an error in their interpretation of data. Since philosophers have expertise in making distinctions between different kinds of action and categorizing them as free, weak-willed, and compulsive, we will achieve a better interpretation of the neuroscience of addiction when taking this philosophical work into account. Conversely, given the status of science in the modern world, philosophers have to grapple with the latest neuroscientific discoveries and to show the compatibility of their philosophical theories with the data for their approaches to maintain credibility.

Keywords: Neuroscience; Addiction; Philosophy; Action theory; Compulsion

INTRODUCTION.

The concept of addiction as a disease came to be taken seriously in the USA and in England at the start of the nineteenth century (Levine, 1978), but it has had a disputed status from its inception and there continues to be debate over whether it is really a disease to the present day (Heyman, 2009; Valverde, 1998). In recent years some neuroscientists have argued that neuroscience can demonstrate the reality of the disease of addiction (Leshner, 1997; Volker & Fowler, 2000). Yet some philosophers have argued that it would take a great deal for neuroscience to be able to demonstrate that any action is truly compulsive, rather than simply giving an account of the causal pathways leading to addictive behavior (Stephens and Graham, 2009). So we would benefit from further discussion of how we can achieve a productive debate between neuroscientists and philosophy, so as to move the debate along

and establish a better foundation for public policy. I will argue that when neuroscience addresses concepts such as freedom, compulsion, and disease, it benefits from philosophical understanding, and conversely, philosophers who address similar concepts in psychiatry benefit from understanding the data provided by neuroscience.

The concept of disease, especially of psychiatric disease, takes a great deal of unpacking. It is doubtful that we can achieve a precise and uncontroversial definition. However, for our purposes with regards to the issue of addiction, we can focus on its connection with involuntary or non-autonomous action. If addiction is truly compulsive and addictive action is not voluntary, then addiction has a much stronger claim to be a disease. Most of the best known criticisms of the disease concept (e.g., Fingarette, 1988; Peele, 1999) have argued that addiction is not a disease because addictive behavior is

voluntary. In order to determine whether addictive action is voluntary or not, we need to specify what we mean.

The debate between philosophy and neuroscience has been dishearteningly confused when it comes to personal freedom. A paradigm of this has been Libet's (1985) notorious claim to have shown that human action is not under conscious control, which has been used by others (e.g., Wegner, 2002) to support the claim that free will is an illusion. These analyses have now been largely shown to be problematic, (O'Connor, 2005; Mele, 2006; Mele, 2009), but one wonders whether it might not have been possible to forestall the erroneous interpretations of the original experiments with better dialog between neuroscientists and philosophers early on in the process. This ambition is complicated by the fact that there is still debate within philosophy about the nature of voluntary action and personal autonomy, and it is easy to understand the temptation of arguing for a shocking conclusion that we have no free will, a view which is often appealing to those who take a scientific view of human behavior. Nevertheless, my claim here is that we will make more progress by increasing the dialog between philosophers and neuroscientists.

ADDICTION

Let us consider the argument of Volkow and Fowler (2000). They point out that the orbitofrontal cortex is an area of the brain that could integrate information from various limbic areas of the brain and which could modulate the response of those areas to drugs. They make many connected observations about the orbitofrontal cortex, including the following. In dopamine transporter knockout mice, self-administration of cocaine results in activation of the area. In human subjects, the area has been associated with reinforced behavior and conditioned responses. Pathology in the orbitofrontal cortex and striatum have been reported in people with OCD, and in the same parts, increases in metabolic activity are found in people with obsessions, compulsions, impulsivity and Tourette's syndrome. The authors mention a case in which a person with a vascular lesion of the orbitofrontal cortex compulsively borrowed cars illegally, leading to multiple incarcerations. Hyperactivity of the orbitofrontal cortex appears to be associated with reports of the cravings of cocaine addicts. "Imaging studies have provided evidence of abnormalities in the striatum, thalamus and orbitofrontal cortex in cocaine abusers" (322) and similarly in alcoholics. After setting out a wide range of other similar pieces of evidence, the authors conclude: "we postulate that repeated exposure to drugs of abuse disrupts the function of the striato-thalamo-orbitofrontal circuit. As a consequence of this dysfunction a conditioned response occurs when the addicted subject is exposed to the drug and/or drug-related stimuli that activates this circuit and results in the intense drive to get the drug (consciously perceived as a craving) and compulsive self-

administration of the drug (consciously perceived as a loss of control)" (323)

The logic of the paper is unclear. In particular, the paper is full of associations between ideas and apparent implications, and the conclusion of the paper is a hypothesis. The authors do not specifically say whether the considerations they list in the main body of the paper are evidence for the postulate. However, the argument seems to be spelled out most clearly in the abstract: "Because the orbitofrontal cortex is involved with drive and with compulsive repetitive behaviors, its abnormal activation in the addicted subject could explain why compulsive drug self-administration occurs even with tolerance to the pleasurable drug effects and in the presence of adverse reactions." (318). So essentially the argument is that because a kind of brain activation distinctively associated with Tourette's, OCD, and impulsivity is also associated with addiction, there's reason to think that addiction is compulsive.

As a hypothesis, it is certainly worth pursuing. However, the paper never spells out what it means by compulsivity. The closest it comes is in making a distinction between pleasure-seeking activity and compulsive action. The idea is that people will sometimes pursue a course of action even when it may result in unpleasant outcomes. Yet it by no means follows that such action is unfree or compulsive. It is relatively uncontroversial that people can be irrational and free and many philosophers have argued that weak-willed action does not need to be compulsive (Mele, 1987). That is to say, people choose to act against their own better judgment when they could have acted otherwise. So Volkow and Fowler need further argument that the phenomena they are discussing are truly compulsive.

Evidence that Addiction is Voluntary

One of the primary empirical studies that suggests that addiction has a voluntary component is the study by Lee Robins in the 1970s of the heroin addiction of US soldiers in Vietnam and their rapid recovery rates on returning to the USA. The study found that in the first year after return, only 5% of those who had been addicted remained so (Robins, 1993, p. 1045). Heyman (2009) points out that offering addicts incentives to change their behavior is often successful. For example, Higgins has done work with the behavioral treatment of addiction. His group offered cocaine addicts cash incentives to refrain from using the drug, and were also given education about drug use and its consequences (Higgins, 1991). The results were that the behavioral treatment led to significantly longer abstinence from drugs than 12-Step treatment. Heyman cites other studies showing that addicts do tend to reduce or end their substance use when they face negative repercussions.

Thus we can conclude that there is countervailing evidence to the neuroscientific studies, and we should remember that

those studies did not provide conclusive arguments, even according to their own authors. What is puzzling is how the Volkow and her colleagues can even countenance the hypothesis that addiction is compulsive, given the weighty set of evidence that addicts can modulate their behavior according to circumstances. It might be possible to preserve the claim that addiction involves compulsive action if a more precise and narrow definition of addiction is used, restricting it to the most serious cases, but this is not the strategy taken by these neuroscientists.

This leaves the neuroscientific defense of a disease model of addiction in a weak position. While it has demonstrated some parallels between addiction and other mental disorders such as OCD and Tourette's, these do not provide sufficient reason to conclude that addictive behavior is involuntary. Even if there was a very strong parallel between addiction and these other mental disorders, it would not automatically follow that addiction was involuntary, because the involuntary nature of behavior associated with OCD and Tourette's is at least up for debate and further investigation. For example, Oliver Sacks' well known discussion of Tourette's in his essay "A Surgeon's Life" (1995) says that people with this condition are able to delay their ticking behavior when they need to, at least for a certain amount of time. One finds similar claims with regard to narrative accounts of OCD, in which sufferers of the condition say they are able to refrain from their compulsive behavior for some time, but if they do so, then they need to immerse themselves in their rituals when they do give in to them. This suggests that people have an ability to resist their compulsions, but that their reserves of resistive energy are limited — this is an idea strongly reminiscent of the phenomenon of ego-depletion investigated by social psychologist Roy Baumeister (2007). If we take this idea seriously, then we might be able to revive the compulsiveness of addiction in a more sophisticated fashion (see Levy, 2007, for an attempt to do this.)

CONCLUDING REMARKS.

The nature of compulsion, whether in OCD, Tourette's, impulsive behavior, or addiction, is not well understood either by philosophy, social psychology, or cognitive neuroscience. Voluntary action is a complex phenomenon, and the concept of voluntariness is not precise in ordinary language. To be capable of serious scientific investigation, it needs to be carefully defined. The concept of involuntary action is especially difficult to grasp, and the above discussion suggests that we might do better to conceptualize the phenomenon differently. For example, we might use the concept of degrees of freedom, and reductions in autonomy. It is clear that there is no straightforward dichotomy between voluntary and involuntary action, and so we need to employ a conceptual apparatus adequate to the task of description of the

phenomena under investigation.

This brings me back to my main claim in this paper. Philosophers have been investigating the concept of action, both voluntary and involuntary, since the start of the discipline. They have already developed theories and vocabularies which address the complexity of the phenomenology of compromised and reduced autonomy. Neuroscientific approaches to addiction and other forms of psychopathology will be improved by a more sophisticated and philosophically informed set of grounding concepts. Then it will be possible to better understand the evidence from neuroscience and to employ it in public policy.

It is important to see that this is not a one-way street. The evidence from neuroscience is also important for our philosophical understanding of persons. The fact that there are similar patterns of brain activation in addiction and other forms of psychopathology involving bizarre, inappropriate, and self-defeating action helps us to conceptualize it better. Using the phenomenology given in self-reports is notoriously unreliable as a guide to the nature of action and philosophers need to embrace the better quantifiable results from brain scans as a new way of grounding our understanding, just as they need to explore work in social psychology. Exactly how this information can be integrated into our philosophical articulations of our self-conception is not yet clear, and this is an exciting new challenge for philosophy. Ideally we would do better to reduce the gap between the disciplines of philosophy and neuroscience and work towards a synthesis of approaches. In order to achieve this, we need to be able to communicate and collaborate on the interpretation of experimental results.

TAKE HOME MESSAGE

When addressing the nature of addiction, neuroscience and philosophy need each other. Neuroscience runs the risk of undermining itself by making simplistic claims about compulsion that do not mesh with well-established results about addict's abilities to do otherwise. Philosophy runs the risk of being empirically out of touch if it has no connection with the latest scientific findings. Yet if the two disciplines collaborate in interpretation, they have the potential of being mutually enriching and thus achieving a sophisticated and helpful understanding of this perplexing phenomenon.

CONFLICT OF INTEREST

None declared.

DECLARATION:

This is my original unpublished and previously unrepresented work.

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Recent Advances in Brain Physiology and Cognitive Processing

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ABSTRACT

The discovery of participation of astrocytes as active elements in glutamatergic tripartite synapses (composed by functional units of two neurons and one astrocyte) has led to the construction of models of cognitive functioning in the human brain, focusing on associative learning, sensory integration, conscious processing and memory formation/retrieval. We have modeled human cognitive functions by means of an ensemble of functional units (tripartite synapses) connected by gap junctions that link distributed astrocytes, allowing the formation of intra and intercellular calcium waves that putatively mediate large-scale cognitive information processing. The model contains a diagram of molecular mechanisms present in tripartite synapses and contributes to explain the physiological bases of cognitive functions. It can be potentially expanded to explain emotional functions and psychiatric phenomena.

Key words: Astrocyte; Calcium Waves; Information Processing; Glutamate; Tripartite Synapse.

INTRODUCTION

Although astrocytes compose one half of brain tissue volume, until recently only passive functions were attributed to these star-shaped cells, such as giving structural, metabolic and functional support for neurons. However, a growing number of 'in vitro' and 'in vivo' results support the conception that astrocytes are also excitable cells and play important roles in information processing in the brain (Perea and Araque, 2005; Haydon and Carmignoto, 2006; Schummers et al., 2008; Wang and Bordey, 2008).

Recent research focusing on the participation of astrocytes in glutamatergic synapses has revealed a connection between four human cognitive functions: learning, perception, conscious processing and memory formation/retrieval. Associative learning and memory formation are classically illustrated at the synaptic level by means of a model composed of two (the pre- and postsynaptic) connected neurons, and their respective inter and intracellular signaling pathways. The discovery of the participation of astrocytes as active elements in synaptic transmission/computation has led to the construction of broader models, composed by functional units of two neurons and one astrocyte, the tripartite synapses (Figure 1).

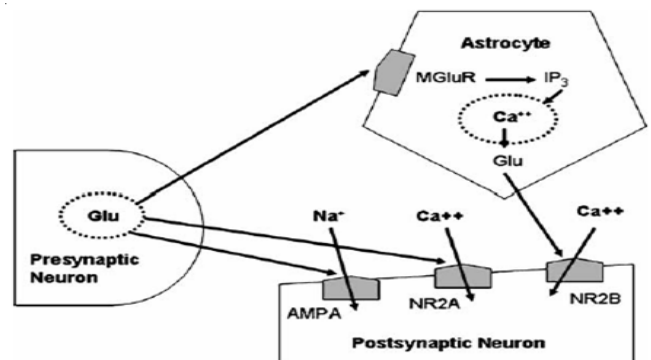


Figure 1: The glutamatergic tripartite synapse. Glutamate (Glu) released by the presynaptic neuron binds with both astroglial (MGLuR) and postsynaptic neuronal (AMPA and NR2A) receptors. MGLuR activate the inositol triphosphate (IP3) pathway, inducing the release of calcium ions from internal stores (mitochondria and endoplasmatic reticulum) to prompt Glu release. Astroglial Glu binds mostly with neuronal NMDA receptors containing the NR2B subunit (NR2B), causing calcium ion entry (slow inward currents) and then sustaining excitatory activity of the postsynaptic neuron (adapted from Pereira and Furlan, 2009).

Astrocyte terminations wrap the synaptic cleft. In some brain regions, each astrocyte can contact up to 140,000 synapses (Agluhon et al, 2008), respond to presynaptic input by means of calcium waves and release gliotransmitters that modulate neural activity. Also, neighboring astrocytes are coupled by gap junctions forming a functional syncytium (Figure 2).

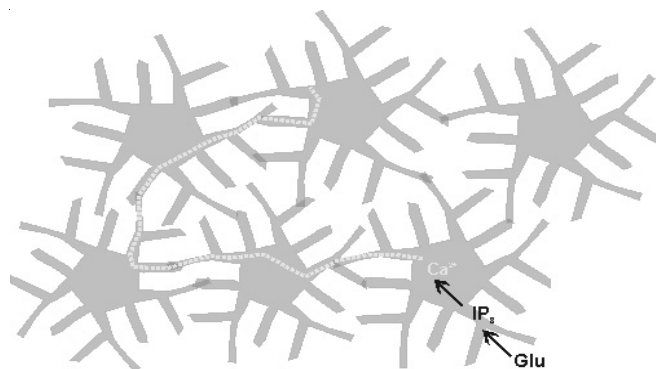


Figure 2: Calcium Waves in the Astrocytic Syncytium. The activation of calcium waves in one astrocyte, by means of the binding of neuronal Glutamate with a metabotropic receptor activating the inositol triphosphate pathway, releases calcium ions from the endoplasmatic reticulum, causing a “saltatory” movement (figure adapted from <http://synapses.mcg.edu/>).

Human cognitive functions, including conscious perception, can be modeled by an ensemble of tripartite synapses connected by the astrocytic syncytium (Pereira Jr and Furlan, 2009). This kind of model can be useful to explain the cognitive roles of both Short and Long Term Potentiation and Depression, as well as calcium waves in astrocytes. The model contains a diagram of molecular mechanisms present in tripartite synapses and contributes to explain the physiological bases of cognitive functions according to the following stages:

- a) Glutamatergic heterosynaptic converging input to a neocortical or hippocampal neuron activates AMPA receptors and the resulting depolarization opens NMDA receptors of the NR2A subtype, promoting calcium ion entry that cause membrane potentiation related to associative learning (mostly by means of a signaling cascade and gene expression that leads to an increase in AMPA-dependent response);
- b) At the same time, the glutamatergic input activates metabotropic receptors in the membrane of one single astrocyte that wraps almost all such active synapses;
- c) When such local glutamatergic converging input are synchronized, the resulting (additive) stimulation over the membrane of the astrocyte crosses a given threshold and elicits coherent, amplitude and/or frequency modulated calcium waves with the potential of integrating local information (Figure 3);

d) When global brain synchronization occurs, calcium waves integrate sensory, cognitive and affective/emotional patterns from distinct neuronal populations;

e) Glutamate released from astrocytes to post-synaptic neurons in tripartite synapses binds to extrasynaptic NMDA receptors of the NR2B subtype, which drives slow inward calcium currents, causing a delayed depolarization and an increase of CaMKII phosphorylation and AMPA excitability, a process we called “meta-potentiation” (Pereira Jr and Furlan, 2007) and reinforces Long Term Potentiation, or, alternatively, triggering a process of Long Term Depression.

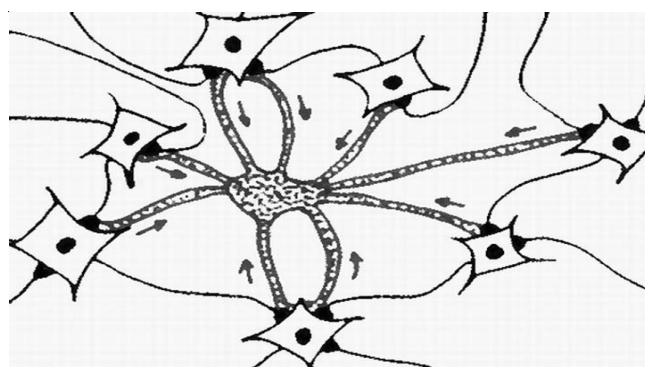


Figure 3: Induction of a calcium wave in one astrocyte, by means of coordinated excitatory input from a surrounding neuronal population. Arrows indicate concentric excitation promoted by synchronized neurons impacting the target astrocyte (adapted from Pereira Jr e Furlan, 2009).

The dynamical process that boosts neuro-astroglial communication is - according to our model - the synchronization of neuronal graded and action potentials. Synchronization of large populations of neurons, in several medium to high frequencies (from theta to gamma), increases glutamate release from neurons to astrocytes, binding with metabotropic receptors that elicit astrocytic calcium waves by means of an activation of the inositol triphosphate pathway.

According to a model developed by De Pittà et al (2008), the dynamics of these waves may encode information about external stimuli in amplitude and/or frequency modulation. Frequency modulated waves shift to amplitude modulated when the excitation reaches a threshold and the state of inositol triphosphate activity inducing calcium release reaches a fixed point. The amplitude-modulated locally generated waves cross the astrocytic syncytium and promote an integration of the information embodied in the populations of neurons connected to the astrocytes. The dynamics of calcium waves is “saltatory” according to Roth et al. (1995), producing fast integration of patterns along a population of cells.

We have made (Pereira Jr., 2007) an approximation of this model with the prospects of a large-scale Ion-Trap Quantum Computer (ITQC) proposed by Kielbinski et al. (2002), to be

combined with the proposal of a “magnetic dialogue” between neurons and astrocytes (Banaclocha, 2007). This approximation takes into account the similarity of the ITQC with the dynamics of calcium ions trapped inside astrocytic membranes previously hyperpolarized by the movement of potassium ions (Wang and Bordey, 2008) and affected by neuronal action potentials (Postnov *et al.*, 2007).

According to the “Astrocentric Hypothesis” advanced by Robertson (2002; for detailed comments on the hypothesis, please check his site: <http://artificialingenuity.com/>), conscious perception of a stimulus occurs when astrocytic calcium waves integrate neuronal distributed information patterns. In a theoretical perspective, the astrocytic syncytium can be viewed as a “Global Workspace” (according to the model presented by Baars, 1997) that integrates patterns from local neuronal assemblies to a brain-wide network (Figure 4), where it is broadcasted and made accessible to other local assemblies.

Once a conscious coherent process is formed in the brain’s astrocytic network, the resulting integrated information can feedback on brain activity, inducing effects on perceptual, cognitive, endocrine and motor systems. Such a feedback is carried from astrocytes to postsynaptic neurons by the slow inward calcium currents (driven by activation of extrasynaptic NR2B subtype NMDA receptors), causing depolarizations that impact on brain activity and behavior.

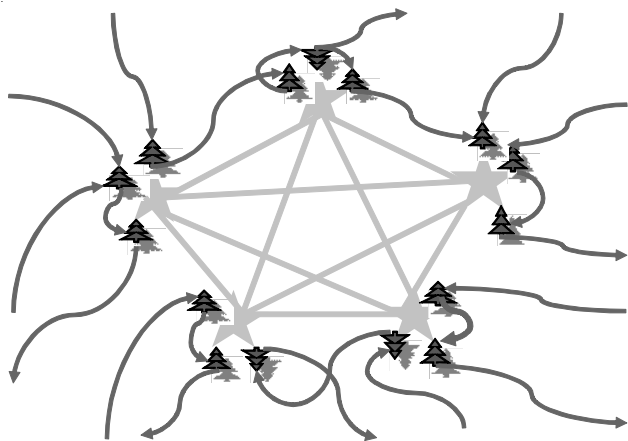


Figure 4: A Network of Astrocytes Participating in Tripartite Synapses. Blue stars represent astrocytes and red trees represent neurons. Each astrocyte participates in a tripartite synapse, being activated by the pre-synaptic neuron and contributing to sustain or reduce the activity of the post-synaptic neuron. Analogously to the process of generating a hologram, when neuronal potentials oscillations synchronize, calcium waves in astrocytes are more likely to form coherent patterns of activity.

Abnormalities in neuro-astroglial cross-talk may result in abnormal brain activity. In fact, astrocytes are involved in epileptic seizures (Silchenko and Tass, 2008; Reyes and Parpura, 2008), schizophrenia (Halassa *et al.*, 2007) and depression (McNally *et al.*, 2008), among other neurological and psychiatric phenomena (De Keyser *et al.*, 2008), most of them accompanied by changes in conscious activity. The onset and propagation of pathological states can also be related to purinergic transmission (Verkhasky *et al.*, 2009).

We further suggest that conscious processing mediated by astrocytic calcium waves has a role in the determination of which patterns are more likely to form new memories that can be retrieved later. When a cognitive pattern is reinforced by astrocytic glutamatergic output to NMDA receptors, the chance to form long-term memories and be retrievable in the future increases. Correspondingly, the chance decreases if the pattern is “vetoed” by means of membrane depression. Post-synaptic neuronal membrane potentiation or depression are thus conceived as possibilities of conscious processing having an effect on memory and behavior.

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Sickness and Healing and the Evolutionary Foundations of Mind and Minding

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ABSTRACT

Disease represents a principal tentacle of natural selection and a staple theme of evolutionary medicine. However, it is through a small portal of entry and a very long lineage that disease as sickness entered behavioral spaces and human consciousness. This has a long evolutionary history. Anyone interested in the origins of medicine and psychiatry as social institution has to start with analysis how mind and body were conceptualized and played out behaviorally following the pongid/hominin split and thereafter. The early evolution of medicine provides a template for clarifying elemental characteristics of mind and minding. Sickness and healing in chimpanzees represents an early manifestation of (ethno) medicine, termed a behavioral tradition, which is found played out in routines of helping, caring, and healing as well as other social behaviors. Chimpanzees seem to know they are sick since they resort to self-medication when exhibiting signs and symptoms of disease. And they help those exhibiting physical and cognitive disability. Among hominins awareness of consequences and implications of sickness and coping with them represented an important feature of human consciousness and major factor in the origins of vaunted human abilities involving language, cognition, and culture as we know them. A philosophical examination of the early evolution of sickness and healing provides a window into an understanding of evolving human capacities such as self awareness, awareness and implications of suffering, theory of mind, altruism, and morality.

Key words: Disease; Evolutionary medicine; Pongid/hominin split; Human consciousness

INTRODUCTION

Evolution of human mental capacities represents a recondite problem construed as speculative and beyond the reach of empirical research in behavioral sciences and the clinical sciences. Yet the evolution of cognition, language, and culture as we understand these capacities falls squarely within the perimeter of *Mens Sana* concerns which, while centered on human behavior and its problems, begs answers to larger questions including that of origins. The role that sickness and healing behaviors may have played in evolution of human mental capacities certainly falls within the purview of *Mens Sana* and further reinforces the relevance of this problem for deliberation among scientists, philosophers, and clinicians.

The topic of origins of mind and minding got started in earnest through the observations and insights of ethologists and biologists who framed the problem as involving forms of animal awareness, fixed action patterns, instinctive behavior, adaptive behavior, and the general organization of behavior

including even culture. During the last few decades of the twentieth century this area of scientific interest gained momentum, diversified, and flowered. Today some of these ideas and others they spawned represent a major area of research and scholarship in biology, anthropology, and psychology (Thorpe, 1956; Tinbergen, 1963; Griffin, 1976 and 1992; Bonner, 1980; Bekoff, 2002). Developments in contemporary social evolutionary sciences such as Human Behavioral Ecology, Evolutionary Psychology, and even Dual Inheritance Theory either owe their birthing to the earlier ethologists and naturalists or have been influenced by their perspectives on behavior.

In studies of primate cognition, in particular, questions about the nature of mind and minding and related ones involving self awareness and self consciousness are staple themes. They cover observations and experimental data involving chimpanzees (Goodall, 1986 and 1988; (de Waal, 1996 and 2005), the antecedents and properties of morality and of moral

minds (Hauser, 2006) and proceed onwards to examine the influence of language on self awareness (Bickerton, 1990 and 1995; Macphail, 1998 and 2000), and the cultural origins of human cognition (Tomasello, 1999).

The frame of reference in studies involving primate psychology and cognition (Maestripieri, 2003; de Waal, 2001) involves ideas and principles of social evolutionary sciences. The latter exemplify the thesis of evolutionary continuity (from primates to Homo sapiens) involving aspects of cognition, behavior, social organization, and culture. The topic of *origins* of human forms of mind and minding as we understand it is thus a subtext in studies of cognition in higher primates. Higher primates are held to embody and best represent the ancestral models of human cognition. Undergirding such studies is the assumption and expectation that research on relevant topics can contribute to a better understanding of the organization of the brain and cognitive capacities and behavior of Homo sapiens.

ORIENTATION AND RATIONALE

The general question being examined in this presentation involves the relationship between, disease, sickness, and medicine, on the one hand, and origins of human forms of mind and minding, on the other. The influence of disease on population genetics and physiological response patterns exemplify the fields of Evolutionary Medicine (Stearns and Koella, 2008) and Darwinian Medicine (Nesse and Williams, 1994) but here the focus is on morbid effects of disease as sickness construed as a holistic biopsychosocial entity (Engel, 1960 and 1977). The genes documenting the history and sources of disease in human populations and a focus on the inner physiological consequences of disease certainly are crucial to an evolutionary understanding of disease but it should be recalled that disease enters the social spaces of groups of organisms through a small portal as sickness and the way the latter impacts on behavior of organisms represents a problem area worthy of examination and research. Stated in general terms, analysis of the behavioral effects of disease in higher primates represents a problem area which is relevant to the question of the evolution and nature of human cognition and consciousness; and the conjunction of these topics sheds light on the cultural evolution of medicine as social institution.

The material discussed in this article centers around observations of self medication behaviors of higher apes and response of group mates to clinical manifestations of disease diagnosed by careful observation. Given the importance of disease as a factor of natural selection and the evolutionary significance of higher apes, behaviors surrounding occurrences of disease provide a stage on which one can consider basic templates of human cognition. Two assumptions exemplify and motivate discussion: 1) An adaptive

behavioral response to observable condition of disease involves mediation of complex brain/behavior or body/mind relationships and 2) healing of self and healing of a group mate (i.e., self healing and other healing) represent adaptive response patterns (conscious or non conscious; intentional or “instinctive” and innate) the function of which is to counteract an evolutionary costly condition of sickness.

What it is that higher apes do when sick to improve their health status, and what their behaviors might mean from a cognitive, cultural, and evolutionary standpoint, the focus of the presentation, provide an opportunity to examine elementary features of thinking tied to natural selection for survival and fitness. The behavior programs responsible for such biological goals and functions represent evolutionary imperatives (Fabrega, 2002). This topic necessarily broaches on the question of related forms of cognition and behavior among earlier varieties of genus Homo leading up to the advent of Homo sapiens. Sickness and healing are behavioral universals and how these are understood and carried out represent the center point of any system of medicine one may characterize as cultural (Fabrega, 1974, 1975, 1997, 2002, and 2009).

STUDYING ORIGINS OF MIND AND MINDING.

Forms of Consciousness.

The study of consciousness is broad and complicated and only a brief schema is given attention in the presentation. Damasio(1994 and 1999) points out that an animal’s awareness depends on *core consciousness*. This form of readiness to react and act (i.e., awareness and responsiveness) is correlated with and rooted in visceral somatic processes, functions, and responses centered in the midbrain and hypothalamus which correlate with recruitment of the reticular activating system with diverse correlates (e.g., heart rate, blood pressure, respiration, endocrine responses). Although not elaborated by him, one can presume that from a cognitive standpoint, so called “core consciousness” involves (an organism’s) sense of self for or about a moment in time –the what is happening now and where. Core consciousness does not encompass access to (i.e., awareness of knowledge of) conventional memory, working memory, reasoning or language. Its scope is “what is on line” at the center of the attention regulation system; with no sense or awareness of the future and a minimalist sense of the past and no sense of authorship or self.

Damasio’s more complex and elaborated form of consciousness, *extended consciousness*, involves levels and grades of awareness of self and situation, forms of knowledge that evolve over an individual’s life time. Extended consciousness attains its highest levels in humans who exhibit a sense or

understanding of self or autoeisis (Tulving, 2005), sense of community or group, and a sense of a historical time line which is based on a capacity to mentally travel into a remembered past and imagined future. *Autobiographical memory* and *autobiographical identity* are correlates of extended consciousness in humans –the self’s experience and awareness of a past and present situation. For example, in certain types of complex partial seizures individuals affected are awake and alert, seemingly attentive to surroundings, objects, and happenings, and able to respond to and behave in relation to what is taking place. However, they do not exhibit a sense of authorship or ownership of a being with sense of historical identity; that is to say, they are deprived of a sense of self as *comprehensively knowing* what it is they are witnessing and literally doing.

Additional Considerations

The problem of consciousness can be viewed in a more extended neuropsychological information handling format. It encompasses thinking, for example, perception (e.g., seeing, hearing, smelling, touching), working memory and executive functions (e.g., image formation, retrieval of memories, comparison, selection) and action (e.g., doing, holding from doing).

The neuropsychology of mind and minding is layered onto (and can be limited to) capacity of *thinking without words* which brings the topic into the arena of primate cognition, namely, forms of thinking and acting of beings without language as we understand this (Bermudez, 2003; MacPhail, 1998 and 2000). There are three domains involving experience and behavior to which the *thinking-without-words paradigm* is applicable. These are non linguistic thought of animals, human infants (i.e., pre-linguistic humans), and hominins which followed the pongid/hominid split of 5-6 million years ago. Thinking without words is an appropriate paradigm for the analysis pursued in this article: the non linguistic thinking of chimpanzees framed in terms of conditions of disease, sickness, and motivated responses (conscious or non conscious) for purposes of understanding evolution of human cognition and behavior and of medicine.

A Schema Linking Body, Mind, Minding, Disease, and Medicine

Animals exhibit awareness and consciousness of their environment. Mating and parenting, securing food resources, responses to injury and noxious toxins, overcoming challenges of predators, and appetitive behaviors favoring ingestion of nutrients that maintain health and promote fitness are examples of elemental parameters of animal life that reflect adaptive behavior and forms of minding or cognition. They represent phenomena that exemplify evolutionary imperatives; in other words, factors intrinsic to the organization and timing

of milestones involving life history theory (LFT) are the product of natural selection .

Evolutionary foundations of human cognition raise questions about the nature of consciousness and awareness; in particular, self and other awareness, past experience and learning, working memory and its retrieval of declarative and non declarative memory stores, and executive problem solving. In complex and social animals like mammals, mediation between sensation and perception through decision making and then motor response have been construed as forms of animal thinking, awareness, and culture (Griffin, 1976 and 1992; Bonner, 1980; Bekoff, 2002; De Waal, 1996 and 2005).

Elements of primate psychology bear directly on the question of adaptive behavior in context of disease. Responses to the effects of disease which contribute to improved health suggest motivation and intention are represented as preconditions if not cornerstones of medicine considered as a set of meaningful social practices designed to alleviate the costs of disease. Indeed, the origins of sickness and healing and the evolution of medicine and psychiatry as social institutions represent chapters of conditioned by higher primate behavior responses surrounding occurrences of disease the central topic of this article (Fabrega, 1997, 2002, and 2009).

Sickness and Self-Healing in Chimpanzees

Prolegomenon: Health Maintenance and the Natural Biology of Animals

Disease and sickness compromise utilization of resources necessary for maintaining life and meeting milestones of life history theory (LHT). Evolution of behaviors that promote health and prevent disease can be construed as medically relevant although they explicitly may not counteract the effects of disease. Behaviors governing adaptive use and avoidance of misuse of environmental products are to be expected in natural populations of animals (Engel, 2002). Many items consumed primarily for their nutritional value can have health promoting and medicinal properties as well. Indeed, the line separating food value or protective action and actual medicinal medical value can be difficult to draw (Johns, 1980; Fabrega, 1997).

Examined in evolutionary context, health promoting behaviors in higher primates involves linking their local (i.e., proximal) motivations and circumstances with remote or ancestral (i.e., distal) evolutionary processes as causes (Tinbergen, 1963). While general evolutionary imperatives of such ultimate causes of adaptive behaviors are understandable, what they translate into and how they actually come into play in proximal circumstances in individual organisms is not clear and contested. Behaviors responsible for avoiding disease, and the (learning) mechanisms that implement this, have been

explained as innate and “hardwired”, physiologically conditioned responses based on previous aversive experiences (e.g., conditioning of an odor, place, or taste which later produces noxious experience), observation of kin or non genetic adults, or voluntary and directed based on trial and error learning (i.e., avoidance of disease) (Garcia and Koelling, 1966; Johns, 1980; Hart, 1988 and 1990; Lozano, 1998; Revusky, 1984; Rozin et al, 2000; Engel, 2002).

Disease and Sickness in Chimpanzees: General Considerations

Infection and re-infection by nematodes and other parasites can produce acute signs of symptoms of sickness in chimpanzees. Observations in open fields of Africa have provided opportunities for primatologists to diagnose conditions of disease or sickness among chimpanzees and infer the possible significance of behaviors that correlate with it. In particular, behaviors that may represent adaptive or maladaptive responses. Recent studies of diagnosis of conditions of disease in chimpanzees are based on observations of changes in physiology (e.g., “signs” of disease such as diarrhea, vomiting, skin lesions, presence of parasites in stools, changes in the condition of the fur) and demeanor/behavior (e.g., lassitude, diminished level of activity, motor coordination or ambulation difficulties, level of interest and participation in social activities).

Some chimpanzees when they are sick select and ingest leaves which are not part of their regular diet. The ingestion involves plants and plant products which seem to be keyed to the condition of sickness which were not only suggested by observation but also corroborated by examination of material egested in stools. The ingested material includes a) chewing and swallowing plant products, the chemicals of which are harmful to infective agents; and b) by swallowing but not chewing abrasive leaves of other plants which appear in the feces of chimpanzees undigested and coated with parasites (Huffman, 1997, 2001, 2005, and 2006; Alados and Huffman, 2000). Viewed in anthropomorphic terms, it is as though higher apes embodied knowledge, genetic and/or learned, which they exhibited when sick and on the basis of which they engaged in behaviors (ordinarily not resorted to when not sick) which may have promoted health in prior sickness conditions.

Self Healing Behaviors as a Chimpanzee Behavioral Tradition

A factor that makes self healing in chimpanzees relevant for an understanding of the cultural organization and evolution of sickness/healing behaviors is that similar patterns of self healing are exhibited by many members of different groups of related chimpanzees. Self healing behaviors are found in varied populations of the same species that are geographically

and ecologically isolated from one another. However, not all self healing behavioral ensembles are the same in geographically or ecologically distinct populations of chimpanzees; for example, different plants are used. Hence, behaviors of self healing in any two populations displaying such differences are unlikely to have been transmitted from one (more or less isolated) population to another. The details of self healing behavior and type of species of plant that are selected differ across populations, sib species, and sympatric species of chimpanzees.

Researchers have identified differences in social behavior routines in separate communities of chimpanzees and describe these as *behavioral traditions* which are construed as analogs of culture (McGrew, 2004). Chimpanzees show many behavioral traditions; for example, stone handling, tool making and use, and sexual signaling. Patterns in the use of medicinal substances during sickness also differ across groups. Huffman opines that the distribution of self healing behavior across chimpanzee communities represent differences in behavioral traditions. This would make the architecture of self healing behaviors in chimpanzees part of their emergent or proto “culture” of medicine in analogy to how in *Homo sapiens* ideas and beliefs about sickness and healing constitute a unit or item of information of their medical culture or ethnomedicine.

While behavioral traditions of self healing indicate differences across populations of chimpanzees, its wide distribution and function beg a formulation of its evolutionary biology. It is possible that the self healing routine involves an innate bio-behavioral program, based on genetic and epigenetic inheritance systems, which is further sharpened through observation learning and ecologically tweaked in different ways, hence also part of a behavioral inheritance system. (Jablonka and Lamb, 2005). Self healing would then represent a behavioral routine that originated in and was transmitted across members of the species which at an earlier date formed connected populations. Subsequent ecological and geologic changes producing isolation between chimpanzee populations or sub species may have then caused via a sort of cultural drift conforming to the current pattern of separate traditions. On the other hand, self healing traditions may simply represent fully emergent learned routines in separate populations. In other words, explanation of contemporary differences in tradition of self healing may be the consequence of intrinsic developments within populations and sub species that took place either before or after ecological separation. The ontology and epistemology of sickness and healing behaviors are taken up later.

Acquisition of Self Healing Behaviors

It is not clear how adult chimpanzees come to acquire self healing behaviors from group mates in the first place. The possibilities include pure individual self learning through trial

and error and the formation of selective associations (of inherited predispositions, for example) or conditioned response patterns. Alternatively, self healing may be a product of social learning; for example, involving imitation, social facilitation, social enhancement, a resultant of emotional communication or empathy, and social reinforcement. According to Huffman it appears that infants learn about self healing through observation of their sick mothers ingesting the plants. They take a turn at tasting its bitter flavor which, however, they (i.e., the infants) do not at this time ingest. One possibility, which is discussed later, is that chimpanzees may be involved in social learning of self healing at a very early age and probably reinforced thereafter.

Acquisition of knowledge of a particular plant's medicinal value and of its relevance as a disease-counteracting routine involves several possibilities. If individual learning pure and simple is the basis for acquisition of self healing, then trial and error and resort to adventitious products of the ecology when organism is sick would commence the learning process and one presumes the conditioning reinforcement comes later if and when a particular plant product or some other routine relieves signs and symptoms of sickness (Garcia and Koelling, 1966; Garcia et al, 1974). Chimpanzees and monkeys show many behaviors that qualify as self medication (e.g., geophagy, fur rubbing) which might conform to an individual learning routine.

A social learning routine is more complex. A first step is individual's observation of a diseased sibling, most likely its mother, or non genetic adult resort to self medication via plant ingestion. A second step involves subsequent use by the observer of the plant used by the teacher or modeler in a context of its own condition of sickness. As mentioned earlier, the same form of learning may involve other varieties of self healing (e.g., geophagy, picking ectoparasites while grooming). They provide the individual with a baseline for future trial and error learning and social learning. On the other hand, Huffman suggests that acquisition of a self healing routine might be the outcome of a "one shot" selective association going from sickness to healing. The learning routines of sickness and healing are taken up in more detail in what follows.

Motivations for Self Healing Routines

General Considerations. To examine chimpanzee self healing during sickness as a test case for the study of evolution of mind and minding one can start with the assumption that the behavior in question does not represent the product of a conscious, conceptual and hence willful decision. One essentially puts aside intervening variables or constructs such as self consciousness, self regulation, mindfulness, and intentionality. Several questions can be raised when one construes self healing as per ingestion of plants or fur rubbing as an "associative ensemble" in a non human primate whose

cognitive capacity is in question. More directly: How does one explain the origin of behaviors which appear to represent an adaptive response to stimuli about an individual's own changed state of sickness? Is directed or trial and error learning about self healing the result of adventitious learning via conditioning following inspection of physical characteristics of plants found in the ecology? If this is the case, then of what does the learned information consist of? And, furthermore, how does the learned information about sickness and healing come into play so as to produce later acts of self healing?

Individual Learning. Leaving a concept like intentionality out of the picture and addressing individual trial and error learning, one is led to consider behavioral responses to sickness in a purely physiological sense, namely, as involving mechanisms of conditioned association between sickness and self healing viewed not just as behaviors but in terms of internal systems. Visceral somatic physiological sensations (or "emergent" psycho-physiological perceptions) tied to sickness (i.e., physiological correlates of signs and symptoms) represent endogenous signals launched by a sickness condition which influence brain centers controlling sensation, perception, and action. Brain processes and networks come to encode the information handling that constitutes a routine of sickness and healing. These include in addition to changes in the internal environment (i.e., the physiology underlying sickness) information about properties of plant and related ecological features, and the physiological consequences of acts of self medication. Sheer physical properties or "intuitively" recognized characteristics of sickness and of faunal elements of the habitat provide information to the sick chimpanzee (conditioned or cueing stimuli) which signal reinforcement of a response program of self medication that when activated relieves signs and symptoms following selection of a particular plant or plant leaf. A scenario or routine such as this appears to correspond to what has been described as "inherited predispositions" as formulated by Revusky (1984; see also Hart, 1988 and 1990, Lozano, 1998, Huffman, 1997, 2002, 2005, and 2006, and Fabrega, 1974, 1975, 1997).

The process of learning to self heal in the event of sickness can be likened to the obverse or reverse of the conditioning routine involving avoidance of chemicals that cause disease. In this instance, the organism while in a state of relative health avoids ingestion of a chemical that in a prior testing situation caused a condition of sickness (Garcia and Koelling, 1966; Garcia et al, 1974). This falls under the category described earlier of sickness avoidance as a motivated adaptive behavior response. The process of self healing involves motivation to counteract a condition of sickness (Revusky, 1984; Lozano, 1998; Rozin et al, 2000). While unclear, it would be surprising if a self healing routine is not reinforced socially by repeated exposure to sickness/healing behavior in others; and/or

transmitted from adult to adult in the first place (as evolutionary anthropologists are likely to suggest) which involves social learning (discussed below). Indeed, one can propose mediation of mirror neurons linking observation of another's self healing routine while sick with acquired, neurologically enculturated routines in response to sickness (Rizzolati and Craighero, 2004; Rizzolati and Sinigaglia, 2008).

Social Learning

Moving beyond the pure trial and error conditioned association pattern of learning, a non human primate's routine of self healing could represent a socially learned sequence of behavior which is non conscious. This formulation of self medication behavior in a higher primate does not negate the earlier explanation of pure individual trial and error learning based on associative predisposition ("mindless") as an explanation: rather, it builds on, elaborates upon, and is not inconsistent with the earlier formulation. However, a socially learned yet non conscious, non intentional basis for a self healing routine also raises several questions. How did the individual acquire the behavior from a group mate in the first place? How does an individual who is sick learn to use a hypothetical socially learned routine at an appropriate time (i.e., when it is sick)? What about (or how did) the teacher of this behavior signal or cue to the learner that the behavior of plant selection/ingestion (i.e., self healing) is "naturally appropriate" or "adaptive" in conditions of sickness?

These and related questions circle around the motivation for or stimuli-triggers that in relation to a social learning paradigm activate what may represent a natural, innate predisposition to avoid and counteract effects of disease in a higher primate who has not evolved self awareness, self consciousness, sense of intentionality, and awareness of changes in its state of being. It would seem that for this socially learned routine to get installed as a behavioral response pattern of a learner, a cause/effect connection has to be established between observation and perception that a putative teacher (or modeler) exhibits sickness behavior (or signals it) and resorts to the ingestion of plant material which is specially selected (i.e., not ordinarily ingested as part of routine diet preferences). As a consequence of this perception, the learner comes to ingest the same or related plant material when it itself is sick.

Knowledge that a group mate has information that is functional, adaptive, and useful in relation to sickness presupposes complexities of mind and minding not currently attributed to chimpanzees. One would presume that part of the socially learned sickness/self healing routine includes the learner's observation that ingestion by the teacher was followed by amelioration of signs and symptoms (or change in behavior) towards "normal" baseline. In this scenario, social learning could proceed in terms of factors that primatologists

construe as local enhancement, emulation and or imitation (the latter, very unlikely).

In summary, when a routine of behavior is acquired through non conscious social learning three factors get conjoined: a) a learner's perception that a group mate (most likely genetically related) is exhibiting sickness which is exemplified in a changed routine of its behavior (e.g., signaling through the signs/symptoms of sickness); b) the learner comes to learn from observing the teacher that ingestion of plant is appropriate mainly under special conditions (when sickness supervenes); and c) the learner when sick is able to somehow connect or associate its present state (of sickness) with that of (an episodic memory about) an observation involving teacher when it was sick from which the learner acquired information about plant ingestion routine in the first place (i.e., when teacher exhibited signs and symptoms of sickness).

Parenthetically, emphasis is given to parental figures or kinfolk in the modeler/teacher compared to learner roles because origins of sickness and healing routines in a social learning context brings into the picture genetic implications of aiding another individual (who functions as a recipient or benefactor) at a potential cost to the giver or provider. This consideration exemplifies the biological problem of altruism and morality (Alexander, 1987). Stated baldly, to provide adaptive information confers advantages and benefits to a recipient of an act or information about sickness and healing at a cost to the provider and the logic of this in a world dominated by evolutionary imperatives of competition and survival requires explanation. The theory of inclusive fitness stipulates exchange is likely among genetic relatives (Hamilton, 1964). Alternatively, the theory of reciprocal altruism (Trivers, 1971) stipulates that the costly giving of benefits to another is functional and adaptive providing the dynamics of exchange are part of a sequence which involves reciprocation in future circumstances of need and giving of benefits. Discussion of these issues is beyond the purview of this presentation.

Effects of Self-Healing

Discussion thus far suggests behavioral contingencies for the social learning of non willful, non deliberative actions involving a self medication routine. It presupposes an origin to the sequence. This presumably is the result of conditioning of improvement following ingestion of a plant. This would represent knowledge from mere adventitious association acquired through classical conditioning or positive reinforcement. As suggested earlier, this process is analogous to (i.e., similar in motivational and reinforcement contingencies) but the reverse of the negative reinforcement involving the evolution of bitter and acquisition of toxiphobia (see Garcia and Koelling, 1966; Garcia et al, 1974). In the case of chimpanzee, conditioning to a future state of improvement is consistent with chimpanzee's ability to cognize forwardly up

to eighteen or so hours (as reflected in ability to save tools for future use).

To go beyond the point of origins self healing as an associative predisposition pure and simple and frame the behaviors in question as a socially learned routine, one can say that a chimpanzee observes a model ingest plant material when sick and learns that the plant ingested was restorative or ameliorative (a self healing act) for the model or teacher. Once the routine is incorporated it becomes habitual as learner experiences physiological or psycho physiological improvement (i.e., reinforcement). As indicated earlier, to propose that a higher primate teacher engaged in pedagogy (towards the learner) as per the self medication routine is to ascribe to it a higher form of cognition which studies in primate cognition do not support.

Other-Healing in Chimpanzees: Responding to a Sick Group Mate

While self-healing has received concerted observation and research, providing support, care, and medical healing to a group mate (termed here other healing) has not. The latter rest on anecdotal information of primatologists and consist of observations of help provided to handicapped group mates, licking and cleaning of wounds, and general response patterns involving supportive and comforting behaviors (reviewed in Fabrega, 2002).

Several constructs not easily separated from one another are used to formulate how primates understand and react to the plight of others (Silk, 2007). These include, for example, *emotional contagion* (instinctive reaction to another's distress), *empathy* (ability to understand and respond to distress in another and perhaps appreciate distinction between other and self) and *sympathy* (feelings of actual concern for welfare of another). Social emotions such as these not only influence but are inherent in cognitive representations and actions related to sickness of a group mate and which will be termed here *other healing*.

Empirical support for other healing in natural communities of primates is not voluminous. Some observation studies of primates including chimpanzees and even monkeys have demonstrated that in some instances they respond with support of conspecifics who are victims of aggression or exhibit behaviors involving sickness, trauma, and disability. Best examples involve licking and cleaning of wounds, attempts to cover or stop bleeding, responses towards handicapped individuals of very young age, and the worried concern and protectiveness towards infants (reviewed in Fabrega, 1997, 2002 and 2006).

There is controversy about whether sickness represents a *special context* for social behaviors involving care of a group

mate who is sick and suffering. Sickness/healing behaviors may represent a token or variety of more general pro-social, altruistic behaviors (which may function as biological roots of morality –mentioned earlier) which happen to merely be exhibited in this (i.e., medically relevant) context (as compared to others with similar functional implications). The observations and analyses of DeWaal (1996) (e.g., consolation, empathy, sympathy, and conflict negotiation) and material discussed and critically examined by peer commentary in Preston and DeWaal's review article (2001) which also suggest generic indices of intentional caring (and in this sense, "healing" as comforting) behavior. With respect to sickness/healing per se, in addition to the material summarized in Fabrega (1997 and 2000), there is the report by Huffman and Seifu (1989) on females caring for infants of sick mothers who cite observations involving more directed support and concern for the mother's suffering.

However, counteracting material on higher primates which suggest *a generic empathy and sympathy* towards plight of others there is sparse information about relevant cognitions devolving from controlled experiments. Furthermore, there are no hard data that would clinch a proposition about other healing: scanty results of experiments involving interpretation of behavior that might be taken to support understanding of another's plight of sickness and providing aid and/or rewards to others in conditions of distress manufactured through experimental protocols (see Silk, 2007, for review).

In general and on theoretical grounds, sickness and both self and other healing in chimpanzees imply experience of embodiment and sharing of representational content involving cognition, visible external somatic changes, internal neuro vegetative changes, and social behavior associated with sickness. The behavioral link between self and other healing, like the connection between inner visceral responses in sickness and the perception of distress in another, could be based on a network of mirror neurons in the frontal lobe of the brain (Brothers, 1990 and 1997; Preston and DeWaal, 2001; Rizzolati and Craighero, 2004; Rizzolati and Sinigaglia, 2008). An individual's cognitive awareness of and response to internal changes in physiology stemming from sickness (giving rise to a need for self healing) along with responses triggered by observation of external manifestations of sickness observed in and/or communicated by another's plight (e.g., involving facial, vocal, or postural cues, distress signals, evidence of gastro intestinal or respiratory), are elements that can be construed to constitute the biopsychosocial wholeness and neuroscience underpinnings of sickness and self and other healing. They provide a test case for discussion of origins of mind and minding; more specifically, of higher forms of cognition in an area of social life of basic importance to survival and fitness.

In general, whether animals including higher primates exhibit and can be presumed to exemplify a capacity for empathy and especially sympathy in context of sickness or generically in contexts of altruism raise questions that have empirical and philosophical implications and about which there is much contestation. The topic is implicit in academic thought pertaining to animal awareness and comparative psychology and feeds into the question of the innateness of human experience and behavior in matters of sickness and healing, morality, and altruism (Bonner, 1980; Bradshaw and Sapolsky, 2006; Bradshaw and Schore, in press; Griffin, 1981 and 1992; Brothers, 1990; Engel, 2002; Preston and DeWaal, 2001; Zahn-Waxler, 2002). As in the case of experimental investigation of health maintenance as a biological problem in higher primates (discussed earlier) the study of responses to sickness either via self healing, victim-other communication, and other healing has not fallen within the envelope of behavioral ecology paradigms.

It is certainly contestable whether “other-healing” behaviors in animals and even higher primates represent *conscious awareness* of, concern for, and directed response to the plight of disabled group mates (like self healing might regarding awareness of sickness in self). Yet, on the other hand, Troisi and McGuire (1991) suggest that sickness can appear to function very much as a socially significant object. They report that non human primates can dissimulate a condition of sickness and/or handicap so as to tactically deceive another. Thus, they suggest awareness and meaning of sickness as a social or psychological condition per se, and this would seem to be a step beyond an intuitive heuristic or proto concept since individuals seem to feign sickness for self advantage. Put differently, “medical malingering” seems to imply awareness of what sickness means in a social context and hence a capacity for sharing a code, however elusive its meaning and scope (e.g., an ability to understand and use behavior of sickness as a symbol). This line of thought would imply that already in higher primates, and presumably in the last common ancestor of humans and higher primates (LCA) sickness related behaviors and meanings represented an emergent *culture of medicine*. On the other hand, the anecdotal report of Troisi and McGuire (1991) might represent simple individual coding, a resultant of an individual’s non conscious, conditioned association of sickness and what it (i.e., sickness) elicits behaviorally and not a truly self conscious understanding and even less an emergent socially shared system of codes (Chase, 2006) about what sickness means which motivates and emplaces sickness in a conceptual structure.

General Comment on Other Healing

The preceding line of thought can be framed in anthropomorphic terms. In association with and as a consequence of a condition of sickness in a particular social

group (e.g., a higher primate, hominin, representative of genus *Homo*, infant or adult *Homo sapiens*) the individual victim is motivated to directly heal itself. It might be its intention to communicate its plight to an audience perceived as of potential help (e.g., parental figure, sibling, group mate) for purposes of eliciting other healing. Finally, a member of the audience may intentionally provide other healing to the victim.

In a related scenario, upon perceiving that a victim is diseased, a group mate may be motivated to provide other healing regardless of whether it is communicated intentionally by a victim. This could be a consequence of (a) the group mate’s *conceptual (i.e., conscious) understanding of sickness as a changed biopsychosocially altered state* (i.e., of self or of an individual) or (b) a consequence of a *visceral somatic intuition* about sickness that another is sick and suffering (a so-called natural, intuitive heuristic—Boyer and Barrett, 2005) mediated, for example, as neurological mirror-neuron response pattern and not necessarily conscious. The group mate, as it were, has innate intuition in relation to occurrence of sickness, alternatively, has intuitively learned to match what it perceives in the victim with an episodic recall of sickness in itself. It has learned about what to do for the victim when a model who happens to be sick (Fabrega, 1997).

Sickness/healing in chimpanzees can exemplify behaviors that are non conscious/innate and conditioned compared to conscious/intentional. Either scenario suggests that in higher apes evolution has productively mined the biological information inherent in biopsychosocial conditions of sickness. It has sculpted adaptive behavior patterns in response to occurrences of sickness, thereby providing individuals of highly social species especially higher apes with a behavioral template or idiom for adaptively understanding, responding to, and communicating information regarding its fitness plight as per imperatives tied to evolutionary and Life History Theory (LHT) (Fabrega, 1975; 1997).

Summary and Conclusions

One can reasonably propose that behaviors of higher apes in context of disease bring into focus and perhaps exemplify earliest manifestation of an intentional and conceptual understanding of and response to changed, biologically undesirable biopsychosocial state of the self or person (i.e., awareness of signs and symptoms of disease). When writ large, such a formulation translates as the earliest instantiation of a cultural approach to medicine. More specifically, given their relevance as closest human ancestors, higher apes’ behaviors in context of sickness can be likened to the earliest phase of evolution of ethnomedicine, the latter involving the cultural study of ideas, beliefs, and practices about sickness and healing which enable a directed, conceptual, and practical way of coping with the evolutionary hardships of disease (Fabrega, 1975).

Chimpanzee behaviors involving self healing suggest that conditions of disease or sickness are things that an individual, if it were self conscious and could tell us about, do not want. It exemplifies the dictum that a prime feature of sickness and disease is that it gives rise to a need for corrected action at the individual and social cultural level (Fabrega, 1974). When complemented with *other healing*, which takes place when an individual provides support, care, and healing to a group mate who exhibits sickness, one completes the primitive or elemental starting point of medicine considered as meaning filled social behavior.

A group the members of which in contexts of manifest conditions of disease heal themselves and their group mates (and vice versa) exhibits an intentional, conceptual, and practical orientation towards existential (e.g., emotional, affective) and evolutionary (e.g., reproductive costs) implications of disease. These conditions can be equated with or at least as setting the starting points for an ethnomedicine, namely, the cultural patterning of sickness and healing. Stated differently, complementarity of self and other healing presupposes some knowledge, awareness, and adaptive responsiveness about the significance of sickness of disease to orderly, adaptive functioning which can be formulated as basic elements of a cultural system of medicine or ethnomedicine.

A conservative position one can take is that chimpanzees do not mentally entertain (i.e., exhibit) *concepts* of self, self healing, and especially other healing. This implies that a conceptual representation of sickness/healing was not a component of thought exhibited in the last common ancestor. Such concepts evolved later. Following the pongid/hominid divide and certainly with the advent of genus *Homo*, sickness and healing behavior and the intuitive heuristic domain which was based on it can be presumed to be relevant to and/or embed in other areas of cognition and social and political life. Emergent awareness and more conscious use of social emotions (e.g., empathy, sympathy) generally and of the implications of sickness more specifically is one scenario for early evolution of medicine.

Another consideration involves the influence of morality as a factor in social life, namely, *moral emotions and motivations*. The latter could represent a development linked to evolution language, culture and cognition as we understand it. Alternatively, the influence of morality in social relations might stem from or be part of intuitive heuristics that constitute the foundation of sociality; to have involved, for example, basic emotional understanding and behavioral dispositions that provide the glue for group formation. In this scenario, sickness and healing ensemble may be viewed as an exaptation of more fundamental psychological adaptations (Gould and Vrba, 1982; Gould, 1991; De Waal, 1996; Preston and DeWaal, 2002;

Hurford, 2007; Hauser, 2006).

CONFLICT OF INTEREST

None declared.

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Understanding Consciousness in the Context of Karl Marx's Theory of Society and Values

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Reality, infinite and elusive, has always posed a serious challenge to man. Marx's philosophy is only an effort to meet such a challenge, in and through human consciousness, whereby it seeks to unveil the meaning of life with its unlimited possibilities that exist for man. It is an attempt to encompass the whole reality in a bid to reproduce the same with the highest attainable consciousness. It is an expression of a deeper longing for man's unity with himself and with the world. It is, in fact, an embodiment of the moral ideal of the enrichment and fulfillment of humanity itself.

The problem of consciousness is undoubtedly of crucial significance in Marxist epistemology. Marxism is above all a theory of social change, and it is not possible to conceive social change without taking into consideration the nature of consciousness. Marx's moral ideal and the ultimate purpose was to rescue man from an ambiguous, fragmented individuality, liberate him from the hollowed forms of human existence and to raise him to heights worthy of the life of humanity. This he conceived possible only through the consciousness of the entire social reality, as well as the laws in accordance with which a fundamental change could be brought about in social structure.

It was Marx's aim to expound the meaning of historical events and processes in order to solve the riddle of the essential relationship between man and nature and man and society. His objective, therefore, was to enhance the self-awareness and life-awareness of man gripped as he was by the class system,¹ in order to restore the lost unity of man, with his own self, with nature and with society.

There are a number of shades and hues in Marx's description of consciousness. At one place he raises it to the level of supreme divinity. "There must be no God on level with it."² This Marx said in the context of Prometheus' defiance of Zeus. It is a rare tribute paid to human consciousness possibly because all human action is actualized through consciousness which alone gives it a practical shape. And Marx's emphasis on action is quite clear from his XI thesis on Feuerbach.

That it is men who change the world is clearly stated by Engels in his Ludwig Feuerbach³ and by Marx in his third thesis on

Feuerbach. According to Marx " ... it is men who change circumstances and that it is essential to educate the educator himself."⁴ But educating the educator clearly implies the significance of cultivating the consciousness of men for a planned, morally oriented change of social reality. Again Marx says "The coincidence of the changing of circumstances and of human activity can be conceived and rationally understood only as revolutionizing practice."⁵ The realization of this revolutionizing practice is possible again only through active human consciousness.⁶

Marx refuted the notion of abstract consciousness. There is no objectively independent existence of consciousness in the sense of an Hegelian Absolute.⁷ For him, only the particularity of thought and of consciousness is an essential feature of reality. He says in this context "Thought, for example is the thought of a particular definite individual; it remains his definite thought, determined by his individuality and the conditions in which he lives."⁸ He explains it as a factor in the total life of the individual having as much of universal character as any other manifestation of his life.⁹

That consciousness and more prominently self-consciousness is the most essential, characteristic of being human occurs as a refrain in Marx's philosophy. Man by nature is a free conscious being "and free, conscious activity is man's species character."¹⁰ His life activity itself is the "object of his will and of his consciousness."¹¹ Marx deduces the consciousness and conscious life activity of man from his species character. This is what makes man a free human being but his freedom is lost when the estranged labour makes his conscious essential being and the life activity as a mere means to his existence. Man's consciousness is proved in his creation of an objective world through his practical activity. And as a *specie being*, he has "to confirm and manifest himself as such both in his being and in his knowing"¹² Therefore consciousness as a faculty of 'knowing' is the cardinal principle of man's reality. It is the mode of man's existence, manifestation and confirmation in and through which he lives. It is precisely this that directly distinguishes him from animal.

It is through this consciousness that man becomes "a universal and free being"¹³ which Marx takes as the point of departure for his total system of reality and thought.¹⁴ Proclaiming the ultimate authenticity of man and his existence. Marx condemns the prevailing social order which causes human bondage and impoverishment. By rejecting the passivity of consciousness and founding it in human sensuous practical critical activity, he lays the foundations for a moral recovery of man from utter degradation. Thus, he forges the conscious recognition of the historical necessity for a fundamental revolution – a precondition for the ultimate liberation of mankind.

How does consciousness evolve? Consciousness, Marx explains, starts with the awareness of the immediate surroundings and of nature, in general.¹⁵ This stage of consciousness he calls as the "animal consciousness" because in it nature appears to man as an all-powerful, unassailable and completely alien force. This was also the stage of natural religion when nature was deified into an all powerful god by the restricted consciousness of man.

Then arose the necessity for the historical transformation of nature for maintaining the very existence of human race. Here man grew conscious of the necessity of associating with other men. This was the true beginning of man's social consciousness. But at this elementary level it was only a "herd consciousness,"¹⁶ which bound them together almost instinctively. The horizons of this stage widened through the increase of productivity which in turn gave rise to the division of labour assuming a definite form in material and manual labour.¹⁷ Finally, industry emerged in its true anthropological and humanized character as the true historical relation between man and nature, conceived by Marx as the exoteric revelation of the essential human faculties.¹⁸

The immediate effect of this relationship is accentuation on dehumanization, but it prepares the way ultimately for emancipation of humanity. This transformation of nature could only occur through a highly developed consciousness, through an equally developed stage of work, i.e. labour and tools which rendered it possible to create objects not found otherwise in nature. The clearly recognized purpose was a late arrival in human consciousness which gave a specific shape and character to the whole process of production, of humanization of nature itself.¹⁹

Action determined by purpose was the birth of human mind, of consciousness-the prime creation of man himself.²⁰ It took a long time for man to rise above nature and confront it as a creator. But this consciousness of man came into being through his social existence "He exists in reality as the representation and the real mind of social existence, and as the sum of human manifestation of life"²¹

Marx says in this context:

*"The entire movement of history is, therefore, both its actual act of genesis... and also for its thinking consciousness the comprehended and known process of its coming-to-be,"*²²

It is therefore from the very beginning a 'social product' and remains so as long as men exist at all.²³ Language as practical consciousness is a social product as it originated from the necessity of social intercourse.²⁴

But what is social existence itself? It is an expression of creative, social and productive specie character of man and is intimately linked with the mode of material production corresponding to the level attained in each historical epoch. It is a nature imposed necessity which must be fulfilled if the human race is to survive at all. Marx explains the whole process of history from the basic given fact of human existence. For, he says: "The first premise of all human history is, of course, the existence of living human individuals"²⁵-who are not mere abstractions but real conscious individuals engaged in practical social activity living under certain material conditions and simultaneously creating new conditions."

Relating consciousness to the conditions of man's material existence, Marx explains the phantoms formed in human brain as necessary sublimates of material life and as direct efflux of their material behaviour.²⁶ This consciousness changes with every change in the conditions of man's material existence, in his social relations and in his social life.²⁷ The intellectual production changes its character in proportion to change in material production. Marx says in this context:

"The ideas of the ruling classes are in every epoch the ruling ideas, i.e. the class, which is the ruling material force of society, is at the same time its ruling intellectual force."²⁸ (Italics in original).

In other words, he seeks to make it plain that consciousness in a class society is primarily class consciousness. The ideas of ruling class are consequently replaced by the revolutionary ideas with the emergence of a revolutionary class.

Marx postulates the notion of 'false consciousness' in respect of class ideologies.²⁹ It is unconscious rationalization in universal terms, of narrow selfish interest into forms of religion and systems of morality in accordance with the interest of the dominant class. Hence morality, religion and all the rest of ideology with corresponding forms of consciousness can be conceived only in the context of men developing material production and changing their consciousness with their change in the mode of existence and life process.³⁰

The social structure and state are continually evolving out of the life process of definite individuals who are productively active and enter into social and political relations. The social

consciousness becomes immanent in these relations. But this comes into contradiction with the existing social relations which in turn come into contradiction with existing forces of production.³¹

Marx's whole argument points in one direction: that consciousness always corresponds to definite stages of social existence. Man's consciousness changes with every change in his material existence, social relations and social life.³²

Strictly speaking Marx gives ontological priority to the reality of "being" over "consciousness" in his treatment of the relationship between thinking and being. According to him consciousness is determined by life. In his Preface to the *Critique of Political Economy* he says:

"The mode of production of material life conditions the social, political and intellectual life processes in general. It is not the consciousness of men that determines their being but on the contrary, their social being that determines their consciousness."³³

This is the wedge which has divided interpreters of Marxist epistemology into two divergent and mutually exclusive view points.³⁴ But it appears that there is really no contradiction involved in the two view-points, namely that all change is possible through human action and human action itself is actualized through consciousness; and that consciousness is of derivative importance insofar as it is determined by the life and the being external to itself.

Marx here only wanted to emphasize the objective character of consciousness from the point of view of reality to which it must correspond. He only wanted to eliminate the abstract, purely subjective, speculative and ideological elements from the realm of our consciousness of the social reality. He wanted the reality to be represented as it actually existed. He held the correspondence theory of truth as the basis of his epistemological position.³⁵ True consciousness is that which reflects the true reality. Such a consciousness alone could be a genuine spring of human action and motivation.

Consciousness is very essential but there are other forces at work, too such as the forces of history. This has been amply made clear by Engels when he admits that both the factors are of equal significance, neither has the absolute validity or existence insofar as the history of mankind is concerned. As he says:

"Everything which sets men in motion must go through their minds; but what form it will take in the mind will depend very much upon the circumstances."³⁶

Hence a correct perspectives of circumstances as reflected in consciousness is a necessary prerequisite.

"In the history of society the process of history works towards a certain ideal set in advance. The actors are all endowed with consciousness, are men acting with deliberations passion, towards definite goals. Nothing happens without a conscious purpose and without an intended aim"³⁷

Thus consciousness helps man to uncover the new social relationships with the specific purpose of recreating a unity, so that the feeling of collectivity flows even from the exclusive subjectivity of man, so that individual life is not lost in the vastness of human reality. As such individual no more stands in isolation from society but in fact merges with its concrete reality and becomes one with it.

In the vision of Karl Marx the whole march of history was a gradual evolution from the conventional moral consciousness, to higher dynamic moral consciousness, a dynamic aspiration of the soul of each for the love of all humanity.³⁸ Marx conceives the true function of consciousness to raise man from the fragmented, dehumanized state into that of a whole integrated being, not only to enlighten and stimulate action, but to change the whole social reality. To move towards true humanism—in the direction of deification of man and as such towards a true religion of man.

1. cf. Ernest Fischer, *The Necessity of Art: A Marxist Approach* (Penguin, 1963) pp.3848
2. Marx Foreword to Thesis: The Difference between the Natural Philosophy of Democritus and the Natural Philosophy of Epicurus, IN Marx-Engels, *On Religion*, (Moscow: foreign Lang 1955) p.15
3. Engels, *Ludwig Feuerbach*, (Moscow: Foreign Lang 1950) p.72 4. Marx, Third theses, IN *German Ideology*,(Moscow: Progress 1964) p.652
5. *ibid*.p.652.
6. cf. Adam Schaff, "Studies of Young Marx", IN Leopold Labedz ed., *Revisionism: Essays on the History of Marxist Ideas* (London: George Allen & Unwa 1962) p.193.
7. Marx, *Ec. Phil. MSS of 1844* (Moscow: Foreign Lang 1961) pp. 147-60
8. Marx-Engels, *German Ideology*, p.285
9. *ibid*
10. Marx, *Ec. Phil. MSS*, p.75
11. *ibid*, p.75
12. *ibid*, p.158
13. *ibid*. p. 74
14. *ibid*. p.103
15. Marx says in this context: "It is mere herd-consciousness, and man is only distinguished from sheep at this point, by the fact that for him consciousness takes the place of instinct, or that his instinct is a conscious one." See, Maurice Cornforth, *The Theory of Knowledge*, (Calcutta, 1965) p. 78.
16. Marx-Engles *German Ideology*, p.42
17. *Theory of Knowledge*, p.78
18. Marx, *Ec. Phil. MSS*. P.110
19. cf Ernest Fischer, *The Necessity of Art*, p.22.
20. Ernest Fischer, *op. cit.*, p.17
21. Marx. *Ec. Phil. MSS*. P.105
22. *ibid*, p.102
23. cf. Marx-Engels *German Ideology* p.42
24. *ibid*.
25. *ibid*.p.31
26. Marx-Engels, *German Ideology*, p.37
27. Marx-Engels, *Manifesto of the Communist Party*, (Moscow: Foreign Lang 1965) p.85
28. Marx-Engels, *German Ideology*, p.60, See also (a) T.B. Bottomore and Mamixillian Rubel, *Karl Marx* (Pelican, 1963), p. 93 (b) David Essential Writings of Karol Marx (London: Panthen, 1967) p.95
29. cf. Maurice Cornforth, *The Theory of Knowledge*, op. 120

30. Marx-Engels, *German Ideology*, p.37, See also Plekhanov, *Fundamental Problems of Marxism* (Moscow: Foreign Lang., n.d.), p.59.
31. Marx-Engels, *German Ideology*, p.43.
32. cf. Marx-Engels, *Manifesto of the Communist Party*, pp. 57, 67.
33. Marx Contribution to the Critique of Political Economy p.11 Preface to the Critique of Political Economy IN Marx-Engels, *Selected Works*, I (Moscow: Foreign Lang, 1962), p. 363.
34. cf. The Controversy between Leszek Kolakowski, "Karl Marx and the Classical definition of truth" and Adam Schaff, "Studies of the Young Marx" IN Leopold Lebedz, ed., *Revisionism*, pp. 179-87 and 188.
35. Barorows Duwham, "On teaching Markist Epistemology" *Philosophy of Science*, 29, 4 (Oct., 1962) p.366
36. Engels, *Ludwig Feuerbach*, p.75
37. *ibid*, p.71 p. 179
38. Dharmendra Goel, *Philosophy of History* (Delhi: Starling 1967) p. 179

Neural Basis of Decision-Making and Assessment: Issues on Testability and Philosophical Relevance

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ABSTRACT

Decision-Making is an intricate subject in neuroscience. It is often argued that laboratorial research is not capable of dealing with the necessary complexity to study the issue. Whereas philosophers in general neglect the physiological features that constitute the main aspects of thought and behaviour, I advocate that cutting-edge neuroscientific experiments can offer us a framework to explain human behaviour in its relationship with will, self-control, inhibition, emotion and reasoning. It is my contention that self-control mechanisms can modulate more basic stimuli.

Assuming the aforementioned standpoints, I show the physiological mechanisms underlying social assessment and decision-making. I also establish a difference between veridical and adaptive decision-making useful to create experimental designs that can better mimic the complexity of our day-by-day decisions in more ecologically relevant laboratorial research.

Moreover, I analyse some experiments in order to develop an epistemological reflection about the necessary neural mechanisms to social assessment and decision-making.

Keywords: Decision-Making; Inhibition; Self-Control; Social Assessment;

INTRODUCTION:

The discussion around the idea of decision-making will be oriented by the thesis that different levels of information processing in our brains interact. The more semantically loaded and interpreted character of frontal lobes' information processing constitute my epistemic credentials to sustain that sheer determinism applied to living creatures, especially human beings is so nonsensical as the metaphysical freedom of the will. I present empirical evidence of how higher-cognitive functions could control more basic stimuli and interpret that as the underlying necessary conditions to decision-making.

Social Assessment:

Cunningham et al. (2004) promoted a study of the neural components of automatic and controlled social evaluation. The design of the experiment was basically the following: Black and White faces were shown to White participants while they

were scanned in firm. A extremely positive feature of this experiment: participants are not told to be taking part in social evaluation experiment. All they knew is that they have to judge whether the image appeared on the left or right side of a fixation cross. Thus, no previously formed intention was generated by training or external cueing.

When the faces were presented in subliminal mode (30 ms), activation in the amygdala was greater for Black than for White faces. Considering that the amygdala is a brain region associated with emotion that would be a representation of automatic fear or alertness. When the faces were presented in supraliminal mode (525 ms), this difference has being particularly diminished. Accordingly, frontal cortex areas associated with control and regulation has shown greater activation for Black than White faces.

Frontal activity generated a reduction in Black-White differences in amygdala activity from the 30 ms to the 525 ms

condition. Beyond the above-cited correlation, Cunningham *et al.* showed, as well, that a direct comparison of amygdala activation for Black and White faces in the 30 ms and in the 525 ms conditions suggest an interaction between the amygdala and the frontal cortex. They show that the Black-White difference in activation observed in the 30 ms condition was considerably reduced in the 525 ms condition, when automatic attitudes were supposedly controlled by more semantic loaded processing, $F(1, 12)=5.25$, $p<.05$. As the authors state: "These results provide evidence for neural distinctions between automatic and more controlled processing of social groups, and suggest that controlled processes may modulate automatic evaluation" (Cunningham *et al.* 2004). The activity of certain areas of frontal cortex were increased for Black faces relative to White faces in the 525-ms condition (PFC; Brodmann's Area, BA, 47), $t(12)=4.04$, $p<.005$; right dorsolateral PFC (BA 9), $t(12)=4.88$, $p<.001$; and anterior cingulate (BA 32), $t(12)=5.82$, $p<.001$. The authors used the strategy of subtracting the magnitude of the Black-White difference in amygdala activation in the 525 ms condition from the corresponding difference in the 30 ms condition to generate an index of amygdala modulation by contrasting the results in both temporal conditions. The increasing frontal activity was proportional to the decreasing of amygdala activation.

My interest in this experiment is directly related to its approach to different levels of information processing stressing the more automatic character of lower-levels in comparison to the more controlled aspect of higher cognitive functions. The participants could not control the reactions when those perceptions were not consciously attended. But when they consciously attended, they could inhibit some of the potential improper behaviours. That is self-control.

Adaptive Vs Veridical Decision-Making

In 1999, Goldberg and Podell wrote a paper called "Adaptive versus Veridical Decision Making and the Frontal Lobes". Veridical decision-making presupposes the idea that of one of the answers is the only correct. The great majority of our choice is adaptive and doesn't have a unique transpersonal correct answer. Adaptive decision-making, is particularly dependent on the prefrontal lobes, differently from veridical decision-making. The ecological relevance of experiments dealing with adaptive decision-making is superior than of those dealing with veridical decision-making:

(...) the prefrontal cortex is central to the mechanisms of consciousness, owing to its unique role as the point of convergence of neural inputs from the organism's external and internal milieus. The integration of inputs informing the organism about these two milieus is at the heart of adaptive behaviour and intentionality. The organism's "best" response cannot be inferred from the properties of the external situation alone, since the choice of such a response depends on the

organism's needs and on how these needs are represented in the "working theater" of consciousness. (Goldberg and Podell, 1999)

That is why the author severely criticised the standard frontal-lobe's tasks as Wisconsin Card Sorting Test and Stroop Test. Thus, they designed CBT (Cognitive Bias Task) to promote a study that could take in consideration preferences of the people under study. The authors showed that patients with prefrontal lesions were more sensitive to the difficulties of CBT than to those present in the control experiment based on veridical decision-making. Comparing what is stated by the authors with my account of causal relevance of the mind, we find that bottom-up stimuli could start the information processing that is, by its turn, monitored by topdown control.

Your Favourite Food Or Today's Special?

Arana *et al.* (2003) designed a very interesting experiment, one of the most ecologically relevant I have ever seen. The experiment focuses on appetitive incentive and decision-making between menus. The "restaurant task" is a highly adaptive paradigm. It could mimic very closely at least part of our assignment of values and the difficulty of choice in our day-by-day contexts. Differently from the great majority of the experiments trying to test decision-making, the one in discussion here really copes with competing possibilities of choice.

As food preference is extremely shaped by personal taste, the menus were especially tailored to each participant. Thus, the participants go under a questionnaire to establish their food preferences before the experiment. This measure allowed tailoring competing menus that could be rated in terms of incentive value.

The general conclusion in terms of functional areas involved shows that amygdala is especially related to process the incentive value and orbitofrontal cortex is particularly activated when participants have to decide each of the possible menus they would prefer to order.

The subjects took part in 12 PET scans, in half of them high-incentive menus were presented and in the other half, low-incentive menus. Low incentive menus were defined as food that the subject would gladly eat but not as one of his/her favourites. In the half of both low and high-incentive values subjects were requested to make a choice.

The amygdala activation was directly proportional to participants' assignments of values. As in the current experiment people under study are satiated, we can infer that amygdala were strictly correlated with hedonic attribution of values. The medial orbitofrontal cortex is probably active even when a decision is not requires because when we are faced with two competing stimuli you are already assigning values to those items.

As decision-making is our main subject, let me focus specifically on the OFC activity during choice of competing stimuli:

(...) a region of right lateral orbitofrontal cortex showed significantly increased activity specifically on trials involving choices between high-incentive menus. Subjects' ratings of the menus demonstrated that choices between high incentive foods were more difficult to make than those between low-incentive foods; thus, when choosing between these foods subjects may have had to suppress responses to the other desirable items to select their most preferred item. (Arana et al. 2003)

This is a very good hypothesis of how complex decision-making between high-incentive values is done. The election of one of the possibilities is given by the suppression of others. When we have two or more stimuli that offer very good reward prospects but we are supposed to select only one, we have to suppress the other(s) to pick up the most promising one.

Economic value is a central issue in decision-making and it is not considered here. That would imply that for the simplest case of our day-by-day menu choices three different variables would be present: physiologically values, hedonic values and rational economic choice values. And to study those variables in a sufficient way we would have to establish the possible interactions of those systems taking in consideration weights of the importance of each of them in different situations and in dissociable and comparable conditions. We never had an experiment that studied all those variables in separable and comparable ways.

CONCLUSION:

Living beings are self-regulated. Even an amoeba in a Petri's plate, if you light up a flame in one of the plate sides, would escape to the other one. Thus, we are not stones that would explode or melt under the flame. Thus, fatalism is not the case. Even though, we are not free in the sense of metaphysics Attention and topdown control increase our possibility to decide among available and viable options. It is the capability to control more basically stimuli and inhibit the undesired part of them that constitute our power of choice.

TAKE HOME MESSAGE:

Decision-making and assessment depends on inhibition of concurrent stimuli in favour of a given one. Inhibition is the physiological basis of self-control, as once was asserted by

William James. Reasoning, as a higher-level type of information processing, can modulate more basic stimuli inhibiting concurrent stimuli in favour of a given one.

CONFLICT OF INTEREST:

None declared.

DECLARATION:

This is my original unpublished contribution, not under consideration for publication elsewhere.

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Questions That This Paper Raises:

- 1) Which are the laboratorial limits for testability in decision-making experiments?
- 2) Could we ever test decision-making perfectly mimicking the costs and values of our day-by-day real contexts?
- 3) Is Inhibition the only strategy to choice?
- 4) Is top-down control always involved in decision-making?
- 5) Do we have free will?
- 6) To what extent we have room for choice, if any?

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The Concept of Thinking: A Reappraisal of Ryle's Work

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ABSTRACT

In *The Concept of Mind*, Ryle's official position seems to be that mental acts cannot be intrinsically private. In *The Concept of Mind* as well as his later work on thinking, Ryle views thinking as an activity that terminates in a thought, which is a state of being prepared for a performance. Thinking is characterized by what Ryle calls intention-parasitism; for it is, insofar as its underlying motive is concerned, parasitic on the final performance which will take place later. Ryle shows that acts of thinking, owing to their intention-parasitism, can be described in a tactical idiom, with reference to the final performance for which it was intended. However, this framework of intention-parasitism is not adequate to describe all instances of thinking in all their aspects, which therefore remain inextricably private. The task of this paper is to accommodate such privacy within the theoretical framework suggested in *The Concept of Mind*.

Keywords: Thinking; Thought; Intention-parasitism; Narrative; Privacy

INTRODUCTION

In this paper, I argue that Gilbert Ryle's attack on 'privacy' of mental acts in *The Concept of Mind* (henceforth *CM*) has been grossly misconstrued. The misconstrual consists in identifying Ryle's concept of mind as a 'psychological' one, which interprets *all* mental concepts exhaustively in terms of observable behaviour or behavioural dispositions.¹ Thus, no mental concept stands for anything that is essentially private. Here, by examining Ryle's insights on the concept of 'thinking' in *CM* as well as his later work, I shall show that Ryle's interpretation of mental concepts is not 'psychological' in this sense.

THINKING OF THOUGHTS

Let us begin with the general distinction drawn in *CM*, between *task verbs* and *achievement verbs*. A task verb denotes an occurrence: an action, an exertion or a performance. An achievement verb refers not to an occurrence, but to the result of a task performance.² Due to the logical independence of task verbs and achievement verbs, a task verb can be used to describe actions and performances, without presupposing any

corresponding achievement verbs, and vice-versa. Ryle believes that many verbs used to describe the intellectual lives of human beings are actually achievement verbs without any corresponding task verbs. Now we ask: is 'think' also an achievement verb without any corresponding task verb?

The verb 'think' does behave like an achievement verb: especially when, used with a 'that' clause, it expresses a thought.³ A thought, we must notice, is not something that goes on within the thinker: it is portrayed as a static object with which the thinker enters into a relation of ownership or possession. If I say that Mozart 'thought' of a new composition on a certain occasion, I will be saying that Mozart was then *prepared* to express that new composition in some way, e.g. by playing it or noting it down. A thought, therefore, is a *state of being prepared for a final performance*; through which the thought is manifested and from which it derives its content.⁴ If Mozart were not prepared to *perform* his composition, I could rightfully doubt whether he had such thoughts at all and also whether his thoughts, if there were any, were *about* the composition.

Now, if *having a thought* is an achievement, is it preceded by a task performance? For example, under an information-processing model of thinking, thinking is nothing over and above a sequence of configurations of the brain *or* the states of a computational mind arising from those configurations. Here, thinking, as a *process* that consists solely of achievements, is not a distinct task performance. Ryle (1978, p286)

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dismissively compares this interpretation of thinking to "describing a journey as constituted by arrivals, searching as constituted by findings, studying as constituted by examination triumphs, or, in a word, trying as constituted by successes."

Ryle (1971, p470) says that thoughts are what the *act of thinking* "incorporates or terminates in, if it prospers."⁵ If a thought is really a state of preparedness, then *thinking of thoughts*, as the act that underlies it, must be a preparation of some sort. In the first place, we must realize that 'thinking' denotes several disparate activities. It is not a homogeneous activity, distinct from all other observable activities, which we perform when we are reflecting, meditating or pondering on some topic. Secondly, thinking cannot be reduced to these concrete activities themselves; it forms a *programme* of which these activities are parts. Thus, a 'thick' description of thinking must portray it as an act of *labouring toward a particular goal*. It must emphasize the very manner in which thinking is conducted: the tentativeness, the caution, the experimental temper, the spirit of rehearsal inherent in the concrete activities that constitute thinking. The *preparedness*, which embodies the possession of thoughts and which is manifested when thoughts are articulated or applied, is absent from the concrete activities that constitute thinking. On the contrary, one performs those activities, with *an intention to prepare oneself* for a final performance. Thus, acts of thinking are *-parasitic* on a final performance. This is what Ryle (1971, pp478-479) calls *intention-parasitism* of thinking.

NARRATIVES OF THINKING

How do we produce narratives of thinking? According to Ryle (1951, p74ff), when asked for such a narrative, we *assume* that our pensive labours have been parasitic on a final performance. This assumption of intention-parasitism makes significant reconstruction of thinking possible, facilitating the description of content which forms the "tenor of thinking" (Ryle 1971, p404) and which alone tells us how thinking culminated in a final achievement. Hence, the thinker must reevaluate the success/failure tests he previously undertook in the light of the achieved results. He must reconstruct his thinking within a 'bottom-up' model of intention-parasitism: he focuses his description on the results of the sub-ponderings, which cumulatively led to the ultimate result of pondering. Now, it is only this reevaluation—which is nothing more than a *tactical history* of thinking—that the thinker presents when he is asked to produce an account of his thinking, because intention-parasitism is the only retrospectible feature of thinking which preserves its content and significance. If, instead of a *tactical history* of thinking, we present only a *chronicle* of images, sounds and other expressions that occurred to us while thinking, we fail to capture those characteristics of thinking which are rooted in its essential intention-parasitism.

However, even a tactical history of thinking reconstructs thinking from its available results and, therefore, cannot record the acts of thinking itself.⁶ Since we cannot retrospectively monitor our acts of thinking, our account of thinking remains inaccurate. At least some aspects of thinking always remain private.

Yet, it must be borne in mind that Ryle believes that it is through intention-parasitism that we can somewhat grasp what the labours of a thinker were like. It seems important to distinguish Ryle's position from that of Dennett (1998, p212-213) who interprets every "introspective" venture as an attempt to build a story about oneself, which, as a product of cultural conditioning, cannot capture the actual nature of cognitive processes. On the contrary, Ryle believes that narratives of thinking, conditioned by the assumption of intention-parasitism, capture the *actual* content of thinking.⁷ In this respect, thinking always remains describable, howsoever inaccurately, and is never completely private.

However, thinking cannot be described within this framework of intention-parasitism, in cases of *non-achieving thinking*, where acts of thinking do not quite terminate in thoughts. For example, "...a poet, essayist or philosopher may be trying hard to find the word, phrase or argument that he needs, but the time when he is thinking what to say is the time when he still has nothing to say." (Ryle 1951, p69) We cannot decide how to portray such acts of thinking as parasitic on some actual goal, thereby failing to produce a meaningful narrative of thinking in such cases. For Ryle (1978, p269), an accurate account of thinking would be possible in such cases only if thinking consisted of "recordable operations actually executable by particular people at particular stages of their ponderings". The impossibility of such an account in these instances shows that acts of thinking are generally indescribable *just as they happen*, outside the framework of intention-parasitism. We can only try to compensate indescribability by constructing narratives around results of thinking rather than thinking itself.

To my mind, this has something to do with what Ryle (1971, p474) calls the *circumstance-detachment* of thinking. For example, though one may think out a solution to a mathematical problem with pen and paper, the act of thinking does not strictly depend on pen and paper. But a first-order activity like writing a solution of a problem depends on external circumstances. This circumstance-dependence makes, in turn, a genealogical reconstruction of first-order activities possible. In case of thinking, we have only the products of the act after the act is over, simply because thinking may not be conditioned by external circumstances at all. Therefore, thinking cannot be described *just as it happens, just as it arises from its conditions*. Under this aspect, it remains private.

Concluding Remarks

This, however, does not mean that the conception of thinking, as an activity conditioned just by a thinker's efforts, is a useful fiction. For Ryle, the word 'think' does refer to circumstance-independent activities, which, though accessible to the thinker, are indescribable afterwards. This conception of thinking, which originates in *CM* itself, stands in clear opposition with the 'psychological' interpretation of mental concepts ordinarily ascribed to Ryle; for it does not explain thinking in terms of observable behaviour or behavioural dispositions. This is because it understands thinking as an autonomous, circumstance-independent sequence of activities and places it outside the framework of intention-parasitism. Thus, it severs the ties of thinking with the describable world and emphasizes its privacy.

TAKE HOME MESSAGE

In sum, we must not exaggerate Ryle's attack on privacy of mental acts, given that it deals with only one aspect of mental acts. Therefore, ordinary 'psychological' interpretation of Ryle's work, which adopts that polemic as one of its central premises, cannot be accepted entirely.

CONFLICT OF INTEREST

None declared.

DECLARATION

This article is original and has not previously been published or submitted for publication elsewhere.

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Questions That This Paper Raises

1. Does the verb 'think', for Ryle, refer to activities over and above thoughts themselves?
2. What, according to Ryle, is the relation between thoughts and the thinking of thoughts?
3. How, according to Ryle, can a narrative of thinking be prepared?
4. Is there any instance of thinking which is completely indescribable?
5. How can such indescribability be reconciled with the attack on privacy that Ryle launches in *The Concept of Mind*?

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Freudian Theory and Consciousness: A Conceptual Analysis

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ABSTRACT

This article reviews studies on the neural correlates of dissociative processes and their contributions to the understanding of consciousness. Various studies using latest neuro-imaging modalities like positron emission tomography, magnetic resonance imaging and functional magnetic imaging resonance are synthesized along with key cortical structures like the medial prefrontal cortex, anterior cingulate cortex, somatosensory cortex and insula. The role of the thalamus and cerebellum in dissociation and consciousness are examined. Distinctive neural correlates of primary and secondary dissociative experiences are examined in the light of psychiatric problems like post traumatic stress disorder. Disconnection of various neural pathways linking self awareness with body state perception occurring as a result of childhood trauma and its implications on dissociative states and consciousness are examined. We also examine a self that is divided, multiplied or perforated by trauma and a self that dissociates turning attention away from external threat and trauma.

Key Words: Dissociative Disorders; Consciousness; Post traumatic stress disorder

INTRODUCTION

“ If often he was wrong and, at times absurd, to us he is no more a person now but a whole climate of opinion under whom we conduct our different lives...”

(W.H. Auden, In Memory of Sigmund Freud)

Despite distorted understandings of Freudian views and despite periodic waves of Freud bashing, Auden’s assessment remains essentially correct. Freudian influence continues to be enormous and pervasive. He gave us a new and powerful way to think about and investigate human thought, action and interaction. He often made sense of the ranges that were neglected or misunderstood. While one might wish to reject or argue with some Freudian interpretations and theories, his writings and insights are too compelling to simply turn away. There is still much to be learned from Freud (Neu, 1991).

There is still much to be learned from Freud in relation to issues in contemporary philosophy of mind, moral and social theory. The special characteristics of unconscious states including their relations to states described by modern psychology and the relevance of the Freudian unconscious to

questions concerning the divided or multiple self is equally important. This paper looks at the connection between Freudian theory and his concepts to the modern day conceptualization of consciousness.

IS THE FREUDIAN UNCONSCIOUS RELEVANT IN THE LIGHT OF MODERN DAY CONSCIOUSNESS

Psychoanalysis regarded everything mental being in the first place unconscious and thus the further quality of consciousness might also be present or again it might be absent. This of course provoked a denial from philosophers for whom consciousness and mental were identical and they could never conceive of an absurdity such as an unconscious mental state. Reasons for believing in the existence of the unconscious are of course empirical but the question as to what most fundamentally distinguishes the Freudian unconscious is a conceptual one. It is very important that one understands the nature of the unconscious in broad holistic terms rather than the fine details that Freud gave and also one must follow the coherence of such a concept to understand our present day understanding of consciousness (Freud, 1912; Ricoeur, 1970).

The qualified spatialization of consciousness that can be located in ordinary thought about the mind provides a source of motivation that is free from conceptual confusion. The analysis of what it is to be in consciousness has a further

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importance for the concept of unconscious mentality. If one assumes that all mental states are conscious alone, we will take a highly skeptical stand on Freudian theory and the topographical model of the mind proposed by him (Laplanche and Pontalis, 1983). For example mental states like beliefs and values do not exist solely by the virtue of consciousness in them. Freud's notion of unconscious mentality is arrived at by pressing the distinction of mental states from consciousness and combining it with the topographical model where all the psychological locales are spoken of as existing independently from their members at any given moment (Freud, 1915; Freud, 1937).

In William James's *The Principles of Psychology* (James, 1890), the concept of unconscious mentality is considered in terms of its role as a necessary concomitant of what James calls the mind stuff theories by which he means theories that regard mental states are empirically analyzable compounds.

It would now be helpful to spell out more precisely various conceptions of the psychoanalytic concept of the unconscious in terms of successive degrees of independence from the concept of consciousness.

- (a) The unconscious may be entirely composed of ideas that were previously conscious and have been repressed. This would meet the Lockenian condition on mentality i.e. there can be nothing in the mind that has not been previously in awareness (Ricoeur, 1970).
- (b) The unconscious may be perceived as entirely composed of, or at least as including some ideas that were not originally conscious but that could become conscious (Sears, 1943).
- (c) The unconscious may be perceived as entirely composed of, or at least as including some ideas that were not originally conscious but that could not become conscious (Sears, 1943).

The last of these conceptions matches the unconscious as described in the writings of Melanie Klein and Wilfred Bion, but it is also most probably attributable to Freud. The evidence for the same comes from Freud's explicit statements that the concept of the unconscious is broader than that of the repressed and also is made of a phylogenetic heritage and primal fantasies (Freud, 1938).

A different question now needs to be addressed. It has been supposed that positive reason to believe in the existence of the unconscious may come and does in fact come from the notion that the unconscious is necessary as data of consciousness have very large number of gaps in them (Freud, 1915). Consciousness is characterized by a special kind of unity on account of which it does not tolerate gaps of any

kind. We could interpret Freud's notion in terms of gaps in self-explanation. These gaps are as such fully psychological in nature and they occur at points where we would ordinarily expect an intentional psychological explanation to be available and in this way they stand apart from other merely nominal gaps in ordinary psychological explanation (for example, the impossibility of explaining how it is that one ordinarily remembers something).

Freud in his topographical model never looked at the mind to be built up of a number of agencies or systems, but rather these are terms used in a very special way and it is further puzzle as to what precisely Freud wanted them to signify (Freud, 1923). Consciousness and unconsciousness are not inimical properties and they are not intrinsically antagonistic to each other. Conflict between them is not regarding their status but because of the particular character of the contents of the unconscious and their consequent connection with repression (Wollheim, 1973).

Many questions remain unanswered, but it is fitting to conclude that the conscious and unconscious are both a set of states with representational content distinguished by special features which need not be regarded as propositional attitudes, characteristically endowed with phenomenology but attributed in a spirit of pure plain psychological realism (Archard, 1984).

RELATIONSHIPS BETWEEN FREUDIAN THEORY AND COGNITIVE PSYCHOLOGY WITH REFERENCE TO CONSCIOUSNESS

Though over a century has elapsed since Freud first proposed his theory, there has been very little comparison between Freudian theory and its links to non-psychoanalytic academic psychology. The choice of cognitive psychology in this discussion stems from the fact that cognitive theory and cognitive psychology have a basis in almost all facets of modern psychology. Though cognitive psychology has explained many areas unknown to us fifty years earlier, one must admit that no other theorist ever constructed a conceptual and metatheoretical framework like Freud in order to understand psychological questions. No theory so far has ever provided a theory conceptually superior to Freud (Reiser, 1984).

Freud reduced the role of consciousness to that of an epistemological tool to know about certain areas of one's mental state removing all ontological implications. The evidence available in his time suggested that some mental states might exist outside one's awareness. Thus Freud had to reject the principle that all mental states are conscious (ontological), but he retained the principle that all conscious states are accessible to awareness (epistemological). The demotion of consciousness to a purely epistemological role leads to serious failure, both by Freud and other theorists. In

the transformation of psychology from a science of consciousness to a science of mental representations, there has been a gain in theoretical power, but there has been a loss of something of great value. Psychologists may in effect be avoiding the problem that made the mental so puzzling in the first place, the problem of consciousness and thereby ignoring the mystery that is at the heart of the nature of meaning and mind (Grunbaum, 1984; Holt, 1989; Roth, 1998).

The term 'conscious' refers to an irreducible and irreplaceable phenomenon no matter what the name. Terms such as awareness, reflective awareness, phenomenal awareness and phenomenal representation have all been used to refer to the same thing. Awareness has been used to refer to what we mean when we are at the moment conscious of something but also refers to the latent knowledge of something. The term conscious unless burdened with additional meaning may serve to mean what is immediately, subjectively and introspectively given in experience. We may be thus conscious of a rational abstract idea, an obsessional preoccupation or even a hallucination. We are conscious in psychosis, dissociative states, in intoxication and so forth. But each of these represents a quite different mental organization of experiences obeying different principles of organization and existing on different levels of categorization and abstraction (Kihlstrom, 1987).

We shall now take a look at the confusion, both terminological and conceptual that dogged Freudian thought as well contemporary cognitive psychology. Freud always struggled with what has been called an adjectival and substantive use of the term conscious. It simply means that the term conscious idea denotes an idea that is directly, subjectively given and capable of being introspected although it need not be. The experience can be conscious in a variety of different states i.e. waking alert state, dream state, psychotic state and so on. It is better to refer to the above states as psychological states rather than different states of consciousness. The experience of consciousness may be different in each state but consciousness as a subjective, introspective given is indivisible no matter what state of consciousness. But the principles of organization, levels of categorization and abstraction effecting or producing the experience may be different.

Cognitive psychology has not been immune from confusing and ambiguous uses of the term conscious and consciousness. If to be conscious can occur in a variety of psychological states regardless of the principles of organization, what purpose does being conscious serve and what shall then be the special conditions needed for consciousness to occur. What is the role that consciousness must play in our lives part from the operation of the different principles of organization and levels of abstraction?

Freud gave consciousness the quality and capacity to transform experienced activity into unconscious states similar

to how different forms of energy are interchanged in physics. It could also play a part in inhibiting and restricting certain thoughts from becoming conscious. It also served the purpose of transforming quantities of unconscious excitation into qualitative experiences of pleasure and unpleasure (Freud, 1900; Hartmann, 1964).

CONCLUSIONS

Whether psychoanalytic and cognitive science views of the conscious are fraternal or identical twins, we do not know but they were certainly reared apart from one another. The psychoanalytic twin was raised in the consulting room, exposed to primal scenes, intrapsychic conflict and the risky improvisations of clinical work while the cognitive twin was raised in the scientific laboratory were calm and order prevailed. There is no doubt that the cognitive and psychoanalytic views are different and come out of different traditions (Shervin and Dickman, 1980). Cognitive science focuses on motive, affect and conflict while psychoanalysis focuses on conflict and underlying psychological processes. There are in fact convergences between these two radically different views but from a holistic perspective. They follow a similarity in the nature of the problems they address though at first look they seem to be far apart. The newer developments in the field of cognitive science dealing with levels of categorization and organization will be of immense value in studying the hierarchical relationship between unconscious and conscious experiences. The chasm between the consulting room and scientific laboratory may soon narrow. We are now at a stage where we must broaden and deepen the scientific investigation of consciousness and conscious states in a way never done before. We need to apply our imagination and good will while being open minded and flexible at the same time.

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Questions That This Paper Raises

- (1) Is Freudian relevant today or must be done away with?
- (2) Does Freudian theory play role in explaining our modern day concept of consciousness?
- (3) Does the Freudian concept of 'conscious' relate at least conceptually to the concept of 'conscious' in cognitive psychology?
- (4) Do parts of Freudian theory have resemblance to modern day cognitive psychology and its theories?

About the Author



Avinash De Sousa is a consultant psychiatrist and psychotherapist with a private practice in Mumbai. He is an avid reader and has over 40 publications in national and international journals. His main areas of interest are alcohol dependence, child and adolescent psychiatry, mental retardation, autism and developmental disabilities. He is also the academic director of the Institute of Psychotherapy Training and Management, Mumbai. He teaches psychiatry, child psychology and psychotherapy at over 18 institutions as a visiting faculty.

Two Approaches to Test Cognitive Linguistics as a Tool to Study Mind

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Cognitive Linguistics exudes enormous promise by offering fecund grounds on which to develop principled accounts of language and language acquisition in a way that creates ample room to also cast deep perspectives on the nature of mind itself; and in doing so, it marks a reasoned and elevated departure from the much touted but not so far-reaching formalist approaches to research language. In what could perhaps be regarded as a salutary thing about cognitive linguistics, it is *in the process* of developing accounts of language that it *also* carves out fairly competent methodical ways to understand mind. And that's an interesting double. Though language has been one of the prime preoccupations ever since man set out upon understanding nature and his place in it, for the large part of history the experimentalist was not so much of its habitué as was the theoretician. It could be said that it is only in the modern period that empirical research on language really took off the ground, with the discovery of left hemisphere domination in language, and the areas which we now know as Pars triangularis and Pars opercularis in the left frontal lobe of most human brains implicated in speech articulation, and a fairly specific neurological candidate in the left posterior temporal lobe assumed widely to house the language comprehension abilities. The field has seen in the ensuing years a myriad of upward ticks. But real accounts of lasting defensible kinds – the kinds we fairly consistently encounter in several other domains of natural sciences – have not come by. One of the cardinal reasons that goes into this is a seemingly close connectedness that language shares with a hugely elusive and controversial entity, namely, the mind. Mind is said to not only offer facilitation to but also be the determinant of several capacities that are uniquely human, and the capacity to create and exercise highly evolved language systems is one of them. But with an account that tenably addresses the naturalization of mind nowhere in place, endeavors to develop complete accounts of the various phenomena in its realm, including language, have been rendered wanting in rigor and foundations. The beauty of cognitive linguistics perhaps lies in the fact that it advocates a principled structural relation between language and mind, and in the process of developing accounts of language, hopes to shed significant light on the nature of mind. This is different from and surpasses a methodology that involves an already developed account of

language being brought to bear upon understanding the nature of mind. That naturalizing language could stand us in good stead as regards naturalizing mind is a grantable point, but whether or not (and if yes - how) we could naturalize language without having at our disposal a settled theory of mind (its ontology and functional efficacies) is an issue that merits serious consideration - and could be understood as a warranted line of enquiry in itself. Secondly, would the seemingly monolithic problem of mind continue to still stand, and in the same guise, after we have naturalized language and have also come to grips with the so called symbol-grounding problem? The other horn of this is the issue of whether or not a theory of mind could be regarded as legitimate if it does not also entail accounts of language and language acquisition. In other words, ought the solution to the mind/body problem to necessarily include answers to all the questions about language? This of course depends on how the problem of mind is constituted. In as much as the key question about mind is constituted as (which is a prevalent case) -why does there exist mental phenomena in living systems, when complete accounts of the system's functional aspects could in principle be given in terms that are purely mechanistic – then, it seems, that the solution to the problem of mind may not have to necessarily also entail the solution to questions about language and its acquisition.

The central thesis in the enterprise of cognitive linguistics is that language maps mind's cognitive system. In this section we discuss how this thesis could be provided with further empirical ground. This paper proposes two approaches to test the efficacy of cognitive linguistics as a tool to study mind.

APPROACH-1

This is a possible approach to study if such a connection exists for the metaphor *Freewill* – that is, we want to see if there exists a connection between semantic information processing of the metaphor *Freewill* on one hand, and its orthographic information processing on the other.

The questions this study could address are about:

- 1) Information processing relation between literal and metaphorical meanings of the word

Freewill;

2) Information processing relation between orthographic plus semantic data and its literal meaning, and interestingly,

3) How is this information processing in this case related to the act or the experience of freewill that we all have?

For this study we use Neurofeedback technique. The crux of biofeedback and neuro-feedback techniques is that the physiological parameters which are otherwise controlled by body's autonomic nervous system are, through training, brought under voluntary control. The important point here is the following: While subject tries to modify in a Neurofeedback setup the amplitudes of the signals shown to him onto a computer screen – *he exercises his free will and has an experience of free will associated with the task.*

We first find the neural correlates of free will. There have been some experiments to find these. We know that the neural correlates of willed action or its onset are located in “left lateral PFC, lateral premotor cortex, somatosensory cortex, M1, thalamus, inferior parietal lobule, and precuneus” (Hunter et al., 2003, pp. 1266.) However, what we are concerned with here is not so much with where the onset of willed action takes place in the brain, and not about the neural correlates of willed “action”; nor are we concerned with neural correlates of “free selection conditions” as in the case of Lau et al. who found “activation in the dorsal prefrontal cortex (BA 46) when we compared a free selection condition with a routine condition” (Lau et al., 2003, pp. 1412.) – Rather, what we are concerned with in this study is the most “basic”, so to say, neural correlates that are associated with free will (not to willed “action”) that are common to all willed actions – in other words, maybe the experience of free will. Secondly, and this supports our above line of thinking, based on a study in hypnosis, Haggard et al. (2004) arrive at the inference that, there could be “change in conscious experience without any corresponding physical change in the actions themselves” (pp. 651.); thus, “the relation between neural events preceding action and the conscious experiences they produce remains unclear” (*Ibid.*, pp. 647.) And we are interested in the neural correlates of the experience of free will; having said that, we could nevertheless take the above brain correlates to be the first approximations of neural correlates of free will.

Finding neural correlates of information processing:

Next we find the neural correlates of information processing of semantic, phonetic and orthographic aspects of “free will” and the metaphor *Freewill*. The fMRI, ERP, PET or any other technique could be used to get data; this data would not fine-grained data, but can nevertheless

serve our purpose in the experiment. This we do for the following three categories of subjects:

In the next part, we find out neural correlates of information processing for the following:

1) We gather from the literature the first approximation of the neural correlates of the act or experience of free will. Finding the exact neural correlates of free will is a mammoth task in itself, and to add to this, there is a parallel debate on whether or not we do have free will. Nevertheless, for the sake of this study, we construct from the data available in literature on this topic - what can be called the first approximation of the neural correlates of free will. (Ideally, we want neural correlates of the experience of free will.)

2) Neural correlates of the orthographical, syntactical and phonetic aspects of the term “free will”. How can we do so when the moment we see or hear the term its meaning pops up in our minds, just like its shadow? Simple - we do so by taking subjects who are absolutely unfamiliar with English language. Or, we could also take subjects who are familiar with English alphabets and basic words and are totally unfamiliar with complex words (they are yet to make their acquaintance with the words “free will”), including any other word that is even remotely connected to this. Children of a certain age group or ideally, those adults who have just embarked upon learning English could be considered. Note that the neural correlates of information processing of these three sub-aspects may or may not be significantly different from each other, or may overlap with each other to a great extent; however, this issue can be dealt with separately, and not so critical for the study at hand. From the studies done on other words, it seems that it is likely that there would be differences.

3) Next, we find neural correlates of information processing of the literal meaning of this term. For this, we take subjects who are familiar with the basics of English language and are also acquainted with the literal meaning of “free will” – but who do not know that *Freewill* can also be used as a metaphor. [In one hostel here I randomly asked forty students whether they were aware that it can be used as a metaphor. Of them, 28 told they were aware and the remaining 12 told they were not aware. In another hostel I kept a paper with the watchman with the following question “Are you aware that *Freewill* is also used as a metaphor?: Yes/No. (Mentioning their name was optional). Of the forty, 26 said they were not aware, whereas the remaining 14 wrote they were aware. Of course, the number forty was not big enough]

4) Next is metaphorical meaning – we find neural correlates of information processing of the metaphorical meaning of the term *Freewill*. (There is slight change in the orthography here, but it's not very critical here.) In 3) and 4) we could again take

different kinds of subjects: For instance, a) Those that are learning English as their second language, b) Those that are learning English as their third language, etc., and c) Those who we train to use *Freewill* as a metaphor, and so on.

STUDIES/EXPERIMENTS:

Study –I: PART - 1

In PART – 1, 2 & 3 we take subjects who are *totally unfamiliar with English language* – in other

words, before they learn English as their second language.

Step – 1: We set up a Neurofeedback experiment.

Step – 2: We feed the subject onto a computer screen the neural correlates of the information processing data found for orthographic aspects of “free will”.

Step – 3: We ask the subject to increase the amplitudes of the amplitudes of the signals shown onto the computer screen.

As noted above, while the subject tries to increase the signal amplitudes – he is exercising an act of free will – and goes through a general experience of free will (his will to modify the amplitudes of signals).

Observation: What we would observe is clearly one of the following two possibilities: Either the subject will be able to increase the signal amplitudes, or he will not be able to increase them. We take one of these two cases for analysis in the following lines (Discussion and representation in the form of figures are not done separately, but done together in this case.)

Case – A: Subjects are *able* to increase the signal amplitudes



Prima facie inference: In these subjects, the experience of free will and the orthographic aspects of the linguistic entity “free will” *do not overlap* or are *not connected* at the level of their neural correlates of information processing.

This observation might be expected, given that the subjects do not know English language at all, and so “free will” is just a set of meaningless squiggles to them.

Case – B: Subjects are *not able* to increase the signal amplitudes



Prima facie inference: Experience of free will and the orthographic aspects of the linguistic entity “free will” *are connected* at the level of their neural correlates of information processing

One might say that such a connection is not expected, because the subject does not know English language at all. But – in case the subjects are not able to increase the signal amplitudes

even after due amount of training (here we refer to the amount of training that is normally taken by subjects to gain a standard expertise in the regular neurofeedback experiments; it’s not difficult to calculate a standard here) – then, there are two inferences (implications of the findings) we can draw – of which, either both or one of them could be the case (the above figure continues below):

1st Inference/Implication: We could infer from above that experience (of free will) and language (at the aforementioned level) are *deeply connected* – probably, more deeply than cognitive linguistics conjectures – [because, we’d have a case where the subject doesn’t know the language at all – yet, his mental experience and the corresponding word are connected at the level of the neural correlates of information processing.



This would *support* deeply the enterprise of cognitive linguistics by lending it weight and making much stouter its basic foundations

A possible argument against the above inference and how we can come to grips with the same: A possible argument that might take issue with the above inference would be: what if, instead of the term “free will” you took some other words (say, “cognitive linguistics”) and observed the same result (that is, subjects not able to increase the signal amplitudes)? This argument could be well taken, but there would be two ways to get around it: For one, we might say that if the findings of the subsequent studies (Study – 2 and Study – 3, along with their respective parts) fetch us results along similar lines, then the above argument would not go too far in undermining our inferences. Secondly, we could conduct similar experiment picking random words from English. And if the subjects can increase the signal amplitude, it’d support our above inference and we’d continue to maintain it. If the subjects are not able to increase the amplitudes, there would be room to be skeptical about our inferences. Having said this, it can be noted that *both* the kinds of results (that is, whichever result we get) would be significant for the foundations of cognitive linguistics and for theories of metaphors and proverbs (it will be clearer as we move ahead to Study II and III).

Now we come to the second interesting inference (2nd implication) that could be drawn from the above finding (the figure continues below):

2nd Inference/Implication: The orthographic aspect of the subject's first language bears some resemblance to that of English language (at least, for "free will" and its corresponding linguistic term in his first language) – [Else, why would the information processing of the experience of free will (the experience which is the same in all subjects (since they all belong to the same species of Homo sapiens) be connected to this unfamiliar term at the level of information processing?]



This implication would be a very useful tool in classifying languages as per their orthographies

meaningless squiggles and the related experience (here, the experience of free will) – then this would strongly support Harnad's proposed "solution" to this problem. We mention above as regards the 2nd inference/implication that it could serve as useful tool in classifying languages as per their orthographies. This approach to classify language would be complementary to the recent approach that employs "mutual intelligibility as a uni-dimensional, experimentally grounded criterion, based on communicative principles, that allows us to classify related languages and language varieties and establish affinity relationships among them" (Chaoju & Heuven, 2009, pp. 728.)

STUDY – I; PART - 2:

(We are still studying subjects who are unfamiliar with or do not know English language at all.)

Step – 1: Same as in Study – 1; that is, we set up the neurofeedback experiment.

Step – 2: Next, we feed the subject (his brain, to be precise) the neural correlates of the information processing associated with the term "free will" (Remember he doesn't know English yet). We find these neural correlates from an English speaker (here again, neural data could be collected from two kinds of subjects: those who have learnt English as their first language, and those who know English as their second or third language; but we wouldn't go into these issues as of now.)

Step – 3: Same as above - We ask the subject to increase the signal amplitudes of above data shown on computer screen.

Observations: Observations and their corresponding implications/inferences would be along similar lines as in Part – 1:

Case A: If the subjects are able to increase the signal amplitudes by exercising their free will (and hence going through the experience of free will) – this would imply that experience of free will and information processing of the literal meaning of "free will" are not the same or are not

connected (if they were the same or overlapping – the subjects would not be able to increase the

signal amplitudes). This is again a significant implication and could be pursued further if such a

finding is seen.

Case B: If the subjects are not able to increase the signal amplitudes, this would imply that the experience of free will is connected to the information processing of the literal meaning of the term "free will". There would be same possible objection, which would be gotten to grips with in the same two ways as mentioned in Study – 1 above.

Implication/Inference – 1: The above observation would imply again that experience and language (in this case information processing of its literal meaning) are deeply connected (perhaps more deeply than cognitive linguists maintain) –because, here is a case where even if the subjects don't know the language at all, the information processing associated with the literal meaning of the term "free will" (gotten from English speaking subjects using fMRI, ERP, PET and such techniques) is either same as or is at least connected with the subjective mental experience of free will.

Again, this would not only go further in supporting cognitive linguistics, but point to a deeper connection between the structure of mind and language.

Implication/Inference – 2:

The observations would imply that subjects' first language bears resemblance to English language. There would be two cases here, though, as follows:

1) If in the English speaking subjects, the neural correlates of information processing of the term's orthographic aspects and that of its literal meaning are the same – then, a) either the subject's first language would bear the resemblance with English at the level of both these aspects of the term, or 2) at the level either of a) the term's orthographic aspect, or at the level of the information processing associated with its b) literal meaning.

2) Second possibility is that the entire first language (all of its words and sentences, orthography and the entire syntax) of the subjects would bear resemblance/structural relation at both or one of these levels.

STUDY – I; PART – 3:

Step -1: We set up Neurofeedback experiment.

Step – 2: We feed the subject the neural correlates for the information processing associated with the metaphor *Freewill*. (Our subjects at hand are not familiar with English. We find

the said neural correlates (their first approximation) from English speaking subjects who are familiar with the use of *Freewill* as a metaphor.)

Step – 3: We ask the subjects to increase the signal amplitudes of the above data by exercising their free will.

Observations: The kind of observations and their implications would be along similar lines as in case of Part – 1 & 2.

Case – A: Subjects are *able* to increase the signal amplitudes



Prima facie inference: Experience of free will and the metaphor *Freewill* in this group of subjects *do not overlap* or are *not connected* at the level of their neural correlates of information processing.

This observation would neither support cognitive linguistics, nor would it be at odds with its central foundational principles.

Case – B: Subjects are *not able* to increase the signal amplitudes



Prima facie inference: Experience of free will and semantic meaning of the metaphor *Freewill* are *connected* at the level of their neural correlates of information processing.

To get around the challenge mentioned in Part – 1, we conduct this study on randomly picked words in English language. If the subjects are able to increase the signal amplitudes, it would further support the inference in Case – B; if the subjects are not able to increase the signal amplitudes in case of randomly picked words, which would disallow us to make this inference. From the prima facie implication, we have two inferences/implications as follows (the above figure continues below):

1st Inference/Implication: We could infer from above that the experience of free will and language in general and the metaphor *Freewill* in particular –are *deeply connected* – probably, more deeply than cognitive linguistics conjectures –[because, we’d have a case where the subject doesn’t know the language at all – yet, his mental experience and the neural correlates of semantic information processing of its corresponding word are connected at the level of the neural correlates of information processing.



This would go a long way in *supporting* deeply the enterprise of cognitive linguistics by lending it weight and making much stouter its basic foundational principle about the principled connection between language and mind.

The second implication would be as follows:

2nd Inference/Implication: This could be divided into two parts: 1) either the semantic aspect of the subjects’ entire first language (at the level of their neural correlates of information processing) bears resemblance to the semantic aspect of English language (at the same level), or 2) the semantic aspect of the linguistic entity (in their first language) that is a counterpart of the metaphor *Freewill* – bears strong resemblance or structural relation (at the level of information processing) with the semantic aspect of the metaphor *Freewill* (in English – their second language.)

[Else, why would the information processing of the experience of free will (the experience which is the same in all subjects (since they all belong to the same species of Homo sapiens) be connected to this unfamiliar term at the level of its semantic information processing?]



This implication would be a very useful tool in classifying languages as per their neural correlates of semantic information processing of metaphors. This would also be useful in constructing theories of metaphors.

STUDY – II:

This study would be done on the following category of subjects: Subjects who are familiar with English – but who are not familiar with the term “free will” (they are yet to learn it.)

PART – 1

Step -1: Setting up of Neurofeedback experiment.

Step -2: Feed: The same signals as in the Part 1 of Study -I. And ask the subject to increase the signal amplitudes.

Case-A: Subjects are able to increase the signal amplitude, which would mean that in this category of subjects, information processing for experience of free will and that associated with the orthographic aspects of “free will” are not connected or not the same.

Case –B: Subjects are not able to increase the signal amplitudes.

PART-2:

Inference-1: In this group of subjects – experience of free will deeply connected to orthographic aspects of the linguistic entity “free will”.

Inference -2: Information processing associated with the orthographic of either the term “free will” OR of the entire English language bears resemblance (or structural relation) with (information processing of) *any one* of the following four:-i) Orthographic aspect of the corresponding term in their 1st language OR with that of entire 1st language; ii) Literal meaning of the corresponding word in their L-1, OR the entire neural substrate for the semantics of L-1; iii) Metaphorical meaning of the corresponding word in L-1, or, the entire neural substratum of the metaphorical domain of L-1 (if it is separate from other aspects of the language). iii) If the neural substratum of all the three aspects of the corresponding word in L-1 are the *same* (highly unlikely) – then, this same neural correlate of information processing would bear resemblance with that of orthographic aspect of the term “free will” in English.

Step – 1: Same. **Step – 2:** Feed: Same signals as in Study -1, **PART – 2.** Ask the subjects to increase these signal amplitudes. We skip Part- 2 and Part- 3 of Study – II, and jump to Study – III which we discuss in brief.

STUDY-III

Category of subjects: Subjects (after learning English) who are familiar with both literal meaning usage of “free will” as well as metaphorical usage of *Freewill*. We skip the details and discuss only the inferences.

PART-1 (Feed: Same as Study-1, PART-1) **Case –A:** Implication: If subjects are able to increase signal amplitudes (immediately or after standard amount of due training), it would mean that: even in subjects who are familiar with English language (including literal meaning of “free will and metaphorical use and meaning of *Freewill*) orthographic aspects and experience of free will are unconnected. This wouldn’t be along the line of a cognitive linguist’s expectation here.

Case—B: Implication: Experience of free will and information processing associated with orthographic aspect of “free will” are connected.

PART-2: (Feed: Same as in Study -1, PART -2). **Case-A:** A cognitive linguist would not expect that the subjects would be able to increase the signal amplitudes, which would be taken to mean that there is no connection between information processing of the term “free will” and experience of free will –even if subjects are familiar with both literal and metaphorical usage of ‘free will’ and *Freewill* respectively. **Case-B:** This observation would be a pointer to a deep connection between experience of free will and information processing associated with literal meaning of “free will” –which would support cognitive linguistics. This observation would also support the “postulate that topographies of word webs reflect aspects of the word’s

referential meaning” (Pulvermuller, 2001, pp. 521).

PART-3: (Feed: Same as in Study -1, PART-3). **Case –A:** Inference: Experience of free will and information processing of meaning of the metaphor *Freewill* could be connected. **Case-B:** They are unconnected.

Note: It would be interesting to see if there are discrepancies in the findings of PART-1, 2 & 3 of this study. In other words, if it turns out, for instance, that Case-B in PART-1 is observed by that in PART-3 is not observed. One of the inferences we could draw from such a finding is that the information processing associated with orthographical aspect *predominates* over that associated with the semantic information processing of *Freewill*. This would be an interesting finding that would be in line with and *support* the studies in literature that show that when familiar words are shown to subjects, information processing of one aspect is initiated and occurs first, followed by the other aspect of the linguistic entity.

APPROACH-II

In this section we delineate another possible line of approach to preliminarily test the main hypothesis of cognitive linguistics, namely, that studying language could and should shed light on the nature of mind.

Our studies here address the following two foundational questions about cognitive linguistics:

A) Whether or not there are structural correlations between conceptual/mental processing and information processing of linguistic/textual entity at the semantic level.

B) What is the nature and degree of such connection, if there exists one?

C) Whether or not there are comparable similarities or differences in neural processes associated with information processing of literal meanings of words and their metaphorical usages. Presence of similarities or patterned differences would bolster the claim of cognitive linguistics that it could be a tool to study mind.

One of the motivations for this study is the increasing evidence for what is called in the relevant literature as the “structure-function principle” (Mechelli et al., 2004, pp. 757.) at fine-grained levels.

PART A) AND B)

STUDY -1:

1. Possible Design & Methodology: Take a certain perceptual activity and construct its mathematical model. This would be preceded by finding out the precise neural correlates of that performance and/or just the resultant integrated mental image formed, and then developing an artificial neural network (ANN)

based on it. An initial step toward finding the neural correlates of the perceptual act would be either carrying out EEG or, better, ERP (Event-Related Potentials that measure voltage changes in the brain). What with many studies using ERP, this technique has become quite a useful tool for cognitive scientists in gathering reliable data about psychophysiological correlates of various tasks. ERPs give good temporal and spatial measures.

1.1 Stimulus/Cue/Cognitive Task: A canonical example of a suitable perceptual activity would be that of one single discrete stimulus, say a dot on a computer screen, moving towards a stationary stimulus, a second dot. A cognitive task that involves rapid movement of two entities could also be considered for this purpose; however, it is safe to employ the activity of perceiving two dots (as above) rather than having the subject perform a cognitive task, for “if the subjects cannot perform a task, it is difficult to determine if the absence of particular ERPs are associated with the cause of their cognitive disorder or simply the result of the task not being performed” (Picton et al., 2000, pp. 129.)

We could also club this simple passive perceptual act with such suitable second factor as subject’s eliciting a response. However, it would be better to have one single well-defined distinct task, since it will allow us to make comparatively more precise measurements on the latencies and amplitudes of ERP waveforms.

1.2 Subject Inclusion Criteria: Subjects belonging to a specific age group should be taken, as ERPs are known to vary significantly with age. And, the subjects chosen should be such that they have a preliminary knowledge of English language, but should not have heard of the linguistic stimulus (text) we want to show them. For this, we can take children of a certain age-group. Also, care should be taken that the selected subjects are normal individuals, in light of the findings that ERPs in subjects with cognitive and general brain disorders vary considerably (in fact, ERP technique is sometimes employed to decide the presence and absence of certain disorders including migraine. Considering children (preferably preschool) would perhaps be better for the study, for the reason that their minds would not have yet generated the concept carried by our linguistic (textual) stimulus. In this way, our purpose of studying the legitimacy of the *origin* of the proposed connections (and not the already developed connections due to matured language use) between mental apparatus and language – would be served – thus, striking at the foundational viewpoint of cognitive linguistics.

1.3 Experiment:

Step – 1: A select number of subjects would be shown the stimulus on a computer screen, within a certain standard time gap. The nature of stimuli could be varied too. Indeed, it would

perhaps be necessary to do so for the following purpose: to filter away brain data associated with shapes and colors of the stimuli (if we choose to vary them, that is). This way, a possibility is opened for finding fairly fine-grained brain data (that is allowed by this technique) associated with a distinct mental activity, namely, (data about the neural candidates and their patterns that are associated with) the discrete perceptual aspect of cognizing rapid movements in the given set of stimuli. We could also go about it using an fMRI (functional Magnetic Resonance Imaging technique – the most reliable and widely used technique in cognitive science today). Using fMRI we could find out what areas in the subject’s brain are active (need increased blood supply). fMRI technique is quite expensive and these instruments are available only at select centers in India. Our goal would be to find out the neurological candidates possibly implicated in the aforementioned task. It is perhaps imperative to go for such techniques as ERP (or fMRI) for two reasons: A) For one, recent works (Burak, 2009; also, Shinomoto, 2003) show new and interesting anomalies about differences among individual neurons for reacting to similar input weights (hence, it is necessary to first go for finding ensemble of neurons implicated in the said task, B) For another, there are well known limitations of single cell studies. Having said this, recent commendable approaches (Ventura, 2008) do make us optimistic about fruitfully understanding integrated information, without the need to go by the dubious method of gathering collective information, followed by individuating that information in terms of single cell behavior.

After we obtain data by ERP or fMRI technique (techniques such as SPECT and PET could also be used) the next step would be fine-graining the data further by constructing an ANN based on it. ANN can be an amazing tool for cognitive scientists to rigorously fine-grain the data (with latest methodologies such as the information-geometric approach); in particular the Kohonen neural network of the self-organizing type would be of interest to us, although, only a few experts seem to use it.

Step –2: The next step would be to develop a mathematical model for the sentence/text, “Christmas is fast approaching” (Evans and Green, 2006, pp. 14.) This could be achieved in two independent ways: A) Picking out relevant strands from mathematical/formal model of English language developed by formal theorists of language, or B) Feed in this sentence to subjects on a computer screen and study the brain areas that get activated. B could be embarked upon by the same techniques: ERP or fMRI. Again, we develop mathematical model of cognition of this sentence. For our purpose, it is not so much crucial to attempt to develop an advanced axiomatic system for these two stimuli; that would be far too an abstraction, and further, it is for constructing a generalized overarching model of all cognitive modalities that axiomatic approach should be used; the task at hand here is specific and

limited. There have been EPR studies that aim at studying various aspects of different languages.

The first aim of the study here is to compare the mathematical models for the two phenomena as discussed above, namely, perception of the rapidly moving stimuli on computer screen, and cognition of the aforementioned sentence. This would be a study different and more fundamental compared to such studies in cognitive linguistics as, for example, a recent study by Simmons et al (2008), in which they show, using fMRI technique, that “words serve as cues for conceptual processing” (pp. 117) and that “different mixtures of language and simulation occur” (pp. 106) during conceptual processing⁴. Our approach here is more *fundamental* than Simmons et al’s study in the following two ways:

A) Our methodology aims to strike at the point of generation of linguistic structure that is assumedly complementary to the conceptual structure of the mind. It is aimed at addressing the *foundation* of cognitive linguistics. In this study, for instance, we take subjects who would not be familiar with the linguistic stimulus (text) in English as well as their own native language, but which is known to the experimenter to be mirroring mind’s perceptual experience. Simmons et al’s experiment is very different from ours in that it addresses the issue of how *already generated* (and housed in the subjects’ minds) primitive form of conceptual processing yields variegated forms of conceptual processing based on different “mixtures of language and simulation”. Importantly, our target subjects are children (preferably preschool children) who are necessarily unfamiliar with the concept that the linguistic cue houses.

B) Secondly, our study goes till the extent of dealing with mathematical models of mental representations of the two stimuli/cues. Comparing mathematical models is one of the important components of our study.

Step –3: The next step, after developing mathematical models of the two stimuli, would be to collate them in finer details for similitude and differences. There would be interesting implications of either kind of finding, which would be significant for foundational elements of cognitive linguistics. If it turns out that both mathematical models bear similar structure, then this would go a long way in sort of corroborating cognitive linguistics’ approach. If, on the other hand, there are fundamental differences non-correlatable in nature, then it would stand to be at odds with this crucial foundation of cognitive linguistics.

It is necessary to mention about the difference between the natures of two stimuli here – one is a spatially characterized figure-based stimulus, and the other is a linguistic text. Some recent studies (for instance, Hostetter and Hopkins, 2002) have shown that there could be marked differences in terms of employment of associated words in conceptual processing

after “spatial and textual encoding of thoughts” (pp. 23). Hostetter and Hopkins’ study, again, is about the already present linguistic thought (along with all the associated words the linguistic entity connects with) and about already present discrete conceptual/mental processing about the spatial stimulus. Our study is more fundamental in that it deals with minds (subjects’ minds) in which there is not already housed mental processing and its corresponding mirrored structure in textual stimulus.

It would be exceedingly difficult to identify similarities or differences at a deeper level in the nature of connections, for it would involve isolating spiking differences in neuronal activities, and analyzing them independently. While this task has its own rewards, it is not crucial for the experiment at hand.

Supplementary Study –1:

Supplementary to this would be a study involving similar approach but with matured speakers of that language. We carry out the same study, using same cues, but in subjects who are familiar with the usage of the linguistic cue in different contexts, and who understand the idea of something “fast approaching”. After we develop mathematical models of the two cues in such subjects, the next step would be to compare and contrast these models with the ones developed above for subjects of special kind, namely, children. What might such a comparison stand to show? Such comparison could turn out to be important in way of giving insight into such issues as the following two:

1] Whether or not relations between textual/linguistic processing and conceptual/mental processing (along with perceptual information processing) is retained, as the subject becomes a mature user of that language.

2] In shedding some light on the proposed similarities/differences between children’s and adults’ mental framework with regard to language and simple perceptual activities. In other words, if there are significant differences between the ERPs, ANNs, and then in the subsequent mathematical models between green and mature learners of a language, it would be suggestive of differences between language representations in them, which would in turn, be a pointer to conceptual apparatuses in them that are not comparable.

Another aspect of this study would be making different groups of children based on age intervals, and carrying out the same experiment. This way, we would be investigating if there are age related differences among children for processing novel visual information and that are detected by ERPs.

Supplementary Study –2: (on complete sentences and single lexical units):

A pertinent question to ask in our main study and indeed in cognitive linguistics could be as follows: if sentential structure could be correlated with mental/conceptual system, then could

single independent linguistic entities be also mapped onto our mental/conceptual system? In fact, it would be interesting to see how different answers to this question could be brought to bear on the central thesis of cognitive linguistics. The question we ask is: What has cognitive linguistics got to say about single words and their mirroring with mental processing? In other words, are single words also capable of offering us insights into the nature of mind in similar ways?

Noguchi et al (2009) find that fairly distinct neurological candidates are implicated in tasks associated with non-sentential linguistic entities (one or two words). It would be interesting to find out to test the central approach of cognitive linguistics — if there also are complementary relations between mental system and single non-sentential linguistic entities (single word). A canonical example here would be the word “Go” which is typically employed in such studies in the literature. As discussed in the main section of our study, we find out neurological candidates associated with the word “Go” (either its phonological or orthographic aspects). Then we develop mathematical model for this data. The next step would be finding our ERP correlates of a neutral moving stimulus shown to subjects on screen, followed in turn by constructing mathematical model of ERP correlates. The two mathematical models could be compared for similarities and differences. If there is indeed significant similitude in certain aspects in the mathematical models of a visual activity that indirectly depicts the word “go” (such as an unfamiliar person or, better, to avoid invoking an emotional response, an object moving away, shown onto a computer screen) – then this will go a considerable way in bolstering the approach of cognitive linguistics.

On the other hand, and this might take issue with cognitive linguistics, one might well say that it is not the *structure* of language that mirrors the mental/conceptual machinery – it is the language *itself* that mirrors mental framework. This is not a moderate view, certainly, but there would be room for such a view, given that the visual cue we have here is not a cue that elicits emotional response (as in case of subject’s spouse’s face) and which therefore in all the likelihood would activate neurons associated with that particular face recognition - more or less the way it does when subject reads that person’s name in textual format; however, what we have in our study is a fairly (emotionally) neutral cue. Further, the technique of semantic priming could be exercised either using masked or unmasked linguistic entities of the same length.

In this part of the experiment, it would be required to identify, isolate and discard ERP waveform differences between the word “Go” and the selected visual stimulus – arisen due to their repetitions, since, there are “genuine differences in the activity of repetition-sensitive brain structures” (Rugg et al, 1995, pp. 23) — else, we might otherwise mistake these differences for differences in their semantic contents. Such differences would be found for just about any set of stimuli, and are therefore not a pointer to differences between two defined stimuli, notwithstanding easily seeable waveform differences.

Supplementary Study –3:

The essential aspect of this study would be — having two different forms of our visual object cue, one in two-dimensions and the other, in three dimensions. Similar study through mathematical modeling could be carried out for three different groups of subjects. The objects of the study could be as follows:

A) We make two groups of normal children subjects of a specific age-group. We show 2D visual cues to one group and 3D visual cues of the same object to the other. We develop mathematical models of the brain data gathered (as discussed above) and verify the recent studies that show, although not conclusively so far, that, “early sensitivity to individual faces, during the N170 window, is predominantly based on 3D shape diagnostic cues, while 2D surface reflectance does not contribute significantly at this latency” (Caharel, 2009). This study shall allow us to examine if similar results are obtainable for 1) non-facial objects, and 2) in children.

B) The second part here would involve carrying out the same study (with same object features) in adults, and studying the yielded data with same objectives. Also, a comparative study of adults and children could be carried out in order to look for similarities and differences in perceptions of 3D and 2D moving objects. The objects would bear similar to facial cues in spatial and other non-emotional aspects.

C) In the third part we could have words and sentences in 3D and 2D format. Words and sentences could also be used as parts to make the objects they refer, or alternatively, object pictures made from similar but smaller sized picture (e.g., object teacup made from small teacups.)

In all these three cases we carry out ERP and/or fMRI and look for similarities and differences. There will be expected differences in the data along the lines of faces invoking emotions and objects not so much. But what is of interest to us as a cognitive linguist here is the following:

1) Across the dimensions:

a1) Find out patterns of similarities and differences, if any, between 3D and 2D aspects of cues that are capable of invoking

emotional response, namely familiar human faces, a2) Find out patterns in similarities and differences, if any, between 3D and 2D aspects of neutral and abstract unfamiliar objects - along with similar studies for their emotional aspects, if any (we choose unfamiliar objects to avoid emotional or behavioral response from subjects, which might influence brain processes associated with other aspects of object perception). a3) Find out patterns in similarities and differences, if any, for 3D and 2D aspects of i) known but neutral words, and ii) objects made of their names. Based on a1, a2, and a3 above, we go ahead as follows: We in turn compare the patterns observed in A, B, and C above for faces, objects and words (along with objects made of words). Let S1 and D1; S2 and D2; and S3 and D3 be the similarities and differences found in a1), a2) and a3) respectively.

Next steps would be the following: 1] Compare S1, S2 and S3, and 2] Compare D1, D2 and D3 for similarities and differences in their structural patterns. This would be followed again by studying S1, S2 and S3, and D1, D2 and D3 separately for

similarities and differences in their patterns; denote these by SA and DA (for similarities and differences in EPR and or fMRI data patterns – between S2 and S2); SB and DB, for S2 and S3; and SC and DC, for S1 and S3 respectively. The last step would be study SA, SB and SC, and DA, DB and DC for similarities and differences.

If there are indeed similarities and patterned differences here between SA, SB and SC and/or between DA, DB and DC — this would command interesting implications for cognitive linguistics in that the similarities would indicate that mind’s conceptual apparatus for perceptions and language bear similar or, at least comparable, structures. Even if there are differences that are patterned or comparable, they would again be indicative of a close embodied connection between language and the nature of mind (in particular, its conceptual system).

This first part of the study is summarized in the following table.

| | | | | | | |
|---|------|----|--|----|-------|----|
| 1. CUES | FACE | | OBJECTS [And pictures (of same objects) made from their English names] | | WORDS | |
| 2. ERP or fMRI Data for 3D and 2D stimuli | 3D | 2D | 3D | 2D | 3D | 2D |
| 3. Principled Similarities | S1 | | S2 | | S3 | |
| 4. Principled Differences | D1 | | D2 | | D3 | |

Fig. 1

S1, S2 and S3 – and brain data similarities and differences in them as follows:

| | | | | | | |
|--|----------|----|----------|----|----------|----|
| 1. Collating Similarities from Fig. 1 | S1 | S2 | S2 | S3 | S1 | S3 |
| 2. Principled similarities in brain data | S_{A2} | | S_{B2} | | S_{C2} | |
| 3. Principled differences in brain data | D_{A1} | | D_{B1} | | D_{C1} | |

Fig. 2

If either SA1, SB1, SC1 OR DA1 DB1 DC1 are comparable, then, this would be indicative of close embodied connection between language and nature of mind, thus bolstering the cognitive linguistics approach by preliminarily verifying their central thesis.

In the next part we follow similar methodology for principled differences obtained for the three cues, as shown in fig. 1.

Again — if either SA2, SB2, SC1 OR DA2, DB2 and DC1 are comparable, then, this would be indicative of close embodied connection between language and the nature of mind, thus

bolstering the cognitive linguistics approach by preliminarily verifying their central thesis.

| | | | |
|--|------------|------------|------------|
| 1. Collating Differences from Fig. 1 (It's nothing but ERP data) | D1 D2 | D2 D3 | D1 D3 |
| 2. Principled similarities in brain data | SA2 | SB2 | SC2 |
| 3. Principled differences in brain data | DA2 | DB2 | DC2 |

Fig. 3

2) Within a dimension:

The second part of the study would entail similar comparative studies between these three stimuli– this time along each dimension independently. That is, we find out principled ERP similarities and differences for the three sets of cues – first, for the two dimensional cues, and then for three dimensional ones. Following this, we put under microscope the similarities and differences in the patterns – of these cues – but with data gathered for the same dimension. (An analogy of what we mean by patterned differences is given later in the write-up.)

FOR 3D

| | | | |
|--|------------------|-----------------------------|---------------------------|
| 1. Cues | Face Object | Object Words/Sentences | Face Words/Sentences |
| 2. Principled similarities in ERP and or fMRI data | S4 | S5 | S6 |
| 3. Principled differences in ERP and/or fMRI data | D4 | D5 | D6 |

Fig. 4

FOR 2D

| | | | |
|--|--------------------|------------------------------|----------------------------|
| 1. Cues | Faces Objects | Objects Words/Sentences | Faces Words/Sentences |
| 2. Principled similarities in brain data | S7 | S8 | S9 |
| 3. Principled differences in brain data | D7 | D8 | D9 |

Fig. 5

We can compare the brain data in two ways: One, studying principled structural patterns across both the dimensions, or of the brain data about these cues in the same dimension. In either case, if there are indeed such comparable or similar patterns in even one case – it would be a pointer to close

connection or overall structural mirroring at the neurological as well as mental level, between language and conceptual (and perhaps perceptual too) system of the mind.

In above studies (and the studies below) we talk about similarities and patterned/principled structural differences in

the brain data gathered. An analogy (not an example) of a patterned structural difference would be as regards the intriguing IPC (Inferior Parietal Cortex) lateralization associated with its functions. It has been experimentally found recently that there is a “clear *right hemisphere* lateralization of the IPC focus activated during the “free” condition” (Goldberg, 2008, pp. 595; emphasis added; the “free” condition here refers to free will). And, Michelli *et al.* (*Ibid.*) find that, “learning a second language increases the density of grey matter in the left inferior parietal cortex” (pp. 757; emphasis added). Thus, on one hand, whereas right IPC plays a role in free will, the left IPC is not known to play any role in free will; on an interesting contrast, left IPC is active in second language learning, while right IPC is not. A patterned difference can be seen here between the two areas.

PART C:

What is a metaphor and where do we place metaphor in a natural language schema? Could metaphors be regarded as an emergent feature of language, with the simple rule-based domain of language as being its basic ground?

As Schaffner says, “the main argument of the cognitive approach is that metaphors are not just decorative elements, but rather, basic resources for thought processes in human society.” (Schaffner, 2004, pp. 1258.) Thus metaphors are being increasingly perceived as interwoven with everyday language, rather than their traditional understanding as rhetorical or “decorative elements”. It is hard to address the above questions satisfactorily without having a naturalistic account of language at hand. A naturalistic account of language could be provided with a rigorous substratum by its evolutionary basis, if there is any. And if cognitive linguists maintain that language is anchored in mind’s conceptual apparatus, then one might say that it is only prudent to first embark upon examining if the cognitive system/structure of mind could be cast in the same mold as the evolutionary principles appearing in the ambit of evolutionary neuroscience. However, we have thus far been able to move hardly any forth to gain empirical ground on the question of emergence of language in humans, evolutionarily speaking - in spite of mammoth empirical and theoretical progress in biological sciences in the last century. This is due partly to the attractive tenets of evolutionary theory being not entirely indubitable

There is thus ample scope to construct structural relations between these two domains of language, or even merging the metaphorical domain into the other larger domain. What lends support to this is an interesting viewpoint being provided with increasing empirical evidence about the brain hemispheric localizations of language abilities for literal and metaphorical meaning processing. In the experiments done by Schmidt *et al.* (2007), they found empirical basis for “the idea that the left hemisphere is involved in processing familiar literal sentences and the right hemisphere is involved in

processing less familiar metaphors” (pp. 136.) What is interesting is that they also found “right hemisphere processing advantage for less familiar metaphors and left hemisphere processing advantage for more familiar metaphors” (pp. 138.)

Thus, familiar literal as well as metaphorical semantic processes are both localized in the left hemisphere, whereas less familiar literal as well as metaphorical semantic processes are both localized in the right hemisphere. This is good news for cognitive linguistics, for, this opens possibilities of structural relation at neuronal and semantic level, since similar kinds of (familiar and less familiar) literal and metaphorical linguistic entities are processed in the same hemispheres. This probably tells a significant deal for being sanguine about developing empirical theory that systematically connects metaphorical domain to everyday commonsense language. This study could be furthered by employing more sophisticated techniques such as ERPs or fMRI. The latter will give us localize information processing pathways in the brain with great precision, which are correlated (or even having the causal basis for) to semantic information processing of the mind. The various possibilities of fMRI findings would be as follows:

1] For familiar literal word and familiar metaphorical word (both in the left hemisphere): (Abbreviations: NC - Neurological candidates or neural correlates; CL - Cognitive Linguistics)

If the neurological candidates for familiar literal word and familiar metaphorical words are the same, it supports cognitive linguists’ view that language is embedded within the fundamental structure of language, and also that both these mirror mind’s conceptual apparatus. This will of course be a lengthy and demanding task, but will yield important results that will go a long way in their bearing on the enterprise of cognitive linguistics.

Note: A similar strategy could be followed for the sets of *less* familiar literal words and *less* familiar metaphorical words (both for the *right* hemisphere), and a similar figure could be drawn. The results would be followed in the similar fashion as above. We skip this and consider next familiar literal word in left hemisphere and less familiar literal word in the right hemisphere.

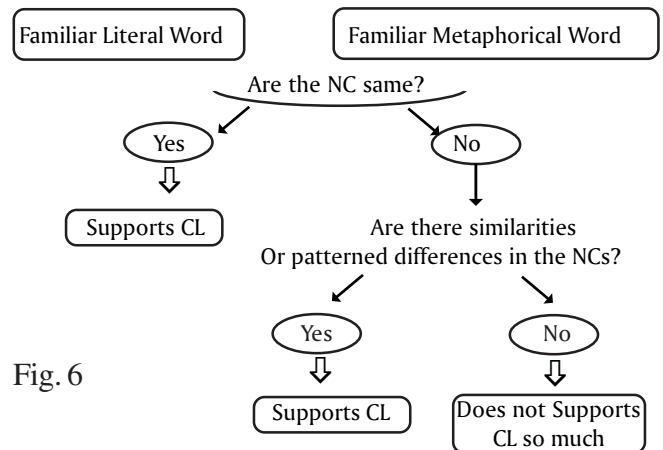
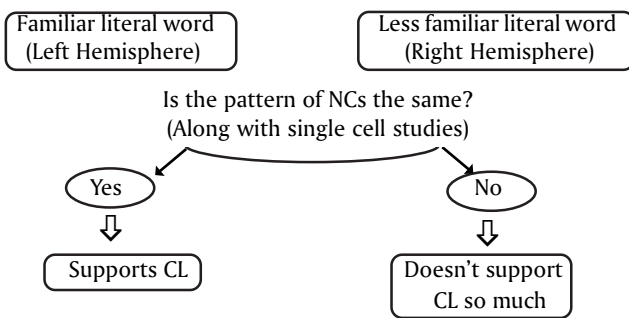


Fig. 6



2] For familiar literal word (Left Hemisphere) and *less* familiar literal word (Right Hemisphere):

After a group of familiar literal word and familiar metaphorical word in left hemisphere, and a group of *less* familiar literal words and *less* familiar metaphorical words (both for the *right* hemisphere), we next considered, as shown in the above figure - familiar literal word (Left Hemisphere) and *less* familiar literal word (right hemisphere). And this in turn would be followed by – familiar metaphor (left hemisphere) and less familiar metaphor (right hemisphere); above figure represents only the former part, but a similar figure representing the latter strategy could be drawn. In these two cases, the NCs won't be the same as their abode is in two different hemispheres. What we study, therefore, using single cell study techniques and also studying neurons in groups, is the presence or absence of patterns in the NCs. If indeed there does exist even a remotely comparable pattern, then that would be a pointer to a relation between these two forms of linguistic entities – which would support the enterprise of cognitive linguistics the way mentioned above.



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Myth of consciousness

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ABSTRACT

Consciousness is a widely debated issue in philosophy. There are innumerable theories which purport to explain consciousness, or which try to deny any such phenomenon called consciousness. My task here is to examine the concept called “consciousness” and try to come to grips with it. Firstly, I will try to show the ordinary usages of the term we call consciousness. I will propose that the term consciousness is elusive, it cannot be defined without circularity.

Secondly, I will examine the concept called Qualia, and give my reasons why I particularly would like to target it.

Thirdly, I will give summary of Dennett’s arguments by which he tries to prove that there is no such thing as Qualia.

Fourthly, I will try to show how far Dennett is successful in denying Qualia.

Lastly, I will conclude that there is no such phenomenon called consciousness apart from the body. To insist upon such a phenomenon is to invest in some myth. I will propose that the whole structure of consciousness, and the human sense of self-control and purposefulness, is a user illusion. We do not have conscious control over ourselves at all.

Keywords: *Consciousness; Qualia; The knowledge argument*

INTRODUCTION

The title certainly is a presumptuous one, but I am not jittery about it. In spite of my audacious title, what I am going to convey to you is very simple. I am going to contend that consciousness apart from the body is a myth; we do have a lot of baggage involved in it. To prove my contention I will firstly talk about the term consciousness used in an ordinary language, secondly, I will try to define the phenomenon called Qualia as it forms an important linchpin in the argument on the issue of consciousness. Thirdly, I will talk about Dennett’s celebrated article “Quining Qualia” in which he has attacked the notion of Qualia maintaining that Qualia, as understood in the philosophical circle today has no explanatory power. I will give summary of Dennett’s arguments by which he tries to prove that there is no such thing as Qualia. Fourthly, I will sum up the discussion.

The other day, I was sitting with a friend in the evening, listening to Ravi Shankar’s Sitar music. Let me talk about that experience. The sun was setting; the sky towards the west was blood red. The smoke of my pipe was rising and disappearing towards heaven. The powerful notes of Marva were sweet and nostalgic, alluding to the lost memory, the memory that was sweet, poignant but somehow elusive. I was aware of my friend

sitting alongside me; her companionship added a subliminal grace to the whole experience.

This is a conscious experience. I am aware of it. Let me see, this conscious experience is possible because of Qualia, the stuff that makes the qualitative conscious experience possible. The first puff of my pipe was different from the second and third and so forth. The initial notes of Marva were felt differently from the latter notes. The first glimpse of the blood-red sky was qualitatively different from the second and third and so on. Not only that, but the friend who was sitting with me had her own “Private” experience about which I can never allegedly know, she had her own smell of my pipe tobacco, (perhaps nasty), she had her own qualitative visual experience, her own qualitative hearing experience. Perhaps she liked the Sitar music, perhaps she did not. Perhaps she could not appreciate the delightful melody of Marva. Perhaps the music was little irritating to her untrained ear! When I asked her to describe her present experience, she was slightly confused. “Describe what?” she shot back at me.

“I do not know, you philosophy students give me screaming abdabs!”

However, when I would not be satisfied unless she would

comply, she tried to narrate her experience. At the end, frustrated, she complained that howsoever hard I try to explain it to you and howsoever sympathetic you are to me and howsoever hard you try to understand my experience, I will never be able to tell you about it.

(a quintessential scenario to prove “consciousness exists” and Qualia are (A) subjective, (B) intrinsic, (C) non-intentional, (D) non-physical, (E) Private, (F) ineffable, (G) mental atomic qualities, isn’t it? Well, doubtful, at the least! That is what I am here to propose.

1. What is consciousness?

Well, the question certainly is a deep one, in answer to which volumes of books have been produced by philosophers. The groaning library shelf contains enormous collection of books right from dogmatic assertions to carefully articulated and well-presented arguments in support of consciousness. However, one thing is certain, as Professor Rajendra Prasad had noted, “in spite of the fact that a lot has been written on consciousness, still it is not easy to give a neat, handy, analysis of it, profitably usable in a short note.” Ordinarily we understand consciousness in different ways. Firstly, consciousness may signify awareness. In the above narration, we both were aware of our surroundings, we were conscious of our surroundings. We use “awareness” and “consciousness” synonymously.

Awareness can mean the ability to perceive, more specifically, the ability to use senses. In this regard then, we often use the expression “She is conscious”. This expression however, we use in specific circumstances. For example, if a person is coming out from a fainting spell, or if a person is coming out of the effects of anaesthetic agent. We mean simply this by the use of the expression “she is becoming conscious”; in a manner that now the person is fully capable of using his/her senses. Hence, I said that more technical meaning of the term “conscious” would be the ability to use one’s senses.

We use the expression “conscious” in the context of knowing. “She is conscious of the fact that she is beautiful”. Roughly, this means that she “knows” that she is beautiful, she is aware of the fact that she is beautiful.

In our ordinary language, we often use the expression “conscious” as signifying perception. Hence, to be conscious means to be conscious of something. Without the perceptual content, consciousness is meaningless. The term is relational to perceiving, without the activity of perception it simply is an empty phrase signifying nothing, the source of unbounded highbrow disputes amongst philosophers.

I contend that there is no such phenomenon called “consciousness” independent of the act of perception. When I hear Ravi Shankar’s Sitar, it is an ongoing constant experience.

In such constant experience, I am hearing the Sitar music. However, there is no perception, no experience or no consciousness independent of the body. In other words, this present experience, perception or consciousness is not something separate from the body; it is not a primordial mental stuff somewhere in the mind independent of the body. There is no such mental “Stuff”.

Consciousness eludes all attempts to capture it in our language, it is a myth. At least, the way it is portrayed in our language, it is non-existent. Hence, I contend that when we use the phrase like “Pure Consciousness”, “consciousness of consciousness”, it does not signify anything.

What do we understand when we assert that there is consciousness? The friends of consciousness mean—I take it—that there is something, which exists, independent of the body. Existence is a problematic term. Do they mean to say that consciousness exists as this chair say, exists? Because existence as an empirical term, when I assert that this chair on which I am sitting, or this pen which I am holding in my hand, or this fan which is say revolving here in this room; exists. I can prove empirically that these things “Exist”. Everybody can see them, or at least, come to know them by touching or smelling or by other senses, which are physical. Where is this consciousness? Can I see it? Touch it? Taste, smell or hear it? I do not think I can.

At the most, what I can say is that I am generally aware, or conscious of the world around me. Therefore, it boils down to saying that there are activities of which I am conscious. However, there is no separate entity called “consciousness” independent of the body. Even if there is such an entity, it slips the attempts to capture it in our language.

2. What are Qualia? Why talk about them while talking about consciousness?

Consciousness—as awareness or more ornately, subjective ability of awareness—is purportedly possible because of certain qualitative entities in human minds, which are categorised as “Qualia”. These qualia are supposed to make conscious experience possible in human beings. These qualia are certain subjective atomic entities about which no adequate explanation can be given. At the most, what we come up with are certain descriptions, which may point out certain features of these qualia. However, one thing is certain, that the philosophers who propose that there is such a phenomenon as called consciousness do talk about qualia to drive their point home. According to them, any subjective conscious experience is impossible without qualia. These qualia are supposed mental stuff of which any conscious experience is made of. The above narration is supposedly an indication that a person who is undergoing the unremitting experience of say, evening, his pipe smoke, the smells around him, the Sitar

music etc. cannot experience these things without his qualia. He is constantly subjected to his various qualia—the Quale of red (Alluding to the setting sun), the Quale of smell (Alluding to his pipe smoke), the Quale of certain taste, the audile Quale (alluding to the Sitar music) are all qualia, which make this unremitting experience possible. In other words, Qualia help an individual understand “What it is like to undergo an experience”. In Dennett’s words: “Qualia” is an unfamiliar term for something that could not be more familiar to each of us: the ways things seem to us. As is so often the case with philosophical jargon, it is easier to give examples than to give a definition of the term.

Let us suppose that qualia are intrinsic, consciously accessible, non-intentional features of sense data and other non-physical phenomenal objects that are responsible for their phenomenal character. Howsoever sensory experiences are ultimately analyzed — whether, for example, they are taken to involve relations to sensory objects or they are identified with neural events or they are held to be physically irreducible events; many philosophers suppose that they have intrinsic, consciously accessible features that are neither intentional nor intentionally determined and that are solely responsible for their phenomenal character. These features, whatever their ultimate nature, physical or non-physical, are often dubbed ‘qualia’.

In the case of visual experiences, for example, it is frequently supposed that there is a range of visual qualia, where these are taken to be intrinsic features that (a) are accessible to introspection, (b) can vary without any variation in the intentional contents of the experiences, (c) are mental counterparts to some directly visible properties of objects (e.g., colour), and (d) are the sole determinants of the phenomenal character of the experiences. Accordingly, Qualia do have the following features: they are ineffable, intrinsic, and they are private and directly or immediately apprehensible in consciousness.

Dennett’s efforts in his celebrated article “Quining Qualia” is to oppose the notion of Qualia. He notes ... Theorists of the contrary persuasion have patiently and ingeniously knocked down all the arguments, and said most of the right things, but they have made a tactical error, I am claiming, of saying in one way or another: “We theorists can handle those qualia you talk about just fine; we will show that you are just slightly in error about the nature of qualia.” What they ought to have said is “What qualia?”...

3. Dennett’s arguments against the notion of Qualia:

Dennett starts his paper by explaining the title itself. The phrase “Quining”, Dennett holds, has a picturesque meaning. The

phrase “Quining”, Dennett holds, means, “To deny resolutely”. It is reminiscent of the attempts of W. V. Quine’s celebrated paper “Two Dogmas of Empiricism”; in which Quine had targeted the notion of analytic—synthetic distinction and reductionism—the supposed two dogmas of empiricism. Dennett wants to do something similar in nature. He wants to attack the notion of Qualia. He proposes that the term Qualia—as understood in philosophical circle today has no explanatory power. He is attacking the notion of Qualia as maintained by philosophers as something ineffable, intrinsic, private and directly apprehensible to one’s consciousness. Dennett explains his attack by saying that these philosophers are proposing the notion of Qualia as a last-minute defence against the creeping science. These philosophers maintain resolutely that Qualia are those phenomena, which cannot be explained by science. In fact, an experiencer cannot even articulate them.

There are three main bulwarks proposed by the friends of the Qualia. They are the knowledge argument, the inverted spectrum hypothesis, and the Zombie argument. I will deal with only one argument, namely, the inverted spectrum hypothesis.

Dennett has many strong arguments against qualia, of course, but one argument in particular effectively repudiates the notion. Specifically, in his discussion of the well known intrapersonal inverted spectrum thought experiment, Dennett shows that there would be no subjective difference between an inversion of one’s supposed qualia and an inversion of one’s reactive dispositions, and therefore, that we cannot conceivably isolate the way things look, sound, feel, taste, and smell independently of how we are supposed to behave.

The intrapersonal inverted spectrum thought experiment considers the possibility of a neurosurgical prank that would invert a person’s colour perceptions. According to the thought experiment, evil neuroscientists have switched the wires in one’s brain (or perhaps even one’s optic nerve) such that “one wakes up one morning to find that the grass has turned red, the sky yellow, and so forth.” Dennett, however, holds that there are two ways that this colour “qualia” inversion could be achieved neurologically:

1. Invert one of the ‘early’ qualia-producing channels, e.g. in the optic nerve, so that all relevant neural events ‘downstream’ are the ‘opposite’ of their original and normal values. Ex hypothesi, this inverts your qualia.
2. Leave all those early pathways intact and simply invert certain memory-access links—whatever it is that accomplishes one’s tacit (and even unconscious) comparison of today’s hues with those of yore. Ex hypothesi, this does not invert one’s qualia at all, but just one’s memory-anchored dispositions to react to them.

Dennett's point is that in both cases one thinks that one's qualia were inverted—the sky would seem yellow, bananas would seem blue—even though *ex hypothesi* only one of the surgical procedures switches one's qualia. What this means, Dennett avers, is that there is no subjective difference between “qualia” and reactive dispositions; therefore, ‘qualia’ are reactive dispositions. However, if ‘qualia’ just are reactive dispositions—which, of course, can be explained scientifically—then our ‘qualia’ are not private, ineffable, intrinsic, or directly or immediately apprehensible. Ergo, Dennett has undermined the notion of qualia.

Therefore, Dennett justifiably concludes, “what the qualophile needs is a thought experiment that demonstrates that the way-things-look can be independent of all these reactive dispositions.”

IN SUM:

We have seen how consciousness eludes all attempts to be captured in our ordinary language. We also have seen that Qualia form an important aspect of the theories of consciousness today. The salient feature of Qualia, according to the Qualiaholics is their elusive nature; science cannot give

an adequate explanation of them. Subsequently, science cannot explain the “hard problem of consciousness”.

Consciousness, I propose is a myth, not that it is not important, but we have a lot of baggage invested in it. We want to think that there is a centralised control over all our experiences. We also want to hold that there is something, which is independent, and that entity is the experiencer of all our experiences.

Philosophers are like little children. The adults teach little children by drawing a picture of man and saying “this is a man”. Philosophers draw some lines on the paper and ask, “What is this”? In short, we create something out of nothing and assert that it has meaning. Consciousness is like that meaningless jumble of lines drawn by little children. We want so much for these lines to signify something, that we start believing that it is something.

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From Data Processing to Mental Organs: An Interdisciplinary Path to Cognitive Neuroscience

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ABSTRACT

Human brain is a highly evolved coordinating mechanism in the species *homo sapiens*. It is only in the last 100 years that extensive knowledge of the intricate structure and complex functioning of the human brain has been acquired though a lot is yet to be known. However, from the beginning of civilization, people have been conscious of a 'mind' which has been considered the origin of all scientific and cultural development. Philosophers have discussed at length the various attributes of consciousness. At the same time most of the philosophical or scientific frameworks have directly or indirectly implied mind-body duality. It is now imperative that we develop an integrated approach to understand the interconnection between mind and consciousness on one hand and brain on the other.

This paper begins with the proposition that the structure of the brain is analogous, at least to certain extent, to that of the computer system. Of course, it is much more sophisticated and complex. The second proposition is that the Chomskyeen concept of 'mental organs' is a good working hypothesis that tries to characterise this complexity in terms of an innate cognitive framework. By following this dual approach – brain as a data processing system and brain as a superstructure of intricately linked mental organs – we can move towards a better understanding of 'mind' within the framework of empirical science. The one 'mental organ' studied extensively in Chomskyeen terms is 'language faculty' which is unique in its relation to brain, mind and consciousness.

Key-Words: Human brain; Mind; Computer system; Chomsky; Mental Organs; Language faculty

INTRODUCTION

The aim of this paper is to suggest that by following a dual approach – brain as a data processing system and brain as a superstructure of intricately linked mental organs – we can move towards a better understanding of 'mind' within the framework of empirical science. It begins with the proposition that the structure of the brain is analogous, at least to certain extent, to that of the computer system. Of course, it is much more sophisticated and complex. The second proposition is that the Chomskyeen concept of 'mental organs' is a good working hypothesis that tries to characterise this complexity in terms of an innate cognitive framework.

This paper consists of two parts : 1] Analogy between the human brain and computer system

2] Noam Chomsky's Idea of 'mental organ'

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Human brain is a highly evolved coordinating mechanism in the species *homo sapiens*. It is only in the last 100 years that extensive knowledge of the intricate structure and complex functioning of the human brain has been acquired though a lot is yet to be known. However, from the beginning of civilization, people have been conscious of a 'mind' which has been considered the origin of all scientific and cultural development. Philosophers have discussed at length the various attributes of consciousness. Consciousness is conscious of (outer world as well as) itself. Human being is conscious of his own consciousness.

Most of the philosophical or scientific frameworks have directly or indirectly implied mind-body duality. It is now imperative that we develop an integrated approach to understand the interconnection between mind and consciousness on one hand and brain on the other. One way of doing this is to begin by studying the analogy between human brain and a computer system.

BRAIN AND THE COMPUTER

Before exploring the analogy, it must be made clear that the

analogy is a beginning, an orientation. It is pursued to notice the similarities in order to understand the distinctive features of the human brain. The main point of the analogy is that there are different layers in both the systems.

Analogy between brain and computer system

| Computer System | Brain |
|-----------------------------------|--|
| | Creativity and Individuality (consciousness conscious of itself) |
| Software applications | Thoughts – induction, inference |
| Operating System | Memory and Interpretation |
| BIOS Basic Input Output System | Perception Centres |
| IC | Neural Pathways |
| Integrated Circuits | |
| Transistor | Neuron |
| P–N Junction | Synapse |

Can a machine develop ‘consciousness’ and creative operations? Can it become an ‘individual’? The answer is an emphatic ‘No’. The ability to idealize about everything else and itself is unique to human consciousness.

Is consciousness a unique set of inter-connections in the brain, a kind of flexible circuit board? Undoubtedly, the basis of all mental activity is physical. But we have access to the higher operations of mind in terms of thought and experience and when we try to approach the system from the lower physical end, the interconnections are not clear. It is very much like a computer. Definitely, all operations of the computer have a basis in the jumping of electrons across the P-N junctions. But as we go upwards to the higher applications, we simply can not see the operations in terms of electron movements. These higher operations have a grammar of their own which a computer user can master and make use of very effectively without at all understanding what exactly happens in the hardware as he does all these things.

In the same way, the synaptic junctions are the basic points of neuronal activity where most complex processes ultimately originate. The neural pathways are like the integrated circuits that form components of the ultimate microprocessor. They create the Basic Input Output System in terms of various perception centres, the visual cortex being the most well

developed example. As we move higher, we see something like a software similar to the operating system in the form of cognitive structures where all the inputs of the perception centres are integrated to form patterns. These patterns are created with the help of memory as well as are stored in the memory. They are retrieved later directly for use of the data or indirectly for pattern matching in future processing.

Interestingly, much of this activity is nonconscious. The more basic processes are automatic. As more complex operations take place, conscious intervention is necessary. If the processes are stored and rehearsed properly, conscious sub-routines tend to become nonconscious and automatic.

At the higher level, we have to assume the existence of some kind of Central Executive localized in the well-developed cerebral cortex, probably in the prefrontal area and the frontal lobe. This Central Executive coordinates its activities with various localized centres like Broca’s area, visual cortex, Reticular activating formation etc.

At this higher level, the role of language becomes very important. Language is a code through which most of our thoughts are represented. Language makes it possible for humans to form concepts and to relate them to the outside world. Though a lot of mental activity is symbolic and non-verbal, it is through language that we become conscious of our own mental processes.

THE CONCEPT OF MENTAL ORGAN

Noam Chomsky proposes that we can think of language as one of the ‘mental organs’ which in coordination with other mental organs carries out cognitive processes. It is important to note here that the word organ does not imply that different faculties like language are localized in a particular area of the brain. It is more of a particular alignment of neuronal connections which is flexible. It is more like the software of the operating system. *A mental organ is a set of cognitive operations that operate upon the similar type of data in similar ways to create similar type of knowledge in all human beings.* Chomsky deliberately uses the word ‘organ’ to stress the physical and biological reality of what he is referring to.

All human beings develop language regardless of conscious training or obvious rewards and punishments.

‘In my opinion, the little that we know about these questions suggests that the mind, like the body, is in effect a system of organs – we could call them ‘mental organs’ by analogy – that is to say, highly specific systems organized according to a genetic program that determines their function, their structure, the process of their development, in quite a detailed manner. The particular realization of these fundamental principles naturally depends on their interaction with the environment. If that is correct, the mind is a complex system of

*interacting faculties - it is constituted of 'mental organs' just as specialized and differentiated as those of the body'*¹

The capacity to process language data and internalize its basic system is innate in every human being. It's the operating system that we inherit, but its development depends upon the richness of the environment. Though higher level uses of language require conscious learning, the basic system is easily acquired. The elders around a child do not provide properly tuned data to the child, but his mental organ can form hypothesis, can use induction and differentiation to develop a system capable of creativity i. e. capable of creating sentences and expressing meaning which it has not heard from anyone. Like any other physical organ, there are distinct milestones in its development with a critical age after which learning can not be as effortless. Learning a new language or a new system of pronunciation after puberty is impossible without great conscious effort and motivation. There is some evidence in research on memory by Tulving and Thomson² that we have a distinct processing mechanism for semantic processing which points to a distinct cognitive faculty – the mental organ of 'language'

'Mental organ' is a concept on a unique plane where physical and non-physical (call it mental or psychological) come together. It is an interface where the basic software in the BIOS and Operating System is genetically inherited in terms of the hardware. Above this base, learning and environmental factors create higher application software. Human beings are capable of writing their own programs at the higher level and these programs are capable of being transmitted to the non-conscious hardware where they can become automatized. Of course, it must be recognized that Chomsky introduces the concept as a working hypothesis,

*'I am not about to propose all this as a new dogma, to replace empiricist doctrine. On the contrary, just as in studying the body, we must simply retain an open mind on this subject. We know a little about a number of cognitive systems, language being the most interesting case at the moment.....the important thing is to determine the deeper principles and the detailed structure of various cognitive systems, their modes of interaction, and the general conditions which each system satisfies.'*³

CONCLUDING REMARKS

The Central Executive mentioned earlier is nearest to what can be called human consciousness. It is always experienced and understood as individual consciousness where a particular organism has undergone a unique process of development of

his mental organs. Chomsky insists upon this biological nature of consciousness while accepting its limitless potential.

*'Of course, this is on the assumption that the human mind is part of nature, that it is a biological system like the others that we know about but a biological system nevertheless, with its potential scope and its intrinsic limits determined by the very factors that provide its scope. Human reason, on this view, is not the universal instrument that Descartes took it to be but rather a specific biological system.'*⁴

Cogito ergo sum - Rene Descartes

I think *therefore* I am

Or is it 'I think *because* I am'?

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The Relationship between Creativity and Mental Disorder in an African Setting

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ABSTRACT

Background. There has for some time now been recognition that there was a relationship between exceptional creative talent and mental disorder. The works of Andreasen (Andreasen, 2008) and others in this area have been very significant. However most of the research has been carried out in USA and Europe. There is very little that has come out of Africa on the subject.

Aims 1. To survey the beliefs of different groups within an African society – concerning the possibility of a relationship between creative talent and mental disorder.

2. To assess creativity within a community of people with a formal diagnosis of mental disorder.

Method. Some of the mythology of the Yoruba was examined for content concerning the behaviour of certain notable individuals and the existence of psychopathology based on modern-day criteria.

The beliefs of members of the general public and mental health professionals concerning the existence of a relationship between creative talent and psychopathology were surveyed using a questionnaire designed for the project.

A sample of patients with formal diagnoses of Affective Disorder or Schizophrenia drawn from two units – the Lagos State University Teaching Hospital and the Federal Neuropsychiatric Hospital Yaba were assessed for 'Creativity'.

Results. Although there are notable 'eccentric' figures in local mythology, the overwhelming majority of the people surveyed do not believe there is any relationship between creativity and mental illness. They however believe that engaging in creative activities helps the mentally ill to recover from illness. The mental health professionals surveyed, who were clinical psychologists and psychiatrists had a significant minority who believed that a relationship does exist, and they also strongly assert that creative activity has a therapeutic effect for the mentally ill. A survey of in-patients diagnosed with Schizophrenia and Affective Disorder failed to show a significant difference in the creativity of the two populations, as measured by the originality score of the Rorschach scale.

The survey of patients is inconclusive, based on small sample size (ten patients with a diagnosis of Schizophrenia, ten with Bipolar Affective Disorder.)

Conclusion. **The linkage between formal mental disorder is only recognised by a significant minority of mental health professionals. A significant proportion of the population believe that creative activity aids recovery from mental illness.**

More research is required into this important subject in Africa.

Key Words: Cultural beliefs; Personality; Recovery

INTRODUCTION

The relationship between exceptional talent, especially 'creative' talent, and the possibility of odd, unusual, or frankly abnormal behaviour is one that has intrigued various writers over time. Creativity is a difficult subject to define. How does one quantify the talent of the novelist, or the atomic scientist who breaks new grounds in his research?

The Oxford English Dictionary defines creativity as 'inventiveness and imaginativeness displayed in addition to routine skills.'

Sango a figure of mythology among the Yoruba, was a person prone to displays of fiery temper in which fire would issue from his mouth, killing people nearby, it may be descriptively said that he suffered from Intermittent Explosive Disorder. (312.34 in DSM IV). In the past, creativity tended to be equated with intelligence. It is now known that the two factors are independent, though most creative people appear to have an IQ of 120 and above (Andreasen & Glick, 1988). For the most part, the definition of creativity has been based on the perceived originality of the 'creative' product.

More recently, attempts have been made to quantify 'creativity' independently of the subject's fame or intelligence quotient. Often this involves a combination of an operational definition (what the person has produced) and the use of psychological markers that are said to be characteristic of creative persons (non-conforming, adventurous, sensitive, introspective, independent).

Much of the early interest of researchers focused on a suggested relationship between creativity and schizophrenia. Lumbroso (Lumbroso, 1891) introduced the concept of 'hereditary taint' to describe the relationship between the manifestation of exceptional talent ('genius') in certain people and the presence of 'madness' in 1891. In a study published in 1926, (Ellis, 1926) a researcher selected 1,020 eminent people in the U.K. They included politicians, scientists and artists. They were actually chosen more for their fame than any creative talent. The researcher found that 4.2% of his sample were 'insane' (i.e. psychotic), 8% 'melancholic' (depressed), 16% imprisoned and 5% had 'personality disorder'. Brain (Brain, 1948) observed that geniuses are more 'nervous' than other people. When they became 'insane', the diagnosis was often 'cyclothymia'. Juda (Juda, 1949) in a paper entitled 'The relationship between high mental capacity and abnormalities' explored the records of 113 artists and 18 scientists. He found 'personality disorder' to be the commonest diagnosis. Artists showed alcoholism and schizophrenia, while the scientists more frequently had affective disorder.

A Danish study (McNeil, 1971) measured psychopathology in some creative people who had been adopted away from an early age; and in their biological and adoptive relatives. It

found that 3.0% of his 'creative' sample had psychiatric diagnosis. 28% of their biological parents also had a diagnosis, while only 5% of the adoptive parents were ill. The commonest diagnosis was 'Reactive Psychosis' (A Scandinavian term equivalent to Affective disorder). In 1983, DeLong and Aldershot assessed a group of children with a diagnosis of Manic Depressive Illness. They found a higher incidence of creative abilities in these children than in a group of 'normal' children of the same age. Rust (Rust et al, 1988) reported a study designed to test the traditionally assumed relationship between creativity and schizophrenia. He and his collaborators found a relationship between creative originality and the positive cognitive aspects of schizotypal thinking. Richard (Richard 1988) working from Harvard University set out to answer the intriguing question – is there a compensatory advantage in Manic Depressive Illness? In entertaining such a possibility he had in mind the examples of Sickle Cell Disease, where the heterozygote is supposed to enjoy relative immunity from Malaria. He selected a sample of Manic-depressives, Cyclothymes and normal first-degree relatives along with matched controls. He measured their creativity using a 'Lifetime Creativity Scale'. He found creativity to be higher among the test sample than the controls. There was also creativity among normal first-degree relatives than among the ill patients themselves, with those diagnosed as Cyclothymic being in-between. The conclusion was that the liability to Manic-Depressive illness carries an advantage for Creativity, especially among individuals who are not actively ill. Working from another direction, another researcher (Jamison, 1989) took a sample of 47 famous living British Writers and Artists. These were people who had won major awards such as the Booker Prize, or were distinguished members of the royal academy of arts. She found that 38% of them had received treatment for Affective Disorder (antidepressant, Lithium and/or hospitalization). Poets and Novelists were particularly prone to mood swings, whereas visual artists were less vulnerable. It was generally recorded that the writers had intense creative episodes lasting 1-4 weeks marked by increased enthusiasm, increased energy and self confidence and high speed of mental association. These resemble the mood and cognitive components of Hypomania, without the behavioral nuisance of talkativeness, hypersexuality and excessive spending. In a similar vein, Andreason in Iowa (Andreasen, 1987) over the years collected a sample of famous writers who came to work on the University faculty. She found that 80% of the writers had had an episode of Affective Illness at sometime, compared to 30% of a control sample. 43% of the writers had bipolar disease. There was also a higher incidence of illness and creativity in the writers' first-degree relatives.

Africa is a continent on which the issue of creative expression plays a central cultural role in the everyday life of the people. Although there are myths that imply an expectation and tolerance of odd behaviour among powerful creative figures,

no formal study of the relationship between creativity has been carried out on the continent.

The present research is an attempt to add an African dimension to the discussion.

MATERIAL AND METHOD

The study was carried out in two parts. The first part involved a survey of a sample of the population in south west Nigeria on their perception of the possible connection between creativity and mental illness. Three groups of participants were surveyed. (1) 50 members of the professional mental health community comprising of psychiatrists, psychologists and mental health nurses. (2) An urban sample comprising of 200 residents of Lagos city, and (3). 100 participants from a rural area in South West Nigeria.

The second part of the study involved assessing the creativity, specifically originality of 10 participants diagnosed as schizophrenics and 10 manic depressive participants. The identification of these participants was based on the administration of the Mini Mental State Examination protocol, which was carried out by resident doctors in two psychiatric facilities in Lagos.

INSTRUMENTS:

1. The perception of the relationship between creativity and mental illness was surveyed using two versions of a questionnaire specifically customized for the mental health professionals on the one hand, and the general public on the other. The questionnaire for the rural sample was translated into Yoruba for easy understandability. The following perceptual variable were surveyed using the questionnaire:

- a. Perception of relationship between creativity and mental illness.
- b. The nature of the relationship if any.
- c. Creative persons' proneness to mental illness.
- d. Whether mentally ill persons are more creative than others.
- e. The potential for the creative process to have therapeutic effect for mentally ill persons.

2. The Rorschach Inkblot test was administered to participants diagnosed as schizophrenic and manic depressive psychotics. Specifically, the Rorschach 'O' originality score was computed as an index of creative perception. The participants were placed in diagnostic categories based on case note diagnosis and the Mini Mental State Examination.

PROCEDURE:

The professional mental health group of participants were surveyed by the two researchers. They included graduate students, psychiatrists including psychiatry resident doctors and psychiatric nurses. Urban and rural members of the general public were surveyed by two collaborators (a social worker and a psychiatric nurse). The Rorschach Ink Blot test was administered and scored by the clinical psychologist member of the research team.

Analysis of Data

The non-parametric techniques of Chi square and the Man Whitney test were used to analyze the data. The SPSS statistical package was used for this purpose.

RESULTS

Table 1
Participants' profile and obtained frequency of study variables

| Group number | Study groups | N | Variable Frequencies | | | | | | | | | |
|--------------|----------------------------|-----------------|---------------------------|----|-------------------|-----|---|-----|----------------------------|-----|----------------------------|----|
| | | | Existence of relationship | | Relationship Type | | Creative person's proneness to mental illness | | Mentally ill more creative | | Is creativity Therapeutic? | |
| 1 | s | | Yes | No | +ve | -ve | yes | no | yes | no | y | n |
| 2 | Mental health professional | 50 (m=27 f=23) | 35 | 13 | 10 | 26 | 17 | 25 | 4 | 41 | 37 | 9 |
| 3 | General public: urban | 200(m=94 f=106) | 135 | 49 | 22 | 109 | 48 | 139 | 17 | 171 | 148 | 42 |
| 4 | General public- rural | 100 (m=51 f=49) | 35 | 65 | 1 | 34 | 1 | 99 | 25 | 75 | 94 | 4 |
| | total | 350 | 205 | 12 | 33 | 169 | 66 | 263 | 46 | 287 | 279 | 55 |

Table 2
Chi Square analysis for study variables

| Nu | Participant groups | Variables | Chi square | | | |
|----|----------------------------------|--|------------|----|--------------|--|
| | | | value | df | significance | Remarks |
| 1 | All groups | Relationship exists | 18.3253 | 1 | .0000 | Significant at .001 level. Significant perception of the existence of creativity – mental illnessrelationship |
| 2 | | Relationship type | 91.5644 | 1 | .0000 | Significant at .001 level. significant perception of –ve relationship between |
| 3 | | Creative persons prone to mental illness | 117.9605 | 1 | .0000 | Sig at .001. creative persons significantly perceived as not being prone o mental illness. |
| 4 | | Mentally ill persons more creative | 174.4174 | 1 | .0000 | Sig at .001. mentally ill persons perceived significantly as not being more creative than others |
| 5 | | Creativity as therapy | 150.2275 | 1 | .0000 | Creativity significantly perceived as therapeutic for mental illness. |
| 2 | Mental health professional group | Relationship exists | 10.0833 | 1 | .0015 | Significant at .01 levels. Significant perception of the existence of creativity – mental illness relationship |
| | | Relationship type | 7.1111 | 1 | .0027 | Significant at .01 level.significant perception of –ve relationship between |
| | | Creative persons prone to mental illness | 1.5283 | 1 | .2170 | Not Significant. |
| | | Mentally ill persons more creative | 30.4222 | 1 | .0000 | Sig at .001. mentally ill persons perceived significantly as not being more creative than others |
| | | Creativity as therapy | 17.0435 | 1 | .0000 | Creativity significantly perceived as therapeutic for mental illness. |

| | | | | | | |
|---|--------------------------|--|---------------------|------|-------|--|
| 3 | General public: Urban | Relationship exists | 40.1957 | 1 | .0000 | Significant at .001 level. Significant perception of the existence of creativity – mental illness relationship |
| | | Relationship type | 57.7786 | 1 | .0000 | Significant at .001 level.significant perception of –ve relationship between |
| | | Creative persons prone to mental illness | 44.2834 | 1 | .0000 | Sig at .001. creative persons significantly perceived as not being prone o mental illness. |
| | | Mentally ill persons more creative | 26.1489 | 1 | .0000 | Sig at .001. mentally ill persons perceived significantly as not being more creative than others |
| | | Creativity as therapy | 59.1368 | 1 | .0000 | Creativity significantly perceived as therapeutic for mental illness. |
| | | General public: rural | Relationship exists | 9.00 | 1 | .0027 Significant at .01 levels. Significant perception of non existence of creativity – mental illness relationship |
| | | Relationship type | 31.1143 | 1 | .0000 | Significant at .001 level. significant perception of –ve relationship between |
| | | Creative persons mental illness | 96.0400 | 1 | .0000 | Sig at .001. Creative prone to persons significantly perceived as not being prone o mental illness. |
| | | Mentally ill persons more creative | 25.000 | 1 | .0000 | Sig at .001. mentally ill persons perceived significantly as not being more creative than others |
| | | Creativity as therapy | 82.6531 | 1 | .0000 | Creativity significantly perceived as therapeutic for mental illness. |

Table 3

Man Whitney U test result of comparison of Rorschach ‘O’ originality scores between schizophrenics and manic depressives.

| Nu | Groups | Rorschach ‘O’ scores (Means) | U | W | Exact 2-tail p | Correction for ties | | Remarks |
|----|-------------------|------------------------------|------|-------|----------------|---------------------|------------|-----------------|
| | | | 45.5 | 100.5 | 0.7394 | z | 2-tailed p | |
| 1 | Schizophrenics | 1.6 | | | | -0.358 | 0.7204 | Not significant |
| 2 | Manic Depressives | 2.7 | | | | | | |

Note: There is no significant difference between schizophrenics and manic-depressives on their scores for the Rorschach originality scores. However manic depressives seem to score slightly more than others.

General Comments:

1. There appears to be notable difference in the way mental health professionals perceive creative persons’ proneness to mental illness compared to both the urban and rural general public participant groups. These groups distinctly perceive creative persons as not being prone to mental illnesses; whereas the mental health professional group seems to be divided in their perspective. A sizable minority of them appear to feel that creative persons are prone to develop mental illnesses.
2. Rural participants do not see any notable relationship between creativity and mental illnesses; whereas both then professional and urban groups appear to perceive a significant relationship.
3. There appears to be a strong consensus of opinion that mentally ill persons are not significantly more creative than others.
4. The possible therapeutic effects of engaging in creative activities for mentally ill persons are uniformly perceived significantly by all groups.

DISCUSSION:

The mentally ill participants with a diagnosis of Affective Disorder did not show a significant increase in creativity compared to others who had a diagnosis of Schizophrenia (although there was a slight positive difference). The research employed a limited sample size and did not include a control group of people who did not have either Schizophrenia or Affective Disorder. The reason for considering this finding interesting is that the relationship for which there exists at present the most positive evidence is that between Creativity and Affective Disorder. The failure to find an association may be due to the confounding factors listed above. The result may also be influenced by the existence of symptoms of active illness in the patients surveyed.

The findings from the questionnaire survey showed that all the groups surveyed were unanimous in their belief that mental illness did not make people more creative than others, and any relationship that existed between mental illness and creativity was a negative one. All the groups also concluded that engaging in creative activities was therapeutically beneficial to persons with mental illness.

A finding of note is that while mental health professionals tended to believe that creative persons were more prone to mental disorders than other persons, members of the general

public in both urban and rural populations felt that creative persons were not more prone to mental disorders than other people. This difference might be due to the greater level of interactional experience of mental health professionals with persons with psychological and psychiatric disorders. The general public on the other hand are mostly acquainted with the creative manifestation of creative individuals. Any psychopathological tendencies might be concealed from them.

Mental health practitioners and the urban sample surveyed significantly believed that there was a relationship between creativity and mental illness, while the rural sample believed that there was no significant relationship. This might be due to the idolization of the rural folk of the creative geniuses in their midst. The urban folk and the mental health professionals might be able to have a more nuanced and objective viewpoint stemming out of their higher level of education.

There was a general consensus that mental illness did not make anyone more creative, but that engaging in creative activity was beneficial to the recovery of the patient. The perception of the potential therapeutic effect of creative activity is of particular interest in the context of this study. The possible applications of this relationship abound in the design of therapeutic programmes for the treatment of the mentally ill, and are not much recognised or employed currently in the African environment. A useful item of cultural information in this connection is that creative activities such as music and drama are routinely employed in the treatment and rehabilitation of mentally ill patients by traditional practitioners.

CONCLUDING REMARKS

The one area where there is uniformity of cultural opinion – the usefulness of creative activity in promoting patient's recovery, is a useful area of future activity, by way of practice and research. The information is not new, but the fact that it has widespread acceptance means that the people – including the patient and his relations, would have certain expectations of what environment is required for the promotion of recovery. Creating such an environment may not only directly influence the patient's recovery positively, but also increase the level of cultural confidence such a person would have in the treatment system as a whole, given the fact there he has an alternative in traditional medicine.

TAKE HOME MESSAGE:

The whole area of the relationship between creativity and mental disorder in the African context requires more active research. It would be interesting to do quantitative research to establish if the widespread view that creative activity can have a positive influence on recovery from psychotic illness is borne out by evidence.

CONFLICT OF INTEREST:

None.

DECLARATION:

The material in this paper is the original work of the authors. It has not been published in any medium.

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Questions Raised By The Paper

1. Are creative individuals truly recognised and valued in African (and other) societies?
2. Can creative talent be separated from such personality factors as personal force, dynamism, extroversion which make people stand out in the crowd?
3. Would the apparently general belief that creative activities can be therapeutic for the mentally ill be borne out by quantitative research?

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testing for politicians.

Meditation and The Brain: Attention, Control and Emotion

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ABSTRACT

Meditation has increasingly been studied within different neuroscientific experimental protocols. Attention and concentration are surely among the most important topics in those experiments. Notwithstanding, inhibition of emotions and discursive thoughts are equally important to understand what is at stake during those types of mental processes. I analyze and compare results of experiments dealing with two types of mediation: “one-pointed concentration” and “compassion meditation”.

Analyzing “one-pointed concentration”, I show the differences between novice and expert meditation practitioners in terms of brain activity and connectivity considering the relationship among increased attention and concentration and the decreased activity in areas related to discursive thought and emotion. Analyzing “compassion meditation”, I show the importance of the limbic circuitry in emotion sharing. I follow the same strategy of comparing novice and expert meditation practitioners. The conclusion establishes a common structure to those different ways of dealing with emotion during meditation.

Keywords: Attention; Concentration; Emotion; Compassion; Neural correlates of meditative states.

INTRODUCTION:

Meditation has being an intriguing source of discussion in the recent literature of neuroscience. I initially define meditation here as the authors of one of the paper I analyzing: “Meditation refers to a family of mental training practices that are designed to familiarize the practitioner with specific types of mental processes” (Brefczynski-Lewis et al., 2007). Certainly, we have several different types of meditation. Although, I only address two types of meditation here: one-pointed concentration” and “compassion meditation”. The first type of meditation (our main focus in this writing) is a mental process where the subject concentrates her/his attention on a small object or on her/his own breath not being distracted by concurrent stimuli. The second type of meditation we address here is “compassion meditation”. This type of mental process is based on training reflection to dismiss the traditional self-centered way of dealing with emotions, and to augment empathy strategies shifting one’s perspective from the first-person to an inter-subjective way of dealing of emotions.

One-Point Concentration Meditation as a subject-matter in the Lab:

As the authors assert: “The technical term for this meditation in Tibetan literally means one-pointed concentration”. (Brefczynski-Lewis et al., 2007). The main technique of this type of mental training called “one-pointed concentration” is so to focus on a small object and maintain the attention focused without surrendering to concurrent stimuli and monitoring your mental activity in such a fashion that sleepiness, agitation, dullness or inner chatter are all avoided. We must highlight something that is only fast mentioned by the authors that this type of meditation is one of the “most basic”. I would say the simplest and in some of the eastern traditions is taken to be a form of initiation to meditation. On the one hand, this simplicity could be taken for some critics as a flaw of the experiment as they do not show what happens in the brain of meditators in more advanced forms of meditation. Probably, people with a religious or mystic relationship to meditation would insist that “one-pointed concentration is

only the iceberg's tip on the way to dissolve consciousness into oneness. Nevertheless, I take the election of "one-pointed concentration" in this experiment as a felicitous option of the authors. Why? Whenever your protocol is focused on the potential difference between experts and novice if you choose a type of task that is almost impossible or bluntly attainable or even really impossible to the novice, you are not comparing the same type of processes but two different types. And that fact would compromise the whole experiment, as we would not be able to isolate one variable of study. Thus, studying "one-pointed concentration" we can understand the difference of training impact in the physiology as a gradual difference and not as a jump to another category of mental process.

As I have a very limited space here for these kinds of more detailed philosophical analysis, my strategy is to shortly describe the structure of the experiment presenting some basic philosophical comments on the experiment's results.

The experiment and its protocols:

The experiments were based initially in three groups of meditators: Novice, Novice with incentive and Experts. 14 Experts (EMs), 16 Matched age Novice (NMs) and 11 Novice who would have a financial incentive if they were among the top one-third in activation of attention-related areas (INs). These novices in general receive a week before the experiment instructions on how to meditate and practice concentration and two other forms of meditation 1 hour a day (20 min each), per one week. During the experiments was understood that splitting the experts groups into two would be a better strategy to understand the results as among the experts we have considerable difference hours of training. Thus the group of experts was divided into LHEMs (less hours of meditation practice - mean hours: 19,000; range 10,000 - 24,000) and MHEMs (top four - most hours of meditation practice - mean hours: 44,000; range 37,000 - 52,000).

In the Meditation block paradigm, the authors designed an experiment in which the participants alternate concentration meditation and neutral resting states. Although, this first experiment is contrasted in a cross-sectional way with another one in which were used distracting sounds. The use of distracting sounds aims at testing the participants' distractibility in face of external stimuli. International Affective Digitized Sound was the matrix in case and the participants were exposed to 25 stimuli of 2 seconds each in a random order in terms of valences (positive, neutral and negative).

Results and Philosophical Discussion:

NMs showed less activation in attention ROIs (region of interest) than EMs. The only exception was the thalamus. Although the difference between INMs were not very significant compared to EMs. Splitting the EMs into two groups (LHEMs and MHEMs)

was possible to trace an inverted U-shaped function in which NMs constitute the group with less activation, INMs the second lowest, LHEMs are in the top and MHEMs show less activations than MHEMs. As the groups of LHEMs and MHEMs were age-matched and culture-matched, the main hypothesis is to credit their differences in activation to training, skill learning and plasticity. The traditional idea in Asian culture and religions that meditation starts as an effortful practice and with time turns into a more natural and less effortful process seems to be possibly represented in the results of this experiment. Achieving the same results with less cognitive effort would be a good scientific proxy of the cultural idea of a quieter mind.

Another result not much commented by the authors is that EMs show a more spread map of activation if we take in account the whole brain. This fact could suggest that meditation implies in a form of widespread brain activation in a low and coherent level. 'Quietness' would not be a 'shut off' function or a literal nothingness or emptiness state, although a widespread low activation. It is especially notable that EMs show considerably less activation in discursive thought and emotional areas. This result is in accordance with the traditional idea that meditation (as a way to a 'quiet mind') is a way to dismiss language and everyday mood swings.

Distracting Sounds were also used as to probe concentration. EMs had less activation in areas such as Posterior Cingulate, precuneus and MeFG/Acc. They had also less activation in DLPFC, caudate and pulvinar. Negative correlation with hours of training was also shown in intraparietal lobule, fusiform and P. temporal. The general picture we can extract from these results is that default-mode and affective areas is negatively correlated with hours of practice suggesting that more trained meditators were less disturbed, having less reactions to the sounds. Although, there were positive correlations with hours of training for a various areas such: Insula, subthalamic, IFG and supplementary motor area. Even less disturbed by the sounds, that suggests that the more experienced meditators would be more likely to respond in case of need of a motor action.

In the case of negatively affective sounds the difference of EMs and the other groups was even more significant, showing less Amygdala activation. These results suggest that more experienced meditators are not deeply affected or disturbed by negative afferent stimuli in accordance with the traditional idea of concentration as a mind 'clean up'.

Some Topics on Compassion Meditation

Compassion meditation is a technique of developing a positive feeling toward others that starts concentrating on beloved people and after some training trying to achieve a non-referential altruistic love.

Based on verbal self-reported intensities was possible to trace a correlation of more activation in ACC and Insula in Good vs. Poor blocks of mediation. Increased activation in the right pSTS and TPJ among experts suggests that compassion meditation augments empathic shift of perspective and emotion sharing. The fact that the right IFG also showed greater activation in experts together with the aforementioned results would represent that experts have more sensibility to unexpected and salient behavioral stimuli. As Amygdala showed also greater activation, compassion meditators could be taken as more sensitive to behaviorally salient events as the suffering of others and meta-cognitive voluntary processes such as self-controlled empathy.

CONCLUDING REMARKS:

Meditation is a powerful form of training focus and inhibition. Attention and self-control are strictly related during meditation. Discursive thoughts and emotions are inhibited during concentration meditation. In the case of compassion, emotional sensibility is increased. As we have very limited space here, I will focus on some specific points of correlation of those two types of meditation. In both cases we have a self-regulatory process in which certain areas are inhibited. In the case of compassion meditation, instead of a spontaneous process of empathy, we would have a self-controlled activity aiming at empathy. The great difference from 'one-pointed concentration' to 'compassion meditation' is related to activation of emotional areas, inhibited in 'one-point concentration'. Discursive thought areas are not primary important in both forms of meditation challenging the idea that language is essential to all forms of consciousness.

TAKE HOME MESSAGE:

Meditation is a superb form of self-control and a very healthy practice. It augments focus and attention and could be used to enhance empathy and all attentional capacities. It is worth of practice and could lead to more quality in one's lifestyle.

CONFLICT OF INTEREST:

None declared.

DECLARATION:

This is my original unpublished contribution, not under consideration for publication elsewhere.

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Questions That This Paper Raises:

- 1) To which extent are mental training and plasticity connected?
- 2) Consciousness needs a higher-order thought or a global pattern of coherence suffices for it?
- 3) How is meditation related to other forms of mental training?
- 4) Could meditation be used as a form of controlling automatic emotional circuitry?
- 5) Could meditation be used to control parasympathetic circuitry?

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Mind-Body Dualism: A Critique from a Health Perspective

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ABSTRACT

Philosophical theory about the nature of human beings has far reaching consequences on our understanding of various issues faced by them. Once taken as self-evident, it becomes the foundation on which knowledge gets built. The cause of concern is that this theoretical framework rarely gets questioned despite its inherent limitations and self-defeating consequences, leading to crisis in the concerned field. The field which is facing crisis today is that of medicine and the paradigmatic stance that is responsible for the crisis is Cartesian dualism - a view that mind and body are essentially separate entities. This paper discusses Cartesian dualism in the context of the practice of medicine. Focussing more closely on how disease, health and treatment are defined through this position, the paper builds up its critique by throwing light on its accomplishments, limitations and self-defeating consequences. The paper also seeks to understand why this dualism is still alive despite its disavowal from philosophers, health practitioners and laypeople.

INTRODUCTION

Mind and body dualism represents the metaphysical stance that mind and body are two distinct substances, each with a different essential nature. Originated in the ancient period, a well-known version of dualism is credited to Rene Descartes of the 17th century. According to him, human beings consisted of two quite unlike substances which could not exist in unity. Mind was unextended, an immaterial but thinking substance and body was an extended, material but unthinking substance. Body was in space and was subject to mechanical laws; mind was not in space, nor was its operations subject to mechanical laws (Descartes, 1952). Therefore, as described by Ryle (1949), "A person... lives through two collateral histories, one comprising of what happens in and to the body, the other consisting of what happens in and to his mind... The events in the first history are events in the physical world, those in the second are events in the mental world" (pp. 11-12).

Mind and Body Dualism: Liberating and Confining Force in Medicine

Mind and body dualism was the critical conceptual leap (Moon, 1995) that was desperately sought at that time in history. Before its advent, the prevalent orthodox Christian views of the mind-body relationship had greatly thwarted the development of medical science. According to these views, human beings were spiritual beings; body and soul were one. Diseases were

attributed to nonmaterial forces such as personal/collective wrongdoing. It was also believed that for the soul to ascend to heaven, the human body had to be preserved intact (Walker, 1955). As a result, there was a religious prohibition on the study of human anatomy through dissection. Descartes, through mind - body dualism, demythologised body and handed over its study to medicine. Thus, the way was paved for the progress in medical science through the study of physiology and anatomy. At the same time, by isolating mind, mind body dualism denied its significance in individuals' experience of health.

Mind and Body Dualism: Methodological Implications

Dualism also laid the groundwork for positivism - logical thought based upon empirical - unbiased, impersonal and unsympathetic observation and measurement. By making objective realm posited "outside" by the knowing mind the only legitimate domain of enquiry; Descartes advocated a complete and exact natural science through analytic method. This method involved the breaking up of a problem into pieces and rearranging them in a logical order. Under the spell of "scientific revolution" that ushered in, disciplines like physics, chemistry and astronomy flourished and became prototype of an exact science. The success of the scientific method reinforced Descartes' philosophy and methodology further

and contributed to dogma of scientism (Klein and Lyytinen, 1985) - the belief that scientific method was the only appropriate and legitimate path to the knowledge. This is an issue because certain disciplines do not lend themselves to scientific method without running the risk of incomplete and at times distorted understanding of their subject matter. The field of medicine, by adhering rigidly to scientific method, mislaid its subject matter and gave up its moral responsibility towards the real health concerns of human beings.

Mind and Body Dualism: A Basis of Biomedical Model

The dualistic stance of human nature and analytical method determined the biomedical model in medicine. Accordingly, human beings are viewed as biological organisms (materialism), to be understood by examining their constituent parts (reductionism) using the principles of anatomy, physiology, biochemistry and physics. Disease is seen as a deviation from the biological norms, caused by some identifiable physical or chemical event and intervention involved introduction of a corrective physical or chemical agent. Consequently, health came to be defined as an absence of disease and got associated with activities of doctors to the extent that to most people, medicine became synonymous with health (Hart, 1985).

New Understanding of Human Nature and Health

Today our understanding of human beings has changed significantly as reflected in Merleau-Ponty's (in Gold, 1985) notion of the "lived-body" and Sprenger's (2005) summary of characteristics of living organisms. The "lived-body" notion maintains that body is not an object, but "multiphasic, experiential beings of finite freedom" (Gold, 1985, pg. 664). It is a nucleus of one's consciousness/intentionality. Moreover, living systems came to be seen as systems (of which mind and body is a unit) which are integral parts of larger systems, in permanent interaction with their environment and capable of constructing their own subjective realities. These views challenge both dualistic nature of human beings and exclusive viability of positivism to pursue knowledge that is not "objective". Simultaneously, health also came to be viewed as something positive (Siegrist, 1941) and eventually, it received its missing dimensions when WHO (1947) defined it as a state of complete physical, mental and social well-being. More specifically, it is seen as "the capacity, relative to potential and aspirations, for living fully in the social environment" (Tarlov, 1996, p 72).

In the context of this new understanding of the nature of human beings and health, the question is - how medicine with its narrow focus on biological factors and cure of disease will help human beings achieve health which is multidimensional in nature and prevention and promotion of the same as

important goals as treatment? Emergence of diseases that have psychological, social and environmental components as part of their etiology also challenged the hegemony of biomedicine. The consequence of this paradigmatic error is discordance between what contemporary medical professionals have got to offer and what lay people expect from them. A focus on the human body made the field of medicine address diseases with complete disregard for illness - personal, interpersonal and cultural reactions to disease. As freedom from illness is as much needed as freedom from disease to experience health and well-being, what one finds rampant is patients'/family's dissatisfaction with contemporary medicine. Part of dissatisfaction is also due to disempowerment of patients and dehumanization of medical care - cold, impersonal, technical style of clinical practice shaped by notion that body is a machine devoid of self (Kriel, 2003). Ever increasing litigation rate, patient noncompliance, increasing resort to alternative practices, mounting consumer criticism (Kleinman, Eisenberg and Good, 1978) also reflect failure of the biomedical model to cope with laypersons' health issues.

Why mind-body dualism is still alive?

As a reaction to the inadequacies of mind and body dualism, several non-dualistic philosophical frameworks have been proposed. Still mind and body dualism persists in the field of medicine. The reasons are multiple: The medical knowledge of the last three hundred years is built on the biomedical model. Lot of money, energy, dedication has been invested in this field, which has paid back hugely in terms of technological success. This success has made medicine a very powerful and all encompassing health care field. This is exactly what reinforces the philosophy that formed the basis of biomedical paradigm (Kriel, 2003). The pharmaceutical companies have great stakes in the existing medical system and opt for status quo by funding research that reinforces the biomedical model. Established importance of drugs in the treatment of diseases, drug taking as a norm for any health concern and cultural tendency to expect quick fixes do not allow paradigmatic change to take place in favour of alternative and complementary medicine based on holistic view of human beings. Physicians are neither aware of the philosophical framework within which they operate nor do they realize the power such model exerts on their thinking and behaviour. It is so because the dominant model is not necessarily made explicit, though the entire socio-cultural and educational context of medical education/training reflects the prevailing conceptual model of nature of human beings, health and disease (Kriel, 2003). Such strong is the influence of these philosophical frameworks that they act as blinders and human beings who are known as cognitive misers (Taylor, 1981) tend to treat them as facts and whatever does not fit into the paradigm as trivial or even nonsense. Therefore, even when a more unified conception of mind and body serves as a more

accurate picture of the human condition, physicians rather stick to the familiar cultural modality of dualistic thought to match the thinking of their mentors and colleagues. Like medical practitioners, patients too perpetuate the mind and body dualism. Being a product of modern dualistic culture, they tend to feel sceptical about nonbiological explanations for their illnesses, as they appear unreal, illegitimate, and unscientific in nature (Duncun, 2000)

CONCLUDING REMARKS

Mind and body dualism was the convenient philosophy that used the “divide and conquer” strategy to cope with the prevalent religious thinking and subsequently, fit well to deal with the complexity of human nature. It, however, cost us dearly, as it took us away from the dynamic nature of human beings, their relationship with the environment and their real health concerns and to that extent blocked the development of effective interventions. Our journey towards knowledge and understanding of nature has never been seamlessly forward moving. Mind and body dualism and its influence on medicine is a prototype of that same journey of great strides forward and a huge leap backward.

CONFLICT OF INTEREST

None.

DECLARATION

The paper is my original unpublished/ unrepresented work.

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QUESTIONS THAT THE PAPER RAISES

1. What kind of metaphysical stand with respect to mind and body relationship is conducive to address the health issues of human beings?
2. Which methods of investigation should supplement the analytical method to study all the influences on health of human beings?
3. How can one bridge the mind body divide that is persisting despite its self-defeating consequences in the field of medicine? Where should we begin?
4. Can alternative and complementary medical practices (based on a different set of assumptions) originating in different cultures be integrated in conventional medicine to affect improved health care? If yes, how? If no, what are the obstacles?

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Dream Consciousness and Dream Argument

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ABSTRACT

The Nature, origin and functions of consciousness are some of the great mysteries of human existence. Scientists have tried to study “consciousness” and altered states of consciousness. Dreaming is one such altered state of consciousness, in which picture stories are constructed based on memories and current concerns or on images. Neurology and other sciences have deciphered the process of dreaming which is universal. However it doesn’t explain the unique experience of every dreamer and unique content of the dream, which is studied by psychoanalytic thinkers like Freud, Carl Jung and Boss. This study emphasizes three qualities about the experience of dreams.

- a) Its similarities with real waking life experience.
- b) Unique way of introducing meaning into our experiences.
- c) The quality of dream consciousness, which makes us believe that what we are experiencing is reality and which gets falsified after waking experience.

On the basis of these qualities the dream consciousness argument in Western Philosophy and Upanishadic Philosophy is formulated. They proclaim that we may arise at such a level of consciousness wherein our life experience may be proved to be just a dream.

The argument becomes difficult to refute for us who have daily experience of dreaming, which is quite similar to our waking life.

Key words: Dreams; Consciousness; Interpretation of Dreams; Quality of Dream Consciousness; Levels of consciousness

INTRODUCTION

The Nature, origin and functions of consciousness are some of the great mysteries of human existence. Scientist have tried to study ‘consciousness and altered states of consciousness such as those produced by drugs, dreams, hypnosis, sleep and waking experiences. Consciousness may be described as a state of awareness. It is awareness of our self and the external world. The awareness of thoughts, sensations, memories and world around us represent the experience of consciousness. According to Kihlstrom, consciousness involves:

Monitoring our environment and ourselves so that we are able to initiate and terminate behavioral and cognitive activities. Thus the two important elements of consciousness are monitoring and controlling.

DREAM CONSCIOUSNESS

Dreaming is regard as an important altered state of consciousness in which picture stories are constructed based on memories and current concerns, or on fantasies and images. Thus dreams are a succession of images, thought, sounds or emotions passing through the mind during sleep. The content and purpose of dreams are not fully understood though they have been a topic of speculation and interest throughout recorded history. The scientific study of dreams is known as oneirology.

Dream provides a unique experience. The dream’s presentation of a story, is meaningful in its own right. It is a real original unique form of human existence; it also discloses unrealized possibilities in dreamers waking life.

The allure of dreams is precisely providing an experience of

something “beyond” objective presence. Furthermore, this “beyond” isn’t usually something that a dreamer can choose in advance - Even a person who goes to sleep seeking to have a specific question answered in a dream may not get that. This characteristic of dream shows that the dreaming experience is arising from an unforeseen depth of our mind.

As it is rightly described, dreams “take” the person. It is more accurate to describe the experience of dreaming as Medard Boss does, in terms of “it dreamt me.” The only exception is the rare experience in a lucid (i.e. in which a dreamer is aware that it’s a dream) dream.

Two approaches towards study of dreams

Two different approaches have dominated 20th century psychologist’s understanding of dreams, both of which are rooted in much older assumptions about dreaming.

One school of thought explains dream as neurophysiological event. Neuropsychologists believe that dream is not the reflection on waking life but a nervous system activity within the brain. As such “dream” is like a nonsensical noise created by our brain without having any personal live meaning. The physiological details about dreaming are described by the scientist, and according to them this precisely amounts to the explanation of dreaming experience.

On the other hand the other school of thought explains dream as meaningful experience of a dreamer’s sleeping life. It tries to explain the specific content of the dream.

Specifying physiologically what happens in the brain when a person is dreaming is not same as understanding the dream itself. Mapping the neurology of the dream is like analysis of ink and print of a book but that does not explain the matter of the book anymore. By dismissing in advance the meaningfulness of dreams, neurophysiology and psychology cannot address the question of why a dream should form precisely the particular synthesis it does, rather than some other. In other words the meaningful experience of the dreamer and the state of consciousness of the dreamer is not explained per say by neurology. Therefore the understanding of the dream itself requires a different level of psychological investigation.

Attempts at psychological interpretations of dreams in psychology

Freud pioneered this type of study with his psychoanalytic theory of dreams and much more followed Freud. Freud interpreted the meaningfulness of dreams as fulfillment of repressed unconscious wishes usually originating in the childhood and mostly of a sexual nature. He viewed the plot of the dream as its manifest content as a disguise, or as a merely

symbolic substitution of something else that remained concealed, e.g. the various symbols are commonly discovered in people’s dreams.

A variety of subsequent psychoanalytic theorists modified Freud’s original insight. Carl Jung developed the most richly elaborated view of dream symbolization. He considered dreams as originating not in ones individual unconscious but from a “collective unconscious” and understood them as compensation for imbalances within ones waking life. However these physiological details are universal, they are true about each and every dreamer, but the dream content is unique and different for everybody. Therefore Ludwig Binswanger and Medard Boss independently were the 1st psychoanalysts to explore dreamers experience phenomenologically, rather than searching behind or beneath the dream for a symbolized reality cut off from the dreamers experience. Ludwig Binswanger and Medard Boss recognized the imaginative powers of dreams as dreamer’s movement into the real. They understood how the dream itself is meaningful to the dreamer and not as a symbol for something else but as original mode of existing on its own terms. They saw dreams as a movement by which dreamers imaginatively project themselves towards the truth of their personal histories.

In other words phenomenology of dreaming takes dreams as “allusions” pointing to the reality, rather than as “illusions” pointing away from it. So instead of interpreting dreams phenomenon as symbols, Boss recommended explicating them with their array of spontaneous references and relationship in the dream itself.

Dream interpretation-Introducing meaning uniquely into our experiences.

Dreams were historically used for healing (as found in the ancient Greek temples of Asclepius) as well as for guidance or divine inspiration. Some Native American tribes used vision quests as rite of passage, fasting and praying until an anticipated guiding dream was received, to be shared with rest of tribe upon their return.

During the late 19th and early 20th centuries, both Sigmund Freud and Carl Jung identified dreams as an interaction between the unconscious and conscious. They also assert together that the unconscious is the dominant force of the dream, and in dreams it conveys its own mental activity to the perceptive faculty. While Freud felt that there was an active censorship against the unconscious even during sleep, Jung argued that the dreams bizarre quality is an efficient language, comparable to poetry and uniquely capable of revealing the underlying meaning.

Fritz Perls presented his theory of dreams as part of the holistic nature of Gestalt therapy. Dreams are seen as projections of

parts of the self that have been ignored, rejected, or suppressed. Jung argued that one could consider every person in the dream to represent aspects of the dreamer, which he called the subjective approach to the dreams. Perls expanded this point of view to say that even inanimate object in the dream may represent aspects of the dreamer. The dreamer may therefore be asked to imagine being an object in the dream and to describe it, in order to bring into awareness the characteristics of the object that correspond with the dreamer's personality.

Dreams and psychosis

Introducing meaning uniquely into our experiences

One of the important characteristics of dream consciousness is its similarity with waking life consciousness. Certain peculiar states of mind during waking life share a remarkable similarity with dream consciousness. A number of thinkers have commented on the similarities between the phenomenology of dreams and that of psychosis. Features common to the two states include thought disorder, flattened or inappropriate affect (emotion), and hallucination. Among philosophers, Kant, for example, wrote that 'the lunatic is a wakeful dreamer. Schopenhauer said: 'A dream is a short-lasting psychosis, and a psychosis is a long lasting dream'. In the field of psychoanalysis, Freud wrote: 'a dream then, is a psychosis' and Jung: 'Let the dreamer walk about and act like one awakened and we have the clinical picture of dementia praecox'.

These observations made by great thinkers point out to the fact that dreaming is a unique state of consciousness and in certain cases the demarcation between waking life and dreaming is difficult to draw. Even a common man who dreams every night is sometimes confused about the events, whether they are real or from dreams.

On the basis of phenomenological interpretation of dreams, a dream argument has been developed in Western Philosophy as well as in Upanishadic Philosophy. A dream argument emphasizes three qualities of dreams namely

- 1) Its similarity with real waking life experience.
- 2) Its unique way of introducing meaning into individual experiences.
- 3) The quality of dream consciousness, which makes us believe that what we are experiencing, is utmost reality & which gets falsified only after waking up.

The argument may be shortly stated as follows.

Dreaming and the "real world"

Dreams can link to actual sensations, such as the incorporation

of environmental sound into dreams such as hearing of a phone ringing in a dream while it is ringing in reality. Except in the case of lucid dreaming, people dream without being aware that they are doing so. In other simple words, dreaming experience is many a times similar to waking experiences. Dreaming consciousness is falsified by waking consciousness. So there is every possibility that we may arise at such a transcendental level of consciousness where by our waking experiences may be falsified and we may arrive at different meaning of our earlier experience. Shankaracharya has put fourth this argument very forcefully by introducing the principle of three levels of reality and three levels of consciousness. They are called as:

- 1) *Pratibhasik satta* — Dream consciousness or dreaming level of reality.
- 2) *Vyavaharik satta* — Waking life consciousness or level of worldly reality.
- 3) *Parmarthik satta* — Transcendent level of consciousness or level of ultimate reality.

The quality of dream consciousness, which makes us believe that what we are experiencing is a reality and which gets falsified only after waking up. On the basis of this phenomenological experience, philosophers like Shankaracharya have drawn analogy upwards. Waking consciousness is higher than dreaming consciousness and therefore it falsifies the dreaming consciousness. (eg. we laugh when we wake up and realize that the tiger which we saw was in our dream.) In the same manner we may wake up at a higher level of consciousness where by our entire waking life experience may get falsified and this stage of higher consciousness is nothing but the ultimate level of reality.

In other words some philosophers have concluded that what we think as the "real world" could be or is an illusion or a dream (an idea known as skeptical hypothesis about ontology). The first recorded mention of the idea was by *Zhuangzi* in the western world. However this idea is thoroughly discussed in *Vedanta* philosophy Hinduism: Buddhism. It was formally introduced to Western Philosophy by Descartes in the 17th century in his *Meditations on First Philosophy*

Reference of Dream Argument in Upanishadic Philosophy.

In *upaniṣadic* philosophy the nature of soul is suppose to be pure consciousness. A human being as regarded as an entity consisting of the self (and the nature of the self is suppose to be self luminous consciousness) mind senses and the body. It is through consciousness that we are able to know the things of the world making use of the mind and the senses. This consciousness functions at various levels. The analysis of which is given as follows:

The self is one. Its knowledge destroys all dualism.

Jiva is different from body, mind, intellect and senses. It is beyond these. It is the knower, the enjoyer and the doer, Eternal, consciousness. It is without beginning and without end. But it does not possess infinite knowledge. It is beyond birth and death and does not die with the body. It has the freedom of will. It is caught in bondage due to its actions. It is subject to re-birth. It is rebirth is according to its *karmas*. *Jiva* has four stages of consciousness:

1. *Waking*—In the waking stage, *Jiva* is called '*vaiswaner*' who enjoys worldly objects through external senses.
2. *Dreaming*— In the dreaming stage, *Jiva* is known as '*Tajjasa*', who knows the subtle internal objects and enjoys them through the mind.
3. *Sleeping*—In the *Turiya* stage *Jiva* is called "*Pranja*" which is one uniform, conscious and bliss and does not perceive internal objects. It is also called as *sushupti*.
4. *Turiya*—In the *Turiya* stage *Jiva* is known as "*Atman*" which is neither conscious nor un-conscious, but one, non dual, universal consciousness. This *Atman* is *Brahman*.

These four stages describe thoroughly four levels of consciousness, in which each level of consciousness transcends the earlier stage of consciousness. The *Turiya* stage is the stage of highest level of consciousness.

The *manukya upanisad* gives us an analysis of consciousness leading to the same conclusion the soul has three conditions which are all included in a fourth they are waking dreaming sleeping and *Turiya*

The waking experience falsifies the dream experience. The dreaming and waking experience are falsified by deep sleep experience. *Turiya* transcends all the earlier levels of consciousness and the Brahman within the self is expressed in its original self-luminous form.

CONCLUSION

A lot of neurophysiological research has taken place on "dreams". It explains the biological details about dreaming. But when it comes to phenomenological interpretation we may still consider the dream argument propounded by

Upanishads philosophically.

What is most striking about dreams is their similarity with waking life experiences. What is most striking about consciousness is its capacity to go beyond itself. On the basis of these two facts about dreaming and consciousness we may consider the plausibility of the dream argument. There is every room to believe that a human being is capable of having experience of higher state of consciousness which goes much beyond dreaming, waking and sleeping consciousness. Such an experience may be highly meaningful for that person.

Secondly dreams introduce some meaning in our experiences (how so ever funny and weird it may seem to be). This is also a unique capacity of our consciousness which is called as intentionality in phenomenology.

The function of consciousness is to introduce meaning into bizarre experiences of the world. There is every possibility that we may wake up at higher level of consciousness and able to give meaning to the earlier experience in the totally new light

Science may decipher such experiences of consciousness as purely neurological, and may provide us with neurological, biological mapping of these experiences but the content of such experiences seems to be still away from the boundaries of science.

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John Locke on Personal Identity

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ABSTRACT

John Locke speaks of personal identity and survival of death. A criterion of personal identity through time is given. Such a criterion specifies, insofar as that is possible, the necessary and sufficient conditions for the survival of persons. John Locke holds that personal identity is a matter of psychological continuity. He considered personal identity (or the self) to be founded on consciousness (viz. Memory), and not on the substance of either the soul or the body.

Key Words Personal Identity; Consciousness; Self; Memory; Survival after death

INTRODUCTION

The issue of personal identity and its determinants has been always an issue of concern for a lot of philosophers. Questions are raised as to what does being the person that you are, from one day to the next, necessarily consist in? Personal identity theory is the philosophical confrontation with the most ultimate questions of our own existence: who are we, and is there a life after death? This sort of analysis of personal identity provides a set of necessary and sufficient conditions for the identity of the person over time. In the modern philosophy of mind, this concept of personal identity is sometimes referred to as the diachronic problem of personal identity. The synchronic problem is grounded in the question of what features or traits characterize a given person at one time. There are several general theories of this identity problem. In this paper the views of John Locke and criticism of his theory of personal identity will be examined.

AGAINST CARTESIAN THEORY

John Locke (29 August 1632 – 28 October 1704) was one of the philosophers who were against the Cartesian theory that soul accounts for personal identity. Chapter XXVII “On Identity and Diversity” in *An Essay Concerning Human Understanding* (1689) has been said to be one of the first modern conceptualization of consciousness as the repeated self-identification of oneself in which Locke gives his account of identity and personal identity to the second edition of the *Essay*. Locke holds that personal identity is a matter of *psychological continuity*. Arguing against both the Augustinian view of man as originally sinful and the Cartesian position, which holds that man innately knows basic logical propositions, Locke posits an “empty”

mind, a tabula rasa, which is shaped by experience; sensations and reflections being the two sources of all our ideas.

Locke creates a third term between the soul and the body - and Locke’s thought may certainly be meditated by those who, following a scientist ideology, would identify too quickly the brain to consciousness. For the brain, as the body and as any substance, may change, while consciousness remains the same. Therefore personal identity is not in the brain, but in consciousness. However, Locke’s theory also reveals his debt to theology and to Apocalyptic “great day”, which by advance excuse any failings of human justice and therefore humanity’s miserable state. The problem of personal identity is at the center of discussions about life after death, and immortality. In order to exist after death, there has to be a person after death who is the same person as the person who died.

Consciousness can be transferred from one soul to another

Locke holds that consciousness can be transferred from one soul to another, and that personal identity goes with consciousness. In section 12 of the Chapter of Identity and Diversity he raises the question: “...if the same Substance which thinks be changed, it can be the same person, or remaining the same, it can be a different person.” Locke’s answer to both of these questions is affirmative. Consciousness can be transferred from one substance to another and thus while the soul is changed, consciousness remains the same and thus personal identity is preserved through the change. And on the other hand, consciousness can be lost as in utter forgetfulness while the soul or thinking substance remains the same. Under these conditions there is the same soul but a

different person. These affirmations amount to the claim that the same soul or thinking substance is neither necessary nor sufficient for personal identity over time.

Though the distinction between man and person is controversial, Locke's distinction between the soul or the thing which thinks in us and consciousness is even more radical. One answer is that the distinction solves the problem of the resurrection of the dead. What is this problem? The problem begins with Biblical texts asserting that we will have the same body at the Resurrection as we did in this life.

The prince and the cobbler

Locke explicitly tells us that the case of the prince and the cobbler shows us the resolution of the problem of the resurrection. The case is one in which the soul of the prince with all of its princely thoughts is transferred from the body of the prince to the body of the cobbler, the cobbler's soul having departed. The result of this exchange, is that the prince still consider himself the prince, even though he finds himself in an altogether new body. Locke's distinction between man and person makes it possible for the same person to show up in a different body at the resurrection and yet still be the same person. Locke focuses on the prince with all his princely thoughts because, on his view, it is consciousness which is crucial to the reward and punishment which is to be meted out at the Last Judgment.

Locke famously called "person" a *forensic term*, "appropriating actions and their merit; and so belongs only to intelligent agents capable of a law, and happiness, and misery". This means, then, that an account of the *identity* of persons across time will have forensic — normative — implications. And so it does.

But this interesting border-case leads to this problematic thought that since personal identity is based on consciousness, and that only oneself can be aware of his consciousness, exterior human judges may never know if they really are judging - and punishing - the same person, or simply the same body. In other words, Locke argues that you may be judged only for the acts of your body, as this is what is apparent to all but God; however, you are in truth only responsible for the acts for which you are conscious. This forms the basis of the insanity defense: one cannot be held accountable for acts from which one was unconscious - and therefore leads to interesting philosophical questions and criticisms.

CRITICS

There are several philosophers who criticized the Lockean memory theory, and stated that it is circular and illogical. Joseph Butler accuses Locke of a "wonderful mistake," which is that he failed to recognize that the relation of consciousness *presupposes* identity, and thus cannot constitute it. In other words, I can remember only my own experiences, but it is not

my memory of an experience that *makes it* mine; rather, I remember it only because it's *already* mine. So while memory can reveal my identity with some past experienter, it does not make that experienter me. What I am remembering, then, insists Butler, are the experiences of a substance, namely, the same substance that constitutes me now.

Thomas Reid was against Locke's memory theory and tried to reduce it to absurdity. He criticized his theories for several reasons. Firstly, Reid believed that personal identity is something that cannot be determined by operations, and that personal identity should be determined by something indivisible. Also, he states that Locke's main problem is confusing evidence of something with the thing itself. Finally Reid introduces the officer paradox in an attempt to reduce Locke's Memory theory to Absurdity. Suppose that as he is stealing the enemy's standard, a forty-year-old brave officer remembers stealing apples from a neighbor's orchard when he was ten, and then suppose further that when he is eighty years old, a retired general, he remembers stealing the enemy's standard as a brave officer but no longer remembers stealing the neighbor's apples. On Locke's account the general would have to be both identical to the apple-stealer (because of the transitivity of the identity relation: he's identical to the brave officer, who himself is identical to the apple-stealer) and *not* identical to the apple-stealer (given that he has no direct memory of the boy's experiences).

Another objection is based precisely on the link between identity and ethics: how can identity — *sameness* — be based on a relation (consciousness) that changes from moment to moment? A person would never remain the same from one moment to the next, "and as the right and justice of reward and punishment are founded on personal identity, no man could be responsible for his actions". But such an implication must be absurd. And Butler concurs, expanding the point to include considerations of self-concern:

Both Reid and Butler, then, wind up rejecting Locke's relational view in favor of a substance-based view of identity.

What Butler and Reid retain in common with Locke, though, is the belief that identity grounds certain of our patterns of concern, both prudential and moral. As Reid puts it, "Identity . . . is the foundation of all rights and obligations, and of accountableness, and the notion of it is fixed and precise". What they disagree over is just what identity consists in. So if Locke's view were right, say Reid and Butler, it would require a host of radical changes to our practices of responsibility attribution and prudential deliberation. But, continues the argument, because making such changes would be crazy — we are strongly committed to the correctness of our current ways of doing things — Locke's view cannot be right. And although Locke disagrees that the implications of his view are

crazy, he does agree to the basic methodology. So while he admits that he has made some suppositions “that will look strange to some readers”, he is also at pains to show that our practices are actually already in conformity with the implications of his view, e.g., human law emphasizes the necessity of continuous consciousness, “not punishing the mad man for the sober man’s actions, nor the sober man for what the mad man did”. And this is a methodological assumption that has been retained by most theorists on identity and ethics since.

Nevertheless, even if this objection to Locke is thwarted, the others remain in force. For one thing, memory does seem to presuppose personal identity, and so cannot constitute a criterion of it. For another, identity is a transitive relation, while memory isn’t, so the latter can’t be a criterion of the former. Finally, there is the obvious worry that identity seems to persist through the loss of memory: it’s hard to believe that I would cease to exist were I to undergo amnesia. It’s for all these reasons that contemporary theorists working in the Lockean tradition have had to make significant changes to the theory to make it a viable contender for the relation between identity and ethics.

CONCLUSION

Locke’s account of personal identity turned out to be revolutionary. His account of personal identity is embedded in a general account of identity. Locke also wrote that “the little and almost insensible impressions on our tender infancies have very important and lasting consequences.” He argued that the “associations of ideas” that one makes when young are more important than those made later because they are the foundation of the self: they are, put differently, what first mark the *tabula rasa*. In his *Essay*, in which is introduced both of these concepts, Locke warns against, for example, letting “a foolish maid” convince a child that “goblins and sprites” are associated with the night for “darkness shall ever afterwards bring with it those frightful ideas, and they shall be so joined, that he can no more bear the one than the other.”

“Associationism”, as this theory would come to be called, exerted a powerful influence over eighteenth-century thought, particularly educational theory, as nearly every educational

writer warned parents not to allow their children to develop negative associations. It also led to the development of psychology and other new disciplines with David Hartley’s attempt to discover a biological mechanism for associationism in his *Observations on Man* (1749).

CONFLICT OF INTEREST

None declared.

DECLARATION

This is my original, unpublished paper.

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Brain, Mind and Consciousness - An Evolutionary Approach

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ABSTRACT

In the process of evolution the first invertebrate brain appeared in round worms and annelids. Among invertebrates cephalopod brain is the largest. Later the vertebrate brain evolved and became more complex in human. Brain can be considered as physical state of mind and consciousness. Consciousness can be explained with a 8 circuit model. Biofeedback and artificial intelligence are the current fields of research.

Key words: Invertebrate; Human brain; Consciousness; 8 circuit model; Artificial intelligence

INTRODUCTION

In 1859 Charles Darwin wrote 'In distant future psychology will be based on a new foundation, that of the necessary acquirement of each mental power, and capacity by gradation'.

With a basic knowledge of genes, inheritance, and the principals of Natural selection different aspects of psychology can be studied. It includes sociobiology, anthropology, paleopsychology, ethnobotany and behavioral genetics.

It is incredibly difficult to actually test out many evolutionary psychological ideas in a conventional, scientific, experimental sense. Evidence come from range of sources, including fossils (e.g. brain size), genetics, animal studies, paleo-anthropological research (e.g. study of human artifacts, including tools, art) and related evidence about climate, plant and animal evolution. But then evolutionary psychology is based on jig-saw puzzle with many missing links.

When we think on this evolutionary approach paramecium does not show presence of any nerve cell but has a well developed neuromotor system. Later in coelenterates we can see the presence or differentiation of basic nerve cells and diffused type of nervous system developed.

In nematodes and annelids the so-called brain is formed consisting of accumulation of nerve cells in the form of ganglia and nervous system is also described as ganglionated nervous system.

And thus the simplest type of brain is formed. Later a complex brain got evolved in invertebrates among arthropods and cephalopods of which cephalopods have the largest brain among invertebrates.

The most thoroughly studied invertebrate brain is of Drosophila and tiny round worm Drosophila neurogenetics is found out to be more relevant to human e.g the biological clock gene found in Drosophila, is similar to that of mice and hence human.

Later evolved the vertebrate brain with cluster of many nerve cells, the intricate arrangement of neurons, many specialized areas for specific functions. The brain did not only increase in size but also became a complex structure for controlling various functions.

The brain is the dominant structure of nervous system which work as analyzer, interpreter or as a powerful computer.

THE HUMAN BRAIN

During the evolutionary process in vertebrates the specific part of brain got modified as per the need for survival or adaptation to environment and from this evolved the human brain which is composed of about one trillion nerve cells.

The human brain makes us understand the color, odor, taste, sound, touch, by analyzing; interpreting every finest aspect and also make us think, take decisions and perform accordingly.

When these processes occur they keep the print on our brain or in our nerve cells which we call as memory. We can then recall those events of past and correlate to present event when needed. The memory can be short term or long term. Many of the vertebrates are considered to have short memory while some primates and human are considered to have long term memory too. Exact physiological reaction of storing and recalling memory is not known. But scientist believes them to

be in the form of 'nerve traces'.

The stimulus from sense organs provokes the biochemical processes in brain region, activate the neural network, and bring about conscious experience. Similarly the conscious information or thought like fear, happiness also trigger the biochemical process and show the virtual effect on the body.

The exact processes here are not yet known but create some waves which are known now to be electrical waves. The brain is an electrically powered and electricity generating organ. The wave generated are found to be of various types like alpha, beta, gamma, theta waves, and the particular brain wave frequency which dominates at any given time determines the state of mind.

The brain connection actually reflects the experience which can be considered as mind. So mind can be the thought process, created due to stimulations of various memory cells, triggering the process of generating the biochemical substances, resulting in various waves without showing the actual virtual effect.

The chemical reaction occurring in brain or nerve net change according to our mood or state of mind. Similarly the exogenous dosage of these chemicals like serotonin, histamine, dopamine, noradrenalin, and acetylcholine change our mood. A very good understanding can come when we think of applications of drugs during depression, pain, sad state of mind etc. The anesthetic effect, pain revealing effect, mood elevating effect of many drugs is well known and is used in many psycho therapies.

Thus consciousness can be different from mind and can be a first person world. But mind and consciousness can be considered to be well rooted in physical brain (Greenfield, 2002) According Greenfield (2000) the aberration of dopamine system where mental status cannot distinguish, between the psychotic and dreaming states can be considered as the most basic consciousness.

Eight-circuit model of consciousness

Psychologist Timothy Leavy (2009) has suggested the eight-circuit model of consciousness where he describes the eight levels of functions of human consciousness. According to him the lower four circuits-larval circuits- deal with normal psychology while upper four- the stellar circuits-deal with psychic, mystical and enlightened states of mind. As per this model the eight levels of consciousness exist in every individual. As one grows from infancy the various circuits are activated and begin to function. It is said that underutilization of lower circuits hinders the complete expression of higher circuits.

The very basic 1st circuit is biosurvival circuit, with which the

human being is born. This circuit is said to have appeared in the earliest evolution of invertebrate brain. The 2nd circuit is the emotional-Territorial circuit, which first appeared in vertebrate territorial animals. The 3rd is symbolic circuit-rational mind appeared first in hominids when they started differentiating from primates. The 4th is Domestic circuit-socio-sexual, which appeared with development of tribes. The 5th is the neurosomatic circuit, which according to Leavy is consciousness of the body. It appeared first in upper classes with the development of leisure-class civilizations around 2000 BC

The 6th circuit is Neuroelectric Circuit or Metaprogramming. According Leavy this circuit enables telepathic communication and computer games it is traced back to 500 BC.

The 7th Circuit is neurogenetic circuit or morphogenic circuit or Buddha mind. It is concerned with evolutionary consciousness (past and future); it is the one, which talks about memories of past lives, reincarnation, immortality. This circuit first appeared among the Hindus in early first millennium. It gets stimulated with Raj Yoga.

And the 8th Circuit is Psycho atomic Circuit or over mind, which is concerned with information from beyond ordinary space-time, out of body experience. The circuit can get activated with awakening of Kundlini, Shock, near-death experience,

With 8-circuit model the evolution of brain and consciousness can be correlated, as the simplest circuit of consciousness is the biosurvival, which is seen even in the animals without brain or has originated with origin of life. The higher circuits can be developed by Yoga, Mediations, Rekki practice, and many more ways.

It also helps us to understand the effect of drugs and treatments in disorders. Biofeedback is one of such mechanical means to amplify certain internal cues, make us aware of them and make it possible to control mental and brain states. The use of biofeedback can control the involuntary psycho physiological states like B.P., body temperature etc. The use of machines designed by researchers to human brain provide the brain and mind an opportunity to exercise themselves by means of self observation and self transformation (Livergood)

Further research is in the direction of artificial intelligence where an artificial neural network i.e. network of artificial neurons can be created. This will lead to an artificial brain with the similar processing power as our organic brain. It is believed that at some point of time this artificial brain will become conscious if we consider consciousness is the brain process.

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Mens-Legem Connect- Infancy, Insanity and Law

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ABSTRACT

Laid down by the State, Law is a standing reminder as to what is permissible conduct and what is not. Law minds both the state and the society. Law can be seen as a body of codified collective 'wills' to govern human conduct. Statute is regarded as the will of the legislature and interpretation of statutes as deciphering the 'intention' of the legislature. Sense of justice, fairness and order has prevailed through the institution of law.

This paper is a law teacher's natural response to the topic, Mind Brain and Consciousness. The paper seeks to explore systematically, although not thoroughly exhaustively, how far are mind, brain and consciousness relevant in law and how do they influence the process of law. Law views at these concepts in lay man's perspectives as evolved by developments in science and society.

Inquiry is proposed into the following-

- Mind-Body relation and the legal theories
- Mind as a constituent of a legal wrong
- Offending mind : a legal wrong
- Immaturity of mind and legal protection
- Mind and Right to Education
- Creations and Law
- Brain mapping and criminal investigation
- Brain death and law
- Semi-consciousness and law

Keywords Law; Statute; Legal Wrong; Immaturity; Education; Creations; Brain death; Macroanalysis

INTRODUCTION

Laid down by the State, Law is a standing reminder as to what is permissible conduct and what is not. Sense of justice, fairness and order has prevailed through the institution of law. The Mens-Legem connect is very old and presents intriguing issues. Socrates found that man's intelligence and insight were the measure of the good and it was this insight which tested the reason and goodness of laws. Law takes into account the state of mind of the alleged wrongdoer in determining the guilt and the extent of liability. Law recognizes the importance of mind and proceeds in various ways to protect and nurture it. Intellectual property is protected. Universal Declaration of

Human Rights, 1948 recognizes that human beings are endowed with reason and conscience. It recognizes the right of everyone to freedom of opinion and expression. Everyone's right to education has been recognized. Constitution of India secures to all its citizens liberty of thought, expression, belief and faith. It casts a fundamental duty on all citizens to develop scientific temper, humanism and the spirit of inquiry and reform. Right to education and information have been recognized.¹ Law crushes under its feet offences against mind. Injury includes harm to any person in mind.²

The purpose of this paper is to explore firstly into how law deals with infancy and its attendant immaturity and secondly

into how law handles persons with a fit of insanity.

Infancy, Immaturity and Law

'Non-age' entails deficiency in maturity and the long arms of law shall protect such persons. U. N. Convention on Rights of the Child, 1989 (UNCRC) mandates the State parties to protect children from all forms of exploitation and abuse. Education of children shall be directed to develop mental abilities to their fullest potential and to train them to become tolerant and peace loving.³ The Indian Constitution calls upon the state to secure that children are given opportunities and facilities to develop in a healthy manner and in conditions of freedom and dignity and that childhood and youth are protected against exploitation and against moral and material abandonment. State is enabled to make special provisions for children and is obliged to provide education to them.⁴

UNCRC requires the states to establish distinct laws, procedures, authorities and institutions to deal with young persons who violate the penal law. There shall be a minimum age below which children shall be presumed not to have the capacity to infringe the penal law.⁵ A child is presumed innocent based on the immaturity of intellect. In India, a child below seven years is *doli incapax*, i.e., it is incapable of committing a crime. A child above seven but below twelve is capable of committing a crime & will enjoy no immunity if it has obtained sufficient maturity of understanding to judge the nature and consequences of the conduct on that occasion.⁶ Law Commission of India has recommended that children below ten years be completely exempted from criminal liability & the rule as to children of age between 7-12 be deleted.⁷ Juvenile Justice Act, 2000 is a special enactment to deal with delinquents below the age of eighteen. In the absence of intention to cause death or grievous injury consent is a defence in a criminal action for offences other than death or grievous hurt. In case death ensues, if the consent is for the benefit of the deceased, consent can still exonerate the accused provided there was no intention to cause death. Such consent should be by a person above eighteen years or by guardian if required for the benefit of the child. Consent by a child who is under twelve years of age is not a valid consent⁸

A person who has not obtained the age of majority is incompetent to contract and any contract entered into is null and void⁹: for want of mental maturity no one should consent against one's own interest. However a minor is not regarded as incapable of accepting any benefit or gift where he / she has to bear no obligation. A child can sue through next friend.¹⁰ A minor's property is liable for necessities supplied to him / her or his / her minor dependents who he / she is legally bound to support.¹¹ A minor cannot be declared insolvent.¹²

In case of civil wrongs by minors, their property will be liable. But where mental element like malice or negligence is an essential requirement, the courts are reluctant to impose liability. 'Consent' a defence in actions for torts cannot be invoked against children as their faculties are not developed adequately to safeguard their interests while exercising their volition.¹³

Law ensures that the society is protected by stipulating minimum age as a qualification or condition to occupy public office or enjoy certain permits. Minimum age is prescribed for marriage,¹⁴ sale of alcohol,¹⁵ driving licences¹⁶, voting at general elections¹⁷ etc. Minimum age for membership is 25 years for Lok Sabha / State Legislative Assembly, 35 years for Rajya Sabha / State Legislative Council and 21 years for Panchayats / Municipalities.¹⁸ Law does not lay down the minimum age to testify as witness in the court of law. A child who cannot understand questions put to it or provide rational answers to them are incompetent to testify.¹⁹

Persons of unsound mind and law

Disease of mind causing defect of reason is as common as disease of body. In the Human Rights perspectives, mental disorder is seen as a disability. Persons with disabilities include those who have long term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.²⁰ Law makes special provisions to exempt them from unreasonable liability and to protect their interests.

In order to attract exemption from criminal liability for any act under penal law, insanity should be one which renders the person incapable of knowing the nature of the act, or that he is doing what is either wrong or contrary to law at the time of doing the act. Courts presume every person of the age of discretion to be sane and the burden of rebutting the presumption & seeking the exemption would be that of the accused.²¹ Unsoundness of mind caused by voluntary intoxication is not a defence²²; alcohol dependency syndrome may constitute an abnormality of mind.

Legal insanity is distinguished from medical insanity and the courts can take advantage of advancements in medical science & psychiatry. Automatism caused by cerebral tumour leading to acts of impulsive violence has been considered as insanity for exoneration.²³ Every mental aberration is not insanity for absolving liability under criminal law.²⁴ Malfunctioning of mind must be due to disease and not due to external factors like anesthetics, drugs etc.²⁵ Whereas other countries²⁶ have incorporated doctrine of diminished responsibility to convert charges of murder to culpable homicide in case of mentally deranged persons, Law Commission of India sees no reason to do so. It fears introduction of complicated medico - legal

issues in the trial and is complacent with judicial discretion in sentencing.²⁷

Right to defend oneself is a human right.²⁸ If any person accused of any offence(s) is of unsound mind at the time of inquiry or trial and therefore incapable of making his / her defence, the court shall send the person to a mental asylum or hand over to the care of a relation or friend. The trial will be postponed till the person recovers²⁹

Insane persons are incompetent to contract. A patient in a lunatic asylum, who is at intervals of sound mind, may contract during those intervals. A sane man, who is delirious from fever, or who is so drunk that he cannot understand the terms of a contract or form a rational judgment as to its effects cannot contract whilst such delirium or drunkenness lasts. In India, an agreement by a person of unsound mind is void absolutely.³⁰ They cannot testify as witness in a court if they are prevented from understanding the questions put to them or providing rational answers to them.³¹ Their property, if any, will be liable for their civil wrongs, but not if the wrong requires malice or negligence.³² They can sue through next friend.³³

In general public interest, unsound mind has been stipulated as a disqualification for all constitutional offices and other statutory public offices. Citizen of unsound mind has been disqualified to be registered as a voter.³⁴

Mental Health Act, 1987 aims at regulating the treatment & care of mentally ill persons and making better provision with respect to their property. Mentally ill person means a person who is in need of treatment by reason of any mental disorder other than mental retardation. Compulsory licensing for private mental asylums has been introduced under the Act. Central and State Authorities are established for Mental Health Services. Admission and detention of the mentally ill for institutional care is dealt with. Mentally ill persons shall be treated with dignity & no such person shall be used for research without consent in writing of the person or his guardian.

The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 defines disability to include mental retardation and mental illness. The Act defines mental illness as any mental disorder other than mental retardation. Mental retardation means a condition of arrested or incomplete development of mind of a person which is specially characterized by subnormality of intelligence. Coordination Committees at the central and state levels are set up with executive committees for implementing the decisions of the Coordination Committees. The Act casts several obligations on the state as to early detection of disabilities, to provide special and free education to persons with disability, employment of them, research for their welfare, and establishment of institutions for them. The Act calls for identification of posts in government and semi-government

offices which can be reserved for disabled and rules that there shall be atleast 3% reservation therein of which one percent shall be for locomotor disability or cerebral palsy. The Act also requires all government educational institutions and educational institutions receiving aid from government to reserve atleast 3% seats for persons with disabilities.

The National Trust For Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act, 1999 constitutes a central level body. Autism means a condition of uneven skill development primarily affecting the communication and social abilities of a person, marked by repetitive and ritualistic behaviour. Cerebral palsy means a group of non-progressive conditions of a person characterized by abnormal motor control posture resulting from brain insult or injuries occurring in the pre-natal, perinatal or infant period of development. The Trust shall work to enable and empower the persons with such difficulties to live as independently and as fully as possible within and as close as to the community to which they belong; to strengthen support and care for them; to evolve procedure for the appointment of guardians and trustees for persons in need of such protection. The trust shall be managed by a Board. It has received a one time corpus of rupees hundred crores for providing adequate standard of livelihood and necessary support systems for the persons with such difficulties. The National Trust for the Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation, and Multiple Disabilities Fund has been constituted.

Freedom from fear and guarantee of security are the ultimate goals of *Human Rights*. Pledged to the cause of human rights, the state has the utmost duty of safeguarding the immature, whether immaturity is due to age or by disease.

Where the Mind is without Fear and the head is held high ...

Into that heaven of freedom, my Father, let my Country awake

Rabindranath Tagore

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Mind Control Through Practice of Pranayam

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INTRODUCTION: WHAT IS YOGA?

Yogic culture is mainly concerned with the improvement of the visible activities of the body including the mind. Physically the practice of *yogasanas* help to bring supply of blood to the brain and various parts of the vertebral column which not only increase the blood circulation in the brain but also helps a person to think better.

Yoga is neither a religion by itself, nor a part of any other religious system. Yoga is universal, a yogi is not necessarily bound by any particular religious faith. The yogi may belong to any religion if he or she so chooses, or may not accept any religious faith at all. No religious philosophy or dogma can give a human being the knowledge of true self, or offer salvation. That can be provided only by the practice of a higher spiritual discipline like yoga.

Yoga is the greatest philosophy of life. It addresses the mysteries of individual life as well as those of the universe. It deals especially with those aspects of life beyond the comprehension of the moral human intellect.

Yoga is not merely a theoretical philosophy, but a practical discipline. It is an ancient, yet timeless science of self development based on the laws governing the natural forces and is a science that is as perfect as it is exact in its methodology and techniques.

The word 'yoga' is derived from the sanskrit root 'yuz', meaning 'to control', 'to yoke' or 'to unite'. Someone who practices yoga or follows the yoga philosophy is called a yogi.

A real yogi is he who keeps a balance between the good and the bad, the happiness and sorrow, the ups and downs and the success and failure of life. This person is called 'Sthitaprajna' in words of Lord Srikrishna in Bhagavatgita.

According to the great sage Patanjali, the father of yoga, "*Chitta Vritti Nirodha* is called yoga."

Literally, the word '*Chitta*' means mind in modern psychology. It is the nature of consciousness which is immaterial by nature but it is affected by the matter.

'*Chitta*' is not only an instrument of thought but also a field where thought and emotion function together.

The other word '*Vritti*' has been derived from the sanskrit root '*vrit*' means to exist. It deals with the existence or state of the mind in a certain situation. The last word '*Nirodh*' means to cure or to prevent from impurities. It is a technique to control the mind or oppose the mind from the absurd sensual pleasures.

Yoga is the ladder by which humans may reach God.

Hence, according to Patanjali, the way of controlling the '*Chitta*' or 'mind' from all the worldly affairs and taking it into a state of perfection, a state of eternal bliss is the essence of yoga. Usually, our mind is absorbed in the material world, it becomes a slave to the five sense organs from which it is difficult to come out. In this context, yoga helps to take care of the mind (*chitta*) and bring it to a certain exiting state (*vritti*) by taking preventive measures (*nirodha*) through yoga. Thus, Patanjali says, "*Yogaschitta Vritti Nirodha*".

Swami Vivekanda translates the sutra as 'yoga' is restraining the mind –stuff (*chitta*) from taking various forms (*vrittis*).

Patanjali's writing also became the basis for a system referred to as '*Ashtanga Yoga*' (eight –limbed Yoga). The eight limbed concept derived from 29th sutra of the 2nd book and is a core characteristic of practically every Raja yoga variation taught today.

I wish to concentrate on *pranayam* which is the fourth part of Ashtanga yoga. *Yama, Niyama, Asana, Pranayam, Pratyahar, Dharana, Dhyana and Samadhi*.

YOGA BREATHING – PRANAYAMAS

What is pranayam ?

Pranayam is an aspect of yoga that deals with breathing. It is the breathing process or the control of the motion of inhalation, exhalation and the retention of vital energy. Proper breathing is to bring more oxygen into blood, brain, and to control *prana* or the vital life energy.

1. *Omkar Pranayam*

Sequence :

Sit in *Sukhasana, Bajrasana, Sidhasana* or any *sahaj asana* (easy posture). Breathe naturally without concentrating on inhaling

and exhaling. Chant the one word Mantra *OM* (A,U,M) elongate the last M as long as possible. After finishing one round , start with second round without break in the first sequence of *OM* , Continue to make it unbroken sequence '*OM*'.

Benefits:

This recitation leads to calmness of unstable mind and subsequent serenity of the brain, silence of negative feelings, thoughts, leading to one pointed concentration , that is perfect self consciousness with Supreme.

2. Anuloma Viloma – (Alternative Nostril Breathing)

This pranayama manipulates the flow of energy through the *nadis* (channels) in our body and ultimately brings about a balance of both stimulation and relaxation.



Sequence:

Using your right hand close your nostrils.

Tuck your index and middle fingers into the palm of your hand.

Use your thumb to close your right nostril.

Use your ring and little fingers together to close your left nostril.

Breathe in through the left nostril closing the right.

Hold breath, closing both nostrils.

Breathe out through the right nostril keeping the left nostril closed.

Breathe in through the right nostril keeping the left nostril closed.

Hold the breath, closing both nostrils.

Breathe out through the left nostril keeping the right closed.

Count to two when inhaling, hold for the count of eight then exhale to the count of four.

Start with eight rounds build up to sixteen rounds.

Caution:

Try to make the inhalation and exhalation of equal length.

Take care not to strain.

Try to make every breath soft and gentle.

Count to two when inhaling, hold for the count of eight then exhale to the count of four.

Benefits:

Anuloma Viloma restores the natural balance in your breathing.

It will remove tension, fear, and worry and will make the mind calm, poised and serene.

Through the practice of this Pranayama, happiness, health, vigour and melodious voice can be attained.

3. Kapala Bhati Breathing

“*Kapala*” means “skull” (and by implication, the brain) and “*Bhati*” means “shines” in Sanskrit. This practice cleanses the nasal passages in the skull and other passages of the respiratory system.



Sequence:

Sit firmly in a cross-legged posture with the spine, neck and head held erect.

First, exhale completely and then take a few deep breaths.

Relax the abdominal muscles.

Inhale without taking a deep breath; make a short and forceful expulsion of the breath through both nostrils producing a hissing sound and, simultaneously, contract the lower abdomen by a rapid and vigorous thrust of the abdominal muscles.

Release the contraction of the abdominal muscles quickly and the lungs will automatically take in air. Follow at once by another forcible expulsion of your breath, contracting the abdomen in the same manner and letting it relax outward as the air is drawn in again.

Repeat the exercise a number of times in quick succession, concentrating your mind on the region of the abdomen below the navel.

After you complete a round and make the last exhalation, take in a deep and slow breath and then resume normal breathing to afford rest to the lungs. Increasing the number and speed gradually, try to do two expulsions a second (120 a minute) in each round which should be the maximum.

Perform three rounds in each sitting, with sufficient pause between the rounds, when normal breathing should be done.

Benefits:

Kapala Bhati flushes out stale residual air in the lungs and helps a fresh supply of air to reach them.

It lends elasticity to the diaphragm and increases the capacity of the lungs.

4. *Bhramari* Breathing

In this breathing practice a soft “humming-bee” sound is produced during exhalation. So this *pranayama* is named *Bhramari*.



Sequence:

Sit in a comfortable posture keeping the head, neck and spine erect.

Place the right thumb against the right nostril but do not close it.

Inhale slowly and deeply through both nostrils.

Press the right nostril with the right thumb.

Retain the breath for a while, then exhale touching the lungs

throat area and larynx.

While inhaling and exhaling, concentrate the conscious mind on the throat and produce a humming sound like the buzzing of a bee.

Caution:

Take care not to strain.

Benefits:

It makes the voice sweet and gently, and helps clarity of speech.

It is useful for hypertension and depression and aids brain cells.

Breathing becomes deep and subtle.

The extended exhalation in this breathing exercise is very good for pregnant women in preparation for labor.

Tips to follow when practicing Breathing or Pranayama

Find a quiet place where you won't be distracted. If doing the exercises inside, make sure the window is open to allow plenty of fresh air into the room.

At first practise pranayama lying down and then gradually aim to sit upright with your spine straight.

Breathe evenly through the nose throughout the postures.

Never strain your breathing in *pranayama*.

Breathe deeply and slowly.

Progress slowly and carefully.

If you feel dizzy or light-headed, return to normal breathing.

Ask a friend to stay with you when trying out a new technique.

Do not rush things and practice all exercises as slowly as you can. Explore the different.

FINALLY

“ Sarva mangala mangalyam,

Sarva papa pranasanam,

Chintha soka prasamanam,

Ayur vardhanamuthamam.”

[This prayer great gives all that is good, Destroys all sins committed, acts as an antidote for sorrow and thought, And also leads to very long life.]

The Concepts of *Manas* (Mind) as per Ancient Indian Medical Literature

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ABSTRACT

Ayurveda is a “science of life and longevity”, a traditional system of medicine of India which considers the mind to be one of the three pillars (tristhuna) on which life depends. The concept of mind (manas prakriti) is both broad and illuminating. Mind, (mana) the mental faculty which makes of a man an intelligent and moral being, and distinguishes him from the mere animal; a synonym of Mahat. The ancient science of Ayurveda offers a holistic approach to mental health that integrates the mind, body and soul. The concept of health in ayurveda encompasses not only the physical and mental aspects but also the spiritual aspect, which is missing in the modern psychological discourse. The Ayurvedic objective for the mind is to attain peace of mind (samadhi) and liberation from the trappings of attachment through discrimination (moksha, vairagya, viveka) as mentioned in yogik literatures which is considered to be the ultimate goal of life. Ayurveda does not look upon the human being as a limited set of biochemical processes. It does not regard mind as merely a function of brain. An attempt has been made to focus on various aspects like concept of atma, evolution and constituents of man, location of manas, dimension and qualities of manas.

Key Words *Ayurveda; Science of life and longevity; Mind; Mana; Samadhi; Manas prakriti; 3 doshas; 5 primary elements.*

INTRODUCTION

The science of Ayurveda- a branch of Indian medical philosophy is founded on the lucid values and principles of physiology, psychology, pathology, pharmacology and diagnostics which have been generalized on firm doctrine of logic. The word Ayurveda made up of two Sanskrit words Ayu and Veda meaning Life and Knowledge respectively. Productively it just means it's a science of Life and Longevity.

As per Ayurveda, health is an excellent states of equilibrium between body, mind and soul through which individual can fulfill his role in life. It's a science of ancient civilization and culture that postulate man as part of environment and microcosm of universe.

The ancient rishis of India who developed the Science of life (Ayur-veda) organized their wisdom into three levels of bodies, viz. physical, mental body and spiritual body. As per their

writings, there never was a time that Ayurveda was not present in this universe in some form or the other. May not in a tangible form like books and active clinics, but present in the collective consciousness of this universe as eternal principles of unity between all things of universe, of unity between man and nature and so on. It views the physical body as a crystallization of deep-seated mental tendencies carried over from precious lives

The concept of mana:

Sharirendriyasatvaatmasanyog dhari jivitam

It means that *mana* (mind), *atma* (soul) and *sharir* (body) together leads to a healthy life of an individual. Further thinking how *atma* (soul) enters the body. Here they explain that atma along with active evolutes of nature (*mahabutas*) i.e. earth (*prithvi*), water (*aapa*), fire (*teja*), air (*vayu*) all these in the very minute

forms enter the zygote. As it is *manojivam* i.e. having the speed of mana which is more than the speed of light or for that matter more than any perceiving thing. As per sages, *atma* enters the bodies of different persons though it is singular; this is only possible because of its *vyapak* nature i.e. universal. It leaves the dead body and enters newly formed body. It's not visible to normal individual but it requires a vision of yogi i.e. *divyachakshu*.

Human body and manas are inseparable during lifetime of the individual and it's not possible to say that when it enters the body because their relationship is from beginning of the universe i.e. manas is already present in fertilized ovum.

Ayurveda defines health or *arogya* as sense of well being “*Sukh Sangyakam Arogyam*” and further stated health as –

Samadhosha samagnischa samadhatuhu malaha kriyaa |

Prasannatmendriya manaha svastha iti abhidhiyate ||

Su.Su 15/48

First part of this verse deals with the anatomical and physiological aspects of the body and the second half deals with the *atma* (soul), *indriyas* (sense organs) and *manas* (mind). When all these three are *prasanna* synonym of happy it is called as total health. *Indriyas* are derived into three categories *Dnyanendriyas* i.e. dealing with the senses, *Karmendriyas* i.e. functions and *Ubhayendriya* i.e. senses and functions both. *Manas* is thought to be *Ubhayendriya*, which perceives the signals and relays them to *budhi* and further *buddhi* guides *Karmendriya* to act accordingly. It regards mind as the reflection of the body and the storehouse of the impressions we access through the senses.

Manas gunas (Quality of mind):

Nature is Divie Mother in manifestation and universe is her play of consciousness. She provides not only for material growth and expansion that moves outwards, but also supports our spiritual growth and development, which moves within. Nature possesses a qualitative energy through which we can either expand into wisdom or contract into ignorance.

Ayurveda provides a special language for understanding the primal forces of nature and shows us how to work with them on all levels. According to it nature consists of three primal qualities, which are the main powers of our spiritual growths i.e. *gunas* that keeps in bondage to external world. They are:

1. **Satwa** – Quality of intelligence, virtue and goodness that creates balance and stability. It's light and luminous in nature. It provides happiness and contentment of lasting nature. It is the principle of clarity, wideness, peace, and force of love that unites all things together.

2. **Rajas** – Quality of change, activity, and turbulence. *Rajas* is motivated in its action, ever seeking a goal or an end that gives it power. It is stimulating and provides pleasure, owing to its unbalanced nature it quickly results in pain and suffering. It is force of passion which causes distress and conflict.

3. **Tamas** – Quality of dullness and darkness and is heavy, obstructing in its action. It functions as the force of gravity that retards things and holds them in specific limited forms. *Tamas* brings about ignorance and delusion in mind and promotes insensitivity, sleep and loss of awareness.

These three *gunas* are the most subtle qualities of nature that underlie matter, life and mind. They are the energies through which not only the surface mind, but also our deeper consciousness functions. They are the power of soul which hold the karmas and desires that propels from birth to birth. All objects in the universe are various combinations of these three *gunas*.

Also Charak mentioned *gunas* of *manas* as:

Anutvamtha chaikatvam dau gunau manasa smrutau ||

Charak mentioned extra two *gunas* of *mana* – *anutvam* and *ekatvam*. When *mana* along with *indriyarthas* gets combined we get to know only of particular subject, this proves *anutvam guna*. All creatures has only one *mana* and at a time gets knowledge from only one source, this proves its nature of *ekatvam*.

The three gunas therapy

Ayurveda helps us to show the relation between healing therapies and *gunas*. *Satwic* therapies work through *Satwic* qualities of love, peace and non-violence. *Rajasic* therapies work through *rajasic* qualities of stimulation, energization and agitation. *Tamasic* therapies work through *tamasic* qualities of sedation, sleep and grounding. *Satwic* healing uses nature, the life force and the power of cosmic mind, through treatment as herbs, vegetarian diet, mantra and meditation. *Tamas* can occasionally be used in healing process e.g. a person in hysteria, an excess *rajas* condition, may require a strong sedative herb, a *Tamasic* therapy.

Ayurvedic psychology aims at moving the mind from *Tamas* to *Rajas* and eventually to *Sattva*. This means moving from an ignorant and physically oriented life (*Tamas*), to one of vitality and self-expression (*Rajas*) and finally to one of peace and enlightenment (*Sattva*).

Nature of mind

No one holds that the body has three legs, or that stomach thinks and brain digest food. The reason for this is that the body is easy to observe. Yet we can easily list the main system

of physical body, but we find it difficult to do so for mind. The mind appears as an amorphous or structureless entity, rather than a precise instrument like the body.

From wrong understanding of the mind, we develop wrong ideas about the world and run into difficulty in our social interactions. All psychological problems are nothing more than a wrong use of mind, which arises from ignorance of how the mind works. What is more important than any examination of our personal or social problems is educating us about the nature of mind.

The mind has a material structure, a set of observable energies and conditions. It's not merely a stone or an organ in the physical body but its matter of subtle nature, ethereal and luminous. As an organic entity, the mind has a structure, a cycle of nutrition and origin. The body is said to be the gross form of mind. The body exists to allow the mind to perceive and act. The mind can function apart from body consciousness as in sleep.

Subject of *mana* (*Mana vishay*) :

Chintyam vicharyammuhyam cha dheyam sankalpyameva cha |
Yatkinchinamanaso dneyam tata sarvam hyarthasangyakam | |

Charak mentioned subject of *manas* as *chintyam*, *vicharya*, *uhyam*, *dheyam*, *sankalpya* and others.

Site of *mana*:

There seems to be a lot of difference in the opinion about the site of *manas*. As *manas* is unperceivable by the senses and as it is *Anu*, it has no anatomy of its own, this fact further complicates the opinions about its site. Generally we think that the mind dwells in either head or heart. The head is considered to be the centre for outer mind that works through senses and heart to be the centre for inner mind.

The survey of relevant ancient literature indicates that *manas* is situated in *hriday*, *shir*, *mastulung* and some scholars indicate its presence all over body. *Hriday* defined as pulsating organ in thoracic cavity. The relevant references can be seen in *granthas* like Charak, Shushrut, and Vagbhat. Other acharyas like Bhel mentioned that *manas* is situated between *shir* and *talv* i.e. palate along with *indriyas*. In spite of it there seems to be an agreement about '*hriday*' as site of *manas*.

Five elements of *mana*:

The *mana* transcends all the five elements because, through the mind, we can perceive all the elements and their interrelationships, they are – *prithvi* (earth), *aapa* (water), *agni* (fire), *vayu* (air) and *akash* (ether).

Mind you can see is always busy coordinating the body and senses, gathering information, making judgements, reacting

emotionally, and endlessly thinking. This ongoing movements occur because of the mind's connection with the air element. Though earth and air are the main elements relating to mind other elements too have their place here by the law of '*vyapadeshastu bhuyasa*' i.e though any one element is prominent other elements too play a minute role in it. The *mana* has its fire or light quality of perceiving things and capacity of understanding. It has watery quality of emotion, empathy and feeling. Finally it carries a certain weight of earth, memory and attachment.

Functions of *mana*

Charakacharya described various function of *manas* as *Manovjapar*.

Atindriyam punarmana satvasangyakam chet ityahureke,
tadarthamasampattadayattachestam
chestapratyabhumiindriyaanaam | |

Cha.su. 8/4

The presence or absence of the knowledge is dependent of the *manas*. It act as mediator between *indriyas* and *atma*. The intellect has three sets i.e. *Dhi*, *Dhruti* and *Smruti*. Out of these three *Dhi* decides the good or bad status of the information, *Dhruti* converts or keep it stored or documented i.e. knowledge. And depending on previous experience *Smruti* recollects the status of the information newly perceived.

CONCLUSION:

Ayurveda consider perception of knowledge as chain process between *aatma*, *mana*, *indriya* & object. Out of it if *mana* is missing then chain will discontinued leading to no perception of knowledge. Ayurveda does not look upon the human being as a limited set of biochemical processes. It does not regard mind as merely a function of brain. It does not look upon the individual as product of social circumstances, Ayurveda view the human soul as pure awareness, linked with but not limited to only mind-body complex, which is its instrument of manifestation. Ayurveda teaches the harmony with nature, simplicity and contentment as keys to well being. It connects us with wellsprings of creativity and happiness within our own consciousness.

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Neuro Linguistic Programming (NLP): A Gate Way to the Mind

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ABSTRACT

Neuro Linguistic Programming (NLP) works by changing the way we perceive and make meaning of the world we live in and how we understand our experiences. It explores the relationship between how we think? (Neuro), how we communicate? (Linguistic) and how our patterns of behaviour and emotions (programming) are. By studying these inter relationships, we essentially can, to an extent, predict about the functioning of the mind. Through my paper I will try to explore how NLP works as a re-programmer for the mind and thereby understanding the functioning of the mind. In an attempt to explain the functioning of NLP, I even try to integrate it with brain functioning. For that I will consider certain implications from recent advancements in Cognitive Neuro Sciences such as mirror neurons. Finally I will consider the relevance and importance of conducting new researches to uncover the unexplored possibilities of NLP which may prove to be a potential tool in understanding the brain mind relationship.

Keywords NLP; Cognitive Neuro Science; Mirror neurons; Mind.

INTRODUCTION

There are several definitions for Neuro Linguistic Programming. Many websites and popular books are trying to explore clear definition and working of Neuro Linguistic Programming. Before discussing NLP, different perspectives of the discipline psychology has tried to interpret and manipulate mind through various dimensions when comparing to psychology as a tool of mind, NLP has come into existence only a few decades ago. While we are discussing about NLP's origin we must consider some theories of psychology like Gestalt therapy of Fritz Perl and Pavlovian Classical Conditioning too. In some of the NLP techniques principles of classical conditioning are quite evident. Any way NLP and its vivid scope are appreciable.

Originally NLP came from several different intellectual disciplines as organized by two co- founders. Richard Bandler and John Grinder (a professor of linguistics) .They began to analyse various theories, other available approaches, and assembled the fundamental principles of NLP. Along with that, John Grinder believes that power of language had to change people.

Neuro Linguistic Programming: Definition

Richard Bandler provided a simple definition for NLP. "Neuro Linguistic Programming is an attitude and a methodology that leaves behind a trail of techniques". One approach is to look at an analytical definition of Neuro Linguistic Programming, and explore the meaning of the three parts of Neuro Linguistic Programming.

Neuro – The mind body system and how it functions, Physiological and mental states. The nervous system through which you experience , interact with ,and make sense of your world, through the sensory systems of vision, speaking and hearing , and through touch and feeling.

Linguistic – The language you use to describe, categorise, and analyse your reality. How you make sense of your world and communicate your experience to others. How you can use language to create change in your own and other models of the world.

Programming – The thought patterns and habitual ways of perceiving and behaving. You learn to interpret the world based on your experience, according to your needs. You develop repeated sequences of behaviour and strategies that

get you what you want, and create stories to explain those experiences. Because these are of your own making, it is possible to re-program them.

According to Oxford dictionary of psychology - Neuro linguistic Programming is a form of psychotherapy and a model of inter personal communication in the tradition of humanistic psychology based on elements of transformational grammar and preferred sensory representations for learning and self expression.

Philosophical Understanding of NLP

Here we try to trace common things with other disciplines such as behaviourism (learning) psychology, cognitive psychology, and various kinds of therapy and so on. In the structure of Magic I, Bandler and Grinder (1975) talked about the philosophical basis of Neuro linguistic Programming. Again they quote Hans Vaihinger: It must be remembered that the object of the world of ideas as a whole is not the portrayal of reality – this would be an utterly impossible task- but rather to provide us with an instrument for finding our way about more easily in the world. (H.Vaihinger , The Philosophy of As If, p.15)

Humanity is forever attempting to understand the nature of its reality: is it possible for us to truly know and understand the universe? Over thousands of years innumerable solutions have been proposed. In the scientific community especially, there is commonly held belief that final explanations are possible, that eventually we will construct a universal theory of everything. The philosopher Hilary Lawson (2001a:xxvii), with a hint of irony, believed that it is possible to make steps, however small and painstaking , towards a true, final , and complete account of the world. “Can we have complete understanding of our universe?” It is not possible. There are ultimate theories of everything .We do not have clear idea about original nature of our universe.

The human being explains their reality through language, and the nature of the relationship between language and reality has produced intense debate in philosophical and psychological circles for many centuries. So the proponents of Neuro Linguistic Programming have adopted a mixture of philosophical approaches to the nature of language. This view was adopted based on Jermy Bentham and Hans Vaihinger.

Computer model of Neuro Linguistic Programming

In modern computer there is repair mode when it is corrupted or malfunctioned. Then we run repair mode and find error, eliminate errors successfully, and system will run smoothly. But in the case of brain, I consider NLP is acting as software of

brain. While the person’s brain is malfunctioning and, if we administer NLP as a psychotherapy the errors will be eliminated. Hence it will act as a re- programmer of mind.

NLP AS A THERAPY

The theorist is focussing on the various sensory modalities of the patient in order to understand his mental set up. The various sensory modalities include visual, auditory, kinaesthetically... etc. On the basis of these the modalities are one way of categorizing exactly what a person does inside their head as they think. They are a way or a model for what a person does in their head as they make up an Internal Representation (I/R). In the process of creating NLP, Bandler and Grinder deduced that by looking at someone’s eyes, you could tell HOW they think. Not what they think, but HOW they think. You can tell what they’re doing inside.



EYE MOVEMENTS -- NORMAL RIGHT HANDED PERSON

Based on above observations by Bandler and Grinder, when people look up, they’re visualizing. When they look horizontally to the left and right, they’re either remembering or constructing sounds. When they look downward and to our left, they’re accessing their feelings. And when they look downward and to our right, they’re talking to themselves (Auditory Digital). The chart above is for a “normal” right handed person. Many left-handed people and some ambidextrous people will have eye movements that are reversed.

Vr Visual Remembered :(Visual Recall) - Seeing images from the memory, recalling things you’re have seen before.

Vc Visual Constructed (Visual Created) - Images of things that you have never seen before. When you are making it up in their head, you are using Visual Constructed.

Ar Auditory Remembered (Auditory Recall) - Is when you remember sounds or voices that you’ve heard before or things that you’ve said to yourself before. When you ask someone,

“What was the very last thing I said, they typically look in that direction.

Ac Auditory Constructed (Auditory Created) - Is making up sounds that you've not heard before.

K Kinesthetic (Feelings, Sense of Touch) - You generally look in this direction when you're accessing your feelings.

Ad Auditory Digital (Talking to yourself) - This is where your eyes move when you're having internal dialogue.

Mirror Neurons and Neuro Linguistic Programming

Mirror neurons are a particular type of neurons that discharge when an individual performs an action, as well as when he/she observes a similar action done by another individual. Mirror neurons have been described originally in the premotor cortex (area F5) of the monkey. (Rizzolatti et.al.2001).In human brain ,evidence for mirror neurons is indirect, but , although there is no single – neuron study showing the existence of mirror neurons, functional imaging studies revealed activation of the likely homologue of monkey area F5(area 44 and the adjacent ventral area 6) during action observation (Rizzolatti and Craighero 2004) . Furthermore, magnetoencephalography (Hari et al. 1998) and EEG (Cochin et al. 1999) have shown activation of motor cortex during observation of finger movements. Very recently, alpha rhythm desynchronization in functionally delimited language and hand motor areas was demonstrated during execution and observation of finger movements in a patient with implanted subdural electrodes (Tremblay et al.2004).

The significant question here is, about the role of the mirror neurons. The various hypotheses are: action understanding, imitation, intention understanding, and empathy (see Rizzolatti and Craighero 2004; Gallese et al.2004).In addition, it has been suggested that mirror- neurons system is the basic neural mechanism from which language has developed (Rizzolatti

and Arbib 1998).

CONCLUSION

Through this paper I am trying to give fundamental ideas about NLP's meaning, its philosophical aspects, and therapeutical sides. Here I wish to raise a question for future research - can NLP works as a re-programmer for the mind? and thereby understanding the functioning of the mind. To inquire recent advancements in Cognitive Neuro Sciences such as mirror neurons on the basis of NLP.

CONFLICT OF INTEREST

No conflict of interest.

DECLARATION

This is my original unpublished contribution, not under consideration for publication elsewhere.

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Efficacies of various Psychotherapies in altering Brain and Consciousness

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ABSTRACT

This paper analyzes various therapy systems on the basis of their effectiveness in bringing about changes in structure (brain) and function (consciousness) of mind in the desired way. As neuropsychology claims there should be some changes (either at structural or functional) happening in the neuronal level in order to establish a change in behaviour of an organism, which obviously is the principle behind success of psychopharmacology. So this study will critically evaluate the prominent and well established psychotherapies like, behaviour therapy, cognitive therapy, and psychoanalysis. This study will be done on the basis of an in-depth analysis of the principles governing each theory as well as on the basis of relevant researches in the field. As a result, it will be easy to assess the comparative efficacy of each systems of psychotherapy in bringing about alteration in brain and consciousness.

Keywords: Brain; Neuropsychology; Psychotherapies Psychodynamic, Behaviouristic, Cognitive.

INTRODUCTION

This paper is focussing on the mechanism of action of various psychotherapies and their efficacy in bringing out changes in the brain and as a result in consciousness too. Currently it is focussing on different psychotherapies like Behaviour therapy, Cognitive therapy & Psychoanalysis. In order to understand the processes better principles governing each therapy, the focus of intervention and pattern of change expected in the brain regions are explored.

The Brain- Behaviour Relationship

The time we believed and held the notion of body- mind dualism is over. Likewise the concepts of Localization and Equipotentiality have with no doubt failed to explain the complex Human Behaviour. With the advances in the field of brain imaging during the past few decades, it has been made possible to an extent, to sketch the minute details about the neural changes happening, corresponding to behavioural changes in the organism. On the basis of various similar studies a concept of '*distributable anatomical system*' is conceptualised by Mesulam M M (1981). The major feature of the 'distributable anatomical system' is that - 'Components of single complex function are represented within distinct but interconnected sites which collectively constitute an integrated network for that function.'

In the research paper titled '*Psychoneurobiochemeduction*' David Krech (1969) also comes to consensus with Mesulam M M stating two of his postulates

1. No learning process or function entirely depends on any one area of the cortex.
2. Each area within brain plays an unequal role in different kinds of behaviour.

Alexander Luria (1902-1977) conceives each area in the central nervous system (CNS) as being involved in one of the three functions which he labelled as units:

- ✓ First unit is the Brain stem and associated areas – regulates the arousal level of the brain and the maintenance of proper muscle tone.
- ✓ Second unit is the posterior areas of the cortex plays key role in reception, integration and analysis of sensory information from both the internal and external environment.
- ✓ The third unit, the frontal and prefrontal lobes, is involved in planning, executing, and verifying behaviour.

According to him all behaviour requires the interaction of all these *units*. So he suggests that behaviour results from several

fuctions or systems of brain areas, rather than from individual brain areas. A disruption at any stage may disrupt the whole behavioural function.

Consciousness: A Function Of Brain

With evidences from various brain studies like that of split brain studies as well as the effect of psychotropic medicines in altering consciousness, it can be clearly established that Consciousness is nothing more than a functional projection of brain. This is the fact because Split-Brain condition can be equated to a two mind condition (splitting of consciousness). The biggest evidence is the stories of psychopharmacological intervention in bringing out successful alteration in consciousness. This paper is no way denying extra sensory phenomenon but it just believes that brain is the apparatus which projects and even helps in experiencing reality. Without brain no consciousness and hence any change in brain function will have a positive effect on consciousness.

Psychotherapy And Brain

Various psychotherapies have found to be effective in bringing about changes in the behaviour that is from the least desirable to the most desirable. Neuropsychology claims that there will be corresponding change in the brain as we perform every behaviour. This means there will be a corresponding change in brain, as and when we try to establish a new behaviour or for that matter unlearning old behaviour, which technically is titled *Psychotherapy*.

Now we will consider each of the psychotherapies separately including their core principles, areas of intervention, brain changes accomplished.

BEHAVIOUR THERAPY

a. Basic principles:

The term *behaviour* in *behaviour therapy* refers to a person’s observable actions and responses. Behaviour therapy focuses on changing the behaviour of patients by reducing maladaptive behaviour patterns to more effective ones. It involves a criterion, referred to as *behaviour analysis*, for the strategic selection of behaviours to change, and an intervention tool to bring about behaviour change, such as modifying antecedents or consequences or giving instructions. All these are based on the classical conditioning, operant conditioning and social learning which forms the platform for the Behaviourist school of thought.

b. Area of intervention:

Focuses on dysfunction in simple forms of learning and memory (overt behaviours) and their environmental influences.

c. Expected regions of Brain changes:

The amygdala, basal ganglia, and hippocampus since these are areas which are prominent in learning and consolidation new memories.

d. Supporting evidences from various researches:

Study 1

Baxter et al. (1992) conducted a experiment with 18 OCD patients. Both the group had 9 patients in each of them. Exposure and response prevention(behavior therapy) was applied for 10 weeks in 9 patients with OCD and the rest 9 patients were taking Fluoxetine (an antidepressant of the SSRI class).

| | | |
|--------------|---------------------------------------|---------------------------------------|
| GROUP | GROUP1(9 patients) | GROUP2(9 patients) |
| INTERVENTION | Fluoxetine (SSRI) | BT* for 10 weeks |
| RESULTS | Decreased metabolism in Right caudate | Decreased metabolism in Right caudate |

BT* - exposure and response prevention

Study 2

Brody et al. (1998) conducted a study on OCD patients. 18 patients with OCD were administered behaviour therapy for a period of 8–12 weeks. 9 patients with OCD were given fluoxetine an antidepressant.

| | | |
|--------------|--|--|
| GROUP | GROUP1 (9 patients with OCD) | GROUP2 (18 patients with OCD) |
| INTERVENTION | Fluoxetine | BT* 8–12 weeks |
| RESULTS | Left orbital-frontal cortex metabolism negatively correlated with treatment response | Left orbital-frontal cortex** metabolism positively correlated with treatment response |

*BT- extinction- based therapy

**Neuro-imaging studies of OCD have shown hyperactivity during neutral states at Orbital-frontal and anterior Cingulate cortex, as well as Striatum that is heightened during symptom provocation. OCD patients have shown significantly elevated glucose metabolic rates in both cerebral hemispheres, especially in Left Orbito-frontal cortex. Glucose metabolic rate is closely tied to neuronal functioning.

COGNITIVE THERAPY

a. Basic principles:

Cognitive therapy being a short-term therapy it uses an active

collaboration between patient and therapist to achieve its therapeutic goals, which are oriented toward current problems and their resolution. It focuses on the types of cognition in an individual. Cognitive theory believes that those cognitions constitute their stream of consciousness or phenomenal field, which reflects their configuration of themselves, their world, their past, and their future. So bringing in some alterations in the content of their underlying cognitive structures will affect their affective state and behavioural pattern. Through psychological therapy, patients can become aware of their cognitive distortions. Correction of faulty dysfunctional constructs can lead to clinical improvement.

b. Area of intervention:

The area of focus and intervention is the patient’s cognitions.

c. Expected regions of Brain changes involves:

Frontal cortex, since it involves higher order logical thinking and rational decision making.

d. Supporting evidences from various researches:

Study 1

Wykes et al.(2002) conducted a study in Schizophrenic patients, 6 of them receiving Cognitive remediation therapy (occupational therapy) for 12weeks and 6 patients on antipsychotics and, 6 healthy controls. The results are as mentioned in the table below.

| GROUP | GROUP1 (6 patients with schizophrenia) | GROUP2 (6 patients with schizophrenia) | Group3 (healthy control) |
|--------------|--|--|--------------------------|
| INTERVENTION | antipsychotics | 12weeks Cognitive remediation therapy* | nil |
| RESULTS | No comparable changes noted | Increased CBF in Right inferior frontal cortex | nil |

* Occupational therapy

Study 2

Laatsch et al. (1999) conducted a study with 5 patients with traumatic brain injury.

They were administered ‘Cognitive rehab therapy for a varying number of sessions. As a result of treatment there was a total increase in cerebral blood flow (CBF) in 3 patients.

PSYCHOANALYSIS

a. Basic principles:

The psychoanalytic process involves bringing to the surface repressed memories and feelings by means of a scrupulous unravelling of hidden meanings of verbalized material and of the unwitting ways in which the patient wards off underlying

conflicts through defensive forgetting and repetition of the past.

The overall process of analysis is one in which unconscious neurotic conflicts are recovered from memory and verbally expressed, re-experienced in the transference, reconstructed by the analyst, and, ultimately, resolved through understanding.

b. Area of intervention:

Focuses on repressed memory and conflicting interpersonal relationship and traces the unfulfilled infantile libidinal wishes in the individual’s unconscious memories.

c. Expected regions of Brain changes:

Lateralised cerebral hemispheres and sub-cortical areas in the brain since it may hold the Interpersonal representations, negative and old memories.

d. Supporting evidences from various researches:

Study 1

Martin et al. (2001) reported a study involving patients having major depressive disorder (MDD). 13 patients with MDD was administered interpersonal therapy (IPT) which is a variant form of psychodynamic psychotherapy for a period of 6 weeks. Simultaneously, 15 patients with MDD were given Venlafaxine (antidepressant).

| GROUP | GROUP1 (13 patients with Major Depressive Disorder) | GROUP2 (15 patients with Major Depressive Disorder) |
|--------------|--|---|
| INTERVENTION | Interpersonal therapy (IPT) 6 weeks | Venlafaxine (antidepressant). |
| RESULTS | Increased CBF in 1. right basal ganglia 2. Right posterior cingulate | Increased CBF in right basal ganglia |

Study 2

Brody et al. (2001) reported a study in which 16 healthy controls were considered along with 14 patients (Major depressive disorder) given Interpersonal therapy for 12 weeks and 10 similar patients were under Paroxetine medication. Results show that both the experimental groups had a decrease in prefrontal metabolism and an increased metabolism in inferior Temporal cortex and Insula as compared to the healthy subjects.

| | | |
|--------------|---|---|
| GROUP | GROUP1 (14 patients with Major Depressive Disorder) | GROUP2 (15 patients with Major Depressive Disorder) |
| INTERVENTION | Interpersonal therapy (IPT) 12 weeks | Paroxetine (antidepressant). |
| RESULTS | 1.Decreased metabolism in prefrontal cortex. 2.Increased metabolism in inferior temporal cortex and insula | Same as psychotherapy |

CONCLUSION:

Psychotherapy, knowingly or unknowingly has been successful in bringing about changes in the structure and function of the brain which affects an organism's behaviour which accounts for its long history and innumerable varieties. As mentioned in the introductory part it has become essential for us to understand the physiology of human behaviour in order to intervene successfully. Certain researches are even mentioning about the need for a psychotherapist to learn how to interpret the brain imaging results because it helps in predicting which therapy to use for a particular patient and about the prognosis too.

TAKE HOME MESSAGE:

- Psychotherapy should be considered as a potential mode of treatment equally competent to Psychopharmacotherapy but not as an alternative.
- Professional in the field of psychology should be proficient enough to understand brain physiology and function which will help them to work more effectively with their clients.
- There is lot of scope in the field of psychotherapy.

DECLARATION

This is my original unpublished work, not submitted for publication elsewhere.

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Suggestions for further research

1. Can we map each functional behaviour units using brain-imaging techniques?
2. Can brain imaging help in understanding and predicting psychopathology?
3. Can we explain each major therapy in psychology using brain-imaging devices?
4. Would it be possible for us to identify other's thought using brain-imaging?

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What Is Mind? : A Neuropsychological Perspective

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ABSTRACT

We commonly call mind is a range of functions carried out by the brain. The action of the brain underlie all behavior not only relatively simple motor behavior such as walking, and eating but, all the complex cognitive actions that we associate with specifically human behavior such as thinking, speaking and creating work of art. The neuropsychological aspect of mind begins with brain- behavior relationship. Charles Darwin put forward the Materialistic theory of behavior. The development of language is an example. Language is a cognitive behavior which can be explained on the basis of neural science. The different theories explain how the language has been developed in animals including human beings. The need for effective communication between the same species and the search for food led to non-verbal language which later led to verbal language. The verbal communication made the life easier. Certain areas in the brain are responsible for the language process. This means that the cognitive behavior (language) is a product of brain. Hence we can say that the mind is a product of brain activity. And a new model to define the mind is also been presented by the author.

Keywords: *Mind; Dualism; Materialism; Neuropsychology; Cognitive behavior; Language; Cerebral Mental Field; Electro-Magnetic Field.*

INTRODUCTION

From the time immemorial, the human thoughts have been in search of the concept of mind. The mind-body relation, the existence of mind and its activities were still inviting attention from different perspectives. Ancient philosophers were able to express their views on the context. Modern researches revealed more scientific idea about the concept. Above all our rich Indian tradition, based on Vedas and Upanishads described mind on more acceptable and comprehensible way. In Kathopanishadu it was stated as,

“Atmanam radhinam vidhi,
Sareeram radhameva thu,
Budhim thu saradhim vidhi,
Manah pragrahameva cha”

-Kathopanishadu, lesson-1, valli-3. (Prasad.M.N, 2003)

The conscious principle within is the lord of the chariot. The body is the chariot, the intellect is the charioteer or driver, the mind is the reins, the senses are the horses, the objects of the senses are the roads. So the charioteer (intellect-brain) controls the (reins-mind) paths where we have to go.

PHILOSOPHICAL PERSPECTIVES

The concept of mind primarily debates on two issues: (1) Is mind an immaterial thing? (2) Is mind is just the brain? There

were several principles put forwarded to discuss this idea. Many philosophers and scientists studied the matter from different perspectives.

Aristotle (384-322BC) describes object as combination of form and matter. He argues that there are many cases where the form of the object is what's essential to being such an object, while matter is not. Aristotle used the term “psyche”, which is responsible for life. He said that the non-material psyche governs our behavior and based on this concept the idea was known as “Mentalism”. (Beakely, B and Ludlow, P. 2006).

Rene Descartes (1596-1650) describes that the mind and body are different sorts of things, made of different substances. It is referred to as Cartesian Dualism. The body, in its intrinsic nature exactly like every other material object, being an essentially extended thing (in Latin *res extensa*), extended in space that is to say, and defined by such properties as length, depth, height, mass, motion and spatial location. On the contrary, mind is essentially a thinking thing (*res cogitans*), devoid of shape, mass, location in space or any other physical property and governed by reason rather than mechanical causation. (Beakely, B and Ludlow, P. 2006).

John Locke (1623-1704) said that our knowledge is limited both by our imperfect evidence and by the limited ideas; we use to understand this evidence. He was totally against Cartesian Dualism. (Beakely, B and Ludlow, P. 2006).

George Berkeley (1685-1753) said that this is a form of Monism- the view that everything in the universe is made of the same substance. Berkeley argues that, what we perceive- our entire concept of an apple, for instance, involves just the qualities of the apple that we see, taste, touch etc. So the apple is nothing more than a group of sensory qualities and he said mind is a cluster of sensations. (Beakely, B and Ludlow, P. 2006).

Julien Offray De La Mettrie (1709-1751) argues that, this is a form of 'Monism' that claims that everything in the universe is made of matter. On the basis of some studies he concludes that everything in the universe –including human mind- is made up of a single physical substance. (Beakely, B and Ludlow, P. 2006).

Auguste Comte (1798-1857) presents a model of the scientific knowledge, surprisingly; psychology has no place in this model, since Comte thinks psychology is far too unscientific to survive the march of progress. Traditional philosophical psychology, he argues, focuses at best only on the intellectual features of the normal humans, thereby neglecting data available from studies of emotions and mental illness, and comparative studies of animals. As a result of this detachment from data, the traditional picture of the mind is populated with objects. (Beakely, B and Ludlow, P. 2006).

John Stuart Mill (1806-1873) opposed the ideas of Comte, by providing a methodological argument that psychology will remain valuable as a separate science. The brain is so complex and so poorly understood. If we believe that mental states are the brain states, we need further study about the mental regularities independently of brain research. (Beakely, B and Ludlow, P. 2006).

William James (1842-1910) said that, everything is made of the same substance (experience), but since that substance makes up both the mental and physical equally, it is no more one than other. (Beakely, B and Ludlow, P. 2006). These are some of the important philosophical views, and we are now going to discuss the neuropsychological views of mind.

NEUROPSYCHOLOGICAL PERSPECTIVE

By the middle of 19th century another theory of the brain and behavior were emerging. This theory was the modern perception of materialism- the idea that rational behavior can be fully explained by the working of the brain and the rest of the nervous system. The perspective had its root in the evolutionary theories of Alfred Russell Wallace and Charles Darwin.

Wallace and Darwin independently arrived at the same conclusion that all living things are related. Darwin elaborated on the topic in his book titled "On the Origin of Species by means of Natural Selection" in 1859. Darwin believed that all organisms, both living and extinct are descended from some

unknown ancestor. In Darwin's terms all living things are said to have a common descent. As the descendents of original organism spilled into various habitats over million of years, they developed different structural and behavioral adaptations that made them suited for specific ways of life. But at the same time they retained many similar traits that reveal their relatedness to each other. Brain cells are having such characteristic common to animal species. Consequently all brain cells that living organism possesses are descendents of that first brain cell (Kolb, B and Whishaw.I.Q. 2001).

Life is evolved to multi cellular body from unicellular structure. The behavior of unicellular structures were as limited as they had only little amount of neural tissues. Reproduction was a behavior that subjected to dramatic change from unicellular animal to multi cellular animal. The unicellular organism reproduced by simple techniques such as binary fission and the method was called asexual reproduction. When the amount of neural tissue increased proportionally with the body size, the behavior also changed. They have developed another way of reproduction- the sexual reproduction. Their thinking pattern (cognitive behavior) and mental activity also changed. The multi cellular animals possess a broader mind than the unicellular animals with the well developed neural tissue-The Brain.

While considering the neuropsychological view of mind, Sir John Carew Eccles (1903-1997) was an important figure who tried to explain the "mind-body problem". He explained mind on the basis of the mechanisms of synaptic transmission and functional controls with in the central nervous system. His contribution was mostly on the philosophical level. The Eccles's model of mind was presented with out any experimental evidence or experimental designs for testing. A mental field model was proposed by Hiroomi Umezawa (Umezawa 1993) which is termed as "Quantum Field Theory". In the interpretation of quantum theory by Nils Bohr (1885-1962), mind and matter are two aspects one undivided process. Based on this idea David Bohm (1917-1992) formulated another theory, but this also does not solve the problem of how neural activity can be directly related to the subjective, non-physical aspect of mind (Bohr and Factor, 1985).

The subjective experience involves an integrative property. Billions of neuronal action produces the actual experience of a unified one. This is termed "binding phenomenon". Wolf Singer and colleagues claimed that a synchronization of rhythmic electrical potentials between different areas of the brain might be involved in binding (Gray and Singer, 1989). Eccles realized that some sort of field would have account for the integrative aspects of mind. For the elements in the brain that give rise to the field are the organized bundles of neurons, or the "psychons" (Eccles, 1994). The American neurosurgeon, Benjamin Libet, proposed another theory known as the

“Cerebral Mental Field” or CMF which is potentially testable (Libet, 1994). A small slab of the sensory cortex is neuronally isolated but kept viable by making all the cortical cuts subpially. This allows the arterial supply to the project area. Libet predicts that electrical stimulation of the sensory slab will produce a subjective response reportable by the subject. The slab produces its own CMF by this activity. Benjamin Libet and Hans Kornhuber found out that a “readiness potential” is created in 1/3 of a second before finger movement and it can be recorded by scalp EEG (Ramachandran.V.S, 2007). That is, we can see an electric potential is created in the EEG before we are thinking for a movement.

The brain imaging studies reveals that the theory of mind(ToM) and the emotion empathy depend on the activation of brain networks mainly localized at the superior temporal lobe and tempero- parietal junction(Benedetti et al 2009).

LANGUAGE AS A BRAIN ACTIVITY

Language is a medium for communication. No other species in the earth has language as developed as human beings are having. The knowledge about the evolution of language is based on various kinds of animal vocalizations. Hewes reviewed many variants of vocalization theory including the “pooh-pooh” theory (associated with strong emotions), the “bow-bow” theory (imitation of natural sounds), the “ye-ho-ye” theory (resonate with the natural sounds), and the “sing-song” theory (noises made while playing or dancing). But there are no evidences to support these theories (Kolb,B and Whishaw,I.Q, 2008).

The language is a cognitive behavior. The basic needs of a living organism are food, sex and shelter. When the number of a specific species in a geographical locality is increased, this led to the scarcity of food and shelter. Foraging became a solution for their existence which led to the development of perceptual skills and in turn increased neural communications within in the brain, compared to other species. This process affected the language also. To finding food and to communicate it to others became an integral part of community living. The non-verbal language converted into verbal language, which made their life easier. So, the brain became more complex and life became simpler. The complex brain performed activities including simple motor behaviors and complex cognitive behaviors. These brain activities were evolved through thousands of years. The *Homo sapiens* are having the most well developed system, in case of language. The cognitive behavior of language has been so developed in human beings is due to the development of both, the brain and its non-physical, subjective experience- The Mind.

An “Electro- Magnetic Field” Model for Mind

While discussing the structure of mind, I am, presenting a

new model by which it can be easily understood. The model is called Electro-Magnetic Field model of mind. When electric current is passed through the copper coils rounded over an iron rod, the rod becomes a magnet, creating an “electromagnetic field” around the device. Neither the magnet, nor iron rod alone can produce such field. The magnet and the coils are only different parts of the system. When energy in the form of electricity is introduced, the components act as unique system to produce an electro- magnetic field, just as the cerebral mental field.

The fore brain, mid brain and hind brain are only the components of the ‘mind system’, and when the soul, in the form of vital energy is introduced, it acts as a unique system and creates the mind. The activities of brain controlled by this subjective experience (mind) are called behavior, or the non-physical mind finds its expression in the outer world through behavior which is observable and measurable.

CONCLUSION

The “mind-body problem” is a fascinating subject. The Cartesian Dualism has opened the path to its enquiry. Every attempt to define the physical existence of mind will be resulted in vein. More researches are needed to study the complex brain activities, Cerebral Mental Field and the Electro Magnetic Field model.

DECLARATION

This is my original unpublished contribution, not under consideration for publication elsewhere.

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Questions That This Paper Raises

1. What will be the fate of neuropsychological study of mind in future?
2. Can we able to describe this non-physical, subjective experience on the basis of materialistic point of view?
3. How does the Electro-Magnetic Field model describe the other functions brain?
4. How does the brain relate to mind?

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Concept of Citta In The Patanjala Yoga

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Yoga, as propounded by Patanjali in his Yoga Sutras is a philosophy, a science and an art also. The sage has presented for us the most scientific method of controlling and purifying our Citta and mind. There are eight constituents of the Patanjala Yoga, and therefore, it is described as 'Astanga Yoga'¹. The eight stages in the Yoga are restraint (Yama), observance (Niyama), a posture (Asana), restraint of breath (Pranayama), withdrawal of senses (Pratyahara), concentration (Dharna), meditation (Dhyana) and profound meditation (Samadhi). It is through these stages that the aspirant tries to rise higher and higher on the scale of consciousness and ultimately attains the state of Samadhi.

Yoga, in its true sense, stands for the method involving efforts towards the attainment of Samadhi and Kaivalya. In this context, the observation made by P. H. Prabhu is perfectly right. He writes, "The word 'Yoga' is derived from 'Yuj', 'to join', in which case it would mean joining or union of finite Soul with the infinite or Supreme Soul (Isvara) i.e. God. It implies that there is disunion or separation (Vi-yoga) between God and man and that Yoga is an effort towards dissolving that separation. Hence the term Yoga has also come to mean the efforts, or the method or system of efforts by the help of which the union of God and man is affected. In fact, the Yoga Sutras use the word Yoga in this latter sense, as a method involving strenuous efforts or exertions towards attaining the liberation of the soul (Kaivalya)."²

The concept of 'Citta' is central in the Patanjala Yoga. This is clear from the fact that the sage has defined 'Yoga' as the restraint of fluctuations in the 'Citta' or consciousness (Yogascittavrttinirodhah).¹ This definition contains the three terms such as 'Citta', 'Vrtti' and 'Nirodhah'. Let us discuss these terms one by one.

CITTA:

The Sage Patanjali defines the term 'Citta' as the entity devoid of desire, passion and affection (Vitaragavisayam va cittam)². Generally the terms 'Citta' and 'Manas' are used interchangeably. But this is not correct because these two terms differ from one another in their meaning, scope and the level of consciousness.

The term 'Citta' stands for consciousness in general and has three main components, namely mind (Manas), intellect (Buddhi), and ego (Ahankara). These three together form a

composite whole. The mind acts as the outer cover of the intellect and ego. It is considered as the eleventh sense-organ. It is very fluctuating and therefore very difficult to control.

As stated above, Citta is wider than mind. It stands for awareness in general that manifests at the seven states, namely physical (Annamaya), physiological (Pranamaya), psychological (Manomaya), intellectual (Vijnanamaya), joy (Anandamaya), consciousness (Cittamaya), and self (Atmamaya). These are the seven sheaths or Kosas of consciousness. The concept of Kosa³ makes it clear that the mind and Citta differ in their level of consciousness. These seven Kosas have corresponding states of consciousness⁴ or Citta which are named as the rising (Vyuthana), restrained (Nirodhah), sprouted (Nirmanam), calm (Prasanta), attentive (Ekagra), fissured (Chidra), and matured (Paripakva). While commenting on these seven states of Citta and the rising of the spiritual seeker at higher and higher states of Citta, B.K.S. Iyengar, one of the world's leading teachers of the Patanjala Yoga, writes, "By Yogic practises, the Sadhaka conquers his body, controls his energy, restrains the movement of the mind, and develops sound judgement from which he acts rightly and becomes luminous. From this luminosity, he develops total awareness of the very core of his being, achieves supreme knowledge and surrenders his self to the Supreme Soul, Parmatman."⁵

VRTTIS:

Vrttis are fluctuations⁶. The Yoga is the control of fluctuations in the Citta leading to their complete cessation. From this point of view, Yoga is the method of disciplining and ripening the Citta. Because of the fluctuations in the Citta the mind gets disturbed, the intellect gets diversified and the expressions of the soul gets distorted. Hence, the necessity of controlling the fluctuations of the Citta. Through Yogic practices, it is possible to restore the stability of mind, sharpen the intellect and give proper direction to the expressions of the soul. This is essential for one's spiritual journey towards the attainment of Kaivalya.

According to Patanjali, there are five epistemological causes (Vrttis) of the fluctuations of Citta. They are: correct knowledge (Pramana), illusion (Viparyaya), delusion (Vikalpa), sleep (Nidra), and memory (Smrti)⁷. He also states the five emotional causes (Klesas) of the fluctuations of the Citta. They are: lack of spiritual knowledge (Avidhya), ego (Asmita), attachment (Raga), hatred (Dvesa) and leaning towards attachment (Abhinivesa)⁸. Besides

the epistemological and emotional causes, Patanjali also lists many environmental causes of the fluctuations of the Citta (Cittaviksepa). They are: disease (Vyadhi), lack of perseverance (Styana), doubt (Samsaya), negligence (Pramada), idleness (Alasya), sensual gratification (Avirati), living under illusions (Bhrantidarsana), missing the point (Alabdhabhumikatva) and unstable state (Anavasthitvam)⁹. He further adds the four causes of the fluctuations of the Citta, such as sorrow (Duhkha), despair (Daurmanasya), unsteadiness of the body (Angamejayatva) and irregular breathing (Svasaprasvasa)¹⁰. One is really surprised while reading this hair-splitting analysis of the causes of the fluctuations of Citta.

NIRODHAAH:

Fluctuations of the Citta are to be controlled for restoring the fluctuationless state of Citta. According to Patanjali, there are two ways of controlling the fluctuations in the Citta: repeated practice (Abhyasa) and asceticism (Vairagya).¹¹ Practice is the steadfast efforts to still these fluctuations of the Citta. Continuous and uninterrupted practice is the surest way of controlling the fluctuations of the Citta. Asceticism is the development of detachment and indifference towards desires and passions.

Patanjali, in his Yoga Sutras, also suggests several ways¹² for keeping the Citta purified and contented. One of them is to cultivate values like friendship (Maitri), compassion (Karuna), delight (Mudita), indifference (Upeksha) to pleasure and pain, virtue and vice. The Citta gets favourably expressed through the development of these four qualities. If the spiritual seeker fails to cultivate these qualities, his Citta gets disturbed because of the development of qualities contrary to these four qualities. While commenting on this Sutra, Iyengar writes, "This Sutra asks us to rejoice with the happy, to be compassionate to the sorrowful, friendly to the virtuous and indifferent to those who continue to live in vice despite attempts to change them. This mental adjustment builds social as well as personal health. Besides cultivating these qualities, one should follow the social virtues of Yama for the well-being of society as a whole. This approach keeps the mind of the Sadhaka serene and pure."¹³

It is necessary to remember that while practicing highly technical practices of Yoga for restraining the fluctuations of Citta, the spiritual seeker is expected to start Yogic practices by observing the five restraints (Yamas)¹⁴, namely, non-violence (Ahimsa), truth (Satya), non-stealing (Asteya), continence (Brahmacarya), and non-possession (Aparigraha), and also the five observances (Niyamas)¹⁵, namely, purity (Sauca), contentment (Santosa), penance (Tapa), study of the self (Swadhyaya), and surrender to God (Iswarpranidhana). Yamas are social values, while Niyamas are personal values. These are the two initial stages in the Astanga Yoga. Thus, the Patanjala Yoga is founded on morality.

It is heartening to note that psychology in the West has already started studying the central topics like soul, mind and consciousness under the names of new branches in psychology, such as cognitive psychology, neuropsychology, neurophilosophy, humanistic psychology, philosophy of mind, parapsychology, etc. On this background, it is surprising to note that the Yoga psychology has been studying the soul, mind, intellect, ego, consciousness and even conscience right from the beginning by using the method of introspection, observation and experiment. The Yoga Darsana of Patanjali has maintained all these topics under its purview and the original framework of the Patanjala Yoga has remained intact till today! This shows that the Patanjala 'Yoga Sutras' is the most scientific work on the philosophy of Citta or consciousness. While commenting upon the supremacy of the Patanjala Yoga as compared to Western psychology, P. Seshadri Aiyar writes, "Western psychology falls short of a true science of mind, because it treats only of the various modifications of the mind. Where Western psychology ends, Yoga begins. It treats of the restraint of the modifications of the Citta which leads to Samadhi or superconsciousness by which the knots of the heart are cut asunder, all doubts cease, and the bliss that passeth all understanding is realized!"¹⁶

DECLARATION

This paper is my original work, not published and not presented before.

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The Concept of Mind –Jaina Perspective

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ABSTRACT

The problem of the nature and functions of mind has a significant place in Philosophy as well as Psychology. It has eluded the group of the Philosophers and Psychologists from the early past to the present day.

Metaphysically, the mind was considered by some as the Principle of the Universe existing in relation to the phenomenal world. Mind, in point of fact, was given primary emphasis as a Cosmic Principle by the idealists. Psychologically, what concerns is the individual mind, individual's sphere of psychic states.

It is not easy to define mind; for its definition has to be in terms of psychic processes and states. Wundt says that mind is the pre-scientific concept. It covers the whole field of internal experiences. McDougall defines mind as an organized system of mental and purposive forces.

The philosophical study of mind shows that the ancient Indian thinkers possibly were aware that they were groping at grasping the intangible, ineffable and immaterial. But they could not free themselves from the material. In the Pre – Upanisadic thought, the Principle of Rta became the Principle of the Order of the Universe. Similarly, the term Kratu is shown to be the antecedent of the term manas or Prajna. In the Upanisads the importance of mind and its functions was gradually realized. An expression such as "I was elsewhere in mind, I could not see, I could not hear" is met within the Brhadaranyaka Upanisad.

The old metaphysical problem of the relation of mind and soul continued to disturb the philosophers of the ancient world. Aristotle, for example, in his De Anima said that Democritus regarded mind as identical with the soul for the fineness of its Particles. Titus Lucretius Carus avered that mind and soul are kept together in close union and make up a single nature. The Jaina thinkers, on their part, asserted the distinction between soul and mind. Jina Vardhamana Mahavira was asked by Gautama whether mind was different from the soul. "Oh, Gautama", said, Mahavira, "mind is not the soul, as speech, like mind, is different from the soul. Non-living substances have no mind."

"Mind was postulated, and the postulation was based on the evidence of experience. The contact of the sense organ with the soul alone does not give rise to experiences, because there the mind is absent. Again mind has the functional Connotation which speaks for its nature, just as speech signifies the function of speaking, fire expresses the function of burning and the light shows the light" Miss Washburn says that there is no objective proof for the existence of mind we have to posit the existence of mind on the basis of behavior and experience.

According to the Jainas, mind has an important place in empirical knowledge. Not only the senses but also mind is the instrumental cause of empirical knowledge.

In the Tattvartha Sutra, mind is defined as anindriya, which means antrikarana or the internal sense (T S, I, 14). It is different from the external sense organs. The objects of Sense Perception are also objects of mind. Mind is also a sense of internal Perceptions like Pleasure, Pain etc. Also it is the means of Scriptural Knowledge (TS II, 22). Thus mind is defined as internal sense.

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Hemacandra in his Pramana – Mimamsa defines mind as the instruments of the self which apprehends everything. Mind acquires knowledge of all objects, in the sense that it is not subject to the limitations which we find in the case of the five sense organs. Each sense organ can apprehend a particular kind of object. For example, the sense of touch cannot apprehend smell. But the mind has no such limitations. Mind can grasp anything, which comes into contrast with the five sense organs. Mind is defined as karana or the instrument of the self. If the mind were defined as what apprehends everything, then this definition would apply also to the self. Which is omniscient. Therefore, the mind is defined as the instruments for knowing all objects. The self is not an instrument but the mind is. Though empirical knowledge is based on mind and the sense organs, yet it may be divided into two forms, the indriyasa and the manonimitta – that which arises mainly from the senses and that which is mainly due to mind, which we may also call external perception and internal perception. Mind is aprapyakari according to the Jainas, because there is no direct contact between the object and the mind.

Mind, according to the Jainas, is a particular material substance. Its modes are different changes of state emerging into acts of thought. Every state of our thought is a particular mode of mind. As our state of thought changes, so also the mind changes. Thus, every state of our thought is reflected in the different modes of our minds. In another language, a state of thought is nothing but a particular mode of mind itself. The direct apprehension of the modes of mind is called telepathy in Jaina Philosophy. A person possessing the faculty of telepathy can directly cognize the states of our thought. This cognition of the states of thought is nothing but a direct perception of the mode of the stuff of which the mind is made up.

Key Words: Mind, Jaina thinkers; Mahavira; Tattvartha Sutra; anindriya; antrikarana; indriyasa; manonimitta

Integrality and Relational Functionality of Minbracon and Man-Agerial Effectiveness: An Indian Paradigm

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ABSTRACT

The inspiring stuff for this study has been my intimate glimpses across various organizations (Educational & Business) as a teacher, trainer & consultant in last two decades. Research material collected, processed & used in studies & discussion notes enabled me to attempt to touch upon the utilitarian aspect of MINBRACON (Mind, Brain & Consciousness) practically for the advantage of man-agerial & organizational effectiveness. Indian Psycho-philosophy grasps the impeccable vertical dimension of man as a transcendent entity. The search has resolved to be guided by orientation for Indian Management Thought and not merely gaining scholastic information. Optimum use of MINBRACON for man-agerial effectiveness as a Psycho-philo model of a 'Wisdom Man-ager' and not a brain worker or knowledge worker as advocated by Peter Drucker. What presented if rings fairly authentic, could benefit to practical use in organizational settings. Modern business is in search of alternative paradigms of exploration and experiencing! You may not be able to measure fragrance of rose but it is reality par excellence! This is the strength of Indian Psycho-philosophy. Hence the effort to develop new thought structure on solid grounding of Indian insights. We are interested in what is wholesome in long run that can be reconstructed on our notions from existing foundations if required. Entire cognitive domains of academicians are mortgaged to the ruling western paradigms.

Indian insights on optimum use of MINBRACON are far deep and enriching when put to practice, and enlighten The human being - The man-ager. Emphasis on understanding the relational functionality of MINBRACON and appreciating its potentiality of developing strongly through the process of purification or transformation, for that, as said by Aravindo, 'Process from lower nature being to highest one i.e. from Physical, Mental, Psychic being to Gnostic being could result and develop pure thinking, decisional ability & powerful execution in resolving organizational problems affecting thousands of stakeholders at a stroke. The man-ager essentially as an influencing individual seeks to grow with organization, sets example by his managerial attitude, knowledge & skills. The hypothesis, that is, Indian thought provides strong foundation, itself is based on the judgment that he has, or acquires proficiency in purification or transformation, is our vision of the managerial effectiveness.

Vipassana Meditation: Medicine on Mind-Body Problem

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ABSTRACT

Lord Buddha's aura of compassion, wisdom and love embraced the whole world; He was great Psychologist in true sense. The major substance for concern of psychology is the core of all seven volumes of *Abhi Dhamma*- Pitakas, which belong to Tripitakas. According to Abhidhamma, there are 89 or 121 kinds of the mind.

Lord Buddha has explained the revelation of the mind as, the process of peeling off each layer of an onion, until its core is reached. Like Scientists he found the truth of the mind by method of 'Analysis & Synthesis' and is the only teacher who measured mind as the sixth sense for the first time in the world.

Each day we take bath, wash our clothes with soap and remove all the dirt. But the mind which is polluted with impure thoughts remains dirty and unclean, this leads to unhappiness. These impure thoughts encompass ailments like hatred, greediness, and resentment, which lead ultimately to human sufferings. The best medicine for human sufferings is Vipassana Sadhana-Meditation. Meditation is the most natural state of a being and its keeps one in harmony with everything that exists. It leads to whole and complete mind.

'MIND IS SOFTWARE & BODY IS THE HARDWARE'

Man can be compared to a computer, wherein, human body being the hardware & the mind is software. Lord Buddha recommends not to feed pessimism in this software i.e. the mind, because the resultant is human suffering. Assimilation of good thoughts, human values, and optimism in the software leads to complete happiness. It means that the software shouldn't get contaminated with antisocial elements, like castism, Human rights exploitation, and antinational activities. This software should be integrated with love, compassion, harmony, equality and Optimism.

Lord Buddha has elaborated the nature of mind, in his Dhammapada's first verse- it is narrated that-

*"Mind precedes all phenomena,
Mind mattes most, everything is mind made!
If with an impure mind
You speak or act,
Then suffering follows you
As the cartwheel follows the foot of the draft animal.*

If with a pure mind

You speak or act,

Then happiness follows you

*As a shadow that never departs"*¹

It can be explained as if we inculcate our mind i.e. the software with inhuman thoughts, then our body will act inhumanly! Cultivating the soil with the mango seed will never crop up with bitter guard. Hence, well cultivated mind culminates into happiness & ill cultivated mind concludes into grief.

Hence, the doctrine is "Grief commences from the mind only, which can be altered into entire "Happiness" by feeding the software of the mind with the Dhamma, through Vipassana Meditation by thus creating hindrances to the negative thoughts.

'The Buddha said 'No enemy can harm one so much as one's thoughts of Cravings, thoughts of hatred, thoughts of jealousy' When we master our mind, we can overcome such negative thoughts, which can make life a nuisance to ourselves as well to others."²

METHOD FOR TRAINING THE MIND

“In Satipatthana Sutta the Buddha explains how to develop and cultivate the mind. In this Sutta, the Buddha offers four objects of meditation for consideration of: body, feelings, thoughts, and mental states. The basis of the Satipatthana practice is to use these four objects for the development of concentration, mindfulness and insight or understanding of yourself and the world around you. Satipatthana offers the most simple, direct, and effective method for training the mind to meet daily tasks and problems and to achieve the highest aim- liberation.”³

NO MORALITY- NO MEDITATION

Our immoral actions always disturb our mind. So, meditation is unattainable without morality.

Ven. K. Dhammaanand said:

“The Buddhist way to meditation is through Sila, Samadhi and Panna. That means – morality, concentration and wisdom. First, we have to develop our moral background by voluntarily observing certain moral principles and virtues. That is the foundation for a good religious way of life. If we violate the universal law of cause and effect (Karma), we will have to experience the bad effects sooner or later. That is why the Buddha introduced a moral code in the form of precepts so that we can live in harmony with existing living beings and maintain a healthy, peaceful atmosphere which will promote the well being of all.”⁴

Morality is the most substantial and precious beauty of life. Dirty and polluted mind ends up speaking impure language. The one, who conquer his tongue, can conquer the world!

“Medicate the mind; rid the sickness of anger, greed and ignorance with the supreme medicine of the Dhamma. The body needs clothing to cover nakedness, in the same manner; mind also needs discipline to prevent mental nakedness.”⁵

Morality is the only way to discipline. But how can we avoid negativity?

“Sit alone and concentrate the mind on the thoughts. Watch the good thoughts and observe how they affect your mental state. Watch the harmful thoughts and observe how they disturb your mental state. Simply observe the thoughts dispassionately and so create the opportunity to go beyond them. The moving beyond all thoughts and knowledge brings peace, harmony, and happiness.”⁶

Vipassanacharya S.N. Goenka Said:

“Our own mental actions have an influence on others. If we generate nothing but negativity in the mind, that negativity has a harmful effect on those who come into contact with us.

If we fill the mind with positivity, with goodwill toward others, then it will have a helpful effect on those around us. You cannot control the actions, the *kamma* of others, but you can become master of yourself in order to have a positive influence on those around you.”⁷

The Buddha Said:

“You are your own Master

*You make your own future.”*⁸

“PSYCHIC - THERAPY OF BUDDHA” LORD BUDDHA WAS A GREATEST PSYCHOLOGIST IN THE WORLD.

“The Buddha speaking on the mind has also spoken on mental disorders and on the treatment of psychic ailments. The Buddha has traced sorrow as one of the chief causes leading to the arising of mental disturbances. On the death of her only son, Kisa Gotami loses control of her senses and in her madness goes in search of medicine for her dead child. Failing all else she appeals to the Buddha, who realizing that nothing would convince her until her mental equilibrium has been restored, sends her on an errand to get him a few mustard seeds from a house where there has been no death. Unable to accomplish the Master’s request, she comes to the conclusion that death is inevitable and that her only son too had succumbed to it.”⁹

CONTROL OVER SENSE

We don’t have any sentry over our tongue, eyes & mind etc. i.e. the inadequacy of sentinel over all 6 senses. This subjective sentinel plays the key role for the successful life.

Ven. Dhammaanand K. Said:

“When compared with Buddhist ideology the function of the pineal gland seems to be the physiological expression corresponding to the psychology of sense control. Buddhism maintains that unrestrained sense stimuli disturb mental activity. If the sense doors are well guarded, i.e. if visual, auditory, olfactory, gustatory and tactile inputs are controlled, a corresponding degree of happiness and concentrated mental activity become possible. *Cittassa ekaggata* or the ability to fix the mind on one point is greatly determined by the control of sense faculties. In terms of physiology it seems to mean that such sense control helps the synthesis of melatonin in the pineal gland which stimulates brain activity and retards sexual activity. Thus in terms of pineal function, brain activity and sexual activity seem to be antithetical. Buddhism, too, emphasizes that sexual desire prevents clear thinking, distorts vision, clouds issues, inhibits wisdom and destroys peace of mind.”¹⁰

Meditation is Medicine

“Medical science and therapy are not so effective in helping a person to eradicate mental disturbances such as frustration and worries because they arise not as a result of organic disorders, but are mind created. The remedy for these problems is meditation”.¹¹

Punishment is not the remedy for emancipation of crime although it's essential to punish the criminal. The roots of the crime, nurture from the illness of the mind. The man can get rid off from these ailments of mind by studying the nature of mind, it's micro -analysis through Vipassana Meditation.

Vipassanacharya Satyanarayan Goenka Gururji conducted Vipassana Meditation Camps for the imprisoned criminals through many jails, towards his compassion for humanity for these criminals. And it revealed the inference interpreted by the sociologist, the psychologist most potent medicine on mind & body problems./ dysfunctions /or disorders.

“Searching for statistical proof of Vipassana's potential, sociologists began to accumulate data concerning the effects of VM on Tihar Jail inmates. Chandiramani, Verma, Dhar, and Aggarwal (1994) studied the psychological effects of VM. They reported significant improvement in parameters like sense of hope and well-being. They also observed considerable reduction in neurotic predisposition, hostility, and feelings of helplessness amongst the prisoners who had taken a VM course. Khurana (1996, 1999) conducted field experiments using 'before and after' designs to find out the effect of VM on Quality of Life (QOL) and Subject well – being (SWB) of under trials in Tihar Jail. She found a slight improvement, but recommended that the study be repeated using a control group design. Chaudhary (1999) analyzed the efficiency of Vipassana meditation to ameliorate stress and promote reformation among adolescent prisoners. In her study, she reported that both “state anxiety” and “trait anxiety” reduced significantly in Vipassana meditators. She also stated that there was a decrease in aggression among the under trial prisoners who had taken the course, and an increase in such positive emotions as hopefulness, self-control, conformity, and compassion. In addition, many other studies have reported positive changes in the behavior of jail inmates, due to Vipassana meditation (Shah, 1976, Unnithan & Ahuja, 1977, Hammersley & Cregan, 1986)”.¹²

“Vipassana Meditation has been found to be effective in reducing Criminal propensity, and improving the subjective well-being of inmates of Tihar Jail. The benefits of Vipassana are many, so long as one continues to practice it. It has the

potential to be the panacea, the harbinger of a new day and age in prison reform. It is hoped that this study will help kindle the torch of Dhamma, and spread Vipassana throughout the prisons of the world.”¹³

The Central Jail- Jaipur Conducted the trials of Vipassana Meditation camps for the prisoners in 1975. it revealed the following important revelations, & observations notes by then eminent researchers viz.

1. “Resumption of Hypertension to normalcy.
2. Regression of mental tension to happiness & subjective well-being.
3. Cessation of clashes among the inmates of the person.
4. Cessation of Smoking cigar or tobacco.
5. Relief from headache, abdominal pain & respiratory dysfunction/ disorders, and.
6. Overwhelming exaggeration of the general efficiency of the inmates of the prison.”¹⁴

DECLARATION

This paper is my original work, not published or presented before.

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Buddhist Concept of Mind

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ABSTRACT

It is well understood Buddhism was a reaction against contemporary tendencies. Gautama Buddha presented a rational religion. He is also presented simple principles of life. In this sense he was anti-intellectualist. But towards superstitions he had the approach of a modern scientist. Seeing the degeneration of faith, he emphasized experience and efforts.

‘Is it “I” who draw the bow, or is the bow that draws me into the state of highest tension? Do “I” hit the goal, or does the goal hit me? Is it spiritual when seen by the eyes of the body, and corporeal when seen by the eyes of the spirit or both or neither? Bow, arrow, goal and ego, all melt into one another, so that I can no longer separate them. And even the need to separate has gone. For as soon as I take the bow and shoot, everything becomes clear and straightforward and ridiculously simple...’

The Buddhist denies the existence of any permanent entity either physical or mental. He considers the human person as a psycho–physical complex. The Buddhist concept of mind is a concept that will always lie in the background of the study of the psychology of Buddhism. The concept of mind is explained with the help of psycho–physical complex (*nāma-rūpa*). *Nāma* is used to refer to the four non-material groups (*skhandhas*): these are *vedanā*, *saññā*, *sañskharā*, and *vijñāna*. Buddhist philosophy is known as momentariness, which is explained with the help of *Prattityasamutpada*. According to Buddha mental phenomena have to be understood in the light of causal laws, meaning law of Dependent Origination.

In this paper, I seek to re-evaluate Buddhist concept of mind.

Key-Words: Common concept of mind; Mind as *vijñāna* (consciousness), or *anattā*; psycho–physical complex; *Prattityasamutpada*.

Introduction

The concept of mind is common problem in India as well as in the West also. We have many general ideas of mind. According to the common man point of view, mind is nothing but part of brain which resides in brain and which is helping us to take a decision related to our emotions. In Western side, the words mind, soul, and consciousness have the same meaning. According to Kant – “Person means those who have a consciousness about identical relation.” In Indian context, there are different meanings for the ‘self’, ‘consciousness’, ‘*cit*’, ‘*manas*’, ‘*buddhi*’, etc.

Concept of Mind in Buddhist Philosophy

‘Is it “I” who draw the bow, or is the bow that draws me into the state of highest tension? Do “I” hit the goal, or does the goal hit me? Is it spiritual when seen by the eyes of the body,

and corporeal when seen by the eyes of the spirit or both or neither? Bow, arrow, goal and ego, all melt into one another, so that I can no longer separate them. And even the need to separate has gone. For as soon as I take the bow and shoot, everything becomes clear and straightforward and ridiculously simple...’

The Buddhist denies the existence of any permanent entity either physical or mental. He considered the human person as a psycho–physical complex. The Buddhist concept of mind, the concept which will always lie in the background of the study of the psychology of Buddhism.

The Buddha denies the existence of any permanent entity whether we describe it as mind or consciousness. What we refer to as mind is a psycho–physical complex (*nāma-rūpa*). *Nāma* is used to refer to the four non material groups (*skhandhas*): these are *vedanā* (feeling), *saññā* (sense –

impressions, images, ideas, concepts), *sañskāra* (conative activity, dispositions) and *vijñāna* (consciousness). The term *rūpa* refers to the four great elements: extension, cohesion, heat and the material shape derived from them. The mental and physical constituents form one complex, and there is a mutual dependency of the mind on the body and of the body on the mind.

All mental phenomena have to be understood in the light of causal laws, since they are causally conditioned. The law of dependant origination (*paṭiccasamuppada*) shows the conditionality of all physical and mental phenomena. While the theory of dependant origination shows that all mental phenomena are causally conditioned (*paṭiccasamuppada*), the doctrine of egolessness (*anattā*) points towards the fact that neither within nor outside the mental and physical phenomena is there an abiding substance.

These two doctrines provides the foundation for understanding the Buddhist concept of mind.

‘Dependant origination is the doctrine of conditionality of all physical and psychical phenomena, the doctrine which, together with that of impersonality (*anattā*), forms a indispensable condition for the real understanding... of the teaching of the Buddha.

In the explanation of phenomena, the first takes a synthetic approach and the second an analytical approach. The dependant origination analysis shows the dependants and inter dependants of phenomena while in the other analysis such constituents of the personality as feeling, ideas, sense impressions, consciousness, volition, etc are revealed in their differentiating characteristics.

The mind according Buddhist psychology is a dynamic continuum which extends to an innumerable numbers of birds. It consists of both the conscious and unconscious mind, the unconscious mind containing the residue of emotionally charged memories which extend beyond one life span. The question whether there are such things as memories which go beyond one childhood in this birth to other past births has of course come under experimental investigation today. This is a significant facet of Buddhist psychology which has not been absorbed or accepted by the recognised school of western psychology. It might be interest to find out what exactly Freud tried to convey by the term ‘The archaic heritage of man’, and Jung by the term ‘Collective Unconscious’.

FOUR ASPECTS OF CONCEPT OF MIND

The meaning of the term *vijñāna*, *sañskāra*, *vedanā* and *sññā* is often coloured by shift of context and emphasis, so it will be useful to sort out the strand of meaning at this point. Additionally, these four concepts are seen as being the key to

a comprehensive grasp of nature of mental phenomena in Buddhism. In fact, there are some scholars who have even compared the Buddhist analysis to the tripartite division of the mind into cognition, conation and affection, a concept which has come down the stream of western thoughts since the time of Aristotle. It is true that contemporary psychologist in the west considered this a highly simplified picture which does not do full justice to the complexity of psychological phenomena.

Scholars who find the tripartite functions useful in understanding the Buddhist concept of mind consider feeling (*vedanā*) as the affective dimension of experience, disposition and volition (*sañskāra*) as a conative dimension, and perception (*sññā*) and consciousness (*vijñāna*) as the cognitive aspect. While this may be a useful way of charting out the dimensions of psychological experience and behaviour, it may not be very safe to put absolute reliance on it. In a deeper sense, all four mental *skhandhas* are present in all states of consciousness and experience. Thus a mental factor like a volition is not a separate entity but is inseparably associated with other factors. In this manner, the three dimensions of experience are the product of abstract analysis, whereas all three aspects are found in all states of consciousness and behaviour.

Vedanā, the feeling – component of our experiences is considered to be of three types: pleasant, painful and neutral. Feelings are classified into bodily and mental feelings and they are also related to the sense organs. Pleasant feelings excite man’s attachments to objects and rouse latent sensuous greed. Painful feelings excite latent anger and hatred. The saint who seeks to master passions has to eliminate three features connected with these feelings: the tendency to attachment in pleasant feeling, the tendency to revulsion in painful feelings, and the tendency to ignorance in neutral feelings.

There is also an interesting ethical dimension that runs through the analysis of feelings. The question is raised as to whether there are pleasurable states devoid of attachment. At this stage distinctions are made between the pleasures of domestic life and the pleasures of renunciation, the pleasure of the senses and the delight which emerges from meditational states and so on. But feeling as a part of the five attachment group (*pañch upādānak – skhandhas*), cannot be severed from the projections of the ego. Feelings arise in association with sensory simulation and conceptual activity of the mind.

As has been said, *sññā* as one of the four non-material groups is often rendered as ‘perception’. While others render it as ‘conceptual activity’, it appears that the translation of the term to fit every context and manifestations is not possible. The term *sññā* is also divided into *patigha-sññā* and *adivacana-sññā*: *sññā* that arises out of contact with the sense organ is

described as *patigha-sñña*. *Adivacana-sñña* is of nominal character and includes sense images and concepts. Perception can be of six kinds: of visual form, of sound, of smell, of taste, of bodily sensation and of images.

Feeling and perception take place only in relation to the senses (*indriyas*) and this exists only in the physical body. The two other concepts, *sañskāra* and *vijñāna* are rooted in the flux of *bhav* or *sansārik* continuity, and they are in some sense the cause for that continuity. Thus the two terms occur both with reference to the five *skhandhas* (aggregates or groups) as well as in relation to the law of dependant origination. *Sañskāra* and *vijñāna* occur in the *pañch upādānak – skhandhas* analysis in the narrow sense of those dispositions and in acts of consciousness which manifest themselves in only so far as the body and mind are together. But they also have a deeper significance as a links in the formula of dependant origination.

In the context of sense perception, there is a reference to six kinds of consciousness: visual consciousness deriving from the eye and the material shapes; auditory consciousness from the ear and sounds; olfactory consciousness from the nose and smells; gustatory consciousness from the tongue and taste; bodily consciousness derived from the mind and mental states. *Vijñāna* in this context may be rendered as cognitive consciousness.

In relation to the will of dependant origination, *vijñāna* is seen as an unbroken stream directed by the rebirth producing *kamma*. Here *vijñāna* is the total consciousness which includes the consciousness and the residual mental events of the individual.

CONCLUSION

We can conclude the concept of mind, the concept of volition, forms a significant strand in its meaning, and *suttas* the word *chetana* and *sañskāra* are used synonymously. The interaction between the body and mind appears to be an idea that has brought in new perspectives to modern medicine. In the way that the body is important in Buddhist thought, consciousness takes a permanent place in the psychology of Buddhism.

CONFLICT OF INTEREST

None declared.

DECLARATION:

This is my original work, not published or presented before.

Guided Imagery: An Action Research

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ABSTRACT

Though modern medical science has proved to be a blessing its limitations led to the search for alternative pathies and therapies, e.g. naturopathy, homeopathy, yoga, reiki, pranik healing etc. The latest entrant in this field is visualization or guided imagery, which is based on the principle that every person has the power to heal himself by making use of images. In the Indian scenario, its application has been little known. The present investigation purports to employ guided imagery (GI) in management of trait anxiety (TA) of 150 adolescent students. The design of the study was pre-test post-test design. Two experimental and one control groups (n = 50 each) were matched in terms of socio-economic status and IQ scores. The experimental group I was given GI auditory intervention. The obtained TA score (M = 33.16) significantly different from the control group (Mean =42.16 & t = 10.33). The GI intervention imparted was of two types: auditory (A) and audio-visual (AV). The results revealed: 1. GI intervention, in general, brought down the TA to a significant level; 2. AV GI proved to have significantly greater impact as compared to A; 3. gender as a variable, did not exert any influence.

The results are discussed in the context of applicability of GI..

A Higher-Order-Thought Theory of Qualitative Consciousness

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I develop and defend a two-stage theory of qualitative consciousness - that is, of what it is for qualitative mental states to be conscious. I begin by discussing what the problem of explaining consciousness consists in. Against that background I then develop a theory of what it is for mental states of any sort to be conscious. This theory posits higher-order thoughts (HOTs) that accompany every mental state that is conscious. These HOTs suffice to make one aware of each conscious state, which is a necessary condition for any mental state to be conscious. Though HOTs are seldom themselves conscious, they still result in awareness of our conscious mental states.

I then briefly consider and rebut several arguments, due to Levine, Chalmers, and others, that no theory that appeals to such higher-order states can do justice to conscious qualitative character - what it's like for one to be in a conscious qualitative state. In the course of that discussion I outline a theory of mental qualities that is independent of whether the relevant qualitative states are themselves conscious states. That theory identifies mental qualities on the basis of their perceptual role, relying for each sensory modality on the quality space that defines the perceptible properties to which the modality in question enables perceptual access. I conclude by showing how combining the HOT theory of a mental state's being conscious with the quality-space theory of mental qualities results in a satisfactory theory of qualitative consciousness that does not succumb to standard objections.

Keywords: Mental qualities; Consciousness; Phenomenal consciousness, Phenomenology

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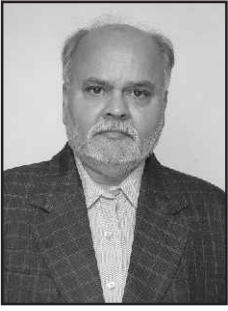
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Chairman's Message

I have great pleasure in handing over this book of proceeding of the seminar to you. The Joshi-Bedekar College has been organizing National Seminars on various subjects, which help students and teachers, not only to enrich their knowledge, but also to broaden their approach to life itself. It makes the process of education enjoyable and creative.

This year we are having an International Seminar on 'Mind, Brain and Consciousness', which is very interesting, relevant, and of concern to philosophers, psychologists, psychiatrists and neuroscientists. As also all of us. Classical and modern philosophical concepts of mind and consciousness will be discussed along with evidential findings from the various neurosciences, including psychiatry/neurology, neurobiology, neuropsychology and neurophysiology.

India has something special to say about mind, soul, consciousness, pure-consciousness and Absolute consciousness. This needs serious and systematic enquiry, and exposition. I hope this seminar takes note of this.

I am sure, if all these different theories are understood and discussed properly, a new branch of knowledge will evolve which is definitely going to help future researchers, and mankind itself.

I congratulate the Dept. of Philosophy in particular, and Joshi-Bedekar College in general, on selecting such an interesting topic. I also welcome all the delegates and speakers who have come from all over the country and abroad.

I also wish to thank our co-sponsors, the *Mens Sana Monographs*, the World Psychiatric Association, and the Indian Council of Philosophical Research who have so kindly associated with us in organizing this seminar. My thanks also to all our eminent keynote and plenary session speakers. Special thanks to Dr Ajai R. Singh who has been very helpful all through in organizing this Seminar.

I wish the seminar all success.

Vijay Bedekar
Chairman,
Vidya Prasarak Mandal, Thane



Principal's Message

Concepts and theories related to Mind, Brain and Consciousness have intrigued both philosophers and scientists since time immemorial. This international seminar is an attempt to present their salient reflections and findings. The expectation is that the robust body of interdisciplinary knowledge that results from the deliberations here will serve as a foundation for further enquiry in this intriguing, and vastly unexplored, field.

This seminar will hopefully also help us fill the knowledge gap — between mind and body, body and consciousness, and mind and consciousness. The concept of mind in Indian thought also needs a special consideration, and hopefully, will be seriously deliberated upon in this seminar.

Our attempt in organizing this seminar is to bring together scholars and intellectuals from diverse streams to evolve a body of knowledge that will help further philosophical/scientific enquiry in this challenging area of research.

I also wish to most heartily thank our sponsors, the *Mens Sana Monographs*, the World Psychiatric Association [Philosophy and Humanities Section], and the Indian Council of Philosophical Research who have so kindly lent their names to this effort, and associated with us at various stages in organizing this seminar. Our advertisers need special mention too. The teaching and non-teaching staff, and the college management, has been extremely supportive, for which I am especially thankful. Dr V.V. Bedekar, our Chairman, has been very encouraging and supportive of our efforts. The different committees have toiled day [and even, sometimes, at night] to see all goes well with this seminar. My special thanks to them. My thanks also to Perfect Prints who have toiled very hard to bring out this book in a record time. I must also thank all the paper presenters who sent in their full papers for these *Proceedings*.

How can I forget our delegates who have come from far and near to grace this seminar? As also our keynote and plenary session speakers who are recognized authorities in their fields. I also wish to thank the other paper presenters who have decided to attend and present their research. I would also like to thank our paper presenters of the two workshops that preceded this seminar.

A seminar of this nature and stature is taking place in the town of Thane probably for the first time. We hope this will further encourage this institution, and others, to take up such challenges.

I welcome all the delegates, speakers, guests and the press, and wish the seminar every success.

Dr. Shakuntala A. Singh

Principal

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Why this Seminar: The Need to Integrate Knowledge from Diverse Disciplines

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ABSTRACT

Mind Brain and Consciousness are the research concern of philosophers, psychiatrists, psychologists, neurologists and cognitive neuroscientists. All these are working in different and important ways to understand the workings of the brain, the mysteries of the mind and to grasp that elusive concept called consciousness. While they are all justified in forwarding their respective researches, there is also the need to integrate their diverse appearing understandings and try and get a comprehensive perspective that is, hopefully, more than the sum of their parts. There is also the need to understand what each one is doing, and by each other. As also the need to understand each other's basic and fundamental ideological and foundational underpinnings. This must be followed by a comprehensive and critical dialogue between the respective disciplines.

Interdisciplinary work and knowledge sharing, in an atmosphere of healthy give and take of ideas, and with a view to understanding the significance of each other's work, as also to critically evaluate the present corpus of knowledge from these diverse appearing fields, and then carry forward from there in a spirit of cooperative but evidential and critical enquiry – this is the goal we set for this seminar, and the work to follow.

Key Words: Mind; Brain; Consciousness; Western Philosophical theories; Mind and Consciousness in Indian Thought; Cognitive neurosciences; Interdisciplinary work

INTRODUCTION

Concepts related to the Mind, Brain and Consciousness have intrigued both philosophers and scientists since time immemorial. While the former have speculated on the nature of mind and put forward many theories of consciousness, the brain as an object of scientific enquiry and how it relates to functions ordinarily subsumed under mind is a relatively recent phenomenon. The emerging body of evidence that the cognitive neurosciences [neurobiology and neurophysiology], and cybernetics are producing cannot but impact our understanding of mind and consciousness and compel us to revise many of our long held theories and convictions. At the same time, many speculative insights of the philosophers regarding mind and consciousness can offer great areas for reflection and experimentation to the neuroscientists. Philosophy of mind is an active, intensely evolving body of knowledge.

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The Purpose

This International Seminar on Mind, Brain and Consciousness is an attempt to present the salient reflections/findings of philosophers and scientists on the interconnections between these concepts and evolve an ongoing dialogue between them so a robust body of knowledge serves as a foundation for further enquiry in this intriguing, and vastly unexplored, field.

Of course we can feel satisfied that much has been done in the realm of reflective thought about mind and consciousness down the centuries by the great masters of western philosophy, including the likes of Plato, St. Augustine, Descartes [all three on mind-body dualism; see Plato's *Phaedo* (many editions), and Descartes on 'mental substance' '*pensee*' or reflexive consciousness, (Descartes, 1644/1911), and Interactionism (Descartes, 1996)]; Locke [rejecting 'mental substance'; see Locke, 1688/1959]; Hume ['bundle concept'; see Hume, 1739/1888], Kant [critique of associationist approaches and stress on 'phenomenal consciousness'; see Kant, 1787/1929], Berkeley [especially his Subjective Idealism; see Berkeley, 1710/1957]; Leibniz [Parallelism; see Leibniz, 1720/1925)]; Spinoza, Gustav Fechner and W.K. Clifford [Double-Aspect Theories; see, for

example, Spinoza, 1985; Clifford, 1879] as also Herbert Spencer and P.F. Strawson (1959); William James ['stream of consciousness; see James, 1890/1999], Brentano ['intentionality'; see Brentano, 1874/1924]; Cabanis and older masters [Epiphenomenalism; see Cabanis, 1802]; Vienna Circle, especially Otto Neurath and Rudolf Carnap [physicalism or extreme materialism; see Carnap, Morris and Neurath, 1938]; Edmund Husserl (Husserl, 1913/1931; 1929/1960), Martin Heidegger (Heidegger, 1927/1962) and Maurice Merleau-Ponty (Merleau-Ponty, 1945/1962) [phenomenology]; J.J.C. Smart (Smart, 1959, 1963) and H. Feigl (Feigl, 1958) [Identity theory]; Russell ['sensibilia'; see Russell, 1914, 1918, 1921]; A.J. Ayer [a type of neutral monism in *Language, Truth and Logic*; see Ayer, 1936]; Geulincx and Malebranche [Occasionalism; see Geulincx, 1893; and Malebranche, 1997]; Gilbert Ryle ['the ghost in the machine' in *The Concept of Mind*; see Ryle, 1949/2000]. There will be occasion to review their work in this seminar.

A lot has been done in the neurosciences by the scientists, especially K.S. Lashley [removal and study of animal brain parts; see Lashley, 1923]; H.-L. Tauber [war time brain damage study by EEG and PEG; see Shaffer, 1972]; W.G. Penfield [direct stimulation of patient's brain; see Penfield, 1975]; Eric Kandel, Paul Greengard and E. Carlsson [Microstructures necessary for learning, memory and effect of psychoactive substances; Nobel Laureates, 2000; see http://nobelprize.org/nobel_prizes/medicine/laureates/2000/index.html]; Paul C. Lauterbur and Peter Mansfield [for their discoveries concerning magnetic resonance imaging, Nobel Laureates 2003; see http://nobelprize.org/nobel_prizes/medicine/laureates/2003], R. Axel and L.B. Buck [genes, protein receptors and odour recognition; Nobel Laureates, 2004; see http://nobelprize.org/nobel_prizes/medicine/laureates/2004].

There is also a vast body of work by different neuroscientists on the neurotransmitters, especially the biogenic amines, aminoacids, neuropeptides etc. There are so many others areas of activity, and the neurosciences are teeming with research work.

But precious little is being done to integrate the vast body of knowledge that already exists about these concepts in these independently progressing branches of philosophical thought and scientific experimentation.

This Seminar is a step to help the process of such integration.

MIND AND CONSCIOUSNESS

We will attempt to review and present classical and modern concepts and theories about Mind and Consciousness, including the Mind-Body or Body-Mind problem; the idealist and materialist views about mind; the identity, the computational and double aspect theories of mind; monistic and dualistic theories of mind; as also interactionism, epiphenomenalism, structuralism, reductionism, materialism, occasionalism, neutral monism, functionalism, psychophysical parallelism etc.

The philosophy of mind is intimately connected with the philosophy of action. Therefore, concepts like free will, motive,

intentions, cognition, volition, feelings, and also ethical issues related to these are of abiding interest, and also of concern in this seminar. Questions related to cognition like perception, sensation, insight, intuition, judgement, as also thought, reasoning, and the notions of doubt, inference, reasoning, logical thinking and how these are connected to our understanding of the mind and its connectedness with evidences from research in the neurosciences will also be of interest in this seminar.

The problem of Consciousness needs to be connected with that of the Mind, but not only our philosophical understanding of the Mind, which of course is very important, but also the emerging evidence from brain research. The various metaphysical positions like the dualist and physicalist theories, and the specific ones like higher-order, representational, cognitive, neural and quantum theories, need to be put in perspective to understand where we stand in our grasp of this complex topic. Qualia (Churchland, 1985), introspection [including the works of the champions of the introspective method, as seen in the work of Wilhelm Wundt (Wundt, 1897), Hermann von Helmholtz, William James and Alfred Titchener] and self-knowledge, as aspects of consciousness, also need detailed analysis. Creature consciousness and state consciousness, as also the 'state of consciousness' needs close study too.

Work in scientific psychology, especially Behaviorism (Watson, 1924; Skinner, 1953), Gestalt psychology (Köhler, 1929; Köffka, 1935) and, more recently, cognitive psychology with emphasis on modeling internal mental processes and information processing (Neisser, 1965; Gardiner, 1985) also need critical appraisal. A major resurgence of scientific and philosophical research into the nature and basis of consciousness in the 1980s and 90s with the works of Baars, 1988; Dennett, 1991; Penrose 1989, 1994; Crick 1994; Lycan 1987, 1996; Chalmers 1996, needs to be extensively critiqued.

Also noteworthy is the emergence of Specialty journals devoted to the study of consciousness [*The Journal of Consciousness Studies*, see <http://www.imprint.co.uk/jcs.html>]; *Consciousness and Cognition*, see http://www.elsevier.com/wps/find/journaldescription.cws_home/622810/description#description; and *Journal Psyche*, see http://www.theassc.org/journal_psyche), as also professional societies (Association for the Scientific Study of Consciousness – ASSC. See <http://www.theassc.org>).

All these exciting developments need to be noted in this seminar.

CONCEPT OF MIND IN INDIAN THOUGHT

The concept of Mind in Indian thought (Chennakesavan, 1991), needs a careful and detailed exposition too. Concepts related to mind and consciousness have occupied Indian thinkers for centuries. Some, like the following, need to be comprehensively critiqued in a modern idiom:

Analytical study of the concept of mind in the Indian philosophies; Comparative study of mind in Indian and western thought; Mind in the Upanishads; Vedanta, mind and

consciousness; Advaitic concept of mind; Buddhist concept of mind; Mind in the different *darśanas*; Mind and self in Indian thought; Self above matter; Mind cannot be identified with self according to Indian thought; *Antahkarana* as internal sense organ; The concept of *manas*; *Jiva*, *manas* and *atman*; *Vasana*, *vairagya* and *manas*; The state of *sat-citta-ananda*; The five organs of perception, the five organs of action [*karmendriyas*], the five vital breaths [*pranas*], the mind [*manas*], intellect [*buddhi*], egoity [*ahamkara*] and the mind-stuff [*citta*]; *Jiva* and its *kosas*; The *Kosas* – *Annamaya* [sheath of food and matter], *pranamaya* [sheath of vital breath], *manomaya* [mental sheath], *vijnanamaya* [intellectual sheath] and *anandamaya* [the sheath of bliss] – and what do they signify in understanding the self; *Citta* and *samkaras*; *Buddhi*, *ahamkara* and *citta*; *Citta-vrtti-nirodha*: what does it signify to the concept of mind in Indian thought; *Citta* and *vrittis*; *Ahamkara* [or egoism] and the Mind; The state of mindlessness; The state of *moksa*; *Atman* and the Mind; The concept of brain in Indian thought; Body represented by the brain, mind represented by *vijnana* and *atman* represented by the life principle make for the complete man; The state of *savikalpaka* and *nirvikalpaka samadhi*; The *Gunas* — *Sattva*, *rajas*, *tamas* — and the self; *Buddhi* or cognition; The concept of *Citta*; The *Indriyas*, *Karmendriyas*, and *Jnanendriyas*; *Jnana* or knowledge; *Smrti* or memory; Mind as an internal organ of sense; Mind as self; Mind as not the self; Mind as minute and subtle; Mind as instrument of knowledge; Mind as instrument of the soul; Self-cognition of Mind; Mind as cause; Mind and dream experience; Mind as reduced to a machine; Sense organs and mind contact; *Vrtti* or mental mode; Self or *Atman* or Soul; Self as pure consciousness; *Vijnana* or discrimination; *Prajna* or intelligence; *Sannikarsa*, or relation between mind, sense-organ and the object; *Samkalpa* or power of conception.

This is but a representative list. Just a perusal of the topics will make clear the amount of work available, and the quantum of work now to be done over it to make it a corpus of contemporary *international* relevance. For that critical and evidential enquiry, not necessarily only reverential and explicatory, will need to be seriously forwarded by those who have the interest of Indian thought at heart.

THE BRAIN

The brain is a complex organ, the structural correlate of the mind, center and head of the central nervous and neuro-endocrine systems, whose various areas are yielding fascinating, though rather tardy, information to science and biology. Areas like the cerebrum, which controls higher functions like thought, language, moral and social conduct, creativity, spirituality etc, need as much study as the limbic system connected with emotions and sexuality, and the neuro-endocrine system which controls an organism's response to stress, emotions, thoughts and feelings. As also various pathological conditions that result from toxic, metabolic, infectious, degenerative and congenital/traumatic conditions of brain pathology, not to forget the great number of neuropsychiatric conditions with hitherto ill-defined aetiology that are the great areas of interest and activity in clinical and research psychiatry/neurology.

The emerging vast body of evidential findings from the various neurosciences, including classical psychiatry/neurology, neurobiology, neuropsychology and neurophysiology needs a thorough presentation and a close look if present and future philosophic theorising has to be grounded on solid foundations. The interdisciplinary field of Cognitive Neuroscience, which connects the sciences of the brain [Neurosciences] with the sciences of the Mind [Cognitive Science], needs a special and careful look. Neuro-imaging and ionic/molecular processes studies are yielding fascinating information of brain function that philosophers of Mind can ill afford to ignore. The presence of neuroscientists and a close look at their findings will be a special feature of this Seminar.

The Goal, And Bridging the Gap

The attempt will be to bring together scholars and intellectuals from these diverse streams and evolve a body of knowledge that will further our quest in this intriguing but still largely inscrutable area of philosophical/scientific enquiry.

Philosophers intimately connected with study of mind and consciousness may know little of brain research. Scientists intimately connected with study of structure and function of the brain may know little about the various theories of mind and consciousness that have engaged philosophers down the centuries, and even actively engages them today. The attempt here is to bring the two bodies of researchers together to evolve a corpus of knowledge that will be mutually beneficial and, hopefully, more than the sum of its parts.

The possibility of opening up new areas of research and throwing up new questions for future research, as well as helping contemporary researchers reorient/ rethink their present positions/convictions is an exciting possibility. Hence this Seminar.

Critiques and reviews of established positions and theories are welcome, but original contributions are equally encouraged.

Often, the philosopher harbours a notion that brain research will only touch the fringe of our understanding of mind and consciousness. And often, brain scientists believe that philosophers indulge in speculation devoid of empirical evidence and hence 'talk out of their hat'. The attempt to bring the two together will hopefully dispel these notions and prejudices, and promote much needed respect for each other and a dialogue and serious study of each others' work. This will add incrementally to the body of knowledge in the respective fields, as well as in interdisciplinary studies, besides being personal eye openers for individual researchers. Hence also this Seminar.

TAKE HOME MESSAGE

There is a need to carefully study the work of diverse appearing branches like philosophy, cognitive neurosciences and biology to get a comprehensive grasp over topics like mind, brain and

consciousness.

There is also a need to forward such interdisciplinary work.

CONFLICT OF INTEREST

None declared.

DECLARATION

This is our unpublished, unrepresented work. Parts of this paper were used to prepare the brochure for the seminar.

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