

SCIENCE  
AND THE  
PRIMACY OF CONSCIOUSNESS

*Intimation of a 21<sup>st</sup> Century Revolution*

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A Book of Readings in Consciousness Studies

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## The Primacy of Conscious Experience

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*Summary:* Currently great interest has developed in trying to come to grips with the mind/brain duality. In part this is due to the outstanding successes in the psychological and neurosciences. The apparent gap between mind and matter is being filled with a plethora of data that firmly establish, in great detail, the way in which our experience can be related to brain organization. This success recalls the recent successes in Darwinian theory, where the evolutionary gap between human and non-human primates is being filled with new discoveries almost daily.

### 1.1 A Synoptic History of the Mind/brain Duality

Today we usually attribute the sharp distinction between mind and matter to Descartes. However, Rene Descartes (1934) articulated a duality that goes back to the origins of propositional utterances: a subject, an object, and a verb that ascribes to the subject an aspect partaken of, or an "intention" taken toward an object. Holophrases, words such as Om in Sanscrit and Yaveh in Hebrew which mean "being", enfold, or rather fail to unfold propositional meanings. Holophrases are said to have preceded propositional utterances in the development of languages, just as holophrases precede the development of language in children. The process of being, becomes a being, a subject with a beard who hands commandments to Moses, an object

For Descartes, the thinker is subject; all else is object. Emanuel Kant, however, pointed out that the objects of thought are ideas and ideas have two sources: sensory initiated phenomenal experience (images of objects), and noumina, the thinker's reasoned contributions. Thus, the thinker and the contents of thought all became subjective -- and knowledge of the objective, "material" aspect of the world, "iffy"

Arthur Schopenhauer, bothered by this indeterminacy, our inability to "really" know the world because of our entanglement in it, came to emphasize the role of the thinker, of energy and "will", of intentions, in unraveling the iffiness of the images. He noted that the unraveling of the world knot, made up as it is of entanglements of phenomena and noumina, is up to us. This provides us with the freedoms to explore and with the opportunities to shape the world we inhabit. Today we often hear that the solution to certain of our social problems is not just money but political will. This insight is very much in line with

formulating a true psychological science that takes subjective experience seriously, but at the same time is filling the mind/brain gap. But they note that it is much harder to bridge the gap between our personal experience and the experience of others that we validate through communication by way of verbal and instrumental behaviors.

The philosophers who are not satisfied do have a point, and the point harks back to Descartes, Kant and Schopenhauer. There is a duality between my subjective experience and that of others. Nonetheless, I believe the current philosophers are in error in restricting the hard problem to conscious awareness of our experience. Descartes' duality was corrected by Kant: All our experience involves phenomenal representation and "noumina". Neither our senses nor our cognitions readily provide us with unadulterated replicas of what's "out there." That is why we must apply ourselves to understand, not only conscious awareness but the origins of all our experience. In short, the hard problem applies to all knowledge, all science, not only to the study of consciousness.

The hard problem is the problem of knowing, the ontological problem of epistemology. It is the problem of unraveling the world knot, almost harking back to the Cartesian problem of cogito vs. all-else. However, the new way that Kant and Schopenhauer sensed the all-else, indeed adds to our sophistication, in that the all-else is to be included in the hard problem -- and to resolve this problem on the plane that they established does require active involvement, intent, will. Neuropsychological and neuroscientific research is the current expression of this intent.

A final point. While psychologists and neuroscientists are resolving the mind/matter duality from one perspective, quantum physicists have been tackling the issue from another. Bohr, Heisenberg, Dirac and Wigner, each in his own way noted that how we approach an observation determines it to a large extent. As Wigner described it to me personally some years ago, we no longer have observables in quantum physics, we have only observations. Bohr's complementarity and Heisenberg's indeterminacy principles make the same Kantian point (see Stapp, 1972). All of science, not just psychological science, is beholden to the "the hard problem."

#### 1.4 A Duality Within Subjective Experience

As noted in the introduction, within Descartes' Cogito itself several different conceptions, different dualities have caught the attention of philosophers. One, most clearly enunciated by Franz Brentano, is the duality between the perceiver and the perceived (Brentano, 1973). This also reflects the Cartesian duality: The perceiver is minding; all else is that which is being perceived and minded. But contrary to Descartes, Brentano is less interested in that which is being perceived but with the perceiver. Shades of Schopenhauer emerge as the perceiver "intends" his perceptions -- he can even intend "inexistent" percepts such as unicorns.

Brain research has shown (see Pribram & Bradley, 1998) that systems occupying the posterior convexity of the cerebral hemispheres are involved in organizing Brentano's duality. When the parietal lobe systems are injured a patient may no longer feel the arm on the side opposite the brain injury to be his own. One of my students who suffered such an injury dubbed her arm Alice and stated that "Alice doesn't live here anymore." Despite this loss of belongingness, the arm routinely performs many tasks such as bringing a cup of coffee to the person's mouth, much to the surprise of the person when she becomes aware of what has happened.

Damage further back in the convexity produces "blindsight." Here again, the person can perform many routine tasks that demand an optical input from the blind side, but the patient is unaware of, is blind to, that input. With an intact brain, we are aware both of ourselves as "see-ers" and of what is being seen.

In these and similar instances, awareness of one's bodily self and the environment are impaired.

Alice isn't any longer part of me; the blind-sighted, optically-guided behavior isn't mine. From such observations one can infer that ordinarily these brain systems operate to allow awareness of a corporeal "me" to occur. When impairment takes place, the distinction in awareness between perceiver and perceived no longer exists -- much as a color blind person can not differentiate between red and green. In the absence of differentiation, neither color exists for that person. In the absence of awareness of the difference between perceiver and perceived, neither exists.

There is another totally different duality that has concerned philosophers. In addition to a self, a me, the concern has been with a transcendental awareness of one's unity with a larger, more universal order. Carl Jung's archetypes address this aspect of experience (Jung, 1933). Paradoxically, this experience is as intensely personal as it is holistic. The experience cannot be analyzed into "in here" vs "out there" as in Brentano's intentionality. Rather it partakes of a holy, healthy awareness that lacks boundaries.

Psychological and brain science have recently made great strides in understanding this type of awareness. First, Endel Tulving (see Bradley & Pribram, 1998) differentiated two types of human memory: a dictionary or semantic type and another which dealt with episodes of one's experience. At the same time, research with non-human primates distinguished a difference between brain systems that dealt with reference memory and those that dealt with trial-by-trial types of processing.

There is good evidence from human neuropsychological research that allows identification between the processes responsible for semantic memory and those of reference memory. These processes are impaired when the posterior convexity of the brain is damaged. Referencing is what is entailed in the Brentano duality, the ability to be aware of the distinction between perceiver and perceived.

There is also good evidence obtained with animals that trial-by-trial processing leads to remembering unique instances and therefore to the processing of episodes. Episodic processing is impaired by damage to the limbic systems that lie on the inner border (thus the term limbic) of the hemispheres of the brain.

Impairment of episodic processing leads to a surprising difficulty. Patients with such impairment are personable and able to interact socially on a moment-by-moment basis by virtue of their intact semantic/referential processing. An interruption or distraction will, however, totally wipe out the episode from further awareness as if that unique instance had never taken place. Therefore, over time, over successive episodes, no personal hermeneutic, narrative "I" becomes established.

The episodic processing that leads to experiencing a narrative "I" is separate from that leading to a corporeal "me." Children who have bilateral damage to the limbic systems from birth, can learn to read and other aspects of semantic processing are unimpaired. A case history dramatically demonstrates the deficiency in constructing a narrative "I."

This child was born with large cysts involving the limbic and frontal part of his brain. He underwent two surgeries before the age of six months. He has never given any evidence of episodic memory; however, he was capable of learning verbal language to age-appropriate levels. At Age 8 he was able to give his name, age, birthday, and names of family members. He reported his favorite game, television program, and favorite color across trials. Expressive language capabilities were age appropriate and there were no obvious weaknesses in grammar. Despite this, he was unable to recall what he had eaten for breakfast a few hours earlier. He was unable to correctly identify an examiner with whom he had worked that morning from among a group of four people. He was unable to say what he had eaten for lunch after returning from a restaurant.

Obviously episodic processing is not necessary for the establishment of normal semantic processing. The converse is also true: children who suffer injury to the systems that process the corporeal "me" as for instance those who are spastic from birth, have no difficulty with episodic processing and develop a normal narrative "I."

Such children also develop normal semantic processing, indicating that the "me" has two distinct aspects: one related to sensory input and another to motor output. This separation of motor skills from body awareness is due to the increased importance of these somatic motor systems. The distance senses depend on their motor components primarily to enhance sensory processing. By contrast, the somatic motor system has the ability to skillfully and dramatically change the environmental input. As a result the motor systems in primates, including those of humans, become more distinctly separated from the somatic sensory input systems, whereas there is more overlap between input and output in the distance senses.

The brain systems that organize episodic processing also have inputs and outputs and these also overlap considerably. A mediobasal motor system covers the anterior portions of the limbic cortex and centers on the amygdala, a basal ganglion. Electrical stimulation of this cortex produces marked changes in heart and respiratory rate, in blood pressure and in gastrointestinal contractions. In contrast to the results of electrical stimulation of the somatic motor cortex, only gross turning of the body and eyes away from the side of stimulation were produced.

Also, the input from the body comes mainly from tracts concerned with visceral, autonomic, pain and temperature stimuli. Together these inputs can be classified as mediating hedonic (pleasant/unpleasant) emotional aspects of awareness. There is, therefore, not surprisingly, an anatomical-physiological relationship between hedonic and episodic processing. After all, the narrative "I" experiences the episodes and research has shown that rewards and deterrents are critical in "stamping in" an episode so that it becomes a remembered part of the personal narrative.

Schopenhauer emphasizes the importance of the body in the organization of intention, of will, though he fails to distinguish between the body as a skilled "me" and the body as a hedonic "I." Plans and the Structure of Behavior (Miller, Galanter & Pribam, 1960) separated these aspects of will by distinguishing between motivations (hedonic) as predispositions and intentions as dispositions. Intentions, in turn, are divided into strategies (prior intentions) and tactics (intentions in action, as John Searle (1983) has called them).

There is a relationship between emotion, motivation, strategy and tactics. As William James (1950) pointed out, emotions stop at the skin, motivations (termed in the literature of that time, instincts) reach out beyond. To implement motivations we develop intentions, both strategic and tactical. Separate brain systems are related to each of these behavioral categories: amygdala to emotion; caudate-putamen to motivation; anterior frontal cortex to strategies; and the more posterior frontal, the precentral cortex to tactics.

Schopenhauer, though well read in the Upanishads fails to follow them in their emphasis on the hedonic aspects of wholeness as exemplified in gardening or in lovemaking, and he therefore fails to understand fully the holistic transcendental aspect of the "I." Despite his attempts to ground the will in the body, Schopenhauer's development of body involvement in untangling the world knot results in a corporeal "me" not a holistic "I." The consequences of this failure led both Nazi (idealistic) and communist (materialist) philosophies to neglect individual incentive, and paradoxically, to an unhealthy, un-holistic, unholy society.

If we follow the lead of the eliminative materialists our society might end similarly. As a judge pointed out at a recent meeting devoted to consciousness studies, reducing psychology to neurons is a category error which would destroy our entire moral structure: We cannot hold neurons accountable for our behavior. One of the eliminativists, Francis Crick (1994), has noted that categories are human inventions and that we often change categories as our knowledge increases. But this misses the point: the category error deals not with how we categorize per se but with the level or scale with which the category deals. The category error is a not just a trivial philosophical contrivance -- making this error has serious personal and social consequences.

In 1989 B.F. Skinner, a pioneer radical behaviorist who led a lifelong crusade against folk

psychology and toward a behavioral science of the "empty organism," ended his career a year before his death with the following revised insight that provides a healthy alternative to elimination:

There are two unavoidable gaps in any behavioral account: one between the stimulating action of the environment and the response of the organism and one between consequences and the resulting change in behavior. Only brain science can fill those gaps. In so doing it completes the account; it does not give a different account of the same thing. (13-18)

Where does that leave us? In other essays, I have noted that our intense interest in the mind/matter duality was fostered by the industrial revolution. Most scientists are materialists and have begotten mentalists (as for example Roger Sperry [1980] and John Searle [1983]) who perceive flaws in the materialist position. But materialism and mentalism bear the same relationship to each other as "down" and "up" -- one would not exist without the other. Which comes first, our experience of the material world or the material brain that makes the experience possible? Is the chicken an egg's way of reproducing itself -- or is it the other way around?

The information revolution is beginning to shift the ground from an intense interest in a mental/material duality to the issue that occupied Plato and Aristotle: the ideal vs the real. Already, some mathematicians (e.g. Roger Penrose[1989]) have, not unexpectedly, declared themselves on the side of Plato. Dualities such as these are extremely helpful in exposing issues, but they are relatively primitive tools. Pre-Socratic holistic pragmatisms such as that practiced by Pythagoras in dividing a vibrating string in half to discover the principle of the octave, or, for that matter, the American pragmatism of Charles Peirce (1934), help to place such dualities in proper perspective.

Kant (who was trained in the law) and Schopenhauer, and even earlier, the Upanishads have illuminated this healthier alternative to elimination: The humble realization that the way to knowing is all of a piece; that the hard problem encompasses all of knowing; and that it takes personal involvement and dedicated work to unravel the world knot.

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