

# Mind-Brain Problem and Consciousness

## Jay Gould 6/15/09

### Two Fundamental Positions Regarding the Mind-Brain Problem

**Dualism** – The human brain and mind are *separate*.

Known formally as **Cartesian Dualism** after its originator, the 17th century French philosopher René Descartes.

*Physical matter*, including the *body and brain*, behaves according to the laws of nature, and is thus suitable for *scientific investigation*.

The *human mind* (soul, self, or spirit), which controls human behavior, lacks physical substance--and thus obeys no natural laws, and is therefore the appropriate purview of the *Church*.

This belief in the *dichotomy of mind and brain* (that they are separate entities) was sanctioned by the Roman Catholic Church, and became the dominant view for centuries.

*Descartes' dualistic philosophical position* that the universe is composed of two elements, and which gave the physical part of the universe to science and the other part to the Church, resolved the conflict that much of the scientific knowledge accumulated during the Renaissance (1400-1700 rebirth following the Dark Ages) was at odds with Church dictates.

**Monism** – The mind and brain are really *one*.

Today we generally accept this *unity position*, but there are many who still believe that some aspects of the mind, e.g., *consciousness*, cannot be just products of the activity of our physical brain--a squishy, wrinkled, 3-pound mass of tissue.

### Let's Elaborate on the Problem and Consider Consciousness

What is mind and how does it relate to the brain?

This is the Mind-Brain Problem, earlier called the Mind-Body Problem:

On the one hand we have this *physical/material substance* known as the brain.

On the other hand we have this *nonphysical/immaterial thing* known as the mind.

Some have taken a humorous approach to this problem:

"What is matter? Never mind.

What is mind? No matter." (Punch Magazine, 1855)

Others have taken a more serious approach, and there are many philosophical views, but all fall into the two general categories already noted. To expand a bit:

Dualists hold that the mind and brain are fundamentally different, and that each can exist independently -- but how they might either run in *parallel* or *interact*, and thus *influence* each other, is unclear.

Dualism in one form or another is the most common view of non-scientists.

Monists, on the other hand, hold that there is only one kind of "substance" -- but they disagree as to what it is.

*Monism*, in one of its varieties, is the most common view of scientists

*Western scientists* today typically take a monistic emergent property position, which is a form of the *monistic identity view* that mind and brain are the same thing, but just described in different terms -- specifically:

THE *BRAIN* IS THE PHYSICAL LOCUS (HEADQUARTERS) OF THE OPERATIONS OF THE *MIND*; AND THE *MIND* EMERGES FROM THE *BRAIN* AT WORK.

This results from the *interactions* (exchanges) among the billions of neurons in the brain, and the brain's interactions with the rest of the nervous system, other body systems, and the environment.

This is how the *brain creates/enables the mind*.

*Mental activity* is therefore *brain activity*!

Thus the *mind* is not a thing, but rather a *distributed process*, and hence it is *difficult to localize*.

(The *Mind* is like a verb, an action, and is thus difficult to point to and grasp -- unlike the *Brain*, which is like a noun, and is thus easy to find and embrace.)

In actuality, and rather surprisingly, every one of us is apparently a society/ensemble of minds!

These minds are each distributed neural networks, incorporating localized, specialized modules, with:

*Hierarchical Organization,*

*Serial and Parallel Pathways,*

*Concurrent Processing,*

*Feedback and Feedforward Interactions,* and

*Binding Mechanism(s)*, i.e.,

Some means of producing our typical *unity of consciousness* with regard to all the components associated with any object or event (perception, memory, thought, emotion, and motivation).

Note: The *perceptual components* of any object or event occur both within and across sensory modalities.

## What then is Consciousness?

It is *awareness* of a portion of one's *mental activity*.  
Simply put, it is **awareness of awareness**.

In addition, the core of human consciousness can be succinctly defined as: the feeling of what has happened, what is happening, and what could happen within the body and our environment (Damasio, A.R., *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*, 1999).

Consciousness can be more completely defined as personal awareness of our: 1. perceptions (of our external and internal environments), 2. thoughts (information processing), 3. feelings (emotions), 4. motivations (drives), and of 5. a unique self having those experiences, (i.e., a sense of self, and thus self-awareness -- the "I" as experienced by an individual).

It has been pointed out that: "The vast majority of mental processes that control and contribute to our conscious experience happen outside our conscious awareness. . . . We are conscious only of the content of our mental life, not what generates the content" (Gazzaniga et al., *Cognitive Neuroscience*, 2002, p. 660).

This can be paraphrased as: We are largely unconscious of the computations carried out by the brain; instead, what we are consciously aware of (and I would add, only sometimes) are the results/products/outcomes of those computations (e.g.,  $6 \times 6 = 36$ ).

Thus we can be *consciously aware* of only a portion of what is in our brain-mind, and at any given time we are, in fact, *unconscious* of the vast majority of our mental activity and its contents--even though it nevertheless influences our perceptions, thoughts, feelings, motivations, and behaviors.

Due to changes in attention, however, we can become conscious of some of the *mental content* that at other times is in the *unconscious or preconscious*. A well-known example is the *Cocktail Party Phenomenon*. Moreover, greater awareness of the activity, processes, and content of the mind can be cultivated through, e.g., *meditation training in mindfulness*.

Attention, it should be noted, is influenced by motivation and emotion. Hence *motivation and emotion* also play important roles in cognition -- the act of knowing. In fact, there is what is referred to as the mental trilogy of cognition, emotion, and motivation.

Note that *cognition and emotion* are tightly coupled/inseparable:

Cognition is about *understanding* the world.

Emotion is about *judging* the world; e.g., is something good or bad.

*Emotions*, moreover, are both *influenced by motivations* (fulfilled vs. unfulfilled), and are themselves motivating.

Consciousness is that part of the content of mental activity that at any given moment is in working memory--which has a *limited capacity* ( $7 \pm 2$  chunks).

It allows for *flexible output* to stimuli, i.e., choice/free-will, by *intervening between perception and action* (see below).

Responding without flexibility does not require consciousness; hence, organisms without flexibility are unlikely to have consciousness.

Conscious awareness has been described as a “conditional readiness to act.” (Ramachandran, V.S., *Phantoms in the Brain*, 1998, p. 249)

Consciousness also gives us the “ability to escape from the here and now of linear time, i.e., to *‘time shift’ away*” (Gazzaniga et al., 2002, p. 671).

It allows us to *review* past actions and to *plan* ahead. Through *conscious thinking* we can *integrate* perceptions of current events with information about past events, and then *plan* future actions that will be *adaptive* by *predicting* physical outcomes and how others might respond to our acts.

Since only humans appear to have *natural language abilities* (as opposed to what is taught to apes and parrots), and thus *verbal working memory*, then only humans typically have verbal consciousness.

*This vastly expands our mental capabilities*, such as for *pre-evaluating* problem solutions -- humans have the capacity for silent self-narration.

Consciousness is not a property of matter per se, but rather it is an *emergent property* of a nervous system that has reached a certain level of *complexity and organization*.

This is similar to the way in which *life* emerges from inanimate matter when it reaches a certain state of complexity and organization.

Consider the analogy of the H<sub>2</sub>O water molecule:

Water is composed of hydrogen and oxygen atoms, but neither of these flammable, explosive gases has the properties of water, nor does a simple sum of the qualities of these two types of atoms.

Water, in fact, is a liquid that can be used to put out fires.

The properties of water emerge when hydrogen and oxygen atoms are put together and organized in a certain way.

The new properties and principles emerge because of an interaction of the component parts, rather than a simple adding together of the parts.

Likewise, consciousness is an *emergent property* of the *interaction of neurons* in a nervous system that is sufficiently complex and appropriately organized. This is *one solution* to the age old *Mind/Consciousness-Brain/Body Problem*.

Consciousness appears to arise from *specialized circuits* in the *temporal lobes* (perhaps especially the left lobe where much of language processing is based) and associated *limbic system structures*, including the *insula*, as well as the projection zone in the *frontal lobes*--the *cingulate gyrus*. The *claustrum* (which means “hidden away” in Latin) might also play a central role. It is a thin layer of gray matter less than 1mm thick between the corpus striatum and insula, with connections to most of the cortex and perhaps the hippocampus, amygdala, and caudate. Crick and Koch have suggested that it might be the *very seat of consciousness*, taking in different types of data (e.g., color, form, & motion) across various modalities (e.g., visual and auditory) and coalescing, i.e. *binding*, them somewhat like the conductor of an orchestra.

**The moral of this story** is that the *whole* is often different (greater) than the *sum of its parts*. This, by the way, is an important antidote to *reductionism*.

Based on the foregoing, it can be seen that the so-called ***Mind–Brain Problem*** is really the ***Consciousness–Brain Problem***.

To sum up, it has been said with regard to the relationships between brain, mind, and consciousness that: “There is only one world, with lots of *translation barriers*.” (Ramachandran, V.S., *Phantoms in the Brain*, 1998, p. 232)

## Notes

1) Evidence for the *brain* being the physical locus of the operations of the *mind* includes studies of lesioning, stimulating, and recording brain activity -- the latter involving the electrical (EEG & ERP), magnetic (MEG), and metabolic (PET & fMRI) actions of the brain; and correlating these events with mental events, such as variations in information processing and states of consciousness.

2) Evidence for the quoted statement from Gazzaniga and the paraphrasing in paragraphs four and five above under *What Then is Consciousness?* includes, e.g.: bias effects of *subliminal perception*; priming in *masking* studies, and *blindsight*. With regard to the latter, *unilateral neglect patients* can use information they are not consciously aware of to make correct judgments of same vs. different regarding visual stimuli in the left vs. right visual hemifields. This is a form of *blindsight* in which the geniculostriate pathway is intact, at least in part, hence it is likely that unconscious/preconscious processing can occur at the level of the cortex, and is not solely limited to subcortical or secondary processing systems. (Gazzaniga et al., 2002, pp. 660-666)]

3) The *preconscious* is defined in The American Heritage Dictionary as: The memories or feelings that are not part of one's immediate awareness but that can be recalled through conscious effort. Webster's Dictionary defines it as: Not present in consciousness but capable of being recalled without encountering any inner resistance or repression.