

Jasanoff, Alan (2018) *The Biological Mind*. NY: Basic Books

In this interesting volume, Jasanoff problematizes the current focus on the brain in mental processing and the lack of consideration for the body and the environment. Indeed, there is current activity in examining the brain in relation to the body and the environment (embodiment and embeddedness), but nevertheless, the brain continues to be idealized, romanticized, mythologized and imbued with an “exaggerated sense of wonder” (32), and it is thus distanced or even removed from the body and the surrounding world. Jasanoff refers to this phenomenon as *The Cerebral Mystique* which supports scientific dualism which takes a scientific stance but makes the brain so central in our lives that it fosters an excessive, inaccurate, and often unconscious distinction between the brain and the other contributors to our mental life.

The metaphor of the brain as a computer has dominated cognitive science, but Jasanoff notes that the metaphor reinforces neurocentrism. This leads computational neuroscientists to largely limit their interest in the brain to neurons and the electric signals that their axons carry. Communication in the brain is much more extensive than electric spiking in the neuron, electric transmission along an axon, and the release of neurochemicals at synapses. Recent research has shown that glial cells, which were once thought to only be support systems for neurons, are now seen to actually participate in brain processing. And neurochemicals which were seen to only communicate with other neurons at a synapse are seen to have effects through what is called volume transmission in which neurotransmitters move freely in cerebrospinal fluid. Thus, the computer analogy minimizes the organic nature of the brain and views its processing through the lens of an inorganic manufactured device rather than an evolutionarily developed organic biological entity.

Jasanoff also criticizes the excessive focus on the brain's complexity and points out the enormous complexity of processes within and among the organs of the body and the enormous complexity of the environment outside our bodies. He says, "to cloak brains behind complexity is therefore to segregate them arbitrarily from the rest – this is the brain-body distinction in another form" (67).

To further his argument, Jasanoff presents an analysis of fMRI research with respect to the notion of neurocentrism. He argues that the cerebral mystique gets

much support from the fMRI images that appear in the popular press. (I have a friend who refers to such images as “brain porn”.) Jasanoff notes, “such pictures provide the best information we can currently obtain about human brain function, but they do not really show what the brain is doing at any point in time, and they rarely come from anybody’s brain in particular. Instead, functional brain maps are highly processed, statistical aggregations of image data that are sometimes as distant from underlying biological processes as baloney is from a pig” (80).

fMRI images also reinforce a phrenological/locationist view of the brain in which there is an attempt to associate brain regions with psychological functions. More recent thinking and research indicate that functions emerge from highly distributed, interconnected, and interacting areas of the brain. Additionally, fMRI can only record neural activation, not inhibition, and the latter is an equally important aspect of neural processing.

Imaging is a valuable source of information about the brain, but it must be done with extreme care by experts who understand its limitations.

Jasanoff next examines the role of the body in our mental lives. He argues that, “the brain interacts in essential ways with the rest of the body, and some of the most personal and individualized aspects of thinking and feeling depend critically on these interactions” (94). Blood sugar, oxygen, and hormone levels link the body to the brain. All emotions are associated with the body. As Damasio (1994) has pointed out, bodily states are crucial to decision-making which is, of course, a major feature of cognition. These states, called somatic markers get associated with positive or negative feelings (gut feelings) that help us eliminate certain alternatives and to focus on the most crucial few. Damasio’s research has shown that damage to the ventromedial prefrontal cortex cuts off communication between the body (the autonomic nervous system, the endocrine system, the musculoskeletal system, etc.), and people with such lesions don’t experience the somatic markers that would help influence their decisions. They can articulate the possible alternatives but can't choose among them. So, indeed, we need the body in order to think. The brain can't operate without it.

The environment in which the brain and the body live also contributes to our mental processing. Jasanoff argues that environmental input changes the brain,

and the brain can alter the nature of the input. The sensory input both changes the brain and is changed by the brain. This is shown by research indicating that humans have temperature dependence, light dependence, and they are influenced by color. There is a visual sensory path which operates out of conscious control but allows levels of light to control the processing of circadian rhythms. Environmental colors have different effects on our behavior. A light shade of magenta, called Baker-Miller pink has a soothing/calming effect by reducing heart rate and breathing after exercise. Other research has shown that saturated colors, especially in the blue-green-yellow range can be arousing. Researchers at the University of British Columbia found that in certain tasks the color red subconsciously generated avoidance; blue had positive effects in attracting participation in task activities, and blue increased performance on creativity tasks. Jasanoff notes that these environmental influences "act through our brains, but are not governed by our brains" (131).

Attention has been an important issue in psychology and neuroscience. Generally, a distinction is made between bottom-up and top-down forms of attention. Environmental stimuli especially those that are salient either through evolutionary adaptation or through individual experience operate ON the brain. Top-down attention operates on the basis of an individual's volition, goals, and effort. The author states that "the details of the stimulus confronting us largely determine our brain activity" (134).

Part of the human environment involves interaction with other humans. Social stimuli received from other people such as facial expressions, eye gaze, tone of voice, body position and movement have important influence on the perceivers brain, and indeed the brain has circuits that are especially responsive to social signals. Human language allows the exchange of thoughts among conspecifics, essentially linking human brains.

Jasanoff makes it clear that the brain does not maintain pride of place in our mental lives. The body and the environment play essential roles