

Chapter 2

Mind–Body Issue

Neuropsychology and neuroscience, more broadly, is a relatively new area of study with no clinical neuropsychology textbooks available until the 1970s, with the notable exception of Alexander Romanovich Luria’s initial publication of his text in 1966. However, there were many relevant resources even within the earliest writings in science. Indeed, the Egyptians described brain lesions some 5000 years ago and even provided insight into head injuries with a case study of “contra coup” damage to the brain. The early Greeks, including Hippocrates (460–379 BC; see Fig. 2.1), Aristotle (384–322 BC; see Fig. 2.2), and Galen (130–200 AD; see Fig. 2.3) each contributed their own accounting of the functions of the brain, which allow for some insights into their philosophical views on the mind–body issue. Hippocrates was clearly ahead of his time when he localized movement to the contralateral brain in his study of “the sacred disease” we know as epilepsy. Aristotle, having touched a brain without producing “feelings,” related these functions to the heart. But Hippocrates stated that “from the brain and the brain alone arise our pleasures, joys, laughter and jests, as well as our sorrows, pains and grief.” In this prescient publication, he established a basis for scientific inquiry that continues with the strongest vigor through the present day, locating the vast territory for scientific exploration squarely inside of the skull.

Notable among the great thinkers was Galen, later known as “the great physician” who provided an anatomical basis for human functions with his ventricular theory. Following his in-depth study of human brains, including those of the Roman gladiators that he studied, he reached the conclusion that inspired air interacted with the fluids within the ventricles to produce “pneuma.” Intentional actions resulted with the flow of pneuma through the nerves out to the muscles resulting in volitional acts or behaviors. Thus, intentional action, involving movements of the musculoskeletal system, was conveyed from the ventricles within the brain down through the nerves and into the muscles, resulting in their enlargement upon exertion. It might even seem reasonable then that a skeletal muscle (e.g., bicep) appears to inflate with movement at the limb following in a predictable fashion. This theory

Fig. 2.1 A likeness of Hippocrates, the “father of medicine.” Originally published in *Historical Aspects of Hydatidosis of the Central Nervous System*, Turgut and Mehmet 2017, p. 7

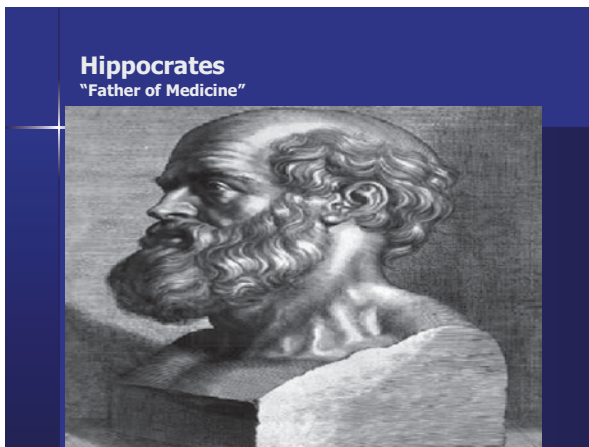
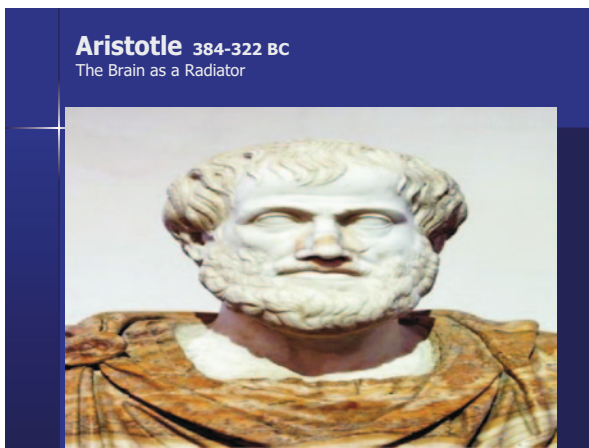
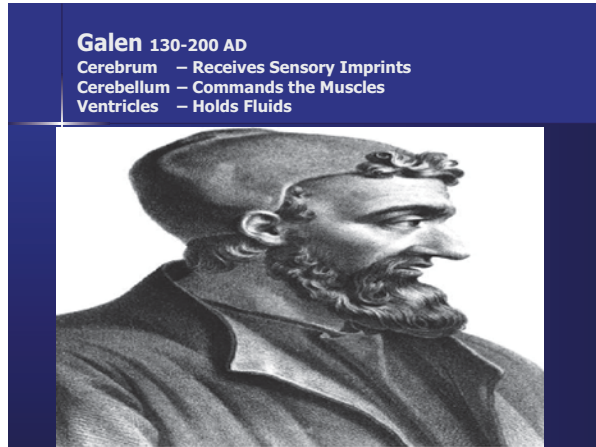


Fig. 2.2 A likeness of Aristotle who wrote “mind is the form that substance body takes.” Originally published in *History of Regenerative Medicine*, Steinhoff and Gustav 2013, p. 4



was eventually disproven by the selective cutting of a peripheral nerve without the predicted flow of pneuma from the nerves and out of the brain’s ventricular system. In addition to the brain, little was known of the function of the spinal cord prior to Galen’s anatomical studies. Galen carried out dissection and vivisection of animals providing details of the structure of the vertebral column, spinal cord, and nerve roots (see Pearce 2008). Despite different mechanisms of action, these early writers appear to ascribe aspects of personality, thought, and behavioral functions exclusively to the human body! Minimal, if any, reference is provided through these propositions of entities beyond the body or the need for an interface with a spiritual realm or divine entity located outside and beyond the bodily tissues fixed within a physical state of existence.

Fig. 2.3 A likeness of Galen, referred to during the dark ages as “the great physician.” Originally published in *Concept of Aging as a Result of Slow Programmed Poisoning of an Organism with Mitochondrial Reactive Oxygen Species*, Skulachev, Vladimir P.; Bogachev et al. 2013, p. 318



Free-Will Construct

The overriding question or concern, which had spurred the mind–body controversy, was the issue of “free will” or what was referred to in earlier literatures in science as “volition.” When laypeople are asked the question of their belief in *free will*, many endorse the construct. This belief defies much of the scientific perspective that we may eventually understand the human brain with the ability to predict behavior, thought, and emotions based on the understanding of these anatomical structures responding to, and interacting with, environmental events. The belief is that, no matter how advanced our scientific understandings, I will always be able to defy the predictions by implementing free will. Even as well-educated scientists, we may view the science of behavior with derision beyond its more basic and elementary efforts to explain intentional actions. For many, this lofty perch allows for a distinct individuality or identity, free of any physical or anatomical constraint, consistent with the core components of their belief system or philosophical view of the world. And for many, this is the fundamental basis for distinguishing human animals from the others, that the latter might be viewed as lower in the overall scheme of things.

Philosophical Doctrines

Throughout our history, there have been three primary philosophical doctrines relevant to the mind–body issue. The first philosophical doctrine for consideration is that of monism. The monistic doctrine holds that mind and body are the same thing and that there is no basis for attributing human functions to imagined or contrived entities beyond our bodies and their interface with the sensory array conveying information from our world

or environment. La Mettrie, writing about 1750, with the publication of his manuscript “L’homme, la machine” provides a classic example of one advocating this perspective and also the dangers associated with this viewpoint. La Mettrie held that the machine was ripe for inquiry into its workings and the contributions of its parts.

Throughout history, scientists have attempted to understand human brain function based on the technology prevalent at the time. For example, the cognitive psychologist of the 1980s up until about 1995 developed elaborate theories of brain function using computer processing models and analogies. Let me say clearly, at this point, that the human brain is not a computer. But, this was viewed as a meaningful way to develop scientific language and to derive scientific predictions that might be tested experimentally in the laboratory. La Mettrie (Fig. 2.4) was impressed with the hydraulic technologies of his day with movement initiated, even in a previously fixed statue in the town square, through hydraulic force. It may help the reader to appreciate that volition or free will was often thought of specifically as the movements that we engage in or the volitional act of doing things. La Mettrie reasoned that if a statue can engage in volitional activities, and if we can understand these activities through understanding the machine, then man might be studied directly through scientific inquiry. The bottom line for La Mettrie was that the human body was a machine and that we could learn of its functions through the understanding of its mechanisms. The human body, though, was “the temple of God” and not subject to study from the dictates of the church. La Mettrie’s view was insulting to many, including the Catholic Church, and to some was considered the view of a heretic.

Add to this the history of the torture of scientists, by the church, and the risks become more apparent. Many suffered under the merciless dictates of those representing the church. It was in 1997 when these actions of torture, imprisonment, and sometimes worse were publicly acknowledged through an apology by the pope. Many in science felt that it was too little and too late. But, regardless of your viewpoint, we can all acknowledge the conflict and the history of political and religious influence, which is most intimate to this controversy. We can also acknowledge the failings of science and the gradual evolution of ethical standards over time.

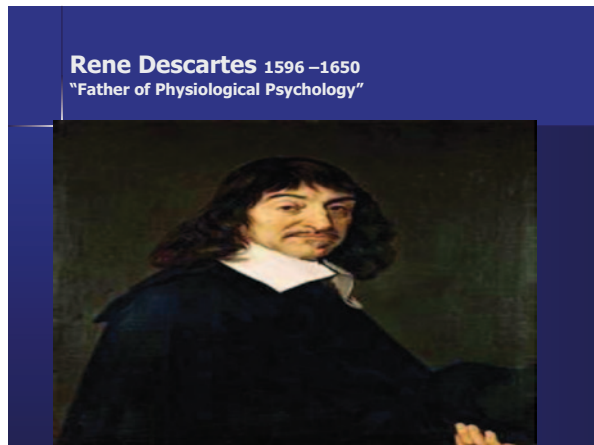
Fig. 2.4 Julien Offrey de La Mettrie, who argued that man could be studied like a machine. Copyrighted by Springer Science+Business Media, LLC



The second philosophical doctrine is that of the dualist, which acknowledges the body and bodily functions but also the “soul” as a determinant of human activities. For our purposes here, “mind” is synonymous with “soul” and, as such, the mind–body issue is essentially an issue of whether or not our philosophical doctrine demands an accounting of a second entity (the soul). In modern times, for example, you may hear expressions of human functions either being “psychological” in origin or “organic.” There is no basis for this distinction in science. Thus, the distinction is specifically identifying that individual’s philosophical viewpoint more publicly as a dualist or one with a dualistic philosophy. Those “psychological” functions, then, are ascribed to something beyond the organism or involving “mental” activities that we cannot see or relate to brain functions. Void of these terms and ill-defined constructs, such as “mind,” “mental,” “unconscious,” and the like, we may establish language derived specifically from functional aspects of a given brain location and within a functional brain system. These more functional terms having a basis in anatomy, include the aphasias, aprosodias, agnosias, alexias, agraphias, apraxias, and others.

Rene Descartes (1596–1650; see Fig. 2.5) was a politically astute gentleman. One might think him different from the monist La Mettrie for his involvement with the Catholic Church, while contributing substantially to the expanding willingness of the church to allow for the scientific study or inquiry into human functions. His influence, early on with the church, facilitated our movement out of “the dark ages” where the church substantially dictated and prevented (via torture when necessary) the activities of those who would do science. Descartes argued that much of human behavior is similar to that of “lower animals” wherein automatic or reflexive behaviors might be the subject of research without offense to the human body as “the temple of God.” He reasoned, though, that other behaviors required conscious decision or free will, at which point the soul would interact with the body allowing for these high level or distinctly human processes. The church was responsive to such reasoning and Descartes cemented his place in science as “the father of physiological psychology.”

Fig. 2.5 The “father of physiological psychology,” Rene Descartes. Originally published in *A Short History of Mechanics*, Allen and David H 2013, p. 13



Descartes also reasoned that the soul would need a perfect place to interact with the body. After some inspection, he settled on the head due to its spherical shape perhaps. Many did not agree at that time, attributing aspects of personality, and the like, to the heart. Descartes also needed a location within the brain for the soul to interact for free-will processes. He selected the pineal body, partly due to its seemingly perfect shape, a sphere, and partly due to its apparent, but not actual, uniqueness as a unitary structure in the brain. This same structure is the focus of much research in modern neuroscience on the effects of ambient lighting in circadian entrainment, and it is known for its rich resources of melatonin associated with serotonin, one of our principle neurotransmitters involved in depression and violent-prone behavior. Of interest is the finding that levels of serotonin differ significantly in comparisons of those successful in committing suicide when compared with those who tried but were unsuccessful, with lowered serotonin levels in the former group (e.g., Stanley and Mann 1983; Fergusson et al. 2005).

The important thing for the reader is to know your own philosophical viewpoint or belief for it will determine what you make of the scientific findings. Indeed, research findings indicate that your philosophical view determines that which you are able to see. So, in knowing your viewpoint, you may be better able to appreciate your perceptual biases, whatever they may be. You will tend to see that which you have learned to see. The effect of learning on perceptual bias is well established in our literatures. A classical example, within the news media and within psychology, was the beating of Rodney King. The nation witnessed much of the same “objective evidence” presented within the courtroom where an African American man was repeatedly beaten by police officers in California. But, the perception of what was being viewed differed as a function of the learning history and perceptual biases of the observers. Two people might look at exactly the same evidence and perceive with vastly different interpretations, based on their experiences.

One man experienced something somewhat similar as an undergraduate after volunteering in a variety of settings, including an adult day care facility with the elderly and an inpatient psychiatric ward. In the latter setting, he met many wonderful folks dealing with one or another difficulty from a psychiatric perspective. One had gelastic lability with auditory hallucination as he carried on elaborate conversations with nonexistent people. His speech consisted of fluent but meaningless speech, which was often incoherent. He suspected that this man’s “schizophrenic” diagnosis more accurately reflected a left temporal lobe or thalamic brain disorder. Another was a young woman who had self-admitted to the psychiatric facility with a history of suicidal ideation and behavior. After several months, the student was accepted into the University of Georgia’s doctoral program. Prior to leaving, he visited the ward once more to say goodbye and that he would be moving away from the area.

He had very little money as a student and felt lucky to have a basement apartment in downtown Albuquerque (near “Old Town Albuquerque”) with a partial dirt floor. He also had a Volkswagen bus that was a world of fun to drive even though he could not afford a battery for it! It required only a small 6-V battery, but that was an unnecessary expense at the time. Albuquerque rests on the foothills of the Sandia Mountains on a descending slope into the valley below. Thus, he was always

parked on a hill, needing only to let the brake off to begin to roll forward, at which point he would “pop the clutch” to engage the engine. It was hard to get dates with this vehicle, though. At least those were his attributions for his state of affairs! His apartment door was something out of an Alfred Hitchcock thriller with glass panes defending him from the homeless, alcoholics, and drug users who rested against his basement windows.

It was some 2 weeks later when, in the middle of the night, he awoke with pervasive apprehension, a sense of urgent desperation, and the stark realization that something was terribly wrong. He had been awakened by the sounds of her wooden-soled “clog” shoes coming down his basement stairs and ultimately as she struggled through the glass pane of his door next to the door knob and lock. It was at that very moment that he learned something about himself with deep insight and still without adequate comprehension. He found himself possibly on death’s doorstep with only one objective as she was breaking into his apartment. He was determined to put his pants on! Accomplishing this seemingly irrelevant task, he met his assailant and struggled with her in self-defense. As her hand went into her bag, he was certain that she had a gun. None was ever found. As they struggled still up the stairs, they literally flopped onto the grounds at the back of the large house above his apartment.

Albuquerque has a long history by American standards, including its role in fighting tuberculosis (TB) as many of those afflicted by the disease relocated to the southwest for the dry and arid conditions, thought to be good for these patients. TB has an affinity for high levels of oxygen and is often found disproportionately in the upper lobes of the lungs. Therefore, higher altitudes with reduced oxygen was hoped to be beneficial in treating the disease. The city has many small Quonset huts, otherwise known as “TB huts” built for some of these patients and now used for student housing! I doubt that this information is revealed in the student’s lease agreement. Regardless, there were two of these Quonset huts located in the backyard of the dwelling, which rested above his basement apartment. He had not met the coeds residing there and, as they were aroused by the battle, they saw what they had learned to see. One commonly held stereotype applied to the perceptual analysis of a man and woman engaged in fisticuffing is that “men do bad things.” Indeed, many will stand vigorously behind such stereotypes, until confronted with conflicting data. Classic examples might be provided by the Iraq War, where we learned of torture and rape of prisoners held under American command (Armed Forces Press Release 2006). The woman commanding all Iraq detention facilities, Brigadier General Janis Karpinski, was reprimanded for dereliction of duty and then later demoted in rank. Specialist Lynndie England (Fig. 2.6) was sentenced to a prison term for these acts. In actuality, women are capable of and indeed do harmful things, like men.

The women from the Quonset huts saw what they had learned to see and swiftly came to the aid of his assailant, swinging their purses onto him. At this point, he clearly had his best stuff out with three women on him and nothing but his physical ability and athleticism to overcome these attacks. Actually, he informed them that this was a psychiatric patient and asked them to please call for assistance, at which point they broke off and assisted him through the point of relief by the officers. For

Fig. 2.6 Torture and rape at Abu Ghraib prison in Iraq. *Wikipedia, the Free Encyclopedia*. Wikimedia Foundation Inc., Web. 07 Oct. 2011. <http://en.wikipedia.org/wiki/Baghdad_Central_Prison>



the young man, it was a learning experience. He went with this woman through the admission process and tried to assist with the health-care professions for readmission to the psychiatric ward. She indicated to the young man her anger and despair as she felt that he had abandoned her like so many others had done before. But the point here is that we see what we have learned to see. The young man saw a gun that did not exist. The coeds initially saw a man attacking a woman, instead of a more valid perception.

For science, the mind–body issue developed into an entirely new issue of localizing behavior, cognition, and emotions to functional brain systems. Specifically, the methods of science allow only for the study of physical events, which may be seen, heard, or felt, but which are ultimately measurable or quantifiable in some respect. We have all heard that “a mind is a terrible thing to waste.” But no one has, at this point, ever seen a mind. No one has ever held one in their hand. No one has ever measured it in its breadth or depth or circumference. No one has ever recorded its activity in any meaningful way. This does not mean that the soul or mind does not exist. But, it comes down to your belief or philosophy. Many neuroscientists are dualists or interactionists and many are monistic in their thinking. One such Nobel laureate and neuroscientist had spent his many years in science studying the neuron and dendritic fields. Despite these monistic activities derived from the scientific method, this gentleman expressed his philosophical views as a dualist. The methods of science may be flawed and inadequate in this respect for many of those reading this book.



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