brain wars

The Scientific Battle Over the Existence of the Mind and the Proof That Will Change the Way We Live Our Lives

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If . . . Descartes . . . had kept a poodle, the history of philosophy would have been different. The poodle would have taught Descartes that contrary to his doctrine, animals are not machines, and hence the human body is not a machine, forever separated from the mind . . .

—ARTHUR KOESTLER[1]

Very often, perhaps more often than you think, ordinary people have unexplained experiences that defy the boundaries and explanations of traditional science:

A group of patients suffering from painful osteoarthritis of the knee—some leaning on canes to walk, and all diagnosed to be in need of knee surgery—participate in a double-blind experiment in which some are given real knee surgery, and others are given placebo, or "fake," surgery. The results are startling: *all* of the patients report much less pain, and those who had gotten the placebo surgery—that is, no surgery—are even able to walk and play basketball.

One evening after dinner, while watching the sunset from his living room, a successful physician and award-winning research psychiatrist enters into a mystical state of illumination in which time seems to disappear. He returns to ordinary consciousness a few minutes later, the course of his life changed forever.

Maria, a migrant worker, has a severe heart attack and is admitted to a hospital coronary unit, where medical personnel rush to restart her heart and save her life. Later, she tells a social worker that during her cardiac arrest she looked down on her body from the ceiling and watched the doctors work. And while she was there, she looked out the window and spotted a tennis shoe on the ledge of another building. Curious, the social worker searches for the tennis shoe—and finds it, right where Maria said it would be—in a spot that Maria could not possibly have seen from her hospital bed.

What happened?

Were the knee patients who received the placebo surgery healed by the power of their belief? Or is arthroscopic surgery simply not all it is cracked up to be?

Did the psychiatrist really experience what Aldous Huxley called "mind at large"? Did his consciousness fuse with the source of the universe? Or was he simply hallucinating or having a waking dream?

Did Maria leave her body and float to the ceiling? And how could she see a tennis shoe that was hidden from her view?

Is any of this really possible?

The questions we are asking in this book are age-old: Are we nothing but sophisticated animals? Where does our sense of self originate? *Is there a difference between our brains and our minds or consciousness?* What happens to us after our body perishes? Does our consciousness completely dissolve into nothingness? Can the mind exist without the body?

Over the past several centuries in the West, most scientists have functioned within a strict materialist framework that holds to one essential assumption: matter is all that exists. This materialist viewpoint has become the lens through which most of us interpret the world, interact with it, and judge what is true. Mainstream neuroscientists—scientists like myself, who study the brain and how it works—operate from the view that electrical impulses in the brain account for all of our thought patterns and mental experiences. In the harsh judgment of the famed molecular biologist Francis Crick, the co-discoverer of the molecular structure of DNA, "'You,' your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."[2]

Yet . . . is matter *really* all that exists? Most of us, regardless of our religious beliefs, feel intuitively that our consciousness—our selves, what makes us unique individuals—resides apart from our bodies. Human cultures globally and throughout history have conceived of a vital principle, the seat of mind and self, that survives the death of the body as an individual spirit or as a part of a Universal Spirit. For the past several centuries scientists have had to put their innate beliefs to one side in order to do the fine, objective work that has enabled so many remarkable discoveries. We have gained much through this method, but along the way science seems to have lost sight of a wider view: the open door to the possibility of the "impossible."

Within the view of materialism, everything is composed of collections of material particles. All that we experience—including our thoughts, feelings, beliefs, intentions, sense of self, and spiritual insights—results from electrochemical impulses in our brains. In this world, people who report transcendent experiences—from out-of-body experiences like Maria's, or clairvoyant visions of things we can't possibly know, or ecstatic experiences in which we seem to merge with the universe—must by definition be hallucinating or having some sort of momentary brain malfunction.

For me, for a growing number of scientists, and perhaps for you too, this sort of thinking does not resonate with what we feel and experience every day, let alone in moments that transcend the ordinary. In fact, materialism's truncated understanding of what it means to be human often prevents us from seeing what is staring us in the face. Physician and author Dr. Larry Dossey puts his finger on the core issue: "There's [a dreary] little secret that veteran scientists never let kids in on—that if they enter science, they have to check their minds at the door. The reason is that mind, as most

people think about it, does not exist in conventional science because the expressions of consciousness, such as choice, will, emotions, and even logic are said to be brain in disguise."[3]

We have been checking our minds at the door for a long time. Yet many of us, whether we describe ourselves as religious or even spiritual, look around at the intricate workings of nature and our own bodies and feel innately that "there must be more." Yes, we understand that our brains direct the amazing systems that keep our bodies running; at the same time, we stubbornly continue to believe that "we"—the intangible stuff that we identify as ourselves—are more than our brains.

The brain can be weighed, measured, scanned, dissected, and studied. The mind that we conceive to be generated by the brain, however, remains a mystery. It has no mass, no volume, and no shape, and it cannot be measured in space and time. Yet it is as real as neurons, neurotransmitters, and synaptic junctions. It is also very powerful.

A wealth of scientific studies indicate that our thoughts, beliefs, and emotions influence what is happening in our brains and bodies and play a key role in our health and well-being. For better or for worse, we create our lives, our health, and our worlds with our minds. You will read about many of these studies in the chapters of this book. Research shows the real and often untapped power of the mind.

Our belief in the efficacy of a bogus treatment—a treatment proved by science not to work—can stimulate our self-healing capacity even in diseases as severe as cancer and Parkinson's disease. Emotions can even affect whether certain genes are turned "on" or "off"—altering, for example, our bodies' response to stress.

We can deliberately change processes in our bodies that are normally not under voluntary control. We can improve our cognitive performance by learning to control the electrical activity of our brains using neurofeedback. We can train our minds—through meditative practices—to enhance the activity of brain areas implicated in emotional well-being, compassion, and attention. And mental training can even change the structure of our brains.

Hypnosis can enable people to see color where there is only gray. Brain wave receptors can enable people to move objects using only their thoughts. The impossible is indeed possible.

Along with an increasing number of scientists, I believe vehemently that *the materialist framework is not science.* A growing body of solid scientific research shows this view to be not only limited, but wrong. In fact, few mainstream scientists operating within the paradigm of scientific materialism realize that it is based on a number of philosophical assumptions—that is, *beliefs without proof.* At least three of these basic assumptions can be traced back to classical physics:

> *Physicalism* is the idea that only matter and energy exist in the universe. This means that life, mind, and consciousness are simply accidental by-products of complex arrangements of matter (and energy).

Reductionism is the notion that complex things can be understood by reducing them to the interactions of their parts, or to simpler or more fundamental things. Key clues to a reductionist viewpoint include terms like *just, merely,* and *nothing but.*

Objectivism is the thesis that scientists should investigate empirical facts in an objective manner: using the physical senses and their technological extensions, including such instruments as microscopes and telescopes.

The story of how science came to accept these ideas without question is invaluable in helping to understand not only why they have been useful for so many years, but why the time has come for science to begin thinking outside the box that originated in ancient Greece.

The Greek philosopher Heraclitus was the first to suggest that human beings consist of body and soul, and that the soul is responsible for thinking and emotions. A bit later, Plato took this idea further and proposed a *dualistic* view: the body is the temporary receptacle of this immortal and invisible soul, which is bound to the brain.[4] (Remember this view—we will come back to it again in our story.)

Democritus, a bit younger than Plato, was skeptical of such supernatural explanations. He proposed a theory that may sound quite familiar: all that exists is composed of matter and void; the world is made up of basic material particles (which he called "atoms," meaning "indivisibles"); and humans are material beings that cease living when the body stops functioning.

Democtritus's ideas were something of a sea change in the mind/brain debate. His contemporary, Hippocrates—the "father of Western medicine"—took this theory a step further. Brain injury can impair mental functioning, he argued, so the brain must be the seat of consciousness, intellect, and emotions. A few centuries later, in the second century, the Roman physician and philosopher Galen postulated that mental capacities such as perception and reasoning are dependent on the brain.[5]

During the Middle Ages in Europe, the church had become a powerful force, permeating everything. "Science" was alchemy, a murky brew of religion and superstition. Free observation and exploration was discouraged, and little was known about the causes and cures of disease. During the Renaissance in the fifteenth and sixteenth centuries, scientific interest apart from religion blossomed once again. And by the seventeenth century, the Scientific Revolution was in full swing.

The French philosopher and mathematician René Descartes revived Plato's conception of a mind/body dualism. Most famous for his pronouncement "I think, therefore I am," Descartes saw human beings as an amalgamation of material bodies and immaterial minds, both of which had their source in God. Bodies, in his view, are machines that function in accordance with the laws of physics, but minds are exempt from those laws because they are not physical. Descartes also theorized that the mind acts willfully upon the body. Most of the prominent philosophers and scientists who

followed Descartes rejected his theory because it failed to satisfactorily account for the interaction between mind and brain. How, they asked, can an immaterial, mental substance act upon the material brain?

The Scientific Revolution brought groundbreaking discoveries that swept away superstition: the laws of gravity and the laws of planetary motion showed us how the world worked; calculus showed us that the world could be measured and calculated; the microscope showed us invisible worlds never imagined. These tools—and the invention of scientific method itself—laid the foundations of modern science and gave us the modern world.

With the Enlightenment in the eighteenth century, religious revelations were increasingly challenged[6]; rationality and science were advocated as the primary sources for authority and legitimacy. Advances in technology allowed scientists to peer into blood and water and other elemental substances to discover teeming life forms. As they began to identify various agents of diseases, such as bacteria, fungus, and viruses, physicians understandably began to believe that the treatment of infectious diseases required only the elimination of such agents.

The Industrial Revolution, with the stunning power of machines to reshape the world and the revolutionary possibility of "progress," gave science a new concept with which to reframe its thought. The body was no longer seen as having been created on a divine model—it was a *biological machine.* Food in, energy out. In this world, medicine's role was no longer to intercede with God for mercy; it was purely mechanical, to repair bodily malfunctions.[7]

With new insights into how the smallest elements of life worked, old concepts of causation began to dissolve. Astronomical and other observational insights led to new philosophies describing a universe that was nothing more than a cold, impersonal, deterministic machine composed of mindless bits of matter, devoid of consciousness and intelligence, and bereft of purpose. Darwin's theory led some to wonder whether humanity was in fact something of an evolutionary accident. The German philosopher Friedrich Nietzsche proclaimed God dead, and other modern philosophers professed that supernatural beliefs about spiritual beings were nothing more than chimeras of religious fantasy.[8]

During the second half of the nineteenth century substantial progress was made on the study of the impact of brain damage on mental functions, such as language, memory, reasoning, and perception. This dealt a blow to the idea of dualism. The prevailing view among scientists was that the causes of mental activities and behaviors were found solely within the brain—and it seemed to have been proven in the laboratory: human consciousness no longer belonged to an inexplicable realm. In 1874, the English biologist Thomas Huxley published an article suggesting that human beings are conscious biological machines.[9]

By the beginning of the twentieth century, this materialist view dominated science. Nonetheless, some philosophers and scientists resisted the materialist trend. In 1891, Oxford philosopher Ferdinand Schiller proposed that matter is not what produces

consciousness but what limits it.[10] In 1898, William James[11]—the father of American psychology—pointed out the fact that scientists can only measure *correlations:* when brain states change in a certain fashion, mental states change too. The fact that mental functions are disturbed when the brain is damaged does not prove that the brain generates mind and consciousness.

Using an elegant analogy we will return to again in this book, James explained what he meant: when white light passes through a prism, he said, the prism allows it to be broken up into all the colors of the spectrum. *The prism is not itself the source of the light,* but it permits us to see the light differently. In the same way, the brain may permit, transmit, and express mental events and conscious experiences that have their source elsewhere. It does not produce them. James felt that this hypothesis could also account for the effects of drugs and brain damage.[12]

To date, a number of scientists and thinkers have used an updated form of James's analogy to illustrate the mind-brain relationship: equating "mind" with "brain" is as illogical as listening to music on a radio, demolishing the radio's receiver, and thereby concluding that the radio was creating the music.

During the twentieth century, mind-brain dualism made a quiet return to scientific circles. This was thanks primarily to the work of researchers Wilder Penfield and John Eccles.

In 1934, Canadian neurosurgeon Wilder Penfield became the first director of the renowned Montreal Neurological Institute. Ironically, he began his career as a scientist with the intention of proving the materialist thesis that mind is simply the product of brain activity. To do so, he developed a surgical procedure in which he treated patients with severe epilepsy by removing cerebral tissue that caused epileptic seizures. Before destroying the epileptic tissue, Penfield stimulated various regions of the brain with electrodes to map cerebral functions. During this procedure patients lay on the operating table fully conscious and alert—they could not feel any pain because brain tissue has no sensitivity.

Penfield performed brain mapping in over a thousand patients during the course of a few decades. He discovered that most of the time, electrical stimulation of the brain elicits rudimentary sensations or motor responses; very rarely, it elicits hallucinated images or scenes. Strikingly, Penfield's patients were always able to discriminate between mental events they had willed and those that were evoked by the electrical stimulation. For instance, if an electrode applied over the motor area of a patient's brain induced a simple hand movement, the patient would tell Penfield, "I didn't do it. You made me do it."[13] At the end of his scientific career, Penfield concluded that higher mental functions—such as consciousness, reasoning, imagination, and will—are not produced by the brain: mind is a nonphysical phenomenon interacting with the brain.[14]

John Eccles, an Australian neurophysiologist, was awarded the 1963 Nobel Prize in Physiology or Medicine for his work on the synapse, the tiny junction across

which a nerve impulse passes from one neuron to another neuron. Eccles felt that materialist theories fail to account for the wonder of being human: "I maintain that the human mystery is incredibly demeaned by scientific reductionism," he said.[15] Eccles's dualistic interactionist theory claims that humans have a nonmaterial mind—belonging to the mental world—that acts upon, and is influenced by, the material brain—which belongs to the physical world. Contrary to Descartes, Eccles argues that the nonmaterial mind is not a substance. Furthermore, he postulates psychic-to-physical laws that regulate the effect of the mind on the brain.[16]

Penfield and Eccles, despite acclaim for their work, were out of the mainstream. Scientists during the twentieth century formulated a number of materialist positions about the mind-brain problem, notably mind-brain identity theory, eliminativism, and emergent mentalism.

Mind-brainidentity theory asserts that mental events are created by, and are identical to, brain events.[17] Although we experience our own consciousness and mental events subjectively ("I feel great"), we can measure events in our brain from the outside, in an objective manner ("My brain released endorphins after my run"). This theory implies that our sense of identity, our beliefs and values, our feelings, our spiritual experiences, and even our free will are nothing more than electrical impulses and chemical reactions in our brain.

Eliminativism, a more radical position, resolves the mind-body problem by denying the existence of mental functions and events, and claiming that there are only physical states of the brain. According to this view the mental world is an illusion, and we only imagine ourselves to have thoughts, memories, feelings, and goals. Consciousness, mind, free will, and self are prescientific concepts belonging to unsophisticated ideas (dubbed "folk psychology") of how the brain works. Eliminativism holds that these concepts will someday be eliminated, thanks to the progress of science.[18]

Emergent mentalism, proposed by Nobel laureate and neuroscientist Roger Sperry, contends that mental events are not possible independently of the brain. Yet Sperry speculated that thoughts, beliefs, intentions, feelings, desires, moral values, and other mental events are higher-level properties that emerge from (but cannot be reduced to) lower-level physical processes in the brain. He also postulated that such mental events can causally influence the brain processes that create them.[19] Various formulations of emergent mentalism have appeared following Sperry.[20]

None of these theories explain what the Australian philosopher David Chalmers has referred to as the "hard problem" of consciousness:[21] why and how subjective inner experiences, such as love and spiritual epiphanies, arise from physical processes in the brain. Given that the evidence from neuroscience does not demonstrate that all mental events, without exception, are caused solely by neural processes, a growing number of people, including Chalmers himself, now question whether this problem will ever be solved by materialist theories of the mind.

Materialism remains the dominant scientific view. Artificial intelligence pioneer Marvin Minsky memorably encapsulated the materialist position: "The brain," he said, slightly updating the machine paradigm, "is just a computer made of meat." Minsky, however, had not reckoned with the infinite worlds of possibility being opened up by a revolutionary new branch of physics called quantum mechanics (QM). QM has effectively smashed the scientific materialist worldview and, as we will see later in this book, is opening up infinite new worlds of possibility that are blowing the materialist box to smithereens.

Materialist theories, despite their stubborn persistence in the scientific community, cannot solve the mind-brain problem.[22] We need a new model through which to view the power of mind and its central role in the universe. This fresh point of view would be free of materialist dogmas that have outlived their time and blocked science from exploring avenues that have been there all along.

Like Frederic Myers (a pioneer researcher in the psychology of the unconscious, or "depth psychology," who greatly influenced William James and the Swiss psychiatrist Carl Gustav Jung), I believe that great progress can be made if we follow a pillar of the scientific method and approach the mind-brain problem empirically:[23] giving priority to the knowledge derived from observations and evidence.[24] In the chapters that follow you will find a large body of evidence related to the impressive capacities of the mind and its fundamental, irreducible, nature.

As you will see, multiple lines of hard evidence show that mental events do exist and can significantly influence the functioning of our brains and bodies. They also show that our minds can affect events occurring outside the confines of our bodies, and that we can access consciously transcendent realms—even when the brain is apparently not functioning. Most important, these various lines of evidence indicate that materialist theories of the mind are erroneous: we are not merely complex biological machines, computers made of meat. Reality is a vastly complex territory that we are only beginning to explore. It encompasses, as you will see in the chapters that follow, much more than the physical world.

Times are changing quickly, particularly in science. The most exciting frontiers of twenty-first century science—quantum mechanics, cloud computing, virtual reality—show us very different models of what is real and what is possible than materialist science permits. They also give us tools with which we can explore the nature of the relationship between our minds—our consciousness, our self-identity—and our brains. Great advances in science are made by following the evidence, wherever it may lead. If our objective is truly to reach an adequate scientific understanding of the human mind, then we must be willing to take into account all the empirical evidence related to this issue. This is what *Brain Wars* sets out to do, and what I hope you will do as you read this book.

Chapter 1

The Power of Belief to Cure or Kill

The Placebo/Nocebo Effect

Placebos are the ghosts that haunt our house of biomedical objectivity, the creatures that rise up from the dark and expose the paradoxes and fissures in our own self-created definitions of the real and active factors in treatment.

—MEDICAL HISTORIAN ANNE HARRINGTON[1]

In the late 1950s, a patient whom psychologist Bruno Klopfer called "Mr. Wright" was on his deathbed in a hospital in Long Beach, California, dying from an advanced cancer of the lymph nodes. That he was dying was indisputable: large tumor masses, the size of oranges, had proliferated in his neck, groin, chest, and abdomen. His spleen and liver were huge, and between thirty and sixty ounces of fluid had to be drawn from his chest every other day just to enable him to breathe. His doctors expected him to live not more than two weeks.[2]

But Mr. Wright was not ready to die. When he learned that his treating physician, Dr. Philip West, was involved in the testing of a new cancer drug, he was filled with hope. This new drug, called Krebiozen, had initially appeared to be very effective; he begged Dr. West to give him the revolutionary drug. Touched by his patient's desperation, and knowing that his case was hopeless, West agreed.

Dr. West gave Mr. Wright an injection of Krebiozen on a Friday afternoon. The following Monday, the doctor was amazed to find his "dying" patient ambling around the unit and joking with the nurses. And he not only seemed better, he *was* better. Over the weekend, the man's tumors had melted like snowballs on a hot stove. After ten more days of treatment with the experimental drug, practically all signs of his disease had vanished. In what seemed like a triumph for Krebiozen, Mr. Wright was discharged from the hospital and returned to his normal lifestyle, seemingly cured.

Two months later, however, Mr. Wright opened the newspaper and read an article that sent his spirits plunging. According to preliminary reports, researchers had found that Krebiozen was *not* effective for the treatment of cancer. Despite his previous recovery, Mr. Wright suffered an immediate relapse and his tumors came back.

Deeply affected by this turn of events, Dr. West resorted to a desperate trick—lying. His voice filled with conviction, Dr. West told his patient that the newspapers were wrong and that Krebiozen was a powerful drug against cancer. He explained to Mr. Wright that his relapse was due to the fact that the dose he had been administered

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