

# The Four Realms of Existence

# The Four Realms of Existence

A NEW THEORY OF BEING HUMAN

Joseph E. LeDoux

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*To Nancy, and our first forty-three years together*

*I made a map of your mind, I've charted my course  
I'm sailing deep inside, I've got the winds of force  
Got the heat of your heart, to keep me from the cold  
I got the currents of will, to take me to your soul*

—“Map of Your Mind,” The Amygdaloids

# Contents

Preface	<i>ix</i>
Introduction: Who Are You?	<i>1</i>
PART I OUR REALMS OF EXISTENCE	
1 What Is a Human Being?	<i>9</i>
2 “Self” Doubt	<i>14</i>
3 The Personality Contest	<i>23</i>
4 It’s Only Words	<i>33</i>
5 A Path Forward	<i>41</i>
PART II THE BIOLOGICAL REALM	
6 The Secret of Life	<i>51</i>
7 Bodies	<i>61</i>
8 The Duality of Biological Existence	<i>73</i>
PART III THE NEUROBIOLOGICAL REALM	
9 It Took Nerve	<i>81</i>
10 Vertebrates and Their Nervous Systems	<i>92</i>
11 Romer’s Rendition	<i>105</i>
12 Viscerology	<i>110</i>
13 The Behavioral Thoroughfare	<i>120</i>

*Contents*

PART IV THE COGNITIVE REALM		
14	Internalizing the External World	137
15	What Is Cognition?	146
16	Mental Models	159
17	Model-Based Cognition in Evolution	166
18	Foraging in the Mind	174
19	The Cognitive Brain	183
PART V THE CONSCIOUS REALM		
20	Is Consciousness Mysterious?	207
21	Kinds of Consciousness	219
22	Making Consciousness Meaningful	230
23	Fact-Knowing and Self-Knowing Consciousness	244
24	Non-Knowing Consciousness	254
25	What Consciousness Might Be Like in Other Animals	268
26	The Stories We Tell Ourselves, and Others	282
	Selected Sources and Further Reading	307
	Index	329

## Preface

I conceived this book in August 2020 while I was sheltered in the Catskills in upstate New York, riding out the peak of the COVID-19 pandemic. I moved the manuscript into the home stretch back in Brooklyn in the summer of 2022, tidied up while I was a visiting scholar at the London School of Economics that fall, and submitted it Thanksgiving weekend. Somehow it seems fitting that, after two-and-a-half squeaky-clean years, I finally came down with COVID just as this book went into production.

I don't have a writing schedule. I love writing and just do it as often as I can. This is how I find out what is on my mind. Regardless of whether you are a methodical writer who thoroughly researches your topic, or a leap-before-you-look writer who, like me, has an idea and figures things out along the way, the content that results is not generated by you explicitly planning each word, phrase, or conception.

As this book unfolds, you will see that this is a key part of the story I will tell—that your conscious understanding of your mind is an interpretation or narration that flows effortlessly from non-conscious processes. I'm not referring here to the deep, dark, Freudian unconscious. I have something far more mundane in mind,

## *Preface*

something I borrowed from the pioneering psychologist and brain researcher Karl Lashley, who said that every conscious thought is preceded by—that is, is based on—non-conscious, or better yet, pre-conscious, cognitive processing.

While this book is partly about how consciousness depends on non-conscious processing in the brain, I tell a much bigger story, one in which our biological makeup is the foundation of our neural makeup, which underlies our cognitive makeup and enables our conscious makeup. No, it's not about reducing consciousness to cognition, cognition to the brain, and the brain to biology. It is instead about how everything that can be said about you as a living thing is subsumed by interactions between biological, neurobiological, cognitive, and conscious ways of being. These are our realms of existence.

All living things, all organisms, exist biologically. But some of these, namely animals, evolved nervous systems, and so they also exist neurobiologically. Of these, some can think and plan, and thus exist cognitively. Finally, some cognitive organisms also exist consciously. All that we are is subsumed within these entwined realms of existence.

Much thanks to my wife, Nancy Princenthal, a fantastic writer and editor. With her keen eye and sharp mind she made invaluable contributions. Our son, Milo LeDoux, also helped by posing challenging questions on key topics, like animal consciousness and conscious AI. It was great working with Robert Lee again. He made the illustrations for my earlier book *Anxious*, and also created the original figures in this book.

I am extremely grateful to colleagues who have spent time talking with me about or reading drafts of this book. Included are Tyler Volk, Richard Brown, Matthias Michel, Hakwan Lau, Steve Fleming, Kenneth Schaffner, Nick Shea, David Rosenthal, Owen Flanagan, Frédérique de Vignemont, Karin Roelofs, and Max Bennett. Others advised me on specific points, including Kalina Christoff, Nathaniel Daw, Bernard Balleine, Niki Clauton, Songyao



*Preface*

Ren, Peter Mineke, Paul Cisek, Todd Preuss, Steve Weiss, Jon Kaas, Charan Ranganath, Onur Güntürkün, Brian Key, and Deborah Brown.

It has been a pleasure getting to know, and to work with, Andrew Kinney at Harvard University Press. His insights along the way, and his pressure on me to shorten the manuscript, made the book much better. Kathleen Drummy and Christine Thorsteinsson at the Press were very helpful with the process. Copyeditor Julie Carlson did a fantastic job, but beyond that, she was a delight to work with. As always, my agent since 1996, Katinka Matson at Brockman Inc., has been by my side, start to finish.

New York University has been a wonderful academic home to me since 1989. The university, and my department, The Center for Neural Science, have supported me in innumerable ways, making it possible for me to be a scientist and a writer, as well as a musician.

William Chang has been my personal assistant for more than two decades. He has made everything possible. Claudia Farb and Mian Hou, two other multi-decade staff members, have also helped in ways that defy words. A special shout out to Mian for his work on my various websites, including the one for this book—<https://joseph-ledoux.com/The-Four-Realms-of-Existence.html>.

Writing a book about science means that you have to have some science to write about. But unlike my first three books (*The Emotional Brain*, *Synaptic Self*, and *Anxious*), my most recent two (*The Deep History of Ourselves* and this one) are more conceptual. That does not mean the work in my lab had nothing to do with them. None of my books would have been possible without the empirical findings obtained by the many fantastic researchers I have had the pleasure of sharing my lab with over the decades. Thank you, one and all.

# The Four Realms of Existence

# Introduction

## *Who Are You?*

One afternoon in 1976 I was sitting in a small camper trailer in Bennington, Vermont, with a teenager named Paul. I said “who” aloud, and simultaneously pushed a button that caused the words “are you?” to briefly appear on the left side of a projection screen. The boy’s left hand reached forward toward a pile of Scrabble letters. He pulled out four and arranged them to spell “Paul.”

Studies of Paul, or PS as he is known in the literature, were part of my PhD research at the State University of New York at Stony Brook under the mentorship of Michael Gazzaniga. Mike, just ten years my elder, had achieved scientific stardom in the 1960s for his PhD work at Caltech on so-called split-brain patients. People received this surgery because available medications were unable to relieve their epilepsy. By severing the nerve fibers that connected the two hemispheres of their brains, most notably the bundle of nerves called the corpus callosum, the seizures became more manageable.

When I first arrived at Stony Brook in the fall of 1974, Mike was not yet my mentor. That transpired after a fellow student showed me an article that Mike had published a couple of years earlier with

## *Introduction*

the title: “One Brain—Two Minds?” I was intrigued, and had the good fortune of being able to join Mike’s lab. A new group of patients was being given the “split-brain” operation by a neurosurgeon at Dartmouth Medical School, and I got in at just the right time. During my first year, Mike bought the camper mentioned earlier, and we converted it into a mobile testing lab. Over the next several years, a couple of other students and I made frequent trips to New England with Mike to test these patients.

In his PhD studies, Mike had showed that when the brain was split, information presented to the right hemisphere stays there. This was achieved by instructing the patient to fixate his or her eyes on a small dot in the center of a projection screen. Because of the way the nerves from the eye to the brain are routed, stimuli on the left side of the screen are directed to the right hemisphere and stimuli to the right to the left hemisphere. And because language is preferentially represented in the left hemisphere, the patient cannot talk about information presented only to the right hemisphere. For example, if only the right hemisphere was shown a picture of an apple, and the patient was asked “What did you see?” the patient would say something like, “I didn’t see anything,” because the vocal left hemisphere did not process that information. But the left hand, which is preferentially connected with the right hemisphere, could reach into a bag with several objects and pull the apple out.

Mike’s PhD research raised the possibility of two minds living side by side inside the head, one in each hemisphere. But the evidence at the time was not conclusive. Even a brief conversation with the loquacious left hemisphere gives you the sense that you are talking to a full-on human being—you hear about opinions, beliefs, memories, fears, and hopes. It was much less clear whether there was a sentient being in the right hemisphere, because exchanges with it mostly involved the left hand choosing which of several stimuli had been seen.

## *Introduction*

The study of Paul involving the Scrabble letters suggested to us that that the right hemisphere of a split-brain patient could indeed have a conscious sense of self. Paul's right hemisphere knew that he was Paul. This is not trivial. A person's name is a key marker of their identity, a hook on which hangs much of what is known about who they are.

But Paul was unusual. Unlike most split-brain patients, who have language only in their left hemisphere, Paul could understand spoken and written language with both hemispheres, despite being able to talk only via his left hemisphere. That's why we could ask his right hemisphere, "Who are you?" and get a response. Because the amount of information that can be processed in a quick flash is limited, I spoke part of the question out loud and presented the rest visually. As a result, both hemispheres heard the word "who," but only the right hemisphere saw "are you."

In other studies of Paul, we were able to use these kinds of simple probes to show that his right hemisphere could imagine the future. When asked what his goal in life was, the left hand, the behavioral agent of the right hemisphere, spelled out "race car driver." Strikingly, the left hemisphere had declared in conversations with us that it wanted to be a draftsman. That two different answers emerged from the same brain was mind-blowing.

In yet another study, we presented two pictures to Paul, each positioned on different sides of the screen, and instructed him to point to the picture that matched what he saw. For example, the left hemisphere saw a chicken claw and the right a snow scene. In response, the left hand pointed to a shovel and the right hand to a chicken. When asked why he chose those, Paul said: I saw a chicken claw so I pointed to a chicken, and you need a shovel to clean out the chicken shed. In other words, Paul's left hemisphere made up a story about his right hemisphere's action that matched the knowledge it (the left hemisphere) possessed, so that the behavior of the whole person, Paul, made sense.

## *Introduction*

That night we were at The Brasserie, a wonderful little bistro in Bennington, Vermont, sipping Jack Daniels at the bar, which was our standard way of consolidating the day's events. Our conversation led us to the idea that we all spin tales or narratives to make sense of ourselves and our world, a notion that would figure prominently in our 1978 book *The Integrated Mind*.

Ever since my studies of Paul, I have been fascinated with questions about how our conscious experiences come about in the brain, especially in relation to emotions and memory, and have summarized updates of my views in my books over the years. But the book you are reading and the one right before, *The Deep History of Ourselves: The Four-Billion-Year Story of How We Got Conscious Brains*, have a special connection. In a phrase, *Deep History* was about “The way we were”—how we evolved. And this book is about “The way we are”—what it is to be a living human.

## Anatomy of a Feast

I serve this book in five courses. The first gives you a taste of what is to come. It raises questions about the value of ancient, entrenched notions of *self* and *person* as ways to define what and who we are. I reconceptualize the useful information obtained by empirical research on these topics and place it in a new framework, one based more on scientific rather than philosophical principles. In particular, I argue that everything about what it is to be a human being can be understood in terms of our biological, neurobiological, cognitive, and conscious realms of existence. These make us biological beings with nervous systems that can think, plan, and decide, and that can experience our inner thoughts and feelings.

The next four parts of the book delve deeply into these realms. I start by describing how all organisms exist biologically, but some of these (namely animals) have a nervous system and exist neurobiologically. Some animals additionally exist cognitively, and some

## *Introduction*

of these also exist consciously. But my primary goal is not to identify the ways that different organisms in the tree of life exist (though there will a bit of that). My main focus is instead on us, on the four realms of existence that account for what it is to be a human being.

At the very end of the book, as the feast is winding down, I will revisit the studies of Paul, and the idea that we all try to make sense of what and who we are by narrating our experiences to ourselves and to others. But the path to, and through, that final taste involves first savoring the four realms of existence.

A final note about what you will feast on. I wrote this book hoping to connect with experts and lay readers alike. With the aim of being “user friendly,” it consists of short, pithy chapters focused on specific points—though a few chapters broke the rule. You will also encounter no footnotes, endnotes, or citations as you read, other than a list of suggested readings at the back of the book. The actual citations and notes are on the book’s website: <https://joseph-ledoux.com/The-Four-Realms-of-Existence.html>. Enjoy.

## PART I

# OUR REALMS OF EXISTENCE



# 1

## What Is a Human Being?

Since ancient times, humans have thought of their bodies and minds as separate spheres of existence. The body is physical. It is the source of aches and pains. But the mind is mental. It perceives, remembers, thinks, believes, feels, and imagines.

Today, many of us understand that the mental aspect of who we are is embedded in the part of the body known as the brain, and therefore is also part of our physical, bodily existence. Still, even true believers of the physical nature of the mind sometimes feel as though it possesses some quality or qualities lacking in other physical systems within our body, and even within our brain. For example, we have firsthand knowledge of the mental states we refer to as perceptions, memories, thoughts, and emotions, but we lack knowledge of the processes in the brain that control digestion, respiration, or heart rhythm, and much of our behavior. What is it about the mental stuff that makes it seem so different from the rest of the physical stuff that constitutes who and what we are?

Just as your mind depends on your brain, your brain, being part of your body, depends on the life-sustaining functions of other components of your body. If your heart stops beating, or your lungs collapse, all your other organs, including your brain,

## OUR REALMS OF EXISTENCE

will soon cease to function in a way that is compatible with life. Without bodily life there is no brain function, and without brain function, no mind.

How, then, out of all this biological physicality, do we each come to exist as a being that knows it was born in the past, exists now, and will someday die?

The standard approach to such questions about individuality is to focus on psychological notions, or constructs, like the self or personality. These have long guided philosophical musings, as well as scientific theories and research, about what it is to be a human being. But there is little agreement about what self and personality refer to, and even whether they refer to real entities, as opposed to just being shorthand labels for a variety of psychologically interesting phenomena. One important reason that clarity about all this is important is because it colors ideas about mental disorders and their treatment.

### If We Don't Know What We Are Looking For, We Will Never Find It

Scientific discoveries over the last several decades in fields such as physics, artificial intelligence, and genetics have led to new ideas about how human biological systems work. These findings, in challenging cherished assumptions about human nature, have resulted in an epistemological vacuum. In no small part, this is because thinking about “who and what we are” has not advanced significantly beyond traditional ideas, some put forth in ancient times.

The mind was indeed long the province of philosophers. But then, with the birth of psychology in the late nineteenth century, the mind became a scientific topic. Many psychologists eagerly applied the experimental methods of physiology to the study of inner existence in humans and in other animals. Some concluded, however, that philosophical conceptions of an unobservable, mental

*What Is a Human Being?*

sphere were not readily compatible with the methods of science, and they offered a simple solution—eliminate the unmeasurable, ghostly mind and make psychology about behavior. The result of this approach, so-called behaviorism, would dominate academic psychology, especially in the United States, for decades.

In the meantime, explorations of the mind were thriving outside of psychology, especially in the young field of psychiatry, where Sigmund Freud embraced the mental sphere in an effort to treat psychological disorders—how else could you possibly do that? But by mid-century, psychopharmaceuticals had emerged as a more rigorous, scientific approach to psychiatry, one that viewed psychological problems as disease states of the brain caused by bad chemistry. Much of this research was carried out by scientists from behaviorist backgrounds. The assumption was that medications for treating psychological problems in humans could be discovered by measuring their effects on behavioral responses in animals, typically in rats or mice. The quaint designation “mental disorders” was retained, but behavioral rather than mental symptoms were emphasized, and have been ever since.

Attempts to deliver treatments that were substantially better than those discovered in the 1950s and 1960s failed over and over. But the legions of scientists involved nevertheless grew, and they soldiered on. The problem, they assumed, was that they were close, but the drugs were not yet quite right pharmacologically, or they weren't yet making their way to the right part of the brain. Surely new technologies, such as gene-informed drug discovery, when combined with “smart drugs” and with new ways to image the circuitry of the brain, would close the gap. But they haven't. Why? I believe it is because measurable behavioral responses are, at best, correlates of the mental states for which mental disorders are named. The problem is less about technological limitations than about our lack of a rigorous, scientifically based understanding of what a human being is.

## OUR REALMS OF EXISTENCE

The digital revolution is teaching us a similar lesson. In *Artificial You: AI and the Future of Your Mind*, the philosopher Susan Schneider noted that as we come to rely more and more on technological advances in mind-brain enhancement and artificial intelligence, our poor understanding of self, consciousness, and mind may well lead to human suffering, or even threaten our survival as a species. The remarkable capabilities of ChatGPT and Bing almost instantly raised concerns as potential threats to humanity.

### Our Realms of Existence

The various phenomena that have been discovered while studying constructs like *self* and *personality* have, without question, provided important insights into human nature. But what if it is our scientific understanding of who and what we are that is confused? Specifically, what if our constructs are inadequate as conceptual hooks on which to hang the empirical findings that have been discovered in their name? Because these centuries-old notions obscure as much as they reveal, maybe the phenomena would be better served by a new conceptual home, one grounded in contemporary scientific conceptions and empirical research.

While human nature has been written about from many points of view, I think I have a novel take on this perennial puzzle. I believe that a human being can be characterized as a composite of four fundamental, parallel, entwined realms of existence that reflect our evolutionary past and account for our present ways of being.

We exist within these four realms of existence—biological, neurobiological, cognitive, and conscious—in every moment of life (especially adult life). But the kind of existence contributed by each realm is different. All four are, deep down, biological. But the neurobiological realm transcends the biological, the cognitive transcends the neurobiological, and the conscious transcends the cognitive. To-

*What Is a Human Being?*

gether, the four account for what and who we are, including those aspects of us that fall under the rubrics of the self and personality.

The composite organismic state that emerges from our four realms of existence can be thought of as an *ensemble of being*. This amalgam varies dynamically moment to moment over the course of one's life in accordance with the activities with which each realm is occupied with, at any given moment.

I am fully aware that this short description raises more questions than it answers. But I can't lay out the solution until I explain the problem. In the next several chapters, then, I take on what I see as fatal shortcomings of *self* and *personality* as accounts of what and who a person is, thereby setting the stage for a deep dive into our four realms of existence, and the ensemble of being that they engender in each of us.

## 2

### “Self” Doubt

Many of you are likely ready to go to the mat defending the idea that we humans have a self that runs through our brain and body. But when we say we have a self, what is it that we think we have? And does “have” mean that we possess it? If so, are we both the thing that is possessed (the self) and its owner (the entity that possesses the thing)? If this sounds philosophical, there’s a good reason.

#### Birth of the Self

The ancient Greeks are often said to have come up with the expression “know thyself.” But according to Christopher Gill, “There was no obvious lexical equivalent in the Ancient Greek (or Latin) for ‘the self.’ The closest they came was ‘person’ and ‘character.’ ‘Self’ began to appear in Old English, by way of other Northern European languages, as a means of describing ‘one’s own person.’ By the 14th century it began to be used as part of reflexive pronouns (myself, herself, himself, itself, etc.) where the subject and object of the verb in a sentence referred to the same person or thing (I blame myself; he, himself, is the one who deserves credit).”

*“Self” Doubt*

Today the word self, at least in Western cultures, commonly refers to those features that make one a conscious being with a first-person point of view. This way of thinking began to take shape in the seventeenth century through the writings of René Descartes. A polymath, Descartes was a philosopher, mathematician, and physicist, and if psychology and neuroscience had existed, he undoubtedly would have excelled in those areas, too.

Descartes viewed the mind as an immaterial, immortal soul. It was both spiritual (connected to God) and mental (the locus of thought, including conscious thoughts about oneself). With his famous statement *cogito, ergo sum* (I think, therefore, I am), he tied personal existence to conscious thought, and equated this *consciousness* with the soul. In his scheme, the conscious mind has agency—that is, it controls the actions of its physical body, and as a result, will be held accountable on Judgment Day. Other animals exist only bodily and, lacking conscious agency, have no afterlife in either heaven or hell.

John Locke, who followed Descartes by a few decades, rocked the Christian world when he proposed that the core of an individual was not an immaterial soul but a conscious self that persisted over time. Key to Locke’s position was his novel solution to the problem of how one knows they are the same person today as yesterday. In England, where Locke resided, identity was based on social status. But Locke said it instead resulted from the continuity of one’s self over time. This was achieved, he proposed, by thinking back to the past—that is, by making one’s self, via conscious memory, the same self now as it was then.

Locke also introduced the idea of a *constitution of man*, which he said encompasses our body, and all our behavioral and mental faculties. (The notion of an *ensemble of being* that I mentioned earlier bears some similarity to Locke’s philosophical conception, but is based on rigorously characterized biological and psychological

## OUR REALMS OF EXISTENCE

phenomena that Locke was not privy to.) Like Cicero before him, Locke allowed for the possibility of an individual having different *personas*—different ways of being, different selves, in various situations, depending on what he or she was conscious of at the time.

By the eighteenth century, conceptions of the self were becoming even more elaborate. The moralist Bishop Butler, for example, talked about two kinds of selves—one cool and settled (a feeling of the moment) and the other passionate and/or sensual (a feeling of self-interest). Along similar divisional lines, the philosopher Adam Smith, known as the father of modern economics, described how he examined his own conduct: “I divide myself, as it were, into two persons.” These he referred to as the examiner and the judge. He also took the self into the social realm, viewing one’s relationship to others as a function of one’s relationship to one’s self. Later, Alexander Bain noted that we look at our thoughts with a “warm eye,” with a “tenderness for that activity” as if it was another person.

Butler also introduced a notion of the self as the core of a monitoring system that maintains the normalcy of human nature (an idea that has become popular today in cognitive science). Deviance, including mental illness and criminality, then came to be thought of as a failure to monitor and was thus a weakness of the self.

By the eighteenth century, the vocabulary of self had proliferated in everyday language with the use of terms like self-worth, self-esteem, self-conscious, self-love, self-praise, self-pride, self-contained, self-regard, self-made, self-interest, self-confidence, self-aware, self-monitoring, self-involved, self-care, and selfish. These reinforced the idea that there is some entity or thing called the self.

Descartes’s immaterial soul continued the Christian tradition of treating the soul as the basis of individuality and personal responsibility. Armed with an emerging lexicon of the self, regular people developed a broader view of “themselves” as autonomous entities with independent lives and choices (entities with agency and responsibility).



# Index

- Abramson, Charles, 167, 169  
action potential, 83  
Addis, Donna Rosa, 200, 250  
adhesion molecules, 84, 94  
adrenal hormones, 57, 113, 116  
affect, anoesis and, 259  
afterlife, 15, 59, 61  
agency, 16, 21, 37–39; conscious, 15, 39, 215, 296–297, 299  
age-related changes, coping with, 71–72  
allocortex, cerebral, 99, 100, 102  
allostasis, 58, 71, 83  
Allport, Gordon, 28  
amnesia, confabulation in, 285  
amniotes, 95–96  
a-modal mentalesse narration, 283, 293, 294–295  
amphibians, 74, 75, 86, 95, 168–169, 170, 279  
amygdala, 99, 100, 102, 104, 114, 115, 184, 197; in defensive survival circuits, 127–128, 216, 264, 265; in fear, 127, 258–259, 264, 265; in goal-directed behaviors, 185, 187, 196, 197, 202; in multi-state hierarchical theory, 234, 239  
animal psychology, 138, 272  
animals, non-human: anoesis in, 280–281; and anthropomorphism, 138–139, 270–275; Bernard on study of, 55; bilateral symmetry in, 86–87; body duality of, 73–77; cognitive realm in, 4, 42, 46, 137, 138–143, 146, 166–173, 174–177, 274; consciousness in, 5, 42, 44, 268–281; Darwin on, 55, 56, 138, 139, 271–272; defensive survival circuits in, 127–128; dual systems of behavioral control in, 156–158; emotions in, 271–272; evolution of model-based cognition in, 166–173, 279; evolution of nervous system in, 44, 81–91, 170–171; goal-directed behaviors in, 142, 156–158, 170; intelligence in, 138; language-related capacity in, 179–181, 268–270; learning in, 90–91, 129–133, 138, 141–142, 156, 157; methodological issues in study of, 268–270, 275–278; neurobiological realm in, 4, 42, 44, 137, 274; pain and behavior in, 274–275; as persons, 32; problem solving by, 139, 280, 281; Skinner studies on, 26; vegetative and animative functions in, 51–52, 73; Watson studies on, 145. *See also entries for specific taxa*  
animative soul, 52, 73  
anoesis, 254–267, 280–281, 301–302, 304, 305; energy requirements in, 298; meso-cortical prefrontal cortex in, 277, 278

## Index

- anoetic dissonance, 304. *See also* wrong-ness, feeling of
- anthropomorphism, 138–139, 270–275
- anus first development of deuterostomes, 92
- anxiety, 24, 25, 26, 27, 29, 36, 127, 223, 261, 266. *See also* fear
- Anxious* (LeDoux), 247
- apes, 176–182, 201, 276, 277; chimpanzees, 139, 176, 177, 180, 201. *See also* primates, non-human
- approach and withdrawal behaviors, 85, 87, 126
- area-restricted search, 88–89, 91, 172, 183, 187
- argument by analogy with human behavior, 167, 169, 270
- Aristotle, 46, 51–52, 73
- arms races, evolutionary, 88–89
- arousal, 117, 219, 259
- articulatory loop in working memory, 149–150
- artificial intelligence, 12, 32, 63, 261, 301, 302
- Arzy, Shahar, 249
- associative cortex, 99, 102
- associative learning, 82, 89–91, 118, 124, 125–126, 156, 157
- attention, 150, 151, 194, 199, 223, 224, 239
- attention schema theory, 224, 240, 251
- Austin, Jane, 229
- autism, 202, 286
- autobiographies, 283
- autonoesis, 246, 247–250, 253, 277, 301, 302, 304, 305; energy requirements in, 298; in fear, 259, 264, 265; and focal consciousness, 257; mental time travel in, 181, 246, 277; relationship with noesis and anoesis, 258–262, 280–281; in social interactions, 266
- autonomic nervous system, 110–116
- awareness, 200–201, 225, 236
- axons, 83, 111
- Baars, Bernard, 221
- Bacon, Francis, 35
- bacteria, 67, 70, 279
- Baddeley, Alan, 149–150, 160–161, 193, 200, 289, 290
- Bain, Alexander, 16, 18, 207–208, 257
- Balleine, Bernard, 132, 156–157, 162
- Bandura, Albert, 29
- Barrett, Lisa Feldman, 231, 266
- Barthes, Roland, 287, 288
- Bartlett, Frederic, 140, 141, 160, 231
- Barton, Robert, 170–171
- basal ganglia, 99, 100, 101, 102, 114, 130–131, 185; dorsal striatum of, 131–132, 184, 185, 186, 196; in multi-state hierarchical theory, 234; ventral striatum of, 184, 185, 196, 202, 234
- Bayne, Tim, 301
- Bechtel, William, 213
- bees, 168
- behavior, 120–133, 162–165, 185–188; in cognitive realm, 137–138, 149, 154, 155; consciousness in, 18, 147, 149, 155, 214–215, 218; dual systems in control of, 156–158; fixed action patterns in, 87, 88; mental states as cause of, 11, 138, 139; motor system in, 73–74; nervous system in, 44, 81–82, 98, 99, 100, 102, 107, 120; in neurobiological realm, 120–133, 148, 154, 155, 214; personality as, 26; sensory system in, 73–74, 120, 121–124; situational differences in, 16, 29, 59. *See also* goal-directed behaviors
- behavior, specific types: approach and withdrawal, 85, 87, 126; escape, 85, 86, 87, 107, 171; nocturnal, 96, 97, 121; verbal, 144. *See also* foraging
- behaviorism, 11, 18–19, 26, 139, 140, 141, 144, 145, 156; consciousness in, 18, 147, 214–215, 218
- behavior therapy, 26
- Being You* (Seth), 22, 208
- Bennett, Max, 169
- Bernard, Claude, 54–56, 57, 59, 73

## Index

- Berns, Gregory, 286–287
- bias, cultural, in intelligence tests, 36
- Bichat, Xavier, 54, 73, 110, 111
- big five model of personality, 28
- bilateral symmetry, 86–87
- biofeedback, 119
- biological individuals, 63–69, 72
- biological naturalism (Searle), 301
- biological realm, 4–5, 12–13, 41–42;
  - bodies in, 61–72; and differentiation of living and non-living things, 51, 137; duality of existence in, 73–77; in evolution, 44, 63–64; hierarchical relationship to other realms, 12–13, 42–43, 45; homeostasis in, 57–58; individuals in, 63–69, 72; and integrated information theory, 60; interdependence with other realms, 43–45, 48, 82; internal milieu in, 54–55; metabolism in, 57–58; organisms in, 61–65; and origin of life, 56; and pansychism, 59–60; visceral and somatic functions in, 75–77, 108–109; and vitalism, 53–54, 55–56, 59–60
- Birch, Jonathan, 276, 281
- birds, 170, 171, 173, 278, 279
- Blessing, William, 112
- Block, Jack, 33
- Block, Ned, 220
- body: Bichat analysis of tissues in, 54; bilateral symmetry of, 86–87; and biological realm, 61–72; and brain connections, 9–10, 31; Descartes on, 53; and embodiment, 29–31; homeostasis in, 57–58; internal milieu in, 54–55, 56; as personalized, 39–40; as repository of evolutionary history, 43–46; somatic and visceral systems of, 75–77
- body plan, 43, 86–87, 96, 97, 171, 175
- body states, 259–261, 265–266
- Bortolotti, Lisa, 286
- brain: in animals and humans compared, 276–278; in arousal, 117; and autonomic nervous system, 110, 112–116; behaviorism in study of, 191; in bilateral symmetry, 86, 98; and body connections, 9–10, 31; default mode network of, 223, 250–251, 252–253, 260, 292; and embodiment, 30, 45; evolution of, 87, 99, 100–104, 183–185, 278; forebrain area, 98–104, 112–114, 115, 183–188; genetic factors in development of, 122; gut brain, 112, 114; hindbrain area, 98, 111, 112, 113, 114–115, 116, 125; in homeostasis, 117; hormones affecting, 116; in invertebrates and vertebrates compared, 94; language areas in, 2–3, 179, 198; and mentalesse, 291–293; midbrain area, 98, 101, 112, 113, 114, 115; in model-based behavior, 185–188, 196–198; in noesis and auto-noesis, 248–250; oxygen use, 45, 171–172; as personalized, 39–40; in species-typical fixed action patterns, 87; in split-brain patients, 1–4, 282, 285, 304; in triune model, 101–103, 104; in vertebrates, 97–104; visceral brain, 101, 112–114.
- See also entries for specific brain areas*
- brainstem, 98, 117
- brain surgery, 1–4, 143, 249, 282, 285, 304
- breath (Galen), 52
- Brick, Cameron, 36, 210
- broadcasting in consciousness, 221–224, 236–238
- Brodmann, Korbinian, 189
- Brown, Richard, 222, 224, 226–227, 235, 238
- Bruner, Jerome, 39, 144, 215, 230, 284–285, 286, 305
- Buckner, Randy, 250
- Bulley, Adam, 250
- Burgess, Paul, 199
- Buss, Leo, 64
- Butler, Ann, 103
- Butler, Bishop, 16, 25
- Buzsáki, György, 165, 246
- Cambrian Explosion, 88–91, 93, 132
- Campbell, Donald, 303
- cancer, 67