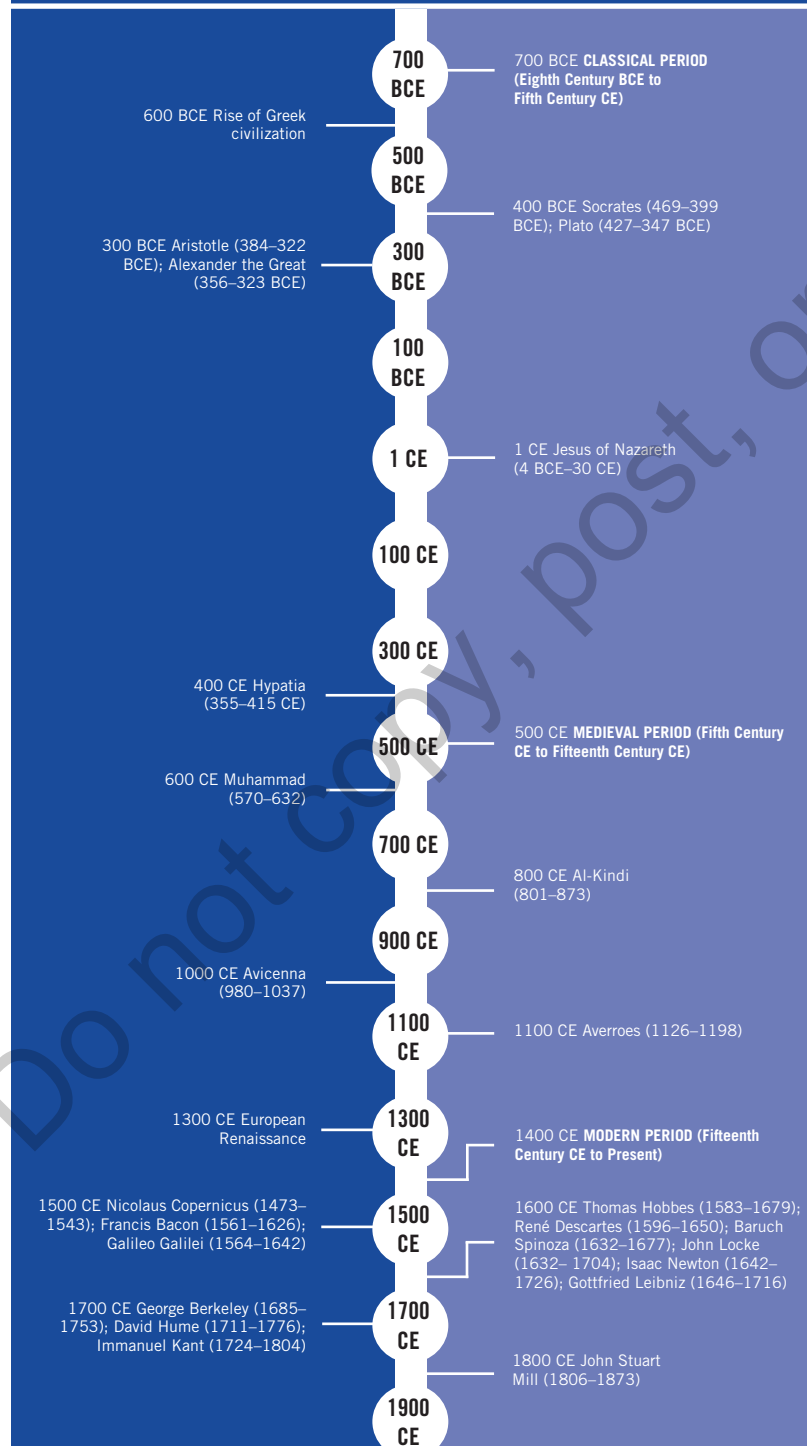


Timeline



Learning Objectives

After reading this chapter, you should be able to:

- Outline the major philosophical trends of the Classical Period, particularly the ideas of Socrates, Plato, and Aristotle.
- Evaluate the psychological contributions of the Islamic philosophers Al-Kindi, Avicenna, and Averroes.
- Contrast the various positions taken by the Continental Rationalists on the mind-body problem.
- Survey the development of thinking on the nature of the mind by the British Empiricists.

Looking Back

For millennia, philosophers have pondered questions that laid the groundwork for modern psychology. We can group these philosophical ponderings into two sets:

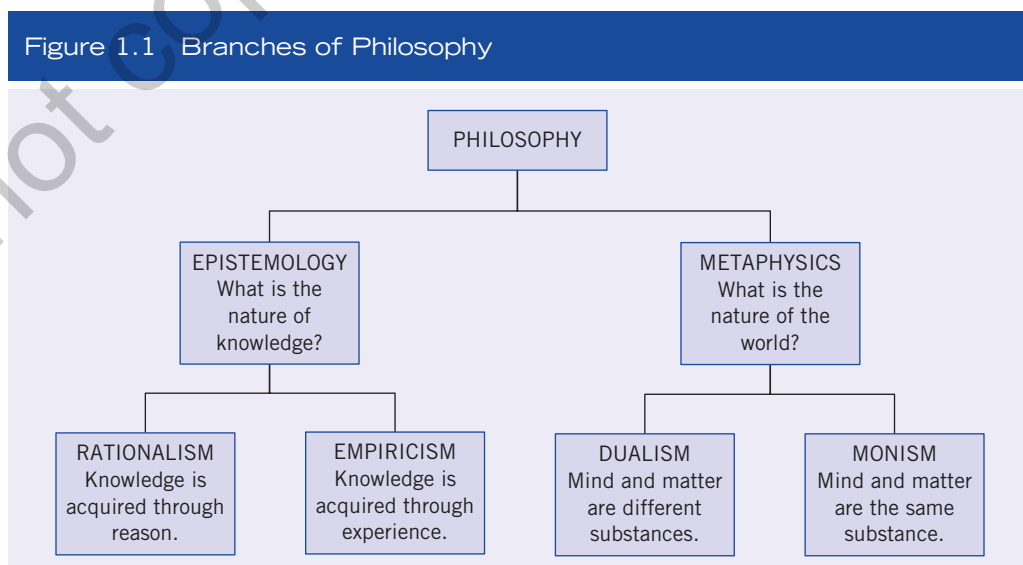
- What does it mean to know something? Where does knowledge come from? What is the role of learning and experience? Are there things we just know without ever having learned them? Are there things we can never know?
- What is the nature of the mind? What is the relationship between mind and body? What is the relationship between our psychological experience and physical reality? Does the mind continue to exist after the death of the body?

Although philosophers ask all sorts of questions about the nature of the world, these two sets are the ones that are most relevant to psychology (Figure 1.1).

The first set of questions illustrates a branch of philosophy known as **epistemology**. This is *the study of knowledge, which asks questions such as what it means to know something and how knowledge can be acquired*. Philosophers have long considered such questions, and they've proposed many theories. However, it's only been in the last century and a half that psychologists have employed scientific methods to test these theories.

Philosophers working in the field of epistemology can be divided into two camps. One camp argues for **rationalism**, which is *the philosophical stance that knowledge can only be obtained through reason*. Rationalists believe that our senses can deceive us, so we need to look inside ourselves instead to find true knowledge. The other camp argues for **empiricism**, which is *the philosophical stance that knowledge can only be obtained through experience*. Empiricists acknowledge that our senses can deceive us, but they also maintain that we can learn about the true nature of the world if we observe it carefully.

The second set of questions comes from a branch of philosophy known as **metaphysics**. This is *the philosophical inquiry into the nature of the universe*. Although metaphysics considers questions about the natural world, it also includes an inquiry into what is known as the **mind-body problem**. This is *the question of how psychological experience is related to the physical world*. There are two ways of thinking about this problem. The first is **dualism**, which is *the philosophical stance that mind and body consist of distinct substances and are subject to different laws*. If you believe you have a conscious soul that will survive the death of your body, then you're a dualist. The second is **monism**. This is *the philosophical stance that mind and body*



consist of the same substance and are subject to the same laws. If you believe your mental states arise from brain activity, then you're a monist.

Most people don't think deeply about epistemology or the mind-body problem. They'll credit a musician with born talent for the piano (nativism) while recognizing the years of dedicated practice that were needed (empiricism). Likewise, those same persons who put a finger to their skull and say they're pointing at their mind (monism) often also believe their mind will continue in their souls after death (dualism). Philosophers, in contrast, have struggled with these questions in all their intricacies for millennia. In this chapter, we begin in Ancient Greece twenty-five centuries ago, when these questions were first asked in a systematic way. And we end in nineteenth-century England, when the time had finally come for a science of the mind.

Classical Period

Western civilization has its roots in the various cultures that sprang up along the coasts of the Mediterranean Sea. The climate was mild, the land was fertile, and the great internal sea allowed for easy trade and the exchange of ideas. But there was also much political intrigue and warfare as various kingdoms and city-states vied for local and regional power. About six centuries before the beginning of the current era, a loose band of city-states rose to regional prominence in the northeastern Mediterranean. Although they weren't a political unit, they were united by a common Greek language and culture. Among these city-states, Athens was the most powerful. There, at the end of the fifth century before the Common Era (BCE) is where our story begins.

Socrates

Chaerephon thought his friend Socrates might be the wisest man in the world, so he went to the oracle of Delphi to find out for sure.

"Is there anyone wiser than Socrates?" he asked the oracle.

"No one is wiser than Socrates," the oracle replied.

So Chaerephon went back to Athens and told Socrates what the oracle had said.

Socrates laughed. "I only know one thing," he said. "And that is, I know nothing."

But Socrates wondered why the oracle had said such a thing, so he sought out the great men of Athens (Plato, *Apology* 20e–23a). He found they all said they knew things they in fact didn't know, so Socrates concluded that the oracle must be right. *The argument that true wisdom comes from knowing the limits of one's knowledge* is called **Socratic ignorance**. Socrates wasn't claiming that he was completely ignorant, only that he was aware of how little he knew and how worthless that knowledge was.

Socrates (469–399 BCE) was an Ancient Greek philosopher who was one of the first to turn philosophy toward questions about the nature of the mind. He spent his days in the marketplace of Athens debating philosophy with anyone who was willing to talk with him. When someone made a vague or unfounded statement, he challenged them by asking, "What is it?" For instance, if you said dying for your country was the greatest honor, his comeback would be: "What is honor?" He'd mastered *the instructional technique of asking questions to guide students in a self-exploration of their own thoughts*, now known as the **Socratic Method**. No doubt you've had teachers who taught in this way.

Young people enjoyed learning from Socrates and became loyal followers. But the wealthy rulers of Athens felt threatened and charged him with defiling the city's gods and corrupting its youth. They wanted to silence Socrates, but at his trial he proclaimed that he could never be silent, because "the unexamined life is not worth living" (Plato, *Apology* 38a). So instead they sentenced him to death. His followers offered to help him escape, but

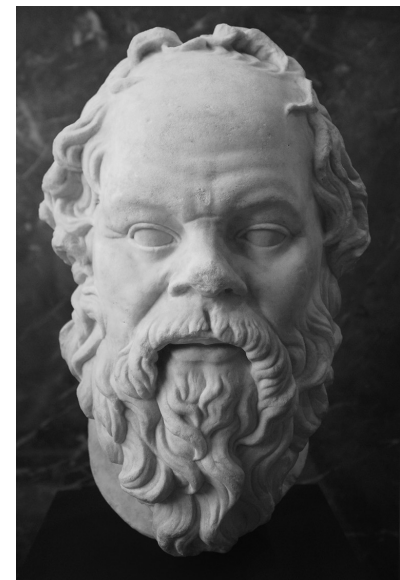


Photo 1.1
Sculpture of Socrates

ChenYX via Wikimedia Commons. CC BY-SA 3.0. <https://creativecommons.org/licenses/by-sa/3.0/deed.en>

the aging Socrates refused. He'd lived his entire life in Athens, and there he would die, by drinking a cup of poison hemlock while surrounded by his friends.

Socrates's enemies may have killed him, but they didn't silence him. Instead, he marked a turning point in Greek philosophy. The pre-Socratic philosophers had mainly concerned themselves with questions about the natural world, and the Sophists had sought out skillful arguments for winning court cases. But Socrates turned philosophy to the study of human nature. Socratic ignorance and the Socratic Method became the hallmarks of intellectual inquiry in the West.

Socrates's impact on psychology has been significant. Traditionally, the Greek word for "soul," or *psyche*, was used to mean the "breath of life" or the "vital spirit" that animated a living being and departed when one died. But Socrates attributed a rich private experience to the *psyche*, and he maintained that the most important thing that people can do is care for and cultivate their *psyche*. In this sense, we can say that Socrates was the first psychologist.

Plato

To the best of our knowledge, Socrates never wrote down any of his ideas, and all we know about him comes from the writings of his students. Most important of these was **Plato** (427–347 BCE), the son of an aristocratic family in Athens who came under the influence of Socrates as a young adult. Plato's writings take the form of dialogues with his master, in which he demonstrates the use of the Socratic Method as a teaching device. Since Plato only reports what Socrates said and not what he himself thinks, many scholars have come to the conclusion that Plato used Socrates as a mouthpiece to voice his own opinions. Nevertheless, we know Plato as the *Ancient Greek philosopher who argued that all knowledge comes from reason*.

In his philosophy, Plato builds on his teacher Socrates's concept of an active *psyche* or "soul" that drives our thoughts and actions (Katona, 2002). Thus, *psyche* is much more like "mind" in the modern sense than "life force" of the Greek tradition. Furthermore, Plato divides the soul into three parts:

- An *appetitive* part that consists of our drives for food, drink, and sex.
- An *emotional* part that contains our passions.
- A *rational* part that seeks truth and should rule over the other two parts.

For Plato, mental health was obtained through the proper balance of these three parts of the soul.

Plato viewed the soul as the repository of our knowledge. And because he believed the soul was immortal, our knowledge must survive in the soul after our death (Plato, *Apology* 40c). This also means that we inherit knowledge from our previous lives. Of course, we ordinarily aren't aware of this innate knowledge. However, it can be drawn out with the proper use of the Socratic Method. Take for example the **allegory of Meno's slave**, a story in which Plato shows how Socrates draws out knowledge of geometry from an uneducated boy (Plato, *Meno* 81a–86b). In the allegory, Socrates leads the boy to the discovery of a geometric proof through guided questions. He then declares that the boy knew this all along but only needed help in finding it within him. Knowledge, Plato concludes, is in our soul before we're born.

According to Plato, this innate knowledge reflects the true reality, and he doesn't trust the information gained through our senses. The **Theory of Forms** is Plato's idea that the world as we experience it is but a poor reflection of the world as it truly is. He expounds on this idea in many of his writings, but the most famous example is in the *Republic*, where he tells the **allegory of the cave**. This is a story in which Plato argues that knowledge can only come from reason because the senses can deceive us (Plato, *Republic* VII.514a–520a).

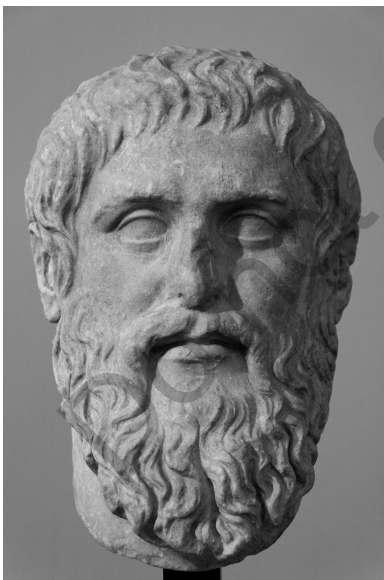


Photo 1.2
Sculpture of Plato

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In the allegory, he asks us to imagine a cave with a large opening toward the sunlight, with a row of men in chains facing toward the back wall of the cave. As people pass by the entrance of the cave, their shadows are projected against the back wall, and for the men in the cave, these shadows constitute the only reality they know. Likewise, our senses only project to us the shadows of reality, not its true essence. If one of those men were to break free and dash to the entrance of the cave, he'd at first be blinded by the sun, but once his eyes accustomed to the light, he'd see reality as it truly is. And so it is with philosophers.

Plato's idea of intrapsychic conflict and a three-part soul were particularly influential to Sigmund Freud (Chapter 7) in the early 1900s. Furthermore, in emphasizing the rational functions of the mind, he set the foundation for cognitive psychology (Chapter 11) in the last half of the twentieth century.

Aristotle

Unlike his teacher Plato, **Aristotle** (384–322 BCE) was more than just a philosopher (Green, 1998). Instead, he was more like a modern scientist, making careful observations of the natural world, describing it as precisely as he could and using logical inference to come up with explanations. And unlike his teacher, who believed all knowledge is innate, Aristotle argued instead that all knowledge is acquired through the senses. However, he conceded, we need to use reason to organize and understand the information our senses provide us. Thus, we know Aristotle today as an *Ancient Greek philosopher who argued that all knowledge comes from experience*.

About a third of Aristotle's treatises discuss topics in biology. He was the first to create a system of categorizing and organizing life forms that is similar to what biologists use today. He accomplished this through a careful examination of over 500 different animal species. Many times, his descriptions and explanations went unsurpassed until the eighteenth or nineteenth century. But Aristotle also got some things spectacularly wrong. For example, he believed the heart was the organ of cognition, relegating the brain to the function of cooling the body.

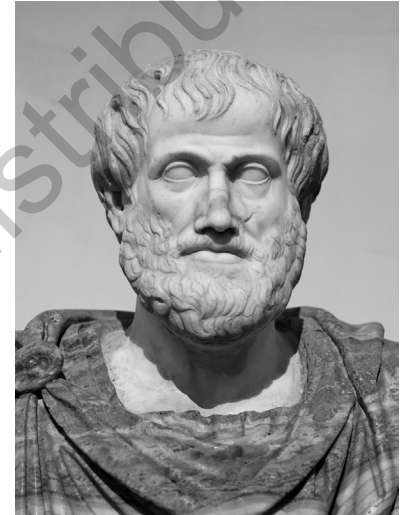
We can name at least three important areas where Aristotle has had an impact on modern psychology. Specifically, these are his thoughts on the mind-body problem, the nature of causation, and the characteristics of happiness and a life well lived. Let's consider each in more detail.

Aristotle's first contribution to modern psychology was his challenge of the prevailing notion that the soul (or mind) had a spiritual existence separate from the body (Katona, 2002). Like his teacher Plato, Aristotle believed that all living things had a soul but its structure depended on the complexity of the animal. In Aristotle's scheme, the three-part soul comprises the following:

- The *nutritive* soul enables the organism to grow and reproduce.
- The *appetitive* soul gathers information from the senses and drives behavior.
- The *rational* soul is the seat of reason, used to make plans and decisions.

These three tiers underlie the traditional division of living things into plants (nutritive soul only), animals (nutritive and appetitive souls), and humans (all three). Aristotle's idea of a three-part soul greatly influenced the early twentieth-century psychoanalyst Sigmund Freud (Chapter 7), who proposed a three-part structure of the unconscious mind (namely, the id, ego, and superego) that had similar properties.

In his treatise *On the Soul*, Aristotle lays out his views on the relationship between body and soul (Aristotle, *De Anima* III.5). Unlike Plato who viewed the soul as separate from the body, Aristotle believed that body and soul were united. This position derives from his more



Jastrow (2006)

Photo 1.3
Bust of Aristotle

fundamental belief that all things consist of both matter and form. Take for instance an object such as an iron ball, the name of which even indicates both its matter and its form. In other words, the matter of the object is iron and the form is roundness. Likewise with living objects, which are composed of matter such as flesh, bones, and blood. However, what gives the body its living form is the soul. That is to say, Aristotle viewed the soul as a sort of life force that animates the body. Thus, in life the body (matter) and the soul (form) are united, but in death they're separated. Aristotle rejected the notion that the soul with an intact mind could survive the death of the body, and in particular he dismissed the notion of reincarnation, which was a fairly common belief among earlier Greek philosophers. Aristotle's monistic stance on the mind-body problem was problematic for both Christian and Islamic philosophers of the Medieval Period as well as much of the Modern Period. However, it does reflect the thinking of most experimental psychologists in the twenty-first century.

Aristotle's second contribution to modern psychology is his thinking on the nature of causation, in particular his distinction between efficient and final causes (Howard, 1998). The *efficient cause* is the action that leads to an end result, whereas the *final cause* is the reason why the action took place. For instance, you stumbled because I pushed you out of my way (efficient cause) because you were blocking my view (final cause). *An emphasis on the final result in a process as opposed to its initial conditions* is known as **teleology**. During the Medieval Period, European philosophers preferred teleological explanations, but with the scientific revolution there was a backlash against teleology in favor of initial, mechanical causes. However, since psychology deals with the purposeful behaviors of living creatures, it can't always shun teleology.

Aristotle's third contribution to modern psychology is his work on ethics and happiness (Aristotle, 1999). In his *Nicomachean Ethics*, he considers the question of what it means to live a good life. He starts with the assertion that a happy life must also be one that is filled with pleasure, since a life of nothing but pain and misery can hardly be called a happy one. However, Aristotle also distinguishes three types of happy life. The first involves the slavish pursuit of sensual pleasures, such as good food, drink, and sex. Certainly these are all components of a happy life, but these alone can never lead to a completely fulfilling one. The second is the pursuit of a political or social life in which the goal is to attain honor. Certainly it's a great pleasure to be respected and esteemed by your peers, but again Aristotle insists it isn't enough to be truly happy. The third is a life devoted to philosophical contemplation, which was the only true path to a truly fulfilling life.

It's important to note that Aristotle isn't suggesting there are three separate pathways to a happy life with only the last being truly fulfilling. Indeed, Aristotle himself was known to indulge in sensual pleasures, and he played important public roles in both Athens and his native Macedonia. Rather, he's saying that engaging in philosophical contemplation is what led to the greatest happiness in his life. Thus, it's a combination of all three—each in good measure—that leads to what he called *eudaimonia* (pronounced *you-die-muh-NEE-uh*). Although the term is often translated as “happiness,” it literally means “good spirits” but with the connotation of “well-being.” The question of what constitutes the good life became of central concern to the humanistic psychologists after World War II, and positive psychologists at the turn of the twenty-first century have picked up Aristotle's concept of *eudaimonia* as one of their guiding principles (Chapter 15).

In sum, Aristotle's thinking diverged significantly from that of his teacher, Plato. The debate between Plato's nativism and Aristotle's empiricism has echoed through the centuries and still pops up in psychological discussions today. For instance, consider the question of whether intelligence is due mainly to innate or environmental factors. This is just one example of the nativism-empiricism debate that will run through many of the chapters in this book. But without question is the fact that Plato and Aristotle set Western philosophy on its course.

At the time of Socrates, Plato, and Aristotle, Greece was unified only in terms of a common language and culture. Politically, it was broken up into a large number of small city-states that were often at war with each other. Both Socrates and Plato were citizens of Athens, but Aristotle was from the northern Greek province of Macedonia. He traveled to Athens as a young adult to study with Plato, and he stayed there twenty years. But after Plato's death, Aristotle returned to Macedonia to become the private tutor to Alexander, heir

to the Macedonian throne. Alexander became king of Macedonia at the age of twenty, and he cleverly united the Greek city-states against a common enemy—the Persian Empire. After subduing Persia, Alexander then marched his troops into Syria, Palestine, and Egypt. At the time of his death at the age of 32, Alexander the Great (356–323 BCE) remained undefeated in battle and had created one of the largest empires ever known. Although that empire soon split into separate political units, Alexander's conquests spread Greek culture around the eastern Mediterranean all the way to India. He also established a number of cities, the most important of which for our story is Alexandria in Egypt, which became the center of Greek learning and culture for many centuries afterward.

Hypatia

Around this same time that Alexander was building his empire in the east, another power was rising in the west. This was Rome, which spread its military power first throughout the Italian peninsula and then into modern France and Spain. By the beginning of the current era, the Roman Empire had completely encircled the Mediterranean, absorbing remnants of Alexander's empire along the way. However, the Romans had great admiration for Greek culture and modeled their own culture after it; hence, we often describe the Classical Period as one of Greco-Roman civilization. Many religions were practiced in the Mediterranean region, but in the early fourth century, the emperor Constantine converted to Christianity, thus giving it important political clout within the empire.

Alexandria was still the most important cultural and intellectual center of the Greco-Roman world, and it was home to the largest library in the world (Booth, 2013). There worked **Hypatia** (355–415 CE; pronounced *hip-PAY-shuh*), one of the most famous woman philosophers of the Classical Period. None of her writings have survived, and all we know about her comes from comments by other writers. Instead, what she's most famous for is the horrendous way she died. Thus, Hypatia is remembered today as the *woman Greco-Roman philosopher who has become a symbol for the struggle between science and religion*.

Hypatia was part of a philosophical movement known as Neo-Platonism, which favored the rationalism of Plato over the empiricism of Aristotle (Grant, 2009). They were mostly interested in mathematics and astronomy, but Hypatia seems to have been well read in other areas of philosophy as well. She gave frequent public lectures and was a popular figure in the city. She also got drawn into politics at a time when a ruthless power struggle was underway.

Two men were vying for control of the city (Grant, 2009). One was the Roman governor Orestes, who was a Christian but tolerant of other religions. The other was the archbishop Cyril, who sought to rid the city of non-Christians. As Orestes's confidant, Hypatia advised him to take a firm stance against Cyril. This in turn made Hypatia the target of Cyril's wrath. One day, a Christian mob surrounded her carriage, pulled her from it, and beat her to death. They then hacked her body to pieces and burned them. Those loyal to Hypatia blamed Cyril for instigating the mob, but those loyal to Cyril insisted he had nothing to do with it. At any rate, Cyril eventually took control of the city and was canonized as a saint after his death.

Over the centuries, the story of Hypatia has been used as a common plot in fiction (Doherty, 2015). In some accounts from the Medieval Period, she's portrayed as a sorceress who bewitched the poor people of Alexandria until they were rescued by Saint Cyril. Especially in the nineteenth century, the story of the hostility between Hypatia and Cyril became an allegory for the conflict between science and religion. And in more recent times, Hypatia has been adopted as a symbol for the feminist movement, representing the intelligent woman who dared to speak her own mind in a world dominated by men. Her name has also been taken for the title of a feminist philosophy journal. One of the most recent retellings of her story is the movie *Agora* (Bovaira, Augustin, & Amenábar, 2009). The movie got mixed reviews, but you can watch and decide for yourself whether the themes it presents are legitimate or not.



Photo 1.4
Portrait of Hypatia

By Jules 0000Maurice Gaspard (1862–1919), via Wikimedia Commons

Medieval Period

The decline of the Roman Empire began around the turn of the fourth century. Barbarian invasions plagued the empire, especially in the west. By the fifth century, the empire had fractured in two, with Germanic kings occupying Rome. Around this same time is when Constantine, still emperor in the east, established his capital at Constantinople, or modern-day Istanbul in Turkey. Christianity had been widely adopted in both the eastern and western portions of the empire, and the political influence of the Catholic Church was growing ever stronger. While a greatly reduced Eastern Roman Empire survived another thousand years, the western portion disintegrated into a number of small political entities.

The time spanning the fifth through fifteenth centuries is often referred to as the Dark Ages. In Europe, there was a drop in population due to disease, warring factions, and foreign invasions. The Catholic Church also had a stranglehold on the intellectual life of the continent, as the Greco-Roman learning of the Classical Period was largely abandoned in favor of Christian theology. And so Europe remained for nearly a thousand years, until the Renaissance of the fourteenth century kindled a renewed interest in science and philosophy.

However, the term “Dark Ages” is something of a misnomer. On the Arabian Peninsula, the new religion of Islam arose in the seventh century. Unlike early Christianity, early Islam maintained a positive attitude toward nonreligious learning, and Muslim scholars of the Islamic Golden Age not only preserved the learning of the Classical Period but also expanded on it, especially in the area of medicine. Because all was not dark during the millennium between the Classical and the Modern Periods, it's better to refer to this time as the Medieval Period, or more colloquially as the “Middle Ages.”

Islamic Golden Age

The religion of Islam was founded by Muhammad (570–632). According to Islamic doctrine, Muhammad was the final prophet in a series that included Abraham, Moses, and Jesus, among others, who taught belief in a single God in contrast to the polytheistic beliefs of most of the classical world. Thus, Islam is considered an Abrahamic religion together with Judaism and Christianity, and its holy book is the Quran. Muhammad used Islam to bring together the various tribes of Arabia into a single religious-political unity. During the following century, Islam spread rapidly across much of the classical world, extending as far east as India and as far west as North Africa and Spain.

Early Muslim rulers tended to be tolerant of non-Muslim peoples in their dominions (Simonton, 2018). The Islamic world comprised many different cultures whose people spoke a wide array of languages. However, Arabic served as the common language for religious and political purposes, much as Latin did in Europe. It was this open exchange of ideas that led to the Islamic Golden Age, which started around the eighth century. In Baghdad, for instance, the Caliph Harun al-Rashid established the House of Wisdom, where Jewish, Christian, and Muslim scholars were tasked with translating all surviving books from the Classical Period into Arabic. This practice of patronizing scholars regardless of their faith was adopted by a number of Muslim rulers during this time period. Within a century, Muslim scholars were completely versed in the learning of ancient Greece and Rome, and they also began to develop that knowledge further.

Al-Kindi

Known as Islam's first philosopher, **Al-Kindi** (801–873) was responsible for translating many of the works of Plato and Aristotle into Arabic (Cerami, 2012). Born to a politically influential family, Al-Kindi was educated at the House of Wisdom in Baghdad. There, he also led a group of scholars who translated and commented on Greek texts. But he was more than just a translator. Rather, he tried to demonstrate in his works that there was no contradiction between the learning of the Greeks and the teachings of the Quran. Thus, we recognize Al-Kindi as the *Islamic philosopher who tried to integrate Greek philosophy with Islamic theology*.

Al-Kindi produced over 300 works on a variety of subjects (Langermann, 2000). These manuscripts of course include standard texts of Greek learning, such as philosophy, mathematics, medicine, optics, and astronomy. However, he also translated and commented on works dealing with a wide range of topics, including astrology, meteorology, and zoology. He also wrote texts on the manufacture of valuable commodities such as glass and mirrors, jewelry and perfumes, as well as sword making. In addition to translations, he also produced a large number of original works. Thanks to the work of Al-Kindi and his students, subsequent generations of Islamic scholars had at their fingertips the bulk of classical learning in the familiar Arabic language instead of the unfamiliar Greek.

More than just introducing Greek learning to his fellow Muslims, Al-Kindi's goal was to show how classical philosophy could be integrated with Islamic doctrine (Staley, 1989). Much of his work was based on the neo-Platonic tradition, and this mathematical and rational approach to understanding the world was fairly consistent with the Islamic belief in knowledge through revelation. However, Al-Kindi's intellectual hero was Aristotle, whose empirical approach to science was more difficult to reconcile with Islamic faith. In his most important treatise, *On First Philosophy*, Al-Kindi argues that because both philosophy and religion seek truth, any contradiction between them is only apparent and can eventually be resolved. And even if we need revelation to gain knowledge of the Divine, the empirical approach is still the best way to understand the natural world.

However, there was one point of Aristotelian philosophy that Al-Kindi took issue with (Staley, 1989). Because every event must have a cause, Aristotle reasoned that there could never have been a beginning to the universe. Instead, he saw an endless chain of causality extending for an eternity into the past. This point, of course, contradicted the Islamic doctrine that God created the universe. For Muslims, as well as for Jews and Christians, God is the "unmoved mover," the one entity that requires no cause but is the ultimate cause of all things. If Islam is true, then Aristotle must be wrong, at least on this point. But to err is human, Al-Kindi contended, and just because the great philosopher was mistaken on this point, it didn't mean that all the rest of his science was flawed.

Al-Kindi laid the groundwork for the Islamic Golden Age by making the great extent of classical learning available to Muslim scholars (Staley, 1989). Although he maintained that any contradiction between religion and science was only apparent, he ceded to theology whenever philosophy conflicted with it. This may have been necessary, since he was extending an invitation to the Islamic intellectual world to learn about the natural world, and he dared not offend religious sensibilities. Later Islamic scholars, however, would be more willing to challenge religion when it contradicted science.

Avicenna

Abu 'Ali al-Husayn ibn Sina was the most significant philosopher of the Islamic Golden Age, although he's better known in the West as **Avicenna** (980–1037; pronounced *av-uh-SENN-uh*; Rizvi, 2017). A physician by training, Avicenna can also count as Islam's first neuroscientist, as he proposed a theory of how the brain performs the tasks of perception and memory. Although the theory is spectacularly wrong by modern standards, it was nevertheless a great advance in that it attributed at least lower cognitive functions to physiology rather than supernatural forces. But most importantly, Avicenna is known today as the *Islamic philosopher who provided an influential thought experiment regarding the nature of self-awareness known as the "flying man" argument*.

Avicenna is most famous for two books whose titles are somewhat misleading (Rizvi, 2017). The first book is the *Canon*, which was a medical textbook. Avicenna was a renowned physician and surgeon, and in the *Canon* he collected the



From Wikimedia Commons

Photo 1.5
Portrait of Al-Kindi

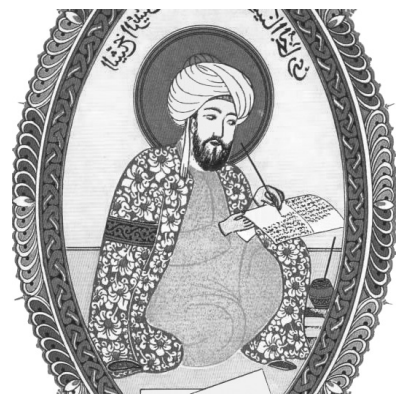


Photo 1.6
Portrait of Avicenna

extent of medical knowledge known in the Western world at the time. This book continued to be the standard text in medical schools well into the Modern Period, both in the Islamic world and in Europe. The second book is the *Cure*, in which Avicenna surveys the extent of Aristotelian science, including not only mathematics and logic but also his work in the natural sciences. It's in this book that Avicenna presents his ideas on human psychology, including his brain-based theory of cognition as well as his "flying man" argument. This book was controversial within the Islamic world, and when it was later translated into Latin, it created quite a stir in Europe as well, challenging scholars to question fundamentalist Christian theology and eventually sparking the Renaissance.

In the *Cure*, Avicenna also proposed the idea that humans are born as "blank slates" with no innate knowledge (Rizvi, 2017). Instead, he maintained, all knowledge was acquired through experience and education. On this point, Avicenna was even more of an empiricist than his model Aristotle. This idea also challenged common assumptions in both Europe and the Islamic world about the need to posit some innate knowledge, such as an awareness of God. As we'll see later in this chapter, Avicenna's radical empiricism would be taken up by the British Empiricists during the early Modern Period. Furthermore, this stance served as the cornerstone of the American behaviorist movement of the twentieth century, as we'll learn in Chapter 5.

Avicenna's neuroscience was based on the concept of *inner senses* (Kemp, 1998). The outer senses, such as vision and hearing, received images of the external world. These images then left impressions on the inner senses, thus accounting for processes such as perception, imagination, and memory. Aristotle, like many classical philosophers, believed that the heart was the organ of thinking. But no doubt because of his extensive medical knowledge, Avicenna understood that the brain played an important role in cognition. According to his theory, these low-level cognitive processes took place in the ventricles of the brain, which he believed to be filled with a fluid he called *animal spirits*. This fluid received images from the external world and made impressions on the interior walls of the ventricle. In the acts of imagination or memory, these animal spirits then "read" the impressions that have been left behind. While the theory is incorrect in its entirety, it's still important because it represents one of the first attempts to explain cognition in terms of physiology. However, Avicenna wasn't able to completely give up supernatural explanations. As a Muslim, he of course believed in the existence of the immortal soul, to which he attributed the human ability to use reason.

In Avicenna's thinking, the soul is also the seat of self-awareness (Rustom, 2018). Although he could simply accept this proposition as a tenet of Islam, Avicenna believed he could use the logic of philosophy to demonstrate it as fact. He attempted this by means of the **flying man argument**, which is *a thought experiment intended to demonstrate the existence of self-awareness outside of the body*. Avicenna asks us to imagine a man created fully formed and suspended in mid-air. Because his senses are muted, he will have no knowledge of the outside world. Furthermore, his limbs are fully extended so that no part touches another. As a result, Avicenna maintains, he will have no knowledge of his own body. What, if anything then, will the man be aware of? He will be aware of his own thoughts, Avicenna tells us. In other words, the flying man will only know one thing—that he has a self of which he is aware. Modern philosophers note the similarity between Avicenna's flying man argument and the method of doubt proposed by the seventeenth-century French philosopher René Descartes, who famously concluded, "I think, therefore I am." However, Avicenna's proof for the existence of the self as an independent "thinking thing" precedes that of Descartes by more than six centuries.

Avicenna's thinking was remarkably advanced for his time period. His work is an outstanding example of the intellectual advancement taking place with the cosmopolitan atmosphere of early Islam. As his books made their way into Europe, they awoke scholars on that continent from their intellectual slumbers. Slowly they turned their attention away from the otherworldly with a new curiosity about the nature of the physical world, including the psychology of the people who inhabited it.

Averroes

By the twelfth century, the Islamic Golden Age had begun its decline (Simonton, 2018). Fundamentalist theologians were attacking the philosophy of Avicenna and others contradictory to Islamic doctrine. Although there were still rulers who saw the advantages of keeping scholars in their courts, the general population had grown more conservative and less tolerant of foreign ideas. These were the times into which was born the last great Islamic philosopher, Abu al-Walid Muhammad ibn Ahmad ibn Rushd. Better known as **Averroes** (1126–1198; pronounced *uh-VEER-oh-izz*), ibn Rushd represents a transitional figure during a period when Islamic scholars were turning from philosophy to theology at the same time that European academics were gaining a renewed interest toward science. As a result, Averroes's influence was greater in the Christian West than in the Muslim East, and thus he's known as the *Islamic philosopher who reintroduced Aristotelian philosophy to Europe*.

Averroes was born in Córdoba (in modern Spain) near the end of Muslim dominion over the Iberian Peninsula (Delgado, 2012). Thus, it was easier for his ideas to make their way into Europe, especially France, where a group of French scholars became dedicated to his teachings after his death. In his hometown, however, his daring philosophy was unwelcomed. There he saw his books burned, and he was banished from the city. He did, however, find a warmer reception with the caliph of Marrakesh (in modern Morocco), where he spent much of his career.

Because of his staunch support for Aristotle's empiricism over Plato's rationalism, Averroes was a controversial figure among both Muslims and Christians (Delgado, 2012). He insisted that observation was the only source of knowledge, for instance by performing autopsies to increase his medical knowledge. He even dared to challenge Aristotle himself when his own observations were counter to what the great master had claimed. Averroes agreed with Avicenna that there should be no conflict between religion and science, but he also denounced what he saw as his predecessor's willingness to forsake reason for dogma when convenient. Instead, he insisted, when scientific observations contradicted religious doctrine, then scripture must be read as allegory rather than as fact. In other words, empirical science was a more reliable source of knowledge than even divine revelation.

Averroes presented his ideas on psychology most fully in his *Aristotle on the Soul* (Hillier, 2017). In this book, he expanded Aristotle's three-part soul into one with five parts, but with the last part, the *rational soul*, being unique to humans. He also proposed a faculty of the mind he called *common sense*, which integrated the separate impressions of the senses into an experiential whole. For instance, when you hold an apple in your hand, you see its redness and roundness, you feel its heft, and you smell its fragrance. When you bite into it, you also hear its crunch and taste its tanginess. In Averroes's philosophy, it's the common sense that binds all these separate experiences together, and it's a remarkably insightful observation. The question of how such an integration takes place was a key concern of the structural psychologists (Chapter 3) working at the turn of the twentieth century, and modern cognitive psychologists (Chapter 11) refer to this process as multimodal perception.

Averroes's views on the soul were in line with those of Aristotle, and they contradicted both Islamic and Christian doctrine (Delgado, 2012). Rather than thinking of the soul as a spirit that survives the death of the body, he saw it instead as a force that animates it. He also agreed with Avicenna's theory of the ventricles in the brain as the seat of cognition, for the reason that this soul—as a physical entity—would need to occupy a hollow space within the body. He also developed a model of localization of brain function, with the frontal ventricles being responsible for imagination, the medial for thought, and the posterior for memory. Of course, this theory is contradicted by evidence from modern neuroscience. However, the significance of this proposal is that it's the first purely brain-based theory of cognition, with



Photo 1.7
Statue of Averroes

no recourse to supernatural explanations. In other words, Averroes was a materialist and a monist who saw the brain as the organ that produces the mind.

As part of this monistic worldview, Averroes held views about human psychology that are remarkably modern (Delgado, 2012). For example, he challenged the commonly held notion that dreams are of supernatural origin. Instead, he maintained that the content of dreams is nothing more than the random recollection of sensory impressions and thoughts from the previous day. This explanation of dreams is quite similar to theories proposed by the American psychologist Mary Calkins (Chapter 4) and the Austrian psychoanalyst Sigmund Freud (Chapter 7) in the late nineteenth century. Furthermore, he disputed the idea that humans were fundamentally rational creatures. Instead, he insisted that our reasoning is always guided by our emotions, a perspective shared by many psychologists in the twentieth and twenty-first centuries.

During the Medieval Period, European scholars largely forsook classical learning because of its perceived contradiction with Christian faith (Chavoushi et al., 2012). Yet during roughly this same time span, Islamic scholars and the rulers who supported them welcomed Greek philosophy as a complement to their new religion. Although many of the classical texts were lost in Europe at the beginning of this period, by the twelfth century the writings of Plato and Aristotle were reintroduced to the continent by way of great Islamic philosophers such as Avicenna and Averroes. However, these scholars weren't just preservers of ancient learning but rather they actively expanded that knowledge base. Avicenna's *Organ* was the standard medical textbook in Europe for centuries, and Averroes's return to Aristotle's empiricism helped spark the Renaissance that marked the transition to the Modern Period. Indeed, the Islamic Golden Age set the stage for the scientific era we live in today.

Modern Period: Continental Rationalism

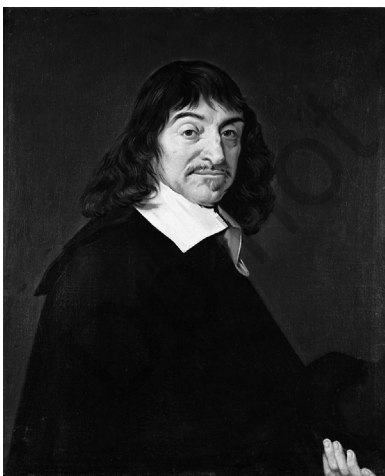
As Europe awoke from its slumber during the Renaissance, copies of these preserved works returned to the Continent, and European philosophers endeavored to integrate Christian faith with Aristotle and Plato. By the seventeenth century, the scientific revolution was in full swing. Natural philosophers like Galileo Galilei (1564–1642) and Isaac Newton (1642–1726) proposed a mechanical, “clockwork” view of the world. Even the human body could be described as a biological machine. This was the intellectual climate into which the French philosopher René Descartes was born.

René Descartes

The seventeenth-century philosopher **René Descartes** (1596–1650; pronounced *day-CART*) would lie in bed until noon, just thinking (Damjanovic, Milovanovic, & Trajanovic, 2015). According to legend, he came up with the idea of Cartesian geometry while watching a fly walk along the ceiling. From this late-morning lounging came one of the most important discoveries in mathematics. But he also gave considerable thought to the mind-body problem, so psychology knows René Descartes as the *French philosopher who was one of the first thinkers of the early Modern Period to provide a detailed model of how the mind and body interact*.

In the early 1630s, Descartes wrote his *Treatise on Man*, in which he argued that the human body is just a machine (Damjanovic et al., 2015). He based this premise on his studies of animal vision systems, in which he had traced the optic nerve from the back of the eyeball to a center in the brain known as the pineal gland, which he surmised to be the center of visual perception.

We now know that he was wrong in this regard, but nevertheless his anatomical investigations led him to an appreciation for the complex network of nerves running between the brain and the body. In Descartes's view, the brain was clearly a control center for the body, and even though he was careful not to suggest that the brain was the seat of



André Hataïa (c. a.) (1997). *De eeuw van Rembrandt*. Bruxelles: Crédit communal de Belgique.

Photo 1.8
Portrait of René
Descartes

the mind, he still feared repercussions from religious authorities. After all, the famous Italian astronomer Galileo Galilei had just recently been sentenced by the Inquisition to house arrest for proposing the heretical notion that the Earth revolves around the sun. So he left this treatise with friends to be published after his death, which they did in 1664.

In the *Treatise on Man*, Descartes (1664/1972) presents various machines as analogies to the workings of the human body. For instance, all the rage at the time were moving statues that worked by hydraulics. As you walk through a garden, you step on a flagstone, which releases a flow of water through a pipe. A figure leaps from the bushes and dances about. When you step off of the stone, the figure retreats to the shrubbery. Maybe the nervous system works by hydraulics as well, Descartes thought. Imagine you touch a hot flame. Particles of heat press against your skin, causing a fluid he called “animal spirits” to flow up to the brain. As the sensory portion of the brain swelled with these animal spirits, it pressed against the motor portion, which in response squirted more animal spirits down to the muscles to move your hand away. If you replace “animal spirits” with “electrochemical signals” and make a few other tweaks, you have a rough outline of our modern conception of the reflex arc (Figure 1.2). Of course, Descartes knew nothing of electricity, let alone chemistry.

It’s in his *Meditations on First Philosophy* that Descartes lays out his vision of the relationship between body and soul (Descartes, 1641/1911). According to Christian theology, our

Figure 1.2 Descartes's Reflex Arc



Source: Wellcome Collection Gallery; CC BY 4.0, <https://creativecommons.org/licenses/by/4.0/>

soul is immortal and survives the death of our body with our personal memories intact. Otherwise, how could we know why we were being rewarded with heaven or punished with hell? Thinking on this issue was murky before Descartes, but he was the one who gave us the modern concept of mind as a set of mental processes, which he equated with the soul of Christian theology.

Descartes (1641/1911) begins his *Meditations* by clearing his mind of all thoughts he doesn't absolutely know to be true. He does this with his **method of doubt**, which is *Descartes's way of avoiding unwarranted assumptions by questioning everything that cannot be logically verified*. Because the senses can deceive, how does he know for certain that he's lying in bed awake staring at the ceiling? Perhaps he's just dreaming. And if so, how does he know his entire life isn't a dream? Or worse, suppose some evil demon has seized control of his senses and is causing him to hallucinate. As far as he knows, all of the physical world around him, including his own body, could be an illusion created by this evil demon. Now, Descartes isn't arguing that the world is an illusion. He's just saying that if it were an illusion, he wouldn't know. He'd still think his experiences were real.

Once Descartes has rid himself of the physical world and even his own body, what's left? He's still aware of his own thought processes, hence his famous quote, "I think, therefore I am." But wait. Couldn't even his own thoughts be deceptions produced by this evil demon? If so, there must still be an "I" that's been deceived. So "I" must exist, Descartes concludes. However, "I" isn't a physical thing, it's a "thinking thing." And if "I" am my thoughts and not my body, then there must be two kinds of things in the world, physical stuff and thinking stuff.

By separating body and soul as distinct entities, Descartes can have his religion and his science too. Because he packs the mind inside a disembodied soul, Descartes explains how we could experience an afterlife with all of our mental functions intact. And by removing the soul from the physical world, he can now talk about the body as a machine without committing heresy. Note that this is essentially the same conclusion that the Islamic philosopher Avicenna arrived at with his flying man argument some six centuries earlier, with much the same motivation of preserving an immortal soul while giving a mechanical account of the body.

Cartesian dualism then is *the proposal that the mind and the body are separate but interact with each other*. Furthermore, Descartes proposed, the point where the body and soul connect is the pineal gland, which he'd supposed to be the seat of vision. However, by making a clear distinction between the physical body and the spiritual mind, Descartes has put himself in a difficult position. Clearly the mind can affect the body, but in the clockwork universe he subscribes to, all physical events must have physical causes. There can be no supernatural intervention in the natural world, yet Cartesian dualism demands it. Another troubling conclusion falls out from Cartesian dualism. According to Christian theology, only humans have souls. If the mind is in the soul and not the body, then nonhuman animals can't have minds or any sort of conscious experience. Descartes viewed animals as mindless machines, but most people today would probably have serious doubts about this conclusion.

René Descartes developed the modern conception of mind as a unified conscious experience and gave us the concept of the sensorimotor reflex. His solution to the mind-body problem is unsatisfactory, and in fact many of his contemporaries pointed this out. Cartesian dualism results from a conflict between the theological need to posit an immortal soul that encapsulates our sense of self with the scientific evidence that the body is a biological machine subject to the laws of physics. As we'll see, many other philosophers of the modern era have struggled with this same issue, each focusing on a particular set of problems. Nevertheless, it was Descartes who gave us the first clear articulation of the mind-body problem, and in that sense every other proposal since then has come as a response to Cartesian dualism.

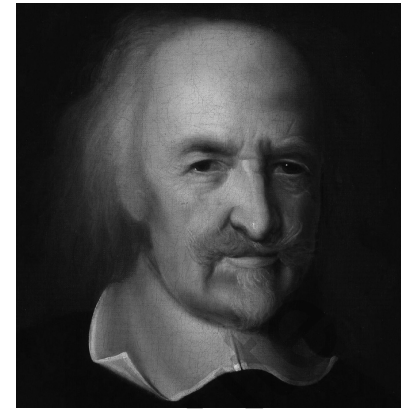
Thomas Hobbes

When the English Civil War erupted in 1642, **Thomas Hobbes** (1583–1679) fled to Paris with other supporters of the monarch. Mostly known as a political philosopher, Hobbes argued in his best-known work, *Leviathan*, that without a strong central government, society would

dissolve into chaos, just as had happened during the decade-long civil war. In his view, this was because humans were no different from other animals, both of which he saw simply as biological machines driven by their passions. Thus, we know Thomas Hobbes as the *British philosopher who argued that the mind is nothing more than the product of a mechanical brain*.

Unlike Descartes, Hobbes was an atheist, so he didn't need an explanation for the afterlife (Meehan, 2009). Instead, he held *the view that there is only matter and that no separate substance is needed to explain the mind*. This is known as **materialism**. Furthermore, he maintained, if mental processes are mechanical, then there can be no such thing as free will. Instead, we only believe we have free will because we're unaware of the external causes of our urges.

We can think of Cartesian interactionist dualism and Hobbesian materialist monism as two poles on the mind-body problem, with all other accounts as intermediate positions between them. Since the twentieth century, however, Hobbes's position has become far more influential among experimental psychologists, who as scientists necessarily take a materialist worldview. For example, many neuroscientists today believe that all mental processes will ultimately be explainable in terms of brain activity. Although Descartes's name is more frequently mentioned, it is Hobbes's viewpoint that is more widely accepted among psychologists today.



John Michael Wright, National Portrait Gallery, via Wikimedia Commons

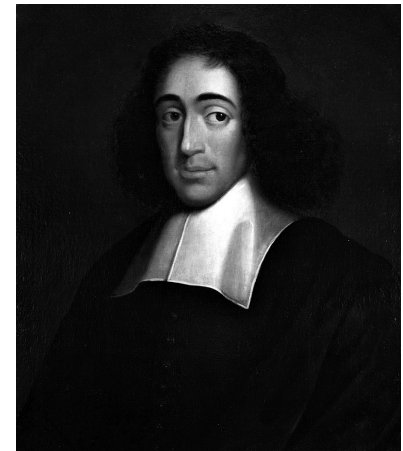
Photo 1.9
Portrait of Thomas
Hobbes

Baruch Spinoza

A generation younger than both Descartes and Hobbes, **Baruch Spinoza** (1632–1677) had the opportunity to consider the strengths and weaknesses of their opposing solutions to the mind-body problem (Meehan, 2009). At first glance, his philosophy appears to be a compromise position between his two predecessors. But on further inspection, we find a nuanced worldview that in fact may be more in line with twenty-first century sensibilities than either Cartesian dualism or Hobbesian monism. Today we know Baruch Spinoza as the *Dutch philosopher who argued that mind and matter are but two aspects of the same underlying nature*.

In his *Ethics*, Spinoza (1677/2009) responded to both Descartes's mind-body dualism and Hobbes's materialistic monism. Like Hobbes, Spinoza rejected Cartesian dualism in favor of monism, but he didn't agree that mind is product of the body. Instead, he proposed what is now known as **double-aspect monism**. This is *the view that mind and body are two facets of the same universal substance*. Mind and body are like two sides of the side coin, with no way to separate one from the other. Thus, it's meaningless to talk of an interaction between mind and body because they aren't separate entities. Furthermore, he agreed with Hobbes that free will was nothing more than an illusion, because all of nature is determined by the laws of physics.

Spinoza's writings were often suppressed during the centuries following his death because of the way they challenged religious dogma (Meehan, 2009). During subsequent centuries, debate on the mind-body problem was largely polarized between the Cartesian and Hobbesian points of view. While Hobbes's materialism appealed to many experimental psychologists in the twentieth century, its inability to provide a satisfactory account of subjective conscious experience has troubled some psychologists in the twenty-first century. For this reason, Spinoza's dual-aspect monism has gained renewed interest in recent decades, especially among neuroscientists who view the brain and mind as correlated systems (Chapter 16).



Via Wikimedia Commons

Photo 1.10
Portrait of Baruch
Spinoza

Gottfried Leibniz

Like Descartes, **Gottfried Leibniz** (1646–1716) was a devout Christian who was also devoted to the idea of a mechanical universe. He understood that an immortal soul had to



Photo 1.11
Portrait of Gottfried Leibniz

be immaterial, so there must be two different kinds of substance, physical and spiritual. But he also saw the logical inconsistency of Cartesian interactionism, and he proposed an alternative dualist approach to the mind-body problem. Thus, Gottfried Leibniz is best known as the *German philosopher who argued for psychophysical parallelism as an alternative to Cartesian dualism*.

Challenging Hobbes's materialistic monism, Leibniz offered the **mill argument** (Jorati, 2019). This is *Leibniz's thought experiment demonstrating that mental processes cannot be produced by mechanical means*. Even if we produced a machine that acted as if it were conscious, he said, we'd never find anything among its internal gears and springs that was actually producing consciousness. Instead, Leibniz argued, only souls can have consciousness, and the material world is mindless.

Leibniz sought a way to align the physical and spiritual worlds (Fancher, 2000). He asks us to imagine two pendulums hanging from a beam. To get them swinging in harmony, all we need to do is push them both at that same time. After that, they'll swing together even though there's no interaction

between them. So it is with the physical and spiritual worlds, Leibniz claims. *The idea that mind and body act in harmony even though they do not interact* is known as **psychophysical parallelism**. If you cut your finger, your body will bleed in response. But your mind will also feel pain, because it was established at the beginning of the universe that the body and soul would always act in harmony.

Unlike Descartes, Leibniz believed animals perceive the world just as humans do, which he attributed to the workings of the physical body rather than the spiritual mind (Duarte, 2009). But what made humans different is that they can think about their experiences as opposed to merely acting on them. *The ability to reflect on one's own perceptions* is what Leibniz called **apperception**. This was a common concept in both philosophical and experimental psychology up to the early twentieth century, but it fell out of use as the functionalists and behaviorists focused on empirical observations of outward behavior.

In his own time, Leibniz was a provocative person, and many of his arguments don't mesh well with thinking in modern psychology. His psychophysical parallelism is difficult to justify with the materialist worldview of science. However, his mill argument has resurfaced in various guises with the rise of artificial intelligence and the question of machine consciousness. Even after four centuries, though, Leibniz still provides food for thought.

Immanuel Kant

During his lifetime, **Immanuel Kant** (1724–1804) was an international celebrity, even though he never traveled more than a few miles from his birthplace. He wrote major works that changed the course of Western philosophy, and he made early contributions to a number of the emerging natural and social sciences. Although he famously opined that psychology could never be a “real” science, he nonetheless proposed a theory of the human mind that is remarkably similar to the thinking of twenty-first-century cognitive scientists. And all this he accomplished from the university town where he spent his entire life. Today, we remember Immanuel Kant as a *German philosopher who sought to reconcile the rationalist and empiricist approaches by arguing that knowledge is acquired through experience but ordered by innate rational processes*.

Kant lived in a time commonly known as the **Age of Enlightenment**, which was a period during the eighteenth century when religious dogma was questioned and reason was held as the ultimate authority. Science was questioning cherished religious beliefs. However, Kant argued that there is in fact no contradiction between science and religion. This is because science deals with the universe as we perceive it through our senses, but there's also a part of the universe beyond the reach of our senses. This is where God, soul, free will, and the afterlife fit in. Although we can't perceive this realm, we can know through reason that it must exist.

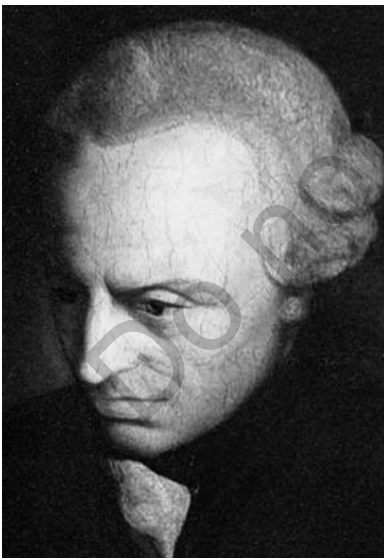


Photo 1.12
Portrait of Immanuel Kant

In his most famous book *Critique of Pure Reason*, Kant (1781/2017) tries to bridge the gap between the rationalist and empiricist approaches to the acquisition of knowledge. While acknowledging that we can only learn about the world through our experiences, he also maintained that the human mind contains innate principles for organizing our perceptions. This assertion then leads to the concept of **transcendental idealism**, which is *Kant's contention that human experience consists solely of appearances and not of things in themselves*. The reason why we can't see things as they truly are is because our minds are preconditioned to experience the world in a particular way, and so there are aspects of the world we have no direct access to.

As examples of how our minds organize our perceptions, Kant argued that three-dimensional space and time are not attributes of the universe but rather of our minds (Mikkelsen, 2000). In other words, our minds impose a space-time structure on our experiences even though these aren't attributes of the universe as it truly is. For Kant, transcendental idealism represented a "Copernican shift" in human thinking. The sun appears to circle around the Earth, rising every morning in the east and setting each night in the west. But the Polish astronomer Nicolaus Copernicus (1473–1543) showed that this is just an appearance and not reality. Only through reason can we know that the Earth circles the sun as it spins on its axis. Kant's theory of human cognition was radical for its time, but it has had considerable influence on psychological thinking up to the present day. In particular, the Kantian concept of innate organizing principles was a cornerstone of Gestalt psychology (Chapter 6), which arose in Germany in the early twentieth century.

Kant also took exception to the general belief at the time that perception was a passive process of accumulating sensory impressions (Palmer, 2008). Instead, Kant viewed perception as an active process. For instance, we organize the sensory input according to our innate structures of time and space, we make judgments about what categories particular objects or events belong to, and we make inferences to fill in the gaps. In other words, perception constructs a conscious experience out of the bits and pieces that come in through our senses. Kant's view of perception as a constructive process had an important influence on the thinking of the great nineteenth-century scientist Hermann von Helmholtz (Chapter 2), who helped lay the foundation for a scientific psychology.

According to Kant, transcendental idealism allowed for free will within a mechanical universe, and therefore humans needed a code of morality to guide their actions (Soloviev, 2018). In Kant's view of morality, when my choices affect no one but myself, I can do as I please. But when my decisions affect others, I must follow what he called the **categorical imperative**. This is *Kant's fundamental moral law that we must always act in such a way as to respect the humanity of other people*. This imperative is "categorical" in the sense that it absolutely applies in all cases and to all persons. Once you unpack the Kantian language, you see that he's talking about the Golden Rule of treating other people the way you want to be treated. However, Kant changes it from a recommendation to an absolute principle of morality that has no exceptions.

Although Kant lived at the end of the Enlightenment, he is viewed today as one of its most important philosophers who changed the course of modern philosophy. And as we'll see in upcoming chapters, his ideas have had great influence on the study of perception and cognition from the nineteenth century up to the present day. Although Immanuel Kant never traveled more than a few miles from his home, his ideas about the human experience continue to influence psychologists from around the world.

Modern Period: British Empiricism

The British have always had an ambivalent relationship with the rest of Europe. On the one hand, they view themselves as "mostly" European, but on the other hand they've always insisted on their independence from the Continent. Enlightenment philosophers in Continental Europe followed the lead of René Descartes, but British philosophers of the Enlightenment rejected both nativism and rationalism. Instead, they argued that we're born as blank slates and only acquire knowledge through experience. Historians generally credit Francis Bacon as the father of British Empiricism.

Francis Bacon

One of the great inventions of the Ancient Greek philosophers was the method of **deduction**. This is *a method of reasoning that applies general rules to specific cases*. Deductions are often framed in terms of syllogisms, which present the general rule (or major premise), the special case (or the minor premise), and the conclusion on three lines. Aristotle demonstrated this with his famous syllogism about Socrates:

- All men are mortal. (Major premise)
- Socrates is a man. (Minor premise)
- Therefore, Socrates is mortal. (Conclusion)

Medieval European scholars were enamored with this sort of syllogistic reasoning, and early scientists such as Galileo and Descartes relied on the method. However, one of the first thinkers of the Modern Period to challenge the usefulness of deductive reasoning in the realm of science was **Francis Bacon** (1561–1626), the *English philosopher and the father of British empiricism who introduced the method of induction*.

In the method of deduction, Bacon argued, the premises are assumed to be true. But how do we know that Socrates is a man or that all men are mortal? You can only know these things to be true from careful observation of the world. That is to say, all knowledge ultimately comes from our experiences. Through deduction, we can come to understand the characteristics of specific cases, but it can never lead us to an understanding of the general laws of nature.

If we want to unlock the secrets of nature, Bacon argued, then we have to run the reasoning process in reverse. In other words, we have to use *a method of reasoning that examines specific cases in order to discover general rules*. Bacon called this the method of **induction**. The way Bacon envisioned it, the scientist collected lots of examples of the item under investigation and searched for patterns among them. Using the method of induction, Bacon (1620/2007, I, 19) wrote, our knowledge will increase through a “gradual and unbroken ascent” from specific instances to more general principles about the world. He disparaged philosophers who used the art of deductive logic to “prove” their pet theories, likening them to spiders who spin their webs out of themselves (I, 95). The true scientist, in contrast, was like a bee collecting nectar from many flowers to make honey.

As a keen psychologist, Bacon (1620/2007) knew that even smart people can fool themselves. The **doctrine of the idols** is Bacon’s assertion that *the human mind is beset with biases that lead it to predictable errors* (I, 38–69). These idols keep us from understanding the world as it truly is. It’s important to note that Bacon is using the term *idol* in its original Greek sense of “image” or “phantom.” Bacon says that our perceptions don’t reflect the world as it truly is. Rather, our mind is like a crooked mirror that distorts its reflections. However, if we’re aware of these idols, we can find ways to overcome them.

Bacon’s doctrine of the idols challenged the prevailing notion that the human mind was essentially rational even though it could be led astray by the passions (Smith, 2000a). Instead, he pointed out that merely taking an intentional stance to think in a rational manner wasn’t enough, because the idols can deceive us into believing we are reasonable when in fact we’re not. Bacon’s doctrine of the idols presaged by more than four centuries the recognition of perceptual and cognitive biases that are the mainstay of any cognitive or social psychology course.

Francis Bacon had a great impact on philosophy and science in his own day, and his influence continues to the present (Smith, 2000a). Among his near contemporaries, both Descartes and Leibniz praised Bacon’s insights, although Spinoza dismissed his method of induction. A few generations later, Kant

praised Bacon as a founder of the modern era and dedicated his *Critique of Pure Reason*



Jacobus Houbraken (1698–1780), via Wikimedia Commons

Photo 1.13
Portrait of Francis Bacon

to him. British scientists in particular recognized the power of the inductive method and adopted it in their work. However, induction didn't replace deduction altogether, as Bacon had advocated. Instead, what developed was a scientific method that incorporated both inductive and deductive reasoning. The Baconian ideal of scientific progress was especially embraced by American psychologists in the twentieth century, who sought to develop an experimental psychology that would be useful for society.

John Locke

In his 1690 *Essay Concerning Human Understanding*, **John Locke** (1632–1704) challenges us to consider the source of our knowledge:

Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas: How comes it to be furnished? . . . To this I answer, in one word, from experience. (Locke, 1690/2004, II.i.2)

Our minds are void of knowledge at birth, according to Locke, but as we go through life, our experiences are written on this blank sheet, and our understanding of the world is built up as we associate new experiences with previous ones. Thus, we know John Locke as the *British empiricist philosopher who developed a mental philosophy known as associationism*.

Because we experience the world through our senses, nothing can be in the mind that isn't first in the senses. Furthermore, each of us has only limited experience with the world, so our knowledge of it must be incomplete. But Locke did believe the scientific method was the most reliable way of gaining accurate knowledge about the world.

Although the mind is empty of content at birth, Locke (1690/2004) said, it does contain innate processes, or faculties, for organizing the information that is brought in. In Locke's view, we have two types of senses:

- *Outer senses* provide us with information about the outside world. You see the bacon frying in pan, and you hear it sizzle in the hot oil. You smell the bacon, you taste it, and you feel pain when it burns your tongue. Locke uses the term *sensation* to refer to experiences brought into the mind by the outer senses (II.i.3).
- *Inner senses* tell us what's happening inside our bodies and minds. You feel hunger. You experience a strong desire to eat something, and you imagine the taste of cooked bacon. Locke uses the term *reflection* to refer to experiences brought into the mind by the inner senses (II.i.4).

Perception and memory then were built up from the combination of simple sensations and reflections.

The natural philosopher Robert Boyle (1672–1691), a longtime friend, had introduced Locke to the new atomic theory, which claimed all matter was composed of tiny, indivisible particles. These simple atoms then combine to create all the complex material objects of the world. Locke applied this atomic theory of the material world to the mental world, and he viewed the basic unit of thought as an *idea* (Introduction.i.8). According to Locke, sensations and reflections make up *simple ideas* (II.iii.1). These simple ideas then combine to form *complex ideas*. When we pick up an apple and bite into it, we experience many sensations—redness, roundness, heaviness, crispness, sweetness, tartness. All of these simple ideas combine together to create the complex idea of “apple.” *The theory that knowledge develops as simple ideas combine to form complex ideas* is known as **associationism**.

Locke (1690/2004) argued that we can have complex ideas of things we've never experienced as long as we've stored all of the simple ideas contained in it (II.xii.1). Think about all the fantastic beasts of cultures around the world—they're always made up of familiar parts. A unicorn is a horse with a horn. A centaur is half man, half horse. Angels have

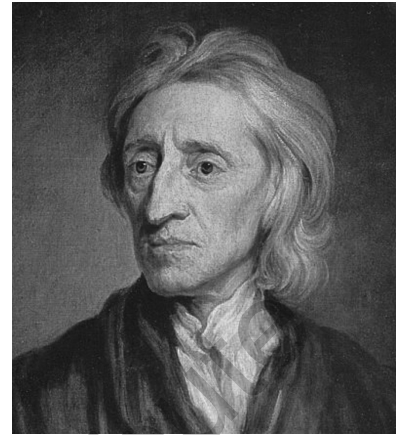


Photo 1.14
Portrait of John Locke

Godfrey Kneller (1646–1723), via Wikimedia Commons

human bodies with wings on their backs. Dragons are giant lizards with wings that exhale fire. No one has ever experienced a unicorn, centaur, angel, or dragon in the real world, and yet they're easily imagined.

Conversely, Locke (1690/2004) maintained that we can't have a simple idea without first having a sensory experience of it. To demonstrate this assertion, he offers the following thought experiment (II.ix.8). Consider a man born blind who has learned to identify a cube by touch. That is, he has a complex idea of "cube" that is composed of all the tactile sensations he's had while holding it. Now if his vision were somehow restored, Locke says, he'd be unable to identify the cube by sight alone, even though he knows what a cube is. Only when he picks up this mysterious object and identifies it first by touch will he know what a cube looks like.

Locke (1690/2004) warns us that we need to view our knowledge of the world as tentative. This is because knowledge is built from sensory experiences, and the senses don't portray the world objectively. He demonstrates this with the following thought experiment (II.viii.21). Fill three buckets with water—one hot, one tepid, and one cold. Put your left hand in the hot water and your right hand in the cold water. After a while, put both hands in the tepid water. Your left hand will tell you the water is cool, while your right hand will tell you it's warm. So our senses don't always accord with reality. Rationalists would argue that this is exactly why you can't rely on experience to provide accurate knowledge of the world. But empiricists like Locke say sensory experience is all we've got, and so we need to understand its limitations and use it wisely.

Subsequent British empiricists strove to work out the mechanics of how ideas are associated in the mind, and psychologists picked up the problem in the twentieth century. In exploring the limits of human knowledge, Locke saw himself playing a supporting role in the newly developing science. He also reminds us that all knowledge—even that of science—is only tentative, and that we may need to change our minds about what we think we know as new information comes in.

George Berkeley

George Berkeley (1685–1753; pronounced *BARK-lee*) was a man of science, but he was also a man of deep religious faith. So his conundrum was how to reconcile the mechanical universe with his Christian beliefs. While at Trinity College in Dublin, Ireland, he produced his two great philosophical works, his *New Theory of Vision* and his *Treatise*. After that, he gave up philosophy for religious and philanthropic work. Today, George Berkeley is known as an *Irish philosopher who did groundbreaking research on depth perception and promoted the philosophy of idealism*.

In his *New Theory of Vision*, Berkeley (1709/2002) calls to mind a sweeping view of a house, some fields, and a river. As you scan this panorama, you have no difficulty perceiving distance. However, the image on your retina is flat. Rationalist philosophers claimed that we used geometric patterns in the retinal image to make inferences about distances. But Berkeley disagreed, maintaining that we *learn* to make inferences about distance as we interact with the world.

Imagine baby Suzie playing on the floor. She sees a wooden block and crawls to it. Picking it up, she turns it about in her hand to examine its shape, and she squeezes it to find out that it's solid. Just holding it, she senses its weight. According to Berkeley, properties of an object like size, shape, and heaviness can only be known through the sense of touch. He also claimed that we learn to judge distance in a similar manner—the image of the object looms large when Suzie brings it close to her face, and it shrinks when she holds it at arm's length. Berkeley's theory of depth perception was revolutionary for its time and still has relevance to vision researchers today.

In his *Treatise*, Berkeley (1710/2002) presents a radical solution to the mind-body problem. He understood that the clockwork universe left no room for God or free will, and so it contradicted the teachings of Christian theology. His purpose wasn't to reject science, but



John Smybert (1688–1751), via Wikimedia Commons

Photo 1.15
Portrait of George Berkeley

rather to save it from the skeptics and atheists. In other words, he sought a way to reconcile science with religion. He believed the problem lay in materialism, which in his view included Cartesian dualism and its contention that the material and spiritual worlds interacted with each other. It was materialism in any form, he maintained, that gave skeptics and atheists fodder for their arguments. The solution, Berkeley thought, was **idealism**. This is *the philosophical stance that the world consists solely of minds and the ideas they produce*. Berkeley wasn't denying the existence of a physical universe, only that it was composed of matter. Rather, every object in the universe exists because it's an idea in the mind of God.

As perceivers, Berkeley (1710/2002) maintains, our knowledge begins at sensation, and we can't say with certainty what causes those sensations. In fact, there are good reasons *not* to assume sensations are representations of a material world. After all, when we dream or use our imagination, we have perceptions that are clearly not representations of material objects. Furthermore, he contends, even the scientists can't come up with a clear definition of matter, admitting that all we know of the material world is what we perceive through our senses.

In Berkeley's (1710/2002) philosophy, then, the world consists only of things that are perceived, which he calls *ideas*, and agents that perceive, which he calls *spirits*. Ideas are passive, simply the objects of perception. Spirits are active in that they not only perceive ideas but can also willfully create them. Humans are spirits in that their essence lies not in a material body—which doesn't exist anyway—but rather in an immaterial soul. Humans can create perceptions through memory or imagination. However, their senses also present them with perceptions originating from a higher spirit, namely God. Berkeley doesn't reject the existence of a physical universe, only one that's material. In his view, the laws of nature still hold in his idealist world. It's just that they don't describe the behavior of matter in motion but rather the regularities of our perceptual experience, which God has created for us. Thus, Berkeley believes he has made science consistent with religion and defeated the skeptics and atheists.

The general consensus among philosophers today is that Berkeley's arguments for an idealist solution to the mind-body problem are fundamentally flawed (Robinson, 2000). However, his theory of vision does still have relevance in psychology. The question of whether various aspects of perception are learned or innate is one that's still discussed by psychologists today. In particular, the topic of perceptual learning will come up again in Chapter 13 when we review the work of Eleanor Gibson. Although psychologists have rejected Berkeley's idealism, they've nonetheless found ample inspiration in the logic of his theory of vision.

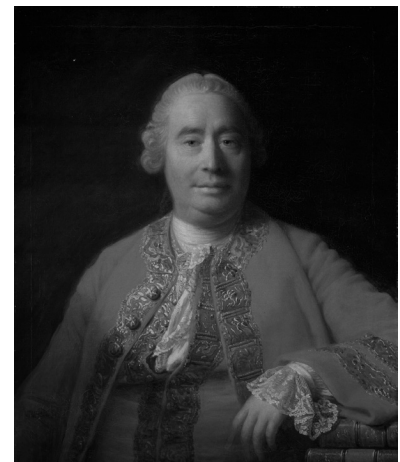
David Hume

David Hume was one of those atheists Berkeley was so concerned about. Hume clearly understood there could be no God in a mechanical universe. He was inspired by Locke's associationism, but he felt Locke had succumbed to Cartesian dualism. Seeing himself as the Isaac Newton of mental philosophy, **David Hume** (1711–1776) was a *Scottish philosopher who developed laws of mental association*.

The **laws of association** are *Hume's description of how simple ideas adhere to each other to form complex ideas*. In his *Treatise of Human Nature*, Hume (1739/1896) maintained that we tend to associate ideas under the following circumstances:

- *Resemblance*: when two ideas resemble each other.
- *Contiguity*: when two ideas co-occur in time or space.
- *Causation*: when two ideas follow one after the other.

In physics, Newton's laws of gravitation and motion are basic, Hume maintained, so they need no explanation. Likewise in his theory of the mind, the three laws of association are basic, and he expects his readers to accept them as self-evident.



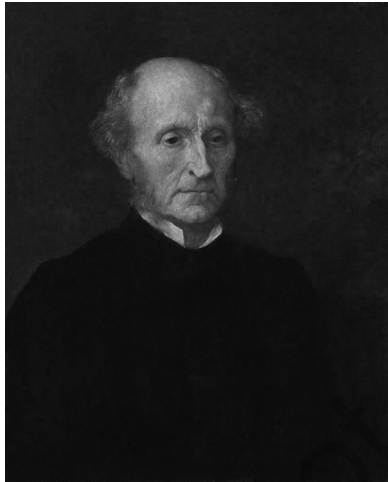
Alan Ramsay (1713–1784), via Wikimedia Commons

Photo 1.16
Portrait of David Hume

In his *Enquiry Concerning Human Understanding*, Hume (1748) further develops his thoughts on association by causation. Using the example of two billiard balls, he illustrates how causation is inferred and not perceived. We observe a white ball rolling toward a red ball, and just when the two come into contact, the white ball stops and the red ball moves. Even though we believe the white ball *caused* the red ball to move, all we really know is the contact of the two balls and the resemblance of their motion. So we don't actually observe causation—we infer it instead. To Hume, the perception of cause and effect is merely a custom of thinking and nothing more.

Hume contributed other important ideas to psychology as well. We tend to see reason and emotion as opponents battling for control of our minds, but Hume challenges this notion. Reason is just thought, and thinking alone cannot move us to act—only feeling can do that. As he famously stated, “Reason is . . . the slave of the passions, and can never pretend to any other office than to serve and obey them” (Hume, 1739/1896, II.III.III.4). This view of emotion as the driving force of behavior is remarkably modern. It accords with Freud's theory of motivation (Chapter 7), and since the late twentieth century, many psychologists have recognized the role of intuition and emotion in decision making.

Hume's laws of association laid the foundations for several early schools of psychology (Rychlak, 1998). Although his philosophical works were largely dismissed during his own lifetime because of their skeptical and atheistic stance, he nonetheless had considerable influence on following generations of philosophers and scientists. John Stuart Mill further developed Hume's laws of association. Immanuel Kant recognized Hume's influence as he struggled to reconcile rationalism with empiricism in his *Critique of Pure Reason*. Charles Darwin also reported finding inspiration in Hume as he was developing his theory of evolution by natural selection. Furthermore, Hume's philosophy still has considerable relevance to twenty-first-century psychology.



National Portrait Gallery via Wikimedia Commons

Photo 1.17
Portrait of John Stuart Mill

John Stuart Mill

In his *System of Logic* (1843/2009), **John Stuart Mill** (1806–1873) laid out his vision for a new psychology, challenging the prevailing view that a study of human behavior and thought processes was beyond the reach of the natural sciences. Instead, he maintained the materialist position that both mind and body were subject to the laws of nature, and hence amenable to study in a scientific fashion. Thus, John Stuart Mill is known as the *British empiricist philosopher who declared that psychology was ready to become a natural science that could be used to improve individual lives and society as a whole*.

In his *Autobiography*, Mill (1873/2003) takes on the question of how to reconcile free will with a materialist worldview. If there is nothing but a physical world, then all events have prior causes and so free will should be impossible. And even if we take a dualist worldview, we still have the question of how free will in the spiritual world can influence our behaviors in the materialist world. To Mill, this contradiction is only apparent, and he makes *the argument that human free will can still exist even in a fully deterministic world*. This position

is now known as **compatibilism**. Unlike billiard balls transferring their motion or planets orbiting the sun, many factors play a role in determining human behavior, including our past experiences, our present emotional state, aspects of the current situation, and our expectations for the future.

According to the compatibilist position, we could in principle know all the antecedents of a behavior, but in practice it's simply not possible (Hart, 2017). We're faced with a multitude of decisions in our daily lives, and as long as there's the possibility that we could have chosen otherwise, we can say that we have free will. Which choice you make is ultimately determined by the complex interplay of many factors. And if any of them changed even in the slightest, your decision may be different. Even though all our decisions are determined, the fact that we might have chosen otherwise means that we have free will. It's up to you to decide (or maybe it's not) whether you can accept this definition of free will. Although many

philosophers find this argument weak, there are also plenty who accept some form of the compatibilist position.

For Mill (1873/2003), compatibilism provides a way of thinking about psychology as a natural science. Astronomers can predict with great accuracy the movements of the planets because the laws that govern them are simple and few. Psychologists, though, will never be able to predict human behavior so precisely because the laws are complex and many in number. At best, we can only make tentative predictions about how someone will act, but the fact that we can do even this indicates that there are underlying regularities.

Mill (1873/2003) also contends that some of the laws that govern the operation of the mind are already known. He assumes the associationist principles of Locke and Hume, but he adds a new process based on analogy with chemistry, in which atoms combine to form molecules with entirely new properties, such as the gases hydrogen and oxygen combining to form water. Mill's argument that complex ideas can have features not found in any of its components is known as **mental chemistry**. This idea presages thinking in the Gestalt school of the early twentieth century.

According to Mill (1873/2003), these laws of the mind form the foundation for a natural science of human behavior. Furthermore, this science can have practical consequences. First, we can develop better ways of raising and educating children so that they'll grow up to be happy persons who are contributing members of society. Furthermore, as we come to understand the laws of human interactions, we can restructure society to ensure social harmony and moral behavior. In other words, we can use psychology to achieve the greatest good for the greatest number. In this sense, Mill's psychology underlies all of his political philosophy and social commentary.

Mill believed that people's lives can be improved through better education and the optimal organization of society. Furthermore, he maintained that a scientific psychology would lead the way forward. Very much ahead of his time, he argued for equal rights for all people, including women and the native populations of the British colonies. As we'll see in the chapters to come, psychology has often played an important role in building a more equitable society, just as John Stuart Mill had envisioned.

Looking Ahead

Like rebellious teenagers, modern psychologists often disown their philosophical heritage. But in fact, philosophers work in tandem with experimental psychologists in the quest for a science of the mind. By the nature of their work, psychologists tend to focus on narrow questions that can be tested with the tools of science. It's then the job of the philosophers to read broadly across the psychology literature, integrating findings and considering their implications. In a sense, the philosophers have the harder job, since they need to know both the philosophy and the science of the mind. However, as we'll see in the following chapters, many of the great psychologists of the twentieth century were both philosophers and scientists.

Today, philosophers of mind mostly work in a field known as **cognitive science**, which is *an interdisciplinary approach to studying the mind and how it works*. Cognitive scientists are drawn from six different fields:

- Philosophy
- Psychology
- Anthropology
- Linguistics
- Artificial intelligence
- Neuroscience

Each of these fields provides a different perspective on the nature of the mind, and the hope is that the combined effort of all six branches can provide us with an understanding that is both broader and deeper than can be obtained by any one approach alone.

Several modern philosophers of mind have made it into the public consciousness, as it were, by publishing popular books on the subject. Here are but a few examples:

- *Marvin Minsky* (1927–2016) was a philosopher who believed that someday machines will become just as intelligent as humans if not more so.
- *John Searle* (Born 1932) is a philosopher who believes that consciousness is a unique property of living things, and that nonbiological machines can never become sentient.
- *Daniel Dennett* (Born 1942) is a philosopher of mind who's a staunch defender of compatibilism in an era when most cognitive scientists reject the existence of free will.
- *Patricia Churchland* (Born 1943) is a philosopher who believes that once we fully understand the brain, concepts like “free will” and “mind” will become meaningless.

Many of these modern philosophers have a presence on the internet in the form of YouTube videos and TED Talks, so you can hear them present their ideas in their own words.

CHAPTER SUMMARY

In this chapter, we surveyed nearly twenty-five centuries of philosophy, starting with the Ancient Greeks in the fifth and fourth centuries before the Common Era (BCE). Socrates introduced a method of inquiry that involved questioning everything, and it became a mainstay in the Western philosophical tradition. His student Plato was a rationalist who believed that knowledge was innate and had to be discovered through logical reasoning. In contrast, Plato's student Aristotle was an empiricist who believed that all knowledge is gained through experience. The rationalist-empiricist debate continues to the current day. Late in the Classical Period, the murder of the woman philosopher Hypatia came to symbolize the struggle between religion and science that also extends to current times. During the Medieval Period, the Catholic Church severely circumscribed intellectual inquiry in Europe, but in the Islamic world, philosophy was valued by the ruling elite if not the religious leaders. During the centuries of the Islamic Golden Age, philosophers such as Al-Kindi, Avicenna, and Averroes not only maintained classical learning but also developed it further. As the works of the Islamic philosophers gradually made their way north, a Renaissance began in Europe that eventually led to the

Modern Period. On the continent, philosophers tended to be rationalists, and their disputes centered on the mind-body problem (Table 1.1). René Descartes proposed an interactionist dualism, while Thomas Hobbes favored materialist monism. Taking middle positions, Baruch Spinoza proposed dual-aspect monism, whereas Gottfried Leibniz favored psychophysical parallelism. Finally, Immanuel Kant developed a philosophy that attempted to reconcile the rationalist and empiricist division. On the British Isles, philosophers were generally empiricists who sought to understand how the mind comes to be formed from its experiences. Francis Bacon introduced the inductive method, in which scientists build their understanding of nature through the inspection of many examples. John Locke argued that knowledge is built from the association of sensory impressions, while George Berkeley analyzed the ways that visual perception is learned through experience and David Hume investigated the types of associations that lead to new knowledge. Finally, the nineteenth-century British philosopher John Stuart Mill declared that psychology was ready to become a natural science that could be used to improve individual lives and society as a whole.

Table 1.1 Various Positions on the Mind-Body Problem

Dualism	The body belongs to the physical world, and the mind belongs to the spiritual world.
Interactionism	The physical body and the spiritual mind interact with each other.
Parallelism	The physical body and the spiritual mind run in parallel without interaction.
Monism	The body and the mind belong to the same world, either physical or spiritual.
Materialism	Only the physical world exists, so the mind is physical as well as the body.
Idealism	Only the spiritual world exists, and the physical world is nothing but a perception.
Double-aspect monism	The physical and spiritual are two facets of the same universal substance.

DISCUSSION QUESTIONS

1. What are the two main branches of philosophy? What sorts of questions does each ask?
2. Discuss the difference between rationalism and empiricism, clarifying the assumptions that usually go along with each position.
3. Discuss the similarities and differences among the Ancient Greek philosophers Socrates, Plato, and Aristotle.
4. Discuss the contributions to psychology made by the Islamic philosophers Al-Kindi, Avicenna, and Averroes.
5. Discuss the similarities and differences among the Continental Rationalists Descartes, Hobbes, Spinoza, Leibniz, and Kant.
6. Discuss the similarities and differences among the British Empiricists Bacon, Locke, Berkeley, Hume, and Mill.
7. Compare and contrast systems of thought between the Continental Rationalists and the British Empiricists.
8. Explain Descartes's method of doubt and how it led him to Cartesian dualism. What are the strengths and weaknesses of this approach?
9. Discuss the motivations behind the responses that Spinoza, Hobbes, Leibniz, and Berkeley made to Cartesian dualism.
10. Compare and contrast the various solutions to the mind-body problem offered in this chapter. What sorts of assumptions underlie each position?
11. Explain the concepts of free will, determinism, and compatibilism. For each of the philosophers discussed in this chapter, make an inference about which position he or she would support, providing evidence for each inference.
12. Among all the philosophers we met in this chapter, whose ideas resonated most with your worldview? Explain.

ON THE WEB

You can find plenty of video clips on YouTube that discuss the ideas of each of the philosophers we met in this chapter. These videos are of variable quality, so watch with a skeptical eye. The 2009 movie *Agora* about the life and death of Hypatia may be available on internet streaming services. Keep in mind that

this is a fictionalized account, but you can judge for yourself whether the themes are relevant to modern society or not. If you'd like to get a taste of modern philosophy of the mind, watch videos by **Marvin Minsky**, **John Searle**, **Daniel Dennett**, and **Patricia Churchland** on YouTube and TED Talks.