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Often a man finds a theory that explains things and he builds atop that theory, finding all the right answers . . . only the basic theory is wrong. But that’s the last thing he will want to admit.

Louis L’Amour, Treasure Mountain

Mrs. Gribbin moved into the bush cabin that very night. I tried to talk her out of it; I sometimes need a place to lay low for a few days. “Why don’t you just give me the whole manuscript right now?” I asked. “Save you the trouble of reading it out to me page after page.” But no, she wouldn’t. She said there was stuff in it that she had to explain and we’d just do it one chapter at a time.

When I showed up in the morning she was sitting at the table, ragged yellow pages scattered everywhere. I tried to make small talk. The old lady grunted once or twice. The first intelligible thing she said was “Enough talking,” as she waved a fistful of those dog-eared pages at me. “That old book of yours is hopelessly outdated and mistaken and missing all kinds of important stuff and . . . never mind. Just turn on your recorder and pay attention.”

I pressed the little circle at the bottom left corner of the new digital recorder that I had bought just in case. Wisely, I had read the instructions.

The old lady started to talk. I couldn’t always tell for sure when she was actually reading or just talking. This is what she said.

WHAT MRS. GRIBBIN SAID: THIS BOOK

This book, she explained as she smoothed out a clutch of manuscript pages on her knees, summarizes what psychologists know and believe about human learning. I noticed, then, that the one-eyed cat, the one who had suddenly appeared at the bush cabin a couple of months ago and who had always been too wild to touch — only tame enough to feed if I kept my distance — had buried himself under the manuscript. Strangely, he was allowing Mrs. Gribbin to scratch his ears. Change of heart, I thought, reaching over gingerly to finally pet him. He growled and tried to bite me again. The old lady said, “That’s not nice, Schrödinger,” but her voice seemed to be saying, “Nice kitty.”1 Among other things, this text presents a historical view of the development of psychological theories related to human learning, the old lady continued. It describes the major principles and the practical applications of each theory, and it evaluates each theory’s main strengths and weaknesses.

1 “Schrödinger?” I said. “That miserable cat doesn’t have a name.” “He’s always been Schrödinger, no matter where he’s been,” she retorted. “Please don’t interrupt again.” I shut up.
Objectives

Tell your readers, said Mrs. Gribbin, that this first chapter is a bit of a preamble: It defines important terms and sets the stage for what comes later. Explain to them that after studying this chapter, they should know with stunning clarity:

• What is meant by the term learning.
• How theories are developed and can be evaluated.
• What terms such as structuralism, functionalism, behaviorism, and cognitivism mean.
• What the principal information-gathering methods are in psychology.
• What placebos and nocebos are and why they might be important in psychological research.

THE PSYCHOLOGY OF LEARNING

Let me begin at the beginning, said the old lady. Psychology is the science that studies human behavior and thinking. It is often defined as the science that studies the mind and mental processes. Among other things, it looks at how experience affects thought and action; it explores the roles of biology and heredity; it examines consciousness and dreams; it traces how people develop from infants into adults; it investigates social influences; it explores the mysteries of the human brain. Basically, psychology tries to explain why people think, act, and feel as they do.

Of course, this book doesn’t tackle all of psychology but is limited to psychological theories that deal with human learning and behavior—and animal learning, too, because studies of learning in animals are inextricably linked with the development of theories of human learning. So, it is important from the outset to know what learning is.

Knowing and Consciousness

What do we learn? What do we know? What is knowledge?

These questions define the branch of philosophy known as epistemology. Epistemology asks how we know the world. It also asks how we know that what we think is real actually is.

Some of the ancient Greek philosophers, such as Aristotle (384–322 BC), answered these questions by proposing the theory that whatever is out there in the world is copied onto the mind. The mind, simply defined, is the set of cognitive (intellectual) faculties involved in human consciousness—our ability to do things such as perceive, feel, think, remember, and imagine. What happens, Aristotle explained, is that the act of perceiving something results in a copy that we then somehow know. Thus, we can never know reality directly; all we know is indirect, resulting from our knowledge of copies of reality. We know not so much because of our senses, he argued, but more as a result of our reason. Thus, the educated person, whose

2 Boldfaced terms are defined in the glossary at the end of the book, starting on page 456. Unlike most of the text, glossary items and many of the footnotes aren’t Mrs. Gribbin’s words but mine. (GRL)
mind is presumably better able to reason, knows reality more clearly than does the less educated person. “The roots of education are bitter,” said Aristotle, “but the fruit is sweet.”

Plato (427–348 BC), another well-known Greek philosopher who was actually Aristotle’s teacher, believed that we know only ideas (he and Aristotle disagreed on the nature of ideas). Hence, the importance of educating people, of making them into thinkers and philosophers. “And may we not say,” asked Plato, “that the most gifted minds, when they are ill-educated, become the worst?” (Plato, 1993, p. 491).3

But, asked other philosophers, how do we even know that there actually is a reality out there if all we have are copies in our minds. Maybe, some suggested, reality exists only in our minds, a belief sometimes referred to as idealism as opposed to materialism. Whereas materialism holds that everything that actually exists is physical (or material), idealism suggests that ideas are the only knowable reality.

These issues are at the core of a big issue in psychology: the mind–body problem. Simply stated, this problem asks about the relationship between the mind and the body. How can something purely physical, such as a cat, produce something purely mental, such as the idea of a cat? And how can the idea of a cat be translated into an act, such as that of looking for a cat?

French philosopher and mathematician René Descartes (1596–1650) presented one of the earliest and most influential resolutions for this problem, at the same time penning one of the most widely known and repeated phrases ever produced by any philosopher: I think; therefore I am. Descartes arrived at this insight by first pretending that everything he was thinking was not real—was simply like a dream. He writes:

But immediately upon this I noticed that while I was trying to think everything false, it must needs be that I, who was thinking this, was something. And observing that this truth “I am thinking, therefore I exist” was so solid and secure that the most extravagant suppositions of the skeptics could not overthrow it, I judged that I need not scruple to accept it as the first principle. (Anscombe & Geach, 1954, pp. 31–32)

I think; therefore I am. The Latin form of this sentence, the language in which learned philosophers and scientists of Descartes’s age wrote, is Cogito, ergo sum. As a result, this principle is commonly referred to as Descartes’s Cogito. One very important conclusion that flows from this principle, said Descartes, is that all ideas must come from God because humans are clearly not perfect enough to generate them on their own (Vrooman, 1970). Hence, the mind and the body must be separate, insisted Descartes. Furthermore, the existence of ideas proves that what we think is out there actually is out there because God would surely never give us ideas that are false. Thus, ideas are pure and innate because they come from God. In contrast, the body is physical or material; its functioning is like the functioning of a machine.

It follows that there are two basic substances in the world, says Descartes: material and immaterial. The material includes things such as bodies, bats, and beverages, all of which actually exist in space and all of which can be compared to machines in their functioning. The

3 In this text, references are cited in the style approved by the American Psychological Association (APA) – that is, the name of the author(s) is followed by the year of the relevant publication. The list of references at the end of the book provides complete information about the source.
immaterial includes the mind or, to use what Descartes considered an equivalent term, the soul. The soul is more closely related to God than to a machine. Thus, mind and body are fundamentally different and separate. This Cartesian (referring to Descartes) position is labeled dualism. Descartes is referred to as an interactive dualist because he believed that even though the mind and the body are separate (are dual, in other words), they are, in a sense, united in the brain. The brain allows the body to influence the mind and the mind to influence the body – hence, interactive dualism.

Descartes thought that communication between body and mind was accomplished by means of a small organ in the brain known as the pineal gland. Why the pineal gland? Because as far as Descartes knew, the pineal gland was the only structure in the brain that did not have a duplicate. Most other brain structures are duplicated in each of the brain’s halves (called hemispheres; see Chapter 5 for a discussion of the anatomy and functions of the brain). We now know that Descartes was wrong about the functions of the pineal gland, which is mainly involved in regulating melatonin, the hormone that is involved in maintaining sleep patterns.

Descartes’s speculations about the mind and the body underlined a very important problem for psychologists: What is consciousness? Put another way, how are physical sensations translated into our minds so we become aware of reality?

One way around this problem is simply to ignore mind or consciousness, which cannot be observed directly, and instead look for the laws that govern observable human behavior. In fact, this solution has been the basis for a great deal of early research and theorizing about learning.

Defining Learning

Ask someone what learning is, and the most likely answer will have something to do with the acquisition of information. If I tell you that the bird over there is a red-breasted nuthatch and the next time you see such a bird you correctly identify it as a red-breasted nuthatch, I might infer that you have learned something. In this case, the nature of the information that you have acquired is obvious. Also note that your behavior has changed as a result of experience. In this case, the specific experience of my telling you that this bird is a red-breasted nuthatch affects your response when you next see a bird of this species.⁴

Disposition

In many cases, what is acquired during learning is not so obvious. For example, if Mrs. Toch laughs sarcastically at Helen’s attempts to pronounce “procrastinate,” some of her other students might subsequently be far more hesitant to try to pronounce difficult words. They have learned to be wary. Put another way, there has been a change in their disposition – that is, in their inclination to do or not to do something – rather than observable changes in actual behavior.

⁴ As Old Lady Gribbin spoke of red-breasted nuthatches, she pointed toward the window where you can see the feeding platform and, sure enough, a red-breasted nuthatch was just then retrieving a sunflower seed. I now knew she wasn’t reading everything she was saying.
behavior. Changes in disposition have to do with **motivation**. Motivation looks at the causes of behavior; the conscious or unconscious forces that underlie our actions. Motivation is discussed in detail in Chapter 9.

**Capability**

Learning involves not only changes in disposition but also changes in **capability** – that is, changes in the skills or knowledge required to do something. Like changes in disposition, changes in capability are not always observed directly. For example, several of Mrs. Toch’s students might well have learned how to pronounce “procrastinate” when she corrected Helen. But these changes may not be apparent unless these students are given the opportunity to manifest them. The inference that dispositions or capabilities have changed – in other words, that learning has occurred – will always be based on **performance**, which is the act of carrying out an action, of *behaving*.

**Performance**

Psychologists usually look for evidence of learning in the changes that occur in people’s behaviors as a result of experience. But not all changes in behavior are examples of learning. If someone smacks you on the head or feeds you strange drugs, your behavior might change in bizarre ways. Hubert claimed this is what happened to him when, thinking there was a pair of small but lethal dragons in his closet, he ran madly down the street shouting for help. This was a striking change in Hubert’s behavior, but to say that this change is an example of learning is to stretch the term beyond reasonable limits.

Behavior changes that are the temporary results of fatigue or drugs do not illustrate learning. Similarly, changes that are mainly biologically determined, such as physical growth or sexual maturation, or that result from injury or disease (especially of the brain and other parts of the nervous system) are not examples of learning.

**The Definition**

To summarize, **learning** is defined as all relatively permanent changes in potential for behaviors that result from experience but are not caused by fatigue, maturation, drugs, injury, or disease. Strictly speaking, of course, learning is not really the actual or potential changes that we observe. Rather, learning is what happens to the organism (human or nonhuman) as a result of experience. Changes in behavior are simply evidence that learning has occurred (see Figure 1.1).

Note that the definition specifies changes in **potential** for behavior rather than simply changes in behavior. Why? Because, as we saw, the permanent effects of experience are not always apparent. And this is true even among nonhuman animals. In a classic experiment, Buxton (1940) left rats in large mazes for several nights. These mazes had start boxes at their beginnings and goal boxes at their ends, but there was no food or other reward in the goal boxes. After these few nights in the
maze, there was no evidence that the rats had learned anything at all. Later, however, Buxton gave them a small taste of food in the goal boxes and then placed them in the start boxes. Now more than half of them ran directly to the goal boxes without making a single error! Clearly, the most clever of these rats had learned a lot during the first nights in the maze. But their learning was latent rather than actual (latent means dormant or hidden rather than apparent). That is, the rats’ learning was not evident in their performance until there had also been a change in their dispositions – in this case, a change in their reasons for going to the goal box.

So, learning may involve changes in capability (in the capacity to do something) and also in disposition (in the inclination to perform). And evidence that learning has occurred may also depend on the opportunity to perform; hence, the need to define learning as a change in potential for behavior rather than simply as a change in behavior. For example, as you read this book, some astounding changes may occur in your capabilities. That these changes should mostly remain potential, becoming apparent only if you are given the opportunity to perform (on a test, for example), makes them no less real.

**SCIENTIFIC THEORIES**

Behavior is a complicated thing; there are all sorts of factors involved in determining what you do (or don’t do). The main task of the learning psychologist is to understand behavior and

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5 At this point, the old lady asked me whether I needed a break – should we continue later – but I said no, it was okay, and I didn’t really think the reader would need a break yet. Well, they won’t ask if they do, she said. That’s the way students are. Besides, she continued, some of the brighter ones might be asking themselves some philosophical questions right now,
behavior change. And from understanding comes the ability to predict and sometimes to control, both of which are useful and important functions. For example, teachers’ predictions about how well students are likely to perform are critical for decisions relating to assessment and instruction.

To understand something as complicated as behavior, psychologists need to simplify, to discover regularity and predictability, to invent metaphors (comparisons). Man looks for order where there is none, said Francis Bacon (perhaps not yet realizing that woman is as guilty of this as man). And Bacon may have been correct that humans would look for order even if there were none – that they seem to have a need to find order. But we have long assumed that there is considerable order in the world. This assumption has guided our research and colored our theories. Discovering this assumed regularity and trying to explain it is what theory building is all about.

Humans like to build theories. Years ago, they devised theories about the lights in the sky, about why babies look like their parents, about the shape of Earth – which some believe might be flat. Often, these theories were expressed as metaphors: The sun is a chariot racing across the sky; dreams are the adventures of souls walking in parallel worlds while the body sleeps. Modern scientific theories can also often be explained and understood as metaphors: The heart is a pump; the brain is a computer; the eye is a camera. In Chapters 6 and 11, we look in more detail at metaphors in psychology.

**Theories, Principles, Laws, and Beliefs**

A scientific theory is a collection of related statements whose main function is to summarize and explain observations. In a simplified sense, theory building works something like this: Theorists begin with certain assumptions (unproven beliefs) about human behavior, perhaps based partly on their observations of regularity or predictability in actions. As a result, they develop tentative explanations for what they observe. This leads them to believe that certain relationships exist – that if this, then that. These if–then statements, or educated predictions, are called hypotheses. Now the theorist gathers observations (data) to test the validity of the hypotheses. The most useful theories in scientific research are those that lead to testable hypotheses. Nontestable hypotheses have little place in scientific theories. Hypotheses that are supported by evidence permit theorists to make generalizations – statements that summarize relationships and become part of the theory. Some of these statements might take the form of principles; some might be expressed as laws; others might simply be beliefs.

so they should maybe take a break and try to answer them. When I asked her what these philosophical questions might be, she said free will and determinism. She explained that this was another of those really big issues in philosophy and in psychology. Determinism, she explained, is the belief that all behaviors result from identifiable causes – even if we don’t know what these causes are – and that they don’t result from the exercise of free will. Lots of philosophers think the two are incompatible, she said, meaning determinism and free will. She said that learning theorists pretty well have to assume that behavior is determined. That’s one of the essential assumptions of science, she said, shaking her head and making her long braids fly wildly. I hadn’t noticed them before. So, does that mean there’s no free will? I asked, and she replied, well, that’s the philosophical question. Then, she went back to her pages.
**Principles** are statements that relate to some predictability in nature or, more important for psychology, in behavior. For example, principles of learning describe specific factors that affect learning and remembering. A very general principle of learning, which we discuss in more detail in later chapters, might be worded as follows: Behaviors that are followed by certain agreeable consequences, such as food, sex, or praise, become more probable.

Theorists have long hoped that a few simple principles of this kind might explain vast chunks of human behavior. For example, this principle seems to be widely evident. It is apparent in the fact that birds come to winter feeders; that dogs that are fed, petted, or praised quickly learn to roll over if you want them to; that children who are rewarded for studying hard continue to study hard. But as we will see in Chapter 5, not all children study harder when they are praised or given high grades for so doing; not all dogs willingly roll over for a bone; and some birds shy away from the best stocked of winter feeders. By definition, principles are probabilistic and uncertain. Although they represent generally agreed-upon conclusions based on what seems solid evidence, they are nevertheless tentative. With new evidence, principles are subject to change.

Such is not the case with respect to laws. **Laws** are statements whose accuracy is beyond reasonable doubt. They are conclusions based on what seem to be undeniable observations and unquestionable logic. Unlike principles, laws are not ordinarily open to exceptions and doubt. For example, the statement \( E = mc^2 \) is a law. However, laws should not be confused with truth because any law can be refuted given sufficient contrary evidence. By definition, truth can never be found to be untrue.

**Beliefs** describe statements that are more private and more personal than are principles or laws. For example, the notion that redheaded people are more prone to anger than are dark-haired people is a belief rather than a principle or a law. Note that, like principles and laws, beliefs attempt to describe general facts. Unfortunately, they are often treated as though they were as universal as principles (or even laws). Beliefs are often formed very early in life, and they are not always based on objective observation or reliable logic. Furthermore, they tend to be maintained even in the face of strong contradiction (Dagnall, Denovan, Drinkwater, Parker, & Clough, 2017). They act as a sort of filter through which people view and understand the world; beliefs guide thought and action.

**Common Misconceptions and Folk Beliefs**

All societies have developed large bodies of commonly held beliefs about human behavior. These beliefs are part of what Kelley (1992) calls **bubba psychology** (bubba means grandmother in some Eastern European languages). Hence, the term indicates an intuitive sort of **folk psychology**, also sometimes labeled **implicit or naïve psychology**. Folk, or bubba, psychology

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6 How about *fake truth* I interrupted. “Not possible,” said Old Lady Gribbin emphatically. “That’s an oxymoron. That’s like saying ‘All generalizations are false. Except this one.’” I noticed that the cat had left. I couldn’t see him anywhere but I could not recall anyone opening the door. “Where’s the cat?” I asked, but the old lady ignored my question.

7 When I pointed out to Old Lady Gribbin that in this age of political correctness it isn’t wise to single out identifiable groups (like grandmothers or maybe even monkeys) as examples of anything that might seem in any way negative, she shot back...
should not be confused with **pop psychology**. Pop (or popular) psychology refers to widely disseminated and generally accepted beliefs and theories about human nature that are passed off as the results of sound academic research, but are instead based on simplistic and often inaccurate interpretations that are popularized (hence *pop*) through various media.

Many of the intuitive beliefs of folk psychology are correct. If they were not, people would constantly be surprised at what others say and do. Most people know enough about human behavior to be able to predict that, for example, those who are sad might cry, those who are overjoyed might smile and laugh, and those who are outraged might do outrageous things.

Quite often, though, the beliefs of folk psychology are wrong. For example, it might seem obvious that many people do not dream, that some women are more likely than others to give birth to sons, and that most people are altruistic enough to try to help someone being raped, mugged, or beaten. In fact, however, all normal people dream, although not all can remember doing so; it is the man’s sperm and not the woman’s ovum (egg) that determines the infant’s sex; and some studies indicate that many people will not try to help a person or even an animal being raped, mugged, beaten, or even killed (for example, Arluke, 2012; Darley & Latané, 1968).

**Misconceptions About Learning and the Brain**

Because they are often misleading or flatly incorrect, personal beliefs can be very dangerous in science. Misconceptions, argue Bensley and Lilienfeld (2017), often interfere with learning and with clear, logical thinking.

Even educated and trained professionals are often victims of false beliefs. And so are students, many of whom approach their psychology courses with more than a handful of false beliefs that are stubbornly resistant to extinction. For example, we tend to believe that there is an average, normal way of thinking and learning – that we all think and learn in identical ways and that the task of learning research is to discover these ways of learning. In reality, things are not quite so simple. For example, there are important differences in people’s *learning styles* – the preferred and customary approaches that different people use when trying to learn. The point is that learning is not a fixed process, unvarying in all learners. Not only is the human organism characterized by remarkable *plasticity* (that is, a striking ability to change), but it is also characterized by a variety of ways of thinking and learning.

Related to this, we tend to believe in the average individual. Thus, we think that six-year-olds are this way or that, that nine-year-olds are this or that other way, and that 50-year-olds are yet another way. But if we think about it, we know that there are profound individual differences among all 6-, 9-, and 50-year-olds: Each person is unique. The average learner (and the average child) is a mathematical invention that makes our study and our understanding easier. As we see throughout this text, most learning theories describe the *average* learner – a mythical, prototypical individual. But as we also see, most theories also try to account for individual differences.

that she wasn’t real interested in being politically correct, that her people had long ago paid the price for telling the truth. “If the book isn’t sufficiently politically correct,” she said, using what I soon learned was a variation of one of her favorite expressions, “well bugger them.” I was much taken aback and did not immediately think of asking who her people were.