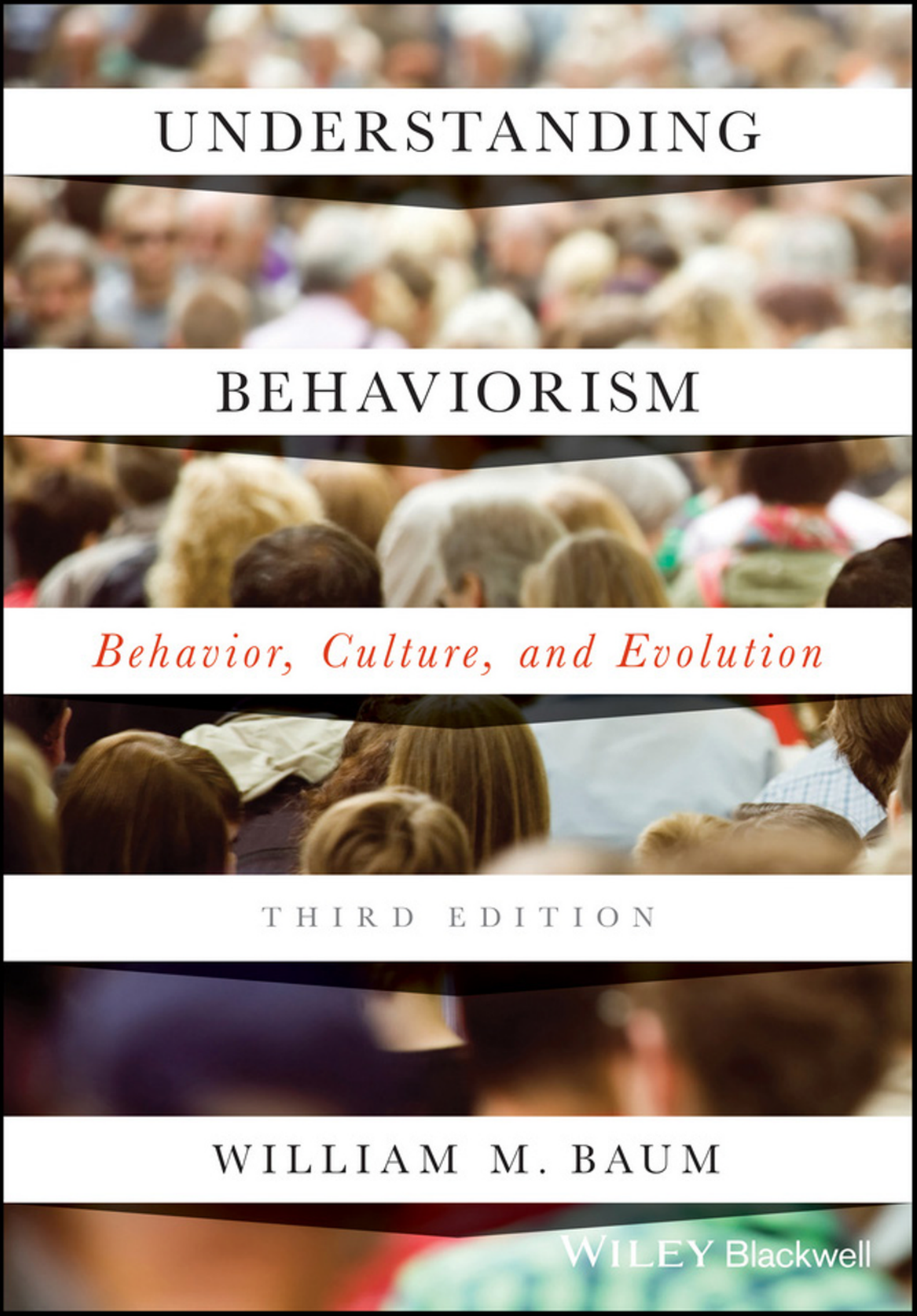
UNDERSTANDING
BEHAVIORISM
Behavior, Culture, and Evolution
THIRD EDITION
WILLIAM M. BAUM
WILEY Blackwell

Understanding Behaviorism

Synthesizing the principles of behavior analysis with contemporary understanding of evolutionary selection, Baum's account progresses systematically from basic pragmatic behavior all the way to the practices that constitute human cultural values. The resulting book is a modern equivalent of B. F. Skinner's groundbreaking *Science and Human Behavior*.

— Philip N. Hineline, Ph.D.,
Professor Emeritus, Temple University, and
President of the Association for Behavior Analysis International (ABAI)

In clear, lively prose Baum's book gives students as well as laypeople an understanding of the cutting edge of behavioristic thought. In this third edition, Baum embeds behavioral psychology even more firmly than previously in its proper setting—that of evolutionary biology. The book is actually an instrument (like a telescope or a microscope) through which the reader may observe human life as it really is, rather than as common sense (that which says the sun goes round the earth) tells us it is.

— Howard Rachlin, Ph.D.,
Professor Emeritus, Stony Brook University

In some quarters in the human sciences the roles of reinforcement and punishment in shaping individual behavior and cultural evolution have been neglected. *Understanding Behaviorism* explains why this is a serious mistake.

— Peter J. Richerson, Ph.D.,
Professor Emeritus, University of California Davis

A mainstay in my undergraduate learning course, *Understanding Behaviorism* is an excellent text covering the core concepts of both the philosophy of behaviorism and the science of behavior analysis. Dr. Baum provides a clear, accessible introduction that anyone interested in behavior analysis or psychology should read.

— Matthew Bell, Ph.D.,
Associate Professor, University of California San Diego

What a thorough and highly intelligible piece of writing! By elucidating the bigger picture and the relation to its parts, this brilliant third edition truly facilitates *understanding behaviorism* and its relation to evolutionary theory. It will be my go-to-guide for many years of tuition and research to come.

— Carsta Simon,
Doctoral Student, Oslo and Akershus University College, Norway

Understanding Behaviorism

Behavior, Culture, and Evolution

Third Edition

William M. Baum

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I dedicate this book to my mentor, Richard J. Herrnstein, without whose influence I could never have written it.

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Preface to the Third Edition

In this revision, I aimed primarily to bring the book up to date, because advances have occurred in both behavior analysis and evolutionary biology. Accordingly, chapters 4, 12, and 13 are substantially rewritten. Other chapters received additional material that I deem helpful. Chapter 1 now has a section on the "standard narrative"—"I thought (or felt) X, and so I did Y"—and a section on Folk Psychology. Chapter 2 now has a rebuttal to the criticism of pragmatism that it cannot account for the "unreasonable success" of science. I added a summary table to chapter 3 that compares the views of methodological behaviorism, Skinner, Ryle, and Rachlin's molar behaviorism. Chapter 4 now tilts more toward my own views of reinforcement, punishment, classical conditioning, and induction, bringing all together in a single framework with the concept of phylogenetically important events. I added an example of behavioral evolution more relevant to everyday life—work-life balance. Chapter 12, on values, now includes Max Hocutt's treatment of values and relates values more closely to human evolution. Chapter 13 is updated to include epigenetics, group selection, and cultural group selection as forces in cultural evolution. All chapters include many small corrections, additions, and improvements in terminology. In addition to "terms introduced" following each chapter, I have added a glossary of all terms introduced in the book.

Acknowledgements

First of all, I thank Matt Bell for all the helpful feedback he provided from his own readings and his students'. Table 3.1 was their idea. Pete Richerson gave me many helpful comments on drafts of chapters 12 and 13. My student Carsta Simon also gave me helpful comments. Some colleagues helped me indirectly by clarifying my understanding of selection as a general process as embodied in the Price equation: Karthik Panchanathan and Richard McElreath. I thank my wife Ellen for her unfailing support, and, for their support and inspiration, I thank my children Shona, Aaron, Zack, Naomi, and Gideon and their significant others Paver, Laura, Alice, and Erin.

Part I

What is Behaviorism?

Behaviorism has been a controversial topic. Some objections arise from correct understanding, but misconceptions about behaviorism abound. The three chapters in this part aim to clarify what might be called the "philosophical stance" of behaviorism.

All that is genuinely controversial about behaviorism stems from its primary idea, that a science of behavior is possible. At some point in its history, every science has had to exorcise imagined causes (hidden agents) that supposedly lie behind or under the surface of natural events. Chapter 1 explains how behaviorists' denial of hidden agents leads to a genuine controversy, the question of whether behavior is free or determined.

Chapter 2 aims to forestall misconceptions that may arise because behaviorism has changed over time. An earlier version, called *methodological* behaviorism, was based on *realism*, the view that all experience is caused by an objective, real world outside of and apart from a person's subjective, inner world. Realism may be contrasted with *pragmatism*, which is silent about the origin of experience, but points instead to the usefulness of trying to understand and make sense out of our experiences. A later version of behaviorism, called *radical* behaviorism, rests on pragmatism, rather than on realism. Anyone failing to understand this difference is likely to misunderstand the critical aspect of radical behaviorism, its rejection of mentalism.

The behaviorists' critique of mentalism, explained in chapter 3, underlies the remainder of the book, because it requires behaviorists to suggest nonmentalistic explanations of behavior (Part II) and nonmentalistic solutions to social problems (Part III).

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Behaviorism: Definition and History

The central idea in behaviorism can be stated simply: *A science of behavior is possible*. Behaviorists have diverse views about what this proposition means, and particularly about what science is and what behavior is, but every behaviorist agrees that there can be a science of behavior.

Many behaviorists add that the science of behavior should be psychology. This causes contention because many psychologists reject the idea that psychology is a science at all, and others who regard it as a science consider its subject matter something other than behavior. Most behaviorists have come to call the science of behavior *behavior analysis*. The debate continues as to whether behavior analysis is a part of psychology, the same as psychology, or independent of psychology, but professional organizations, such as the Association for Behavior Analysis, and journals, such as *The Behavior Analyst, Journal of the Experimental Analysis of Behavior*, and *Journal of Applied Behavior Analysis*, give the field an identity.

Since behaviorism is a set of ideas about this science called behavior analysis, not the science itself, properly speaking behaviorism is not science, but philosophy of science. As philosophy about behavior, however, it touches topics near and dear to us: why we do what we do, and what we should and should not do. Behaviorism offers an alternative view that often runs counter to traditional thinking about action, because traditional views have been unscientific. We shall see in later chapters that it sometimes takes us in directions radically different from conventional thinking. This chapter covers some of the history of behaviorism and one of its most immediate implications, determinism.

Historical Background

From Philosophy to Science

All the sciences—astronomy, physics, chemistry, biology—had their origins in, and eventually broke free from, philosophy. Before astronomy and physics existed as sciences, for example, philosophers speculated about the arrangement of the natural universe by starting from assumptions about God or some other ideal standard and reasoning to conclusions about the way the universe

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must be. For example, if all important events seemed to occur on the Earth, then the Earth must be the center of the universe. Since a circle is the most perfect shape, the sun must travel about the Earth in a circular orbit. The moon must travel in another, closer, circular orbit, and the stars must be in a sphere, the most perfect three-dimensional form, around the whole. (To this day, the sun, the moon, and the stars are called heavenly bodies, because they were supposed to be perfect.)

The sciences of astronomy and physics were born when individuals began trying to understand natural objects and phenomena by observing them. When Galilei Galileo (1564–1642) trained a telescope on the moon, he observed that its crater-scarred landscape was far from the perfect sphere the philosophers supposed it to be. Contributing to physics also, Galileo recorded the motion of falling objects by rolling a ball down a chute. In describing his findings, Galileo helped invent the modern notions of velocity and acceleration. Isaac Newton (1642–1727) added concepts like force and inertia to create a powerful descriptive scheme for understanding motions of bodies on the Earth as well as heavenly bodies such as the moon.

In creating the science of physics, Galileo, Newton, and other thinkers of the Enlightenment broke with philosophy. Philosophy reasons from assumptions to conclusions. Its arguments take the form, "If this were so, then that would be so." Science proceeds in the opposite direction: "This is observed; what could be true that would lead to such an observation, and what other observations would it lead to?" Philosophical truth is absolute; as long as the assumptions are spelled out and the reasoning is correct, the conclusions must follow. Scientific truth is always relative and provisional; it is relative to observation and susceptible to disconfirmation by new observations. For a long time, astronomers thought there were only seven planets, but then an eighth and a ninth were discovered. Philosophical assumptions concerned abstractions beyond the natural universe: God, harmony, ideal shapes, and so on. Scientific assumptions used in theory-building concern only the natural universe and the way it might be organized. Though Newton was a theologian as well as a physicist, he separated the two activities. About physics, he said, "*Hypotheses non fingo*" ("I do not make up hypotheses"), meaning that when studying physics he had no concern for any supernatural entities or principles—that is, for anything outside the natural universe itself. The reason the ocean has tides is not God's will but the gravitational pull of the moon as it revolves around the Earth.

As well as physics, the ancient Greeks speculated about chemistry. Philosophers such as Heraclitus, Empedocles, and Aristotle speculated that matter varied in its properties because it was endowed with certain qualities, essences, or principles. Aristotle suggested four qualities: *hot*, *cold*, *wet*, and *dry*. If a substance was a liquid, it possessed more of the wet quality; if a solid, more of the dry. As centuries passed, the list of qualities or essences lengthened. Things that grew hot were said to possess the inner essence *caloric*. Materials that burned were said to possess *phlogiston*. These essences were considered real substances hidden somewhere within the materials. When thinkers turned away from speculation about hidden essences and began making and interrelating careful observations of material change, chemistry was born. Antoine

Lavoisier (1743–1794), among others, developed the concept of oxygen from the careful observation of weights. Lavoisier found that when the metal lead is burned and transformed into a yellow powder (lead oxide) in a closed vessel, the powder weighs more than the original metal, and yet the entire vessel retains the same weight. Lavoisier reasoned that this could occur if the metal combined with some material in the air. Such an explanation contained only natural terms; it left out the hidden essences suggested by philosophy and established chemistry as a science.

Biology broke with philosophy and theology in the same way. Philosophers reasoned that if living and nonliving things differed, that was because God had given something to the living things He had not given to the nonliving. Some thinkers considered this inner thing to be a soul; others called it *vis viva* (life force). In the seventeenth century, early physiologists began looking inside animals to see how they worked. William Harvey (1578–1657) found what seemed more like the workings of a machine than some mysterious life force. It appeared that the heart functioned like a pump, circulating the blood through the arteries and tissues and back through the veins. As in physics and chemistry, such reasoning left out the hypothetical assumptions of the philosophers and referred only to observations of natural phenomena.

When Charles Darwin (1809–1882) published his theory of evolution by natural selection in 1859, it created a furor. Some people were offended because the theory went against the Biblical account of God creating all the plants and animals in a few days. Darwin even shocked some geologists and biologists. Familiar with the overwhelming fossil evidence of the rise and extinction of many species, these scientists were already convinced that evolution occurred. Yet although they no longer took the Biblical creation account literally, some of them still regarded the creation of life (hence, evolution) as the work of God. They were no less offended by Darwin's theory of natural selection than were those who took the Biblical account literally.

Darwin's theory impressed his contemporaries because it offered an account of the creation of life forms that left out God or any other nonnatural force. Natural selection is a purely mechanical process. If creatures vary, and the variation is inherited, then any reproductive advantage enjoyed by one type will cause that type to replace all competitors. Modern evolutionary theory arose in the first half of the twentieth century when the idea of natural selection was combined with the theory of genetic inheritance. This theory continues to arouse objections because of its godless naturalism.

Just as astronomy, physics, chemistry, physiology, and evolutionary biology broke with philosophy, so psychology broke with philosophy. Psychology's break was relatively recent. Until the 1940s few universities had a separate department of psychology, and professors of psychology were usually to be found in the philosophy department. If evolutionary biology, with its roots in the mid-1800s, is still completing its break with theological and philosophical doctrine, it is no surprise that today psychologists still debate among themselves about the implications of calling psychology a true science, and that laypeople are only beginning to learn what a truly scientific psychology might mean in practice.

In the last half of the nineteenth century, psychologists began to call psychology the "science of mind." The Greek word *psyche* means something more like "spirit," but *mind* seemed less speculative and more amenable to scientific study. How to study the mind? Psychologists proposed to adopt the method of the philosophers: introspection. If the mind were a sort of a stage or arena, then one could look inside it and see what was going on; that is the meaning of the word *introspect*. This is a difficult task, and particularly so if one is trying to gather reliable scientific facts. Nineteenth-century psychologists thought that this difficulty might be overcome with enough training and practice. Two lines of thought, however, combined to undermine this view: objective psychology and comparative psychology.

Objective Psychology

Some nineteenth-century psychologists were uneasy with introspection as a scientific method. It seemed too unreliable, too open to personal bias, too subjective. Other sciences used objective methods which produced measurements that could be checked and duplicated in laboratories around the world. If two trained introspectors disagreed over their findings, the conflict would be hard to resolve; with objective methods, however, one might note differences in procedure that could produce different results.

One of the early pioneers in objective psychology was the Dutch psychologist F. C. Donders (1818–1889), who was inspired by an intriguing astronomy problem: how to arrive at the exact time when a star is in a certain position in the sky. When a star is viewed through a powerful telescope, it appears to travel at considerable speed. Astonomers trying to make accurate time measurements were having difficulty estimating to the fraction of a second. An astronomer would listen to a clock ticking once a second while watching a star, and count ticks. As the star crossed a line marked in the telescope (the "moment of transit"), the astronomer would mentally note its position at the tick just before transit, mentally note its position at the tick just after transit, and then estimate the fraction of the distance between the two positions that lay between the position just before transit and the line. The problem was that different astronomers watching the same moment of transit obtained different time estimates. The astronomers tried to get around this variation by finding an equation, called the "personal equation," for each astronomer that would compute the correct time from the particular astronomer's time estimates.

Donders reasoned that the time estimates varied because no two astronomers took the same time to judge the exact moment of transit, and he believed they were actually making their judgments by different mental processes. Donders thought that this "judgment time" might be a useful objective measure. He began doing experiments in which he measured people's *reaction times*—the times required to detect a light or sound and then press a button. He found that it took a certain reliable amount longer to press the correct one of two buttons when one or the other of two lights came on than to press a single button when a single light came on. By subtracting the shorter simple reaction time from the longer choice reaction time, Donders argued that one could objectively measure the

mental process of choice. This seemed a great advance over introspection because it meant that psychologists could do laboratory experiments with the same objective methods as the other sciences.

Other psychologists developed other methods that seemed to measure mental processes objectively. Gustav Fechner (1801–1887) attempted to measure subjective intensity of sensation by developing a scale based on the *just-noticeable difference*—the physical difference between two lights or sounds that a person could just detect. Hermann Ebbinghaus (1850–1909) measured the time it took him to learn and later relearn lists of nonsense syllables—consonant-vowel-consonant combinations with no meaning—to produce objective measures of learning and memory. Others used the method developed by I. P. Pavlov (1849–1936) to study learning and association by measuring a simple reflex transferring to new signals arranged in the laboratory. These attempts held the common promise that by following objective methods psychology could become a true science.

Comparative Psychology

At the same time that psychologists were trying to make psychology an objective science, psychology was also being influenced by the theory of evolution. No longer were human beings seen as separate from other living things. The recognition was growing that not only do we share anatomical traits with apes, monkeys, dogs, and even fish, but we share with them also many behavioral traits.

Thus arose the notion of the *continuity of species*—the idea that even if species clearly differ from one another, to the extent that they share a common evolutionary history, they also resemble one another. Darwin's theory taught that new species came into existence only as modifications of existing species. If our species evolved like any other species, then it too must have arisen as a modification of some other species. It was easy to see that we and the apes shared common ancestors, that apes and monkeys shared common ancestors, that monkeys and tree shrews shared common ancestors, that tree shrews and reptiles shared common ancestors, and so on.

Comparative thinkers reasoned that, just as we could see the origins of our own anatomical traits in other species, so we could see the origins of our own mental traits. Thus the notion of making comparisons among species in order to learn more about our own, coupled with the assumption that our mental traits would appear in other species in simpler or rudimentary form, gave rise to comparative psychology.

Comparisons between our species and others became common. Darwin himself wrote a book called *The Expression of the Emotions in Men and Animals*. At first, evidence of seemingly human mentality in other animals consisted of casual observations of wild and domestic creatures, often just anecdotes about pets or farm animals. With a little imagination one could see a dog that learned to open the garden gate by lifting the latch as having observed and reasoned from its owner's example. One could imagine further that the dog's sensations, thoughts, feelings, and so on must resemble ours. George Romanes (1848–1894)

took this line of reasoning to its logical conclusion, even claiming that our own consciousness must form the basis of our guesses at whatever dim consciousness occurs in ants.

This "humanizing the beast" or *anthropomorphism* seemed too speculative to some psychologists. In the last part of the nineteenth and early part of the twentieth century, comparative psychologists began to replace the loose anecdotal evidence with rigorous observation by conducting experiments with animals. Much of this early research relied on mazes, because any creature that moves about, from human to rat to fish to ant, can be trained to solve a maze. One could measure the time the creature took to traverse the maze and the number of errors it made, and one could see these decline as the maze was learned. Carrying on the attempt to humanize the beast, these early researchers frequently added speculations about the animals' mental states, thoughts, and emotions. Rats were said to show disgust on making an error, confusion, hesitation, confidence, and so on.

The problem with these claims about animal consciousness was that they depended too much on individual bias. If two people introspecting could disagree over whether they were feeling angry or sad, two people could disagree even more over whether a rat was feeling angry or sad. Since the observations were so subjective, making more observations was no help in resolving either disagreement. John B. Watson (1879–1958), the founder of behaviorism, considered inferences about consciousness in animals to be even less reliable than introspection and concluded that neither could serve as the method of a true science.

Early Behaviorism

In 1913, Watson published the article "Psychology as the Behaviorist Views It," soon considered the manifesto of early behaviorism. Taking his lead from objective psychology, he articulated the growing unease among psychologists over introspection and analogy as methods. He complained that introspection, unlike methods in physics or chemistry, depended too much on the individual:

> If you fail to reproduce my findings … it is due to the fact that your introspection is untrained. The attack is made upon the observer and not upon the experimental setting. In physics and in chemistry the attack is made upon the experimental conditions. The apparatus was not sensitive enough, impure chemicals were used, etc. In these sciences a better technique will give reproducible results. Psychology is otherwise. If you can't observe 3–9 states of clearness in attention, your introspection is poor. If, on the other hand, a feeling seems reasonably clear to you, your introspection is again faulty. You are seeing too much. Feelings are never clear.
>
> *(p. 163)*

If introspection was unreliable, analogies between animals and humans were even more so. Watson complained that the emphasis on consciousness forced him into

> the absurd position of attempting to *construct* the conscious content of the animal whose behavior we have been studying. On this view, after having determined our animal's ability to learn, the simplicity or complexity of its methods of learning, the effect of past habit upon present response, the range of stimuli to which it ordinarily responds, the widened range to which it can respond under experimental conditions,—in more general terms, its various problems and its various ways of solving them,—we should still feel that the task is unfinished and that the results are worthless, until we can interpret them by analogy in the light of consciousness … we feel forced to say something about the possible mental processes of our animal. We say that, having no eyes, its stream of consciousness cannot contain brightness and color sensations as we know them,—having no taste buds this stream can contain no sensations of sweet, sour, salt and bitter. But on the other hand, since it does respond to thermal, tactual and organic stimuli, its conscious content must be made up largely of these sensations…Surely this doctrine which calls for an analogical interpretation of all behavior data may be shown to be false.
>
> *(pp. 159–160)*

Psychologists trapped themselves into such fruitless efforts, Watson argued, because of their definition of psychology as the science of consciousness. This definition was to blame for the unreliable methods and baseless speculations. It was to blame for psychology's failure to become a true science.

Instead, Watson wrote, psychology should be defined as the science of behavior. He described his disappointment when, seeing *psychology* defined by Pillsbury at the beginning of a textbook as the science of behavior, he found that after a few pages the book ceased referring to behavior and reverted instead to the "conventional treatment" of consciousness. In reaction, Watson wrote, "I believe we can write a psychology, define it as Pillsbury, and never go back upon our definition: never use the terms consciousness, mental states, mind, content, introspectively verifiable, imagery, and the like" (p. 166).

Avoiding the terms relating to consciousness and mind would free psychologists to study both human and animal behavior. If continuity of species could lead to "humanizing the beast," it could equally well lead to the opposite (bestializing the human?); if ideas about humans could be applied to animals, principles developed by studying animals could be applied to humans. Watson argued against anthropocentrism. He pointed to the biologist studying evolution, who "gathers his data from the study of many species of plants and animals and tries to work out the laws of inheritance in the particular type upon which he is conducting experiments … It is not fair to say that all of his work is directed toward human evolution or that it must be interpreted in terms of human evolution" (Watson, 1913, p. 162). To Watson, the way seemed clear to turn psychology into a general science of behavior that covered all species, with humans as just one of the species.

This science of behavior Watson envisioned would use none of the traditional terms referring to mind and consciousness, would avoid the subjectivity of introspection and animal-human analogies, and would study only objectively

observable behavior. Yet even in Watson's own time, behaviorists debated over the correctness of this recipe. It was unclear what *objective* meant or exactly what constituted *behavior*. Since these terms were left open to interpretation, behaviorists' ideas about what constitutes science and how to define behavior have varied.

Of post-Watsonian behaviorists, the best known is B. F. Skinner (1904–1990). His ideas of how to achieve a science of behavior contrasted sharply with those of most other behaviorists. Whereas the others focused on natural-science methods, such as measurement and experimental control, Skinner focused on scientific explanation. He argued that the way to a science of behavior lay through development of terms and concepts that would allow truly scientific explanations. He labeled the opposing view *methodological behaviorism* and styled his own view *radical behaviorism*. We will discuss these more in chapters 2 and 3.

Whatever their disagreements, all behaviorists agree with Watson's basic premises that there can be a natural science of behavior and that psychology could be that science. The idea that behavior can be treated scientifically implies that, just as the other sciences cast out hidden essences, forces, and causes, so behavior analysis (or psychology if they are the same) omits such mysterious factors. This omission raises controversy paralleling the reaction to Darwin's naturalistic account of evolution. Whereas Darwin offended by leaving out the hidden hand of God, behaviorists offend by leaving out another hidden force: the power of individuals to direct their own behavior. Just as Darwin's theory challenged the cherished idea of God the creator, so behaviorism challenges the cherished idea of free will. We will discuss hidden causes more fully in chapter 3, but because the challenge to free will often arouses antagonism, we take it up now.

Free Will Versus Determinism

Definitions

The idea that a science of behavior is possible implies that behavior, like any scientific subject matter, is orderly, can be explained, with the right knowledge can be predicted, and with the right means can be controlled. This is *determinism*, the notion that behavior is determined solely by heredity and environment.

Many people find determinism objectionable. It appears to run counter to long-standing cultural traditions that assign the responsibility for action to the individual, rather than to heredity and environment. These traditions have changed to some extent: delinquency is blamed on bad environment; famous artists acknowledge debts to parents and teachers; and some behavioral traits, such as alcoholism, schizophrenia, handedness, and IQ, are acknowledged to have a genetic component. Yet the tendency remains to assign credit and blame to individuals, to assert that behavior depends not just on heredity and environment but on something more, that people have freedom to choose their actions.

The name for the ability to choose is *free will*. It implies a third element besides heredity and environment, something within the individual. It asserts that

despite inheritance and despite all environmental impacts, a person who behaves one way could have chosen to behave another way. It asserts something beyond merely experiencing that one has choice—it could seem to me that I can eat the ice cream or not, and yet my eating the ice cream could be entirely determined by past events. Free will asserts that choice is no illusion, that individuals themselves cause behavior.

Philosophers have tried to reconcile determinism and free will. Positions have emerged called "soft determinism" and "compatibilist" theories of free will. A soft determinism attributed to Donald Hebb (a behaviorist; see Sappington, 1990), for example, holds that free will consists of behavior's dependence on inheritance and past environmental history, factors less visible than one's present environment. But, since such a view still considers behavior to result solely from inheritance and environment, past and present, it implies that free will is only an experience, an illusion, and not a causal relation between person and action. A compatibilist theory of free will proposed by philosopher Daniel Dennett defines free will as deliberation before action (Dennett, 1984). As long as I deliberate over eating the ice cream (Will it make me fat? Could I offset its effects with exercise later? Can I be happy if I am always dieting?), my eating the ice cream is freely chosen. This is compatible with determinism because deliberation itself is behavior that might be determined by heredity and past environment. If deliberation plays any role in the behavior that follows, it would act only as a link in a chain of causality extending back into earlier events. This definition, however, deviates from what people conventionally mean by free will.

Philosophers call the conventional idea of free will—the idea that choice really can be free of past events—*libertarian free will*. Any other definition, like those of Hebb and Dennett, that is compatible with determinism presents no problem for behaviorism or a science of behavior. Only libertarian free will conflicts with behaviorism. The history of the concept in Jewish and Christian theology suggests that it exists precisely in order to deny the sort of determinism that behaviorism represents. Parting with the philosophers, therefore, we will refer to libertarian free will as "free will."

Arguments For and Against Free Will

Proving free will (in other words, disproving determinism) would require that an act go counter to prediction even though every possible contributing factor is known. Since such perfect knowledge is impossible in practice, the conflict between determinism and free will can never be resolved by evidence. If it seems that middle-class children from good homes who become drug addicts must have chosen freely to do so because nothing in their backgrounds would account for the behavior, the determinist can insist that further investigation would reveal the genetic and environmental factors that lead to such addictions. If it seems that Mozart's musical career was entirely predictable on the basis of his family background and the way society in Vienna worked in his day, the free-will advocate can insist that little Wolfgang freely chose to please his parents with musical efforts rather than to play with toys like the other

children. If evidence cannot persuade, then whether a person accepts determinism or free will may depend on the consequences of believing one or the other, and these may be social or aesthetic.

Social Arguments

Practically, it appears that denial of free will might undermine the whole moral fabric of our society. What will happen to our judicial system if people cannot be held responsible for their actions? We are already having trouble when criminals plead insanity and diminished competence. What will happen to our democratic institutions if people have no free choice? Why bother to have elections if choice among candidates is not free? Belief that people's behavior can be determined might encourage dictatorship. For these reasons, perhaps it is good and useful to believe in free will, even if it cannot be proved.

We will address these arguments in Part III when we discuss freedom, social policy, and values. A brief survey now will give an idea of the general direction taken later.

The perceived threat to democracy derives from a false assumption. Although it is true that democracy depends on choice, it is false that choice becomes meaningless or impossible without free will. The fear that choice would disappear arises from an oversimplified notion of the alternative to free will. If an election offers a person two different ways to vote, which vote actually occurs depends not only on the person's long-term history (background, upbringing, or values) but also on events right before the election. Campaigning goes on for precisely this reason. I can be swayed by a good speech, and without it I might have voted for the other candidate. People need not have free will for elections to be meaningful; their behavior need only be open to influence and persuasion (shorter-term environmental determinants).

We favor democracy not because we have free will but because we find that, as a set of practices, it works. People in a democratic society are happier and more productive than under any known monarchy or dictatorship. Although other factors—notably wealth—contribute to citizens' reported happiness, perceived freedom to make life choices and freedom from corruption count as two of the most important factors in the United Nations' *World Happiness Report*, which surveys citizens in 158 countries. The 2015 report ranks the five happiest countries as Switzerland, Iceland, Denmark, Norway, and Canada—all democracies. (The United States ranks fifteenth, and the 14 countries above it are all democracies.)

Instead of worrying over the loss of free will, we may more profitably ask what it is about democracy that makes it better. If we can analyze our democratic institutions to discover what makes them work, we might be able to find ways to make them even more effective. Political freedom consists of something more practical than free will: It means having choices available and being able to affect the behavior of those who govern. A scientific understanding of behavior could be used to increase political freedom. In this way, the knowledge gained from a science of behavior could be put to good use; nothing requires that it be abused. And after all, if we really do have free will, presumably no one need worry about the use of such knowledge anyway.