approach to psychology. He blamed much of "the present unhappy condition of the world" on what he saw as our confusion between a "scientific conception of human behavior" and a "philosophy of personal freedom."

In these extracts from his late book *About Behaviorism* (1974), Skinner continues to maintain his hopes for both a science and a technology of human behavior.

About Behaviorism

Behaviorism is not the science of human behavior; it is the philosophy of that science. Some of the questions it asks are these: Is such a science really possible? Can it account for every aspect of human behavior? What methods can it use? Are its laws as valid as those of physics and biology? Will it lead to a technology, and if so, what role will it play in human affairs? Particularly important is its bearing on earlier treatments of the same subject. Human behavior is the most familiar feature of the world in which people live, and more must have been said about it than about any other thing; how much of what has been said is worth saving?

Some of these questions will eventually be answered by the success or failure of scientific and technological enterprises, but current issues are raised, and provisional answers are needed now. A great many intelligent people believe that answers have already been found and that they are all unpromising. Here, for example, are some of the things commonly said about behaviorism or the science of behavior. They are all, I believe, wrong.

1. It ignores consciousness, feelings, and states of mind.
2. It neglects innate endowment and argues that all behavior is acquired during the lifetime of the individual.
3. It formulates behavior simply as a set of responses to stimuli, thus representing a person as an automaton, robot, puppet, or machine.
4. It does not attempt to account for cognitive processes.
5. It has no place for intention or purpose.
6. It cannot explain creative achievements—in art, for example, or in music, literature, science, or mathematics.

7. It assigns no role to a self or sense of self.
8. It is necessarily superficial and cannot deal with the depths of the mind or personality.
9. It limits itself to the prediction and control of behavior and misses the essential nature or being of man.
10. It works with animals, particularly with white rats, but not with people, and its picture of human behavior is therefore confined to those features which human beings share with animals.
11. Its achievements under laboratory control cannot be duplicated in daily life, and what it has to say about human behavior in the world at large is therefore unsupported metascience.
12. It is oversimplified and naïve and its facts are either trivial or already well known.
13. It is scientistic rather than scientific. It merely emulates the sciences.
14. Its technological achievements could have come about through the use of common sense.
15. If its contentions are valid, they must apply to the behavioral scientist himself, and what he says is therefore only what he has been conditioned to say and cannot be true.
16. It dehumanizes man; it is reductionistic and destroys man *qua* man.
17. It is concerned only with general principles and therefore neglects the uniqueness of the individual.
18. It is necessarily antidemocratic because the relation between experimenter and subject is manipulative, and its results can therefore be used by dictators but not by men of good will.
19. It regards abstract ideas such as morality or justice as fictions.
20. It is indifferent to the warmth and richness of human life, and it is incompatible with the creation and enjoyment of art, music, and literature and with love for one's fellow men.

These contentions represent, I believe, an extraordinary misunderstanding of the achievements and significance of a scientific enterprise. How can it be explained? The early history of the movement may have caused trouble. The first explicit behaviorist was John B. Watson, who in 1913 issued a kind of manifesto called *Psychology as the Behaviorist Views It.* As the title shows, he was not proposing a new science but arguing that psychology should be redefined as the study of behavior. This may have been a strategic mistake. Most of the psychologists at the time believed they were studying mental processes in a mental world of con-

sciousness, and they were naturally not inclined to agree with Watson. Early behaviorists wasted a good deal of time, and confused an important central issue, by attacking the introspective study of mental life.

Watson himself had made important observations of instinctive behavior and was, indeed, one of the first ethologists in the modern spirit, but he was greatly impressed by new evidence of what an organism could learn to do, and he made some rather extreme claims about the potential of a newborn human infant. He himself called them exaggerations, but they have been used to discredit him ever since. His new science was also, so to speak, born prematurely. Very few scientific facts about behavior—particularly human behavior—were available. A shortage of facts is always a problem in a new science, but in Watson's aggressive program in a field as vast as human behavior it was especially damaging. He needed more factual support than he could find, and it is not surprising that much of what he said seemed oversimplified and naïve.

Among the behavioral facts at hand were reflexes and conditioned reflexes, and Watson made the most of them, but the reflex suggested a push-pull type of causality not incompatible with the nineteenth-century conception of a machine. The same impression was given by the work of the Russian physiologist Pavlov, published at about the same time, and it was not corrected by the stimulus-response psychology which emerged during the next three or four decades.

Watson naturally emphasized the most reproducible results he could find, and most of them had been obtained from animals—the white rats of animal psychology and Pavlov's dogs. It seemed to be implied that human behavior had no distinguishing characteristics. And to bolster his claim that psychology was a science, and to fill out his textbook, he borrowed from anatomy and physiology, and Pavlov took the same line by insisting that his experiments on behavior were really "an investigation of the physiological activity of the cerebral cortex," although neither man could point to any direct observations of the nervous system which threw light on behavior. They were also forced into hasty interpretations of complex behavior, Watson arguing that thinking was merely subvocal speech and Pavlov that language was simply a "second signal system." Watson had little or nothing to say about intention or purpose or creativity. He emphasized the technological promise of a science of behavior, but his examples were not incompatible with a manipulative control.

More than sixty years have passed since Watson issued his manifesto, and a great deal has happened in that time. The scientific analysis of behavior has made dramatic progress, and the shortcomings in Watson's account are now, I believe, chiefly of historical interest. Nevertheless, criticism has not greatly changed. All the misunderstandings listed above are to be found in current publications by philosophers, theologians, social scientists, historians, men and women of letters, psychologists, and many others. The vagaries of the early history of the movement can hardly suffice as an explanation.

Some trouble no doubt arises from the fact that human behavior is a sensitive field. Much is at stake in the way in which we look at ourselves, and a behavioristic formulation certainly calls for some disturbing changes. Moreover, terms originating in earlier formulations are deeply imbedded in our language, and they have had a place in both technical and nontechnical literature for centuries. Nevertheless, it would be unfair to argue that the critic has not been able to free himself from these historical prejudices. There must be some other reason why behaviorism as the philosophy of a science of behavior is still so seriously misunderstood.

I believe the explanation is this: the science itself is misunderstood. There are many different kinds of behavioral science, and some of them, as I shall show later, formulate the field in ways which do not raise important behavioristic issues. The criticisms listed above are most effectively answered by a special discipline, which has come to be called the experimental analysis of behavior. The behavior of individual organisms is studied in carefully controlled environments, and the relation between behavior and environment then formulated. Unfortunately, very little is known about this analysis outside the field. Its most active investigators, and there are hundreds of them, seldom make any effort to explain themselves to nonspecialists. As a result, few people are familiar with the scientific underpinnings of what, I believe, is the most cogent statement of the behavioristic position.

The behaviorism I present in this book is the philosophy of this special version of a science of behavior. The reader should know that not all behaviorists will agree with everything I say. Watson spoke for "the behaviorist," and in his time he *was* the behaviorist, but no one can assume that mantle today. What follows is admittedly—and, as a behaviorist, I must say necessarily—a personal view. I believe, however, that it is a consistent and coherent account, which satisfactorily answers the criticisms listed above.

I also believe in its importance. The major problems facing the world today can be solved only if we improve our understanding of human behavior. Traditional views have been around for centuries, and I think it

is fair to say that they have proved to be inadequate. They are largely responsible for the situation in which we now find ourselves. Behaviorism offers a promising alternative, and I have written this book in an effort to make its position clear.

The Explanation of Behavior

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Why do people behave as they do? It was probably first a practical question: How could a person anticipate and hence prepare for what another person would do? Later it would become practical in another sense: How could another person be induced to behave in a given way? Eventually it became a matter of understanding and explaining behavior. It could always be reduced to a question about causes.

We tend to say, often rashly, that if one thing follows another, it was probably caused by it—following the ancient principle of *post hoc, ergo propter hoc* (after this, therefore because of this). Of many examples to be found in the explanation of human behavior, one is especially important here. The person with whom we are most familiar is ourself; many of the things we observe just before we behave occur within our body, and it is easy to take them as the causes of our behavior. If we are asked why we have spoken sharply to a friend, we may reply, "Because I felt angry." It is true that we felt angry before, or as, we spoke, and so we take our anger to be the cause of our remark. Asked why we are not eating our dinner, we may say, "Because I do not feel hungry." We often feel hungry when we eat and hence conclude that we eat because we feel hungry. Asked why we are going swimming, we may reply, "Because I feel like swimming." We seem to be saying, "When I have felt like this before, I have behaved in such and such a way." Feelings occur at just the right time to serve as causes of behavior, and they have been cited as such for centuries. We assume that other people feel as we feel when they behave as we behave.

But where are these feelings and states of mind? Of what stuff are they made? The traditional answer is that they are located in a world of nonphysical dimensions called the mind and that they are mental. But another question then arises: How can a mental event cause or be caused by a physical one? If we want to predict what a person will do, how can we discover the mental causes of his behavior, and how can we produce the feelings and states of mind which will induce him to behave in a given way? Suppose, for example, that we want to get a child to eat a nutritious

but not very palatable food. We simply make sure that no other food is available, and eventually he eats. It appears that in depriving him of food (a physical event) we have made him feel hungry (a mental event), and that because he has felt hungry, he has eaten the nutritious food (a physical event). But how did the physical act of deprivation lead to the feeling of hunger, and how did the feeling move the muscles involved in ingestion? There are many other puzzling questions of this sort. What is to be done about them?

The commonest practice is, I think, simply to ignore them. It is possible to believe that behavior expresses feelings, to anticipate what a person will do by guessing or asking him how he feels, and to change the environment in the hope of changing feelings while paying little if any attention to theoretical problems. Those who are not quite comfortable about such a strategy sometimes take refuge in physiology. Mind, it is said, will eventually be found to have a physical basis. As one neurologist recently put it, "Everyone now accepts the fact that the brain provides the physical basis of human thought." Freud believed that his very complicated mental apparatus would eventually be found to be physiological, and early introspective psychologists called their discipline Physiological Psychology. The theory of knowledge called Physicalism holds that when we introspect or have feelings we are looking at states or activities of our brains. But the major difficulties are practical: we cannot anticipate what a person will do by looking directly at his feelings *or* his nervous system, nor can we change his behavior by changing his mind *or* his brain. But in any case we seem to be no worse off for ignoring philosophical problems.

Structuralism

A more explicit strategy is to abandon the search for causes and simply describe what people do. Anthropologists can report customs and manners, political scientists can take the line of "behavioralism" and record political action, economists can amass statistics about what people buy and sell, rent and hire, save and spend, and make and consume, and psychologists can sample attitudes and opinions. All this may be done through direct observation, possibly with the help of recording systems, and with interviews, questionnaires, tests, and polls. The study of literature, art, and music is often confined to the forms of these products of human behavior, and linguists may confine themselves to phonetics, semantics, and syntax. A kind of prediction is possible on the principle

that what people have often done they are likely to do again; they follow customs because it is customary to follow them, they exhibit voting or buying habits, and so on. The discovery of organizing principles in the structure of behavior—such as "universals" in cultures or languages, archetypal patterns in literature, or psychological types—may make it possible to predict instances of behavior that have not previously occurred.

The structure or organization of behavior can also be studied as a function of time or age, as in the development of a child's verbal behavior or his problem-solving strategies or in the sequence of stages through which a person passes on his way from infancy to maturity, or in the stages through which a culture evolves. History emphasizes changes occurring in time, and if patterns of development or growth can be discovered, they may also prove helpful in predicting future events.

Control is another matter. Avoiding mentalism (or "psychologism") by refusing to look at causes exacts its price. Structuralism and developmentalism do not tell us why customs are followed, why people vote as they do or display attitudes or traits of character, or why different languages have common features. Time or age cannot be manipulated; we can only wait for a person or a culture to pass through a developmental period.

In practice the systematic neglect of useful information has usually meant that the data supplied by the structuralist are acted upon by others—for example, by decision-makers who in some way manage to take the causes of behavior into account. In theory it has meant the survival of mentalistic concepts. When explanations are demanded, primitive cultural practices are attributed to "the mind of the savage," the acquisition of language to "innate rules of grammar," the development of problem-solving strategies to the "growth of mind," and so on. In short, structuralism tells us how people behave but throws very little light on why they behave as they do. It has no answer to the question with which we began.

Methodological Behaviorism

The mentalistic problem can be avoided by going directly to the prior physical causes while bypassing intermediate feelings or states of mind. The quickest way to do this is to confine oneself to what an early behaviorist, Max Meyer, called the "psychology of the other one": consider only those facts which can be objectively observed in the behavior of one person in its relation to his prior environmental history. If all linkages are

lawful, nothing is lost by neglecting a supposed nonphysical link. Thus, if we know that a child has not eaten for a long time, and if we know that he therefore feels hungry and that because he feels hungry he then eats, then we know that if he has not eaten for a long time, he will eat. And if by making other food inaccessible, we make him feel hungry, and if because he feels hungry he then eats a special food, then it must follow that by making other food inaccessible, we induce him to eat the special food.

Similarly, if certain ways of teaching a person lead him to notice very small differences in his "sensations," and if because he sees these differences he can classify colored objects correctly, then it should follow that we can use these ways of teaching him to classify objects correctly. Or, to take still another example, if circumstances in a white person's history generate feelings of aggression toward blacks, and if those feelings make him behave aggressively, then we may deal simply with the relation between the circumstances in his history and his aggressive behavior.

There is, of course, nothing new in trying to predict or control behavior by observing or manipulating prior public events. Structuralists and developmentalists have not entirely ignored the histories of their subjects, and historians and biographers have explored the influences of climate, culture, persons, and incidents. People have used practical techniques of predicting and controlling behavior with little thought to mental states. Nevertheless, for many centuries there was very little systematic inquiry into the role of the physical environment, although hundreds of highly technical volumes were written about human understanding and the life of the mind. A program of methodological behaviorism became plausible only when progress began to be made in the scientific observation of behavior, because only then was it possible to override the powerful effect of mentalism in diverting inquiry away from the role of the environment.

Mentalistic explanations allay curiosity and bring inquiry to a stop. It is so easy to observe feelings and states of mind at a time and in a place which make them seem like causes that we are not inclined to inquire further. Once the environment begins to be studied, however, its significance cannot be denied.

Methodological behaviorism might be thought of as a psychological version of logical positivism or operationism, but they are concerned with different issues. Logical positivism or operationism holds that since no two observers can agree on what happens in the world of the mind, then from the point of view of physical science mental events are "unobservables"; there can be no truth by agreement, and we must abandon the examination of mental events and turn instead to how they are studied. We cannot mea-

sure sensations and perceptions as such, but we can measure a person's capacity to discriminate among stimuli, and the *concept* of sensation or perception can then be reduced to the *operation* of discrimination.

The logical positivists had their version of "the other one." They argued that a robot which behaved precisely like a person, responding in the same way to stimuli, changing its behavior as a result of the same operations, would be indistinguishable from a real person, even though it would not have feelings, sensations, or ideas. If such a robot could be built, it would prove that none of the supposed manifestations of mental life demanded a mentalistic explanation.

With respect to its own goals, methodological behaviorism was successful. It disposed of many of the problems raised by mentalism and freed itself to work on its own projects without philosophical digressions. By directing attention to genetic and environmental antecedents, it offset an unwarranted concentration on an inner life. It freed us to study the behavior of lower species, where introspection (then regarded as exclusively human) was not feasible, and to explore similarities and differences between man and other species. Some concepts previously associated with private events were formulated in other ways.

But problems remained. Most methodological behaviorists granted the existence of mental events while ruling them out of consideration. Did they really mean to say that they did not matter, that the middle stage in that three-stage sequence of physical-mental-physical contributed nothing—in other words, that feelings and states of mind were merely epiphenomena? It was not the first time that anyone had said so. The view that a purely physical world could be self-sufficient had been suggested centuries before, in the doctrine of psychophysical parallelism, which held that there were two worlds—one of mind and one of matter—and that neither had any effect on the other. Freud's demonstration of the unconscious, in which an awareness of feelings or states of mind seemed unnecessary, pointed in the same direction.

But what about other evidence? Is the traditional *post hoc, ergo propter hoc* argument entirely wrong? Are the feelings we experience just before we behave wholly unrelated to our behavior? What about the power of mind over matter in psychosomatic medicine? What about psychophysics and the mathematical relation between the magnitudes of stimuli and sensations? What about the stream of consciousness? What about the intrapsychic processes of psychiatry, in which feelings produce or suppress other feelings and memories evoke or mask other memories? What about the cognitive processes said to explain perception, thinking, the

construction of sentences, and artistic creation? Must all this be ignored because it cannot be studied objectively?

Radical Behaviorism

The statement that behaviorists deny the existence of feelings, sensations, ideas, and other features of mental life needs a good deal of clarification. Methodological behaviorism and some versions of logical positivism ruled private events out of bounds because there could be no public agreement about their validity. Introspection could not be accepted as a scientific practice, and the psychology of people like Wilhelm Wundt and Edward B. Titchener was attacked accordingly. Radical behaviorism, however, takes a different line. It does not deny the possibility of self-observation or self-knowledge or its possible usefulness, but it questions the nature of what is felt or observed and hence known. It restores introspection but not what philosophers and introspective psychologists had believed they were "specting," and it raises the question of how much of one's body one can actually observe.

Mentalism kept attention away from the external antecedent events which might have explained behavior, by seeming to supply an alternative explanation. Methodological behaviorism did just the reverse: by dealing exclusively with external antecedent events it turned attention away from self-observation and self-knowledge. Radical behaviorism restores some kind of balance. It does not insist upon truth by agreement and can therefore consider events taking place in the private world within the skin. It does not call these events unobservable, and it does not dismiss them as subjective. It simply questions the nature of the object observed and the reliability of the observations.

The position can be stated as follows: what is felt or introspectively observed is not some nonphysical world of consciousness, mind, or mental life but the observer's own body. This does not mean, as I shall show later, that introspection is a kind of physiological research, nor does it mean (and this is the heart of the argument) that what are felt or introspectively observed are the causes of behavior. An organism behaves as it does because of its current structure, but most of this is out of reach of introspection. At the moment we must content ourselves, as the methodological behaviorist insists, with a person's genetic and environmental histories. What are introspectively observed are certain collateral products of those histories.

The environment made its first great contribution during the evolution of the species, but it exerts a different kind of effect during the lifetime of the individual, and the combination of the two effects is the behavior we observe at any given time. Any available information about either contribution helps in the prediction and control of human behavior and in its interpretation in daily life. To the extent that either can be changed, behavior can be changed.

Our increasing knowledge of the control exerted by the environment makes it possible to examine the effect of the world within the skin and the nature of self-knowledge. It also makes it possible to interpret a wide range of mentalistic expressions. For example, we can look at those features of behavior which have led people to speak of an act of will, of a sense of purpose, of experience as distinct from reality, of innate or acquired ideas, of memories, meanings, and the personal knowledge of the scientist, and of hundreds of other mentalistic things or events. Some can be "translated into behavior," others discarded as unnecessary or meaningless.

In this way we repair the major damage wrought by mentalism. When what a person does is attributed to what is going on inside him, investigation is brought to an end. Why explain the explanation? For twenty-five hundred years people have been preoccupied with feelings and mental life, but only recently has any interest been shown in a more precise analysis of the role of the environment. Ignorance of that role led in the first place to mental fictions, and it has been perpetuated by the explanatory practices to which they gave rise.

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On the Positive Side

Behaviorism has so often been defined in terms of its supposed shortcomings—of what it is said to ignore or neglect—that setting the record straight often appears to destroy what was meant to be saved. In answering these charges I may seem to have "abandoned the very basis of behaviorism," but what I have abandoned are the vestiges of early statements of the position, subjected to various elaborations and criticisms over a period of some sixty years. What survives can be put in a positive form:

1. The position I have taken is based, as the reader was warned, on a particular kind of behavioral science. I have chosen it in part no doubt because of my familiarity with it but mainly because it has certain features especially relevant to the behavioristic argument. It offers, I believe, the clearest possible statement of the causal relations between behavior and environment. It analyzes individual data rather than group averages. The complexity of the experimental environment has gradually increased until it now approaches the complexity of daily life—in which, therefore, extrapolations from the laboratory become increasingly useful.

2. What we have learned from the experimental analysis of behavior suggests that the environment performs the functions previously assigned to feelings and introspectively observed inner states of the organism. This fact has been only slowly recognized. Only very strong evidence of the role of the environment could offset the effects of mentalism in directing attention to supposed inner causes.

3. A behavioral analysis acknowledges the importance of physiological research. What an organism does will eventually be seen to be due to what it is, at the moment it behaves, and the physiologist will someday give us all the details. He will also tell us how it has arrived at that condition as a result of its previous exposure to the environment as a member of the species and as an individual.

4. A crucial step in the argument can then be taken: what is felt or seen through introspection is only a small and relatively unimportant part of what the physiologist will eventually discover. In particular it is not the system which mediates the relation between behavior and the environment revealed by an experimental analysis.

As the philosophy of a science of behavior, behaviorism calls for probably the most drastic change ever proposed in our way of thinking about man. It is almost literally a matter of turning the explanation of behavior inside out.

The Future of Behaviorism

A good deal of what is called behavioral science is not behavioristic in the present sense. Some of it, as we have seen, avoids theoretical issues by confining itself to the form, topography, or structure of behavior. Some of it appeals to the "conceptual nervous systems" of mathematical models and systems theories. Much of it remains frankly mentalistic. Perhaps this diversity is healthful: different approaches could be regarded as mutations, from which a truly effective behavioral science will eventually be

selected. Nevertheless, the present condition is not promising. Even in a single part of the field it is unusual to find two authorities talking about precisely the same things, and although nothing could be more relevant to the problems of the world today, the actual accomplishments of behavioral science do not seem to be extensive. (It has been suggested that the science is "too young" to solve our problems. This is a curious example of developmentalism, in which immaturity offers a kind of exoneration. We forgive the baby for not walking because he is not yet old enough, and by analogy we forgive the asocial or disturbed adult because he has not quite grown up, but must we then wait until the behavioral sciences *grow* more effective?)

I contend that behavioral science has not made a greater contribution just because it is not very behavioristic. It has recently been pointed out that an International Congress on Peace was composed of statesmen, political scientists, historians, economists, physicists, biologists—and not a single behaviorist in the strict sense. Evidently behaviorism was regarded as useless. But we must ask what the conference achieved. It was composed of specialists from many different fields, who probably spoke the commonsense lingua franca of the layman, with its heavy load of references to inner causation. What might the conference have achieved if it could have abandoned this false scent? The currency of mentalism in discussions of human affairs may explain why conferences on peace are held with such monotonous regularity year after year.

To assert that a thoroughgoing behaviorism could make a great difference is almost inevitably to be asked: "Well, then, what do you suggest? What would *you* do about war, or population, or pollution, or racial discrimination, or the revolt of the young?" Unfortunately, to understand the principles involved in solving a problem is not to have the solution. To know aerodynamics is not at once to know how to design a plane, to know plate tectonics is not at once to know how to predict earthquakes, to understand the double helix is not at once to be able to create a new species. The details of a problem must be studied. Knowing the basic principles without knowing the details of a practical problem is no closer to a solution than knowing the details without knowing the basic principles. But problems can be solved, even the big ones, if those who are familiar with the details will also adopt a workable conception of human behavior.

When we say that science and technology have created more problems than they have solved, we mean physical and biological science and technology. It does not follow that a technology of behavior will mean further

trouble. On the contrary, it may be just what is needed to salvage the other contributions. We cannot say that a science of behavior has failed, for it has scarcely been tried. And it will not be given a fair trial until its philosophy has been clearly understood. A distinguished social philosopher has said, "It is only through a change of consciousness that the world will be saved. Everyone must begin with himself." But no one can *begin* with himself; and if he could, it would certainly not be by changing his consciousness.

If it were true that "an ever greater danger than nuclear war arises from within man himself in the form of smouldering fears, contagious panics, primitive needs for cruel violence, and raging suicidal destructiveness," then we should be lost. Fortunately, the point of attack is more readily accessible. It is the environment which must be changed. A way of life which furthers the study of human behavior in its relation to that environment should be in the best possible position to solve its major problems. This is not jingoism, because the great problems are now global. In the behavioristic view, man can now control his own destiny because he knows what must be done and how to do it.