Skinner Boxing

Take your seats, please. The guru of behaviorism is set to challenge the palookas who discarded his scientific approach.

BY BRUCE BOWER

Good evening and welcome to tonight's long-awaited academic heavyweight bout, soon to appear in a book published by Cambridge University Press. In the near corner stands the "Behaviorist Bomber," B.F. Skinner of Harvard University. Jammed into the far corner are 142 of his critics — biologists, computer scientists, linguists, neuroscientists and philosophers — waiting to hit the head of behavioristic psychology with their best shots.

The fight is scheduled for six rounds, barring any low blows or rabbit punches. As usual in psychological scuffles, scoring is up to each spectator. There's the opening bell.

Round One: Skinner takes the offensive, brandishing a 1984 paper in which he argues that the environment — not individual decision-making — shapes human behavior. He throws a one-two-three combination: Natural selection picks out adaptive traits for the species; individual behaviors are "reinforced" and shaped by their consequences; and cultural practices promoted by external circumstances further determine each person's behavior.

Often, he explains, the last two factors end up outweighing natural selection. For example, certain foods were originally consumed solely for their survival value. Gradually, different foods acquired reinforcing properties in different cultures, leading to new ways of gathering, processing and cultivating foods. Conditioned eating behavior is not always adaptive, since unhealthy foods, such as sweets, are over-reinforced in some modern societies.

The appearance of language, or "verbal behavior," greatly increased the importance of cultural reinforcement, adds Skinner. Individuals who talk are able to take advice from others, learn rules, heed warnings, follow instructions and develop self-awareness in response to the questions of comrades ("Why did you do that?"). Responses that prove to be successful for a group — a better way of making a tool, growing food or teaching a child — shape cultural practices.

The critics quickly counter-punch. There are limits, they say, to the environment's power over a species and its members. For instance, when someone creates a work of art or takes action to solve a disagreement with someone else, they might mentally rehearse various scenarios, envision probable consequences and select one with the most desirable imagined outcome. In this way, thoughts and goals work in tandem with prior reinforcements.

In a shot to the body, the critics further contend that Skinner's three categories are oversimplified. The aim of natural selection is survival, they say, but reinforcing consequences often promote sensory gratification that can be destructive (drug addiction and dangerous sports are two examples). Human survival, as well as animal survival, may be intertwined with a need for sensory satisfaction that, paradoxically, works against survival in some ways.

Skinner, however, rolls with the punches. The thoughts and goals of an artist or a negotiator spring from their inherited qualities and the prior reinforcements each has received, he says. Furthermore, reinforcers work by strengthening behavior, be it heroism or heroin abuse, over time: Behaviors are defined as good or bad, pleasurable or painful, by groups and cultures.

Round Two: In a condensation of several early articles, Skinner jabs at psychologists' "flight from the laboratory" and reluctance to study how behavior is "selected" by its consequences. They are attracted, he says, to real-life people (as in psychotherapy), all-encompassing mathematical models of learning and performance, the "inner man" composed of perceptions, habits, ideas and other presumed qualities, and the "remedial patchwork" of commonsense notions about why people do what they do. These pursuits are often fun, he admits, but a science of behavior should study orderly changes that take place in different contexts.

Laboratory work is important, acknowledge the critics, but so is "real-

Entering the Fray

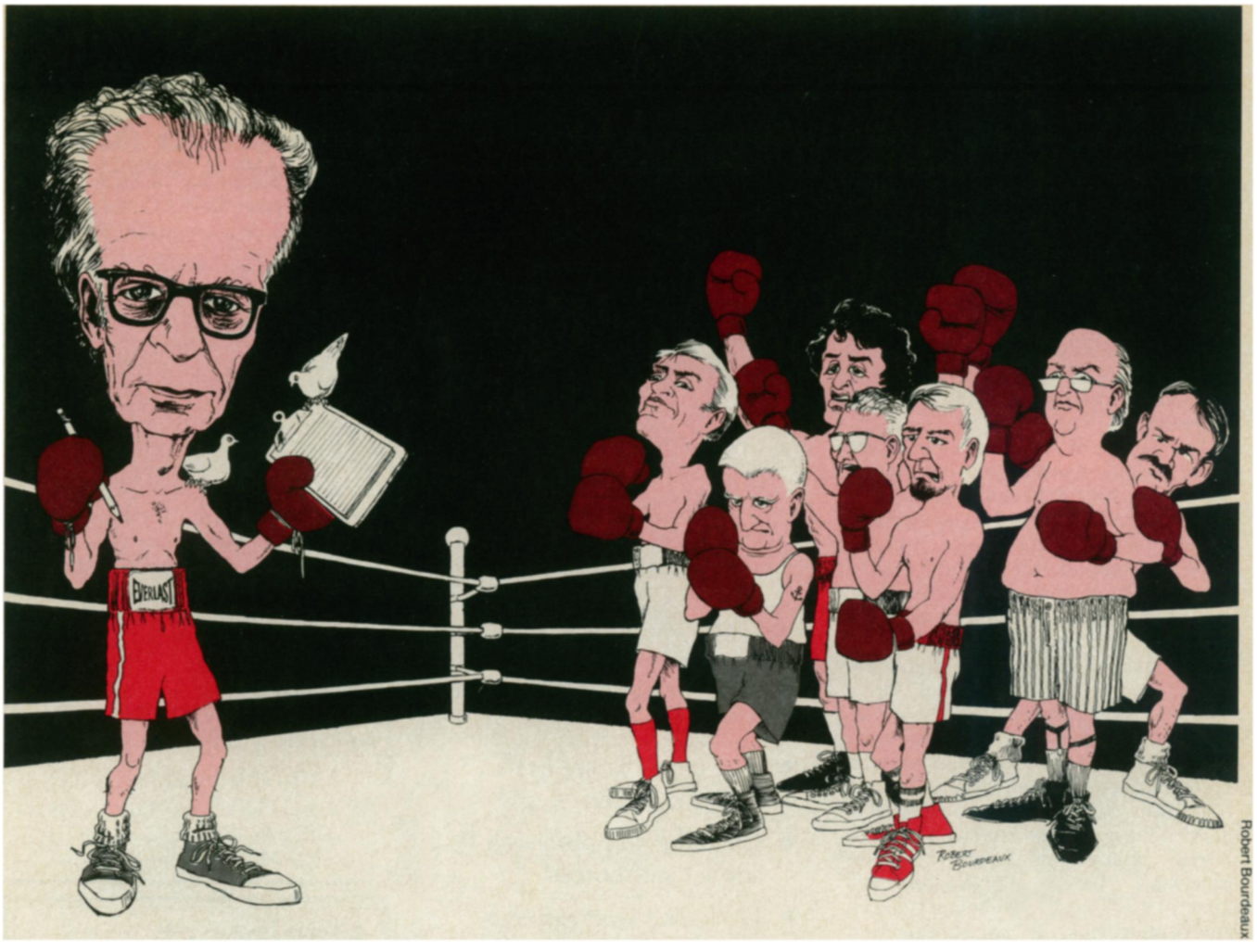
B.F. Skinner has published scientific papers and stirred up controversy for more than 50 years, but he has studiously avoided open confrontation with his numerous detractors. As he wrote in 1983, "I have escaped from the punishers . . . I do not often read my critics."

The next year he did an about-face. Six of his most influential articles were circulated to scientists around the world for their written commentaries, which, along with Skinner's responses to each correspondent, appeared in the December 1984 BEHAVIORAL AND BRAIN SCIENCES. That publication, along with added commentaries, is slated for wider exposure in an upcoming book titled *Canonical Papers of B.F. Skinner.* It is the only extensive, written confrontation between Skinner and his challengers.

What prompted Skinner's change of heart? His prime consideration, he says, was to grapple with the further implications of his work that a diverse group of scientists might come up with. Unfortunately, in his opinion this meeting of the minds produced more misunderstandings than implications. Still, it gives Skinner a chance to air out theories that have fallen into disfavor among psychologists and are widely misunderstood by professional and lay people alike.

The exchanges become vitriolic and personal at times. "I have tried to keep the personal tone out of my replies," says Skinner, "but the temptation was great, and at a few points I have failed." He concludes that the book will "be of interest to the future historian as a sample of the style of discussion among behavioral scientists near the end of the 20th century."

— B. Bower



world" psychology. Internal mental states, argue many, do more than mediate the effects of reinforcement; they can determine behavior. Even in basic animal experiments, they point out, a reinforcer (food, for example) of one behavior (say, a pigeon pecking a key) will not necessarily condition other behaviors (such as wing flapping).

Certainly there are genetic reasons why many events are reinforcing for specific behaviors, responds Skinner. Someday anatomists and physiologists may directly observe neurological changes connected to learning and behaving, but until then, he notes, a reliance on inner workings encourages useless theories.

Round Three: Skinner uses a paper published 40 years ago to attack the common misperception that he sees humans as passive organisms with nothing of importance happening beneath their skin. People have an "inner behavioral life" and are conscious or aware of what they do and feel, he explains, but only after they learn to respond verbally to inner experience through the examples and instructions of others. In a simple case, the stimulation from a damaged tooth that brings someone to the dentist is described by the sufferer as "a toothache." This may or may not be true, but the verbal response is anchored in the way a society reinforces descriptions of pain and other body sensations. Most mental activity, he adds, is unconscious (shades of Sigmund Freud) and flows from a complex history of reinforcement that originates from without, not within.

Language is an innate human ability, counter the critics, too complex to arise full-blown from social reinforcements. The same word becomes attached to all sorts of meanings that cannot be easily explained by outside reinforcers. A child, for example, may say "Mama" when unhappy, wistful, overjoyed or in pain. In the absence of external events, they continue, people still respond to mental "representations" of events.

There are no mental copies or representations of the world, answers Skinner. We respond to events according to past reinforcements, and some behaviors eventually change. The attachment of words to their myriad meanings is difficult for any science of psychology to address, he says, but researchers should assume that behavior stems from a person's genetic and personal history, not internal "ideas" or states of mind.

Round Four: The "Behaviorist Bomber" plows on, tackling the issue of problem solving in a 1966 paper. He holds that as a culture formulates maxims, laws, grammar and science, its members behave more effectively and develop verbal rules for behavior. A web of reinforcers—the natural environment, a piece of equipment, a verbal community and numerous others — sets the stage for individuals to use induction, deduction and other problem-solving techniques.

Nice try, retort the critics, but the behaviorist approach explains little about complex problem solving, such as long-range planning, appreciation of possible consequences and scientific discovery. Situations affect behavior, but mental mechanisms—motivation, for instance—are invaluable in unraveling the twists and turns involved in finding a solution.

Problem solving is indeed a tough nut to crack, says Skinner, but the study of behavior and its consequences rather than internal information processing or motivation "offers, I believe, the most rigorous analysis of the facts which neurology will someday explain."

Round Five: The contestants look a bit weary, but they are still bobbing and weaving. In a 1963 assessment of behaviorism, Skinner says that private events, including sensations, memories and dreams, are part of behavior rather than reflections of mysterious mental op-

erations. For example, if someone dreams of wolves, no wolves are actually there, but, he asserts, the behavior of seeing them still takes place. Descriptions of the behavior of seeing a dream, a baseball game or anything else arise from cultural reinforcement that is largely verbal.

Consciousness of "private events" is more than a behavioral by-product of language and the environment, contend the critics. Human behavior is too complex and experimental data too rich to deny the importance of mental processes. Computer models of human thinking (artificial intelligence) are important tools, they note, for exploring intelligent behavior.

The study of circumstances under which people report seeing, hearing and other conscious behavior, answers Skinner, will reveal more than speculation about mental processes. Computers store information and respond to input with output. People, on the other hand, are changed by encounters with the world and then behave in new ways; they do not mentally store rules and representations.

Round Six: Time remains for a few last licks. Skinner asserts in a 1966 paper that the consequences of behavior over the millennia have selected for genetic variations that contribute to so-called "innate" behaviors, and external reinforcements shape individual "learned" behaviors. The evolutionary reinforcement of species-wide behaviors is difficult to study, but this "natural selection" works with more immediate reinforcers to influence "inborn" behaviors such as aggression, communication and imitation. It is not good enough to say that "traits" or "instincts" cause aggression; where, asks Skinner, do the traits and instincts come from?

The critics charge, however, that internal traits such as introversion and extroversion are invaluable in explaining the variety of individual responses to the same reinforcer. Skinner, they say, focuses on similarities, not differences, in behavior, thus ignoring what one biologist calls "the vast panorama of life on earth."

The final bell sounds, and the flushed competitors retreat to their corners. From his stool, Skinner declares that psychologists have "escaped from the strain of rigorous thinking" by casting aside behaviorism for cognitive theories and computer models. "Why have I not been more readily understood?" he laments. "[My] central position is not traditional, and that may be the problem. To move from an inner determination of behavior to an environmental determination is a difficult step."

As Muhammad Ali might say, the fight was no "Thrilla in Manila," but the 81-year-old Skinner can still float like a butterfly and sting like a behaviorist. □