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**What John B. Watson left out of his behaviorism**  
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Behaviorism meant to many young men and women of the time a new orientation and a new hope when the old guides had become hopelessly discredited in their eyes. It was a religion to take the place of religion (Woodworth, 1948, p. 94).

Despite the risks, my own approach to religion is a "behavioral" one. The term has an emotional loading these days among scientists and laymen alike (Schoenfeld, 1993, p. xii).

Those mainly familiar with the contemporary "emotional loading" of the term *behavioral* may wonder at the widespread (though by no means universal) acceptance of John B. Watson's behaviorism in its day. In describing Watson's success in winning a public following in the 1920's, Woodworth (1948, p. 92) characterized behaviorism as "hopeful and democratic" and suggested that its environmentalism was part of the basis for its appeal. Of the book "Behaviorism" (Watson, 1924, 1930), the *New York Times* wrote that "It marks an epoch in the intellectual history of man" and the *Tribune* that "Perhaps this is the most important book ever written. One stands for an instant blinded with a great hope" (Woodworth, 1948, p. 93).

But Watson's reception changed over time. This is how B. F. Skinner put it in an obituary of Watson:

And so it came about that Watson was to be remembered for a long time, by both laymen and psychologists alike, for a too narrow interpretation of self-observation, for an extreme environmentalism, and for a coldly detached theory of child care, no one of which was a necessary part of his original program. His glimpse of the need for, and the nature and implications of, a science of behavior was all but forgotten (Skinner, 1959, p. 198).

John B. Watson's behaviorist manifesto (Watson, 1913) was addressed to a psychology that was marked by substantial disagreements about its methods and its subject matter (some of those disagreements have yet to be resolved). Researchers claimed to be able to study the content of consciousness through the method of introspection, but could not agree on fundamental issues such as the nature of basic mental units. In this historical context, Watson advocated behavior, as opposed to consciousness or mind, as the only legitimate subject matter of psychology. On methodological grounds he excluded mental events such as images as proper areas of inquiry in psychology. Later preoccupation with the scientific legitimacy of psychology disposed researchers to look to other sciences for principles of scientific method, and gradually Watsonian behaviorism was merged with the operationism that was newly developing in physics and with the logical positivism that was being introduced as a revolutionary change in the philosophy of science (e.g., L. D. Smith, 1986). It became

*methodological* behaviorism and, as such, rejected the study of private events.

But Watson's behaviorism had social impact outside of psychology as well as scientific impact within it. Watson did not deny the importance of physiology and genetics (in fact, he devoted substantial portions of his books to them), but his emphasis was on the environment, and the implications were practical. His writings appeared in popular magazines and his recommendations on child-rearing and other practices were taken seriously. The following quotation is probably all too familiar:

I should like to go one step further now and say, "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select---doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors." I am going beyond my facts and I admit it, but so have the advocates of the contrary and they have been doing it for many thousands of years. (Watson, 1930, p. 104)

This radical pronouncement came at a time when United States culture was changing drastically under the pressures of women's suffrage, continuing racism, the absorption of large numbers of immigrants, and the aftermath of a world war. Racial segregation was a mostly unquestioned fact of life. Intelligence testing in the service of military induction (Yerkes, 1921) had led to judgments about the relative intelligence of different ethnic groups. Though women had won the vote, they were more likely to be homemakers than breadwinners. Veterans brought their experiences of war back to a society that was becoming increasingly urban and mobile. In the face of these cultural tensions, Watson's appeal to environmental rather than genetic sources of behavioral differences was decidedly antiestablishment. Here, for example (and perhaps in partial compensation for the sexist *his* and *him* in the quotation above), is Watson on the environmental determinants of the "relative efficiency of the two sexes":

In so far as life's activities are concerned the accomplishments of women are undoubtedly below those of men... Undoubtedly, the failure of women to achieve greatness in many of these vocational and artistic fields is due to social conditions; for example, it is only within recent years that the universities have encouraged women scientists and even then for them to have a fair show in scientific matters their training in manual dexterity should start at birth, as it does for men. University positions would have to be open to women as they are to men if they are to have the same stimulus for achievement in scientific lines (Watson, 1919, p. 384).

For some, Watson's views were liberating and for others they were threatening (they would probably have seemed less threatening if they had not seemed to contain elements of truth). The implications extended not only to privilege based upon ethnic and racial and class origins and therefore to the maintenance of the status quo; once the argument had been made for the environmental determination of behavior, it followed that behavior could be controlled. Over time, these implications became evident in a variety of ways. In Germany, the playwright Berthold Brecht read Watson in translation and incorporated a behavioral view into his theory of theater (Rosenbauer, 1970). In Soviet Russia, Ivan P. Pavlov's psychology gradually became politicized (Joravsky, 1961), and because Watson had made Pavlov's conditioned reflexes a part of his behaviorism, the behaviorist view came to be identified with conditioning and eventually with brainwashing. In the United States, B. F. Skinner

took up the possibility of a behaviorally based design of cultures (Skinner, 1948).

But for those who welcomed Watson's behaviorism, what he left out of it may have been as important as what he put in. The science of the time was not yet ripe for selectionist rather than associationist accounts. Furthermore, the stuff on which environments worked, according to Watson, was muscle twitches and glandular squirts, so that the criteria for what counted as behavior were physiological rather than functional. And, finally but perhaps most importantly, Watson's behaviorism had no place for consciousness or mind or sensations or feelings; as a consequence, he had no way to deal with private events and thereby left that realm to others, uncontested.

### **Selection in Phylogeny, Ontogeny, and Culture**

It would be easy but unfair to fault Watson for his relative neglect of Darwinian selection and its implications. The modern synthesis in the 1920's, in the integration of Darwinian selection with experimentally determined mutation rates as a source of genetic variation, rescued Darwinism from an eclipse that had lasted roughly half a century (cf. Bowler, 1983). But at the time of Watson's major writings, this achievement had only begun to be broadly accepted even within biology.

Watson did refer to Darwin, but in the first half of the 20th century physics rather than biology was the model science for psychologists. Decades were to pass before selection by consequences could become a viable basis for the organization of behavioral phenomena, in Skinner's elaboration of the operation of selection in the three areas of phylogeny, ontogeny and culture (e.g., Skinner, 1981). The science of behavior has only recently begun to resemble biology more than physics in its methods and its theories.

Selection in phylogeny corresponds to natural selection, Darwin's account of evolution in terms of the differential survival and reproduction of the members of a population; the environment selects the individuals that pass on their characteristics to the next generation and thereby shapes the characteristics of individuals in subsequent populations. Behavior is a product of evolution, and the selection or survival of patterns of behavior in an organism's lifetime parallels the selection or survival of individuals in evolutionary time; in turn, the selection or survival of patterns of behavior as behavior is passed from one individual to another within cultures parallels both the phylogenic and the ontogenic varieties of selection. All involve variations that provide the source materials upon which evolution acts, and each involves some basis for selecting what survives (parallels among these varieties of selection by consequences have been explored in considerable detail: e.g., Catania, 1992b; Skinner, 1981; T. L. Smith, 1986). Some of the implications of selection are only just beginning to be appreciated in contemporary behavior analysis.

### **The Definition of Behavior**

In Watson's account, behavior consisted solely of muscular twitches and glandular squirts. Other kinds of "doing" did not count as behavior unless they manifested themselves in those forms. Most of Watson's interpretation of thought and other complex processes was in terms of the development of abbreviated forms of overt behavior. Here, for example, is Watson on a human subject's verbal problem solving:

...when you have tried this out for yourself you will be convinced that you have an

accurate story of how your subject worked his problem out by word behavior. If then, you grant that *you have the whole story of thinking when he thinks aloud, why make a mystery out of it when he thinks to himself?* (Watson, 1930, p. 246, Watson's italics)

(In the same book, Watson went on to take the mystery out of creativity in a similar way: "How do we ever get new verbal creations such as a poem or a brilliant essay? *The answer is that we get them by manipulating words, shifting them about until a new pattern is hit upon*"; p. 247, again, Watson's italics.)

Watson presented his theory as holding

...that the muscular habits learned in overt speech are responsible for implicit or internal speech (thought). It holds, too, that there are hundreds of muscular combinations with which one can say either aloud or to himself almost any word, so rich and so flexible is language organization and so varied are our overt speech habits (Watson, 1930, p. 239).

Watson considered and rejected an alternative view that might have included various central processes as behavior, and thereby conceded to others the activities that would later be included under the rubric of cognitive processing:

The alternative sometimes advanced to this theory is that so-called central processes may take place in the brain so faintly that no neural impulse passes out over the motor nerve to the muscle, hence no response takes place in the muscles and glands (Watson, 1930, p. 239).

To accept this alternative and give up his theory would imply that "the whole physiological conception of motor activity---that motor activity follows sensory stimulation---will have to be given up along with it" (Watson, 1930, p. 241).

Paradoxically, Watson's criterion for what counted as behavior was physiological rather than behavioral. It would not be long before his criterion would be challenged on behavioral grounds. The concept of the operant (Skinner, 1938) freed the definition of responses from their dependence on antecedent (and especially eliciting) stimuli, and it substituted a functional criterion, the environmental effects of responding, for Watson's physiological one. Once this had happened, it would only be a matter of time for other kinds of activities besides muscular and glandular ones to be recognized as instances of behavior.

Most processes called cognitive (e.g., imagining and visualizing) are kinds of behavior that do not manifest themselves as muscle movements. They are typically observed indirectly. Consider the behavior called paying attention. It is not enough simply to ask whether someone is attending. The problem of introspection is the same as it was in Watson's time: it is unreliable. Reports of covert behavior are constrained by the limited ways in which verbal communities can establish reliable vocabularies based on such events.

The response of attending may include movement, but that does not mean that *it is* movement. For visual stimuli, the response may superficially resemble looking toward or even pointing at something. But individuals also look without seeing, as when they are "lost in thought" (they are then not paying attention). Treating attending as equivalent to eye movement would inappropriately imply that looking without seeing is the same as looking and seeing. Separate acts of looking at a given place may seem

the same, but they differ if different things are looked for each time. For example, scanning a page to find a name is not the same behavior as scanning it to find a definition (Watson, of course, would have argued that the two types of scanning differ in the detailed organization of covert muscle activity, but the argument is no longer cogent because topography does not define operant classes).

When response classes do not involve overt movement, other properties such as duration or latency can be recorded. This rationale has been applied experimentally to the response of attending (Sperling & Reeves, 1980). Observers were instructed to look at a visual fixation point. Just to the left of this point, letters were presented one at a time in rapid sequence. Just to the right, numbers were similarly presented. Observers could see both the letters and the numbers without moving their eyes. Their instructions were to watch for a particular letter and, immediately upon seeing it, to shift attention to the numbers and report the one they saw. They were able to perform this task with rates of stimulus projection in excess of 20 per second and without eye movements (an infrared monitoring system detected trials in which eye movements occurred, and allowed data from such trials to be discarded). Observers reported not the one that had appeared simultaneously with the critical letter, but instead one that appeared some fraction of a second later. These times were latencies to switch attention from the letters to the numbers (like the latencies of more obvious responses, such as button-presses, they depended on task difficulty and other variables).

The point is that, with such procedures, attending can be studied as a behavior class (e.g., contingencies can be arranged for it), even though it cannot be identified as particular muscle movements or glandular secretions. There is more to behavior than was available to Watson's system. The methods for measuring attending, imagining, and other covert processes are necessarily indirect, but they do make such varieties of behavior accessible to analysis (see Catania, 1992b, Chapter 15, for a more detailed account). The primary concern must be to determine the properties of such behavior rather than to base accounts of other kinds of behavior upon them. A behavioral account does not deny their existence, but it does limit the conditions under which they can properly serve as explanations of behavior. They should be regarded as instances of behavior in their own right.

### **The Nature of Private Events**

To appeal to the objective is to acknowledge its alternative. It might be regarded as a quibble to point out that the subjective remains implicit in the very first sentence of Watson's manifesto: "Psychology as the behaviorist views it is a purely objective experimental branch of natural science" (Watson, 1913, p. 158). But though it is possible to read Watson as integrating the subjective into his objective system, most interpretations of his work assume that the subjective remained out of reach of and therefore untouched by his behaviorism. For example, when Watson argued in his manifesto that "either psychology must change its viewpoint so as to take in facts of behavior, whether or not they have bearings upon the problems of 'consciousness'; or else behavior must stand alone as a wholly separate and independent science," it was not necessary to assume that Watson was questioning consciousness itself:

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; and we usually add, to protect ourselves against the reproach of being anthropomorphic, "if it has any consciousness." Surely this doctrine which calls for an analogical interpretation of all behavior data may be shown to be false: the position that the standing of an observation upon behavior is determined by its fruitfulness in yielding results which are interpretable only in the narrow realm of (really human) consciousness.

Later in the manifesto he acknowledged a function of this "(really human) consciousness":

The separate observation of "states of consciousness" is, on this assumption, no more a part of the task of the psychologist than of the physicist. We might call this the return to a non-reflective and naive use of consciousness. In this sense consciousness may be said to be the instrument or tool with which all scientists work. Whether or not the tool is properly used at present by scientists is a problem for philosophy and not for psychology.

If this quotation is to be taken seriously, according to Watson consciousness exists but is not the business of the behaviorist.

Woodworth's account of Watson's behaviorism supports this interpretation. In discussing Watson's use of the human's verbal report, he concluded that

This verbal response is a perfectly objective phenomenon. We need not assume that he has any conscious sensation but only accept the fact that he makes the verbal response....

Well and good---but.... for the behaviorists to deny that the human subject, at least, is actually seeing or hearing when he so reports, seems pedantic to say the least. The behaviorist certainly admits that he himself can see and hear, for does he not insist that only what he can see and hear shall be accepted as scientific data? (Woodworth, 1948, p. 81-82).

And further, "If Watson accepts this report, he admits "seeing" into his system, while pretending to have a system which excludes all such subjective foolishness" (Woodworth, 1948, p. 83). Watson "evidently did not regard feelings or images as mere unreal ghosts, for then he would not have attempted to explain them" (Woodworth, 1948, p. 85). Watson had conceded the territory of the private to others. It was later to be reclaimed by Skinner (though Skinner rejected the term *mental* as a label for it).

Skinner presented the core of his argument in "The operational analysis of psychological terms" (Skinner, 1945; see also Skinner, 1957), where he discussed the difficulties created by positing a language of private events not based on the public practices of the verbal community (the paper has often been taken as a defense of operationism, but in fact it was a renunciation of operationism). The issue was not the existence of such private events as feeling or thinking or imagining; rather, it was how we learn to talk about them. We learn to talk about our feelings, but the words we use are taught to us by the same verbal community that provides us with all of the other words of our language. This teaching can only be accomplished on the basis of what is publicly shared by the speakers and listeners of the verbal community.

The argument, often misunderstood, did not deny the private; instead, it pointed out the limitations imposed on the vocabulary of private events by the fact that common vocabularies can be based only on what is mutually accessible to and therefore shared by speakers and listeners. If a private feeling has

no public correlate, how can anyone ever tell when anyone else has it? If one cannot tell, how can one ever teach the other the word for it? The speaker usually has a more intimate relation to private than to public events, but that does not imply that the speaker knows the former in some more effective way than the latter. "The skin is not that important as a boundary. Private and public events have the same kinds of physical dimensions" (Skinner, 1963, p. 953).

A parent can teach a child color names because the parent can see the colors that the child sees and therefore can respond differentially to the child's correct and incorrect color naming (so many different consequences follow from color naming that it ordinarily does not matter whether the parent teaches the color names through explicit instruction or simply allows them to become established through casual day-to-day interactions). With private events, however, the vocabulary can be taught only through extension from terms based on events to which the verbal community has access. For example, the child may learn to report pain because the parents have access to overt manifestations such as the event that caused an injury, or to overt behavior such as the child's crying or facial expression; if the child has learned the names of body parts, the combination of relevant verbal responses may produce the report of pain in a particular part of the body. The reports may also be extended through generalization (especially along the dimension of reduced magnitude) or through metaphorical extension (as when pains are called dull or sharp by extension from some properties of the objects that produce them).

A toothache is a physical event, but the person with the toothache has different access to it than does the dentist called on to treat it. Both respond to the unsound tooth, but one does so by feeling the tooth and the other by probing it with instruments. One kind of contact is not necessarily more reliable than the other. For example, in the phenomenon of referred pain, a bad tooth in the lower jaw may be reported as a toothache in the upper jaw. In this case, the dentist is a better judge than the patient of where the pain really is. We often think of private events such as feelings and thoughts as ones to which we have privileged access and therefore of which we have special knowledge. But we learned the relevant words from others, and in teaching them to us they had access only to the public correlates. If we can be mistaken even about the location of a toothache, what assurance do we have of the reliability of any of our other reports of private events?

It follows from Skinner's analysis of the vocabulary of private events that the issue of verbal origins extends to all psychological terms. One problem with operationism had been its acceptance of the common vocabulary in terms of which operations, especially including those of observation, were defined. For any such term, one essential question is how it could have been learned; another is how it could be taught. The questions have the advantage that they always bring the argument back to the verbal environment and the practices of the verbal community. They also turn the analysis back upon behavior analysis itself, because behavior analysis too is the behavior of a verbal organism. Unlike the non-reflective consciousness of Watson's behaviorism, Skinner's radical behaviorism had become a self-conscious one. With the verbal props kicked out from under, it had to lift itself up by its own bootstraps.

### **Information and its Consequences**

In his early writings, Watson took some care to keep his readers from drawing the inference that his behaviorism might challenge certain established beliefs. For example, here is Watson in "Psychology from the standpoint of a behaviorist":

[Thought] is not different in essence from tennis-playing, swimming or any other overt activity except that it is hidden from ordinary observation and is more complex and at the same time more abbreviated so far as its parts are concerned than even the bravest of us could dream of. Does this view rob us of anything in science, literature or art? Surely the putting of thought back upon reasonable and debatable grounds robs us of nothing (Watson, 1919, p. 325).

He went on to deal explicitly with religion:

We have more than once pointed out that the real hesitancy in making thought highly integrated bodily activity and nothing more is due to the fact that historically "thought" has always been connected with religion. While it would not be admitted, it is probably, nevertheless, true that even now thought as it is generally conceived of by the scientific man is his pigeon-hole and scapegoat for religious tendencies which even he himself may deny having. To make thought a bodily process like any other act forces him to break away from an anchorage to which he has tied a good many of his adolescent boats. It is aside from our subject to point out here that the view we advocate need not rob such a one of his admitted or unadmitted religious views; when alchemy, healing by touch, astrology, the weaving of spells gave way to science, religion was not touched by the process nor need it be in the present instance (Watson, 1919, pp. 325-326).

But later he was less tactful. For example, he could not have been much more blunt and outspoken than he was on the very first page of his introduction to "Behaviorism":

Human beings do not want to class themselves with other animals. They are willing to admit that they are animals but "something else in addition." It is this "something else" that causes the trouble. In this "something else" is bound up everything that is classed as religion, the life hereafter, morals, love of children, parents, country, and the like. The raw fact that you, as a psychologist, if you are to remain scientific, must describe the behavior of man in no other terms than those you would use in describing the behavior of the ox you slaughter, drove and still drives many timid souls away from behaviorism (Watson, 1930, p. v).

No doubt such passages antagonized some readers and appealed to others (perhaps including the young B. F. Skinner: cf. Catania, 1992a). Yet for all the rhetoric, one defensible conclusion from Watson's work, as we have seen, was that all of the valued properties of mind and consciousness were untouched and unassailable. If the mental remained out of reach because there was in principle no access to it, then such accessories as mind and soul were also safe.

Freud's message too had shaken up Western culture, but even that message took consciousness for granted while reducing its scope. Freud's unconscious processes, in the interactions of ego and superego and id, were supplements to consciousness. In Skinner's account, however, consciousness itself was derivative. Behavior had to come first, and therefore the unconscious, before there could be

anything to be conscious of. For one who followed Skinner's arguments through, there was no place to hide. Consciousness and mind had been reduced to those private events that became accessible only as a consequence of the public practices of the verbal community; so reduced, there was nothing left over to accommodate their special and valued properties. To some, this organism in its environment might just as well be empty.

Of the many features of Watson's behaviorism that differentiates his from Skinner's, this one may be of special significance. Skinner's message was that the private is still the physical, with merely a different route of access; beyond that, it has no special status. And in leaving nothing out, this message presumably was threatening in a way that Watson's was not.

It is typically risky to speculate on the determinants of past events, but it is tempting to suggest that this difference between Watson's and Skinner's behaviorisms played a crucial role in the acceptance of their respective positions. The positive features of Watson's behaviorism could be entertained while popular cultural and religious assumptions about human nature remained in place. Skinner's behaviorism, however, was marked by its insistence on its implications for such assumptions (though what those implications are may not yet have been adequately determined: cf. Schoenfeld, 1993). As implied by the quotations that opened this treatment, religion and behavior analysis remain uneasy bedfellows.

Of the various behavioral analyses that have been carried out in recent years, one of the most significant in its implications for practical human behavior is Dinsmoor's (1983) body of work on observing behavior. One main conclusion is that organisms do not work to produce informative stimuli per se; instead, they work to produce informative stimuli correlated with reinforcers rather than those correlated with aversive events. The finding undercuts the reliance on information processing as a primary cognitive process; probably more important, it also implies that the effectiveness of a message depends more on whether its content is reinforcing or aversive than on whether it is correct or complete. For example, it is consistent with this finding that people often hesitate to have medical symptoms diagnosed. The phenomenon has long been recognized in folk psychology, as in accounts of the unhappy treatment of messengers who brought bad news or of the Trojans who would not listen to Cassandra's dire predictions. If this is how it is, then there may be a crucial lesson in the reception of Watson's and Skinner's behaviorisms. What if the future of behavior analysis depends less on whether it is effective or true or coherent than on whether its competitors are more likely to tell the story that contemporary audiences want to hear.

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