

## Behaviorism, Private Events, and the Molar View of Behavior

William M. Baum  
University of New Hampshire

Viewing the science of behavior (behavior analysis) to be a natural science, radical behaviorism rejects any form of dualism, including subjective–objective or inner–outer dualism. Yet radical behaviorists often claim that treating private events as covert behavior and internal stimuli is necessary and important to behavior analysis. To the contrary, this paper argues that, compared with the rejection of dualism, private events constitute a trivial idea and are irrelevant to accounts of behavior. Viewed in the framework of evolutionary theory or for any practical purpose, behavior is commerce with the environment. By its very nature, behavior is extended in time. The temptation to posit private events arises when an activity is viewed in too small a time frame, obscuring what the activity does. When activities are viewed in an appropriately extended time frame, private events become irrelevant to the account. This insight provides the answer to many philosophical questions about thinking, sensing, and feeling. Confusion about private events arises in large part from failure to appreciate fully the radical implications of replacing mentalistic ideas about language with the concept of verbal behavior. Like other operant behavior, verbal behavior involves no agent and no hidden causes; like all natural events, it is caused by other natural events. In a science of behavior grounded in evolutionary theory, the same set of principles applies to verbal and nonverbal behavior and to human and nonhuman organisms.

*Key words:* behavior analysis, behaviorism, dualism, evolution, mental, private, verbal behavior, molar paradigm

Defining *behaviorism*, Skinner (1974) wrote, “Behaviorism is not the science of behavior; it is the philosophy of that science” (p. 3). One may define behaviorism by its central proposition, what all behaviorists agree on, that a science of behavior is possible (Skinner, 1953, 1974; Watson, 1913; see Baum, 2005, for further discussion). Watson (1913) proposed further that the science of behavior should be a natural science, and Skinner (1945), coining the term *radical behaviorism*, similarly asserted that the science of behavior (behavior analysis) is a natural science (Skinner, 1953). One implication is that behavioral events are natural events and, just like the weather or natural selection, involve

no agency, but are explained by other natural events (Baum, 1995). Another implication is that the science leaves out nothing important (i.e., that it is sufficient).

Advocates of radical behaviorism often say that its chief distinguishing characteristic is its treatment of private events. They say it is unlike other versions of behaviorism because it treats private events as well as public events and therefore avoids the accusation that it ignores inner life (Moore, 2008; Skinner, 1974). For example, Skinner (1974) wrote,

A science of behavior must consider the place of private stimuli as physical things, and in doing so it provides an alternative account of mental life. The question, then, is this: What is inside the skin, and how do we know about it? The answer is, I believe, the heart of radical behaviorism. (pp. 211–212)

Having said this much, however, advocates carefully point out that *private* differs from *mental*. In the view of radical behaviorists, mental things and events seem to occur in some inner, imaginary space, usually

---

Earlier versions of this paper were presented at the annual meetings of the Association for Behavior Analysis, May 1995, and the American Psychological Association, August 1995. I thank Howard Rachlin for thoughtful comments on an earlier draft of the paper.

Address correspondence to the author, 611 Mason #504, San Francisco, California 94108 (e-mail: Wm.Baum@unh.edu).

called the mind. Because this inner, imaginary space and all its contents are nowhere to be found in nature, radical behaviorists see mental events as fictional and deny them any role. Private events, in contrast, are said to be just like public events except that they occur within the skin (Skinner, 1969, 1974; Zuriff, 1979). For example, Skinner (1969) wrote,

An adequate science of behavior must consider events taking place within the skin of the organism, not as physiological mediators of behavior, but as part of behavior itself. It can deal with these events without assuming that they have any special nature or must be known in any special way. The skin is not that important as a boundary. Private and public events have the same kinds of physical dimensions. (p. 228)

The radical behaviorists' denial of mental inner space and its contents is a rejection of a dualism that is fundamental to modern, commonsense folk psychology. In the commonsense view, the self dwells in inner space while the body deals with the outer world. Accordingly, it seems obvious that thoughts, feelings, and images remain forever intimate and private while outer actions alone are available for the inspection of others. For example, a cartoon shows a husband saying to his wife, "Nobody's ever understood me, Joyce, not my teachers, not my parents, my boss, my so-called friends—just you, baby—you're the only one who's ever listened." Above the wife is a box saying, "Christ, will he ever put a cork in it?" Between her and her box is a string of circles, which we immediately understand to indicate that the words in her box are private—unknown and unknowable to the man. The rejection of this fundamental inner-outer dualism is one of the features that makes radical behaviorism radical (Baum, 1995; Baum & Heath, 1992; Catania & Harnad, 1984).

In this paper, I will argue that, in comparison with antidualism, the role of private events in radical

behaviorism is peripheral and inessential. They are brought to the center in a misguided effort to render behaviorism acceptable to laypeople by suggesting that they offer an account of mental life. I am not saying they do not exist. Many different types of private events occur within the skin: neural events, events in the retina, events in the inner ear, subvocal speech (i.e., thinking), and so on. All of these are possibly measurable and, therefore, possibly public. I will argue that private events are not *useful* in a science of behavior, and, far from being a key defining aspect of radical behaviorism, private events constitute an unnecessary distraction. Private events are irrelevant to understanding the function of behavior, that is, activities in relation to environmental events. Because the origins of behavior always lie in the environment, the origins of behavior are public. Measuring private events might help to understand the mechanisms of behavior, but understanding function is propaedeutic to studying mechanism; one must know what one is trying to explain before one can explain it. Roughly speaking, the distinction between function and mechanism is the difference between understanding why behavior occurs and understanding how it occurs. Understanding function entails relating an activity to environmental events (present and past), whereas understanding mechanism entails tracing the causal chain between environment and behavior. I will argue that the ideas of private stimuli and private behavior, in particular, are irrelevant to understanding behavior in relation to environment. To see why, we must first review the problems with dualism.

## DUALISM

Most, if not all, of the sciences had to eliminate dualism early in their histories. The habit of supposing an

immaterial world or immaterial causes behind or within the material world cannot work for science, because the relationship between the immaterial and the material remains forever a mystery. When we read about Descartes's theory that the soul influenced the flow of animal spirits by moving the pineal gland, we wonder without hope of an answer how the soul could move the pineal gland. The historian Benjamin Farrington (1944/1980), writing about the origins of Greek science, contrasted the Babylonian creation myth, in which the god Marduk created the waters and lands, with Thales's proposal in the 6th century B.C.:

The general picture Thales had of things was that the earth is a flat disc floating on water, that there is water above our heads as well as all round us (where else could the rain come from?), that the sun and moon and stars are vapour in a state of incandescence, and that they sail over our heads on the watery firmament above and then sail round, on the sea on which the earth itself is afloat, to their appointed stations for rising in the East. It is an admirable beginning, the whole point of which is that it gathers together into a coherent picture a number of observed facts *without letting Marduk in*. (p. 37)

Farrington's main point was that scientific thinking originated in the rejection of dualism. Science seeks explanations ("coherent pictures") of natural events in other, related, natural events, not in nonnatural causes. As the need was for physics then, so it is for a science of behavior now.

Eliminating dualism from a science of behavior, however, presents a formidable problem. English and other Western languages incorporate mind-body dualism so intimately that it is difficult to talk about behavior without using terms that sound dualistic. Skinner (1974) complained of this and warned his readers to resist being misled by phrases such as "I have in mind" and words such as "choose" and "aware." The linguist Benjamin

Whorf (1956) wrote eloquently about the inner-outer dualism inherent in what he called the "habitual thought and behavior" of Western culture:

Now, when WE think of a certain actual rosebush, we do not suppose that our thought goes to that actual bush, and engages with it, like a searchlight turned upon it. What then do we suppose our consciousness is dealing with when we are thinking of that rosebush? Probably we think it is dealing with a "mental image" which is not the rosebush but a mental surrogate of it. But why should it be NATURAL to think that our thought deals with a surrogate and not with the real rosebush? Quite possibly because we are dimly aware that we carry about with us a whole imaginary space, full of mental surrogates. To us, mental surrogates are old familiar fare. Along with the images of imaginary space, which we perhaps secretly know to be only imaginary, we tuck the thought-of actually existing rosebush, which may be quite another story, perhaps just because we have that very convenient "place" for it. (Whorf, 1956, pp. 149-150)

Anticipating behaviorists' objections to mental representations, Whorf notes that "mental surrogates" are hard to escape because they are built into the English language and other aspects of Western culture. Scientific views that run counter to the "habitual thought and behavior" of the culture, such as relativity theory, encounter difficulty getting accepted, Whorf argued, because they must speak "in what amounts to a new language." This must apply with at least as much force to a science of behavior. Indeed, laying stress on *private* instead of *mental* may be seen as an attempt to talk in a new language that still makes contact with ordinary English.

## TWO USES OF *PRIVATE*

The word *private* gets used in two different ways (cf. Baum, 1993; Lubinski & Thompson, 1993, pp. 667-668; Rachlin, 2003). In the common-sense, folk psychology view alluded to earlier, a private event can only be known to its possessor. It might seem

self-evident, for example, that thinking can only be known to the one who thinks. According to this notion, private events are private in principle, can never be known to another, and therefore are qualitatively different from public events. To try to exorcise this qualitative difference, some behaviorists have claimed that private events are exactly like public events except in the size of the audience; private events always have an audience of one, and public events have an audience greater than one (e.g., Moore, 1995). Such a move fails, however, to erase the dichotomy. For example, how does one distinguish between a potentially public event that happens to have an audience of one (i.e., occurs when the actor is alone) from a private event? If size of audience were the only criterion, then my singing when I am alone would be a private event, but would become a public event if my wife were there to hear it. This would contradict the notion that private events are private in principle, because it is a practical matter (accidental) whether my wife happens to be there or not. Thus, size of audience is insufficient, and if private events are private in principle, they must be so according to some unstated, unanalyzed other criterion. One suspects it is precisely the sort of inaccessibility indicated by circles in cartoons that places them in a world forever inside.

What that other criterion is matters little, however, because, whatever it is, it constitutes a qualitative difference between private and public events. Accepting in-principle private events would reintroduce the inner-outer dualism that was to be avoided. Instead of the mind-body problem, we would have the equally intractable problem of how a so-called private event could serve as a stimulus for public behavior. How would anyone know if it occurred or how it was connected to a public act? If it cannot be made public, even with the help of instruments, it remains a ghostly

cause, and its effects remain a mystery.

The second use of *private* makes it purely a practical affair. In this view, the privacy of singing when I am alone really is the same as the privacy of a thought or feeling. No private events are private in principle; thoughts and feelings are public in principle, if only we are able to invent apparatus to observe them. This idea depends on the faith that with enough technical advances, even the subtlest thought or feeling in one person could be observed by another. One has to believe, for example, that brain-scanning technology could advance to the point at which an arrangement like that in Figure 1 would be possible; that a person's head might be put in a machine (say, a helmet) that would be attached to a monitor, and if the person thinks *Who am I?*, the words "Who am I?" appear on the screen. This view at least has the advantage that it truly makes no distinction between private and public events, thereby leaving no mysteries. The idea that private behavior and private stimuli are only accidentally private, however, encounters at least three problems. The first is that it rests on an article of faith that cannot be disconfirmed. No antiprivacy machine exists at present, and possibly none will ever exist.

Whatever its disadvantages, the notion that private events are public in principle remains the only tenable position for radical behaviorism. Skinner (1945) apparently recognized this. In his discussion of private events, he wrote,

The response "My tooth aches" is partly under the control of a state of affairs to which the speaker alone is able to react, since no one else can establish the required connection with the tooth in question. There is nothing mysterious or metaphysical about this; the simple fact is that each speaker possesses a small but important private world of stimuli. So far as we know, his reactions to these are quite like his reactions to external events. Nevertheless the privacy gives rise to ... the ...



Figure 1. The implication of taking all private events to be public in principle. To suppose that all private events are only private by accident, not in principle, some sort of arrangement like this would have to be possible. Whenever a private thought or feeling occurred in a person wearing the helmet, the thought or feeling ("Who am I?" here) would be displayed on the monitor.

difficulty ... that we cannot, as in the case of public stimuli, account for the verbal response by pointing to a controlling stimulus. ... It is often supposed that a solution is to be found in improved physiological techniques. ... But the problem of privacy cannot be wholly solved by instrumental invasion. No matter how clearly these internal events may be exposed in the laboratory, the fact remains that in the normal verbal episode they are quite private. (pp. 275–276)

Skinner here points to a second problem with the antiprivacy machine. From a practical point of view, even if private events might be "exposed" in the laboratory, in everyday life ("the normal verbal episode") private events remain private. Even if the antiprivacy machine existed, it would only be available in

the laboratory and not in everyday life, which is most of the time and of primary interest.

Skinner (1945, 1974) took pains to distinguish his view from what he called methodological behaviorism, the view that private events are inaccessible to direct scientific study but may be studied indirectly in verbal reports. He criticized methodological behaviorism particularly for preserving dualism (Skinner, 1974). He argued instead that "what is felt or introspectively observed is not some nonphysical world of consciousness, mind, or mental life but the observer's own body" (pp. 18–19).

Introspection, however, is notoriously unreliable; that is why Watson



(1913) rejected introspection as a method. Skinner presumably would agree, but in the preceding quote he seems to credit introspection with some degree of accuracy. People often express confusion or uncertainty about private events (Is that a pain or an itch? Am I embarrassed or angry?), and also frequently lie in response to questions like, "What are you thinking?" In particular, introspection could never reliably render private events public. The unreliability of introspection brings us to the third problem with accidental privacy.

The third and biggest problem is that, even if an antiprivacy machine were invented, the machine would always be subordinate to the testimony of the person being interrogated. Even if a "solution" to privacy like the antiprivacy machine (Figure 1) were to be realized, and the monitor showed all manner of private events ("Who am I?" "pain in foot," "seeing a chicken," or "hearing Beethoven's Ninth Symphony"), still nothing would prevent the person being observed from denying that any such event is occurring. Imagine the machine were brought into a court of law, and the monitor showed, "I shot the sheriff," and the person said, "I never thought any such thing; your machine is lying." What could the onlooker do then? Insist the person is lying? The antiprivacy machine still requires the person to corroborate the outcome, presumably on the basis of introspection, which is always unreliable. Thus, even an antiprivacy machine, were it to be invented, would fail to solve the problem of privacy altogether. Its promise proves to be an empty promise, and we cannot assert with certainty that privacy is accidental or that "Private and public events have the same kinds of physical dimensions" (Skinner, 1969, p. 228).

Private events may be inferred by the verbal community in everyday affairs, but inferred private events

can never serve as scientific explanations of public behavior (Skinner, 1974, p. 17–18; "the role of the environment"). If behavior analysis is a natural science, then putting together "coherent pictures," to use Farrington's phrase in the earlier quote, requires observed activities (natural events) to be related to observed events in the environment (past and present natural events). Behavior originates in the environment. Even if we learn much about the physiology of behavior, we only learn about mechanisms and not about the origins in the environment (see Thompson, 2007, for a review of research on mechanisms). If we learn that a certain hormone induces nest building in canaries, we still need to know what, under normal circumstances, stimulates secretion of the hormone (e.g., lengthening day in spring), and, beyond that, we still need to know what history of natural selection brought about this mechanism. Similarly, even if we were able to measure events in the human brain that would permit us to predict behavior, we would still need to study the environmental events, past and present, which led to the brain events and the behavior.

As Heath and I explained in 1992, explanations in behavior analysis are historical. Folk psychology, cognitive psychology, and physiological psychology focus on immediate causes of behavior (e.g., thoughts, information processing, and neurotransmitters). Behavior analysis, like evolutionary biology, finds explanations in the past, in a history of selection. Thus, evolutionary biologists seek to understand how natural selection, acting on populations of birds over millions of years, resulted in canaries building nests *and* in their hormones being triggered by increasing daylight. If Tom's car won't start when he needs to get to the airport, and he thinks, "Mary owes me a favor," and calls Mary to give him a ride, behavior analysts need to explain

how the calling *and* the thinking came about, considering Tom's history of asking for help, with terms like *favor*, and his more specific history with Mary. At best, the thinking is additional behavior to be explained, but usually, as Skinner noted, the thinking goes unobserved. Particularly if it is unobserved, Tom's thinking doesn't cause Tom's calling. Behavior might be caused by environmental events like food, injuries, and people exchanging favors, but, in a natural science, it cannot be caused by unobservable events.

Some confusion has arisen among behaviorists on this score of unobservable causes. For example, Zuriff (1979) identified what he called 10 inner "causes" of overt behavior implied in Skinner's writings. He commented that, in comparison with mental causes, these private events leave no mystery about "their ontological status so that metaphysics does not stand in the way of prediction, control, and interpretation of behavior" (p. 8). A little earlier in the same article, however, he suggested that covert stimuli "are hypothesized to function the same as public stimuli, except that they are located on the other side of the skin" (p. 8). This seems to imply that private events are hypothetical. This impression is strengthened by the further statement that "the properties of covert stimuli and responses are inferred from observations of analogous overt stimuli and responses" (p. 8). Finally, Zuriff notes approvingly that radical behaviorism starts "with the external world of stimuli and responses and then [moves] them inside the skin where necessary" (p. 8), apparently suggesting that private events are inferred whenever one runs out of public explanations. We are left with an ambiguous description, in which private events are hypothesized or inferred, considered internal as opposed to external (a usage that sounds dualistic) and yet are pronounced to have ontolog-

ical status that is unambiguous. A contradiction arises because inferred private events produce no less specious explanations and have no less mysterious an ontological status than inferred mental events. The possibility of turning private events into public events, and thereby disambiguating their ontological status, remains out of reach in everyday life and is attainable, if at all, only in the laboratory. If behavior analysis is a science, we cannot explain observed behavior by simply making stuff up, even if we insist that the stuff we are making up is "just like" the stuff we observe. Only in folk psychology do private thoughts cause behavior.

Even in the context of laboratory experimentation, some behaviorists have advocated inferring private events. Lubinski and Thompson (1993) claimed that they trained pigeons to report on private events. Their experiment is diagrammed on the right in Figure 2, along with a conventional conditional discrimination on the left. In brief, a hungry pigeon was given one of two drugs, A or B, before its daily session. If Drug A was given, pecks at the key marked with the corresponding letter (A in Figure 2) produced food; if Drug B was given, pecks at the other key (B in Figure 2) produced food. When the pigeons pecked correctly, Lubinski and Thompson concluded that the pecks were under stimulus control of the different private feelings produced by the different drugs. In the conditional discrimination diagrammed on the left, a red or green key is first presented as the sample, and then (sometimes after a delay) the choice keys, labeled A and B, are presented. If the sample was green, pecks at A produce food; if the sample was red, pecks at B produce food. In both experiments, correct performance may be explained by public events: the colors and the drugs. In the conditional discrimination, particularly if a delay elapses between the sample and the choice,

## Conditional Discrimination (Lubinski &amp; Thompson, 1993)









Sample:			 Drug A	 Drug B
Reinforce:				

Figure 2. The Lubinski and Thompson (1993) experiment compared to a conditional discrimination of color. They claimed that the pigeons' discrimination reflected feelings produced internally by the drugs, but their results are more easily understood as discrimination between the public drugs themselves.

one might be tempted to posit some private event (a trace or representation of the sample) to control the pecking at the choice key. The discrimination, however, is between the red and green circles. No need arises to put copies of the circles inside the pigeon, and keeping the stimuli public—in the environment—avoids confusion over who sees the circles (i.e., the actual pigeon and not an imagined inner pigeon peering into an imagined inner space). Similarly, in the Lubinski-Thompson experiment, instead of inferred private stimuli, the equivalent of an inferred copy of the red circle, one may point to the public drugs. Just as one may omit imagined inner representations of the circles, one may omit imagined inner feelings produced by the drugs and avoid confusion over who feels the feelings and where the feelings reside. The preponderance of correct responses constitutes a discrimination between Drug A and Drug B. That is all. In either experiment, and in any discrimination, the decision about what is a correct response and what is an error depends on what the experimenter knows (the color or drug presented), which is public. A discrimination consists of a change in behavior with a change in environment, but an onlooker (experimenter) must judge the change in environment (see Herrnstein, Loveland, &

Cable, 1976, for further discussion). The drug might produce changes in the pigeon's body, but as long as these changes go unmeasured (remain private), they are useless for explaining the pigeon's behavior; the public events of the drugs and the colored circles suffice.

Philosophers who regard behaviorism as incomplete pose the following challenge (e.g., Dennett, 1978). Imagine that Tom rides the Number 4 bus home every day. We see him riding the bus, but no cause for this behavior is evident. He must be riding the bus because he wants to go home and believes this bus will take him there. Thus, behavioral accounts are incomplete, because one cannot explain behavior without reference to mental causes. Behaviorists respond that such explanations are circular, because the only way we know that Tom wants or believes is that he behaves (e.g., rides the bus). The causes are not evident because they lie in the past, that is, in Tom's history with home and buses.

Including private events in behavioral accounts undermines the behaviorists' response. The philosopher may reply that private events hardly differ from wants and beliefs. Tom might be sitting on the bus and reciting to himself that he needs to get out at 79th Street. How different is that?



### THE DILEMMA OF PRIVATE EVENTS

Radical behaviorists who consider private events to be useful additions to explanations of behavior sit on the horns of a dilemma. Should private events be included or should they be excluded? On the one hand, to exclude private events would be to deny what almost everyone says, that his or her private thoughts and feelings determine public behavior; to deny this would seem to open behaviorists to the philosophers' accusation that behaviorism is incomplete because it neglects an important part of behavior, the very accusation that Skinner strove to avoid. On the other hand, to concede the importance of private events is to introduce hypothetical events that appear to be (and perhaps actually are; see Zuriff, 1979, discussed above) hidden causes and to undermine the behaviorists' claim to a true natural science of behavior. Either way, the mentalists seem to win.

If explanations are sought in public events and all privacy is assumed to be accidental, and there is no other consistent position for behaviorists, then the position is the same as that of Watson (1930), who argued, for example, that thought is subvocal speech. Instead of *subvocal*, Skinner used the word *covert*. Neither term solves the problem that private events remain hidden when one is explaining another creature's behavior.

Behaviorists should be careful about the claim that radical behaviorism deals with thoughts and feelings at all, because laypeople are likely to conclude that radical behaviorism incorporates the conventional notion of thoughts and feelings, that is, as things or events in mind-space. Radical behaviorism admits to no such inner space. That denial makes the verbal behavior of behaviorists unconventional (Hineline, 1995), and that unconventionality poses the same dilemma: Should radical behav-

iorism be presented as if it deals with conventional concepts, making it seem acceptable on false grounds, or should it be presented as the truly radical position it is (i.e., the complete denial of dualism) risking its seeming inadequate and implausible? What is the way out? How to preserve the science of behavior and yet have the science be complete and plausible? I argue that the answer lies in adopting a molar view of behavior.

### THE MOLAR VIEW OF BEHAVIOR

Organisms fill the seas, land, and air because they carry genetic material and because that genetic material reproduces more often when in organisms than when not. Otherwise the genetic material would have remained in the original soup (see Dawkins, 1989, for a book-length discussion). Why did selection favor organisms? What is the advantage? In a word, it is *behavior*. To be an organism, to be alive, is to behave. Organisms interact with their environment, and that commerce with the environment is behavior, and its importance lies in its effects on reproductive success via the environment. Organisms produce offspring, feed themselves and their offspring, build shelters, avoid predators, and change the world around them in myriad ways. All of these advantageous effects occur through time, on average and in the long run. Behavior is, by its very nature, extended in time. Just as any one individual in a population may fail (may die without leaving progeny), so any individual action may fail. Advantage and success occur over time, on average and in the long run. Just as natural selection operates on populations and cannot be understood by looking at individuals, so behavioral selection operates on extended patterns of activity and cannot be understood by looking at moments. At any particular moment, for example, we

might see a pigeon poised with its back parallel to the ground and its beak extended, but when we see an extended sample in which it marches along pecking at seeds on the ground, only then do we understand that it is foraging. The insight that behavior is commerce with the environment tells us both that behavior is extended in time and that behavior and its effects are concrete and measurable. In other words, all the behavior and effects that matter are public.

In the molar view of behavior, activities are more extended or less extended in time, which means they have the property of *scale*; more extended activities are defined on a longer time scale than less extended, more local, activities (Baum, 2002, 2004). A canary building a nest gathers material, puts it in the nest, and works it in with its feet. Building the nest is a more extended activity, defined on a longer time scale, and its parts (less extended activities) are defined on a shorter time scale.

The philosophers' challenge, "Tom is riding the Number 4 Bus because he wants to go home and believes that this bus will take him there," leads behaviorists to respond that this explanation is circular, because the only evidence for the wanting or believing is Tom's behavior of riding the bus, getting off at the correct stop, and getting home. That response overlooks a problem with the philosophers' argument itself. The challenge begins with a false premise: that Tom can ride the bus at a moment. "Momentary behavior" is an oxymoron. By its very nature, behavior is extended in time. If Tom is sitting on the bus, we cannot tell if he is going home, to the store, or somewhere else. A momentary snapshot is subject to maximal uncertainty; only with a larger time sample do we become certain about what Tom is doing.

The temptation to posit private events arises when an activity is viewed on too small a time scale. If

we view a snapshot of a moment, we see, for example, Tom with a shovel in the garden, but we have little idea what activity is occurring. Viewing over a slightly longer timeframe, we see that Tom is digging a hole. Viewing on a scale longer than that, we see that Tom is digging a ditch. Longer still, and we see he is laying a pipeline. Longer than that, and we see he is installing a waterfall in his garden. And so on. At each time scale, we see public activity, and no problem arises. But, let Tom stop for a while and lean on his shovel, looking at the ground; then the temptation arises to suppose he is thinking privately about his project. However, we don't know what he is doing at that moment; he might be resting or thinking about getting something to eat. In a larger time frame, we might see that he resumes digging after a while, and even though he took a short break, he is still working on his project. Whatever covert speech may have occurred hardly matters, because Tom is engaged during the period of observation in the activity of digging a ditch, laying a pipeline, or installing a waterfall. Seen on a longer time scale, the activity is continuous, and any private events that occur may be ignored (Baum, 2002).

Suppose that after pausing, Tom resumes digging in a different direction, and we ask why. Tom says that he encountered a buried electric line and had to dig around to avoid it. We might say that Tom encountered a problem that he solved by changing direction. Whatever subvocal or overt verbal behavior may have occurred, it was part of an extended activity, that is, solving the problem. Any private actions or stimuli were neither causal nor essential. The verbal behavior and the change in direction were both due to encountering the buried electric line, a public event. Dealing with the electric line was a less extended part of digging the ditch and laying the pipeline.

The molar view also allows us to avoid hypothesizing about the private events that are called “feelings” or sensory events. The temptation to view seeing, hearing, and being in pain as private events arises when we look at behavior over too short a time span. Does the zebra see the lions stalking it? At a moment, we cannot say. We have to watch for a while, until the zebra takes evasive action, before we conclude that the zebra sees the lions. A police officer asks a motorist, “Didn’t you see that stop sign?” If the motorist says no, the officer might be tempted to suppose some private seeing occurred, but would have no basis to conclude the motorist is lying, because the officer has seen only the subsequent driving past the sign.

Indeed, the point may be extended to all inferred events, private or mental. Carrying on from the point that in everyday life and in the laboratory most of the time we have access only to public stimuli and public behavior, Rachlin (1994, 2003) argued that mental events, including thinking, feeling, and sensing, may be identified with the public activities from which they are inferred. Drawing on the writings of Aristotle and Gilbert Ryle (1949), Rachlin identified mental events like believe, want, intend, know, hear, see, be in pain, and so forth with extended patterns of public behavior. For Jane to believe that the death penalty is wrong, for example, means Jane speaks out against it whenever the subject comes up, gives money to organizations that work to oppose it, joins in demonstrations against it, and so on. If enough of these activities occur, over a period of time, people around Jane will assert that she believes the death penalty is wrong. Jane herself will assert her belief on the same grounds. No private or mental event need come into the account.

Following Rachlin, we may go a step further and assert that, seen in

the context of her other overt activities, Jane’s activities about the death penalty *are* her belief in its wrongness. Anyone who watches the extended patterns of Jane’s activities could know as well as Jane what Jane’s desires and beliefs are. Indeed, such an observer might know better than Jane, because another person’s actions are easier to observe than one’s own; people pay money to psychotherapists for exactly this reason.

### ARE SENSATIONS PRIVATE?

Events that might be considered private sensations or private stimuli may be treated the same way as beliefs and desires. Philosophers pose the following problem for behaviorists (Rachlin, 2003). Suppose that two persons are seated in a room where music is playing, and neither is moving but one of them is deaf. How could the two be distinguished except by their private experience of the music? This challenge is really just another version of Tom riding the bus. If one is restricted to observing them at a moment, one cannot say which person is deaf and which can hear. Afterwards, however, one of them will talk about the music and enjoyment of it, whereas the other will have nothing to say about it. In a more extended time frame, the distinction between deafness and hearing is readily made; the extended patterns of public behavior of the two persons make the difference (Baum, 2011b). Suggesting that one person is enjoying the music privately would be the wrong answer, because it would concede the mentalists’ point by referring to a hidden mental criterion.

A more challenging example is pain, because pain is usually taken to be the quintessential private event. As we saw earlier, Skinner considered pain to be a private stimulus. To understand why this is an error, Figure 2 may help, because it made the point that inferred inner feelings

were unnecessary to understanding discrimination. Although some insult to the body stimulates nerve endings that may be involved in pain, the cut, burn, pressure, blow, or tear is the origin of the pain and is always observable. The stimulation of the nerve endings is like light stimulating receptors in the retina. If Jane stops her car at a red light, the stimulus that controls her stopping is the red light, not an inner representation or sensation of the red light. Similarly, if Jane has a pinched nerve in her spine, the pinched nerve is the event contributing to her pain, not an inner representation or sensation of pain. When she complains, "I am in pain," she is not complaining about an inner sensation or private stimulus, but about the pinched nerve (assuming she is not faking). The pinched nerve may be regarded as a stimulus, but it is not private, except perhaps in the trivial sense that no one has taken the necessary X-rays.

Laypeople and philosophers often claim that one may be in pain but not show it. On that basis, they insist that pain must be private. Rachlin (1985) argued that this is a logical impossibility, because to be in pain *is* to show it. If a soccer player flops to the ground, clutching his leg, rolling about, grimacing, and groaning, we are likely to say he is in pain. If thereby he stops the game to his team's advantage, we are tempted to conclude he is faking. We will decide only later, if ever, in a longer time frame, on the basis of his ability to continue playing or his limping, whether he was faking or not. Conversely, if someone actually succeeds in showing no pain behavior at all, we conclude that person was not in pain; regardless of what the person might claim later, for all practical purposes, he or she was not in pain.

Similar to Skinner's (1945) treatment of such utterances, another approach to understanding the claim, "I was in pain but didn't show it," is to ask what conditions might occa-

sion such speech. If Tom makes the claim, one possibility is that he shut himself away in a separate room, say, and thereby rendered all his behavior necessarily private. People usually mean by the claim, however, that others were present but saw no pain behavior. The claim is based on the possibility that some conditions (e.g., an injury or a pinched nerve) might be present that would ordinarily result in public pain behavior, but that some other conditions (e.g., being at a wedding) might override the usual activity. If Tom succeeds in arranging that no one sees any of his pain behavior, then everyone around him concludes he is not in pain. In contrast, if he shows pain behavior, and no one sees any circumstance to conclude he is faking, then usually onlookers will conclude he is in pain and will act sympathetically; try to soothe him, offer palliatives, call an ambulance, and so on. Whether or not the person is in pain resides in the onlookers' behavior, particularly the onlookers' behavior in an extended time frame.

A football player who is hit by an opposing player but goes on to receive a pass might after the game complain and groan, and X-rays show that he has a broken rib. The immediate causes of his pain behavior are the broken rib and the presence of sympathetic onlookers. If he is asked whether he was in pain while making that great catch, he might say he was in pain but was ignoring it at that moment. But, how could he know that? Even if the broken rib was affecting nerve endings that could in turn affect his brain, his nervous system was responding only to the broken rib. If he was ignoring anything, he was ignoring the broken rib (the injury now made public) and not some inner pain *thing*, not a private stimulus. To onlookers, he was not in pain then, even if the X-rays combined with his pain behavior lead present onlookers to conclude he is in pain now.

The conclusion that one's being in pain depends on the judgment of onlookers, rather than on one's own judgment, might seem counterintuitive. A layperson might still insist that he or she has been in pain but not shown it. More accurately, we might reply, you succeeded in engaging in so little pain behavior that no one around noticed. You were faking not being in pain, so to speak, and people around you saw no reason to behave as if you were in pain. They would have behaved so, too, if you exhibited pain behavior but you seemed to be faking. Ultimately, we still decide about what a person is or is not doing on the basis of prior and subsequent behavior in an extended time span.

The real solution to the problem of privacy is to see that private events are unnecessary to understanding behavior. They might or might not exist; they are irrelevant. A complete account of behavior can be had without them. Recalling that behavior exists only as commerce with the environment and consists of activities more extended or more local in time, we need not talk about any private events to understand the function of behavior. Mechanisms inside the skin, particularly in the nervous system but also in glands and muscles, are important to understanding how behavior is accomplished, but understanding how the environment causes an organism to behave one way rather than another depends on a larger time frame, that is, the history of the individual and the species to which the individual belongs (Baum, 2002, 2005). If behaviorists wish to understand why people talk about private and mental things and events or to avoid the accusation that behaviorists fail to address people's inner life of thoughts and feelings, they may follow Rachlin's suggestion that private and mental terms are verbal behavior occasioned by extended patterns of behavior.

From an evolutionary perspective or a therapeutic perspective, only public behavior matters. Whatever a human or nonhuman animal may think or feel privately, the private thinking and feeling cannot affect reproductive success; only commerce with the environment, such as moving about, gaining resources, interacting with conspecifics, avoiding predators, and the like, in other words, events that are observable and measurable (i.e., public) can advance reproductive success. Natural selection cannot affect inner events, whether they are labeled mind, psychology, philosophy, thinking, or feeling, but natural selection can favor advantageous behavioral tendencies and patterns, as long as they are influenced to some extent by genes. If a therapist were to change a client's private thoughts and feelings without changing any public behavior (were such a thing possible), the therapist would have failed, because the aim of therapy, even psychoanalysis, is to help the client live more effectively. If Jane asserts that she feels better about her life but continues her addiction, stays in an abusive relationship, cringes from her boss, and continues to attempt suicide, no one should believe her. Indeed, for any practical purpose, only public behavior matters. A safety engineer doesn't want people only to think privately that wearing a seat belt is good; the actual buckling up is what matters. If we can predict, control, and understand public behavior, our understanding will not be incomplete due to the omission of private events, because private events are irrelevant; only public behavior matters to evolution and for all practical purposes.

### **THE MISTAKE OF PRIVATE EVENTS**

Whorf's (1956) point about the need to "speak in another language" is well illustrated by the concept of



*verbal behavior*, which amounts to speaking about lay concepts like language, reference, and meaning in an entirely different vocabulary (speaking about language in a different “language,” Whorf might say). Skinner (1957) defined *verbal behavior* as operant behavior of a speaker reinforced by the behavior of another organism present (the listener) and acquired as a result of membership in a verbal community of speakers and listeners. The definition covers not only speech but also gestures (e.g., signing). Skinner aimed, however, not to establish a distinct category but exactly the opposite: to liken verbal behavior to other operant behavior and to overcome the seeming difference (Baum, 2005). Much of the confusion about private events derives from failure to grasp fully the implications of replacing mentalistic notions about language with verbal behavior. If a dog limps, whines, and whimpers, we may unhesitatingly say that it is in pain, our utterance being occasioned by its pain behavior. If a preverbal infant cries, grimaces, whines, whimpers, and swipes at its ear, we may say it is in pain or has an earache, our utterance being occasioned by its pain behavior. If Jane, an adult human, grimaces, groans, and holds her face, we may say she is in pain or has a toothache, our utterance being occasioned by her pain behavior. If, in addition, she says, “I have a toothache,” that utterance is just more pain behavior; it only makes our utterances about her pain more likely and more sympathetic (Baum, 2011a).

Many philosophers and other mentalists, committed as they are to inner–outer dualism, would insist that first-person statements like “I am in pain” differ fundamentally from third-person statements like “She is in pain.” They do so because they assume that first-person statements are based on private events, whereas third-person statements are based on public events. Usually, they

assert also that first-person statements are “incorrigible.” They mean by this that no one can question what Jane says about herself, because she alone is privy to the private events that underlie her statement. Even if we set aside the possibility that Jane is lying or faking, we know that first-person statements can be unreliable (people change what they say). For example, an athlete may report no pain from an injury in the heat of play, but complain of the pain later.

From the viewpoint of radical behaviorism, first-person utterances and third-person utterances are instances of verbal behavior, and they are controlled by similar, if not identical, conditions in the environment. We look at the dog’s paw for a thorn and in the child’s ear for a swollen eardrum; Jane’s dentist will find the decay that explains all of her pain behavior, including her saying she is in pain. Injuries, pinched nerves, excessive blood flow to the brain, and other afflictions all are potentially made public and, when made public, make our responses to pain behavior more sympathetic and less suspicious of faking. When Jane complains of a toothache, she is not peering at some inner pain thing (or a private stimulus) and reporting on it; she is responding to the injury in her tooth (Baum, 2011a). When Skinner (1945) wrote famously, “my toothache is just as physical as my typewriter” (p. 285), one wonders just what he meant. He treated the toothache as a “private stimulus,” but the statement remains cryptic. Is the private stimulus the injury to the tooth? That would be physical. But he says “toothache,” not “tooth.” The private stimulus cannot be some inner pain thing; that would not be physical. In the molar view, the toothache is the pain behavior (“hand to jaw, facial expressions, groans, and so on,” p. 277), which Skinner called “collateral responses,” plus the person’s verbal complaints and assertions—that behavior *is* just as physical as a typewriter.

Much confusion arises from the notion that Jane “reports on” or “observes” some inner private event when she says she is in pain. The mentalistic way of looking at observing is to suppose that it is a single activity directed at different objects. Observing a cow differs from observing a flower, in the mentalistic view, because inner attention is directed toward two different objects in the external world. The weakness of this view appears when we ask questions like, “Who does the inner attending?” and “Is the observer in the external world with the objects?” (see Baum, 2011a, for additional discussion).

In radical behaviorism, which rejects mentalism and dualism in favor of monism, the observer or reporter is the whole organism, and the behavior of observing or reporting is public verbal and nonverbal behavior. Observing a cow and observing a flower are not the same activity directed at two different objects, but are two qualitatively different activities. One pattern consists of orienting toward the cow, saying that it looks like a Holstein, that it seems skinny, and so on; the other pattern consists of orienting toward the flower, smelling it, saying that it is lovely, perhaps picking it, and so on. When we see such behavior, we say the person sees (observes) the cow or the flower. The presence of the cow or flower alone cannot suffice to produce the behavior of “observing” or “reporting”; other conditions usually have to be met, such as the presence of other people who might respond to the utterances and a history of interactions with cows or flowers. The activities are occasioned by all of these circumstances, but not by any inner copy of a cow or flower (Skinner, 1969). Moreover, if one “imagines” a cow or flower (sees it in the absence of the thing seen; Skinner, 1969), still the imagining involves no inner copy or private event. The person behaves more or

less as he or she did when the thing was seen (with eyes open in good light; see Rachlin, 2003, for additional discussion of imagination).

As it is with cows and flowers, so it is with pain and other so-called private events. When one reports on the oboe playing in a piece of music, one is engaging in verbal behavior that includes words like “oboe,” “plaintive,” “surprising,” and so on. It is occasioned by the music. No inner oboe enters the picture. Similarly, when one reports on pain, one is engaging in verbal behavior that includes words like “hurts,” “sharp,” “excruciating,” and so on. No inner pain thing enters the picture, and if the person is not faking, the pain behavior is occasioned, in part, by an injury or other condition that is at least potentially public.

## CONCLUSION

In the mentalistic view of verbal behavior, which relies on phrases like “using language” and “symbolic communication,” a speaker is said to “produce” speech, that is, to act as an agent who talks for his or her self. A natural science includes no place for hidden, unobservable causes; not spirits, not essences, not an inner self (Baum, 1995, 2005; Ryle, 1949; Skinner, 1969). Radical behaviorism views all behavioral events as natural events, like earthquakes, rain, sunsets, cell division, birth, death, and taxes, including verbal behavior. Utterances are episodes of verbal activity, like running a race or walking home. Speech, like bird song, comes down to sounds that affect the behavior of conspecifics (humans) who hear them. Thus, when someone speaks of thoughts or feelings, we need not imagine private events as causing the utterance, but rather we must seek the determinants in environmental events present and past. The past events are invisible in the present, but they were public and observable, and all inferences about

them are testable, unlike inferences about private events. When a person says, "I hear music," "I see cows," or "My foot hurts," a science explains those utterances with other natural (environmental) events, such as music, cows, injury, and the presence of listeners. The same holds for utterances like "I feel like going home" and "I thought about the problem." Viewing these utterances on a time scale broader than the moment renders hidden events irrelevant, and these utterances require no private events to explain them. In a science grounded in evolutionary theory, verbal behavior requires no new principles to explain it, and the same set of principles applies to the behavior of verbal and nonverbal organisms.

## REFERENCES

- Baum, W. M. (1993). The status of private events in behavior analysis. *Behavioral and Brain Sciences*, 16, 644.
- Baum, W. M. (1995). Radical behaviorism and the concept of agency. *Behaviorology*, 3, 93–106.
- Baum, W. M. (2002). From molecular to molar: A paradigm shift in behavior analysis. *Journal of the Experimental Analysis of Behavior*, 78, 95–116.
- Baum, W. M. (2004). Molar and molecular views of choice. *Behavioural Processes*, 66, 349–359.
- Baum, W. M. (2005). *Understanding behaviorism: Behavior, culture, and evolution* (2nd ed.). Malden, MA: Blackwell.
- Baum, W. M. (2011a). Evasion, private events, and pragmatism: A reply to Moore's response to my review of *Conceptual Foundations of Radical Behaviorism*. *Journal of the Experimental Analysis of Behavior*, 95, 141–144.
- Baum, W. M. (2011b). What is radical behaviorism? A review of Jay Moore's *Conceptual Foundations of Radical Behaviorism*. *Journal of the Experimental Analysis of Behavior*, 95, 119–126.
- Baum, W. M., & Heath, J. L. (1992). Behavioral explanations and intentional explanations in psychology. *American Psychologist*, 47, 1312–1317.
- Catania, A. C., & Harnad, S. E. (1984). Canonical papers of B. F. Skinner. *Behavioral and Brain Sciences*, 7, 473–724.
- Dawkins, R. (1989). *The extended phenotype: The long reach of the gene*. Oxford, UK: Oxford University Press.
- Dennett, D. C. (1978). Skinner skinned. In *Brainstorms: Philosophical essays on mind and psychology* (pp. 53–70). Cambridge, MA: MIT Press.
- Farrington, B. (1980). *Greek science*. Nottingham, UK: Spokesman. (Original work published 1944)
- Herrnstein, R. J., Loveland, D. H., & Cable, C. (1976). Natural concepts in pigeons. *Journal of Experimental Psychology: Animal Behavior Processes*, 2, 285–302.
- Hineline, P. (1995). The origins of environment-based psychological theory. In J. T. Todd & E. K. Morris (Eds.), *Modern perspectives on B. F. Skinner and contemporary behaviorism* (pp. 85–106). Westport, CT: Greenwood.
- Lubinski, D., & Thompson, T. (1993). Species and individual differences in communication based on private states. *Behavioral and Brain Sciences*, 16, 627–680.
- Moore, J. (1995). Radical behaviorism and the subjective-objective distinction. *The Behavior Analyst*, 18, 33–49.
- Moore, J. (2008). *Conceptual foundations of radical behaviorism*. Cornwall-on-Hudson, NY: Sloan.
- Rachlin, H. (1985). Pain and behavior. *Behavioral and Brain Sciences*, 8, 43–83.
- Rachlin, H. (1994). *Behavior and mind: The roots of modern psychology*. New York: Oxford University Press.
- Rachlin, H. (2003). Privacy. In K. A. Lattal & P. N. Chase (Eds.), *Behavior theory and philosophy* (pp. 187–201). New York: Kluwer Academic/Plenum.
- Ryle, G. (1949). *The concept of mind*. Chicago: University of Chicago Press.
- Skinner, B. F. (1945). The operational analysis of psychological terms. *Psychological Review*, 52, 270–277.
- Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1969). Behaviorism at fifty. In *Contingencies of reinforcement: A theoretical analysis* (pp. 221–268). New York: Appleton-Century-Crofts.
- Skinner, B. F. (1974). *About behaviorism*. New York: Knopf.
- Thompson, T. (2007). Relations among functional systems in behavior analysis. *Journal of the Experimental Analysis of Behavior*, 87, 423–440.
- Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review*, 20, 158–177.
- Watson, J. B. (1930). *Behaviorism*. New York: Norton.
- Whorf, B. L. (1956). *Language, thought, and reality*. Cambridge, MA: MIT Press.
- Zuriff, G. E. (1979). Ten inner causes. *Behaviorism*, 7, 1–8.