A Functional Analysis of Psychological Terms Redux

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In his seminal paper, “An Operational Analysis of Psychological Terms,” Skinner (1945) offered the revolutionary suggestion that, rather than endlessly debating the meanings of psychological terms, psychologists should analyze the variables that control their occurrence as verbal behavior. Skinner’s suggestion reflected the essence of his 1957 book, *Verbal Behavior*, wherein he argued that the behaviors of which language is composed (i.e., speaking and listening) are controlled by variables found in the social environment (which he called the verbal community), and that analyzing those variables would lead to an understanding of the behaviors. Although Skinner formally introduced his radical approach to language in 1945, it has yet to be fully realized. The result is that psychologists, including behavior analysts, still debate the definitions of terms. In the present paper, I review Skinner’s functional approach to language and describe ways in which behavior analysts have already applied it to traditional psychological terms. I conclude by looking at other current terms in behavior analysis that engender some confusion and encourage behavior analysts to apply a functional analytic approach to their own verbal behavior.

Key words: functional analysis, verbal behavior, psychological terms, behavior analysis

The purpose of this paper is four-fold. First, I revisit Skinner’s functional analytic position on the definition of psychological terms in its historical context. Second, I describe the traditional approach to the definition of psychological terms. Next, I describe how a functional analysis of psychological terms might proceed. Finally, I encourage behavior analysts to extend such an analysis to current terms in our own discipline, such as functional analysis itself, rules, and private events, as well as to definitions in general.

SKINNER’S OPERATIONAL ANALYSIS OF PSYCHOLOGICAL TERMS

In case it is not obvious, my title bears a strong resemblance to the title of Skinner’s revolutionary treatise on operationism, “An Operational Analysis of Psychological Terms” (1945). A little history about his paper is in order.

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In 1944, the Harvard psychologist E. G. Boring wrote to the editor of *The Psychological Review* suggesting that he consider publishing a symposium on operationism in which well-known psychologists and philosophers would be invited to answer several questions about the nature and usefulness of operational definitions in psychology. In the second volume of his autobiography, Skinner (1979) explained how he adapted part of his *Verbal Behavior* manuscript for his contribution to the symposium, writing, “I raised the question of how a verbal community can teach a person to describe stimuli to which the community has no access” (p. 294). In his 1945 paper, Skinner went on to describe how children learn to respond differentially not only to observed stimuli but also to their own behavior and private events through exposure to “selective contingencies” arranged by the verbal community, and how, as a result, consciousness or self-awareness is generated (see also Schlinger, 2008b). This is all pretty heady stuff, especially for a behaviorist.

Although his analysis of how we come to describe so-called private events was groundbreaking, and even

today continues to generate discussion within behavior analysis as is evidenced by recent special sections on the subject in two journals (see Burgos, 2009; Schlinger, 2011), Skinner's description omits what I think may be the most important contribution of his paper: his suggestion that rather than endlessly debating the definitions of psychological terms, psychologists should deal "with terms, concepts, constructs, and so on, quite frankly in the form in which they are observed—namely, as verbal responses" (1945, p. 271). In fact, this was a main point of *Verbal Behavior* (1957); terms, concepts, and constructs do not have an existence independent of the behavior of the speaker, and the function of a verbal response tells us more about its "meaning" than its topography, which Skinner detailed in the first chapter, appropriately titled "A Functional Analysis of Verbal Behavior." As he stated in 1945, "Meanings, contents, and references are to be found among the determiners, not the properties, of a response" (p. 271). In other words,

The extent to which we understand verbal behavior in a "causal" analysis is to be assessed from the extent to which we can predict the occurrence of specific instances and, eventually, from the extent to which we can produce or control such behavior by altering the conditions under which it occurs. (Skinner, 1957, p. 3)

This statement of a functional analysis of verbal behavior contained in his 1957 book and earlier in his 1945 paper, which Skinner could have titled "The *Functional* Analysis of Psychological Terms," was (and still is) a revolutionary suggestion that has yet to be fully realized, even by behavior analysts. In essence, all Skinner was saying was that to understand any particular verbal response, what is important is not what the response looks like (i.e., its topography), but why it occurs (i.e., its function within the verbal community); and that meanings are to be found among the

independent variables of which the verbal utterance is a function. These independent variables include mostly antecedent events (i.e., motivating operations and discriminative stimuli; see Normand, 2009). To truly discover the causes of some bit of verbal behavior, we need to manipulate the variables responsible for its occurrence; in other words, do an experiment. Failing that, our best bet is to carry out an interpretive analysis, of which Skinner (1957) was an exercise on a grand scale.

Interestingly, even before his first book, *The Behavior of Organisms* (1938), was published, Skinner was already imagining how the basic principles discovered in the lab with rats could be extended to that most special of human traits: language. Skinner reported that after his famous dinner table conversation with the philosopher Alfred North Whitehead in 1934, in which Whitehead challenged Skinner to explain his statement, "There is no black scorpion falling upon this table," Skinner went home and immediately began to work on sketches of what would eventually become *Verbal Behavior* (1957).

Of course, as numerous behavior analysts (e.g., Palmer, 1991; Schlinger, 1992; Schnaitter, 1978) have noted, once basic scientific laws or principles have been induced from hundreds of experiments and summarized in statements or equations, one does not need to carry out an experiment to understand behavior, especially behavior that is complex or difficult to study experimentally; one can use the basic principles to interpret the behavior. As Skinner pointed out in the first chapter of *Verbal Behavior*, his book was such an exercise. In his 1945 paper, Skinner proposed a program of research (the operational analysis of psychological terms) but, as Leigland (1996) noted, he "never pursued the functional analysis of psychological terms in the sense of a systematic program of empirical research" (p. 106). Over the years, Skinner provided numerous

cursory translations of both psychological and everyday terms. More recently, however, other behavior analysts have carried out more thorough interpretive analyses of several traditional psychological terms and concepts, including memory (Palmer, 1991), cognition (Palmer, 2003), various language regularities (Palmer, 1998), intelligence (Schlinger, 2003), consciousness (Schlinger 2008b, 2009b), listening (Schlinger, 2008c), theory of mind (Schlinger, 2009c), and imagining (Schlinger, 2009a).

TRADITIONAL APPROACHES

The approach to defining psychological terms practiced by many psychologists is to ask what the terms mean. Typical questions might be, "What is consciousness?" or "What is memory?" Such questions suggest several implicit assumptions about the supposed referents of the terms. First, because many traditional psychological terms (e.g., *consciousness*, *memory*, *perception*, *personality*, etc.) are nouns, one might react to them as if the referents are tangible things or, as some psychologists assume, cognitive processes. Our everyday vernacular consists of numerous intraverbal chains reflecting this practice; for example, "I solved the problem in my mind," or "Dolphins have consciousness, too." Once the assumption is made that the referents named by the psychological terms are real, one is then tempted to look for them, nowadays in the brain by using various brain imaging techniques. In doing so, psychologists commit the fallacy of reification, which is reflected in such locutions as "Where in the brain is consciousness located?" or, in the memory literature, by talking about representations or short-term and long-term memories. Once a term is reified, it becomes easier to explain behavior by appealing to the reified concept in the form of what is called a circular explanation (or as Skinner referred to it, an explanatory

fiction), in which the only evidence for the explanation is the very behavior to be explained. For example, saying that the inattention, impulsivity, and excessive activity of a young child is caused by attention deficit hyperactivity disorder (ADHD) is circular if the only evidence for ADHD as the explanation are the very behaviors we want to explain.

Traditional psychological terms are not technical scientific terms but rather the common terms of everyday discourse. They are ingrained in our collective languages, as Skinner (1957) used the term (i.e., as the reinforcing practices of a verbal community), at least in Western cultures, and are part of what even some cognitive psychologists refer to as a folk psychology. The advantage of psychology coopting these common terms is that everyone "knows" what psychologists are talking about. The disadvantage is that the terms are not abstract tacts, like the technical terms of the behaviorist's verbal repertoire, and they do not aid in the prediction and control of behavior. As Schnaitter (1978) noted,

When a behaviorist says, in regard to a situation he is analyzing, "That response is being reinforced," the utterance of "reinforced" is tact. The response is under the control of a complex set of properties of the situation the behaviorist observes, and the stimulus control by those properties is maintained by the reinforcing practices of the verbal subcommunity of behavior analysts to which he belongs. (p. 3)

Because the referents of traditional psychological terms (the subject matter of much of psychology) are unobserved (and probably unobservable), there are few uniformly agreed-upon definitions. And in cases in which terms are fairly consistently defined, the definitions suffer from the logical fallacies of reification and circularity. Consider the following definitions of a few traditional psychological terms from a popular introductory textbook in psychology by Gerrig and Zimbardo (2002):

Memory: "The mental capacity to encode, store, and retrieve information."

Consciousness: "A state of awareness of internal events and of the external environment."

Intelligence: "The global capacity to profit from experience and to go beyond given information about the environment."

Perception: "The processes that organize information in the sensory image and interpret it as having been produced by properties of objects or events in the external, three-dimensional world."

These definitions refer to capacities, states, and processes that are not and probably cannot ever be directly observed. And in some instances, the capacities and processes are said to act. In the case of memory, they encode, store, and retrieve. In the case of perception, they organize information. It has become fashionable nowadays to adopt the *brain-as-person* metaphor and say that the brain acts, as, for example, when *perception* is defined as the brain interpreting sensory information. Moreover, some descriptions (e.g., of memory) are almost entirely metaphorical, referring as they do to encoding, storing, and retrieving information. As Palmer (2003) noted,

Unfortunately each such concept introduces a qualitatively new element that itself requires explanation or justification. That is, each new term must ultimately be paid for in the coin of physical, biological, or behavioral events. Like the improvident debtor who pays off one credit card by drawing down the balance of a second, such devices provide only temporary satisfaction, for the overall explanatory burden has been increased, not reduced. (p. 172)

Consider the following brief excerpt from a relatively recent article on the tip-of-the-tongue (TOT) phenomenon (see also Schlinger, 2004): "Results support the transmission deficit model that the weak connections among phonological representations that cause TOTs are strengthened by production of phonologically related words" (James & Burke, 2000, p. 1378). This short quotation is almost entirely metaphorical. In other words, very little that is described

is observed, neither the representations nor the weak or strong connections between them, despite the fact that the description is based solely on the performance of participants in an experiment. Worse, the weak connections among the representations are said to be the cause of the TOTs. The exact structures (phonological representations) and processes involved (strengthening of connections by production of phonologically related words) are never specified, thus making it impossible, in the absence of descriptions of actual observed behavior, for other researchers to make the same observations. Speaking metaphorically is not bad per se; it does make difficult concepts more accessible to the uninitiated. However, as Machado, Lourenço, and Silva (2000) wrote, "When a scientist extends an everyday concept into a new domain, it is incumbent upon him to explain the new meaning of the concept and how the concept should be used" (p. 33).

Psychologists may defend their practice of inferring unobserved processes by pointing out that they are merely emulating natural scientists. As an example, I have previously described how, long before they were able to make direct observations with space telescopes such as the Hubble and Spitzer, astronomers inferred the existence of extrasolar planets based on the slight perturbations, or wobbles, of the movement of the stars around which the supposed planets orbited. In other words, astronomers based their inferences on already established laws of physics (Schlinger, 1998). But as I noted, "In psychology, cognitive events are not deduced from an experimentally established foundation of lawful relationships between objective events" (Schlinger, 1998, p. 3). Moreover, such events, unlike extrasolar planets, are not only not directly observed but probably not observable. Of course, many scientific phenomena are not directly observed for different reasons (like

the moment of inertia and electron). This fact raises the issue of the controlling variables for the term *observable*.

Having said all that, the controlling variables for psychologists' verbal behavior are similar to what they are for behavior analysts, namely, behavior in its context. After all, terms like *memory* and *consciousness* are not evoked by actual memories or consciousness. That is why I have argued that terms like *intelligence*, *perception*, and *consciousness* are just words (i.e., verbal responses), and to understand what psychologists (or anyone, for that matter) mean when using such terms, we need to look at the circumstances that evoke the terms.

A FUNCTIONAL ANALYSIS OF PSYCHOLOGICAL TERMS

A functional analysis of psychological terms, as Skinner (1945) noted, deals with the terms in the "form in which they are observed—namely, as verbal responses" (p. 271). Thus, for example, the question "What is consciousness?" becomes "What is *consciousness*?" or, more specifically, "What is someone doing when he or she is said to be conscious (of themselves or their surroundings)?" Asked this way, the question is meant to focus the lens on the variables responsible for the emission of the verbal response "consciousness," that is, the circumstances that evoke the response. For example, what causes someone to say that an individual is conscious of a book? Another way of asking it is: What evidence is there that the person is conscious of the book? The answer has to be that the person must be observed to behave in some way with respect to the book, for example, by looking at it, pointing to it, picking it up, reading from it, or talking about it. Of course, if we do not observe the individual behave in any way with respect to the book, we would

probably not be willing to say that she is not conscious of it because she may talk to herself about or visualize it. In such instances, only the person herself may report that she is conscious of the book. We can see another problem with many traditional psychological terms if we ask what evidence there is that the individual *perceives* the book, because the answers are exactly the same as they are when the individual is conscious of the book (i.e., she may look at it, point to it, pick it up, read from it, or talk about it).

Likewise, the evidence that causes us to say that someone is conscious or *self-aware*, is that she engages in certain behaviors with respect to herself, such as dressing, using a mirror to groom, and so on. But, most of the time, we are likely to say that an individual is self-aware if she can describe her own behavior. Some behavior analysts (e.g., Schlinger, 2008a; Skinner, 1957) have suggested that self-descriptive repertoires are acquired as a result of parents teaching children to tact their own behaviors by answering questions such as "What are you doing?" Similarly, Skinner (1945, 1957; see also Schlinger, 2008a) suggested ways in which verbal behavior could be brought under the control of private stimuli. In these instances, in the presence of collateral responses or publicly accompanying stimuli, parents ask, "What are you feeling?" and then reinforce children's correct answers based on the observed evidence and the conventions of the verbal community. Even though the verbal community can only reinforce self-reports on the basis of observed events or behavior, the assumption is that the private stimuli that accompany those observed events eventually assume some control over the self-report.

As the foregoing example of consciousness suggests, and as Skinner first pointed out in his 1945 paper, psychological terms have no meaning separate from the circumstances that

evoke them. Of course, the same is true of behavior-analytic terms. The difference is that behavioral terms, the so-called technical terms of our discipline, are abstract tacts controlled initially by consistent, regular findings in the experimental laboratory and, later, by circumstances with similar features. For example, the term *reinforcement* is not defined a priori, but rather it is a tact of consequences or outcomes of responses that increase or maintain similar responses under similar circumstances. As a scientific community, behavior analysts thus reinforce the response “reinforcement” only under circumstances that possess those features. As Schnaitter (1978) noted,

An expression such as “reinforcer” is itself a tact, but one whose provenance is relative to a specialized verbal community, and where the conventional requirements of the controlling relation between events or properties of events and the responses are maintained with great rigor. (p. 3)

That is not to say, however, that just as with any tact, the response “reinforcement” does not occur under other circumstances in which it may be called metaphorical. For example, in the applied literature, a consequence meant to reinforce behavior is frequently referred to as a reinforcer before its effect on future responses is observed. Of course, generic extension of a tact is only as tightly controlled as the verbal community permits.

THE SCIENTIFIC VERBAL BEHAVIOR OF BEHAVIOR ANALYSTS

The preceding discussion of terminology in psychology and behavior analysis leads logically to a discussion of how terms in behavior analysis are used. In what follows, I consider a few of these terms.

Functional Analysis

The term *functional analysis* is uttered a lot by behavior analysts

these days, but how consistent are the controlling variables? In a recent article, Normand and I (Schlinger & Normand, 2013) briefly address the functions of the term *functional* in behavior analysis. In so doing, we note, following from Hineline and Groeling (2011), that the term *functional* has historically been evoked by at least two related conditions. A narrow use of *functional* in behavior analysis, especially in the applied arena, is to describe the selective effects of consequences on behavior (see Hineline & Groeling for a more extensive discussion). Thus, when one speaks of “the function of a response,” one is referring to the consequence produced by that response and which determines the probability of similar responses under similar circumstances. Such a formulation essentially defines the operant.

The broader use of *functional*, not only in behavior analysis but the sciences in general, involves a statement that some variable y is observed to change systematically as a result of changes in another variable x , or stated mathematically, $y = f(x)$. Even though Skinner was almost single-handedly responsible for the concept of the operant as a class of responses united by their common effect on the environment, he also fostered the broader use of functional analysis. For example, he wrote,

The external variables of which behavior is a function provide for what may be called a causal or functional analysis. We undertake to predict and control the behavior of the individual organism. This is our “dependent variable”—the effect for which we are to find the cause. Our “independent variables”—the causes of behavior—are the external conditions of which behavior is a function. Relations between the two—the “cause-and-effect relationships” in behavior—are the laws of a science. (1953, p. 35)

Thus, functional analysis was equivalent to experimental analysis; hence, the experimental analysis of behavior. For Skinner, interpretive accounts of behavior could also be

functional analyses (Schlinger & Normand, 2013). Skinner (1984) defined *interpretation* in science as “the use of scientific terms and principles in talking about facts about which too little is known to make prediction and control possible” (p. 578). As he said,

Laboratory analyses of the behavior of organisms have yielded a good deal of successful prediction and control and to extend the terms and principles found effective under such circumstances to the interpretation of behavior where laboratory conditions are impossible is feasible and useful. (p. 578)

Following from Skinner’s (1957) functional taxonomy of verbal behavior, in which the elementary verbal operants are defined primarily by characteristic discriminative and motivational variables rather than any specific kinds of reinforcers, a functional analysis of verbal behavior would properly focus on the manipulation of discriminative and motivational variables rather than on consequences (Schlinger & Normand, 2013). Thus, a functional analysis of psychological terms, that is, the verbal behavior of psychologists as well as behavior analysts, would look at the antecedent controlling variables. To understand *why* those variables evoke particular responses, however, one would have to look at the reinforcing practices of the verbal community to which the speaker belongs.

Rules

Ever since Skinner (1966) first discussed their role in behavior analysis, numerous behavior analysts have debated the nature and function of rules. In other words, the term *rule* has been evoked by a variety of variables. But what exactly controls the verbal response “rule” or “rule-governed behavior”? The term *rule* entered the collective behavioral verbal repertoire through Skinner because, as he noted, in the early 1960s cognitive psychologists claimed that behavior could not only be shaped and maintained by reinforcement, it

could also be rule governed. In other words, for these psychologists, according to Skinner, not only could the behavior of verbal humans be rule governed, the behavior of nonhuman animals in operant conditioning chambers could be as well (Skinner, 1979). However, beginning with Skinner, the primary variable that controlled the verbal behavior of behavior analysts regarding rules seemed to be at least implicitly a formal one. In other words, a *rule* is a contingency-specifying stimulus (Blakely & Schlinger, 1987; Skinner, 1966; but see Schlinger, 1993). That is, a *rule* is a statement that specifies the terms of a contingency; for example, “If I work quickly when the light is illuminated, I can earn more points.” Moreover, various behavior analysts have borrowed the common vernacular of describing individuals as “generating rules,” “stating rules,” “following rules,” “obeying rules,” and so on. All of these expressions seem to suggest that a rule has a certain structure; that is, it can be stated or followed, despite the fact that behavior analysts view rules functionally. This way of talking resembles the traditional distinction between expressive and receptive language that implies that language is something possessed by both speaker and listener (cf. Skinner, 1957, p. 33). But another implication of these expressions is that they designate the rule follower as the instigator of his or her actions with respect to the rule, instead of having the rule control behavior.

Even if behavior analysts have approached the study of rules functionally, they differ in the functions they attribute to rules. In his first treatise on the subject, Skinner (1969) asked, “How does a rule govern behavior?” His answer:

As a discriminative stimulus, a rule is effective as part of a set of contingencies of reinforcement. A complete specification must include the reinforcement which has shaped the

topography of a response and brought it under the control of the stimulus. (p. 148)

Following Skinner, other behavior analysts offered discriminative interpretations of rules (e.g., Catania, Shimoff, & Matthews, 1989; Cerutti, 1989), while others interpreted rules as motivating operations (Malott, 1989). Still others viewed rules as verbal stimuli that participate in relational frames (S. C. Hayes & Hayes, 1989) or as function-altering operations (Blakely & Schlinger, 1987). In fact, Blakely and I (Blakely & Schlinger, 1987) argued that if a rule was only a verbal discriminative stimulus, a special term was unnecessary (see also Brownstein & Shull, 1985). Because “almost any salient verbalization” can condition a listener’s behavior (Palmer, 2007), I have suggested that if behavior analysts continue to use the term *rule*, they reserve it for “any verbal stimulus ... that functions to condition the behavior of the listener” (Schlinger, 2008c, p. 158).

Other locutions are less specific about the type of control exerted by rules. For example, some have referred to rules as verbal antecedents (Zettle & Hayes, 1982) and rule-governed behavior as verbally governed (Catania, 1998). Some use the term *rule* synonymously with instruction, although as I have pointed out, Skinner (1957) used the term *instruction* for relational autoclitics that had function-altering effects, although he never returned to that analysis even when he began talking about rules (Schlinger, 2008a).

The point of this discussion is to illustrate the sometimes widely differing variables that control the response “rule” by behavior analysts. As a reaction against the terminological confusion regarding rules, I recently suggested that behavior analysts abandon the term altogether (Schlinger 2008c), a suggestion made long ago by Brownstein and Shull (1985), albeit for different reasons.

Private Events

Another term that seems to be controlled by different variables in the behavior-analytic community is *private events*. Nowhere is this more apparent than in special sections on private events in two different journals in the past few years (see Burgos, 2009; Schlinger, 2011). More fundamental than behavior analysts’ disagreement on the role of private events in a natural science of behavior, however, is their disagreement on what is meant by *private*.

Skinner (1945) first introduced the concept of private events (private stimuli and covert responses) in his discussion of how verbal responses (i.e., tacts) could be brought under the control of private stimuli. Skinner used the discussion as an opportunity to contrast his radical behaviorism with what he called methodological behaviorism, which did not consider private events to be worthy of scientific consideration. Since Skinner’s introduction of this distinction, behavior analysts have debated what private events consist of and what role, if any, they play in the behavioral stream, with sometimes widely differing views (see Marr, 2011).

For example, L. J. Hayes and Fryling (2009) criticized Skinner for bifurcating events into public and private, based mostly I think, on his claim that private events occur within the skin. However, it is possible that Skinner’s verbal behavior in this regard was controlled by making a point to nonbehaviorists that radical behaviorism does not exclude unobserved events, wherever they take place, and not, as L. J. Hayes and Fryling charge, to separate the subject matter of behavior analysis into public and private events. Skinner’s choice of the terms *private stimuli* and *covert responses*, as well as talking about them occurring “within the skin,” were perhaps unfortunate in this regard. Let us look briefly at both terms.

For Skinner, private stimuli differ from public stimuli only in their accessibility, not in their function. For example, there are stretch receptors located in the muscles that respond to energy produced by the stretching of those muscles (the patellar reflex is a good example). A behavioral interpretation must assume that these receptor cells function no differently than other receptor cells, and that their stimulation can potentially assume both respondent and operant functions. A thoroughgoing behaviorism, then, must define the *environment* as “all of the stimuli that affect the behavior of an organism at a given moment,” including those stimuli that can only affect the receptors of one individual (i.e., private stimuli). Saying that some of these stimuli occur within the skin is not a defining feature of private stimuli, and to the extent that such a location causes problems, it should probably be abandoned, while acknowledging that at the time Skinner introduced the distinction it was, in fact, useful in contrasting radical from methodological behaviorism. Indeed, one could reasonably argue that all stimuli act “within the skin.”

What about the term *covert responses*? As with the concept of private stimuli, by “covert” all Skinner meant was “unobserved.” If behavior analysts assume that behavior is continuous both in space and in time (Schlinger, 2009a), then we can talk about responding that is observed (i.e., public) and unobserved (i.e., private). There is, perhaps, the ontological question of when a response actually begins. For example, is it when a motor neuron fires? When the actual muscles contract? Either way, it does not seem far-fetched to assume that when a response is operantly conditioned, the increased probability of that response may be so slight that it is not observed by others. We also cannot rule out the possibility that the unobserved response produces stimuli that may

affect the person who is behaving. Thus, responding exists on a continuum of observability or magnitude, and one would expect that low magnitude, or unobserved, behavior would function no differently than behavior that exceeds the “threshold of observability” (Palmer, 2009), that is, observed behavior.

Others have used the term *private* somewhat differently, however. For example, Rachlin (2003) distinguishes between Privacy A and Privacy B, which Baum (e.g., 2011a) calls privacy by accident and privacy in principle. In the former, events are unobserved, which may include when one is behaving alone in a room, whereas the latter refers to events that cannot be observed (i.e., unobservable). However, at least for Baum, “private means, by definition, unobservable by another” (2011b, p. 237). Regardless, it seems clear that since the initial distinction between public and private events by Skinner, the variables controlling the verbal response “private” by behavior analysts have not been the same.

Other Behavioral Terms

In addition to rules and private events, behavior analysts do not agree on the definitions of other commonly used terms in the field. For example, there are disagreements about the seemingly straightforward definition of *verbal behavior* (e.g., see Normand, 2009, Schlinger, 2008c) and what constitutes a *verbal stimulus* (e.g., S. C. Hayes & Hayes, 1989). Discussions about what rules are or what privacy means or how we ought to use the term *verbal* are healthy for a sophisticated discipline. However, behavior analysts in particular, following from Skinner’s (1945, 1957) functional approach to verbal behavior, ought to view such discussions in terms of the variables that control the respective verbal responses. We might, as Leigland (1996) suggests, engage in an empirical program to discover the

variables that control these verbal responses. This might at least lead behavior analysts to an understanding of how their terms are being used in a given context. As Skinner (1957) pointed out, however, the real goal of such an undertaking is a practical one; that is, whether our formulations are effective in achieving prediction and control (if possible) with respect to the phenomena of interest. One unique problem with an empirical program to discover controlling variables of behavior analysts' scientific verbal behavior is that the analysis itself must necessarily also be formulated in terms of verbal behavior. In addition to revealing the variables of which our verbal behavior is a function, such a program might also result in a fresh look at the definitions of terms in behavior analysis.

A FUNCTIONAL ANALYSIS OF DEFINITIONS

What are scientific definitions, how do they come about, and what functions do they have? These are all questions for an empirical program or interpretive functional analysis. Skinner (1957) distinguished between ostensive and purely verbal definitions. In both cases the definitions function as relational autoclitics or, as I would argue, verbal function-altering operations. For example, for a person with a sufficient history, the statement, "This is a Fender Telecaster" (while pointing to one) alters several behavioral functions. As I have previously noted (Schlinger 2008c),

Assuming a listener who engages in echoic (and perhaps intraverbal and imaginal) behavior at the time, the listener's future behavior with respect to Fender Telecasters is altered such that shown one of the guitars, the listener can tact "Fender Telecaster," or when someone utters "Telecaster," the intraverbal response "Fender" is momentarily strengthened or vice versa. In addition, if someone asks the listener to point to the Fender Telecaster, presumably he or she can do so. (p. 157)

On the other hand, an example of a purely verbal definition would be "A guitar is a stringed instrument with six strings." Again, assuming a certain history, as a result of hearing such a statement, several behavioral functions are altered such that the listener is able (a) to say "guitar" when asked, "What is a stringed instrument with six strings?," (b) to say "a stringed instrument with six strings" when asked "What is a guitar?," and (c) point to a guitar when asked "Which one of those is a guitar?" (Schlinger, 2008c; Skinner, 1957).

In the mature sciences, many definitions are intraverbal sequences evoked by terms that began as abstract tacts of events in the laboratory. Thus, *reinforcement* was originally a tact under the control of behavioral consequences that strengthened similar responses under similar circumstances. Once such a tact is established, the response form may be emitted as part of an intraverbal frame, as when an instructor states it as a definition. Under such circumstances, the intent is to alter the behavioral functions of events such that when the listener observes such a behavioral consequence, he or she can say "reinforcement," or when asked "What is a consequence that strengthens similar responses under similar circumstances?," he or she can say "reinforcement," and so on. Realistically, however, the stimulus control over such behaviors drifts depending on the verbal community. As mentioned previously, nowadays, mostly in applied settings, verbal communities reinforce the response "reinforcement" in the presence of some, but not all, of the characteristics specified in the definition, resulting in altered behavioral functions that may include calling consequences "reinforcers" that do not have reinforcing functions or, more seriously, in manipulating events that are presumed to function as reinforcers that, in fact, do not.

The behavioral functions of scientific terms and definitions are twofold,

corresponding to the control by discriminative stimuli and the function-altering effects of verbal stimuli (i.e., rules). As Skinner (1957) wrote,

The contingencies of reinforcement that create a special scientific repertoire and sharpen its stimulus control provide for a kind of behavior which serves the listener as (1) an optimally effective *discriminative stimulus* in evoking any behavior he may already possess with respect to a situation and (2) a fruitful source of *instruction* in altering his behavior with respect to a new situation. (p. 420)

CONCLUSION

In this paper, I have addressed the verbal behavior of psychologists in general and of behavior analysts in particular. Skinner (1957) maintained that logical and scientific verbal behaviors are distinguished from the verbal behavior of the layperson “because of the emphasis on practical consequences” (p. 429). For Skinner, these practical consequences include nonverbal action (the control of nature) that ultimately is responsible for maintaining the scientist’s verbal behavior. Behavior analysts might claim that the ability to predict and control behavior is perhaps the main feature that distinguishes behavior analysis from most of nominal psychology. As Skinner (1957) said, “The techniques of logical and scientific methodology must, of course, be adapted to the phenomena of verbal behavior” (p. 430).

Skinner (1945) closed his contribution to the symposium on operationalism with the following words that also apply to behavior analysts:

To be consistent the psychologist must deal with his own verbal practices by developing an empirical science of verbal behavior. He cannot, unfortunately, join the logician in defining a definition ... he must turn instead to the contingencies of reinforcement which account for the functional relation between a term, as a verbal response, and a given stimulus. That is the “operational basis” for his use of terms; and it is not logic but science. (p. 277)

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