The Behavior Analyst 2005, 28, 133–142 No. 2 (Fall)

Variables of Which Values Are a Function

Sam Leigland
Gonzaga University

The ordinary-language concept of values has a complex history in psychology and in science generally. The traditional fact–value distinction commonly found in traditional scientific perspectives has been challenged by the varieties of philosophical pragmatism, which have similarities to Skinner's radical behaviorism. Skinner's challenge to the fact–value distinction maintained that the phenomena of both "facts" and "values" are a matter of contingencies of environment–behavior interaction, and both phenomena may be observed when a scientist does research or makes recommendations in applied settings based on that research. Some of the processes and variables relevant to an analysis of values as behavioral phenomena are described, and examples of both nonverbal and verbal contingencies are considered, along with implications for the values of an individual and a culture. If the various issues of methodology can be addressed successfully, then behavior analysis will be in the position to move beyond descriptive studies of values, such as those found in humanistic psychology, by providing analyses of the variables of which values are a function.

Key words: values, radical behaviorism, pragmatism

With all of the many achievements and advances of behavior-analytic science, there naturally remain many areas of complex human functioning that call for a behavioral analysis. One such area involves the phenomena of human values (e.g., Baum, 1994), a topic that has received attention from such fields as humanistic psychology (e.g., Hergenhahn, 2001). The interests of phenomenological psychologists in values are primarily descriptive in character, yet a functional analysis of values would be of potentially great importance as well, because it might contribute to a practical understanding of values as behavioral phenomena (e.g., Baum, 1994; Skinner, 1953, 1971).

Questions of values and science are of continuing interest in the behavioral sciences, as seen in a recent series of papers published in *Behavior and Philosophy* (Staddon, 2003). Much earlier in the history of the field of behavior analysis, Skinner (1971) made the following observation:

> When we say that a value judgment is a matter not of fact but of how someone feels about a fact, we are simply distinguishing between a thing and its reinforcing effect. Things themselves are studied by physics and biology, usually without reference to their value, but the reinforcing effects of things are the province of behavioral science, which, to the extent that it is concerned with operant reinforcement, is a science of values. (p. 99)

First, this statement asserts an intimate connection between the ordinary language of "values" and not only science but behavior-analytic science in particular. An examination of the implications of this theme will provide context for what follows. That is, the statement also indicates a direction for the analysis of variables of which values are a function.

VALUES AND BEHAVIOR-ANALYTIC SCIENCE

Facts and Values

The traditional distinction between statements of value and statements of fact has roots in a number of philosophical sources (e.g., Day, 1992; Putnam, 2002; Quirk, 2000). The traditional role of the fact–value distinction in science has been a continuing source

This article is based on a contribution to a symposium presented at the 2004 meeting of the Association for Behavior Analysis, Boston, entitled "Science and Human Values." My thanks to the symposium chair, Maria Ruiz, for her invitation to participate in the symposium.

Address correspondence to Sam Leigland, Department of Psychology, Gonzaga University, Spokane, Washington 99258 (e-mail: leigland@gonzaga.edu).

of controversy (e.g., Staddon, 2001, 2003) and has been the subject of criticism from various sources in philosophy (e.g., Putnam, 2002), perhaps most notably, philosophical pragmatism (e.g, Dewey, 1929; Murphy, 1990; Rorty, 1979), which shares certain characteristics with Skinner's radical behaviorism (e.g., Day, 1980, 1983; Hayes & Brownstein, 1986; Leigland, 1997, 1999; Zuriff, 1980).

Skinner's own criticism of the fact–value distinction may be seen in the quotation above. Of course, one might distinguish between "statements of fact" and "statements of value" on the basis of cultural practices or verbal contingencies, but what is under dispute is whether there is an ontological distinction between facts and values. Skinner's statement above acknowledges that a given "thing," a tree for example, might be described as an object, as when we are interested in having it removed (e.g., the tree's height, weight, etc.). In this sense we could say that the statements are tacts under the control of certain physical properties (Skinner, 1957). The tree might also contribute to the control of statements involving descriptions such as "beautiful" and "magnificent," in which case the control would involve a more complex array of variables, including, for example, the speaker's private events (Skinner, 1957). The point is that both statements involve verbal behavior in interaction with a complex environment given a history of such interactions, and no ontological distinction is necessary in describing the two types of statements (e.g., Day, 1992).

Compare this view with Quirk's (2000) summary of Dewey's naturalistic view of aesthetics, ethics, and values:

> Our experience in and of nature is shot through with aesthetic value, since it is our *felt* needs in an environment which can satisfy or thwart them that spurs us to act both habitually and intelligently. In our transactions with the natural world in "situations" we experience *things* in that world as themselves good or bad, noble or base, helpful or frustrating, beautiful, sublime, striking, etc. These "felt" immediacies are neither "subjective" nor "objective," strictly speaking, for they "emerge" in the *practical* situation where agent and environment "transact" and mutually constitute each other as subject and object (among other things). Think of it this way: the value is not "out there" or "in us" as much as it is "in the situation." When we articulate the situation in thought, what is to prevent us from saying, with equal vigor, that not only do things, like scenic landscapes, paintings, or poems, *strike us* as beautiful, they are *themselves* beautiful? Why should the subject/object distinction, which isn't ultimate anyway, be assumed to coincide with the valuable/inert distinction? So the idea that aesthetics is "subjective"—a matter of "mere" taste or "opinion"—is radically misplaced, for Dewey. (p. 6)

Thus, Skinner's radical behaviorism and Dewey's pragmatism share the naturalistic view of human beings (and other creatures) in constant and inextricable interaction (or "transaction") with the environment, with all "philosophical" and "psychological" issues arising from, and in the case of science, to be analyzed in terms of, such interactions (although the result is not a reductive analysis; the issues are linguistic and pragmatic rather than ontological; e.g., Leigland, 1993, 1999).

Stated another way, because the inseparable interaction between environment and behavior constitutes the naturalistic view applied to all phenomena, there would be no way to get to either the environment, or to behavior, in and of themselves (e.g., Leigland, 1999). Thus, from a behavior-analytic perspective, values, like all other psychological-behavioral phenomena (including facts), may be viewed productively as a function of certain variables found in environment–behavior interactions.

Scientists and Values

Another, and perhaps more controversial, part of Skinner's treatment of values concerns the values of scientists as potential agents of social change. Skinner's theme is summarized as follows:

> Decisions about the uses of science seem to demand a kind of wisdom which, for some curious reason, scientists are denied. If they are to make

value judgments at all, it is only with the wisdom they share with other people in general.

It would be a mistake for the behavioral scientist to agree. How people feel about facts, or what it means to feel anything, is a question for which a science of behavior should have an answer. . . . If a scientific analysis can tell us how to change behavior, can it tell us what changes to make? This is a question about the behavior of those who do in fact propose and make changes. (1971, p. 97)

Traditionally, scientists deal in facts, and issues of the implementation of those facts for purposes of application is to be left to others. But how controversial is it to say that scientists themselves have a stake in the application of scientific findings, and to say further that the views of scientists might be a valuable source (but certainly not the only source) of recommendations or advice on such matters? Certainly the National Academy of Sciences, for example, plays an important role in making public policy evaluations and recommendations regarding science-related issues.

To take the quotation above as an example, the controversial passage may be, "can it tell us what changes to make?" Scientific analysis may indeed tell us what changes to make with respect to a particular problem, if the analyses have produced reliable, practical, evidence-based results that may be put to use in the solution of the problem (some problems expressed in metaphysical or religious terms, such as "Do humans possess a nonphysical, immortal soul?," do not engage scientific methods when taken literally, but such questions may nevertheless be analyzed as verbal behavior under complex control; e.g., Baum, 1994; Hayes, Barnes-Holmes, & Roche, 2001; Leigland, 1996; Skinner, 1945). Science-based recommendations for what changes to make in solving a given problem are one thing, but why would those who receive such recommendations be likely to follow them? Although the latter contingencies are also complex (e.g., Barnes-Holmes et al., 2001; Skinner, 1987), part of the answer may be described informally as a matter of "shared values."

For example, suppose that a behavioral scientist approaches a school administrator with the following recommendation: "You should (you ought to) adopt my effective, science-based educational practices." Skinner interprets such value statements in terms of reinforcement contingencies as in the following rough translation (Day, 1992; Leigland, 1993; Skinner, 1953, 1971): "If your professional behavior is reinforced by documented academic achievements X, Y, and Z, by your students (and I have evidence that this is the case), then your professional behavior will be reinforced more effectively if you adopt my effective, science-based educational practices (and I will provide you with evidence of this)." This interpretation turns a value statement into an if–then conditional, and the latter could be described (in traditional terms) as potentially either true or false.

In other words, if the variables that function with respect to the behavior of the scientist-speaker and the school administrator as listener have made certain functional consequences effective for both regarding student behavior (i.e., if the effects of the variables that make such consequences effective are shared), then a necessary (but certainly not sufficient) condition is in place for the advice to have an effect. If the relevant variables have produced no such common effect regarding such consequences, then the advice would have no effect. This characterization may be turned back to ordinary language by saying that a necessary condition for the advice to be effective is the "shared values" of the speaker and listener.

The general point is illustrated in the following passage from Skinner (1971):

"You should (you ought to) tell the truth" is a value judgment to the extent that it refers to reinforcing contingencies. We might translate it as follows: "If you are reinforced by the approval of [others], you will be reinforced when you tell

the truth." The value is to be found in the *social contingencies* [italics added] maintained for the purposes of control. It is an ethical or moral judgment in the sense that ethos and mores *refer to the customary practices of a group* [italics added]. (p. 107)

In the practice of applied and clinical behavior analysis, of course, science-based recommendations are part of the normal, problem-solving interactions. An interesting variation occurs when the values in question may differ in the initial stages of a therapeutic interaction, and the scientist seeks to alter the goal or value of the client for the long-term solution to the client's problem. In other words, the client's value is misplaced, so to speak, because the problem may have been misconstrued (regarding the clinically relevant behaviors and consequences), a situation that may be fairly common in individual psychotherapy (and, of course, in medical practice as well).

In clinical behavior analysis, examples of such situations may be seen in acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999). At the beginning of therapy, for example, a client may be assuming that the obvious goal of the treatment shared with the therapist is the removal of the client's anxiety. The ACT approach, however, is to reconfigure the client's perceptual behavior to show that it is not the feelings that are the problem, so to speak, but rather experiential avoidance behaviors (such as "attempts to control" the feelings) that need to be addressed. Later in therapy, the issue of values arises again when a client, having learned to release the control-based avoidance behaviors that have dominated his or her life, for example, now has the opportunity to establish new values and goals in the context of the therapeutic interaction. This valuation process would be an interesting context for research for those interested in the development of values.

To summarize, any controversy regarding Skinner's views of scientists as wielders of both information and values is largely neutralized upon examination. The traditional fact–value distinction has been criticized from a number of quarters, and the idea that scientists should be limited to the impartial gathering of factual information is contrary to how applied science actually works (see also the excellent discussion by Baum, 1994). Note that in Skinner's treatment of values, one can find no guidelines or ethical rules for settling ethical disputes in general. For the radical behaviorist, generating such rules would be analogous to formulating rules for how species should, or ought to, evolve. Both cases are a matter of contingencies.

VARIABLES THAT AFFECT VALUES

A Functional Analysis: Basic Considerations

Because *value* is a commonly occurring ordinary-language term, an analysis of controlling variables may begin with a look at the conditions under which the term appears as verbal behavior (again, this is not a reductive exercise, but rather involves two vocabularies that serve different functions regarding behavior; neither vocabulary is reducible to the other; e.g., Leigland, 1996, 1999; Skinner, 1945). Such a functional analysis of an ordinary-language term can be quite complex, of course; thus, there is advantage in beginning with the simplest situations.

For example, we might begin with a third-person usage of the term as applied to nonhuman behavior. Specifically, the standard experimental operant preparation with rats or pigeons clearly evokes a host of ordinary-language psychological terms in human observers (e.g., Leigland, 1989, 1996; a frequent observation of those who teach undergraduate operant laboratory courses). As we analyze a rat's operant behavior of pressing a lever by manipulating the remaining variables of the four-term contingency (reinforcer, discriminative stimulus, establishing op-

eration), which of these variables would be most effective in evoking the term *value* in the verbal behavior of a lay observer?

As Skinner noted in the first quotation above, it would have something to do with operant reinforcement, and we could predict that specifically it would be likely to be evoked under the control of variables that affect the momentary effectiveness of the available reinforcer, and also affect the probability of any response class that has been reinforced by that type or class in the experimental context. That is, we could predict that the establishing operations (EOs) (e.g., Catania, 1998; Michael, 1982) would be of special relevance to evoking observers' talk of values, as food deprivation, for example, could be said to affect the momentary value of the food pellets for the rat and conditions of satiation could be said to make the pellets lose their value. Such predictions may be "confirmed" (in the sense of Skinner's, 1957, analysis of the term) by, for example, systematically manipulating the available variables in the experimental context and presenting lay observers with suitable thematic probes (see Leigland, 1996). We may thus identify EOs, the motivational variables of the basic operant formulation, as an important class of variables to the verbal behavior of values (or, nontechnically, as one of the meanings of the term; e.g., Skinner, 1945).

Values and Verbal Behavior

Moving into the interpretation and analysis of human values naturally involves a considerable increase in complexity, because verbal contingencies are involved in any distinctively human behavioral phenomenon. Nevertheless, the central notion of EOs appears to apply in the human case. In general, for example, when we say that we value something or someone, the statement concerns the relative effectiveness of certain consequences of behavior (although the statement may or may not be predictive; i.e., the statement may be a function of a variety of contingencies, audience effects, etc.; see Skinner, 1957). More specifically, when someone says that they value someone's advice, the statement describes the establishment of that person's advice as a reinforcer. Some of the complexity of such examples may be approached through a verbal form of the EO, which in turn may be examined as a form of rule-governed behavior (e.g., Catania, 1998).

Barnes-Holmes et al. (2001; cf. Zettle & Hayes, 1982) have proposed a functional classification of three types of rule following in terms of the verbal contingencies involved (pliance, tracking, and augmenting). One of these types, the augmental, provides a verbal variant of the EO function. Barnes-Holmes et al. distinguish further between formative and motivative augmentals. Formative augmentals establish events as reinforcers or punishers (as when an experimenter instructs a participant, "the numbers you see in this corner of the screen indicate points that you will earn, which are exchangeable for money," and the reinforcement effect of the points is observed to follow), and motivative augmentals alter the momentary effectiveness of a previously established functional consequence (as when two conference attendees are leaving a late-afternoon session and one says, "Let's go have a beer," and both engage in generalized behavior that, in the past, has resulted in the acquisition and drinking of beer).

Verbal rule governance of behavior involves the altering or transformation of stimulus functions that occur in the context of networks of relations among arbitrary stimuli (e.g., Barnes-Holmes et al., 2001; Schlinger & Blakely, 1987). An example may be seen in the following:

A person says, "I'm going on vacation in two weeks and will be gone for a month. If you water and mow my lawn each week I am gone, the following month I will pay you $100." This is a thoroughly specified contingency. It alters the

functions of calendar time, the grass, and the implements needed to mow and water the lawn. It specifies all the major elements of a contingency: a temporal antecedent, topographical form and the context within which it should occur, and the nature and delay of a consequence. The contingencies that are specified could not be effective through direct training; in part because greatly delayed consequences are simply not effective in the absence of verbal rules. (Barnes-Holmes et al., 2001, p. 106)

The difference between the standard definition of an EO and that of the augmental, as a verbal EO (and as a type of rule), is that the latter derives its function from participation in relational networks, which are themselves a product of a complex history presumably involving multiple-exemplar training and socially mediated reinforcement (for a more extensive treatment from the perspective of relational frame theory, see Hayes et al., 2001). It is through such a history that the arbitrary stimuli involved in a speaker's instruction can transform another arbitrary stimulus (e.g., a number on a computer screen) into a reinforcer.

Such function-altering or transformational effects have been observed in laboratory studies in which, for example, an arbitrary stimulus has been shown to function as a conditioned reinforcer without direct training but rather through its participation in an equivalence relation with a different arbitrary stimulus that had been previously established as a conditioned reinforcer (Hayes, Kohlenberg, & Hayes, 1991). Recently, Whelan and Barnes-Holmes (2004) reported the establishment of arbitrary stimuli as conditioned reinforcers in an experimental context in which no conditioned reinforcers were trained directly. In this case, the reinforcement function was observed when a previously conditioned punishment function was altered by way of a conditional stimulus previously trained using nonarbitrary stimuli in the relation of "opposite." Such studies point to a more complex version of the EO and may also illustrate what may be the distinguishing characteristic of the verbal EO or the augmental. In such cases reinforcement may be a derived function established through participation in a network of relations among arbitrary stimuli.

To return to the vocabulary of values by way of summary, we may say that an important, perhaps central, class of variables that control the verbal practices of values are variables that affect the establishment and conditions of effectiveness of classes of reinforcers. Such motivational variables are functionally defined as EOs. These range from biologically based unconditioned establishing operations, as in food deprivation increasing the value of getting something to eat, to the complex verbal processes involved in, for example, formative augmentals, as when a therapeutic process enables the identification and construction of one's "life's values" as part of the therapeutic process (for a detailed discussion and examples, see Hayes et al., 1999). Beyond these are the even more complex issues involving the values of a culture, a topic to which we now turn.

CULTURAL VALUES AND "THE MOST TERRIFYING QUESTION"

Although it may be reasonable to interpret "values" in terms of the effects of such motivational variables as EOs and augmentals (in the nonverbal and verbal cases), the importance of identifying and understanding the functions of these variables cannot be overstated. Beyond the questions concerning such topics as personal values, for example, are questions concerning cultural values. Among the latter is the question of how the future may be taken into account for the purposes of social change when immediate contingencies have such powerful effects (e.g., Skinner, 1971).

In Skinner's writings, such discussions have taken place in the context of the issues of cultural values and contingencies of cultural evolution (Skinner, 1953, 1971). Skinner's focus in these writings has been the particu-

lar cultural value of cultural survival, a value that engages long-term contingencies. Despite Skinner's emphasis on survival as a value, there is no sense in which Skinner is offering survival as an ontological, foundational, or absolute value. That is, it is not the case that in some sense, survival is the only "true" or "real" value, whereas other cultural values are mere social constructions (in philosophy, the latter view is often labeled *relativism,* but see Rorty's, 1999, arguments against such a label for antifoundationalist or antidualistic views). From Skinner's evolutionary, contingency-oriented perspective, a cultural value such as survival is one that deserves attention only because it may be that those cultures that have established survival as a value may be those that are most likely to survive. The general point is seen in the following famous quotation:

> When the goods of others are challenged, especially the goods of organized others, it is not easy to answer by pointing to deferred advantages. Thus, a government is challenged when its citizens refuse to pay taxes, serve in the armed forces, participate in elections, and so on, and it may meet the challenge either by strengthening its contingencies or by bringing deferred gains to bear on the behavior at issue. . . . But what is its answer to the question: "Why should I be concerned about the survival of a particular kind of [cultural] system?" The only honest answer to that kind of question seems to be this: "There is no good reason why you should be concerned, but if your culture has not convinced you that there is, so much the worse for your culture." (Skinner, 1971, pp. 130–131)

If those who are concerned about the future survival of a culture cannot expect to make a case in recruiting others to such a value simply through rational appeals to ontological foundations, then the difficult work of "pointing to deferred advantages" must somehow be faced. The difficulty, well known to behavior analysts (and to politicians), lies in the relative effectiveness of immediate compared to delayed contingencies of reinforcement.

Although this practical problem was addressed in a number of Skinner's writings, a theme relevant to the analysis of values may be seen in a paper published in 1982 in *The Behavior Analyst* entitled "The Contrived Reinforcer." Skinner's discussion of the applied importance of contrived contingencies concluded with a consideration of the question of "taking the distant future into account." The issue concerns the tendency for evolutionary and operant contingencies to prepare the species and the individual for a future that more or less resembles the past. Skinner (1982) concludes the paper as follows:

> But what about events that have no precedent—events that have never occurred in the experience of anyone? Certain predictions about the future of the world are of this sort. Something may be happening for the first time. It can be predicted with some accuracy, but the future of the species may depend upon whether there can ever be any contingencies of reinforcement . . . that will induce us to act on those predictions. We may "know" that certain things are going to happen, but knowing is not enough; action is needed. Why should it occur? That is perhaps the most terrifying question in the history of the human species. It will be answered, if at all, by someone who knows a great deal about contrived reinforcement. (p. 8)

Having at that time also recently read Michael's (1982) important paper on motivational variables, distinguishing between "establishing operations" in the case of unconditioned reinforcement and "establishing stimuli" in the case of conditioned reinforcement, I wrote to Skinner to see if the last sentence was an implicit reference to these variables, in the sense that such remote and unusual consequences would need to be made effective for current behavior as a complex form of establishing stimuli. Skinner replied (personal communication, 1984) that he was really referring to the fact that the solution would be another example of rule-governed behavior, which had been the principal theme of the final section of the paper.

Taken together, the rule or verbal governance of behavior that has the effect of establishing or increasing the effectiveness of certain types of reinforcement may be the beginning of an

approach to Skinner's "terrifying question." In the quotation above, Skinner implies that the question is indeed a "motivational" one, because knowing is not enough to guarantee action. But how could such contingencies operate for behavior that must occur now when the relevant consequences are "in the future"? That is, in what sense could EOs affect temporally remote consequences in such a way that the relevant behavior is affected in current environmental contexts? The only possible scientific answer to this question lies in the field of verbal behavior.

The fact is that people do work persistently for remote consequences. For example, many people worldwide are working for a cleaner environment, for significant reductions in mercury in drinking water, significant reductions in greenhouse gasses, and so on. Yet any significant progress toward the achievement of such goals may very well lie in a future beyond the lifespans of those who are now working to achieve them. Practitioners of certain religious perspectives may work for years as monks, philanthropists, or terrorists to achieve goals that they believe will take place after their deaths, in another metaphysical world or plane of existence. How are we to account for these values from the scientific perspective of nonverbal and verbal contingencies?

Skinner's (e.g., 1982, 1987) interpretations of similar sorts of examples led to the following general recommendations: "Contrived reinforcers are necessary when natural consequences are long deferred" (1982, p. 7), and "Why not arrange immediate [contrived] consequences that will have the effect that remote consequences would have if they were acting now?" (1987, p. 6). Interpretations also have been developed in Baum's (1994) analysis of rule-governed behavior in terms of two contingencies: a long-term or ultimate contingency that constitutes the basis for the abstraction of the rule, and a short-term proximate contingency of contrived reinforcement of rule following (cf. Barnes-Holmes et al., 2001). A parent prompts and praises hand washing in a child (the contrived proximate contingency) with a long-term probabilistic result of avoiding infections (the ultimate contingency).

A long-term cultural value is a verbal construction, an ultimate contingency that is the result of a formative augmental. That is, a history of contact with verbal materials that describe, for example, the effects of mercury on the developing child, studies that provide evidence of increasing mercury pollution in the water supply, and so on, may establish mercury reduction in the water supply as a verbally constructed reinforcer. It is verbally constucted in the sense of the transformed and abstracted arbitrary-stimulus functions described above, and it may be said to be a reinforcer only in the sense that it participates in the ultimate contingency, the long-term consequence of many people working to reduce mercury levels in the water supply, which, if successful, may contribute to the cultural experiences for the successful treatment of future problems of that type. The behaviors of the people who work toward such a long-term consequence would be proximally reinforced by the social practices of the group and by whatever social (e.g., legislation to reduce mercury) or nonsocial (recent measurements of reduced levels of mercury in the water supply) consequences that might augment (in the sense of motivative augmentals) the verbal practices of the group.

These problems may be the most complex and difficult in behavioral science, and the present discussion is intended only as part of a continuing, beginning discussion of some of the issues and variables involved (e.g., Baum, 1994; Glenn, 2004; Hayes et al., 2001; Skinner, 1953, 1971). One might conclude from the preceding discussion that to begin working toward long-term change we might begin with grass-roots organizations, changes in the educational system, setting up social support systems, organize the dis-

tribution of information, and so on. These are hardly surprising recommendations. But the power of the behavioral analysis is what our basic and applied research, particularly in the analysis of verbal behavior, will tell us about the relevant histories and contingencies. Certainly the methodological challenges for such programs are considerable, but if the complex issues of methodology can be addressed successfully, then behavior analysis will be in the position to move beyond descriptive studies of values, such as those found in humanistic psychology, by providing empirical analyses of the variables of which values are a function.

REFERENCES

Barnes-Holmes, D., O'Hora, D., Roche, B., Hayes, S. C., Bissett, R. T., & Lyddy, F. (2001). Understanding and verbal regulation. In S. C. Hayes, D. Barnes-Holmes, & B. Roche (Eds.), *Relational frame theory: A post-Skinnerian account of human language and cognition* (pp. 103–117). New York: Kluwer Academic/Plenum.

Baum, W. M. (1994). *Understanding behaviorism: Science, behavior, and culture*. New York: HarperCollins.

Catania, A. C. (1998). *Learning* (4th ed.). Upper Saddle River, NJ: Prentice Hall.

Day, W. F. (1980). The historical antecedents of contemporary behaviorism. In R. W. Rieber & K. Salzinger (Eds.), *Psychology: Theoretical-historical perspectives* (pp. 203–262). New York: Academic Press.

Day, W. F. (1983). On the difference between radical and methodological behaviorism. *Behaviorism, 11,* 89–102.

Day, W. F. (1992). Ethical philosophy and the thought of B. F. Skinner. In S. Leigland (Ed.), *Radical behaviorism: Willard Day on psychology and philosophy* (pp. 199–208). Reno, NV: Context Press.

Dewey, J. (1929). *Experience and nature*. La Salle, IL: Open Court.

Glenn, S. S. (2004). Individual behavior, culture, and social change. *The Behavior Analyst, 27,* 133–151.

Hayes, S. C., Barnes-Holmes, D., & Roche, B. (Eds.) (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*. New York: Kluwer Academic/Plenum.

Hayes, S. C., & Brownstein, A. J. (1986). Mentalism, behavior-behavior relations, and a behavior-analytic view of the purposes of science. *The Behavior Analyst, 9,* 175–190.

Hayes, S. C., Kohlenberg, B. S., & Hayes, L. J. (1991). The transfer of specific and general consequential functions through simple and conditional equivalence relations. *Journal of the Experimental Analysis of Behavior, 56,* 119–137.

Hayes, S. C., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford.

Hergenhahn, B. R. (2001). *An introduction to the history of psychology* (4th ed.). Belmont, CA: Wadsworth.

Leigland, S. (1989). A functional analysis of mentalistic terms in human observers. *The Analysis of Verbal Behavior, 7,* 5–18.

Leigland, S. (1993). The case against physicalism in the analysis of behavior. *The Behavior Analyst, 16,* 351–355.

Leigland, S. (1996). The functional analysis of psychological terms: In defense of a research project. *The Analysis of Verbal Behavior, 13,* 105–122.

Leigland, S. (1997). Systems and theories in behavior analytic science: An overview of alternatives. In L. J. Hayes & P. M. Ghezzi (Eds.), *Investigations in behavioral epistemology* (pp. 11–31). Reno, NV: Context Press.

Leigland, S. (1999). Pragmatism, science and society: A review of Richard Rorty's *Objectivity, relativism, and truth: Philosophical papers volume 1. Journal of the Experimental Analysis of Behavior, 71,* 483–500.

Michael, J. (1982). Distinguishing between discriminative and motivational functions of stimuli. *Journal of the Experimental Analysis of Behavior, 37,* 149–155.

Murphy, J. P. (1990). *Pragmatism: From Peirce to Davidson*. Boulder, CO: Westview.

Putnam, H. (2002). *Collapse of the fact/value dichotomy and other essays*. Cambridge, MA: Harvard University Press.

Quirk, M. J. (2000). *Dewey's version of pragmatism*. Molloy College, Philosophy Department, Sophia Project. Retrieved September 5, 2003, from http://www.molloy.edu/academic/philosophy/sophia/Dewey/pragmatism_txt.htm

Rorty, R. (1979). *Philosophy and the mirror of nature*. Princeton, NJ: Princeton University Press.

Rorty, R. (1999). *Philosophy and social hope*. London: Penguin.

Schlinger, H., & Blakely, E. (1987). Function-altering effects of contingency-specifying stimuli. *The Behavior Analyst, 10,* 41–45.

Skinner, B. F. (1945). The operational analysis of psychological terms. *Psychological Review, 52,* 270–277, 291–294.

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. (1971). *Beyond freedom and dignity*. New York: Knopf.

Skinner, B. F. (1982). The contrived reinforcer. *The Behavior Analyst, 5,* 3–8.

Skinner, B. F. (1987). Why we are not acting to save the world. In B. F. Skinner (Ed.), *Upon further reflection* (pp. 1–14). Upper Saddle River, NJ: Prentice Hall.

Staddon, J. (2001). Editorial: Science as politics by other means: Fact and analysis in an ethical world. *Behavior and Philosophy, 29,* i–iii.

Staddon, J. (2003). Editorial: Fact, value, and science. *Behavior and Philosophy, 31,* 193.

Whelan, R., & Barnes-Holmes, D. (2004). The transformation of consequential functions in accordance with the relational frames of same and opposite. *Journal of the Experimental Analysis of Behavior, 82,* 177–195.

Zettle, R. D., & Hayes, S. C. (1982). Rule-governed behavior: A potential theoretical framework for cognitive-behavioral therapy. In P. C. Kendall (Ed.), *Advances in cognitive-behavioral research and therapy* (Vol. 1, pp. 73–118). New York: Academic Press.

Zuriff, G. E. (1980). Radical behaviorist epistemology. *Psychological Bulletin, 87,* 337–350.