

*B. F. SKINNER AND G. H. MEAD:
ON BIOLOGICAL SCIENCE AND SOCIAL SCIENCE*

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Skinner's contributions to psychology provide a unique bridge between psychology conceptualized as a biological science and psychology conceptualized as a social science. Skinner focused on behavior as a naturally occurring biological phenomenon of interest in its own right, functionally related to surrounding events and, in particular (like phylogenesis), subject to selection by its consequences. This essentially biological orientation was further enhanced by Skinner's emphasis on the empirical foundations provided by laboratory-based experimental analyses of behavior, often with nonhuman subjects. Skinner's theoretical writings, however, also have affinity with the traditions of constructionist social science. The verbal behavior of humans is said to be subject, like other behavior, to functional analyses in terms of its environment, in this case its social context. Verbal behavior in turn makes it possible for us to relate to private events, a process that ultimately allows for the development of consciousness, which is thus said to be a social product. Such ideas make contact with aspects of G. H. Mead's social behaviorism and, perhaps of more contemporary impact in psychology, L. Vygotsky's general genetic law of cultural development. Failure to articulate both the biological and the social science aspects of Skinner's theoretical approach to psychology does a disservice to his unique contribution to a discipline that remains fragmented between two intellectual traditions.

Key words: B. F. Skinner, biological science, verbal behavior, consciousness, social science, G. H. Mead, L. Vygotsky

Of all contemporary psychologists B. F. Skinner is perhaps the most honored and the most maligned, the most widely recognized and the most misrepresented, the most cited and the most misunderstood. (Catania, 1984, p. 473)

The paradoxical evaluations of Skinner's contributions to psychology noted by Catania do not require further documentation here. In spite of frequent discussions (e.g., Blackman, 1980; Himeline, 1990b; Skinner, 1974), three particularly persistent misunderstandings or misrepresentations of radical behaviorism are that it is a stimulus-response psychology, that it is based on a belief that people are somehow "empty organisms," and that of necessity it leads to an illiberal (and usually ineffectual) technology.

Catania (1984, p. 473) asks of "these and other misconceptions": "How did they come about and why do they continue?" Himeline

(1990a, p. 225) has suggested that one reason is to be found in "the very unconventionality of Skinner's position (which) constitutes much of its value." The question and its answer relate to points in Skinner's own concluding commentary in the collection of some of his "canonical" papers edited, together with critical evaluations, by Catania and Harnad (1984):

Why have I not been more readily understood? Bad exposition on my part? All I can say is that I worked very hard on these papers. . . . The central position, however, is not traditional, and that may be the problem. To move from an inner determination of behavior to an environmental determination is a difficult step. (Skinner, 1984, p. 719)

The present paper focuses on the intellectual context of this very step, which is so crucial to a proper understanding of Skinner's contribution to psychology.

*Radical Behaviorism as a
Biological Science*

The depiction of radical behaviorism as a biological science is indeed appropriate. In the first place, Skinner's emphasis on behavior as a naturally occurring phenomenon that can be

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appropriately regarded in its own right as a fundamental object of scientific inquiry is in its true sense biological, focusing as it does on properties of living creatures. Such a basic idea was not new to Skinner, for it can be traced in different theoretical contexts back through Watson to Darwin (see Boakes, 1984). But it gained further emphasis from experimental analyses of behavior that stemmed from the technological innovations whose results Skinner reported in *The Behavior of Organisms* (1938). That research explored systematically the behavior of individual organisms in the simplified form of the rate of lever pressing by rats as a function of the environmental conditions to which the organism was exposed.

Skinner's emphasis on the experimental analysis of the behavior of individual organisms was controversial at the time, and indeed the orthodoxy of statistical modes of thought in contemporary psychology makes this aspect of the experimental analysis of behavior distinctive still. It is of course this very distinctiveness that continues to provide the primary *raison d'être* for the *Journal of the Experimental Analysis of Behavior*. This emphasis on data from individual organisms is by no means unique in experimental biology, however, for at least since Bernard (Thompson, 1984), it has been an essential element of attempts to wrest scientific information from living organisms.

As emphasized by Sidman (1960), researchers need to maximize their experimental control over independent or putative independent variables in order to gain scientific knowledge of an orderly kind from the behavior of individual organisms. One aspect of this is provided by the use of nonhuman experimental subjects, because their histories and their exposures to variables that are not of immediate experimental interest can be controlled. Since Skinner's charming early attempts to reduce extraneous interference and thereby maximize orderly relations between behavior and its environment (see Skinner, 1956), the experimental analysis of behavior has progressed from mechanical innovations to electromechanical, electronic, computer, and now microprocessor control of increasingly complex experimental contingencies. The orderliness of the resulting behavioral data and the precision of the laboratory technology have made it possible to

extend experimental analyses to studies in nonhuman animals of complex patterns of behavior, such as those which might be described as reflecting "choice" and "self-control" (Rachlin & Green, 1972) or as relating to "cognition" (White, McCarthy, & Fantino, 1989). Thus have developed laboratory-based enquiries of considerable impact. This impact is apparent even to a casual observer: It is easy to paint a picture of the experimental analysis of behavior as a branch of experimental biology merely by emphasizing its reliance on laboratories, nonhuman animal subjects, and high-technology control procedures. This possibility reached its apogee (or perhaps its nadir) in the age of electromechanical control apparatus: The photograph of a white-coated technician who might be (indeed as been) B. F. Skinner, holding a pigeon with a complex patchwork of wire connections across the face of electromechanical modules as background, readily prompts an aura of experimental biological science. On a more serious level, the experimental analysis of behavior, with its emphasis on behavior as a naturally occurring phenomenon of interest in its own right, with its intensive laboratory studies of models of behavior provided by nonhuman subjects and with its resulting emphasis on the environmental determinants of often complex behavior, *is* indeed a biological science, and a successful one at that.

Yet the experimental analysis of behavior is in essence perhaps merely the empirical foundation of the true biological force of Skinner's radical behaviorism. Of course it demonstrates impressively that the behavior of living organisms can successfully be submitted to questions posed by the methods of experimental science. It shows how quite complex experimental arrangements for presenting environmental events can reliably and precisely produce predictable patterns of behavioral outcomes. No critic of the experimental analysis of behavior can take away the scientific facts that it has produced. Critics can and often do express weighty reservations about the extent to which our knowledge of the determinants of lever-pressing behavior of food-deprived rats in constrained environments can help us to understand the complexities of other behavior such as human acts in their "real" worlds. Yet the more fertile grounds for intellectual contro-

versy, as opposed to uncharitable deprecation, are to be found, not in the facts of the biological science of the experimental analysis of behavior as such, but rather in the essentially biological organizing principles that Skinner brought to bear on their interpretation.

First, Skinner was content to rely on the explanatory power of the scientifically demonstrated relations between behavior and its environment. He never denied the scientific interest of adequate reductionist analyses of the relations between observed behavior and observed biological processes within organisms, for example at the physiological level (e.g., Skinner, 1974, p. 212). But, he did insist that these additional facts would never replace the dynamics of interactions between behavior and its environmental context, for they cannot. Some might say that such a statement removes psychology from the domain of biological science. If, however, behavior is to be accepted as a naturally occurring phenomenon in its own right, subject to orderly influence by identifiable independent variables, it would surely be more appropriate to say that the study of behavior-environment interactions is one of the biological sciences.

Skinner's scientific analysis of behavior therefore finds part of its explanatory power within demonstrated relations between behavior and environment. The statement that behavior occurs *because* of its environmental context is essentially a biological explanatory statement. Skinner took an important step further, however, by invoking the idea of selection by consequences as a more precise explanatory principle. Skinner's principle of reinforcement was used in a way analogous to the way the principle of evolutionary selection is used in biology: as an alternative to explanations couched in terms of purpose. Thus, in operant experiments, a rat's lever pressing was said to occur because it is followed by identifiable environmental consequences and not because of some assumed antecedent purpose on the part of the rat. It becomes an experimental matter to determine whether a specific event does indeed serve as a reinforcer in a specific experimental situation, and such a reinforcer is identified solely in terms of its effects on behavior, not by reason of any other assumed intrinsic properties of the event or because it satisfies any assumed purposes or needs within the rat.

It is perhaps the often still insufficiently recognized significance of this functional definition of reinforcement as an organizing principle of behavioral analysis that gives rise to the deepest controversy.

The idea of the selection of naturally occurring phenomena is of course the organizing principle that lies at the heart of the Darwinian theory of evolution in biology. The centrality of this principle in Skinner's theoretical analysis, expressed as a principle of reinforcement in a behavioral context, was captured well by Donahoe (1984) who posed the question of whether Skinner might be dubbed "the Darwin of ontogeny." Donahoe noted the similarity between former controversies about Darwin's theory of the selection of the taxonomic form of species by consequences and more recent controversies about Skinner's account of the selection of behavioral repertoires in individuals by their consequences, emphasizing their common reliance on "selectionist theory." Donahoe writes

Skinner and Darwin are . . . alike in provoking fundamentally identical counter-arguments from their critics. Leaving aside those criticisms that could only have arisen from failure to read the original writings—and this is a substantial portion of the lot—both Darwin and Skinner have been charged with asserting just about every absurdity that they did not specifically deny. As a historian of biology has observed, selectionist theory "is so easy almost anyone can misunderstand it." . . . The differences among scientists regarding natural selection have been "to a large extent determined by ideological factors" and have centred upon "the fundamental scale of values" (Ellegard, 1958, pp. 8, 197). So too with the reinforcement principle. (Donahoe, 1984, p. 487)

Donahoe (1984, p. 487) also comments that Darwin frequently remarked on special difficulties in understanding the force of the principle of natural selection that seemed to be encountered by those trained in mathematics and physical science, a comment particularly interesting perhaps in the light of the dominance in contemporary psychology of so-called "cognitive science," based as it is on the computational metaphor and an analogy between people and machines. In another context, Morris (1962) has explored the reason for Darwin's reported special problems with

mathematicians and physicists. He points out that the

doctrine (of biological evolution) had dramatically called attention to the factor of developmental change in the world, as physics and mathematics had previously exhibited the element of structural constancy. (Morris, 1962, p. ix)

It is of course exactly this dynamism that characterizes Skinner's emphasis on the selective effects of reinforcement. Skinner, therefore, also calls attention to the functions of developmental change, in this case expressed in the behavior of organisms rather than in the taxonomic form of species. Thus, Skinner's system leads to interpreting behavior less as reflecting assumed underlying "elements of structural constancy," such as short-term memory or hippocampal anatomy.

The essential dynamism of functional analysis in Skinnerian behaviorism cannot be over-emphasized. Behavior is seen not as an appendage to events occurring at some other level nor as "only the outward manifestation of what counts" (Deese, 1972, p. 99), but rather as reflecting the dynamic selective effects of contingencies of reinforcement. This essential dynamism, however, often is not sufficiently captured in commentaries on contemporary behaviorism, a notable recent exception being found in Lee (1988), who goes so far as to assert (p. 77) that "operant psychology is a contingency-oriented psychology," making a "conceptual shift from an organocentric psychology to a psychology of action" (p. 170). The contingency here is the interdependent relation between the emitted behavior of an organism and its environment: What the organism does affects some aspects of its environment (hence the term "operant"), and aspects of the environment in turn affect the frequency of the behavior. Contingencies are not seen here as necessarily contrived in experimental situations, though of course they may be. Relationships between behavior and the environment are equally present in natural nonexperimental conditions.

As in evolutionary theory, then, functional explanations in behavioral analyses are all-pervasive and are expressed in terms of contingencies of reinforcement. These contingencies do not provide the only useful accounts of behavior, but they cannot be replaced by ac-

counts couched in different terms. Furthermore, the effects of contingencies of reinforcement are overlooked too easily in practical situations that cry out for effective analysis and intervention (Skinner, 1971). It is this principle of the dynamic interaction between behavior and its context that is extrapolated from the experimental analysis of behavior to form an explanatory principle in psychology in general.

This is not the forum in which to explore in detail the ramifications of Skinner's functional analyses of behavior. However, it is necessary here to emphasize yet again that radical behaviorism is most emphatically not a science of behavior confined solely to nonhuman animals. Any simple page count of Skinner's writing over the last 35 years would reveal that he was primarily concerned with elucidating the dynamics of human behavior. A step in this direction is achieved by studies that extend experimental analyses to human subjects, exploring the effects of contrived contingencies of reinforcement on their behavior (e.g., Catania, Shimoff, & Matthews, 1989). Skinner emphasized in his seminal work *Verbal Behavior* (1957) that humans differ from other animals by reason of having verbal repertoires. The potential impact of such verbal behavior on the dynamics of reinforcing contingencies was recognized by Skinner, and his discussion of rule-governed as opposed to contingency-shaped behavior has formed the focus of a lively area of contemporary research (Hayes, 1989) and debate (Heline & Wanchisen, 1989).

Verbal Behavior is of crucial importance to an understanding of Skinner's analysis of human behavior because it extends the interpretive principles discussed above to that most complex of human behavioral repertoires, language. Again it is not appropriate or possible here to review the details of Skinner's extensive theoretical analyses of verbal behavior. However a number of points should be reemphasized. First, *Verbal Behavior* is overtly an exercise in interpreting and extrapolating the principles discussed above; that is, verbal behavior is interpretable in terms of its dynamic relations with its environment, rather than as reflecting some underlying system such as "meaning" or "communication." Second, verbal behavior is defined initially as "behavior reinforced through the mediation of other persons" (Skinner, 1957, p. 2) and not exclusively

in terms of "language." The impact of these two points is that the analysis of human behavior (including speech) is explored as a function of its social context. It need not be assumed that the contingencies of reinforcement within this social context are contrived. Nor are they necessarily unidirectional. Thus, a further degree of dynamism is injected into the system: The behavior emitted by Person A may serve to reinforce behavior emitted by B, and in turn the behavior of B may serve to reinforce the behavior of A. It is inevitably difficult to talk of such dynamic and interdependent relations, so *Verbal Behavior* is sometimes discussed from a relatively static unidimensional perspective (the effects of the behavior of A on the verbal behavior of B). Nevertheless, it is the *reciprocal* interactions between people that essentially provide the context for the analyses explored by Skinner.

With respect to language per se, Skinner's thesis is that speech may be interpreted as behavior exactly analogous to other behavior. Thus, he attempts to develop a functional analysis of what we say, expressed in terms of the effects of social contingencies of reinforcement. Our social community can be said to shape and tune our verbal utterances through processes of reinforcement and discriminative control whose dynamics have been explored in fundamental research within the experimental analysis of behavior. Different classes of speech acts may be identified in terms of their relations to surrounding contingencies of reinforcement. For example, mands are said to be classes of behavior that are followed by characteristic consequences, whereas tacts are classes of behavior that are socially reinforced when emitted in the presence of an object or event or of some property of an object or event (Skinner, 1957).

Some of the most important aspects of Skinner's analysis of verbal behavior are to be found in his discussions of how the verbal community comes to reinforce verbal utterances relating to private events. Tacts that relate to events in the publicly observable world do not seem to produce special problems: As noted above, in the presence of some events or objects, specific utterances may be reinforced by the social behavior of others, either naturally or in a contrived (teaching) mode. Statements that relate not to the external world but to feelings or experiences cannot enter so precisely into the

dynamics of discriminative control and reinforcement, however, because those feelings or experiences cannot be explicitly observed or monitored by the verbal community in its interactions with the speaker. This is not to say that the verbal community does not enter through its behavior into dynamic interactions with the speaker of utterances relating to private events. Natural contingencies of reinforcement (social interaction) are such that the verbal community will give its best approximation to what might be deemed appropriate reinforcement of statements about private events (e.g., seek observable circumstances that make the statement likely to be under appropriate discriminative control). This process thus fosters the development of self-directed speech, although this cannot be under such precise discriminative control as statements about publicly observable events, where the social community may employ consistent criteria for reinforcement to be delivered. In various places, Skinner discusses the progression of statements such as "that is blue" to "I see blue" and to "I feel 'blue'" (see especially Skinner, 1963, for discussion of the transition from "seeing" to "seeing that we see").

The short discussion offered above is inevitably simplistic and merely scratches the surface of Skinner's detailed discussions of verbal behavior, with which most present readers will, in any case, be familiar. However, it serves to emphasize an extremely important point, namely that, far from pretending that people have no inner lives or private experiences, Skinner is in fact one of the few experimental psychologists to address the fundamental and difficult questions of the provenance and function of experience. Nor is this some unimportant peripheral aspect of Skinner's behaviorism, for he writes

A science of behavior must consider the place of private stimuli. . . . The question is, then, what is inside the skin and how do we know about it? The answer is, I believe, the heart of radical behaviorism. (Skinner, 1974, pp. 211-212)

Developing this theme, Skinner discusses how we become aware of ourselves, writing

The verbal community generates "awareness" when it teaches an individual to describe his past and present behavior and behavior he is likely to exhibit in the future, and to identify

the variables of which all three are presumably functions. (Skinner, 1969, p. 159)

We have by now moved, too quickly but by a route that will be familiar to most readers, well beyond the idea that the experimental analysis of behavior is a branch of experimental biology, true though this ascription is. We are now addressing an interpretive and theoretical framework that analyzes ways in which private subjective experience may emerge and what its functions might be. The point being made in the present argument, however, is that this interpretive scheme is the result of retaining the higher order biological principles used initially to explain the relatively simple acts of laboratory nonhumans, namely that behavior can be seen in its own right, subject to influence by its environmental context especially through the selective effects of consequences. These principles are now used within the more complex dynamics of social interaction. In no sense do they reduce people to the status of pigeons. On the contrary, Skinner emphasizes the unique propensity of humans to use verbal behavior. Although this is not in itself taken as fundamentally different from other behavior (i.e., it is at root contingency shaped), it permits the developing verbal rules that may modulate the effects of reinforcement contingencies. It also provides for developing self-directed statements and thus awareness and consciousness, the products of social interaction and the use of verbal rules.

Thus, radical behaviorism can be said to be an aspect of the biological natural science approach within psychology; indeed, this is the view that seems to be emphasized most often. Its biological nature is found in the experimental analysis of behavior and also in the extension of biological principles to the interpretation of complex human behavior and experience.

Radical Behaviorism as a Social Science

(The) existence of private or "subjective" contents of experience does not alter the fact that self-consciousness involves an individual becoming an object to himself. . . . Apart from his social interactions with other individuals he would not relate the private or "subjective" contents of his experience to himself, and he could not become aware of himself as such, that is, as an individual, a person. . . .

This quotation clearly makes contact with the account of awareness offered by Skinner (1969) and discussed earlier. Both passages emphasize the priority of social interaction, both emphasize the crucial function of language, and both argue that awareness emerges from social interaction. However, this second quote is drawn from a very different intellectual tradition, for it is attributable to G. H. Mead (1934, pp. 225–226), who is often now seen as a doyen of social science rather than of biological science.

Mead's position in contemporary psychology seems somewhat equivocal. In particular, it has been noted recently that "most behaviorists show little awareness of the full breadth of Mead's contributions to the philosophy of behaviorism" (Baldwin, 1988, p. 109). When Mead is mentioned in contemporary psychology, it is often in the context of the subdiscipline of social psychology, often through reference to his concepts of the "generalized other," his distinction between "I" (self-as-subject) and "me" (self-as-object), and the social context of identity. A recent introductory textbook in psychology (Roth, 1990) gives rather more general prominence to Mead than is now usual, but includes a summary that conforms to the above, arguing that Mead

believed that we all go through recognizable stages in developing the ability to relate to other people. He argued that an essential part of being able to enter fully into relationships is not just seeing ourselves as individuals but also seeing other people as individuals, with their own thoughts and feelings. (Roth, 1990, p. 28)

The subsequent chapter (Miell, 1990) gives an unusually cogent introductory account of Mead's writings on these topics set in a broader developmental context, emphasizing also that Mead was "the foremost proponent" (Miell, 1990, p. 45) of symbolic interactionism. The spirit of symbolic interactionism is perhaps today more associated with contemporary sociology than psychology (Baldwin, 1986), but it is well captured by Miell:

For Mead, human society rests upon shared meanings between people, upon understandings about each other's interactions and upon being able to interpret each other's behavior. In order to be a social being, therefore, we must be capable of putting ourselves in the position of the other person. In order to understand their

meanings we have to be able to take on their role symbolically. . . . This is what Mead meant by *symbolic dialogue*. (Miell, 1990, p. 50)

In light of this brief account of Mead's ideas, the similarities between his account of awareness and Skinner's account above may seem strained, a semantic accident perhaps, in which the two very different intellectual traditions of biological science and social science happen to touch. Such an interpretation would be hasty, however. For example, Baldwin (1988, p. 110) has suggested that Mead has been "misrepresented by his most outspoken followers in sociology and symbolic interactionism," in particular by their drawing selectively on his work to "create a mentalistic model of the human actor" (as is perhaps suggested in the above quotation from Miell), although Mead himself took great pains to reject such a dualistic notion.

The overlap between Skinner's views and those that can be traced to Mead is in fact substantial and, I believe, important. We should not perhaps be too surprised by this possibility. Mead (working in the 1930s) has been called a social behaviorist (Morris, 1962). Certainly his work emphasized the ideas of the original exponent of behaviorism, J. B. Watson. Insofar as the term behaviorism is now associated with Skinner, we might perhaps expect some ideas to be shared between the behaviorisms of Watson, Mead, and Skinner, even though the differences between the radical behaviorism of Skinner and the methodological behaviorism of Watson have been repeatedly emphasized in the psychological literature (e.g., Skinner, 1974). Nevertheless, seeking shared concepts in the writings of Mead and Skinner entails exploring points of similarity between influential modes of thinking within *social science* and the work of Skinner, who has been emphasized thus far in this paper to be a proponent of what is essentially a *biological* orientation within psychology.

In an important section of his work, Mead sought to develop Watson's emphasis on the Pavlovian conditioning of reflexes by adding to it the concept of the significant vocal gesture. As Morris (1962, p. xvi) noted

Mead considered Watson's views as over-simplified. . . . Though Watson talks much about language, the essence of language . . . has escaped entirely, and hidden itself under the skin.

And even there it hides in the movements of the vocal cords, or in the responses substituted for vocal responses, and is finally lost entirely among implicit responses.

For Mead, a characteristic outcome of significant speech is a process that he termed "self-conditioning" (1934, p. 108); this process is absent in nonhuman animals.

(A) dog only stands on its hind legs and walks when we use a particular word, but the dog cannot give to himself that stimulus which somebody else gives him. He can respond to it but he cannot himself take a hand, so to speak, in conditioning his own reflexes; his reflexes can be conditioned by another but he cannot do it himself.

Mead elaborates this idea in the context of the development of functional language in children:

The process of getting an idea is, in the case of (an) infant, a process of intercourse with those about him, a social process. He can battle on by himself without getting any idea of what he is doing. . . . We can teach a dog to do certain things in answer to particular words. We condition his reflexes by means of certain vocal gestures. In the same way a child gets to refer to a chair by the word "chair." But the animal does not have an idea of what he is going to do, and if we stopped with the child here we could not attribute to him any idea. What is involved in the giving of an idea is what cannot be stated in terms of the conditioning of a reflex . . . involved in such giving is the fact that the stimulus not only calls out the response, but that the individual who receives the response also uses that stimulus, that vocal gesture, and calls out that response in himself. (Mead, 1934, pp. 107-108)

The underlying concept of a recognized idea may perhaps not seem congenial to radical behaviorists, but again it is possible to see important points of contact between Mead's concepts and concepts familiar in radical behaviorism, for example, in the concept of rule-governed behavior briefly discussed earlier. Hineline and Wanchisen (1989) have provided a thoughtful review of the concept of rule-governed behavior, defining it as follows:

. . . the rules posited by behavior-analytic theory are explicit verbal statements that the person is able to state or are explicitly provided by someone else and that interact with behavior. (Hineline & Wanchisen, 1989, p. 226)

Clearly the concept of rule-governed behavior as defined by Hineline and Wanchisen is not synonymous with the "getting of an idea" discussed by Mead. For example, the possibility that rules provided in words by another person may influence behavior as well as the words and rules given by the self does not sit readily with Mead's emphasis on the "giving of a stimulus" only by the self. On the other hand, in both cases the discussion centers on the importance of verbal behavior (in both cases thought to result from a social process) and its relationship to and modulation of behavior under environmental control.

It might be objected that too much is again being made here of a small point of contact between symbolic interactionism and radical behaviorism. For example, as noted earlier, the concept of idea in the passage above appears to emphasize symbolic communication or meaning as that which is conveyed between individuals by means of significant gestures. This is clearly not the underlying rationale of Skinner's analysis of verbal behavior. Yet juxtaposing the views of Mead and Skinner about the concept of meaning itself suggests that this difference is more apparent than real, at least as expressed by them if not necessarily as developed by others within symbolic interactionism and radical behaviorism:

Meaning . . . is not essentially or primarily a psychical content (a content of mind or consciousness), for it need not be conscious at all. . . . The meaning of a gesture on the part of one organism is the adjustive response of another organism to it, as indicating the resultant of the social act which it initiates. (Mead, 1934, p. 80)

We want to approach language not from the standpoint of inner meanings to be expressed, but in its larger context of co-operation in the group taking place by means of signals and gestures. Meaning appears within that process. (Mead, 1934, p. 6)

In traditional terms, meaning and referents are not to be found in words but in the circumstances under which words are used by speakers and understood by listeners. (Skinner, 1974, p. 192)

. . . meaning is not properly regarded as a property either of a response or a situation but rather of the contingencies responsible for both the topography of the behavior and the control exerted by stimuli. (Skinner, 1974, p. 90)

It seems clear then that for both Mead and Skinner meaning *is*, or is *in*, social interactions. This view extends readily to the meanings of the "significant gestures" (Mead) that are studied by psychologists under the guise of "nonverbal communication," a domain central to symbolic interactionism in sociology and that also arises naturally from Skinner's definition of verbal behavior as behavior reinforced through the mediation of others rather than as language *per se*.

If the imagination begins to be captured by this apparent coming together of the progenitors of movements associated with social science and biological science often portrayed as mutually hostile or uncomprehending, it becomes perhaps a little too easy for a radical behaviorist to turn to some parts of Mead's work in the hope of being able to find further congenial statements or ideas. Perhaps, therefore, this is the point at which it should be emphasized that the argument being developed here is not that Mead and Skinner hold the same theoretical ground or that they are in essentials the same, because it will soon become clear to his radical behaviorist readers that much of Mead's psychology makes little contact with their interests. Rather, the argument here is that there are points of similarity and that these are so fundamental that they deserve to be noticed.

Consider for example the concept of consciousness as discussed in the following passage:

. . . we find no evidence for the prior existence of consciousness as something which brings about behavior on the part of one organism. . . . We are rather forced to conclude that consciousness is an emergent from such behavior; that so far from being a precondition of the social act, the social act is a precondition of it. The mechanism of the social act can be traced without introducing into it the conception of consciousness as a separable element in that act; hence the social act, in its more elementary stages or forms, is possible without or apart from some form of consciousness.

This statement would seem to capture admirably the essential aspects of the position advocated by Skinner concerning consciousness. For example, consciousness (or private events) is clearly not afforded any special status as a prime autonomous cause of behavior, although it is argued that it can enter into a functional

relationship with overt behavior. Or, again, consciousness is said to arise from social interaction, as from the reciprocally interacting contingencies of reinforcement that lie at the heart of Skinner's analysis of human behavior. Yet there are textual clues that the passage was not written by Skinner, and indeed it is to be found in Mead (1934, pp. 17–18). The term "social act," indeed more generally the word "act," is not frequently used in radical behaviorism. In spite of the argument spiritedly advocated by Lee (1988), preference is given to the term behavior as a specific rather than a generic noun (and hence to its inelegant plural form) or to the word "response," as in "operant response." This linguistic convention within radical behaviorism, which is often used by Skinner and by other radical behaviorists even though their analyses focus on emitted operants and not elicited respondents, is unfortunate because of its connotations of a reflexological stimulus–response model that confuse critics still.

The social construction of consciousness is a difficult topic, yet it lies at the heart of many systematic approaches to psychology. It might also be said that consciousness is conspicuously absent from many approaches to psychology. It must be emphasized here that we are addressing not how the shape or detail of some given thing or entity, consciousness, is tuned to lesser or greater extents by social interaction, as might happen, for example, with a person's attitudes as a result of social experience. Instead, it seems that both Mead and Skinner strive to capture the idea that in the absence of social interaction there is no consciousness, that consciousness emerges (Mead) only as a social product (Skinner), arising from significant gestures (Mead) whose meaning in turn is found within social interaction or verbal behavior (Skinner). The idea is also addressed in the currently influential work of Vygotsky, who is more often evaluated in relation to Mead than to Skinner. In his general genetic law of cultural development, Vygotsky asserts

Any function in a child's cultural development appears on the stage twice, first on the social plane and then on the psychological, first among people as an intermental category and then within the child as an intramental category. (see Wertsch, 1985, pp. 60–61)

The ideas of Mead and Vygotsky have been

used by many in the social science tradition as a base from which to launch attacks on the biological and scientific orthodoxy of much of contemporary psychology, in the form of the so-called social-constructionist movement in modern psychology (Gergen, 1985). The flavor of much of this is illustrated in the following passage, extracted from Richards and Light (1986):

I think it is no exaggeration to say that the Cartesian polarity that dichotomizes reality between a subjective and an objective pole continues to dominate a great deal of psychological thinking. Classical behaviourism was born out of it, through the assumption that subjectivity was a closed realm to science, while phenomenology was in part the consequence of a search for that level of factuality which was to be immune from revision. Despite the fact that neither of these classical approaches to psychology now seems to commend widespread assent the picture of a mental realm (encouragingly called the realm of "cognitive" psychology) standing over against a physical realm seems to be invoked implicitly in most contemporary discussions amongst academic psychologists. But this is not the only deeply buried assumption in much contemporary work. There is also the quasi-political doctrine of individualism that plays an almost equally potent role. In such a concept as "socialization" we have a joint use of the two leading ideas. To be socialized is something that is required of an individual and it is achieved by the acquisition of something essentially mental. Suppose we were to try for a new beginning by denying both these deeply buried "axioms" of the contemporary approach. What would the conceptual space of psychology look like then? (Harré, 1986, pp. 288–289)

Insofar as social constructionism is seen by its proponents as an attack on empirical and thereby biological orthodoxy in psychology, it is seen by them as an attack on behaviorism. However, as can be seen from the above passage, that target is but diffusely delineated. Although opening up the possibility that fundamental similarities may be found between some aspects of Skinner's radical behaviorism and basic ideas in social science as initially expressed by Mead, radical behaviorists in fact are placed in an interesting position with respect to the polemic of social constructionists who emphasize the importance of Mead's concepts of symbolic interactionism within their

own movement. In fact there are many points in the passage above that prompt discussion rather than the direct or total disagreement which Harré might perhaps expect. For example, in light of well-rehearsed discussions about private events and consciousness reviewed above, radical behaviorists would not accept for themselves the view attributed by Harré to "classical behaviorism" (presumably Watson, although Harré might expect to include Skinner in that category too) that subjectivity is a "closed realm to science" because of an essentially Cartesian view of a "polarity" between the subjective and the objective. Neither have radical behaviorists instead resorted to a "phenomenological" psychology that accepts verbal reports as the only substantive psychological facts "immune from revision." Nor yet do radical behaviorists find any form of satisfaction in contemporary "cognitive psychology" (see Skinner, 1985).

Of course, merely by their standing together in opposition to other views it should not necessarily be expected that social constructionists and radical behaviorists will agree on anything. Nevertheless, as sketched earlier, there seem to be real points of contact, particularly in relation to the crucial idea that the conscious person is in a real sense constructed by or created by social interaction and that, in turn, language plays a crucial role in this process. Indeed, with respect to the role of "significant vocal gestures" (Mead), Skinner's views about the significance of or nature of meaning as lying *within* social interactions may be even closer to those of Mead than are those of some contemporary symbolic interactionists or social constructionists.

In addition to its opposition to the duality said to be implicit in much of contemporary psychology, social constructionism is characterized by Harré (1986) as being in opposition to the doctrine of individualism; this emphasis, too, is worth comment from a radical behaviorist perspective. When discussing what was described as the biological science of the experimental analysis of behavior, it was pointed out that such research is unusual in seeking generalizable knowledge about behavior from the intensive study of individual subjects. It might be thought, therefore, that this emphasis on individuals means that radical behaviorism as a whole is subject to the doctrine of indi-

vidualism and thus opposed to social constructionism. However, the issue is more complex than it may at first appear. Although it is true that the behavior of individual subjects is studied, this behavior is described in functional, not topographical, terms (i.e., in terms of its *relationship* with the environment). By definition, operant behavior cannot be identified without an environmental context that is shown to be related to it through reinforcement, and, in turn, reinforcers are defined only in terms of their effects on behavior. It is the mutually interdependent dynamism of these relationships that lies at the heart of Skinner's theoretical analysis. Thus, although the technology of the experimental analysis of behavior makes it possible to investigate the behavior of individuals in a systematic manner, behavior is defined only in relation to its dynamic interactions with events in its environment, not, for example, in topographical form or as the reflection of processes or structures within the individual. But, in turn, the experimental analysis of behavior stands as a simplified system of empirical investigation within the broader theoretical framework of radical behaviorism. By moving from this to discussions about the analysis of the verbal behavior of humans, Skinner extrapolated the principles of functional analysis to social situations in which the behavior of one individual is defined and analyzed in relation to a social environment, that is, within a dynamic interrelationship with the behavior of other persons. Thus, although radical behaviorism may not replace individualism by some concept of collectivism, it is also true that it has no place for the concept of individuals who have some psychological existence that somehow precedes or is independent of the social context. So again we may conclude that there are at least points of contact between social constructionists and radical behaviorists rather than there being a need for outright rejection of each by the other. Indeed, as was true of the other focal point in the passage from Harré above (the relationship between the objective and the subjective), the issue of individualism within contemporary psychology may be a problem shared by social constructionism and radical behaviorism rather than one that divides them.

In his authoritative introduction to Mead's work, Morris (1962) summarized and built on

the central focus discussed above in the following way.

(The) transformation of the biologic individual to the minded organism or self takes place . . . through the agency of language, while language in turn presupposes the existence of a certain kind of society and certain physiological capacities in the individual organisms. (Morris, 1962, p. xx)

This statement provides an opportunity for a brief exploration of points of similarity between Mead and Skinner with respect to the role of physiological processes within psychology. Here again, there are similarities:

Consciousness or experience . . . cannot be located in the brain. . . . Consciousness is functional, not substantive . . . it belongs to, or is a characteristic of, the environment in which we find ourselves. What is located, what does take place, in the brain, however, is the physiological process whereby we gain or lose consciousness: a process analogous to that of pulling down and raising a window shade. (Mead, 1934, p. 112)

Although, once again, styles of expression and details differ from those that might be used by Skinner when discussing the status of physiological events, points of similarity are readily seen. Mead, like Skinner, did not deny the existence of or importance of physiological events, but, like Skinner, he did not give them some logical priority within a reductionist account that postulates that behavior, and indeed experience, merely reflects underlying physiological processes. These aspects of Mead's writing also have been explored and illustrated by Baldwin (1988, pp. 114–115).

As was said earlier, there are dangers in any overenthusiastic search for similarities between Mead and Skinner, especially when much of the focus of their writings is so different. It might be mentioned that there is, to a radical behaviorist, a pleasing sparkle about some quite specific sentences from Mead, as for example when he describes "mental images" as "the last resort of consciousness as a substance" (1934, p. 332). Also, although the emphasis here has been on Mead as a definitive influence on modes of thought within the intellectual tradition of social science, his accounts of psychological processes were by no means detached from biological concepts. In particular, he repeatedly emphasized the im-

portance of biological evolution in philosophical and psychological analysis:

The evolutionary point of view has had more than one important result from philosophical thought. . . . Not only can we trace in the history of thought the evolution of the conception of evolution, but we find ourselves with a consciousness which we conceive of as evolved; the contents and the forms of these contents can be looked upon as the product of development. (Mead, 1908, cited in Baldwin, 1986, p. 54)

Mead was not an experimental biologist, and did not investigate empirically "the products of development." The emphasis of evolutionary theory in his writings is therefore such as to inform the analysis of social interactions by reference to dynamic processes in biology, in particular as an alternative to appeals to autonomous mentalism.

This short review of selective aspects of Mead's theorizing has not been in any way intended to reduce the ideas of one theorist to those of another, nor to assign historical or intellectual priority to either. Mead and Skinner wrote in different contexts, with different goals and different audiences. Indeed, Baldwin (1988), although he emphasized the relevance of a proper understanding of Mead's work for a full appreciation of the philosophical context of contemporary behaviorism, identified what he termed a major difference between Mead and Skinner with respect to their treatment of the fundamental issue of determinism:

Skinner emphasized determinism more than Mead did. Whereas Mead counterbalanced his discussion of methodological determinism with discussion of the emergence of unpredictable events, Skinner emphasized methodological determinism much more than probability or emergence. (Baldwin, 1988, p. 122)

Baldwin supports this view by quoting examples of Skinner's "pronouncements about complete determinism," adding that

When such statements are not understood as interpretive analyses they sound like statements about absolute metaphysical truths—or naive assertions about the power of a science of behavior. . . . (such) extreme positions have caused many serious scientists and scholars to reject behaviorism, much as Watson's extremes did. (Baldwin, 1988, pp. 122–123)

Here, too, differences may be more apparent than real, and Baldwin may not fully have recognized the complexities of the concept of determinism as currently used in contemporary behaviorism. For example, Skinner has frequently discussed the emergence of "creative" events (e.g., Skinner, 1972). The experimental analysis of behavior investigates the changing frequencies or probabilities of operant behavior rather than one-to-one relations between stimuli and responses (Hineline, 1990b), and behavior theorists increasingly emphasize nonconventional causes of behavior such as correlations between molar frequencies of environmental events and behavior (e.g., Baum, 1973) or "control at a temporal distance" without recourse to "a kind of mental aether . . . to mediate" it (Marr, 1984, p. 358).

Notwithstanding these uncertainties, the present review has revealed points of quite striking similarity between the ideas of Mead and Skinner. In turn, there also seem to be quite striking points of contact between radical behaviorism and Vygotsky's general genetic law of cultural development and also with some of the basic tenets of contemporary social constructionism. Thus, Skinner's theoretical analyses should not be regarded as inimical to predominant modes of thought within the intellectual tradition of social science as opposed to biological science. This is not to force the view that Skinner's position is better regarded as social science than as biological science, nor is it to minimize the real differences between these two modes of thought. However it is perhaps too easy to overlook the points of contact that have been explored here. Social scientists often have only a diffuse and often inappropriate understanding of radical behaviorism that deters them from evaluating Skinner's work carefully in this context. On the other hand, biological scientists are often repelled by the robustness of the challenge from social science to their prized objectivity and the factual nature of their hard-won data base and are thus impatient with searches for any similarities between some of their views and some of those expressed by social scientists.

Some Implications

Psychology as an intellectual discipline has long been dogged by heated dissension concerning its very roots and goals between exponents of what have sometimes been de-

scribed as "hard" and "soft" approaches to the discipline. The hard approach incorporates a number of features. Staunch in its advocacy of the power of natural science to elucidate psychological phenomena, mechanisms, and processes, it prizes empirical/objective data open to public scrutiny, often gained from experimental methods that focus on behavior rather than experience. This natural science of behavior, like other natural sciences, incorporates the principle of causal determination: Behavior is thought to be caused and thus dependent on environmental events, physiological processes, genes, drugs, and so forth. In principle, therefore, the dependent variable that behavior provides is open to prediction and control, as are the phenomena of other natural sciences. The opposing soft view has been described as "hermeneutical," as a moral science of action rather than a natural science of behavior (e.g., Shotter, 1975). This enterprise emphasizes the negotiation of social reality and of interpretations and meanings, placing these within multifaceted systems of varying influence that often allow for free will rather than conceptualizing them as the inevitable outcomes of a unidirectional system of causality. Advocates of this approach usually eschew the goals of prediction and control, seeking instead understanding of a more empathic, less independent kind than that sought by natural scientists. In short, the traditions of natural science and social science have come into particularly virulent conflict within the arena provided by the discipline of psychology.

As was emphasized earlier in this paper, the experimental analysis of behavior fits readily into the approach sketched above as that of natural science. Focusing on publicly observable behavioral data, it uses powerful procedures of experimental control that make even the behavior of individuals predictable, thereby elucidating the ways in which behavior can be said to be causally dependent on its environmental context. Skinner argued that this empirical data base can be interpreted by means of principles that can also be described as appropriate within a biological natural science. The first is that the empirical phenomena of behavior do not need to be reduced to being mere reflections of events at other levels in order to be regarded as biological, because their orderly relations with environmental events provide a focus for scientific analysis in their

own right that could never be replaced by other levels of enquiry. A second interpretive principle favored by Skinner is that of the explanatory power of selection by consequences, a principle that also forms the basis for evolutionary biology. This leads to an emphasis on dynamic interactions between behavior and environment rather than more static accounts of behavior reflecting structure.

However, the discussion above also suggests that Skinner's theoretical writings, centering as they do on people in social contexts rather than on rats and pigeons in experimental conditions, at least make contact in a number of fundamentally important ways with influential examples of the social science tradition in psychology. With respect to the interpretation of verbal behavior as a social interaction *within* which meaning is to be found and the emphasis on the importance of verbal behavior or language in the emergence of private events and the creation of consciousness, Skinner's ideas are strikingly similar to those of Mead. This observation is not designed to force the theoretical writings of either Skinner or Mead into some Procrustean bed that fails to appreciate the differences between them. Yet these points of contact, which may be extended through to Vygotsky and to contemporary social constructionism, seem rarely to be noticed or discussed. Indeed Skinner appears often to be regarded by social scientists as a particular enemy within the natural science camp.

In his introduction to Mead's (1934) work, Morris provides a powerful summary of what he regards as the special strengths of Mead's psychological theories:

He does not neglect with the traditional psychologist the social process in which human development takes place: he does not neglect with the traditional social psychologist the biological level of the social process by falling back upon a mentalistic conception of science as being lived in antecedent minds. Both extremes are avoided by an appeal to an ongoing social process of interacting biological organisms, within which process, through the internalization of the conversations of gestures (in the form of the vocal gesture) mind and selves arise. (Morris, 1962, p. xv)

It is certainly not possible to evaluate the force of this striking appraisal of Mead solely on the basis of the few excerpts from his writing in the present paper. And in the spirit of

the present paper, there is certainly no wish here to pit Mead's unique contribution to psychology against that of Skinner. Nevertheless, Morris' evaluation of Mead maps very readily onto Skinner's work. Skinner can be said to be a "traditional psychologist" insofar as he emphasized the need for experimental analyses of behavior within a biological tradition; however, his extrapolation of interpretive principles to human behavior and experience emphasizes the fundamental importance of the social environment: interactions between people. Looked at from the inverse perspective, Skinner's essentially social theoretical analysis benefits enormously from its forceful contact with "the biological level," for the very reason that from Skinner's work has developed an unusually detailed and robust data base that supports his theoretical analyses (see also Baldwin, 1988, p. 121). From this rich empirical foundation, radical behaviorism can be extrapolated to the social world, not just in terms of global principles such as the selective effects on behavior of its consequences (rather than of "antecedent minds"), but also in terms of detailed knowledge of the intricacies and power of contingencies that include different patterns of intermittent reinforcement, differing conditions of discriminative control, and so forth. Thus, radical behaviorism appeals in some detail as well as more generally to "an ongoing social process of interacting organisms, within which . . . mind and selves arise" (Morris, 1962, p. xv).

Skinner's theoretical approach to psychology is, in a real sense, available as a potential bridge between the hostile camps of natural and social scientists. Although his position is apparently often confronted with diffuse hostility from both opposing fractions, there are clear ways in which Skinner can be said to be operating within the principal traditions of both the biological and the social sciences. It is disappointing that this potential centrality of radical behaviorism in psychology has been so overlooked. It is perhaps inevitable that Skinner's emphasis on the experimental analysis of behavior should appear uncongenial to social scientists, who are perhaps thereby prevented from seeing points of contact with their own organizing principles. The "difficult" move from "an inner determination of behavior" (Skinner, 1984, p. 719), which has proved so controversial for many natural scientists,

has been left exposed by the fact that its goal of identifying environmental determinants of behavior has not been sufficiently integrated with the intellectual goal familiar to social scientists of understanding actions and experience in terms of how they are constructed from social interactions.

It is to be hoped that Skinner's contributions to psychology will increasingly come to be appreciated as an integrative framework that draws strength from both the biological and the social sciences. Perhaps psychologists from both traditions may then increasingly come to see the relevance of radical behaviorism to their own programs of intellectual endeavor and thus study Skinner's writings in more detail and with more understanding than seems currently to be the case.

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