

Is a New Definition of Verbal Behavior Necessary in Light of Derived Relational Responding?

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The functional analysis of verbal behavior is clearly an area of critical importance to the future of behavior-analytic science. One area of research that is clearly relevant to verbal behavior is the rapidly expanding field of stimulus equivalence phenomena (Hayes & Wilson, 1993; Sidman, 1994). Although the relations between verbal behavior and equivalence phenomena remain to be clarified, there have nevertheless been suggestions that the latter are of central and paramount importance to the former (e.g., Hayes & Hayes, 1992).

The purpose of this commentary is to examine recent suggestions that a theoretical account of equivalence and other derived relational phenomena may be viewed appropriately as the basis of the very definition of *verbal* events. Specifically, Hayes (e.g., 1994) has argued that (a) there are serious problems with Skinner's (1957) original definition of verbal behavior and that (b) a more appropriately functional, inclusive, and discriminating definition of verbal (vs. nonverbal) events is provided by Hayes' relational frame theory (RFT; e.g., Hayes, 1991, 1994; Hayes & Hayes, 1992; Hayes & Wilson, 1993, 1994).

What follows is a brief examination of the central arguments proposed by Hayes (e.g., 1994) regarding Skinner's (1957) original definition compared to the newly proposed definition derived

from relational frame theory. Of central importance is the question of whether a new definition of verbal events is necessary in light of relational frame theory's account of derived relational phenomena. This discussion is not intended to be a final statement on this question, but is proposed rather as a starting point for a broader discussion of the important issues involved. It should be emphasized as well that the purpose of this definitional exercise is not to determine "what verbal behavior really is," but rather to examine some of the issues involved with certain verbal practices within the behavior-analytic scientific community (e.g., Chiesa, 1994; Day, 1980; Hayes, 1994; Leigland, 1996b; Skinner, 1945, 1957; cf. Rorty, 1991).

Verbal Behavior and Equivalence Phenomena

Skinner's well-known definition of verbal behavior (well known, that is, among behavior analysts) appeared on the second page of his book, *Verbal Behavior* (1957), following a brief discussion of definitional issues. Here it was suggested that the initial definition was in need of refinement, and a "further provision" was described much later in the book. The complete definition may be quoted as follows, where verbal behavior is "behavior reinforced through the mediation of other persons" (p. 2), and "where the 'listener' must be responding in ways which have been conditioned precisely in order to reinforce the behavior of the speaker" (p. 225). In this definition, the listener's ability to mediate the reinforcement of the behavior of the

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speaker has itself been enabled by a special history of socially mediated reinforcement (the first part of the above definition will be abbreviated as “social mediation” and the complete definition as “trained social mediation,” after Hayes, 1994). The details of the necessary histories are certainly complex and remain largely unknown, but in Skinner’s (1957) interpretive exercise, the histories certainly required the critical role of the verbal community, processes such as differential reinforcement, response differentiation, discriminative stimulus control, and so on.

One of the principal questions to be addressed in the definition and analysis of verbal behavior, however, concerns the role of equivalence phenomena. In the standard equivalence experiment, a matching-to-sample task is employed using sets of arbitrary stimuli. The subject is to learn predesignated but arbitrary relations between stimulus members in each set, such that, with Set A stimuli presented as samples and Set B stimuli serving as comparisons, the subject will be able to select the appropriate stimulus from B when given a particular stimulus from A as a sample. After reaching a criterion of accuracy on such $A \rightarrow B$ training, subjects are given $A \rightarrow C$ training, where C is a third set of arbitrary stimuli (here serving as comparisons in the arbitrary matching-to-sample task, with the A stimuli again serving as sample stimuli), with predesignated relations to be trained between the individual members of the A and C sets. The findings of interest are that once such $A \rightarrow B$ and $A \rightarrow C$ training has taken place with human subjects, one typically finds that additional relations of conditional stimulus control have occurred or “emerged” without additional training; that is, the subjects now can accurately demonstrate not only $B \rightarrow A$ and $C \rightarrow A$ relations (where the roles of the sample and comparison sets are now reversed) but also $B \rightarrow C$ and $C \rightarrow B$ relations (i.e., between two stimulus sets that have not yet been pre-

sented in the same sample-comparison context; e.g., Sidman, 1994; Sidman, Kirk, & Willson-Morris, 1985).

The fact that conditional stimulus control procedures can produce sets of arbitrary stimuli that can enter into such extensive and reversible relations without direct training appears to have a great deal of relevance to what would, in ordinary-language terms, be considered as *symbolic*, *linguistic*, or *verbal* processes (e.g., Catania, 1992; Hayes, 1994; Sidman, 1994). Hayes, in particular (e.g., Hayes, 1991; Hayes & Hayes, 1992; Hayes & Wilson, 1993, 1994), has emphasized the central role of such phenomena in understanding verbal processes.

Hayes’ relational frame theory (e.g., Hayes, 1991, 1994; Hayes & Wilson, 1993; see also Barnes & Roche, 1996; Roche & Barnes, 1996; Saunders, 1996) is an account of verbal events that incorporates equivalence phenomena, and that has been proposed as an alternative account to Skinner’s (1957) interpretations of verbal behavior. RFT emphasizes relational rather than equivalence phenomena, in that the latter is viewed as an example of a broad range of derived relations or arbitrarily applicable relational responding. Such derived relations, or relational frames, may involve arbitrary stimuli or stimuli that are related formally, but the abstracted relations or frames themselves (or more properly, framing) are regarded as varieties of operants, and are thus a product of a particular kind of history of interaction between the individual’s behavior and the social and nonsocial environment. In other words, just as equivalence classes are formed by a particular history of reinforcement contingencies with respect to arbitrary stimuli, RFT contends that other kinds of relations, such as “greater than” or “subsequent to,” may be viewed as acquired abstracted relations (or relational frames) as well. Further, RFT takes the position that it is these relational frames, and the history of arbitrarily applicable relational responding that is responsible for them, that are the defin-

ing characteristics of verbal events (e.g., Hayes, 1994). In general, then, Hayes proposes that verbal behavior is any behavior that involves arbitrarily applicable relational responding.

Hayes' discussions of RFT (e.g., 1994) also include a critique of Skinner's (1957) interpretive analysis of verbal behavior. Generally speaking, Hayes' criticisms are of two types. First, he suggests that Skinner's analysis does not encompass derived relational responding involving arbitrary stimuli, such as equivalence phenomena (or more generally in the sense of RFT, framing relationally). It is such flexible, extensive, reversible, "symbolic" relations with arbitrary stimuli that produce the unique character of linguistic or verbal activities. Although it is certainly true that Skinner did not have the equivalence literature available as part of his interpretive repertoire when he completed his "exercise in interpretation," Hayes contends (e.g., 1994) that it is now time to include and emphasize the importance of such contingencies and interactions. Although the issue of the relation between derived relational responding and Skinner's analysis of verbal behavior has been the subject of discussion elsewhere (e.g., Hall & Chase, 1991; Stemmer, 1995), this commentary will address the second of Hayes' criticisms.

The second criticism begins with Skinner's (1957) definition of verbal behavior. Hayes (1994) argues that Skinner's account of verbal behavior does not constitute a functional analysis, because Skinner's definition of verbal behavior is not a functional definition. To illustrate, Hayes describes an example in which we look into an operant chamber and see a rat pressing a lever, and on average, every 10th lever press is followed by the occurrence of a food pellet. In the first case, we find that an experimenter has arranged or is arranging the observed contingency. In the second case, we find that the other end of the lever has punctured a bag of food pellets, and we see that it gener-

ally happens to take about 10 presses for the lever to work loose a pellet, which then falls into the food dish.

Hayes (1994) argues that according to Skinner's (1957) definition, the first case would constitute verbal behavior on the part of the rat, whereas the second would not. In the first case, the rat's behavior is reinforced through the mediation of a person, where a special history of training has been necessary for such mediation by the "listener" (the experimenter) with respect to the behavior of the "speaker" (the rat). It should be noted that Skinner explicitly included such experimenter-mediated interactions within the domain of his definition, as seen in the following footnote:

Our definition of verbal behavior, incidentally, includes the behavior of experimental animals where reinforcements are supplied by an experimenter or by an apparatus designed to establish contingencies which resemble those maintained by the normal listener. The animal and experimenter comprise a small but genuine verbal community. This may offend our sense of the proprieties, but there is consolation in the fact that such a relation as that represented by the abstract tact is susceptible to laboratory study. (Skinner, 1957, footnote 11, p. 108)

Thus according to Skinner's definitions, the first rat would be engaging in verbal behavior, but the second would not. Hayes (1994) emphasizes, however, that in addition to offending our sense of proprieties, the example illustrates that from the perspective of the rat, there is no difference between the two scenarios in terms of contingencies. The problem from Hayes' perspective is that Skinner's definition of verbal behavior is based upon a *source* of reinforcement rather than upon the behavior of the individual, and thus does not qualify as a functional definition. Hayes has proposed the following analogy:

Suppose a pigeon pecks a key light three times. In case one, the light comes from an electrically excited filament in a vacuum. In case two, it comes from the sun. In case three from a wax candle. Imagine that the illumination is indistinguishable. To follow Skinner's logic, we would call the first peck, "Edison-produced behavior," the second "fusion-produced behavior," and the

third "bee-produced behavior." These are not functional categories in a psychological sense, because the psychological issue is not the source of the lighted object, but the source of the behavioral function of the light. Similarly, in the case of verbal behavior, it is not a functional analysis to suggest that the difference between verbal and nonverbal behavior comes from the source of the objects that might function as reinforcers. The psychological difference, if there is a difference, will be found in the nature of and sources of the actual behavioral functions involved. (Hayes, 1994, p. 21)

Is a New Definition Necessary?

It should be noted first that Skinner's (1957) definition of verbal behavior does not make the distinction between nonverbal and verbal based merely upon "the source of the objects that might function as reinforcers" (Hayes, 1994, p. 21), but rather distinguishes verbal behavior based on a particular kind of *history*; a history (to employ our summary terms) of trained social mediation. By all accounts, it is a history that produces special effects with respect to behavioral interactions. To be sure, there was a great deal about the necessary history that was unknown when Skinner's book appeared in 1957, and much of it remains unknown today. Yet Skinner's definition may be construed as a summary description of special environmental conditions that are necessary (perhaps not sufficient) for the production of the verbal phenomena that were the subject of his extensive interpretations (Skinner, 1957).

In looking once again at Hayes' (1994) rat example cited above, the case is made that Skinner's (1957) definition does not constitute a functional definition, because

Unlike all other functional analyses accepted within behavior analysis, [Skinner's] so-called functional analysis of verbal behavior distinguishes "functions" from the point of view of an *observer* rather than the point of view of the behaving organism. (Hayes, 1994, p. 21, emphasis in original)

That is, from the point of view of the rat in the example above, it makes no difference whether the food pellets are

produced by a verbally trained experimenter or whether they are being produced through mechanical happenstance, yet Hayes' argument is that from Skinner's definition, the rat's lever presses are verbal in the former case but not the latter.

It is possible that the phrase, "from the organism's point of view," is equivalent to the phrase, "with respect to the organism's behavior," but it is more likely that the phrase may be properly understood in terms of discriminability. In the former case, Skinner's definition of verbal behavior specifies a necessary history; a functional history because such a history (as will be discussed below) makes a functional difference with respect to behavior. In the latter case, it may be true that in Hayes' scenario the rat would not be able to discriminate between the pellets produced by the "listener" and those produced by mechanical happenstance, but discriminability must also be placed in functional context.

To use an analogous example, let us say that we observe a pigeon in an operant chamber to respond such that those movements that more closely approximate a complete clockwise turn are followed by the presentation of food, and that after a few such presentations the bird is turning the complete circle with food presentations, and so on. In one case we find that an experimenter has been mediating the reinforcement through a standard shaping operation, and in the other case we find that the food presentations have occurred without respect to the behavior of the pigeon. Certainly one could imagine a case in which, from the point of view of the pigeon, there is no difference between the two conditions. Is it useful to distinguish between such conditions of reinforcement, even if the pigeon may not? In the broader perspective, the example illustrates that a contingency, whether "causal" in the sense of mechanical or mediational, or whether happenstance or accidental, has the same effect regarding behavior

over a given period of time; yet it remains useful to distinguish between contingency-shaped and “superstitious” behavior, not only because the conditions are different from an observer perspective, but also because the different conditions, in the long run, produce different effects.

Skinner’s (1957) expanded definition of verbal behavior qualifies as a functional definition because a history of trained social mediation makes a functional difference with respect to behavior. In Skinner’s (1953, 1957) interpretation, for example, abstraction is described as a process that can arise *only* from a history of trained social mediation, because “a nonverbal environment cannot provide the necessary restricted contingency” (Skinner, 1957, p. 109). Hayes (1994) has also described the special functional characteristics of such a history in the context of his own theory, as in the following passage:

Framing relationally necessarily involves trained social mediation, precisely because it is arbitrarily applicable. Only the social/verbal community can arrange reinforcement for such activities because, at least initially, the activities are not based on the formal properties of the related events and the natural contingencies they engage—they are inherently conventional. (Hayes, 1994, p. 29)

This is not to say that Skinner’s definition should be considered complete or without the need for further refinement. To say that a history of trained social mediation may be necessary to what we might generally call verbal is not to say that it is sufficient in terms of a useful definition for the purposes of the behavior-analytic scientific community. A definition is not the same as a complete account, of course, and any sort of definition of verbal behavior, processes, or interactions for the purposes of behavior analysis will likely be a crude demarcation. It will need to strike a practical balance between traditional distinctions that are found in ordinary language on the one hand (for a useful summary, see Catania, 1986), and the radical behaviorist position that

there are no “real,” “true,” or “genuine” distinctions between the verbal and the nonverbal on the other. That is, although it may be useful to distinguish between the verbal and the nonverbal for the purposes of scientific practice (cf. Skinner, 1957), it would be unnecessary and probably hazardous to invest in any ontological seriousness regarding such a distinction (cf. Rorty, 1991). The nonverbal and the verbal clearly overlap and interact however the terms are to be construed, and we are, after all, the integrated product of biological, historical, and contextual contingencies.

Any sort of definition of the verbal will thus likely be provisional and will probably have its own peculiarities. As we have seen, Skinner’s (1957) inclusion of the rat–experimenter interaction as an example of verbal behavior might, as he noted, “offend our sense of the proprieties,” but it will probably be difficult to formulate a definition that uniformly fails to do so. According to Hayes’ (e.g., 1994) definition, for example, the sea lion that has reportedly demonstrated equivalence (Schusterman & Kastak, 1993) could be said to be behaving verbally when the first derived relation was demonstrated among arbitrary stimulus classes. We can perhaps describe the peculiarities in the following way: Skinner’s rat–experimenter interaction technically qualifies because of the special history of the “listener,” but in everyday language it probably more closely approximates the language of a crude sort of “socially based interaction”; whereas under Hayes’ definition the derived arbitrary relation qualifies the sea lion example, although the ordinary-language term *symbolic* (e.g., Catania, 1992) may be a better fit than *verbal*. Naturally, such examples are not a matter of “what they really are,” but rather by what names we will decide to label them.

Is a new definition of verbal behavior necessary in light of equivalence phenomena? Not yet, although a continued discussion of the relevant issues

is clearly needed, in conjunction with the obvious need for further empirical research. One of the central issues that requires a great deal of further clarification is the relation between verbal behavior (Skinner, 1957) and equivalence phenomena (e.g., Hall & Chase, 1991). Current treatments of equivalence frequently speak of the relations between what might be termed *natural language* phenomena and equivalence (e.g., Hayes, 1994; Sidman, 1994). Barnes and Roche (1996) have recently promoted the use of Hayes' relational frame theory as a "conceptual and empirical tool to analyze human language, and we should not devote our time to analyzing stimulus equivalence as a phenomenon in its own right" (p. 506; although it is not clear if the authors are employing the term *human language* in the sense of "verbal behavior," in the sense of its "ordinary-language usage," or in some other sense).

Although there are a number of studies that have examined the effects of arbitrary stimuli as the equivalent of relational "words" (e.g., "same," "different," "opposite"; e.g., Roche & Barnes, 1996; Steele & Hayes, 1991), there remain many questions regarding the role of equivalence phenomena in the larger domain of the verbal (for discussions, see Hall & Chase, 1991; Hayes, 1994). One concerns the role of such processes in research employing Skinner's functional classification of controlling relations (e.g., Hayes, 1994; Sundberg, Michael, Partington, & Sundberg, 1996; Twyman, 1996), and another concerns verbal processes, contingencies, and units of analysis that are studied in the context of real-time interaction (e.g., Leigland, 1996a; Rosenfarb, 1992). It is probably safe to say that a great deal of methodological and empirical work remains to be done before we can adequately formulate many of the important questions that are waiting to be asked.

Questions also remain regarding the necessary histories for the production of equivalence or derived relational phenomena, although several proposals

have appeared in recent years (e.g., Boelens, 1994; Hayes, 1991; Horne & Lowe, 1996; Sidman, 1994). Most of these questions await further research and methodological development, but we may yet be reasonably clear in speaking of verbal behavior in terms of those activities that have been effectively reinforced only through the behavior of others, where such interactions are a function of a special history of socially mediated reinforcement. Until we know a great deal more about the necessary histories and the interactions themselves, it will be difficult to say when we have seen the last word on the most effective way to speak of the "verbal."

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