Do We Need an Alternative Theory of Verbal Behavior?: A Reply to Hayes and Wilson

Nathan Stemmer

Hayes and Wilson (1993) discuss some alleged weaknesses in Skinner's (1957) account of verbal behavior. In order to overcome these weaknesses, they propose an alternative account called the *relational frame theory*, which is based upon stimulus equivalence. I will not discuss in detail the relational frame theory. Rather, I will try to show that no alternative theory is needed, because the scientific framework that is developed by Skinner (1957) does account for the phenomena discussed by Hayes and Wilson.¹

THE SKINNERIAN FRAMEWORK

Transfer Across Modalities

Three main aspects of verbal behavior will be discussed here: the transfer

phenomenon, listener behavior, and speaker behavior. The first aspect involves a listener of a language becoming a speaker of the language; as a result, some speaker behavior occurs without any direct shaping. That is, an individual's listening behavior shows transfer to another modality.

As has repeatedly been pointed out, the transfer effect is based on stimulus equivalence (e.g., Hall & Chase, 1991; Sidman, 1971; Sidman & Cresson, 1973; Sidman & Tailby, 1982; Sidman, Willson-Morris, & Kirk, 1986; Sidman, Wynne, Maguire, & Barnes, 1989). Skinner also mentions the transfer effect, but he does not discuss the mechanism responsible for it. He merely states that the transfer effect is the "end result of a long process of verbal conditioning" (1957, p. 360). It is therefore important to point out, as Hayes and Wilson (1993) do, that stimulus equivalence is a central component of what Skinner calls the long process of verbal conditioning. But by identifying the mechanism that is responsible for the transfer phenomenon, no *alternative* theory is being introduced. At least, none of the authors who have pointed to the dependence of the phenomenon on stimulus equivalence have claimed to have done so.

Listener Behavior

The second aspect to be studied here is listener behavior. The most basic listener behavior is established by exposure to the pairing of a verbal stimulus with a nonverbal stimulus. For example, a child can become an effective listener of the word *Jones-plug*

by watching someone working with electrical apparatus while describing his own behavior as he does so. . . . The effect upon the listener is not only to establish *Jones-plug* as an appropri-

Address correspondence to the author at 9 Diskin St., Apt. 17, Jerusalem, Israel.

¹ Although I do not examine here the relational frame theory, let me just mention that some basic aspects of this theory suffer from serious vagueness. For example, Hayes and Wilson speak of the relational response "greater than" but they also speak of the cue "greater than" that may evoke the relational response "greater than." Presumably, they mean that the cue "greater than" may evoke a response—for example, the verbal response "x is greater than y"—and this response is a relational one. But they also say, "To relate psychologically is to respond to one event in terms of another. More precisely, in its broadest sense, a relation exists if the stimulus functions of one event depend upon the stimulus function of another event" (Hayes & Wilson, 1993, p. 285). It is not clear how the "greater than" example fits into this definition. Moreover, the definition speaks of relations that are supposed to exist. But which is the existing relation in the example? Is it the relation "greater than" itself, or is it the relation between a response and this relation? Or what are existing relations and the relational responses for other relations, for example, for "x eats y" or "x gives y to z"? The definition does not give us the means to answer such questions.

ate tact but to set up nonverbal behavior in response to similar stimuli, for example, behaving correctly when asked *Please hand me a Jones-plug*. (Skinner, 1957, p. 360)

This child has experienced the pairing of two stimuli: the verbal stimulus *Jones-plug* and the concrete Jones-plug. This experience has two effects. First, it establishes a verbal stimulus as an appropriate tact: In the presence of a Jones-plug the child will be more likely to say "Jones-plug." (Skinner is assuming here that the child has already undergone the verbal conditioning processes that generate the transfer effect.) Second, the experience establishes correct nonverbal behavior with respect to the verbal stimulus: The listener will be able to respond correctly to further utterances of the word *Jones-plug*.

The exposure to the pairing of the new word *Jones-plug* with a Jones-plug is thus sufficient to establish correct listener responses to the word. No previous experiences with Jones-plugs are necessary. But the word *tool* is different. Had the new word been *tool* rather than *Jones-plug*, the child's listening responses to this word would not have extended to the full class of tools; they would have been restricted to objects that are physically similar to the original Jones-plug. This difference between *Jones-plug* and *tool* (and, e.g., between *ball* and *toy*) derives from the difference between the properties that determine the respective stimulus classes. The class of Jones-plugs is determined by physical properties. Therefore, no previous experiences with Jones-plugs are necessary for establishing the class "Jones-plugs" as a stimulus class for children. (I ignore a number of finer points, see, e.g., Jenkins & Harrison, 1960.) On the other hand, the class of tools is determined by functional properties. Therefore, previous experiences are necessary for establishing the class "tools" as a stimulus class.

I will not deal with the experiences that establish classes such as "tools" (or "toys") as stimulus classes. The

reader is referred to the literature on functional generalization (see, e.g., Dube, McIlvane, Callahan, & Stoddard, 1993; Goldiamond, 1966; Har- ing, Breen, & Laitinen, 1989; Wasserman & Devolder, 1993; see also Razran, 1939, on functional generalizations between physically different words, and Stemmer, 1973, 1980, for a discussion of Razran's experiment and of an experiment described in Pavlov, 1927).

Skinner acknowledges the role of functional generalization in verbal behavior. For example, when analyzing the learning of the word *familiar*, Skinner points out that a "familiar place is not distinguished by any physical property" (1957, p. 136). Rather, the condition determining the stimulus class "familiar [places]" is in the history of the individual. It follows that Skinner's framework can account not only for the learning of "physical" words such as *Jones-plug* or *ball* but also of "functional" words such as *tool* or *toy*.

Correct listener behavior can also be established by *intraverbal* events. In these events, an individual hears (or reads) a new expression together with an appropriate verbal context. For example, Skinner mentions that correct listener responses to the word *amphora* may be established by the exposure to an utterance of *An amphora is a Greek vase with two handles* (1957, p. 360).

Speaker Behavior

The third aspect of verbal behavior that is relevant to our topic is speaker behavior. This behavior has been widely analyzed by Skinner (1957), and I will therefore discuss here one issue only, namely, the role of *listener establishing events*—that is, events that establish correct listener responses to verbal stimuli—in generating speaker behavior. This role is crucial because, except perhaps for a few words such as *Mommy* and *Daddy*, in order for a person to become an effective speaker of a lexical item *x* (e.g., of the word *amphora*), the person must first be ex-

posed to an appropriate listener establishing event. The reason is the following. In general, an individual becomes an effective speaker of a lexical item *x* if the person emits *x* (or a derived form of *x*) under correct conditions, and these emissions are then reinforced by the verbal community. But if an individual has never heard *x* under such conditions, then the probability that the person will emit *x* on correct occasions is practically zero. The only way to increase this probability is by exposing the individual to appropriate listener establishing events (e.g., to the utterance of *An amphora is a Greek vase with two handles*, or to the pairing of the word *amphora* with an amphora). Afterwards, the person's relatively correct emissions of *x* can then be reinforced by the community. It follows that for virtually every lexical item, learning to emit the item (or a derived form) correctly requires the previous exposure to appropriate listener establishing events.²

Skinner (1957) agrees that if a person has already undergone the conditioning processes that establish the transfer effect, then the exposure to appropriate listener establishing events is sufficient to establish correct speaker behavior. Thus, he mentions that one of the effects of the exposure to the pairing of *Jones-plug* and a Jones-plug is to establish *Jones-plug* as an appropriate tact (p. 360), and one of the effects of the intraverbal learning of *amphora* is the ability to afterwards emit this word on correct occasions (p. 360). Skinner's position has an important consequence; it enables him to account for a person's ability to emit a word on correct occasions, even if the emission of the word on such occasions has not been directly reinforced.

THE ARGUMENTS IN FAVOR OF AN ALTERNATIVE THEORY

Let me now consider some of the arguments of Hayes and Wilson (1993). The first is based on the fact that a child, who has been trained to point to dogs when seeing the written word *d-o-g* and also to say "dog" when seeing this word, is able to say "dog" in the presence of dogs even though this behavior "is not based on a direct history of generalized reinforcement for saying *dog* in the presence of dogs" (p. 284). Because the child's correct emission of *dog* does not require direct reinforcement, Hayes and Wilson conclude that the emission cannot be a tact. This allegedly contradicts Skinner's view on tacts, and is supposed to be "one example of several empirical problems faced by Skinner's (1957) theory" (p. 284).

But we have just seen that Skinner does not require a tact to be based on a direct history of generalized reinforcement. Other events may give a verbal stimulus the status of a tact. It follows that the example does not point to an empirical problem faced by Skinner's theory.

Notice, moreover, that if the training events indeed establish the child as an effective speaker of *dog*, then it is very likely that the events first established the child as an effective listener of this word. Utterances such as *Point to a dog* may now evoke correct listener responses. This possibility suggests that the child's speaking behavior actually derives from the transfer effect: from correct listener behavior to correct speaker behavior. Again, the phenomenon is accounted for by Skinner's theory.

A second argument is based on the generalizations across situations that derive from verbal factors. Suppose an agoraphobic has a panic attack while in a traffic jam on a bridge. Such a traumatic episode may lead the person to feel panicky not only on bridges but also in a marital relationship or on the

² This conclusion holds for virtually all methods for training speakers. For example, the typical training method for speakers described in Sundberg, San Juan, Dawdy, and Arguelles (1990) is essentially based on listener establishing events (Stemmer, 1992).

phone. But, Hayes and Wilson notice, "a bridge, phone, or relationship share no physical properties that would explain the generalization" (1993, p. 292). Rather, they suggest the generalization is based not on a formal similarity but on a verbal relation, probably on such verbal responses as *Difficulty escaping*.

Hayes and Wilson's premise is correct; the generalization from a traffic jam on a bridge to marital relationships and phone calls is not based on physical similarity. But this generalization, if it occurs, is not a problem for Skinner because, first, Skinner has not denied the possibility that verbal factors may influence an individual's generalizations. Rather, such phenomena are compatible with a Skinnerian framework. Suppose that a child has already learned to respond correctly to the word *toy*. Then, showing the child a new object while saying "This is a toy" will frequently incorporate the corresponding type of objects into the stimulus class "toys"—the objects will now often evoke typical "toy" responses (cf. Ninio & Bruner, 1978). Such phenomena, and the more complex instances that occur in therapy and clinical settings, are clearly compatible with a Skinnerian framework.

Second, in the present example, it seems more plausible to attribute the generalization from the traffic jam to the other events to a functional generalization rather than to a verbal factor. The different instances share the functional property of being difficult to escape. Again, this is compatible with Skinner's views.

Hayes and Wilson also observe that "words have some of the stimulus functions of the events to which they are related," and they attribute it to the fact that the "names of events participate in an equivalence relation with the events named" (1993, p. 298). There is, however, a problem with this interpretation, because stimulus *equivalence* also requires the inverse effect, namely, that the events acquire some of the stimulus functions of the words

that name them. Because the inverse effect has not been regularly observed, it is more plausible to attribute the phenomenon to the Pavlovian character of the processes that establish listener behavior.

In a Pavlovian conditioning procedure, an organism is exposed to the pairing of two stimuli: a conditioned stimulus (CS) with an unconditioned stimulus (US). One of the main effects of such an exposure is the acquisition by the CS of some of the functions of the US (see, e.g., Rachlin, 1976; Rescorla, 1988; Walker, 1987). Therefore, if the relevant word has been learned by an exposure to the pairing of the word with a nonverbal stimulus, then the Pavlovian character of this learning process explains why the word has acquired some of the stimulus functions of the nonverbal stimulus. (On the Pavlovian character of these processes, see Skinner, 1957, p. 357; Staats, 1968; Stemmer, 1973, 1992.)

If the word has been learned intraverbally, then the learning event did not include a concrete instance of a nonverbal stimulus. In this case, the above effect—the word has some of the stimulus functions of the event to which it is related—derives from the Pavlovian character of the second-order conditioning process on which intraverbal learning is based (Staats, 1968; Stemmer, 1973).

Another phenomenon discussed by Hayes and Wilson is the issue of personal death. They point out that a person who is dealing with personal death "is not dealing with actual death, but death verbally constructed" (1993, p. 295), and they discuss several hypothetical contingencies by which the word *death* can acquire positive or negative functions for a person. These functions may then determine the person's future behavior.

But such phenomena are explicitly acknowledged by Skinner (1957), and he attributes them to Pavlovian conditioning (pp. 154–155, 214–218). Interestingly, when analyzing the behavior of a reader, Skinner uses the same ex-

ample *death*, but in its written form, and he mentions the conditioned emotional responses to this word (p. 170).

Hayes and Wilson (1993) discuss some further phenomena, but a detailed analysis would exceed the limits of this paper. Let me just say that by paying careful attention to the many sophisticated insights of Skinner (1957), these phenomena can be accounted for within his framework.

I will close with two remarks. Skinner had concluded that an experimental animal and the experimenter "comprise a small but genuine verbal community" (1957, p. 108). Hayes and Wilson (1993) criticize this view. They believe it gives a too wide definition of verbal behavior. It would include, for example, the behavior of a rat who has been taught to press a lever upon seeing the words *red light*. Hayes and Wilson contrast this behavior with that of a person who has been trained to press a lever in the presence of a red light, and who has also learned to relate the words *red light* to the words *luz roja* and *luz roja* to actual red lights (1993, p. 288). This person will likewise press the lever when seeing the words *red light*, but the process will be completely different. Hayes and Wilson now believe that only the latter process should be deemed verbal behavior.

The two processes are indeed different. Whereas the rat's behavior takes place in one modality only, the person's behavior requires complex transfer effects. But there is no reason why the definition of verbal behavior should be limited to behavior that must include transfer effects. Consequently, there is no reason to reject Skinner's view on the verbal character of the community that is comprised of an experimental animal and an experimenter.

Hayes and Wilson (1993) observe that their relational frame theory starts with stimulus equivalence as a jumping-off point. The present analysis points to a more fundamental jumping-off point: the jumping-off point of verbal behavior. This point consists of the

listener establishing events—basically, the pairing events described above—that stand at the beginning of listener behavior and indirectly at the beginning of speaker behavior. To be sure, stimulus equivalence also plays an important role in verbal behavior, but only in a later stage, when it generates the transfer effects that enable a listener of a language to also become a speaker of the language.

REFERENCES

- Dube, W. V., McIlvane, W. J., Callahan, T. D., & Stoddard, L. T. (1993). The search for stimulus equivalence in nonverbal organisms. *The Psychological Record*, 43, 761–778.
- Goldiamond, I. (1966). Perception, language, and conceptualization rules. In B. Kleinmuntz (Ed.), *Problem solving* (pp. 183–224). New York: Wiley.
- Hall, G., & Chase, P. N. (1991). The relationship between stimulus equivalence and verbal behavior. *The Analysis of Verbal Behavior*, 9, 107–119.
- Haring, T. G., Breen, C. G., & Laitinen, R. E. (1989). Stimulus class formation and concept learning: Establishment of within- and between-set generalization and transitive relationships via conditional discrimination procedures. *Journal of the Experimental Analysis of Behavior*, 52, 13–25.
- Hayes, S. C., & Wilson, K. G. (1993). Some applied implications of a contemporary behavior-analytic account of verbal events. *The Behavior Analyst*, 16, 283–301.
- Jenkins, H. M., & Harrison, R. H. (1960). Effect of discrimination training on auditory generalization. *Journal of Experimental Psychology*, 59, 246–253.
- Ninio, A., & Bruner, J. (1978). The achievement and antecedents of labeling. *Journal of Child Language*, 5, 1–15.
- Pavlov, I. P. (1927). *Conditioned reflexes*. London: Oxford University Press.
- Rachlin, H. (1976). *Behavior and learning*. San Francisco: Freeman.
- Razran, G. H. (1939). A quantitative study of meaning by a conditional salivary technique (semantic conditioning). *Science*, 90, 89–90.
- Rescorla, R. A. (1988). Pavlovian conditioning: It's not what you think it is. *American Psychologist*, 43, 151–160.
- Sidman, M. (1971). Reading and auditory-visual equivalences. *Journal of Speech and Hearing Research*, 14, 5–13.
- Sidman, M., & Cresson, O. (1973). Reading and crossmodal transfer of stimulus equivalences in severe retardation. *American Journal of Mental Deficiency*, 77, 515–523.
- Sidman, M., & Tailby, W. (1982). Conditional discrimination vs. matching to sample: An ex-

- pansion of the testing paradigm. *Journal of the Experimental Analysis of Behavior*, 37, 5–22.
- Sidman, M., Willson-Morris, M., & Kirk, B. (1986). Matching-to-sample procedures and the development of equivalence relations: The role of naming. *Analysis and Intervention in Developmental Disabilities*, 6, 1–19.
- Sidman, M., Wynne, C. K., Maguire, R. W., & Barnes, T. (1989). Functional classes and equivalence relations. *Journal of the Experimental Analysis of Behavior*, 52, 261–274.
- Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.
- Staats, R. W. (1968). *Learning, language, and cognition*. New York: Holt, Rinehart, and Winston.
- Stemmer, N. (1973). *An empiricist theory of language acquisition*. The Hague: Mouton.
- Stemmer, N. (1980). Natural concepts and generalization classes. *The Behavior Analyst*, 3, 41–48.
- Stemmer, N. (1992). The behavior of the listener, generic extension, and the communicative adequacy of verbal behavior. *The Analysis of Verbal Behavior*, 10, 69–80.
- Sundberg, M. L., San Juan, B., Dawdy, M., & Arguelles, M. (1990). The acquisition of tacts, mands, and intraverbals by individuals with traumatic brain injury. *The Analysis of Verbal Behavior*, 8, 83–99.
- Walker, S. (1987). *Animal learning: An introduction*. London: Routledge & Kegan Paul.
- Wasserman, E. A., & Devolder, C. L. (1993). Similarity- and nonsimilarity-based conceptualization in children and pigeons. *The Psychological Record*, 43, 779–793.