The Current Status and Future Directions of the Analysis of Verbal Behavior: Introductory Remarks

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In 1957, B. F. Skinner published the book that he considered to be his most important, titled simply, *Verbal Behavior*. In that book, Skinner argued that much of what was traditionally referred to by the commonsense term *language* could be accounted for according to the principles of a natural science of behavior; then, using those principles, he interpreted several types of verbal relationships. According to Skinner (1982, 1983), shortly after the book's publication, he received a copy of a review from Noam Chomsky, who was unknown to Skinner at the time. After glancing at Chomsky's review and discovering that it missed the essential point of the book, Skinner put it aside. What happened next concerning Skinner's book, Chomsky's review, and the subsequent articulation of Chomsky's own structuralist, rationalist theory of human language has been retold countless times, mostly by cognitive psychologists, Chomskian linguists and, secondarily, by many general psychology textbook authors.

According to those accounts, Chomsky's review single-handedly dismantled not only Skinner's interpretation presented in *Verbal Behavior*, but simultaneously, the conceptual foundation of behaviorism. Despite the fact that many, if not most, reviews of Skinner's book were favorable (Knapp, 1992), and that at least one behaviorist had formally responded to Chomsky's review of Skinner's book (e.g., MacCorquodale, 1970), a myth had already been born within psychology

that Skinner's behaviorist position on human language in particular and the behaviorist approach in general were bankrupt, thus paving the way for the now well-publicized cognitive revolution in which Chomsky and his theories were credited with a central role. The myth grew into a kind of lore within the scientific culture at large, with unfortunate results for behavior analysis. For example, consider the November-December, 1996, issue of *The Sciences*, the magazine of the New York Academy of Sciences, in which notable accomplishments over the last 30 years within various scientific disciplines were described by practitioners in those fields. Linguistics of a plainly Chomskian flavor was represented in two disciplines, psycholinguistics and linguistics, whereas behavior analysis was not represented at all, despite the fact that this distinctly scientific approach to behavior is supported by volumes of experimental data as well as a successful behavioral technology derived therefrom.

It may not be unreasonable to ask why Chomsky's brand of linguistic analysis in particular and the cognitive approach in general carried the day in psychology and related disciplines (e.g., neuroscience), whereas Skinner's radical behaviorism and behavior analysis have been declared dead and of historical interest only. Although there are probably many reasons for the popular victory of cognitive psychology, one answer, I think, is not as difficult as behavior analysts might imagine. Cognitive science, even by some cognitivists' own admission (e.g., Baars, 1986), is squarely rooted in a commonsense understanding

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of human nature and is, thus, immediately accessible to students of psychology and laypersons alike.

As readers of this journal know, however, behaviorism did not die, and Skinner's natural science approach to verbal behavior and its extensions are a mainstay of behavior analysis. Although still fairly isolated from mainstream psychology, behavior analysis has remained a strong, united, and growing, albeit still relatively small, group of researchers, theoreticians, and practitioners who are committed to the analysis of behavior from a natural science perspective. Some evidence of that strength is the existence of a journal devoted exclusively to the analysis of verbal behavior. In 1985 *The Analysis of Verbal Behavior* (TAVB) in its current journal format was officially born (although two volumes had been published as the official newsletter of the Verbal Behavior Special Interest Group of the Association for Behavior Analysis [ABA]) (Sundberg, 1997), and just last year was officially acquired by ABA. Since the first issue, many experimental, theoretical, and applied articles have appeared in TAVB (see Sundberg, 1997, for brief overviews of the types of articles that have appeared during that time).

For this, the first issue of TAVB under my stewardship, I thought it would be appropriate to take stock of the current status of the analysis of verbal behavior with a concomitant look toward the future. Toward that end, I invited numerous individuals to comment briefly on the current status and future directions of the analysis of verbal behavior, and asked Jack Michael to serve as a discussant. What follows are the commentaries, followed by Michael's reaction. Although there are several possible ways these diverse papers could be organized, I introduce them according to the level of scientific analysis they address and whether they deal with primarily experimental, methodological, technological, or theoretical concerns.

The scientific analysis of any phenomenon can occur on at least three different levels. First, experimental analysis directly involving the phenomenon in question may be carried out, and although only a few of the papers (e.g., by Catania and Shimoff and

Leigland) specifically address this, several papers (e.g., by Hall, Knapp, Spradlin, and Sundberg) implicitly recognize the need for more basic research on verbal behavior. Catania and Shimoff argue, somewhat ironically, for less talk and more action, specifically more basic research on verbal relationships. In addition to issues that have historically been popular among behavior analysts, such as the shaping of verbal behavior and the relationship between verbally governed (the term they prefer to rule-governed) and contingency-shaped behavior, Catania and Shimoff urge behavior analysts to cast their experimental-analytic net over a range of verbal topics traditionally considered the purview of mainstream psychology (see also papers by Hall and Spradlin), such as the vocabulary of feelings and other private events and the development of verbal and nonverbal stimulus control in the behavior of children.

Significant experimental advances, however, may not be possible without concomitant methodological innovation. Leigland suggests that the especially sensitive and dynamic character of verbal interactions might render the traditional behavior-analytic steady-state research methodology less effective and states, "The building of an effective science of verbal behavior" may necessitate the development of novel "experimental preparations as functional analytic tools." According to Leigland, such methodological innovation may be the biggest challenge yet to behavior analysts studying verbal behavior. In fact, the kind of methodological liberalism for which TAVB is an outlet, according to Knapp, might be conducive to such innovation.

Several authors (including Hall, Spradlin, and Sundberg) point out that research on the types of verbal relationships of interest to readers of TAVB has been published in other journals, although not necessarily in the vocabulary of Skinner's (1957) verbal operants. Hall argues that behavior analysts studying verbal behavior should pursue what she describes as a synthesis of different specialty areas concerned with the same behavioral events. Of course, such a synthesis would require the translation among conceptual frameworks and integration of

research findings from the specialty areas. According to Hall, such areas might include stimulus equivalence research, direct instruction theory and application, and relational frame theory. One by-product of such a synthesis could be the birth of new methodologies to study verbal relations. Finally, Salzinger wants behavior analysts to continue their basic researches into the role of verbal behavior as both cause and effect, especially in terms of how an understanding of this dual role distinguishes behavioral approaches to "talk therapy" from their cognitive counterparts.

A second manner in which scientific analysis of complex phenomena can proceed is through simulation of the functions thought to be responsible for a particular set of outcomes. In a science of behavior, this is tantamount to setting up the behavior (Skinner, 1982). This can be accomplished in at least two ways: by simulating behavior and the processes responsible for it using organisms (e.g., Epstein, 1981) or by using computers (e.g., Stephens & Hutchison, 1992). This approach is experimental in that putative controlling variables are manipulated in an effort to produce outcomes that resemble in structure and, possibly, in function the behavioral phenomena of interest. Although simulations do not provide a direct experimental analysis of ongoing behavior as it occurs in a natural environment, they do provide plausible accounts of the development of such behavior as well as support for behavioral interpretations of complex verbal relationships. As Hutchison points out, successful computer simulations of verbal relationships based on behavior-analytic principles have the advantage of simultaneously demonstrating that operant learning is sufficient to produce verbal relationships and refuting claims by critics such as Chomsky that operant conditioning is insufficient to account for such phenomena. According to Donahoe, adding computer simulations of adaptive neural networks can "reveal the emergent effects of fundamental biobehavioral processes acting over time" that may not be revealed with neural or behavioral observations.

Both direct experimental analysis and simulation research have obvious implications

for the technological application of their findings. In fact, a particular account of behavior can be tested, in part, according to the degree with which it leads to an effective technology. Papers by Mabry, Sundberg, and J. Vargas remind us that Skinner's (1957) interpretive analysis and subsequent experimental analysis of verbal behavior by behavior analysts have already had immediate practical applications in such areas as language training with special education populations and can potentially have implications for technologies involved in second-language teaching and programmed instruction. J. Vargas adds, however, that behavior analysts need to solve a "central problem" in education, namely, the lack of a unit of responding. Thus, a methodological hurdle remains before the application of a verbal behavior analysis to education can be fully realized. Perhaps such a unit of responding that will be useful in educational settings will emerge from the synthesis of different specialty areas concerned with the same behavioral events, as suggested by Hall.

A third vehicle for understanding complex phenomena, especially those that cannot for whatever reason be subjected to direct experimental analysis, is interpretation. In short, complex phenomena are analyzed according to a set of principles or laws derived from an experimental analysis of simpler, but presumably related, phenomena. *Verbal Behavior* (1957) was an explicit exercise in interpretation. In the present section, E. Vargas makes the case to extend that kind of interpretation, and Cherpas and Donahoe argue for expanding interpretations to include concepts and principles derived from other theoretical disciplines. For example, Donahoe suggests that interpretations of verbal behavior using neural network simulations can supplement knowledge gained from observations of both behavioral and neural processes and simulations informed by the experimental analysis of behavior (see also Hutchison's paper) by providing a more complete picture of complex verbal relationships. Cherpas argues for expanding our interpretation of verbal behavior by considering a theoretical perspective from outside behavior analysis – perceptual control theory – which, according to Cherpas, may

help behavior analysts more successfully tackle the bothersome problems of the continuity, simultaneity, organization, and subjectivity of behavior in general and verbal behavior in particular. E. Vargas and Donahoe note that in addition to clarifying the nature of verbal relationships, such extensions and expansions might have the added benefit of placing the experimental analysis of verbal behavior within the broader context of other selectionist disciplines such as sociobiology and neuroscience.

Behavior analysts are, of course, still concerned with the interpretation of verbal behavior using already established behavior-analytic principles (see Palmer, 1998, for a recent example). Toward that end, Place argues that behavior analysts have historically neglected the sentence as a functional unit and that proper attention to it can strengthen the case for behavior analysis as "the only convincing explanation of" language phenomena.

Although the brief commentaries in this special section were introduced according to the level of analysis they primarily address, they are presented in alphabetical order by author. I hope that reading these

papers will evoke in readers a verbal repertoire that, through whatever processes a science of behavior ultimately discovers are responsible, will lead them to the kind of research, applied, and theoretical behaviors that will further our understanding of verbal behavior.

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