

THE LONG GOOD-BYE: WHY B. F. SKINNER'S *VERBAL BEHAVIOR* IS ALIVE AND WELL ON THE 50TH ANNIVERSARY OF ITS PUBLICATION

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The year 2007 marked the 50th anniversary of the publication of B. F. Skinner's Verbal Behavior, a book that by Skinner's own account was his most important. The received view, however, is that a devastating review by a young linguist not only rendered Skinner's interpretation of language moot but was also a major factor in ending the hegemony of behaviorism in psychology and paving the way for a cognitive revolution. Nevertheless, in taking stock of Verbal Behavior and behaviorism, both appear to be thriving. This article suggests that Verbal Behavior and behaviorism remain vital partly because they have generated successful practical applications.

The year 2007 marked the 50th anniversary of the publication of B. F. Skinner's *Verbal Behavior* (1957). This anniversary is worth noting because, according to most accounts, a scathing review by a young linguist named Noam Chomsky (1959) in the journal *Language* not only undermined Skinner's main arguments but simultaneously hammered a nail in the lid of behaviorism's coffin and paved the way for the return of cognitive psychology (e.g., Hunt, 1982). Even though many linguists and psychologists said good-bye to *Verbal Behavior* and to behaviorism in the wake of Chomsky's review, both are still around and seem to be thriving. Given that the book Skinner called his most important work (Skinner, 1977) is selling as well as ever, it might be instructive to look at why it and the discipline that forms its experimental foundation have been so resilient.

The Deaths of *Verbal Behavior* and Behaviorism Have Been Greatly Exaggerated

To borrow the words of Mark Twain, reports of the death of behaviorism were greatly exaggerated (see Wyatt, Hawkins, & Davis, 1986). In fact, according to Virués-Ortega (2006), scientometric studies cast doubt on claims that behaviorism was predominant in the United

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States before World War II and that a cognitive revolution following the war signaled its demise. These studies also indicate that behaviorism (now referred to as behavior analysis) has undergone a slight but steady growth over the past 20 years. Other evidence suggests that behavior analysis is healthy.

The Association for Behavior Analysis International claims 4,962 members (Association for Behavior Analysis, electronic mail, March 2007) and 60 affiliated chapters in the United States and abroad, with a reported 13,000 members and annual membership growth averaging 6.5% over the past 10 years (www.abainternational.org). Many of these affiliated chapters hold annual conferences, each attracting hundreds of attendees. Behavior analysts have also been active in nonbehavioral organizations. For example, they have had their own division (Division 25, Behavior Analysis) in the American Psychological Association for more than 40 years, were instrumental in the founding of the Association for Psychological Science, and are represented in the Association for Cognitive and Behavior Therapies. And for the past decade or so, the Behavior Analyst Certification Board, Inc., has offered an international certification for the practice of applied behavior analysis.

In addition to a number of journals that regularly publish work by behavior analysts (e.g., *Behavioural Processes*, *Behavior Modification*, *Journal of Mind and Behavior*, *Learning and Behavior*, *The Psychological Record*), several journals in the United States and abroad are devoted exclusively to experimental, theoretical, and applied behavior analytic work, including basic and applied research on verbal behavior (e.g., *Behavior and Philosophy*, *European Journal of Behavior Analysis*, *Japanese Journal of Behavior Analysis*, *Journal of Applied Behavior Analysis*, *Journal of the Experimental Analysis of Behavior*, *Journal of Organizational Behavior Management*, *Mexican Journal of Behavior Analysis*, *The Analysis of Verbal Behavior*, and *The Behavior Analyst*). Moreover, the number has been increasing, with a new journal published by the Association for Behavior Analysis International, *Behavior Analysis in Practice*, as well as several electronic journals (e.g., *Behavioral Technology Today*).

At least 110 institutions of higher learning around the world offer advanced degree programs in behavior analysis (www.abainternational.org), and many more offer course work in behavior analysis. Furthermore, behavior analysts are faculty members in departments of psychology, education, medicine, public health, and social work. In addition, at least 15 universities in the United States offer graduate training in Skinner's analysis of verbal behavior (<http://behavioralspeech.com/training>).

This is hardly the picture of a discipline whose death knell was sounded almost 50 years ago. Roddy Roediger, past president of the Association for Psychological Science, said as much in a 2004 essay marking the centenary of B. F. Skinner's birth titled "What Happened to Behaviorism?" Roediger¹

¹ Roediger, an avowed cognitive psychologist, suggested that Chomsky's review was at best "a minor cause of the cognitive revolution" and, moreover, was "rather effectively refuted in a commentary by Kenneth MacCorquodale, by the way" (2004, p. 42). (Incidentally, MacCorquodale's [1970] rejoinder to Chomsky, which was rejected by the journal *Language*, was eventually published in the *Journal of the Experimental Analysis of Behavior*, thus limiting its impact outside behavior analysis.)

(2004) offered five possible answers, none of which was that behaviorism was killed off by Chomsky's review or by a cognitive revolution. Two of Roediger's answers were that behaviorism is alive and well: either behaviorists won the intellectual battle, as is evidenced by the fact that modern cognitive experimental psychology essentially studies (i.e., observes and measures) behavior, or "there is, thank you, nothing wrong with behaviorism today" (p. 41). According to Roediger, "Anywhere that prediction and control of overt behavior are critical, one finds behavioristic analyses at work" (p. 41). Roediger explained that the reason for "enthusiasm" about behavior analysis is that it works; it delivers the goods. Although Roediger didn't mention the power of behavior analysis to deal with so-called cognitive phenomena, he clearly acknowledged the strength of both the science and the application of behavior analysis.

The *Verbal Behavior* Controversy

The health of a scientific discipline, however, is based not solely on the number of adherents or journals or its popularity but ultimately on the soundness of the science. And the value of interpretive accounts like *Verbal Behavior* is ultimately determined not by book reviews, hearsay, or descriptions in college textbooks but by the consistency of the interpretation, its conformity to basic scientific principles, and its ability to generate empirical and practical applications. Chomsky, however, faulted Skinner for extrapolating principles from the experimental laboratory with nonhumans to human language, a domain that was in his view taboo for a behavioristic analysis. But interpretation is a time-honored tradition in the natural sciences. Newton could explain the gravitational effects of the moon on the ocean tides only after experimenting with more earthly things. Because Skinner's analysis rested on already established experimental principles, he probably thought he was on pretty safe ground for pursuing an interpretation. Thus, perhaps he didn't really understand what the fuss over his book was all about when he wrote:

My *Verbal Behavior* has been called controversial, and in one accepted sense of the word perhaps it is, but most of the argumentation is due to a misunderstanding. The book is not about language. A language is a verbal environment, which shapes and maintains verbal behavior. As an environment, it is composed of listeners. Linguists have usually studied listening rather than speaking (a typical question is why a sentence makes sense), but *Verbal Behavior* is an interpretation of the behavior of the *speaker*, given the contingencies of reinforcement maintained by the community. It uses principles drawn from the experimental analysis of nonverbal behavior—and nothing else. So far as I am concerned, the only question is whether the interpretation is adequate, but that is not the question raised by the supposed controversy. Those who want to analyze language as the expression of ideas, the transmission of information, or the communication of meaning naturally employ different concepts. Whether they work better is a question, but is it a controversy? (1987, p. 11)

The only question for Skinner, then, was whether the interpretation conformed to and was constrained by the principles on which it was based. For most behavior analysts, the answer has been in the affirmative (e.g., Palmer, 2006a). But the answer from outside behavior analysis has been mixed.

When *Verbal Behavior* was published, Chomsky's review was one of at least 14 reviews—many of which were positive—that appeared in a variety of journals at the time (Knapp, 1992), although Chomsky's negative review was seized upon as the definitive rebuttal.² There are indications, however, that the tide against *Verbal Behavior* initiated by Chomsky's review had begun to turn by the 1980s. For example, in a 1991 article titled "Skinner and Chomsky 30 Years Later, or The Return of the Repressed," linguistic historiographer Julie Tetel Andresen described several reasons, related to the cognitive humanistic zeitgeist of the 1960s, why a behavioristic account of verbal behavior was repressed while Chomsky's structural theory of generative grammar was embraced. Andresen (1991) also described how changes in the psychological zeitgeist, as well as developments in biological thinking about the brain—in particular, the selectionist features of neural Darwinism (Edelman, 1987)—provided "a more positive climate" for the return of Skinner's account of verbal behavior. Moreover, by the 1980s, possibly as a reaction against structural linguistics and its failure to generate practical applications, many linguists were already turning to a more functional approach that emphasized the social, contextual components of language (e.g., Halliday, 1985; Halliday & Hasan, 1985), thus creating a zeitgeist more favorable to a behavioral analysis of verbal behavior.

Verbal Behavior Is Alive and Well

Fifty years after the publication of *Verbal Behavior*, we can ask how it has fared in terms of more utilitarian considerations, including the number of books sold and citations. Precise quantitative data are difficult to come by, but even an informal analysis reveals a surprising answer.

Let's begin with the most difficult assay, the number of books sold. For this, we have to rely on crude and often incomplete data. However, for the first 14 years, we have fairly accurate data—thanks to Skinner himself. Figure 1, based on royalty receipts from Skinner's publisher, shows that from 1957 until 1972, cumulative sales of *Verbal Behavior* totaled about 13,500 copies. This is a remarkable number, since the book was extremely difficult, even for behaviorists. The steepest rise in sales occurred during the first 3 years (1957–1959) and then again after about 1962. One could perhaps argue that the slower rate of sales between 1959 and 1962 was due to Chomsky's review. But it is obvious that, at least in terms of number of books sold, Chomsky's review did not have a devastating effect. See Figure 1 for sales of *Verbal Behavior* from 1957 to 1972.

² For a brief historical perspective on Skinner's *Verbal Behavior* and Chomsky's review, see Palmer, 2006a.

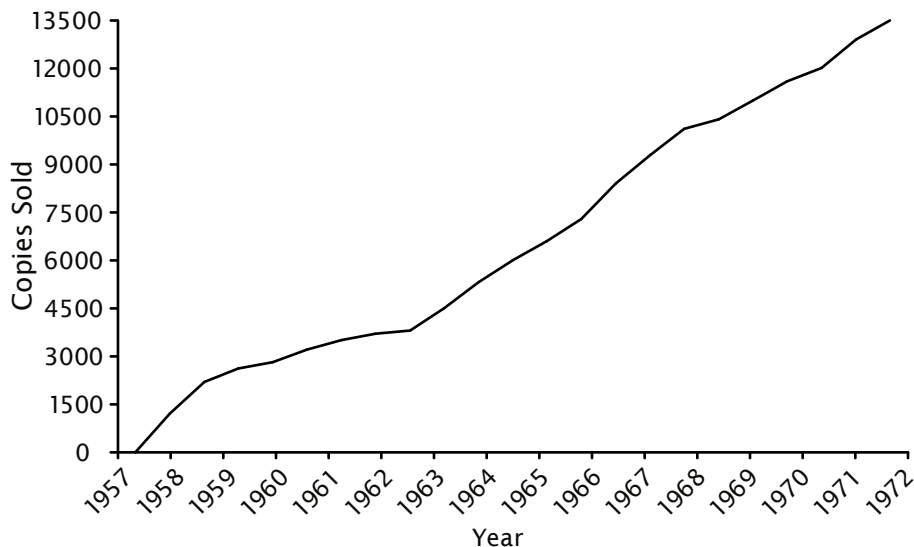


Figure 1. Cumulative sales of *Verbal Behavior* from 1957 to 1972. (Adapted from a figure hand-drawn by B. F. Skinner and provided courtesy of Dr. Julie Vargas.)

Figures for sales of *Verbal Behavior* during the ensuing years are difficult to find, but the Association for Behavior Analysis International sold more than 646 copies from 1998 to 2006 (Association for Behavior Analysis, electronic mail, May 18, 2007). According to Julie Vargas, Skinner's daughter, about 940 copies of *Verbal Behavior* were purchased from the B. F. Skinner Foundation and Copley books in 2006 alone (Julie S. Vargas, electronic mail, March 30, 2007)—an amazing number, demonstrating that *Verbal Behavior* is truly undergoing a resurgence. A crude indication of the relative strength of *Verbal Behavior* is that on Amazon.com, its sales consistently rank about twice as high as sales of Chomsky's *Syntactic Structures* (1957), which, coincidentally, also celebrated its 50th anniversary in 2007.

We can further assess the durability of *Verbal Behavior* by looking at how often it is still cited. At least two citation analyses of *Verbal Behavior* have been conducted in the past 25 years. One, concluded in 1984, examined the *Social Science Index* and the *Science Citation Index* and found that between 1966 and 1983 *Verbal Behavior* had been cited 836 times (McPherson, Bonem, Green, & Osborne, 1984). A more recent analysis by Dymond, O'Hora, Whelan, and O'Donovan (2006) used the Institute for Scientific Information (ISI) index and the journal *The Analysis of Verbal Behavior* (which is not yet listed in the ISI) and found 1,093 citations of *Verbal Behavior* from 1984 to 2004 (see Figure 2). Although both studies found that a majority of citations were from nonempirical articles, the Dymond et al. study found a slow but steady increase in the rate of empirical studies citing *Verbal Behavior*, demonstrating a growing body of evidence supporting Skinner's interpretation and taxonomy of verbal operants (Sautter & LeBlanc, 2006). Moreover, from 1984 to 2004

the average number of all citations of *Verbal Behavior* rose from 32 to 52 per year, a 61% increase, and an indication that “*Verbal Behavior* has had a substantial influence on academic writing that continues to the present date” (Dymond et al., 2006, p. 78).

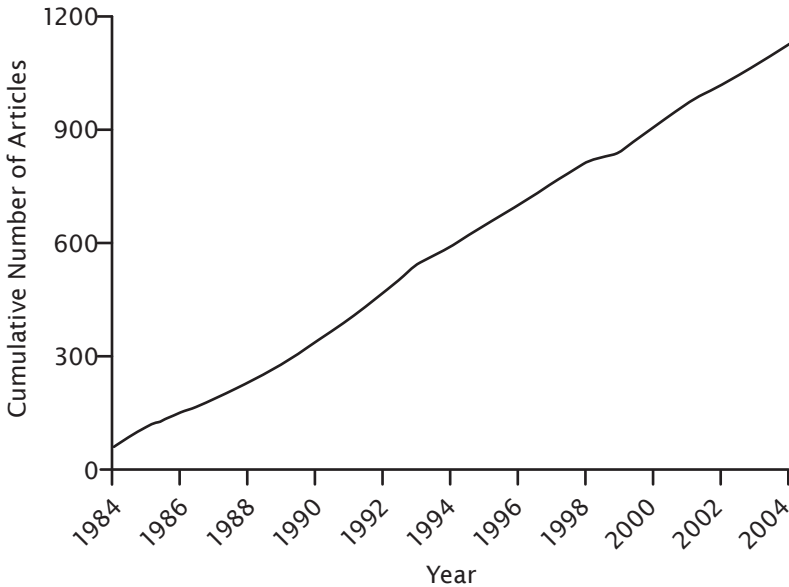


Figure 2. Cumulative number of citations of *Verbal Behavior* from 1984 to 2004. (Figure provided courtesy of Dr. Simon Dymond.)

Skinner’s *Verbal Behavior* has also given birth to other empirical and theoretical programs derived from its conceptual base. Consider the concept of joint control (Lowenkron, 1998). In its simplest form, joint control occurs when one verbal operant topography is evoked jointly by two sources of stimulus control, usually a self-echoic and a tact. For example, suppose a child who has never been taught to point to a red square is instructed to point to the red square from an array of colored shapes. According to a joint-control account, the child echoes the instruction “red square” and then continues to self-echo (“red square,” “red square,” etc.) until she sees the red square, which immediately evokes the response “red square” as a tact. At that instant, under the joint control of “red square” as a self-echoic and as a tact, the child points to the red square. As Lowenkron notes, this type of selection response may be considered a descriptive autoclitic (Lowenkron, 1998; Skinner, 1957): By pointing, the child is in a sense reporting which colored square “enters into joint control with the topography currently under self-echoic rehearsal” (Lowenkron, 2006, p. 125).

A joint-control account, as a form of mediated stimulus selection, has an advantage over unmediated accounts in that it is independent of the particular stimuli used (Palmer, 2006b). Thus, a joint-control account of selection-based responding, including matching-to-sample procedures, is a parsimonious explanation because it appeals to the ongoing behavior of the individual as a source of stimulus control over selection-based responding. Moreover, it has

immediate practical applications in language training programs for children with language deficits (Sidener, 2006). For present purposes, however, joint control is important because it is a theoretical and empirical program derived from the concepts described by Skinner in *Verbal Behavior* and from the more general concept of operant stimulus control.

What Accounts for the Vitality of *Verbal Behavior*?

What explains the vitality of *Verbal Behavior* 50 years after its publication and 48 years after Chomsky's review? Although this question may prompt more than one answer, one stands out and underscores the real value of Skinner's interpretative account of language and the science on which it is based: It works. *Verbal Behavior* has been successful on two levels. First, as an interpretation, it is both a parsimonious and an adequate account of the behavior of speakers. It is consistent with the principles established in the experimental laboratory, and it does not appeal to any other processes or mechanisms. Skinner's interpretation may not be exhaustive, but because it posits objective events and is based on a foundation of extant experimental principles, it is plausible.

Verbal Behavior also succeeds on another level: Many of its concepts are immediately applicable to language instruction. In fact, a technology of teaching verbal behavior based generally on the science of operant learning and specifically on Skinner's analysis has already been developed. This technology has been in use for several decades, but more recently it has mushroomed because of its success with people diagnosed with autism and related disorders. Individuals with autism typically exhibit qualitative impairments in communication, including the delay or total lack of speech, the inability to sustain a conversation with someone else, and the repetitive use of idiosyncratic speech (e.g., echolalia). In the past 10 years or so, an increasing trend has been to address those deficits not only within applied behavior analysis but also by using Skinner's interpretation in *Verbal Behavior*. Numerous programs around the world now emphasize a verbal behavior component as a critical ingredient to their treatment regimen. Furthermore, research on teaching manding, tacting, echoic, and intraverbal behavior, as well as powerful but subtle variables such as automatic reinforcement, is also becoming more common, although still largely restricted to journals devoted to publishing behavior analytic work (e.g., Hernandez, Hanley, Ingvarsson, & Tiger, 2007; Lerman, Parton, Addison, Vorndran, Volkert, & Kodak, 2005; Miguel, Petursdorrit, & Carr, 2005; Wallace, Iwata, & Hanley, 2006; Wright, 2006; Yi, Christian, Vittimberga, & Lowenkron, 2006). Moreover, a number of books based in large part on Skinner's analysis are now on the market (e.g., Greer & Ross, 2008). These books are designed to teach various aspects of verbal behavior to populations ranging from typically developing children to those diagnosed with developmental delays.

Conclusion

It seems absurd to suggest that a book review could cause a paradigmatic revolution or wreak all the havoc that Chomsky's review is said to have caused to *Verbal Behavior* or to behavioral psychology. To dismiss a natural science (the experimental analysis of behavior) and a theoretical account of

an important subject matter that was 23 years in the writing by arguably the most eminent scientist in that discipline based on one book review is probably without precedent in the history of science.

Evidence certainly indicates that reports of the death of Skinner's *Verbal Behavior* or any operant analysis of language were indeed greatly exaggerated. Although the book may have lain somewhat dormant for several years, interest in it and in a behavior analysis of language in general has been revived as part of the slow progress that science often makes. As Palmer (2006a) has recently written, "Science is like a river, flowing inexorably downstream, freshened and swollen by rivulets of data. Our efforts to dam or divert it are too puny to prevail for long against the gathering weight; sooner or later all obstacles are swept away, and the river resumes its natural course. . . . In 1957, the tributary represented by Skinner's book was a mere trickle and was easily dammed. But water is now spilling over the top" (p. 265).

Those who long ago said good-bye to Skinner's *Verbal Behavior*, in particular, and to behaviorism, in general, may have to dust off the "welcome back" sign.

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