

The Verbal Behavior Approach to Early and Intensive Behavioral Intervention for Autism: A Call for Additional Empirical Support

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Early and intensive behavioral intervention (EIBI) has been firmly established and disseminated as one of the most effective treatments for early childhood autism. Recently, a number of practitioners have employed a variant of this approach in which the language curriculum is organized and taught according to Skinner's (1957) analysis of verbal behavior. In this commentary, we briefly describe the verbal-behavior approach to EIBI and summarize the existing data that support its use. Although the approach is conceptually sound and is supported by a modest literature on the acquisition of verbal operants, no outcome research currently exists to directly support the long-term application of the verbal-behavior approach to children with autism. Thus, we outline three steps that clinicians and researchers can take to collect and publish outcome data on the verbal-behavior approach so that correspondence between dissemination and empirical evidence can be better coordinated.

KEYWORDS: autism, early and intensive behavioral intervention, verbal behavior.

Applied behavior analysis has been successfully applied to behavioral excesses and deficits in the area for autism since the 1960s (e.g., Lovaas, Freitag, Gold, & Kassorla, 1965). However, it was not until the publication of Lovaas' (1987) seminal outcome study on early and intensive behavioral intervention (EIBI), the McEachin, Smith, and Lovaas (1993) follow-up study, and Catherine Maurice's (1993) *Let Me Hear Your Voice* that behavioral treatment was widely and effectively disseminated. The Lovaas (1987) study, along with several others (e.g., Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991), differed from earlier efforts in the effects of comprehensive and *intensive* (e.g., up to 40 hours per week) behavioral treatment that spanned several years were evaluated. Furthermore, Lovaas (1987) showed that with EIBI some children with autism were able to obtain normal intellectual functioning. Although recent critiques have questioned the probability of achieving such "best outcomes" (Shea, 2004), no other treatment approach has been able to replicate the magnitude of effects produced with EIBI (for a review, see Smith, 1999).

The EIBI model developed by Lovaas (1981, 2003) (hereafter referred to as the "Lovaas approach") has arguably been the most significant influence on the instructional methodology employed by behavioral practitioners in recent years. This methodology includes discrete-trial instruction (Smith, 2001), intensive treatment delivery, and a developmentally sequenced curriculum (e.g., Leaf & McEachin, 1999; Lovaas 1981, 2003). We refer the reader to Lovaas and Smith (2003) for a more detailed description of their approach to EIBI.

More recently, an alternative EIBI service-delivery model has emerged. Sometimes referred to as "Applied Verbal Behavior" (Burk, n.d.) (hereafter referred to as the verbal behavior [VB] approach), this model appears to have increased in popularity and demand among practitioners and consumers alike as evidenced by the publication of a treatment manual (Sundberg & Partington, 1998) and corresponding assessment (Partington & Sundberg, 1998), numerous online resources including a listserver (Verbal Behavior - ABA & Teaching Verbal Behavior, n.d.) and resource store for program materials (Verbal Behavior Network - Resources, n.d.), and clinically oriented workshops (e.g., Bosch, Saltzman, & Granpeesheh, 2004). Although the VB approach shares a number of similarities with the Lovaas approach (i.e., treatment intensity, hierarchically organized curricula, operant training techniques), there are important differences between the two which are described in the next section.

As a response to the rapid pace of dissemination of the VB approach, the purpose of the current paper is to discuss a series of steps that practitioners and researchers can take to ensure that the

dissemination and implementation of the VB approach is tempered by equally driven efforts to generate outcome data substantiating its use in favor of other models (e.g., the Lovaas approach) for which comparatively more empirical support currently exists. The present commentary is organized such that the VB approach is first briefly described, followed by a summary of its existing empirical support and then a plan for the generation of empirical evidence to better inform and support its dissemination and implementation.

Contrasting The Verbal Behavior and Lovaas Approaches to EIBI

The Lovaas and VB approaches can be compared and contrasted according to several shared or distinct features, many of which are described in the leading manual for the VB approach, *Teaching Language to Children with Autism or Other Developmental Disabilities* (Sundberg & Partington, 1998). It is critical to note, however, that the Lovaas model appears to be, at this time, considerably more standardized across clinics and practitioners compared to the VB approach. This circumstance may be a byproduct of the fact that, while the Lovaas approach was developed in a university setting, the VB approach was born out of clinical practice based on Skinner's interpretive writings. For this reason, only the core features of the VB approach can be discussed in an attempt to isolate and address the most representative and reliable points of divergence between the two approaches.

First, both models emphasize the importance of contriving carefully organized training environments, including a variety of readily accessible, highly preferred tangible items and activities to be delivered contingently upon correct performance. Another relevant similarity between the two models is that they both teach expressive/speaker and receptive/listener behavior. In compliance with a set of dual imperatives initially proposed by Lovaas (1977), the VB and Lovaas models both assert the value of early intervention and subscribe to the importance of facilitating specific and frequent daily training opportunities. Finally, both models of intervention use a discrete-trial training format for the presentation of instructions and consequences. In the case of the Lovaas approach, discrete-trial instruction appears to be the modal format in which training is conducted. In the case of the VB approach, discrete-trial instruction is used in conjunction with Natural Environment Training (NET), a practice that is directly related to a critical point of distinction between the two models of EIBI (Sundberg & Partington, 1999).

Two of the primary differences between the VB and Lovaas approaches include the emphasis on NET and the Skinnerian theoretical framework guiding language instruction. According to Sundberg and Partington (1998), the primary function of NET is to continue language training in the presence of the stimuli and motivative variables that must eventually control and maintain the verbal behavior of the client. In addition, NET targets the generalization of acquired responses and variations of those responses across a variety of appropriate captured and contrived stimulus conditions. Particularly in the case of mand training, this strategy affords Skinner's emphasis on operant-specific antecedents and consequences, in conjunction with current motivating operations, to guide the training of functional classes of verbal behavior (Shafer, 1994). In contrast, the Lovaas approach often conducts training trials in a highly structured, analog environment in which primarily edible consequences and social praise are used to reinforce target responses evoked under very specific stimulus control. Supplementary programming for stimulus and response generalization is conducted, although not necessarily formally integrated into daily teaching practices (Lovaas, 1987).

As originally proposed by Skinner (1957), the VB approach employs a functional account of language (a) to teach children multiple functions of language (e.g., mand, tact, intraverbal) and (b) to teach each function using the ultimate controlling variables specific to that function (Sundberg & Michael, 2001; Sundberg & Partington, 1998). This marks a notable departure from the traditional psycholinguistic model reflected by the terms used to describe the "receptive" and "expressive" language training employed by the Lovaas approach to EIBI (e.g., Leaf & McEachin, 1999; Lovaas, 2003). In line

with a more structuralist interpretation of language, the Lovaas approach teaches children to engage in verbal behavior using the same discrete-trial preparation as other skill acquisition tasks and, more significantly, often without specific regard for the functionally relevant antecedents and consequences stipulated by Skinner's analysis of verbal behavior. We refer the reader to Sundberg and Michael for an elaboration of this distinction.

Empirical Support for the Verbal Behavior Approach

The VB approach to EIBI for children with autism is based on sound conceptual logic (Sundberg & Michael, 2001), which is perhaps one of the reasons for its effective recent dissemination. However, relatively little empirical research exists to support such widespread dissemination. The bulk of the support exists in the publication of numerous studies on the training of single verbal operants with individuals with and without language disorders. For example, Braam and Poling (1983) showed that intraverbal behavior (i.e., responses to a category name such as "food") could be taught to adolescents with mental retardation by transferring stimulus control from tacts of pictures (e.g., specific foods) to the initial antecedent stimulus (e.g., "Tell me the names of some foods."). Miguel, Carr, and Michael (2002) paired experimenter-produced sounds with the delivery of preferred stimuli to children with autism and showed that the children subsequently emitted those sounds more often, possibly through conditioned automatic reinforcement. Sundberg, Loeb, Hale, and Eigenheer (2002) increased the value of knowing the location of a missing item to teach children with autism to mand for information about the item's location. Drash, High, and Tudor (1999) showed that responses could be transferred from mand to echoic control in the development of echoic repertoires (i.e., vocal imitation) of children with autism. Numerous other investigations exist to support the teaching of specific verbal operants and the use of specific interventions for these purposes (for a review, see Oah & Dickinson, 1989). Although this evidence does constitute support for the VB approach, the support is rather indirect. A more direct form of support would be to evaluate the outcomes of the application of an EIBI program based on the VB approach after an extensive period of service delivery (e.g., 2 years) with a well-defined population of children with autism. Thus, it is currently unknown whether, for example, a 2-year EIBI program based on the VB approach produces significant improvements to the repertoire of children with autism akin to other approaches (Smith, 1999).

To date, there exists only one attempt to compare the outcomes of a VB language curriculum with a more traditional linguistic (i.e., structuralist) curriculum. Williams and Greer (1993) compared the number of words correctly used across training trials and the accuracy of responses during maintenance probes for three adolescents diagnosed with developmental disabilities across VB and linguistic (similar to that found in many Lovaas programs) curricula. Operant training procedures, specified as incidental and discrete-trial procedures, were held constant across conditions. In general, procedural features included the antecedent use of nonverbal and verbal discriminative stimuli, contingent consequences including praise and access to additional stimuli or events, and the contingent opportunity to mand for those stimuli or events known to have reinforcing properties for a particular participant. Different words were taught across the curriculum-specific phases, with the exception of "yes/no" responses, which were taught in both curricula. The VB curriculum consisted of target responses that were first taught as echoics, then tacts, and, ultimately, as mands when the word(s) specified a reinforcing item or activity for the particular participant. A series of autoclitic responses was also trained. The linguistic curriculum included target responses derived from the program developed by Guess, Sailor, and Baer (1976) in which individuals were first taught to label novel items when asked "What's that?," and were then taught to label actions, persons, and things in a similar manner. Next, individuals were taught to state possession and color by responding to questions such as, "Is this my/your ___?" and "What color?" Finally, participants were taught to describe the size, location, and relationship of relevant items to other stimuli.

Williams and Greer (1993) implemented two phases of training in each curriculum using an ABAB design in which the VB curriculum was always implemented first. Although the number of correct trials for each participant was similar across training conditions, the number of words emitted during the VB training sessions exceeded the number of words emitted during the linguistic training sessions. The authors also reported that more words taught during previous VB phases were emitted in the context of subsequent training phases for 2 of 3 participants, while the overall number of appropriate words taught during previous linguistic phases that occurred during subsequent training phases was lower. During maintenance probes that occurred following the completion of the first linguistic phase, the second VB phase, and the second linguistic phase, considerably more correct trials were completed from the VB curriculum than those revisited from the linguistic curriculum. The results of multiple maintenance probes conducted at the completion of training and covering all of the words taught across all phases showed a greater percentage of correct responses for the VB curriculum. Hence, the authors demonstrated considerable support for their VB language curriculum given its comparative effectiveness over the linguistic curriculum across a number of dependent measures.

The Williams and Greer (1993) investigation is noteworthy because it was the first attempt to directly compare Skinnerian and traditional linguistic language curricula and, thus, can be considered more direct evidence of support for the VB approach than studies based on single verbal operants (e.g., Braam & Poling, 1983). Nonetheless, the Williams and Greer investigation should be viewed as a preliminary step in the accumulation of supportive evidence because participants were not exposed to the VB approach for an extended period of time, which would have permitted an evaluation of more global outcomes (e.g., IQ, adaptive behavior). Furthermore, the specific procedural descriptions for the VB programming in the Williams and Greer study are minimal and seem to bear only a limited resemblance to the more sophisticated administration of trials and systematic control over controlling variables prescribed by Sundberg and Partington (1998).

In summary, the VB approach is based on sound conceptual logic and is empirically supported by a number of studies on the acquisition of verbal operants and their corresponding teaching procedures (e.g., Braam & Poling, 1983; Miguel et al., 2002; Sundberg et al., 2002). Furthermore, the Williams and Greer (1993) study suggests numerous benefits of using a functional rather than a linguistic language curriculum. However, to date, there exists no long-term outcome data on the intensive application of a VB approach to problems associated with autism.

Recommendations for Additional Empirical Support

Given the apparent disconnect between published evidence supporting the effects of the VB approach and the quickening pace of dissemination and consumer interest in this approach to EIBI, we recommend the following efforts to generate additional outcome data.

Published case studies. Practitioners with a vested interest in the empirical validation of the VB approach can take immediate steps by gathering and publishing one or several well-documented case studies demonstrating the overall treatment effects produced for specific clients who have been intensively treated using EIBI based on the VB approach. These case studies would contribute to the literature and might be relatively convenient for practitioners who have existing data sets from which to draw.

Green, Brennan, and Fein (2002) recently published an excellent model of an EIBI case study. The article chronicles in appreciable detail, the progress of a toddler identified at high risk for a later diagnosis of autism who began EIBI at the age of 1 year, 2 months and completed the program at the age of 4 years, 5 months. The program was designed based upon the existing behavioral treatment literature (e.g., Fenske, Zolenski, Krantz, & McClannahan, 1985; Lovaas, 1987; Perry, Cohen, & DeCarlo, 1995),

selected research from the literature on early childhood development (e.g., Stone, Ousley, & Littleford, 1997), and the clinical experience of the supervising practitioners. The authors included detailed information about the curriculum (including how it changed over time) as well as program intensity. Graphs depicting the progress of the child in key curricular programs (e.g., peer initiations, receptive language) were provided in addition to thorough descriptive accounts of the progress of the child across the duration of treatment. Notably, the authors also incorporated the results of standardized, norm-referenced intellectual, language, and adaptive-behavior assessments that were administered prior to and throughout treatment that clearly document the progress of the child as indicated by specific measures (e.g., age-equivalent scores). The authors demonstrated that after 4 years, the child displayed no behavioral or developmental abnormalities and above-average intellectual functioning.

The inclusion of standardized outcome measures (beyond acquisition data for specific behavior programs) in a case study is particularly important for comparing the magnitude of treatment gains of the VB approach with already published data from other models. As previously mentioned, the need to identify the uniform and idiosyncratic recommendations advanced by various practitioners of the VB approach is critical to the prospect of experimentally evaluating a representative incarnation of the VB approach to EIBI. The inclusion of a complete description of treatment components (e.g., error correction, prompting techniques, task interspersal) within a case study would enable us to begin documenting the range of practices within the VB approach. We believe this preliminary step (i.e., published case studies) toward building a body of outcome research for the VB approach is appropriate, timely, and will do a great deal to inform future, more rigorous efforts.

Published outcome data for multiple cases. As a second and slightly more demanding effort, published data from multiple cases, perhaps from a single clinic, could continue to add to the reliability of previous findings. Martella, Nelson, and Marchand-Martella (1999) described this evaluation strategy as a one-group pretest-posttest design. As with the case study described above, treatment would need to be delineated, and pre- and post- outcome measures would need to be included, perhaps along with data on individual program targets acquired during treatment. Ultimately, the inclusion of data from many cases would permit (a) an evaluation of the reliability of treatment effects, (b) treatment effects to be compared to existing published data sets, and (c) preliminary correlations between treatment outcomes and potential predictor variables such as specific child (e.g., comorbid mental retardation) and program characteristics (e.g., frequency of contact with the supervising consultant).

The study by Bibby, Eikeseth, Martin, Mudford, and Reeves (2001) is a good example of the reporting of multiple cases. The authors reported data after 24 and 36 months of therapy for 66 children who were served in parent-managed, in-home EIBI programs supervised by various early intervention consultants. The general treatment model that was employed was based on Lovaas (1996). The authors reported data from intellectual, language, and adaptive-behavior assessments, among others, for each child and showed that they, on average, performed much more poorly than those in the Lovaas (1987) study (cf. Sheinkopf & Siegel, 1998). The large number of data sets to which the authors had access allowed them to begin examining correlations between certain predictor variables, such as pre-treatment IQ, and treatment outcome. Although the authors were unable to identify any statistically significant predictor variables, their report does suggest that future research on the *quality* of EIBI is warranted. Because treatment was managed by parents and intermittent consultants, unlike the intensive university-based model described by Lovaas (1987), the Bibby et al. study raises the possibility that EIBI is more likely to produce best-outcome cases when treatment integrity is kept at an optimal value (e.g., weekly training and supervision). Although no firm conclusions can be drawn from the Bibby et al. study, we believe the questions it raises to be important and potentially fruitful for subsequent investigations. We hope that similar efforts and potential benefits will be possible with the publication of multiple cases from the VB approach.

Although findings from the published case-study (single and multiple) strategies described above are obviously bound by their non-experimental nature, we believe that they nonetheless have value given the current paucity of published outcome data on the VB approach. Until more rigorous evaluations are available, we believe that a relatively small number of case-study contributions as described above could be useful. However, given the scrutiny with which new EIBI findings are evaluated (Green, 1999), the quality of the research produced in the interest of evaluating the outcomes of the VB approach for children with autism should advance quickly toward the highest standard of experimental research. \

Experimental or quasi-experimental treatment comparisons. It follows that the third and final step toward building a body of empirical support for the VB approach to EIBI is for researchers to conduct experimental or quasi-experimental outcome studies in which the VB approach is compared to a control condition (e.g., no treatment, standard treatment). There are numerous examples of published outcome studies of EIBI for children with autism. Besides the seminal Lovaas (1987) investigation, Sheinkopf and Siegel (1998) showed that children who received parent-managed in-home EIBI (based on the Lovaas model) performed better at follow-up than similar children receiving conventional and shorter-term services (cf. Bibby et al., 2001). As an additional example, Smith, Eikeseth, Klevstrand, and Lovaas (1997) showed that children diagnosed with mental retardation *and* a pervasive developmental disorder performed better at posttest than similar children who received minimal treatment; however, children in the experimental condition remained quite delayed at posttest.

One practical consideration posed by this extended research goal is that control groups for such an investigation are difficult to comprise given the widespread dissemination and implementation of EIBI methods. This circumstance is perhaps secondary to the ethical concerns associated with recruiting a group of children to serve as no-treatment or sub-optimal treatment controls given what we know about the importance of early intervention. Thus, the most feasible experimental approach would most likely be to compare the treatment effects of the VB approach to the Lovaas model of intervention for children with autism (i.e., a standard treatment control group; Kazdin, 2003). Although the Lovaas (1987) study was often criticized (e.g., Gresham & MacMillan, 1997) for failure to randomly assign participants to each experimental condition, the reality is that random assignment will sometimes not be feasible (cf. Smith, Groen, & Wynn, 2000). In such cases, a more practical approach might be to employ a quasi-experimental design in which participants are nonrandomly assigned to each condition and are perhaps already pre-assembled (e.g., children at two different clinics). However, in the absence of random assignment, strict measures (e.g., matching) would need to be taken to demonstrate equivalence between the groups of children before treatment implementation. We refer the reader to recommendations offered by Kasari (2002) and the Committee on Educational Interventions for Children with Autism (2001) for further information on the methodological design of experimental evaluations of EIBI.

This most resource-exhaustive empirical endeavor will probably be the work of researchers in academic or well funded private settings and its latency may depend largely on the prerequisite work of practitioners who will aid in first publishing case studies that (a) help standardize the procedures that characterize the VB approach in contemporary clinical practice and (b) document the outcomes of the VB approach using standardized dependent measures.

Conclusion

The purpose of this commentary has not been to dissuade practitioners from continuing to implement EIBI programs based on Skinner's analysis of verbal behavior, as this model clearly enjoys a great deal of internal consistency, a strong conceptual and logical foundation, and some empirical support. In fact, much of the EIBI work in which we are involved is heavily based on the VB approach. However, we believe that the current dissemination of the VB approach must be correlated with equally fervent efforts, on the part of practitioners and researchers alike, to empirically (and ultimately,

experimentally) evaluate its outcomes. By publishing preliminary case studies in which treatment procedures are standardized and long-term treatment outcomes are quantified, and ultimately moving toward the execution of larger-scale experimental evaluations, proponents of Skinner's analysis of verbal behavior and the clinical methods derived from that account will be in a better position to ensure that treatment dissemination efforts and supporting empirical evidence are better correlated.

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