

The Contributions of Applied Behavior Analysis to the Education of People With Autism

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Among the numerous treatments available for helping to educate people with autism, applied behavior analysis (ABA) is the best empirically evaluated, as many articles in this dual-volume special issue document. Unfortunately, the best supported treatments are not always the best disseminated or accepted. Recently, however, ABA has emerged with widespread recognition beyond the limited community of academic and behavioral psychologists and special educators. In fact, ABA has been recognized by the surgeon general of the United States as the treatment of choice for autism in his mental health report for children: “Thirty years of research demonstrated the efficacy of applied behavioral methods in reducing inappropriate behavior and in increasing communication, learning, and appropriate social behavior” (U.S. Department of Health and Human Services, 1999). Corroborating the surgeon general’s recommendation are state governments in New York (Department of Health, 1999) and California (Collaborative Work Group on Autistic Spectrum Disorders, 1997), as well as a collaborative group in Maine (MADSEC Autism Taskforce, 1999). New York and Maine reference the unparalleled quantity of outcome research supporting behavior analytic instruction and its best-practice features (see Jacobson, 2000). Beyond governmental organizations, the popular media has begun to recognize and educate the public about ABA treatment for autism. For example, ABC broadcast a *Nightline* episode endorsing ABA early intervention for children with autism

(Koppel, 2001), accompanied by an extensive ABA resource list on its Web site. The *New York Times* featured an article on the failure of the educational system to meet the needs of autistic students due to the insufficient number schools offering ABA services (Peterson, 2000). *Newsweek* magazine featured autism on its cover and featured ABA as a “godsend” (Cowley, 2000).

With the publication of clear outcome data that support many ABA interventions, more recent coverage of behavior analysis by the media, and the rise of behavior analyst certification, this is an excellent opportunity for behavior analysts to cooperate on many fronts to bring more and improved empirically supported treatment strategies to assist people with autism. The foundation for doing so must continue to be a strategy that utilizes the tactics of those who have been at the forefront of ABA research and dissemination. This two-part special issue covers the span of contemporary ABA offerings and research on autism, looking at how we have moved beyond initial classic research showing its efficacy to identify the current unknowns and areas for organized effort.

Behavior analysis interventions for children with autism began in the 1960s with the work of Ivar Lovaas and his colleagues at the University of California, Los Angeles. Their classic study (Lovaas, 1987), cited in the surgeon general report, demonstrated that with appropriate intervention children with autism could make intellectual and social gains previously seen as impossible. The study included an experimental group of 19 children and two control groups, totaling 40 children. The three groups were similar in relevant preintervention measures. The treatment differed mainly according to the number of hours of educational treatment, with the experimental group receiving at least 40 hours of one-to-one training per week and control group participants receiving 10 hours or less. The differences in outcomes between the groups were profound, with 47% of experimental group participants achieving IQs exceeding 100 as compared to only 2% of the control group students. In addition, several of the experimental group participants were successfully mainstreamed in regular classrooms.

In several respects, the Lovaas (1987) study has led the way for educators and researchers who deal with the education of children with

autism. First, it demonstrated the primacy of language training in the educational process. Next, it showed that intervention must begin early, be intense, and be of sufficient duration that normal functioning can be achieved. Finally, it showed that inclusion of children with autism was an achievable goal.

Undoubtedly, early ABA programs produced impressive language gains for children with autism. Yet, as Sundberg and Michael point out in this issue, there were still many failures, and at times, progress was extremely slow. Sundberg and Michael suggest the possibility that such difficulties emanated from a failure of applied behavior analysts to make use of Skinner's (1957) classic and controversial book on verbal behavior. They observe that many language-training programs began the teaching process with unduly complex language components and with elements of language that were nonmotivational for the learner. For example, early teaching often includes emphasis on a type of language that behavior analysts call *tacts*. This type of language functions to describe characteristics of the environment (e.g., "This crayon is red") for which the reinforcer is often generalized and conditioned (e.g., acknowledgment, praise) and is not inherent to a request by the learner. In contrast, Sundberg and Michael propose that the early portions of language training programs stress *mand* development—a type of language within a behavioral conceptualization that specifies its own reinforcement (e.g., "I want the ball"). Other types of language training, for which the reinforcers are more general, come later in the educational sequence.

Bondy and Frost, who developed the highly recognized Picture Exchange Communication System (PECS), provide an example of a socially based approach to teaching language beginning with mand training. Rather than pointing to a picture of a desired item, students must hand the appropriate picture to a teacher, who then reinforces the request with the actual item. As students develop fluency at each stage of the six-step program, they are exposed to a variety of behavioral procedures that help them to delay reinforcement, become less prompt dependent, make environmental discriminations, and use more complex pictorial mands, such as making the request, "I want an apple." In the final stage of the program, students learn the less motivating form of language that describes elements of their environment (i.e., *tacts*).

Interestingly, Bondy and Frost report that 59% of children with autism who are properly trained with PECS spontaneously develop independent speech.

In addition to building on earlier language-training strategies, contemporary research has built on Lovaas's demonstration that early, intensive intervention is critical to progress, so today there is increased recognition of the importance of intervening early and intensively and continuing the process into adulthood as necessary. Evidence for this position is found in terms of treatment that is recommended and funded by both the public and private sectors. Nonetheless, the expense of 40 hours of weekly treatment calls for increased interpretation and justification. This issue begins with Pelios and Lund's review of the literature on the problems of the classification of symptoms and early diagnosis; there are subtle questions regarding the accuracy of diagnosis at very young ages as well the lingering question of what is causing the increased number of children diagnosed with autism spectrum disorders—are there more children with this problem, or are we diagnosing better or differently? In addition, Pelios and Lund cover the range of theories concerning neurophysiological causation. Despite disagreement about specifics, most now agree that early intervention is critical based on the greater degree of brain plasticity found in younger children. A quantitative case study of a successful early ABA intervention for a child with autism, begun at age 1 year 2 months, is featured in Part 2 of this special issue (see the article by Green, Brennan, and Fein in the January 2002 issue). Also in Part 2, McClannahan, MacDuff, and Krantz extend the literature to treatment for adults by drawing on the same behavioral principles, including comprehensive, intensive, and individualized curricula, that have been successful with children. A student of Lovaas's, Smith, and his colleagues Eikeseth, Jahr, and Eldevik feature groundbreaking empirical research in a group comparison controlled study that extends his work with Lovaas (also in Part 2). They show that ABA, rather than eclectic treatment, is better, even when the intensity of treatment is held constant.

In a third area of expansion, ABA has mirrored the trend in special education in general, emphasizing the placement and teaching of children with disabilities in integrated environments. Koegel, Koegel, Frea, and Fredeen present a data-based, natural observational study of

five children with autism who are compared with their typically developing peers in an inclusive setting. Focusing on early intervention treatment targets, the authors specifically address the social skills deficits that inhibit children with autism from benefiting from integrated environments. They also help dispel the myth that ABA treatment targets academic and language acquisition but not social-emotional needs, as do the Green et al., Eikeseth et al., and Bondy and Frost articles in this special series. Harrower and Dunlap take this theme further with a comprehensive review of the research support and ABA techniques available for facilitating the progress of children with autism in inclusive settings. Weiss and Harris examine behavioral social and emotional skills training across the life span, many specifically relevant to inclusive settings such as the use of scripts to increase social initiations, self-management strategies, and classwide interventions.

A final area of progress within ABA treatment of autism involves the development of more effective ways to disseminate effective ABA interventions. Meeting the increased demand for services and well-trained practitioners, created by heightened public recognition of ABA's benefits, requires more scalable training programs. ABA is beginning to systematize training and certification of practitioners competent to implement this broader range of interventions. Shook, Ala'i-Rosales, and Glenn (January 2002), in their article on this topic, identify key areas for training practitioners at various levels and discuss the importance of increased professionalization of ABA service provision. Credentialing—and perhaps, in the future, licensing—was initiated in response to parents, organized in groups, who rightfully desire a way to determine if the treatment their children are getting is what has been empirically validated by competent professionals. In Lovaas's early work, he trained all his own staff; now, many treatment programs have the benefit of being able to hire staff with solid training in basic behavioral principles and procedures. This benefits children with autism and their families, as well as the field of ABA.

Unlike other applied branches of psychology, behavior analysis is not lacking in a coherent theoretical basis, nor is it new to the demand for empirical outcome data. ABA is also very strong in individualizing treatment, as many of these articles demonstrate. Following Eikeseth

et al.'s contribution to these two special issues, as well as the surgeon general's report, there is a need for more controlled comparison group studies; continued strong support for the current favorable trend in public policy, including educational and mental health funding and money for research and training, depends on procedures shown to be cost-effective for many people meeting the diagnosis of autism. Additional areas for the future include the need for increased research clarifying the conditions under which inclusion is beneficial to those with special needs, the efficacy of particular types of clinical training procedures and credentialing, and further demonstration of the fruits of theoretically driven verbal behavioral training such as PECS, natural language training, and newer computer-assisted training methods.

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