

Applied Behavior Analysis Treatment of Autism: The State of the Art

Richard M. Foxx, PhD^{a,b,*}

^a*Psychology Program, Penn State University Harrisburg,
777 West Harrisburg Pike, Middletown, PA 17057, USA*

^b*Department of Pediatrics, Penn State University School of Medicine,
500 University Drive, Hershey, PA 17033, USA*

The treatment of individuals with autism often involves the application of nonscientifically based practices, even though a scientifically validated and highly effective treatment, applied behavior analysis (ABA) is available [1]. ABA, sometimes called behavior therapy [2] or behavior modification [3], uses methods derived from scientifically established principles of behavior [4]. ABA has been applied successfully to a range of populations and areas including autism, developmental disabilities, education in all its many forms, business, mental health, counseling, marriage counseling, and child abuse, to name but a few [3].

The evidence for the effectiveness of ABA with autism is extensive. [Box 1](#) lists much of this evidence.

In the past 20 years, there has been growing evidence that early intensive behavioral intervention (EIBI) by means of ABA results in improved developmental progress and intellectual performance in young children who have autism [13,15–17]. The effects with young children with autism under age 3 have been particularly gratifying.

Are other treatments effective?

Green [18] described the various types of evidence of effectiveness and detailed why subjective evidence such as testimonials, anecdotes, and personal accounts are not reliable. Nonbehavioral special education classes,

* Corresponding author. Psychology Program, Penn State Harrisburg, 777 West Harrisburg Pike, Middletown, PA 17057

E-mail address: rmf4@psu.edu

Box 1. Evidence for the effectiveness of applied behavior analysis

Individuals of all ages have been successfully educated and treated for over 40 years and children for over 47 years [5]. ABA was identified as the treatment of choice for individuals with autism in the early 1980s [6].

Over 1000 peer-reviewed, scientific autism articles describe ABA successes [1].

No other educational or treatment approach to autism has the support of The State of New York Health Department [7] and United States Surgeon General [8].

The National Institute of Mental Health (NIMH) has been funding ABA autism research continuously for over 40 years.

All individuals who have autism receive some degree of benefit from ABA.

For over 35 years, agencies using ABA have provided successful nonresidential and residential autism services for thousands of school-aged children.

ABA is the only therapy recognized to treat young children who have autism.

No other educational or treatment approach to autism meets the standards of scientific proof that are met by ABA, and there are no other scientifically valid treatments that produce similar treatment, educational, or outcome results [9,10].

Competency guidelines regarding the delivery of ABA autism services are established [11], and certification of ABA practitioners has existed for several years [12].

Investing in early ABA intervention for young children [13] is financially worthwhile, whether the results lead to complete or partial effects [14].

individual therapies, and biological interventions (except antipsychotic medications) have not been established as effective treatments for children who have autism. Some treatments, especially facilitated communication and psychoanalysis, are quite harmful and should be avoided [19].

The New York State Department of Health [7] took a rigorous approach to guideline development and creation when it examined assessment and interventions for young children who have autism. To make recommendations regarding assessment and educational programming, a panel of professionals, service providers, and parents screened the literature and conducted an in-depth review of the most relevant articles. The selected studies had to meet high standards for quality, including adequate information concerning

the intervention methods, controlled experimental designs, and the evaluation of functional outcomes [7,10]. The panel provided overall recommendations for early intervention programs, indicated the strength of the scientific evidence for each recommendation, and provided detailed summaries of the evidence on 18 types of interventions. ABA was the only intervention recommended. Interventions reviewed and not recommended included: auditory integration therapy, facilitated communication, floor time, sensory integration therapy, touch therapy, music therapy, hormones (corticotropin [ACTH] and Secretin), vitamin therapies, and special diets [7].

Criticisms of validated treatments such as ABA or traditional medicine often come from proponents of pseudoscientific interventions [20]. Consider that critics may suggest that ABA treatment or educational gains are specific to the setting where the intervention took place or may note that medications can cause adverse effects. These criticisms often are used to promote the adoption of unvalidated interventions. The push for early intensive behavioral (ABA) intervention (EIBI) with young children who have autism has met considerable resistance from several sources. The main resistance has come from educational and governmental agencies not wishing to pay for expensive individualized programs. Other opposition has come from professionals unfamiliar with autism, with philosophical perspectives antithetical to ABA, or with agendas that involve the promotion of competing approaches [9].

Eclecticism is not the best approach to the treatment and education of children with autism

Heward and Silvestri [21] discussed the thinking in special education that leads to eclecticism, wherein incorporating components from several different models into a program is designed to cover the gaps or deficiencies found in any single model. They pointed out that while the logic underlying such eclecticism may appear to have face validity, the problems inherent in eclecticism far outweigh its logical appeal. Heward [22] discussed several reasons why. Eclecticism is based in part on a misplaced egalitarian view that there is value in every approach, although not every model or theory is equally trustworthy and valuable. Indeed, the more models contained in the eclectic mix, the greater the probability that ineffective and potentially harmful components will be included. Practitioners sometimes do not choose the most important and effective parts of each model, but rather select weaker and perhaps ineffective components. Some components of a model can be ineffective when applied in isolation and without other essential elements of the model. Elements from different models are sometimes incompatible. An eclectic mix might prevent any single model from being implemented intensely enough to produce significant outcomes. Some of everything and a lot of nothing leave eclecticism as a recipe for failure. Teachers will not

learn to implement any model with the fidelity necessary to achieve a good result. Eclectic practitioners typically are apprentices of many models but masters of none [22].

Heward and Silvestri [21] concluded that their wariness of eclecticism was

“based on (1) a commitment that students should only be taught with instructional tools that have empiric support for their effectiveness; (2) a research-derived knowledge that not all models are equally effective; and (3) the fact that some approaches have a harmful effect on student learning.”

Adding ineffective treatment to an effective one may be detrimental

Adding an ineffective treatment to an effective one is at best not useful, and at worse detrimental [20]. The available evidence indicates that such combinations can be less effective than relying on a single validated treatment for individuals who have autism. For example, Eikeseth and colleagues [23] compared ABA with an eclectic treatment made up of ABA and unvalidated educational interventions. Although the interventions were of equal intensity, the performance of the ABA-only group was superior to that of the eclectic group.

Although no one yet had studied why combining treatments would reduce effectiveness, there are several possible explanations [20]. One, some of the combined treatments may be harmful. Two, ineffective treatments divert time and resources away from the effective interventions with which they have been combined. Three, treatments may interfere or counter each other's effectiveness. For example, while ABA emphasizes helping individuals follow a structured routine, other treatments may discourage this practice. Four, as noted by Heward [22], therapists may become “jacks of all trades and master of none” by implementing several interventions but none very well. In effect, combining treatments can present considerable risk, especially if any of the treatments have no empiric support [20].

Applied behavior analysis epitomizes effective intervention in autism

ABA programming follows the general guidelines for effective intervention for children who have autism spectrum disorders [9,24]:

Intervention should be started at the earliest possible age.

Intervention must be intensive.

Parent training and support are critical.

Intervention should focus on social and communication domains.

Treatment should be systematic, built upon individualized goals and objectives tailored to the child.

It is very important that effective intervention emphasize generalization.

ABA programming also incorporates all of the factors identified by the US National Research Council [25] as characteristic of effective interventions in educational programs for children who have autism. These factors included:

- Early entry into intervention
- Intensive instructional programming (defined as equivalent to a full school day, 5 or more days a week, 25 hours per week, year-round, 12 months per year)
- Use of planned teaching in frequent brief instructional sessions
- One-to-one or small group instruction to enhance the achievement of individualized goals
- Use of specialized interventions such as discrete trial training and incidental teaching
- Systematic and individualized instruction
- Focus on the development of spontaneous social communication, adaptive skills, appropriate behaviors, play skills, and cognitive and academic skills

Major emphasis also was placed on monitoring progress, generalization of skills, use of skills in generalized settings, and the creation of opportunities to interact with typically developing peers [9,25].

The basics of the behavior analytic treatment of autism

Behavior analytic treatment of children and adolescents who have autism seeks to construct socially and educationally useful repertoires and decrease or reduce problem behaviors through the use of specific, carefully programmed environmental interventions [18]. Various behavior analytic methods are employed to strengthen the child's current skills and build new ones. Multiple, repeated opportunities are created each day for the child to gain new skills and practice mastered ones. Positive reinforcement is used generously to ensure that the child is motivated [26].

Often several steps are chained together to form a behavioral repertoire. Some of the ABA methods used include:

- Positive reinforcement, in which appropriate behavior is followed by a pleasurable event such as praise, a hug, a check mark, a favorite activity
- Shaping, rewarding the child for behavior that approaches the target behavior or goal
- Fading, reducing the child's dependence on the therapist for help
- Providing stimuli (prompting) that cue the child to try a behavior
- Maintenance and generalization strategies to ensure that a recently learned behavior will last and be performed in other environments [26]

To treat inappropriate behaviors, several strategies are employed, including analyzing and altering the antecedents that trigger the behavior, ignoring the behavior, or providing undesired consequences [27]. The overall goal of ABA is to motivate the child to want to be successful.

Typically, teaching trials are repeated many times until mastery is obtained. Accurate records are kept so that progress can be assessed and programmatic changes made. Each child's program is unique to his or her needs and evolves with the child's progress. Teaching is done in several formats. The discrete trial format is characterized by a one-to-one interaction with the trainer/educator; short, clear instructions; careful use of prompting and fading; and immediate reinforcement for correct responding [28]. A less-structured format, incidental teaching, is used to help the child learn behaviors in less structured situations [18,29]. The overall teaching model is to move the individual's instruction systematically from one-to-one with a trainer/educator, to a small group and ultimately to a larger group [30].

ABA programming for children who have autism features the use of scientifically validated methods incorporated into a comprehensive but highly individualized package [31]. A defining feature of ABA programs is that they are applied consistently. This is accomplished: through the use of explicitly written programs for each skill to be taught or maladaptive behavior to be treated and by having the behavior analyst who is responsible for the child's program train everyone who works with the child to implement it. To increase the likelihood of the generalization of the treatment efforts, it is critical for therapists/parents to be trained to implement the programs across situations, settings, and people. Maladaptive behaviors such as aggression and self-injury are not reinforced, whereas specific, appropriate alternative behaviors are either taught or maintained through positive reinforcement [27].

Before treatment, an evaluation is conducted to assess the child's skill and developmental levels. This evaluation assists in the selection of therapeutic goals. The treatment regimen that is developed considers all pertinent domains, including academic, communication, leisure, play and self-care, and social in determining which skills will be taught. The next step is to break down each skill into smaller and more easily taught component skills or steps. As the child progresses, the skills that are taught are increased in complexity. Attention is given to the achievement of developmental milestones. The overall goal is to provide the kind of regimen that will ensure that each child reaches his or her highest potential and level of independence [28,29,31,32].

Critical to the therapeutic process is the direct and frequent measurement of the child's progress. The data from these observations are graphed to portray how each targeted skill and maladaptive behavior has responded to the treatment effort. The behavior analyst responsible for the child's program frequently checks the graphed and recorded data to determine if reasonable progress is occurring and to make any necessary programmatic adjustments

[31]. Ongoing review of the child's responsiveness to the intervention and treatment personnel allows problems to be identified and corrected quickly. Treatment consistency also is assured by having the responsible behavior analyst frequently observe the treatment efforts so that feedback can be provided to the program implementers [28].

Although the principles of ABA will guide programming efforts and activities, each child is seen as unique. High levels of consistency, repeated and consistent presentations of material, individually selected and strategically used motivators, careful use of prompting procedures, and systematic planning for generalization are used to establish and maintain a positive treatment environment. ABA programs strive to organize therapeutic experiences that will lead to enduring positive changes over time and across all settings in such crucial areas as toileting [33], feeding [34], social skills [35], and language [32].

All appropriate ABA interventions are directed by a professional with advanced formal training in behavior analysis. This person should have at least a master's degree and supervised experience in designing and implementing ABA programs for children who have autism and related disorders [11]. These professionals have either met the educational, experiential, and examination performance standards of the Behavior Analyst Certification Board (BACB) and are board-certified behavior analysts [12] or can document that they have equivalent training and experience. They adhere to the BACB's Guidelines for Responsible Conduct [12] and base all treatment decisions on the best available scientific evidence [31].

Applied behavior analysis in educational programs

Quality educational programs for children who have autism rely heavily on ABA principles, because eclecticism is not the best approach [21]. Effective school programs share several characteristics [36]:

- Their interventions are based upon empirical evidence of effectiveness and are highly structured.

- They do functional assessments and behavioral assessments of challenging behaviors, employ specificity in the development of objectives, have operationally defined targets, have criteria for the achievement of instructional objectives, feature the systematic use of instructional prompts, and have objective and ongoing measures of progress.

- They identify specific skills to be taught, do direct teaching of social skills, employ peer tutoring, individualize reinforcement and lesson plans, and develop a tolerance for delay of reinforcement and an actively program for generalization.

- Instructional objectives are determined without reference to disciplines. Services are wrapped around the child.

Parents whose children have success in school display several behaviors [36]. They:

- Do not rely on anecdotal information—they require accountability, make data collection a requirement, and seek frequent measures of success.
- Take their child's individualized education plan home and read it carefully, provide input on program design, relate instructional objectives to the child's home and community needs, have external monitoring of their child's school program, and have a behavior analyst accompany them to the IEP meeting
- Obtain training to allow replication at home and insist that successful relevant home programs be replicated at school
- They are active and spend time at the school.

Applied behavior analysis is the primary method of treating aberrant behavior in children and adolescents with autism

Although aberrant behavior represents a major obstacle to the successful treatment and education of individuals who have autism, ABA offers scientifically validated methods of overcoming it [27,37].

In most cases, aberrant behavior is an acquired behavior or set of behaviors. This means that the child has learned that a desired outcome can be achieved by behaving aberrantly. Typically, this desired outcome is to either gain attention from others or escape or avoid an unpleasant situation or demand [37]. Although aberrant behavior is learned, there can be antecedent or precipitating factors that increase the probability that it will occur. These factors can be environmental, physiologic, or social changes. An example of physiologic factors could include hunger and physical pain caused by illness or allergies. The treatment of aberrant behavior typically involves two initial considerations.

First, an attempt is made to identify the antecedent or precipitating factors, because changing or correcting them may eliminate the behavior. For example, a child who aggresses because of allergies can be given allergy medication, and one who aggresses because of hunger can be given snacks before the times when aggressive attacks typically occur. In school settings, a child's aberrant behavior often is related to the nature of the educational tasks being presented. If the task is too easy, the child may aggress, because doing so typically results in its termination by the teacher. Thus, aggression is reinforced by escape from the task. This problem can be avoided by establishing appropriate criterion levels of performance so that students are moved to the next step or program once they have demonstrated mastery. The same scenario can occur if the task is too difficult or if insufficient positive reinforcement is available for performing it. In the former case, a simpler task must be substituted or the task analyzed and broken down into more easily mastered steps, whereas sufficient positive reinforcement and

other training procedures will solve the latter problem [27,38]. Second, a formal functional analysis or in-depth set of clinical observations [39] is conducted to determine the function or outcome of the aberrant behavior. At that point, a treatment program can be developed to help the child achieve the same outcome through more appropriate methods and alter the function and consequences of the aberrant behavior.

Several intervention strategies can be used to treat aberrant behavior, including withholding or withdrawing attention when aggression occurs, reinforcing appropriate behavior, teaching the child an appropriate way to communicate the desire to end or not participate in an activity, or not allowing the child's aberrant behavior to terminate or avoid the activity if it is critical to academic or life skills training [40].

The design of a successful treatment program to treat aberrant behavior

The overall successful treatment of aberrant behavior by ABA requires a consideration of the following strategies and factors.

First, a hypothesis-driven treatment model [37] is used, whereby interventions are designed after a formal functional analysis identifies the variables that control the behavior [41]. Because aberrant behavior is sometimes under multiple motivational and setting event controls and hence cannot be definitely linked to specific consequences, an in-depth analysis of antecedent and setting events is conducted to determine whether the occurrence or nonoccurrence of the behavior is correlated with environmental events that repeated themselves predictably with specific people or activities or across times of the day or days of the week.

Second, arrangements are made to ensure that the stimuli that can, at times, control appropriate behavior are present before, during, and after the aberrant behavior is treated. In order to determine what procedures, skills, and activities to implement when children are not misbehaving, all of their significant others can be surveyed for suggestions. Another tactic is to enhance the child's preexisting skills so that they can be displayed more frequently and with more variety.

Third, a skill-building strategy is employed wherein new behaviors are taught to serve the same function as the aberrant behavior. Behaviors are emphasized that access the same reinforcers, especially communicative ones. Requesting behaviors are taught that are functionally equivalent to the aberrant behavior but more effective in generating reinforcement. In effect, requesting behavior must be less effortful than aberrant behavior. For example, treatment personnel must respond consistently and rapidly to requests and be knowledgeable about the child's communication system.

Fourth, situations such as frustration, boredom, and protracted periods of inactivity are eliminated, because they are known to occasion aberrant behavior. This can be accomplished by varying tasks and activities, encouraging choice making, and increasing children's and adolescents' activity levels. In

this way, problematic behaviors that produce attention or gain task or situation escape or avoidance will become unnecessary and thereby nonfunctional.

Fifth, the least restrictive treatment model is followed, wherein the least intrusive but effective procedure for a specific inappropriate behavior is selected based on a review of treatment literature [27]. Careful consideration is given to the intensity, severity, frequency, and topography (form) of the aberrant behavior.

Sixth, aberrant behavior is not allowed to produce escape from educational activities. The child is required to remain in the teaching situation and complete one or more requested tasks before ending the activity. This will prevent reinforcing escape-motivated problem behaviors and, instead, will provide escape for task completion.

Seventh, the complexity of social reinforcement and tasks are increased as the child's behavior becomes increasingly more appropriate [38,42]. Over time, the density of naturally occurring positive reinforcement will increase correspondingly as the child's behavior becomes more appropriate. The complexity and relevance of tasks also are increased.

Eighth, choice-making [40] and problem solving [43] are emphasized.

Ninth, treatment staff members are selected who are functional for the child, because they are associated with positive reinforcement. In other words, staff members are selected who are familiar and liked by the treated child, because a mutual affection exists.

Tenth, the participation of the child's significant others, typically parents, in every treatment decision is expected and encouraged. Parents and family are excellent and valuable sources of information, because they know the child's learning history, reinforcer preferences, communications skills, and history of inappropriate behavior.

Maintaining treatment effects

It is equally important to plan for the maintenance and long-term assessment of treatment effects. Maintenance refers to treatment effects or improvements that remain stable even after the intervention is removed [44]. Rarely are the effects of a treatment maintained in the absence of programming. As a result, careful planning is required to ensure that clinical effects will endure. Successful strategies for achieving maintenance effects are included, such as:

- Actively programming for maintenance [45]
- Ensuring similarity between the treatment and maintenance programs [46]
- Ensuring that there is change agent and system accountability [37]
- Following a functional approach by strengthening alternatives to the undesirable behavior and using naturally occurring positive reinforcers [47]
- Ensuring that the program has social validity by being beneficial to the child and society [48]

Wherever possible, treatment should approximate the child's natural environment, because it permits potential maintenance-inferring problems to be identified and corrected and maintenance enhancing factors to be maximized. Some behavioral methods that approximate the natural environment and can be used to maintain therapeutic gains include:

- Intermittent reinforcement
- Reinforcement delay
- Shifting to natural consequences
- Fading therapist control
- Teaching self-control
- Developing peer or sibling support
- Fading in situations and conditions that previously provoked the behavior before treatment [47]

All of these methods can fail, however, if treatment decisions are based on factors other than clinical progress, not individualized, or when sound ABA methods are stretched to the point where they cannot work effectively [47]. For example, fading therapist control cannot be made on the basis of expediency (eg, financial considerations rather than the child's progress).

The need for long-term follow-up assessment is particularly critical when treating aggressive behavior. Follow-up assessments should include repeated observations conducted over an extended period rather than a single behavioral sample. The contingencies in effect throughout the maintenance phase should be specified so that factors likely to have contributed to any durable effects can be identified [49].

Finally, generalization and maintenance of treatment gains are assessed independently, because they are separable and measurable. Doing so will prevent confounding generalization records with maintenance records. Maintenance and generalization differ in that maintenance refers to continued positive outcomes after the intervention ceases, whereas generalization refers to positive treatment effects being apparent even in the settings, situations, and behaviors not involved in the treatment. Addressing generalization and maintenance also facilitates inclusion, because it allows the determination of what are the existing functional and acceptable behaviors in the individual's social environment.

Behavior analysis has played a vital role in revolutionizing treatment and education in autism by freeing individuals from many behavioral, educational, and adaptive barriers that had kept them dependent and devalued. New research findings are being incorporated to enhance ABA [50]. It is important to distinguish between ABA and positive behavior support, because some individuals regard them as the same approach when in fact they are separate entities. They differ in the depth and breadth of their scientific base and their political correctness [51].

In closing, two conclusions reached by Metz and colleagues [9] in their discussion of fads and autism seem particularly relevant. One, few other

medical or neurodevelopmental conditions have been as fraught with fad, controversial, unsupported, disproven, and unvalidated treatments as autism. Two, the only interventions that have been shown to produce comprehensive, lasting results in autism have been those based on the principles of ABA.

References

- [1] Foxx RM. The critical importance of science based treatments for autism. Progress and challenges in the behavioral treatment of autism. Association for Behavior Analysis International Conference Proceedings February 2007;1:15–20.
- [2] Lovaas OI, Koegel RL, Simmons JQ, et al. Some generalization and follow-up measures on autistic children in behavior therapy. *J Appl Behav Anal* 1973;6:131–65.
- [3] Martin G, Pear JB. Behavior modification: what it is and how to do it. 8th edition. Upper Saddle River (NJ): Prentice Hall; 2007.
- [4] Baer DM, Wolf MM, Risley TR. Some current dimensions of applied behavior analysis. *J Appl Behav Anal* 1968;1:91–7.
- [5] Ferster CB. Positive reinforcement and behavioral deficits of autistic children. *Child Dev* 1961;32:437–56.
- [6] DeMyer MK, Hingtgen JN, Jackson RK. Infantile autism reviewed: a decade of research. *Schizophr Bull* 1981;7:388–451.
- [7] New York State Department of Health Early Intervention Program. Clinical practice guidelines; autism/pervasive developmental disorders, assessment, and intervention for young children (age 0–3 years). Albany (NY); 1999.
- [8] US Surgeon General's Report on Mental Health—Autism Section 1999.
- [9] Metz B, Mulick JA, Butter EM. Autism: a late 20th century fad magnet. In: Jacobson JW, Foxx RM, Mulick JA, editors. *Controversial therapies for developmental disabilities: fads, fashion, and science in professional practice*. Mahwah (NJ): Lawrence Erlbaum; 2005. p. 237–64.
- [10] Newsom C, Hovanitz CA. The nature and value of empirically validated interventions. In: Jacobson JW, Foxx RM, Mulick JA, editors. *Controversial therapies for developmental disabilities: fads, fashion, and science in professional practice*. Mahwah (NJ): Lawrence Erlbaum; 2005. p. 31–44.
- [11] Autism Special Interest Group. Association for Behavior Analysis—International. Available at: www.abainternational.org. Accessed August 1, 2008.
- [12] Behavior Analyst Certification Board. Available at: www.BACB.com. Accessed August 1, 2008.
- [13] Lovass OI. Behavioral treatment and normal educational and intellectual functioning in young autistic children. *J Consult Clin Psychol* 1987;55:3–9.
- [14] Jacobson JW, Mulick JA, Green G. Cost-benefit estimates for early intensive behavioral intervention for young children with autism—general model and single state case. *Behav Interv* 1998;13:201–26.
- [15] McEachin JJ, Smith TH, Lovass OI. Long-term outcome for children with autism who received early intensive behavioral treatment. *Am J Ment Retard* 1993;97(40):359–72.
- [16] Perry R, Cohen I, DeCarlo R. Case study: deterioration, autism, and recovery in two siblings. *J Am Acad Child Adolesc Psychiatry* 1995;34:232–7.
- [17] Sallows GO, Graupner TD. Intensive behavioral treatment of children with autism: four-year outcome and predictors. *Am J Ment Retard* 2005;110(6):417–38.
- [18] Green G. Early behavioral intervention for autism: what does research tell us? In: Maurice C, Green G, Luce SC, editors. *Behavioral intervention for young children with autism: a manual for parents and professionals*. Austin (TX): Pro-Ed; 1996. p. 29–44.

- [19] Smith T. Are other treatments effective? In: Maurice C, Green G, Luce SC, editors. Behavioral intervention for young children with autism: a manual for parents and professionals. Austin (TX): Pro-Ed; 1996. p. 45–62.
- [20] Smith T. The appeal of unvalidated treatments. In: Jacobson J, Foxx RM, Mulick JA, editors. Controversial therapies for developmental disabilities: fads, fashion, and science in professional practice. Mahwah (NJ): Lawrence Erlbaum; 2005. p. 45–60.
- [21] Heward WL, Silvestri SM. The neutralization of special education. In: Jacobson JW, Foxx RM, Mulick JA, editors. Controversial therapies for developmental disabilities: fads, fashion, and science in professional practice. Mahwah (NJ): Lawrence Erlbaum; 2005. p. 193–214.
- [22] Heward WL. Ten faulty notions about teaching and learning that hinder the effectiveness of special education. *J Spec Educ* 2003;36(4):186–205.
- [23] Eikeseth S, Smith T, Jahr E, et al. Intensive behavioral treatment at school for 4-7 year-old children with autism: a 1-year comparison-controlled study. *Behav Modif* 2002;26: 49–68.
- [24] Kabout S, Masi W, Segal M. Advances in the diagnosis and treatment of autistic spectrum disorders. *Prof Psychol Res Pr* 2003;34:26–33.
- [25] National Research Council. Education children with autism. Committee on educational interventions for children with autism. In: Lord C, McGee JP, editors. Washington, DC: National Academy Press; 2001.
- [26] Foxx RM. Increasing the behaviors of persons with severe retardation and autism. Champaign (IL): Research Press; 1982.
- [27] Foxx RM. Decreasing the behaviors of persons with severe retardation and autism. Champaign (IL): Research Press; 1982.
- [28] Maurice C, Green G, Luce SC. Behavioral intervention for young children with autism: a manual for parents and professionals. Austin (TX): Pro-Ed; 1996.
- [29] Maurice C, Green G, Foxx RM. Making a difference: behavioral intervention for autism. Austin (TX): Pro-Ed; 2001.
- [30] Schreibman L. Autism. Newbury Park (CA): Sage; 1988.
- [31] Green G. Applied behavior analysis for autism. Available at: www.behavior.org. Accessed August 1, 2008.
- [32] Lovaas OI. Teaching developmentally disabled children: the me book. Austin (TX): Pro-Ed; 1981.
- [33] Foxx RM, Azrin NH. Toilet training persons with developmental disabilities: a rapid program for day and nighttime independent toileting. Champaign (IL): Research Press; 1973.
- [34] Williams KE, Foxx RM. Interventions for treating the eating problems of children with autism spectrum disorders and developmental disabilities. Austin (TX): Pro-Ed; 2007.
- [35] Taylor BA. Teaching peer social skills to children with autism. In: Maurice C, Green G, Foxx RM, editors. Making a difference: behavioral intervention for autism. Austin (TX): Pro-Ed; 2001. p. 83–96.
- [36] Anderson SR. Clinical Practice Guidelines: Methodology, Findings, and Implications. Presented at the Association for Science in Autism Treatment Conference. New York City; March 9, 2000.
- [37] Foxx RM. Twenty years of applied behavior analysis in treating the most severe problem behavior: lessons learned. *Behav Anal* 1996;19(2):225–35.
- [38] Foxx RM. The Jack Tizzard memorial lecture: decreasing behaviours: clinical, ethical, legal, and environmental issues. *Australia and New Zealand Journal of Developmental Disabilities* 1985;10:189–99.
- [39] National Institutes of Health. Treatment of destructive behaviors in persons with developmental disabilities. Washington, DC: NIH Consensus Developmental Conference. US Department of Health and Human Services; 1991.

- [40] Foxx RM. Thirty years of applied behavior analysis in treating problem behavior. In: Maurice C, Green G, Foxx RM, editors. *Making a difference: behavioral intervention for autism*. Austin (TX): Pro-Ed; 2001. p. 183–94.
- [41] Romanczyk RG. Behavior analysis and assessment: the cornerstone to effectiveness. In: Maurice C, Green G, Luce SC, editors. *Behavioral intervention for young children with autism: a manual for parents and professionals*. Austin (TX): Pro-Ed; 1996. p. 195–217.
- [42] Foxx RM. Social skills training: the current status of the field. *Australia and New Zealand Journal of Developmental Disabilities* 1985;10:237–43.
- [43] Foxx RM, Bittle RG. *Thinking it through: teaching a problem solving strategy for community living*. Champaign (IL): Research Press; 1989.
- [44] Foxx RM. Long term maintenance of language and social skills. *Behav Interv* 1999;14(3): 135–46.
- [45] Stokes TF, Osnes PG. Programming the generalization of children's social behavior. In: Strain PS, Guralnick MJ, Walker H, editors. *Children's social behavior: development, assessment, and modification*. Orlando (FL): Academic Press; 1986. p. 407–40.
- [46] Foxx RM, Livesay J. Maintenance of response suppression following overcorrection: a ten-year retrospective examination of eight cases. *Analysis and Intervention in Developmental Disabilities* 1984;4:65–79.
- [47] Konarski EA Jr, Favell JE, Favell JE. *Manual for the assessment and treatment of behavior disorders of people with mental retardation*. Morganton (NC): Western Carolina Center Foundation; 1992.
- [48] Wolf MM. Social validity: the case for subjective measurement, or how applied behavior analysis is finding its heart. *J Appl Behav Anal* 1978;11:203–14.
- [49] Linscheid TR, Iwata BA, Foxx RM. Behavioral assessment. In: Jacobson JW, Mulick JA, editors. *Manual of diagnosis and professional practice in mental retardation*. Washington, DC: American Psychological Association; 1996. p. 191–8.
- [50] Johnston JM, Foxx RM, Jacobson JW, et al. Positive behavior support and applied behavior analysis. *Behav Anal* 2006;29:51–74.
- [51] Mulick JA, Butter EM. Positive behavior support: a paternalistic utopian delusion. In: Jacobson JW, Foxx RM, Mulick JA, editors. *Controversial therapies for developmental disabilities: fads, fashion, and science in professional practice*. Mahwah (NJ): Lawrence Erlbaum; 2005. p. 385–404.