

A Program Description of a Community-Based Intensive Behavioral Intervention Program for Individuals with Autism Spectrum Disorders

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Abstract

Autism Spectrum Disorders (ASD) impact all areas of a person's life resulting in deficits in language, social behavior, and intellectual abilities as well as the development of repetitive behaviors that can greatly restrict access to the community and quality of life. Intensive behavioral intervention (IBI) has repeatedly been shown to be effective in improving functional skills and intellectual scores as well as minimizing problem behaviors in individuals diagnosed with ASD. In previous studies, some children who received intensive behavioral intervention became indistinguishable from their peers and were served in typical educational environments with no supplemental supports. However, the majority of the published studies on this intervention describe university-affiliated grant funded programs. This program description provides details about a private community-based agency that provides IBI for children and adolescents with ASD. Information about staff training, the therapies implemented, the population served, and instructional and programmatic content is offered and a preliminary analysis is provided of the outcomes achieved for a subsample of the clients served (i.e., 64 of 181). These findings suggest that increases in functional skills and intellectual scores were achieved for all clients and that many clients met criteria similar to those established in prior landmark studies.

Keywords: applied behavior analysis, autism, behavioral intervention, discrete trial teaching, outcome, program description

Autism spectrum disorder (ASD), the term which is increasingly used to refer to severe disturbances of childhood that come under the umbrella of Pervasive Developmental Disorder (American Psychiatric Association, 2000), is characterized by impaired language, play, cognitive, social and adaptive functioning. Although the diagnostic criteria have evolved over time and the terminology has varied (e.g. autistic disorder), the prognosis has consistently been one of children falling farther and farther behind their peers, ultimately

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having a severe impact on overall adjustment and quality of life as adults (Lockyer & Rutter, 1970; Ballaban-Gill, Rapin, Tuchman, & Shinnar, 1996; Howlin, Mawhood, & Rutter, 2000). Intensive Behavioral intervention (IBI), a treatment approach that is based on the principles of applied behavior analysis (ABA), has the strongest body of empirical support demonstrating efficacy for improving the functioning of children diagnosed with ASD (Leaf, McEachin, & Taubman 2008; New York State Department of Health, 1999; Simpson, 2005).

One of the first major reports detailing the outcomes of children diagnosed with autism who received IBI was the UCLA Young Autism Project (Lovaas, 1987). Lovaas (1987) compared 19 children diagnosed with autism who received IBI treatment to 19 children who received less intensive behavioral treatment combined with other treatment approaches. The 19 participants who were quasi-randomly assigned to the treatment group received an average of 40 hrs of IBI per week for two years or longer using exclusively IBI treatment. The treatment emphasized the use of positive reinforcement, but occasionally punishment procedures were also implemented. The 19 participants who were quasi-randomly assigned to the control condition received an average of 10 hrs of behavioral treatment per week. Those 10 hrs per week did not include the use of punishment procedures and various other non-behavioral therapies were also implemented (e.g., occupational therapy, speech therapy, traditional special education).

Lovaas (1987) categorized the resulting observed outcomes as either "best outcome", "fair outcome" or "poor outcome". In "best outcome" children ultimately scored within the normal range on standardized intelligence tests, were placed in general education classes without supports, and no longer exhibited symptoms of ASD. Those who showed "fair outcome" had Intelligence Quotient (IQ) scores in the moderate to mild range of mental retardation and were placed in special education classrooms other than those for students with autism. Those in the "poor outcome" group had IQ scores in the profound to severe range, were placed in classrooms for students with autism, and continued to display strong characteristics of autism. Results of the study demonstrated that 9 of the 19 children (47%) receiving IBI (i.e., those in the treatment group) were classified as best outcome and eight (42%) were classified as fair outcome while only two (10%) were classified as poor outcome. In the control group, no children were classified as best outcome while eight children (42%) were classified as fair outcome, and 11 (57%) children were classified as poor outcome. Thus, children who were assigned to the treatment group improved significantly compared to those assigned to the control group.

In 1993, McEachin, Smith and Lovaas conducted a long-term follow up of the Lovaas (1987) study and found that the nine best outcome children in the treatment group maintained their functioning levels an average of six years following completion of treatment. In addition, children in the treatment group scored an average of 30 points higher on IQ tests than children in the control group. Finally, results indicated that eight of the nine children who reached best outcome in the 1987 study remained absent of ASD symptoms.

Multiple replication studies (Cohen, Amerine-Dickens, & Smith, 2006; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Sallows & Graupner, 2005) and partial replication studies (Harris & Handleman, 2000; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Smith, Groen, & Wynn, 2000) have shown the efficacy of IBI for the treatment of children with ASD. Reviews conducted to determine the most effective intervention have also reached similar conclusions that IBI is the most effective intervention for children with ASD (Eldevik et al., 2009; Freeman, 2008).

Despite the empirical support for behavioral intervention, there have been numerous criticisms of the UCLA Young Autism Project as well as skepticism about the effectiveness of IBI (e.g., Gresham & MacMillan, 1998; Howlin, Magiati, Charman, & MacLean, 2009; Mundy, 1993; Schopler, Short, & Mesibov, 1989). Most of these criticisms have already been addressed thoroughly in the literature (e.g., Baer, 1993; Eikeseth, 2001; Smith & Lovaas, 1997; Reichow & Wolery, 2009). However, one of the persisting criticisms has been that intervention is extremely costly and not practical and therefore cannot or should not be provided in community settings (Sheinkopf & Siegel, 1998; Msall, 2009). Despite the efficacy of early intensive behavioral intervention implemented in research settings with substantial resources, limited data exists on the effectiveness of IBI intervention programs that are not affiliated with universities and that are not receiving federal grants. Reports such as those by Bibby, Eikeseth, Martin, Mudford, & Reeves (2002), and Magiatti, Charman, & Howlin (2007) have shown less impressive results with community-based efforts that followed different protocols for the training and oversight of program staff than those implemented in university-based clinics. Additionally there has been very little effort directed at describing a model for widespread implementation of IBI at the community-agency level. Given that community-based centers serving individuals with ASD are so prevalent today it is important that researchers describe and evaluate the effectiveness of such agencies.

The purpose of this report is to provide a program description of a non-university affiliated, non-grant supported, community-based

program offering IBI for children and adolescents with ASD. In doing so, this report will provide detailed information on the critical components of intervention and a preliminary analysis of the clients served by such a community-based program. This paper will also examine the effectiveness of IBI intervention provided outside of research settings for children diagnosed with ASD by evaluating pre to post changes in standardized measures that were available for a subset of the clients served in a community-based program.

Method

Program Description

Autism Partnership is a community-based agency that provides IBI to children and adolescents diagnosed with Autism Spectrum Disorders (ASD) using a model that was described as contemporary behavioral therapy by Prizant & Wetherby (1997). Being community-based, it is necessary for such an agency to acquire funding on a case-by-case basis through schools, government agencies, or private entities. Therefore, such an organization is required to comply with the regulations of the varying funding agencies. Often the number of hours, treatment settings and duration of intervention are dictated by these funding sources. Additionally, treatment decisions must be made in concert with the funding agencies, making it difficult to follow a priori research protocols. Documenting pre-treatment status can also be difficult since there is no provision for funding many of the assessments that would be desirable for a research investigation and available records vary across referral sources. Providing services in multiple countries, Autism Partnership must follow local and national standards in regards to a host of labor and governmental policies. Additionally, being a community-based agency requires employing treatment methods that are acceptable to the general public. In aggregation such factors can mean that treatment procedures, service delivery, and analysis of effects can be dramatically impacted in community-based service delivery settings, as compared to university or other research-intensive settings.

The treatment approach utilized by Autism Partnership has been described in a curriculum book (Leaf & McEachin, 1999), in empirical studies (e.g., Leaf et al., 2009; Soluaga et al., 2008; Taubman et al., 2001) and at national conferences (e.g., Papovich et al., 2005). Several of the authors of this article, who are the co-directors of Autism Partnership, as well as many of the lead staff of the agency, received their early training in autism under Dr. Ivar Lovaas at UCLA. Many served as students of Dr. Lovaas and as clinic directors, co-principal investigators on government research grants, and co-directors of treatment

and research projects at the UCLA Young Autism Project. The model utilized at Autism Partnership therefore represents a continuation, evolution, and updated implementation of the UCLA Young Autism Project model. Advancements in the field of ABA, further research in autism treatment, and accumulated service experience account for the variations between the contemporary model employed by Autism Partnership and the earlier version employed at UCLA and examined in the Lovaas (1987) study.

The UCLA Young Autism Project spanned two decades of continual adaptations, modifications, and evolutions to the treatment package. For example, the earlier versions of the UCLA Young Autism Project utilized strong punishment procedures while such strategies were abandoned toward the end of the project. Other evolutions to the original UCLA model included an increased focus on developing parental expertise, increased provision of intervention in schools, and more advanced language programming. These evolutions to the model were continued at Autism Partnership since its inception in 1994 and new evolutions have occurred in intervention strategies, curriculum, and philosophy. For example, the Autism Partnership program places a stronger emphasis on the use of proactive strategies to address behavior problems (e.g., teaching functional replacement behaviors) rather than relying upon reductive strategies (e.g., extinction or response cost). In the earlier UCLA Young Autism Project, the importance of observational learning was recognized; however, that skill was not explicitly targeted until later in the curriculum. The current Autism Partnership program focuses on observational learning earlier in intervention and with a greatly expanded curriculum in this area. Increased emphasis has been placed on using discrete trial teaching (DTT) in a group format and the procedures used in one-to-one format have been adapted and enhanced to facilitate effective group learning (Taubman et al., 2001). Finally, the preponderance of programming centered on language development in the early UCLA model, while the current Autism Partnership model places a greater emphasis on learning-how-to-learn, along with social, play, self-help, and daily living skills, while continuing to target language development.

In general, the core elements of the approach utilized by Autism Partnership include DTT (Lovaas, 1987), use of functional assessment (Iwata et al., 1994; Parker, Kennedy, & Waks, 2008), development of behavior plans which include reactive, proactive, and motivational (including token economies) elements (Ayllon & Azrin, 1968), the Teaching Interaction procedure (Leaf et al., 2009), use of flexible prompt fading procedures (Soluaga et al., 2008), use of task-analysis

and chaining (Cuvo, Leaf, & Borakove, 1978), extensive shaping (Koegel, O'Dell, & Dunlap, 1988), and incorporation of respondent-based procedures such as systematic desensitization (Koegel, Openden, & Koegel, 2004; Jackson, & King, 2004). While the curriculum is structured and there is general uniformity in the approach across sites, the application of the model is individualized to the learner and the procedures are implemented flexibly and in a child-friendly manner, based on the ever changing needs and evolving skills of the children treated. The curriculum taught is individually applied with an emphasis on functionality, meaningfulness, generality, and promotion of independence.

The treatment examined in this report was conducted at Autism Partnership's home office in Seal Beach, California (serving clients across Southern California) as well as in the agency's offices in Hong Kong; Leeds, United Kingdom; and Melbourne, Australia. Each office provides direct in-home, school, and clinic-based interventional services to children who typically reside within a one hour to two hour ride from the site. Although consultation services are provided by lead staff at each office to children and agencies (such as schools and school districts) located at a greater distance, information contained within this paper pertains only to children who received direct intervention services or supervision, rather than consultation, from the various sites. Although the offices are in four different locations, the structure, philosophy, and treatment are identical. To ensure consistency, the senior clinical staff in the foreign offices completed internship training and make periodic training update visits at the Seal Beach office. Additionally, supervision and on-going training is provided frequently by the U.S. based senior clinicians at the foreign offices.

The primary differences between the offices are the funding sources. Whereas funding in Seal Beach and the United Kingdom are provided mainly through public sources (i.e., school districts and government agencies), in Hong Kong and Australia parents directly pay for intervention. Because public funding is so limited for direct therapy, most intervention in Australia was provided by therapists directly employed by parents rather than as employees of our clinic program. In the U.K., when funding did not cover all of the hours of therapy needed, families hired tutors who were trained and supervised alongside clinic-employed staff. Another variation between offices is the cultural differences between countries. For example, in Hong Kong many families have nannies that spend significant time with the children. Therefore, treatment includes training and supporting the nannies as well as parents. In general, parents' comfort with being involved

in their child's treatment varied across countries. Parents had often been socialized that it was the professionals' role to treat their child and therefore they were resistant to being an integral part of the treatment team. In some cultures, there was a tendency among parents to resort to punishment procedures rather than proactive teaching and reinforcement-based interventions. Thus treatment included helping parents understand the importance of gaining behavioral expertise. There were also cultural differences in acceptance of the diagnosis, openness about discussing a child's developmental delays, the value placed on attendance at prestigious schools, and comfort level with allowing therapists into the home and into the child's life that presented challenges to intervention.

Staff

Staff training. Staff who provided the intervention in this paper were usually direct employees of Autism Partnership. Staff received rigorous training prior to working with any client and throughout their course of employment regardless of the employer. Staff members were recruited by postings in newspapers and on the internet, and referrals from parents, staff and professionals. Staff members were expected to hold a Bachelor degree in the field of psychology, education, applied behavior analysis, or a related field. In some cases the individual was nearing completion of the degree. Staff members were selected based on their demonstrated ability to interact with clients, willingness to work as part of a team, responsiveness to feedback, and long-term commitment to work with clients with ASD.

Pre-service training lasted an average of eight weeks, with the actual length of time dependent upon completion of all training modules. The training included both didactic and experiential components as well as independent study and covered the core features of DTT and IBI (e.g., instructions, reinforcement, or prompting) and the core features of ASD (e.g., limited language, stereotypic behaviors, and lack of social reciprocity). Before being assigned to clients, staff members were required to complete eight modules: foundation skills, behavior observation and reinforcement, instructions and prompting, data collection, behavior management and shaping, curriculum development, teaching, and overall considerations relevant to treatment provision. In the few cases where staff were recruited and employed directly by parents, the candidates practiced the modules directly with the child they were hired to serve. During instruction in each of these modules, staff members typically observed models displaying target skills (e.g., reinforcement, prompting, or discrimination training, etc.), role-played those skills with supervisory staff and then demonstrated

the skills with a client in front of that supervisor. Trainees received ongoing feedback and were evaluated using a three-point Likert scale (i.e., not present, emerging, or competent). In order for the trainees to move from one module to the next they needed to receive scores of 'competent' on every item in that module. Once staff members completed all the modules they received a final formal evaluation (please see Leaf & McEachin, 1999, Appendix E) that was performance based and covered the elements of discrete trial teaching.

Staff members received ongoing supervision and training throughout their work at Autism Partnership. Typically, staff members interacted on at least a weekly basis with supervisors who gave them feedback on their performance and worked with them on any areas of deficit. In addition, each month all staff members attended a monthly meeting, which consisted of a half-day didactic workshop on a specific topic (e.g., group instruction, data analysis, dealing with resistance) followed by a half day of hands-on training working directly with children. Finally, staff members received ongoing formal evaluations on a yearly basis.

Staff roles. Each of the clients included in the current data set (described below) had a treatment team that consisted of (a) two to five behavior interventionists, (b) a program supervisor, (c) a program mentor, and (d) a psychologist. The behavior interventionists were responsible for the implementation of the IBI in the home and school environment. Program supervisors were in charge of training and overseeing the work of behavior interventionists, curriculum selection, functional assessment and behavior plans, updating and analyzing data, running team meetings, interacting with parents, and attending IEP meetings. These supervisors had a minimum of two years experience with the majority having five or more years of experience and demonstrated outstanding performance as a behavior interventionist along with strong potential for leadership and clinical professionalism. Mentors, who had at least five years of experience, with the majority having more than 10 years of experience, oversaw the program supervisors, ensuring their continued professional development and that the best programs were being implemented on individual cases. Finally, each case was assigned a psychologist who had over 20 years of experience in the field of ABA and ASD. The psychologist was ultimately in charge of the entire program, had direct contact with every staff member on the team, met with parents to address issues and concerns, and also dealt with clinical, legal, and school related issues. Across the four sites there were a total of 114 staff who provided services to the children in this analysis encompassing 59 behavior interventionists, 28 supervisors, 19 mentors, and 8 psychologists.

Intake and Assessment

Referrals for service for the children in this study typically came from local diagnosticians, school districts, or self-referral. Once referred, potential clients received detailed information regarding philosophy, services and requirements, and were placed on a waiting list until an opening occurred. Average wait-time ranged from two to six months. Once a client was accepted he or she came into the office for the initial intake and assessment, which consisted of multiple components. Interviews with parents included collecting developmental, medical, and treatment histories. Clients were observed in a number of conditions, including free play, interactions with parents, interactions with staff, and probing of skills. Parents provided copies of any assessments and IQ tests that were previously administered. In some cases where the child was not previously tested, Autism Partnership staff conducted testing when it was possible to schedule without undue delay. Children for whom assessment information could not be obtained in a timely manner still received services. In some cases parents reported that testing had occurred but it was later determined that the data were incomplete. After the intake and initial assessment process, clients were assigned a treatment team. Data-based assessment was ongoing throughout treatment on behavioral and skill acquisition targets and informal assessment, such as teacher reports, occurred periodically.

Clients and Setting

This analysis encompassed all clients diagnosed with ASD who commenced IBI over a 10-year period from 1996 through 2005 across the four Autism Partnership clinics, who were younger than eight years of age. IBI was defined as an average of at least 10 hours per week of direct intervention for least 12 months duration. For the 181 young IBI clients served during these 10 years we collected demographic information, intake data, and follow-up assessment data. Due to the intervention-oriented nature of the program, not all clients had available research-quality measures that covered both pre- and post-treatment status. The criteria for including clients in this preliminary analysis of outcomes were: (1) the client had a record that included some form of IQ testing prior to starting services from this agency; (2) the client had an IQ test following intervention (either from an outside agency or from staff within our agency); and (3) there was clear information on the post-treatment school placement. These criteria yielded a sample of 64 clients across four offices who met the criteria for use in this preliminary analysis. Thirty-three of these clients received services from the office in the United States, 19 from the Hong Kong office,

seven from the Australia office, and five from the United Kingdom. One hundred seventeen clients were excluded from this preliminary analysis, 104 due to lack of pre-treatment IQ assessment information and 13 had missing followup IQ scores.

All clients were formally diagnosed with an Autism Spectrum Disorder by a psychologist or other medical specialist who is qualified to make such a diagnosis who was not affiliated with Autism Partnership. Of the 64 clients included in this preliminary analysis 61 received a diagnosis of autistic disorder and 3 received a diagnosis of pervasive developmental disorder-not otherwise specified. Table 1 provides additional general demographic information on clients who were included. Information from each office is reported separately and in aggregation.

Table 1
Demographic Information Across Offices

| Office | Number of Clients | Males | Females | Autistic Disorder | PDD-NOS |
|----------------|-------------------|-------|---------|-------------------|---------|
| United States | 33 | 28 | 5 | 33 | 0 |
| Hong Kong | 19 | 18 | 1 | 16 | 3 |
| Melbourne | 7 | 7 | 0 | 7 | 0 |
| United Kingdom | 5 | 5 | 0 | 5 | 0 |
| Total | 64 | 58 | 6 | 61 | 3 |

Number of Hours of Treatment.

The number of hours of direct intervention that clients received across the four offices averaged 21.7 hrs per week during the first year of treatment, with a range of 10 – 40 hrs. The number of hours that clients received varied based upon staff availability and funding sources as well as assessment of clinical need. Duration of treatment ranged from 12 to 116 months with a median of 34 months, although two clients were still in treatment at the time the analysis was conducted. The two clients who had not completed treatment received 38 and 43 months of intervention respectively as of the time of this analysis and were classified as other outcome. Table 2 provides general treatment information. The number of hours per week of intervention was below the average of 40 hrs reported in the research conducted by Lovaas

Table 2
Treatment Information for All Clients

| Category | Average | Range |
|---|---------|-----------|
| Age at Intake (Months) | 40.9 | 13 to 96 |
| Average Hours per week | 21.7 | 10 to 40 |
| Total Months of Treatment for All Clients | 40.5 | 12 to 116 |
| Total Months of Treatment For Clients who Completed Intervention at Time of the Analysis (n=62) | 40.4 | 12 to 116 |
| Best Outcome Group 1 (n=27) | 38.2 | 12 to 97 |
| Best Outcome Group 1-R (n=18) | 40.8 | 13 to 116 |
| Other Outcome (n=17) | 44.1 | 12 to 82 |
| Total Months of Treatment For Clients Still in Treatment at Time of the Analysis (n=2) | 41.5 | 39 to 44 |
| Age at Outtake for Those Clients who Completed Intervention (Months) | 82 | 37 to 195 |
| Best Outcome Group 1 (n=27) | 79.2 | 37 to 138 |
| Best Outcome Group 1-R (n=18) | 84 | 41 to 195 |
| Other Outcome (n=17) | 84.4 | 38 to 172 |
| Age of Clients who did not complete Intervention at Time of Analysis (Months) | 67.5 | 66 to 69 |

(1987) and McEachin, Lovaas, & Smith (1993). However other replications of Lovaas, such as Eikeseth, Smith, Jahr, & Eldevik (2002) and Howard et al. (2005), have also provided less than 40 hrs per week. Although Lovaas recommended that children receive 40 hrs, some of the children in the UCLA Young Autism Project received as little as 20 hrs, and the two children who were in the “poor outcome” group received far more than the 40 hrs weekly average (Leaf & McEachin, 2008).

Typical Client’s Program.

Overall programming. As mentioned, each of the client’s programs was determined by their individual needs; therefore, no two client’s programs were identical. Despite the differences among each of the clients’ intervention, there remain similarities in the types of programs that were implemented. Clients received programming across eight broad domains: learning-how-to-learn skills (e.g., sitting, waiting giving back reinforcers, learning from feedback, attending to instructions, and instrumental responding); basic language (e.g., matching, receptive labeling, and expressive labeling); advanced

language (e.g., conversation, question-asking, jokes); social skills (e.g., sharing, sportsmanship, empathy); play (e.g., games, sports, and parallel play); reduction of problem behaviors (e.g., self-stimulatory, self-injury, noncompliance, aggression); self-help skills (e.g., toilet training, dressing, feeding); and academic skills (e.g., math, history, and science). For some clients initial programming started in the home or clinic and moved to the school. For other clients programming began after they were already attending school.

School intervention. The clients in this program quickly progressed to attending a learning center for the majority of their week, although the percentage of time in a classroom varied according to age and the client's ability to benefit from group instruction. By the time a client was school age he or she attended full time, according to the local custom (e.g., in some cases Kindergarten was a half day program). Their placement ranged across self-contained special education classrooms, partial inclusion, general education classrooms with aide supports, and general education placement without any supports. Agency staff served as shadows in the classroom for the majority of clients when aides were necessary. Shadows provided support to the classroom teacher, helped ensure that clients met individualized goals, reinforced clients, and trained classroom staff when possible so as to be able to fade their presence.

Illustrative example of programming. Daniel started receiving services from Autism Partnership at two and a half years old. During the first year of intervention, targets for Daniel were learning-how-to-learn skills, mastering basic language concepts (e.g., receptive nouns, verbs, people), imitation, making choices, and play with simple cause and effect toys. Therefore intervention consisted of numerous programs (see Table 3). He received 30 hrs per week of IBI at home and in the community. Despite this programming, Daniel still engaged in high rates of self-stimulatory behaviors and was not generalizing skills learned in the clinic to his home setting. The second year of therapy mainly focused on generalization of skills learned from the clinic to the home and community settings, tolerance of others in his environment, and teaching a variety of new skills (see Table 3). He began preschool during this year and had full time 1:1 support during the 12 hrs per week he was there. In addition he received 20 hrs per week at home. The third year of therapy had a heavy focus on socialization and more advanced comprehension skills (see Table 3). The fourth and fifth year of therapy focused substantially on teaching and developing social skills as well as learning from group instruction (see Table 3). For these two years he was in school full-time and had a 1:1 shadow. Home-based therapy was reduced to 8 hrs per week.

Table 3
Programming for Daniel across 5 years

| First Year | Second Year | Third Year | Fourth Year | Fifth Year |
|---------------------------|------------------------|--|----------------------------------|----------------------------|
| Non Verbal Imitation | I Don't Know | Problem Solving | Non Verbal Communication Skills | Critical Thinking |
| Matching | Pretend | Comprehension Questions | Pragmatics | Seeking Information |
| Receptive Instructions | Gestures | Play Dates | Advanced Emotions | Decreasing Perseverations |
| Receptive Labeling | Commenting | Brainstorming | School Role-Play | Classroom readiness skills |
| Play Imitation | Play Games | Inference | Classroom Readiness Skills | Perspective Taking |
| Expressive Labels | Play Initiation | Family Concepts | Sports and Motor Skills | Conversational skills |
| Communication Temptations | Statement/ Statement | Relationship Identification | General Knowledge of Pop Culture | Subtle Social Skills |
| Two Word Phrases | Pronouns | Small group Work | Stress Management | |
| Social Questions | Describing | Observational Learning | Play | |
| Verbal Imitations | Expanding Language | Sequencing | Cool versus Not Cool | |
| Songs | Conditional Directions | Reasoning | | |
| Colors | Negation | Perspective Taking | | |
| Block Imitation | Same/ Different | Integration into mainstream activities | | |
| Yes/No | Emotions | Before/After | | |
| Functions | Quantitative Concepts | Ritual Breaking | | |

During the sixth year his shadowing was completely faded out and he no longer received any services.

Treatment Fidelity

An important component of behavioral therapy is that practitioners implement the procedures consistently and as specified (procedural reliability). Though this is an important component of behavioral therapy it is often hard to document in a treatment clinic due to several factors that include (a) the numerous trials that are implemented within a session and across sessions, (b) procedural modifications for individual clients, and (c) limited amount of time for supervisors to score procedural integrity along with other treatment delivery priorities. One way that Autism Partnership ensured that the behavioral interventions were implemented correctly was to conduct periodic evaluations of staff members as they provided intervention. Evaluations consisted of videotaping random sessions that were later scored by supervisors. Staff were rated on their ability to implement various behavioral procedures (e.g., instructions, consequences, and prompting) on a five-point likert scale. The likert scale ranged from (1) rarely occurred, (2) partially occurred, (3) usually occurred, (4) finely tuned performance, to (5) exceptional finesse. Finally the supervisor and therapist viewed the videotape and went over the evaluation together.

An analysis on a subset of these evaluations was done to determine to what extent therapists were able to implement the various behavioral procedures correctly. Results of this analysis are the following: providing instructions (mean 3.3; range 2.3 to 4.3), giving appropriate feedback (mean 3.1; range 2.4 to 3.9), appropriate pacing, appropriate setting, and appropriate tasks (mean 3.2; range 2.4 to 4.1). Only prompting received a collective score below 3.0 (mean 2.9; range 2.2 to 3.6) and this could be due to the difficulty in implementing a flexible prompt fading procedure (Solauga et al., 2008). Thus, results indicate that behavioral interventions were implemented correctly.

Analysis of Best Outcome

This preliminary analysis determined how many clients were able to reach best outcome levels following intervention. At the time of this analysis, clients were either placed in Group 1 (best outcome using the Lovaas criteria, described below); Group 1-R (best outcome using a revised criteria, described below); or Group 2 (those clients who did not achieve the best outcome criteria, described below). Measures of outcome were determined by IQ's and school placement following treatment. As stated previously, only those clients for whom IQ information was available prior to and following intervention were

utilized in this report. The information presented here has not been derived with the benefit of experimental design or with control conditions and therefore can only be considered a preliminary analysis of outcomes rather than a true research finding.

Best outcome group similar to Lovaas (Group 1). This grouping uses a definition equivalent to that reported in the Lovaas (1987) study. In the present study, best outcome status required a full scale IQ of at least 85 at followup. Lovaas stipulated only that IQ was in the normal range. Inspection of the data confirms that none of the best outcome children in the Lovaas (1987) study had IQ below 85. The 85 cutoff was also used by Sallows & Graupner (2005) in their replication study. Lovaas (1987) additionally required successful completion of grade level work in a regular education class as of first grade with no supports. In the present study children who became shadow free in a subsequent grade were still counted as best outcome Group 1 as long as they met the other requirements.

Best outcome group with revised definition (Group 1-R). Group 1-R uses a broader definition of best outcome than was utilized in the Lovaas (1987) study and the Sallows and Graupner (2005) study. This group includes clients who have IQs of 85 or higher but were still receiving minimal supports at the time of followup (a similar group was reported in the Lovaas replication study conducted by Cohen et al., 2006). The rationale for the expanded definition of best outcome in Group 1-R had to do with changes in education services, treatment, and culture that have occurred since the time of the Lovaas (1987) study. Today, many clients who ultimately achieve indistinguishable status are more slowly weaned from their special education services. This occurs for a variety of reasons, including consumer peace of mind, educational team recommendations, and desire to ensure success. Additionally, concerns about the stigma of being in special education as well as reduced expectations due to labeling have not been demonstrated to affect adversely outcome in intensive treatment studies. Furthermore, the field is now more keenly aware of the subtleties of the challenges, in addition to academics, which confront children with ASD in general education and regular life settings, including those children in the best outcome group. In the absence of contrary evidence, it was deemed reasonable in some cases for supports to be more slowly weaned and a number of transitional components, including behaviorally oriented counseling, to be utilized. The thinking is similar to that pertaining to extended school year programs (Silva, 2007) and after-care programs for delinquent youth (Wiebush, McNulty, & Le, 2000). The hope is that such extended service would increase the chances of later, more complete independence and greater

and more nuanced competencies in social, learning-how-to-learn, and other relevant areas as well as contribute to greater overall well-being and long term success. In part, this preliminary analysis was undertaken to determine if such speculation had merit.

Group 2. The third group of clients, in this analysis, were clients that were not placed in either of the best outcome groups. These clients did not have an IQ over 85 after intervention, and/or were not placed in a general education classroom independently, and/or required substantial supports. Despite not being placed in either of the best outcome groups, clients in Group 2, the other outcomes group, still generally showed improvements in their IQ, adaptive functioning, and overall quality of life (see below).

Results

Analysis of Programs

An analysis was conducted to determine the prioritization of each of the eight interventional domains listed above, across the two groupings of clients (e.g., best outcome and other outcomes).¹ Supervisors were asked to rank each of these categories from the most important programming (8) to the least important programming (1). This analysis was conducted separately for the first year of intervention, second year of intervention, and third year of intervention and beyond. Results of this analysis can be found on Figure 1.

Results of this analysis show that across both groupings, learning-how-to-learn and reduction of problem behaviors were the most critical programming in the first two years of intervention. In the first two years of intervention for children in the best outcome groups there was also an emphasis placed on basic language programs and play. As the years of therapy progressed the focus switched to more advanced language and social skills. The same pattern was evident for clients who were in the other outcomes group. The difference between the two groupings is that for clients in the other outcomes group, learning-how-to-learn always remained a top priority but for clients in the best outcome groups, after the second year of intervention, that domain was no longer a priority of programming, most likely due to these skills having been mastered.

Demographic Information

Table 4 provides group demographic information for Group 1, Group 1-R, and Group 2. The table describes several different demographic areas across the two groups: (1) the total number of clients in each category; (2) gender of clients; and (3) average age at intake.

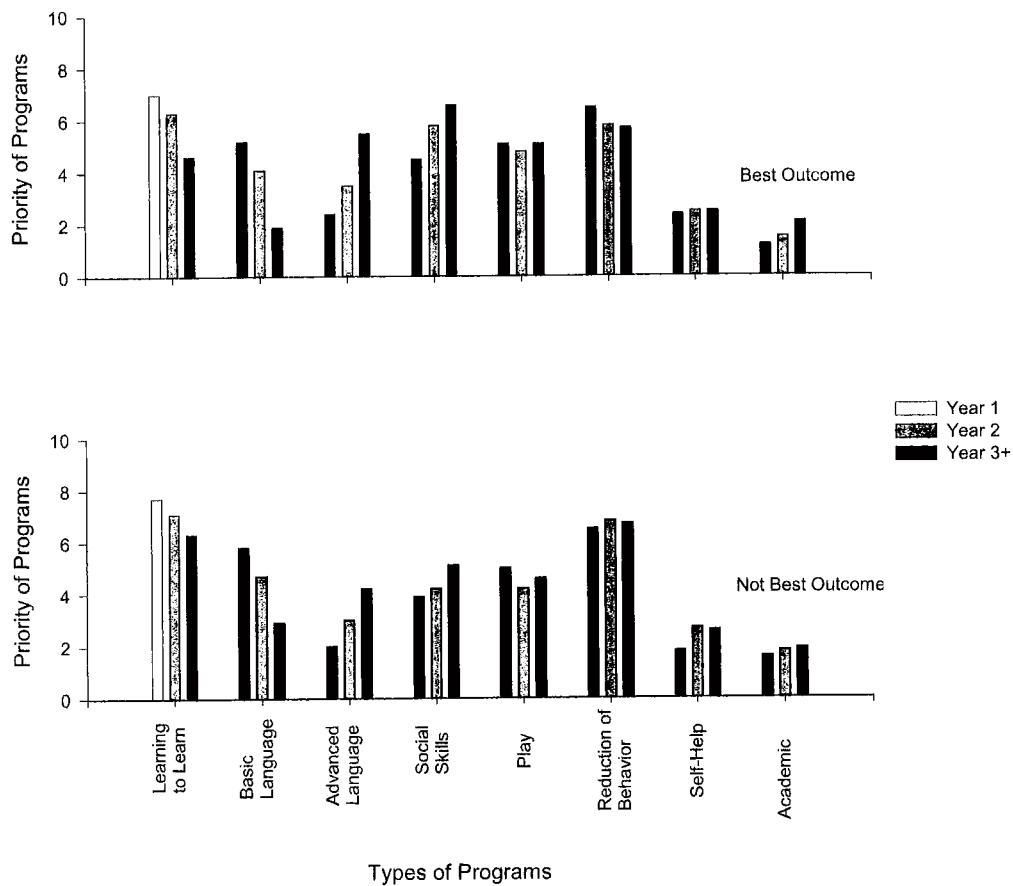


Figure 1. Program Prioritization Across Years

Table 4
Gender and Age at Intake Breakdown across Outcome Groups

| | Best Outcome: Groups 1& 1-R | Group 2 |
|--------------------------------|-----------------------------|-----------|
| Number of Clients | 45 | 19 |
| Number of Males | 40 | 18 |
| Number of Females | 5 | 1 |
| Average Age at Intake (Months) | 42 Months | 37 Months |

Outcome Levels

In total, there were 64 clients analyzed in this study across four offices. Table 5 provides information on the number of clients who were analyzed and the percentage of clients who reached best outcome status in this preliminary analysis. Information from each office is reported separately and in aggregation. Clients who reached best outcome were either placed into Group 1 or into Group 1-R, as the two groups were mutually exclusive. The remainder formed Group 2. Across all offices combined, 25 out of 64 clients (39%) were able to meet the criteria to be included in best outcome Group 1, using the more stringent definition similar to that of the Lovaas (1987) study. Of the 25 best outcome Group 1 clients, 12 required no support in class by the time of first grade. Fifteen still required support until a subsequent grade. In the best outcome Group 1-R 20 clients (31%) were able to meet the revised definition of "best outcome", meaning they still required a minimal level of support. Altogether, 45 out of 64 clients (70.3%) were able to reach one of the best outcome groups.

Table 5
Outcome Data

| Office | Number of Clients | Number and Percentage of Clients in Group 1 | Number and Percentage of Clients in Group 1-R | Number and Percentage of Clients in Group 1 and 1-R |
|----------------|-------------------|---|---|---|
| United States | 33 | 11 (33.3%) | 13 (39.4%) | 24 (72.7%) |
| Hong Kong | 19 | 9 (47.4%) | 4 (21.1%) | 13 (68.4%) |
| Melbourne | 7 | 4 (57.1%) | 1 (14.3%) | 5 (71.4%) |
| United Kingdom | 5 | 1 (20%) | 2 (40%) | 3 (60%) |
| Total | 64 | 25 (39%) | 20 (31.3%) | 45 (70.3%) |

The 64 clients in this analysis had a mean intake IQ of 77.3. At follow-up their mean IQ was 99.8. The increase of 22.5 points represents a significant change ($F_{(1,63)}=93.56, p<.001$) according to a one way ANOVA. The IQ change for each of the three outcome groups was individually significant, with best outcome group 1 obtaining a

24.7 point IQ change ($F_{(1,61)}=44.17, p<.001$), best outcome group 1-R a change of 24.4 points ($F_{(1,61)}=25.62, p<.001$), and Group 2 a change of 17.6 points ($F_{(1,61)}=26.15, p<.001$). A comparison of the relationship between intake IQ score and outcome status was assessed using a point-biserial correlation, results show that intake IQ is strongly correlated with outcomes ($r=.4416, p<.001$). Age at intake was not significantly related to outcome status but there was a trend among older clients to have a higher intake IQ. The older clients aged 42-96 months ($n=19$) had a mean IQ at intake of 84.2 vs. a mean IQ at intake of 74.4 for the clients under 42 months ($n=45$), however the difference was not statistically significant ($F_{(1,63)}=3.01, p=.0876$) according to a two way ANOVA. The country where services occurred was not related to outcome ($F_{(3,60)}=0.12, p=.9476$) according to a two way ANOVA. The Vineland Adaptive Behavior Scale (VL-ABS) provides an indication of overall adaptive skills functioning and the 57 clients who had a score that was obtained prior to treatment had a mean score of 73. Fifty-six clients had a VL-ABS score at both intake and follow-up and they demonstrated a mean increase of 12.4 points on that measure, a significant increase ($F_{(1,55)}=49.98, p<.001$) according to a one way ANOVA.

Discussion

This report has described a community-based IBI program for children diagnosed with ASD. In doing so, some of the core features of the treatment package have been discussed and some preliminary information on the treatment's effectiveness has been provided. There is no doubt that many more community-based agencies are currently providing behavioral services to children with ASD than there were 10 or 15 years ago and that such clinical service constitutes the majority of IBI programs for this population. However, few if any have attempted to provide outcome data on their treatment services. Although a preliminary analysis of clients who have reached best outcome has been offered, it again needs to be stressed that the information presented here was not derived through experimental analysis. Although the status at outcome that was reported here may be similar to the findings of the Lovaas study and its investigational replications (e.g., Anderson, et al., 1987; Cohen et al., 2006; Harris & Handleman, 2000; Smith et al., 2000; Sallows & Graupner, 2005), those were experimental, controlled analyses, while the present analysis did not have the rigor of an experimentally controlled investigation.

Lessons Learned Along the Way

There exist many obstacles for a community-based service program desiring to preserve the integrity of its treatment approach as

well as its adherence to the central tenets of ABA. Clearly, the demands of consumers and funding sources present challenges in such areas as staff training. For example, there are times that urgency to commence treatment requires staff being rushed to service. Sometimes procedures, targeted objectives, and the intensity of intervention are dictated by funding agencies. For example, a local education authority might insist on adherence to academic goals, when clinical judgment indicates other areas should be a higher priority.

Ironically, we feel that many of these realities have helped hone our clinical skills and increase the efficiency of our treatment work. The pressure from educational funding sources to move children into group instruction forced us to learn how to instruct clients effectively in groups. The need to use precious instruction time as efficiently as possible resulted in development of streamlined data collection procedures. Finally, we had to develop skills that extend far beyond our original education and training in ABA. These include competencies necessary for successful interface with consumer groups that can at times be adversarial, with professionals who adhere to other theoretical models, and with bureaucratic systems struggling to balance individual student needs against fiscal survival.

Limitations

There are additional limitations alongside the lack of a true experimental design and a control group with this analysis. One limitation is that we did not report any measures of the severity (e.g., ADOS, GARS, CARS) of autistic symptoms for the 64 children in this study. Many of these children commenced treatment without one of these assessments and for the few clients that did there was no consistency among the various assessments. However we did report Vineland Adaptive Behavior Scores both prior to and following intervention for most clients, which provides an indication of the functioning levels for the majority of the clients in the current data set. Also, those without Vineland scores had mean IQ of 71, which suggests that the available Vineland data did not come from children who were more impaired intellectually. A third limitation is that there was no outside independent evaluation of the 64 children included in this report and future researchers should use outside evaluations for outcome analysis.

A final and major limitation is that we only reported data for a subset of clients (64 out of 181) clients who received services from Autism Partnership. A large number of clients' data had to be excluded because of record restrictions; that is, we were not able to obtain pre-assessment information or we were unable to conduct a post assessment. This is one of the difficulties that is encountered by

a community-based agency. Nevertheless not having this data for the majority of clients who received intervention from Autism Partnership is a major limitation which makes it more difficult to determine overall effectiveness of the program. Furthermore, it is not clear if the presence or absence of assessment information may be related to factors that could impact outcome. For example, it might be the case that those clients who had pre and post measures could have had better resources (e.g., parental advocacy) which may have led to better results. Therefore this analysis really only consists of a partial sample of clients and the reader should interpret accordingly. Future community-based investigations should attempt to consistently collect relevant data both prior to and following intervention for all clients.

Conclusions

Despite these limitations, this report and preliminary analysis, however, does address some important questions related to IBI for children diagnosed with ASD. For one, we have provided information on the various components of a community-based behavioral program. Secondly, this report provides further support that behavioral intervention can substantially improve the lives of children diagnosed with ASD. Prior to receiving intervention, none of these 64 clients had both an IQ higher than 85 and successful participation in regular education classes. After receiving intervention 45 of these children had IQ scores in the normal range and were successfully completing grade level work in a regular education setting, the majority of them with no classroom support. Additionally, those children who were not considered best outcome still made significant improvements in their IQ scores, adaptive functioning, and overall quality of life.

The report provided further evidence about indicators of which children respond most favorably to treatment. Pre-treatment IQ was positively related to outcome status. Children with higher intake IQ were more likely to attain best outcome status, regardless of which definition was used. Age did not turn out to be a significant predictor. Within this study, children who were older tended to have higher IQ at intake. This finding is consistent with a hypothesis that children who are more severely impaired are more likely to be diagnosed and referred for treatment at a younger age. If older children are less severely impaired, it may be that they can attain best outcome status even with a later start in treatment. One other measure that was tested as a predictor, average number of hours per week of intervention, was not found to be significantly related to outcome. In deciding how many hours to provide, rate of progress was taken into account. Thus it is not surprising to see that many children who received fewer

hours of intervention still attained best outcome, because those students who were slower learners would be the ones requiring more hours of treatment to achieve optimal gains. Anecdotal observations in the present preliminary analysis suggested that rate of progress during the first 12 months of treatment was the best indicator of future path of progress, although formal measures were not available to confirm this impression.

A third finding involves the question of whether large numbers of clients with ASD are achieving normal functioning as a result of IBI and whether it is realistic to think that this can occur in a community-based program. We have located 25 clients out of 64 who fully meet the best outcome criterion set by Lovaas and another 20 who nearly met this criterion. Given that several of the clients in outcome Group 1 were not completely weaned from all support until after completion of grade 1, it is reasonable to hope that some of the Group 1-R clients who were still receiving a limited amount of support in class at the time of this analysis would eventually be able to move into the Group 1 (comparable to Lovaas) outcome level. Most reports have been on the efficacy of behavioral intervention occurring under ideal conditions (i.e., university settings supported by grants). Yet the majority of children with ASD are typically treated by agencies operating under the day-to-day challenges of a community-based clinical program such as the one in this report. The information presented herein provides a provisional suggestion that a substantial number of children could achieve best outcome even in a community-based service program and thus expands the body of evidence showing the effectiveness of behavioral intervention implemented with children and adolescents diagnosed with ASD.

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Notes

- 1 It should be noted that the several of the authors of this report were co-directors of the community-based program presented and that benefits could be accrued by that agency if positive

findings were generated. This could be seen as motivation for bias or misrepresentation in the presentation of findings. The authors of this report affirm adherence to the American Psychology Association's ethical principles and code of conduct in the operation of the agency, provision of treatment services and presentation of findings

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