Why is ABA an evidence-based treatment for autism?

Eric V. Larsson, PhD, LP BCBA-D
The Lovaas Institute Midwest
ABA is not Medically Necessary?

- Uses rote techniques to create robotic responding
- 40 hours is unnecessary – robs a child of their childhood
- It is all drills at a table – no natural social skills
- It is punishment based
- It doesn’t work for high functioning children
- It doesn’t work for low functioning children
- It doesn’t work for older children
- It doesn’t work for younger children
- It is based upon bribery
- Children don’t really recover
- It doesn’t take into account the whole child
- It denies the child their own self direction
- It plays upon the fears of the parents
- It is too expensive
- It is not used in classrooms
- Its curriculum does not take into account pragmatics
- The staff are poorly trained
- It doesn’t help the parents with the real challenges of daily life
- It creates prompt dependency
- It creates anxious, and depressed children
- It relies upon edible reinforcers
- It doesn’t develop advanced abstract language

Low Quality ABA comes from Low Quality Implementation
Nationwide Hearings on ABA

- 1997-2012 Primarily due to the intense resistance of school districts to funding in-home and private services, many independent state, federal, and professional task forces were convened to study intensive early intervention using behavioral models.
- These task forces universally found that the services were appropriate and effective, and hence medically necessary.
  - American Academy of Pediatrics
  - British Columbia Supreme Court
  - California Legislative Commission
  - Maine Administrators of Services for Children
  - New York State Department of Health
  - U.S. Surgeon General Mental Health Report
  - National Research Council
  - Autism Research Institute
  - Centers for Disease Control
  - American Academy of Child and Adolescent Psychiatry
  - American Academy of Neurology
  - American Psychological Association Division of Clinical Psychology

What is the evidence for ABA?
Why is ABA Evidence-Based?

B.F. Skinner

- The Experimental Analysis of Behavior

Analysis of the continuous change in behavior:
Development of the fixed interval scallop

Skinner, 1950
Analysis of the dynamic change in behavior vs. the static average

Don Baer, Mont Wolf, Todd Risley

● Applied Behavior Analysis

Skinner, 1950
Risley & Wolf (1968)

A cumulative record showing the effects of Casey's receiving bites of ice cream independent of his picture-naming responses. For the first session and a half, Casey was fed a bite of ice cream after each correct response. At the first arrow, Casey was allowed to feed himself ice cream independent of his naming responses. At the second arrow, the food reinforcers were again made contingent upon correctly naming the pictures. Each dot represents a one-minute period.

Contingent Reinforcement of Accurate Vocal Imitation

Effect of reinforcement on accuracy of sound production.
Why is ABA Evidence-Based?

O. Ivar Lovaas

- UCLA: Early Intensive Treatment for Autism

Gregg’s self-injury (head hitting) over successive sessions (1 through 7). The upward moving hatchmarks in Sessions 3 and 5 mark delivery of sympathetic comments, play, etc., contingent on self-injury.

(c) Eric Larsson, PhD, BCBA-D, The Lovaas Institute Midwest
Why is ABA Evidence-Based?

Lovaas (1966)

Figure 3. S1's performance on the bar as cumulative curves. The hatch-marks on the curves pointing up indicate delivery of the social stimulus contingent upon bar pressing. The hatch-marks pointing down indicate the presentation of the social stimulus as discriminative for food during the Acquisition (A) sessions and mark times out for feeding during Extinction (E) sessions. Reprinted by permission of Academic Press, Inc. from O. I. Lovaas, G. Foretak, M. I. Kinder, B. D. Rubenstein, B. Schaffer, & J. O. Simmons, Establishment of social reinforcers in schizophrenia children using food, *Journal of Experimental Child Psychology*, 1966, 5, 106–123.)

Koegel, Egel, & Williams (1980)

Fig. 1. Changes in behavior in both the therapy and extra-therapy settings in the context of the multiple baseline analysis in Part I of the investigation. The solid vertical line represents the point at which treatment was begun in the therapy setting.

(c) Eric Larsson, PhD, BCBA-D, The Lovaas Institute Midwest
Parrish, Cataldo, (1986)
Covariation of Compliance and Behavior in Group and Individual Sessions

Figure 4. Percentage of Mary's compliant (closed circles) and inappropriate behaviors (open circles) across settings and experimental conditions. "A" indicates onset of use of edibles in addition to praise and physical affection.

Why is this data important?
The Development of the Young Child

How many successful learning trials per day does the child receive?
How many inadvertent autistic trials per day does the child receive?

- To make progress,
  - the child must practice target responding more often than he is allowed to practice autistic responding
- Preventing practice of autistic responding
  - Throughout the child’s day, he is getting many S^0s in natural situations
  - We must train the parents and staff to ensure that these teachable moments result in learning new target behavior
- At the end of the day, were 80% of his teachable moments successful?

The Implications of Research in Applied Behavior Analysis

- Behavior constantly responds to its environment
  - Resulting in all of the learned behavior patterns of life
  - Inconsistent or maladaptive treatment does not easily result in progress toward normalcy
- Therefore to alter the course of autism
  - We must transform the child’s home and community into a 24-hour therapeutic environment
Does ABA Research Prove This?

Effect of Parent Involvement

(c) Eric Larsson, PhD, BCBA-D,
The Lovaas Institute Midwest
Effect of Intensity

Lovass (1987): Experimental Comparison of Intensity of Treatment

<table>
<thead>
<tr>
<th>Eclectic Treatment</th>
<th>Moderate Behavior Therapy</th>
<th>Intensive Behavior Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Outcomes</td>
<td>Best Outcomes</td>
<td>Best Outcomes</td>
</tr>
<tr>
<td>Severely Impaired</td>
<td>Mildly Impaired</td>
<td>mildly Impaired</td>
</tr>
<tr>
<td>Severely Impaired</td>
<td>Severely Impaired</td>
<td>Severely Impaired</td>
</tr>
<tr>
<td>Mildly Impaired</td>
<td>Mildly Impaired</td>
<td>Mildly Impaired</td>
</tr>
</tbody>
</table>

In traditional, eclectic treatment, only 3% of the children attained the best outcomes (no diagnosis of autism, normal IQ, and able to graduate from first grade without special education). Half of the rest were placed in classes for severely impaired children and the other half in classes for mildly impaired children. When moderate levels of behavior therapy were added to the mix, the children did no better.

However, in intensive early intervention using behavior therapy, 47% of the children attained the best outcomes. And only 11% needed to be placed in classes for the severely impaired. 88% of these children maintained their gains through adulthood without special education.


Group Data backed up by Individual ABA Outcome Data

Lovas 1987 Child by Child Behavior Data

(c) Eric Larsson, PhD, BCBA-D, The Lovas Institute Midwest
But is this data replicated?

The Scope of Individualized ABA Research before 2000
Research on the Treatment of the Restricted Range of Interests

Positive Reinforcement to Remediate Stereotyped, Perseverative Tendencies

Significant Researchers:
Ferster, Indiana U.; Wolf, Risley, U. of Washington; Koegel, Dunlap, Rincover, Newsome, Carr, Lovaas, UCLA; Hall, U. of Washington; Sajwaj, U. of Tennessee; Baer, U. of Kansas; Repp, Dietz, U. of Georgia; Iwata, Florida State U.; Dyer, The May Institute;

Salient Research Studies: 39
Sample Study:

Effects of Structure on Stereotyped, Perseverative Tendencies

Significant Researchers:
Lovaas, Schreibman, Koegel, Dunlap, Newsome, UCLA; Foxx, Azrin, U. of Southern Illinois; Iwata, Bailey, Florida State U.; Repp, Northern Illinois U.; Dyer, The May Institute;

Salient Research Studies: 31
Sample Study:

Development of Effective Skill Development Strategies

Significant Researchers:
Risley, LeBlanc, Spradlin, U. of Kansas; Touchette, Columbia; Schreibman, Russo, Lovaas, Dunlap, Rincover, Koegel, UCLA; Dyer, Christian, Luce, The May Institute; Repp, Northern Illinois U.; Charlop, Claremont College; Heward, Heron, Ohio State U.;

Salient Research Studies: 42
Time Span: 1965 – 1996
Sample Study:

Generalization of Treatment Gains

Significant Researchers:
Wolf, Sulzbacher, U. of Washington; Sulzer, U. of Massachusetts; Sailor, Walker, Baer, Hart, Risley, U. of Kansas; Wahler, U. of Tennessee; Rincover, Koegel, UCLA; Handleman, Rutgers; McGee, Krantz, McClannahan, Princeton Child Development Center;

Salient Research Studies: 29
Sample Study:

Research on the Treatment of Language Deficits

Development of Imitation Skills
Significant Researchers:
Baer, Sherman, Garcia, U. of Kansas; Lovaas, UCLA;
Salient Research Studies: 19
Time Span: 1964 – 1994
Sample Study:

Development of Basic Language Skills
Significant Researchers:
Michael, U. of Arizona; Salzinger, Columbia U.; Risley, Wolf, U. of Washington; Sloane, Mithaug, Charlop, Claremont College; Foxx, Southern Illinois U.;
Salient Research Studies: 28
Time Span: 1965 – 1987
Sample Study:

Development of Complex Language Skills
Significant Researchers:
Guess, Baer, Sailor, Garcia, U. of Kansas; Krantz, McClannahan, Princeton Child Development Center; Smith, Lovaas, UCLA;
Salient Research Studies: 32
Sample Study:

Development of Social Compliance
Significant Researchers:
Baer, Rowbury, Allen, U. of Kansas; Forehand, U. of Georgia; Neef, Russo, Cataldo, Johns Hopkins U.; Mace, U. of Utah;
Salient Research Studies: 18
Time Span: 1964 – 1988
Sample Study:
Research on the Treatment of Significant Social Deficits

Development of Social Play Skills
Significant Researchers:
Baer, Allen, Hart, Rogers, Rowbury, Fowler, Kohler, Greenwood, U. of Kansas; Koegel, Dunlap, Dyer, UCLA; Strain, U. of Pittsburgh; Carr, SUNY Stony Brooke; McEvoy; Vanderbilt;
Salient Research Studies: 31
Sample Studies:

Development of Creativity and Spontaneity
Significant Researchers:
Baer, U. of Kansas; Charlop, Schreibman, Claremont College; Dunlap, Marshall U; Haring, U. of Washington; Van Houten, Halifax U.; Harris, Rutgers;
Salient Research Studies: 18
Sample Studies:

Research on the Treatment of Significant Social Deficits

Development of Social Conversation Skills
Significant Researchers:
Garcia, Kamps, U. of Kansas; Strain, U. of Pittsburgh; Neef, Western Michigan State; Charlop, Claremont College; Koegel, U.C. Santa Barbara; Krantz, McClannahan, Princeton Child Development Institute;
Salient Research Studies: 32
Sample Studies:

Development of Group and Classroom Skills
Significant Researchers:
Koegel, Rincover, Russo, UCLA; Favell, U. of North Carolina; Fowler, Baer, Guess, Kamps, U. of Kansas; Strain, U. of Pittsburgh; Sasso, U. of Iowa;
Salient Research Studies: 26
Sample Studies:
Service System Research

Staff and Parent Training Procedures

Significant Researchers:
Guess, Baer, Spradlin, U. of Kansas; Koegel, Schreibman, Russo, Rincover, Glahn, UCLA; O’Dell, U. of Mississippi; McLennahan, Krantz, McGee, Princeton Child Development Center; Strain, U. of Pittsburgh; Dyer, Luce, The May Institute;

Salient Research Studies: 41
Time Span: 1968 – 1993
Sample Studies:

39 Group Replications of Intensive Treatment Research

9 Meta Analyses of Intensive Treatment Research


What are the essential features of these studies?
Evidence-Based Levels of Behavior Therapy, Behavior Analysis, and Clinical Supervision

<table>
<thead>
<tr>
<th>Study</th>
<th>Reported Hours of One-to-One Behavior Therapy per Week</th>
<th>Behavior Analysis and Clinical Supervision</th>
<th>Additional Levels of Parent Training</th>
<th>Clinical Reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lovaas, 1987</td>
<td>An average of 40 hours, with frequent co-therapy, range: 10 to 60 hours per week</td>
<td>Daily to weekly direct supervision by direct supervisor, clinical supervisor, and psychologist</td>
<td>Clinic supervisors provided ongoing performance feedback</td>
<td>Weekly team clinical review meeting</td>
</tr>
<tr>
<td>Cohen et al., 2006</td>
<td>30 to 40 hours</td>
<td></td>
<td></td>
<td>Weekly team clinical review meeting</td>
</tr>
<tr>
<td>Sallows &amp; Graupner, 2005</td>
<td>An average of 27 to 39 hours</td>
<td>6 to 10 hours of weekly co-therapy by the senior therapist and weekly supervision by the clinic supervisor</td>
<td>Parents attended weekly team meetings and extended treatment throughout the day</td>
<td>Weekly team clinical review meeting &amp; six-month clinical review</td>
</tr>
<tr>
<td>Howard et al., 2005</td>
<td>35 to 40 hours</td>
<td>Direct observational data reviewed by program supervisors several times per week</td>
<td></td>
<td>2 weekly 1-hr team clinical and progress review meetings</td>
</tr>
<tr>
<td>Elkeseth et al. 2002, 2007</td>
<td>28 hours of school-based and additional home-based parent therapy</td>
<td>30 hours per week of apprentice observation and supervision by supervisors weekly supervision by project director</td>
<td>4 hours per week of parent training</td>
<td>2 hour meeting weekly</td>
</tr>
<tr>
<td>Hayward, et al. 2009</td>
<td>40 hours of school-based, home-based and school-based treatment</td>
<td>5 hours per week of programme consultant supervision. 11 hours per week of senior tutor supervision. 2 hours per month by programme director</td>
<td></td>
<td>2 hour meeting weekly</td>
</tr>
</tbody>
</table>

What is the effective age for ABA?
Cost Effective Age Range of EIBI

- The range of age cut-offs in evidence-based EIBI studies were established for the purpose of controlled research, and were based upon a number of factors, such as available funding. They weren’t meant to imply that autism was untreatable after those ages.
- Throughout the EIBI literature, the published range of such age cut-offs, for the purpose of research, was 48 to 84 months for the maximum age to begin receiving treatment, and then the subsequent duration of treatment was one to five years.
- Therefore the age of completion of these children’s intensive treatment was up to 12 years of age.

Social Skills Meta Analysis

- Bellini and colleagues, in 2007, reported the following age ranges of 155 children who benefited from ABA social skills training:
- “21 studies involved preschool-age children, 23 involved elementary age children, and 5 studies involved secondary-age students.” (page 158).
Social Skills Meta Analysis

- Reichow and Volkmar, in 2010, reported on 31 studies of children, aged four to fifteen, who benefited from ABA social skills training:
  - “The school-age category had the highest participant total of the three age categories (N = 291).” (page 156).
  - “Within the last 8 years, 66 studies with strong or acceptable methodological rigor have been conducted and published. These studies have been conducted using over 500 participants, and have evaluated interventions with different delivery agents, methods, target skills, and settings. Collectively, the results of this synthesis show there is much supporting evidence for the treatment of social deficits in autism.” (page 161).

Aggression – Peer Review

- Brosnan and Healy, in 2011, reported on 18 studies of children aged three to 18, who received effective ABA treatment to reduce or eliminate severe aggressive behavior:
  - “All of the studies reported decreases in challenging behavior attributed to the intervention. Of the studies included, seven reported total or near elimination of aggression of at least one individual during intervention in at least one condition.” (page 443).
  - “only four of the studies conducted follow-up assessments. However, each of these studies reported that treatment gains were maintained.” (page 443).
**Anxiety**

- Lang, et al. in 2010, reported on nine studies which involved 110 children aged nine to 23, who received a variety of forms of behavior therapy for anxiety.
- “Within each reviewed study, at least one dependent variable suggested a reduction in anxiety following implementation of CBT.” (page 60).
- “CBT has been modified for individuals with ASD by adding intervention components typically associated with applied behaviour analysis (e.g. systematic prompting and differential reinforcement). Future research involving a component analysis could potentially elucidate the mechanisms by which CBT reduces anxiety in individuals with ASD, ultimately leading to more efficient or effective interventions.” (page 53).

**Problem Behavior**

- Hanley, Iwata, and McCord in 2003, reported on 277 studies which involved 536 children and adults (70% of the studies included persons between the ages of 1 and 18, and 37% also included persons older than 18), who received functional analyses of problem behaviors. Of these, 96 percent were able to yield an analysis of the controlling variables of the problem behavior. The specific functional analysis of individual problem behaviors is crucial to the successful intervention with those behaviors.
- “Large proportions of differentiated functional analyses showed behavioral maintenance through social-negative (34.2%) and social-positive reinforcement (35.4%). More specifically, 25.3% showed maintenance via attention and 10.1% via access to tangible items. Automatic reinforcement was implicated in 15.8% of cases.” (pages 166-167).
Self Injury

- Iwata and colleagues, in 1994, reported on the effective treatment of self-injurious behavior with 152 children, adolescents, and adults. In their sample, 39 were between the ages of 11 and 20, and 74 were 21 and older. The function of the self-injurious behavior could be identified in 95% of the persons, and in 100% of those cases an effective treatment could then be prescribed.

- “Results of the present study, in which single-subject designs were used to examine the functional properties of SIB in 152 individuals, indicated that social reinforcement was a determinant of SIB in over two thirds of the sample, whereas nonsocial (automatic) consequences seemed to account for about one fourth of the cases.” (page 234).

The Evidence Base for Treatment

- Independent Panels
- Peer Review
- Long-Term and Group Outcome Studies
  - RCTs Randomized Controlled Trials
  - Non-Randomized Matched Trials
  - Registries
- Comparison Data
- Meta-Analysis
- Cost-Effectiveness Analyses
- ABA Applied Behavior Analysis
  - Within-Subject Experimental Studies
Independent Panels

Independent National Reviews

- The APA Society for Clinical Child and Adolescent Psychology
- American Academy of Pediatrics
- The U.S. Agency for Health Care Research and Quality
- The National Institute of Mental Health
- National Research Council
- The State of California
- The State of New York
- The U.S. Surgeon General
- The Center for Disease Control
Why is ABA Evidence-Based?

Division 53 of the American Psychological Association (the Society for Clinical Child and Adolescent Psychology)

“Randomized controlled trials have demonstrated positive effects in both short-term and longer term studies. The evidence suggests that early intervention programs are indeed beneficial for children with autism, often improving developmental functioning and decreasing maladaptive behaviors and symptom severity at the level of group analysis.”

“Lovaas's treatment meet Chambless and colleague's (Chambless et al., 1998; Chambless et al., 1996) criteria for ‘well-established’”

“Across all the studies we cited, improvements in language, communication, and IQ, and reduction in severity of autism symptoms indicate that the core symptoms of autism appear malleable in early childhood”

Rogers & Vismara (2008)

American Academy of Pediatrics

“The effectiveness of ABA-based intervention in ASDs has been well documented through 5 decades of research by using single-subject methodology and in controlled studies of comprehensive early intensive behavioral intervention programs in university and community settings.”

“Children who receive early intensive behavioral treatment have been shown to make substantial, sustained gains in IQ, language, academic performance, and adaptive behavior as well as some measures of social behavior, and their outcomes have been significantly better than those of children in control groups.”

Hawaii Department of Health

“Best Support: Intensive Behavioral Treatment was successful in three (3) studies, beating alternative treatments in two (2) of those, and beating a no-treatment control in one (1). Likewise, Intensive Communication Training was also successful in three (3) studies, beating alternative treatments in two (2) of those, and beating a no-treatment control in one (1) study.”

“These results are quite promising in terms of effect size, although it should be noted that the outcome variables for these studies mainly involved reductions in the frequency of autistic behaviors or increases in social communication or other forms of social exchange (e.g., turn taking). None of these studies claimed that children were autism free following the intervention programs. Nevertheless, these findings represent an extraordinary improvement over the evidence base for interventions for autistic spectrum disorders in the previous Biennial Report.

Is there a consensus?

- Forty-five such independent, meta-analysis, and peer reviews are available.
- Every review cites the obvious positive results of ABA and EIBI and accepts them as proven.
- The reviews are critical evaluations
  - in many cases, other non-ABA treatments are assigned to categories such as
    - “insufficient evidence,”
    - “unproven,” or
    - “potentially harmful.”
Cost Effectiveness Analyses - CDC

- “The mean medical expenditures for children with ASD were 6 times higher than those of the comparison group.”
- “Children with ASD and ID incurred expenditures 2.7 times higher than did children with ASD and no co-occurring condition.”


Comparison Data
Why is ABA Evidence-Based?

Comparison Data
Lord & Schopler, 1989

<table>
<thead>
<tr>
<th>Age at Start</th>
<th>Hrs/Wk</th>
<th>Length</th>
<th>Service Location</th>
<th>Mean Starting IQ</th>
<th>Mean Ending IQ</th>
<th>Change in Group IQ</th>
<th>Percent Best Outcomes</th>
<th>Percent Substantial Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 mos.</td>
<td>12 hrs*</td>
<td>4.5 yrs</td>
<td>school</td>
<td>57</td>
<td>64</td>
<td>7</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>55 mos.</td>
<td>20 hrs**</td>
<td>4.5 yrs</td>
<td>school</td>
<td>58</td>
<td>61</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>78 mos.</td>
<td>23 hrs***</td>
<td>4.5 yrs</td>
<td>school</td>
<td>58</td>
<td>53</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

What is the evidence for the outcomes without ABA

- “Health care utilization and costs are substantially higher for children and adolescents with ASDs”
- “mortality is increased as well.”
- “Cases of suicide in higher-functioning individuals have been reported.”

Howlin (2005)
Liptak, Stuart, Auinger. (2006)
Mandell, Cao, Ittenbach, Pinto-Martin. (2006)
Shavelle, Strauss, Pickett (2001)
Pickett, Paculdo, Shavell, Strauss (2006)
Other Medical Reviews

“Recovery in children with ASD through behavioral and educational interventions seems possible in a significant minority of cases.”
Helt, Kelley, Kinsbourne, Pandey, Boorstein, Herbert, & Fein (2008). (The authors are psychologists and pediatricians at the University of Connecticut, Queen’s University, the New School, Children’s Hospital of Philadelphia, and Massachusetts General Hospital).

“The weight of currently available scientific evidence, however, indicates that ABA should be viewed as the optimal, comprehensive treatment approach in young children with ASD.”
Barbaresi, Katusic, & Voigt (2006). (The authors are pediatricians at the Mayo Clinic and at Harvard University).

Meta Analyses
Meta Analyses of Magnitude of Effect and Dosage Effects

“Results suggested that long-term, comprehensive ABA intervention leads to (positive) medium to large effects in terms of intellectual functioning, language development, acquisition of daily living skills and social functioning in children with autism.”

“Although favorable effects were apparent across all outcomes, language-related outcomes (IQ, receptive and expressive language, communication) were superior to non-verbal IQ, social functioning and daily living skills, with effect sizes approaching 1.5 for receptive and expressive language and communication skills.”

“Dose-dependent effect sizes were apparent by levels of total treatment hours for language and adaptation composite scores.”

Virues-Ortega, (2010)

---

So what is the controversy?

- In none of the reviews do the authors systematically refute the published evidence for ABA treatments of autism.
- The most “negative” conclusions that are offered are:
  1) ABA does not cure all children of autism
  2) ABA is not the only established treatment, nor is it clearly the best treatment
  3) There are not well-established means to identify the best candidates for treatment
- These conclusions can be drawn about any medical treatment that already enjoys full coverage,
- they should not be cause for denying coverage for ABA.
Reports cited as Negative

“There is little question now that early intensive behavioral intervention is highly effective for some children. However, gains are not universal, and some children make only modest progress while others show little or no change, sometimes after extremely lengthy periods in treatment.”

Howlin, Magiati, & Charman, (2009). (The authors are professors at the Institute of Psychiatry, King’s College (London, UK) and University College, London, Institute of Child Health).

Agency for Healthcare Research and Quality (AHRQ) Comparative Effectiveness Review

“Evidence supports early intensive behavioral and developmental intervention, including the University of California, Los Angeles (UCLA)/Lovaas model and Early Start Denver Model (ESDM) for improving cognitive performance, language skills, and adaptive behavior in some groups of children.”

“Evidence suggests that interventions focusing on providing parent training and cognitive behavioral therapy (CBT) for bolstering social skills and managing challenging behaviors may be useful for children with ASDs to improve social communication, language use, and potentially, symptom severity.”

Warren, et al. (2011)
AHRQ “Negative” Qualifiers

“All of these studies need to be replicated, and specific focus is needed to characterize which children are most likely to benefit.”

“Information is lacking on modifiers of effectiveness, generalization of effects outside the treatment context, components of multicomponent therapies that drive effectiveness, and predictors of treatment success.”

AHRQ Review of Alternatives

“No current medical interventions demonstrate clear benefit for social or communication symptoms in ASDs.”

“Little evidence is available to assess other behavioral interventions, allied health therapies, or complementary and alternative medicine.”
What about the AHRQ?

- The AHRQ report reached these positive conclusions about ABA and EIBI despite:
  - excluding a large number of studies
    - Sample size less than 10
    - excluding all studies published prior to 2000
      - Already covered elsewhere
    - ADOS
  - Bias toward RCTs – Randomized Controlled Trials
  - Not experts in ABA for autism, so analysis is lacking
- Yet the AHRQ report still found 78 studies of behavioral interventions, which included 34 studies of EIBI, that met their criteria for inclusion.
- The report of “strength of evidence” is not the same as “strength of effect.”

Applied Behavior Analysis Answers the Questions Raised by the AHRQ

- Addresses the heterogeneous diagnosis of autism
- The outcomes of ABA research are the objective improvements in the behavior of individual children
- Analyzes the individual components of treatment, and the individual responses to treatment
- Addresses the needs for generalization and maintenance
- The research is not composed of uncontrolled case studies
  - They are powerful within-subject controlled experiments
- Provides a model for clinical practice
Why is ABA Evidence-Based?

Other Standards for Evidence

- Smith, 2012: Single-Case Experimental Designs: A Systematic Review of Published Research and Current Standards

Evidence Based Practices in Within Subject Controlled Experiments

<table>
<thead>
<tr>
<th>Strength of research report</th>
<th>Group research</th>
<th>Single subject research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Received high quality ratings on all primary quality indicators and showed evidence of four or more secondary quality indicators</td>
<td>Received high quality ratings on all primary quality indicators and showed evidence of three or more secondary quality indicators</td>
</tr>
<tr>
<td>Adequate</td>
<td>Received high quality ratings on four or more primary quality indicators with no unacceptable quality ratings on any primary quality indicators, and showed evidence of at least two secondary quality indicators</td>
<td>Received high quality ratings on four or more primary quality indicators with no unacceptable quality ratings on any primary quality indicators, and showed evidence of at least two secondary quality indicators</td>
</tr>
<tr>
<td>Weak</td>
<td>Received fewer than four high quality ratings on primary quality indicators or showed evidence of less than two secondary quality indicators</td>
<td>Received fewer than four high quality ratings on primary quality indicators or showed evidence of less than two secondary quality indicators</td>
</tr>
</tbody>
</table>

Reichow, Volkmar, Cicchetti, (2008)
Evidence Based Practices in Within Subject Controlled Experiments

Table 4: Criteria for treatments to be considered EBP

<table>
<thead>
<tr>
<th>Level of EBP</th>
<th>Criteria (treatment must meet at least one criterion, can meet multiple criteria)</th>
</tr>
</thead>
</table>
| Established EBP | At least five single subject studies of strong research report strength meeting the following criteria  
                    Conducted by at least three different research teams  
                    Conducted in at least three different locations  
                    Total sample size of at least 15 different participants across studies  
                    At least 30 single subject studies of at least adequate research report strength meeting the following criteria  
                    Conducted by at least three different research teams  
                    Conducted in at least three different locations  
                    Total sample size of at least 30 different participants across studies  
                    At least two group experimental design studies of strong research report strength conducted in separate laboratories by separate research teams  
                    At least four group experimental design studies of at least adequate research report strength conducted in at least two different laboratories by separate research teams  
                    One group experimental design study of strong research report strength and three single subject studies of strong research report strength  
                    Two group experimental design studies of at least adequate research report strength and three single subject studies of strong research report strength  
                    One group experimental design study of strong research report strength and six single subject studies of at least adequate research report strength  
                    Two group experimental design studies of at least adequate research report strength and six single subject studies of at least adequate research report strength |

Reichow, Volkmar, Cicchetti, (2008)

Peer Reviews
ABA Effects on Social Skills

“Within the last 8 years, 66 studies with strong or acceptable methodological rigor have been conducted and published.”

“These studies have been conducted using over 500 participants, and have evaluated interventions with different delivery agents, methods, target skills, and settings.”

“Collectively, the results of this synthesis show there is much supporting evidence for the treatment of social deficits in autism.”

Reichow, & Volkmar, (2010).

ABA Effects on Challenging Behavior

“The available intervention technology is reasonably effective at reducing problem behaviors performed by people with developmental disabilities, including autism.”

“Reductions of 80% or greater were reported in half to two thirds of the comparisons.”

“Reductions of 90% or greater were reported for all classes of problem behavior, and with individuals with all diagnostic labels.”

Horner, Carr, Strain, Todd, & Reed, (2002)
National Autism Center (2009)

- Standards on ABA-researched procedures
  - Established
    - Antecedent Package
    - Behavioral Package
    - Comprehensive Behavioral Treatment for Young Children
    - Joint Attention Intervention
    - Modeling
    - Naturalistic Teaching Strategies
    - Peer Training Package
    - Pivotal Response Treatment
    - Schedules
    - Self-management
    - Story-based Intervention Package
  - Emerging
  - Unestablished
  - Ineffective/Harmful

What about Other Treatments?

- The RCT, Randomized Controlled Trial is not well suited to uncover many of the specific treatments that help the individual children who are under the Heterogeneous umbrella of autism.
- Instead it is single subject laboratory research that can detect promising therapies.
What evidence are the Policy Makers and Funders looking for?

- They want a system of cost-effective management of autism services
- In addition to the money that they pay out for coverage,
- How does the health plan control their own bureaucratic costs?

Effective cost control through accountability for results

Instead of managing the process, let’s manage the outcomes.
Cost effectiveness through Assessment of Value

- Conform with Medical Necessity Guidelines for Rehabilitative Treatment
- Identify evidence-based treatment models.
- Identify evidence-based service-delivery models.
- Certify the provider organizations who maximize value.
- Prescribe the optimal form of treatment, intensity, and service delivery for each child’s prognosis at intake
  - Individual behavioral measures
  - Complicating conditions
  - Parent involvement
  - Service capacity
- Prescribe the continuation of care based upon each individual child’s responsiveness to treatment

Socially Significant Independence Discharge Objectives

Receptive Language, the child will understand and comply with instructions.
  - Generalized compliance.
  - Distal compliance.
Expressive Language, the child will use functional language with care-providers and natural peers.
  - Intelligible speech.
  - Functional requests.
Pro-social skills, the child will interact appropriately with natural peers.
  - Generalized imitation.
  - Cooperative play with adult.
  - Cooperative play with a typical age-peer.
  - Small-group attending.
  - Maintain two mutual friendships.
Community Living, the child will safely use the community.
  - Walk with adult.
  - Parent Mastery.
  - Participate in community.
Self-Care, the child will attend to personal needs independently.
  - Appropriate nutrition.
  - Appropriate sleep.
  - Independent toileting.
Self-control, the child will control severely health-threatening behavior at all times.
  - Waiting.
  - Self-control of health-threatening behavior
  - Self-control of stereotyped offensive behavior
  - Self-control of physical aggression.
  - Self-control of property destruction.
  - Self-control of bolting behavior
Socially Significant
Long-Term Service Objectives

- Accepted standard practice process measures in supported employment
  - Competitive work Averages at least 20 hr per week for each pay period
  - Integrated work setting has a work group of not more than 8 individuals with handicaps, and has regular contact with typical co-workers
  - Ongoing support services provide continuous or periodic job skill training provided at least twice monthly at the job site

- Implicit outcome measures in supported employment
  - Movement from the more restrictive (sheltered workshop) to a setting with more independence (work enclave), due to case management.
  - More accurate placement into services (accurately matching recipients to services)
  - Cost-benefit of job retention and increased earnings, as they offset the cost of the service.
  - Social Validity of quality of life and reduction of family anxiety.
  - Quality of implementation of the specialized skills of the practitioner.
  - Accessibility of services – adequate network, and adequate professional training system.

Payment Reform

- Payment systems should reinforce best practices and reduce incentives for abuse.
- ABA offers objective criteria for decision making in human services.
Ivar Lovaas (2003)

“Providers of ABA services who do not report treatment outcome should take notice of this problem of falling into the same trap of those service providers who preceded us, of misleading parents and short-changing their children.

“Today the contingencies are different for the majority of providers who are reinforced by charging fees for services with minimal or no outcome data and peer review. We may be drifting off the criterion of data-based treatment procedures and, if we do, the future may look as bleak for us as for the Freudians.

“I shudder at the thought of someone receiving a grant to assess long-term outcome from ABA providers. Will the parents of these children feel that they have been deceived?

“Now that we are being accepted as fellow citizens and providing what is considered the ‘treatment of choice,’ we need to be concerned about the truthfulness of what treatment we offer.”