

The Society for Clinical Child and Adolescent Psychology (SCCAP): Initiative for Dissemination of Evidence-based Treatments for Childhood and Adolescent Mental Health Problems

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Keynote

Evidence-Based Practices for Children with Autism Spectrum Disorders

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Learning Objectives

1. Importance of evidence-based practice in autism
2. Signs of scientific and pseudoscientific treatments
3. Evidence-based treatments for autism
4. Plausible but under-researched treatments for autism
5. Controversial treatments for autism
6. State of evidence on discrete trial training
7. Implications of evidence-based practice for families and service providers

1. Importance of Evidence-based Practice

Importance of Evidence-Based Practice (1)

- 1940s-1960s: Psychoanalysis (Bettelheim, 1967)
 - Techniques turned out to increase challenging behaviors (e.g., Lovaas et al., 1965, JECPP)
 - Parents were falsely blamed for child's condition
- 1970s: Bonding therapy (e.g., Kaufman, 1976, Son Rise)
 - Attachment is one aspect of social functioning that is intact in ASD (Rutgers et al., 2004, JCPP)

Importance of Evidence-Based Practice (2)

- 1980s: Fenfluramine
 - Found to be ineffective as an intervention for ASD (e.g., Leventhal et al., 1993, J Neuroscience Clin Neurosci)
 - Taken off the market in 1997 because of risk of heart valve disease
- 1990s: Facilitated Communication
 - Found to be ineffective as an intervention for ASD (Mostert, 2001, JADD)
 - Associated with false accusations of sexual abuse
- 1990s: Secretin
 - Found to be ineffective as an intervention for ASD (Demichelli et al., 2005; Williams et al., 2005, Cochrane Reports)
 - Often considered best studied intervention for autism—many more randomized clinical trials than any other treatment

Importance of Evidence-Based Practice (3)

■ 2000's

– Nonvaccination

- Health care organizations expected to eradicate measles from the earth by 2010, but it is now making a comeback because of nonvaccination
- 12,132 cases in Europe in 2006-7, including 13 deaths
- Outbreaks in parts of the US (e.g., San Diego)

– Chelation

- 3 deaths in 2003-5, including a 5-year-old with autism who died in the doctor's office immediately after receiving chelation in Pittsburgh

Importance of Evidence-Based Practices

- Research has led to identification of effective interventions
 - Behavioral approaches
 - Medications in some cases

2. Signs of Scientific and Pseudoscientific Treatments

Evidence-Based Practice

- Treatment plans based on three factors:
 - Scientific evidence
 - Clinical decision about client need
 - Data collection on client response to intervention
 - Family priorities

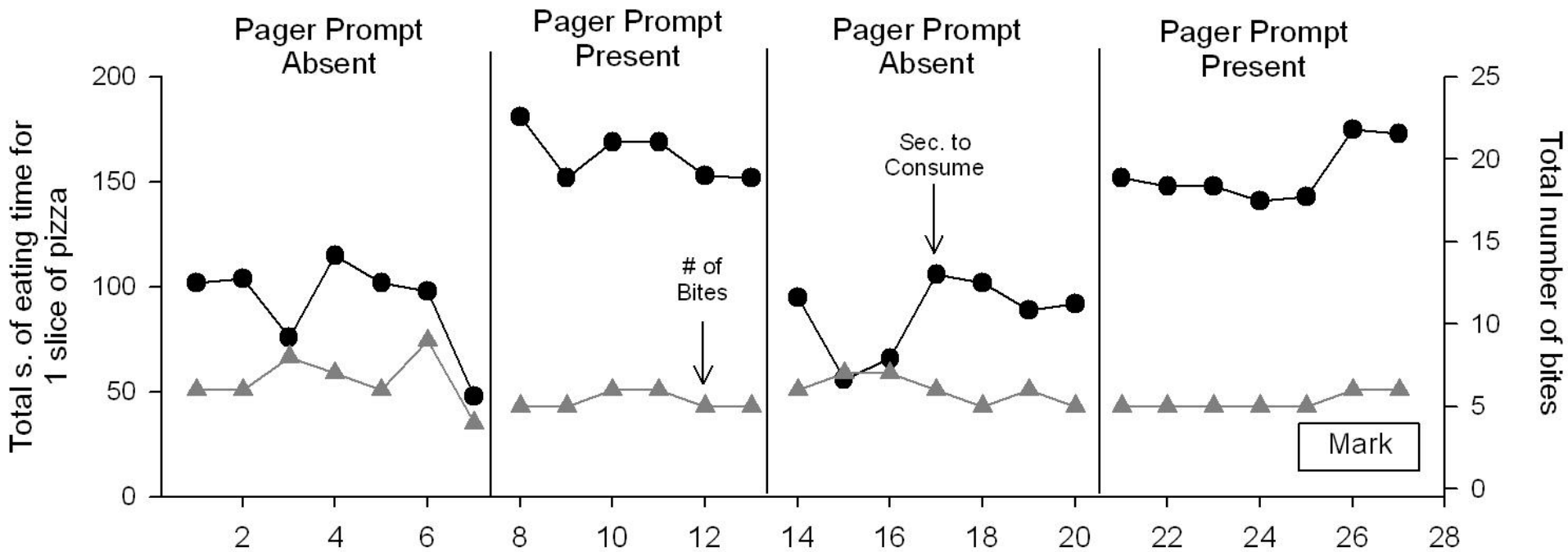
Scientific methods for testing interventions

- Single-case designs
 - Each subject serves as his/her own control
 - Baseline (no treatment) phase is compared with one or more intervention phases
 - Data are collected continuously, yielding many data points for analysis
- Peer-reviewed
 - Anonymous experts evaluate the report

Single-case designs

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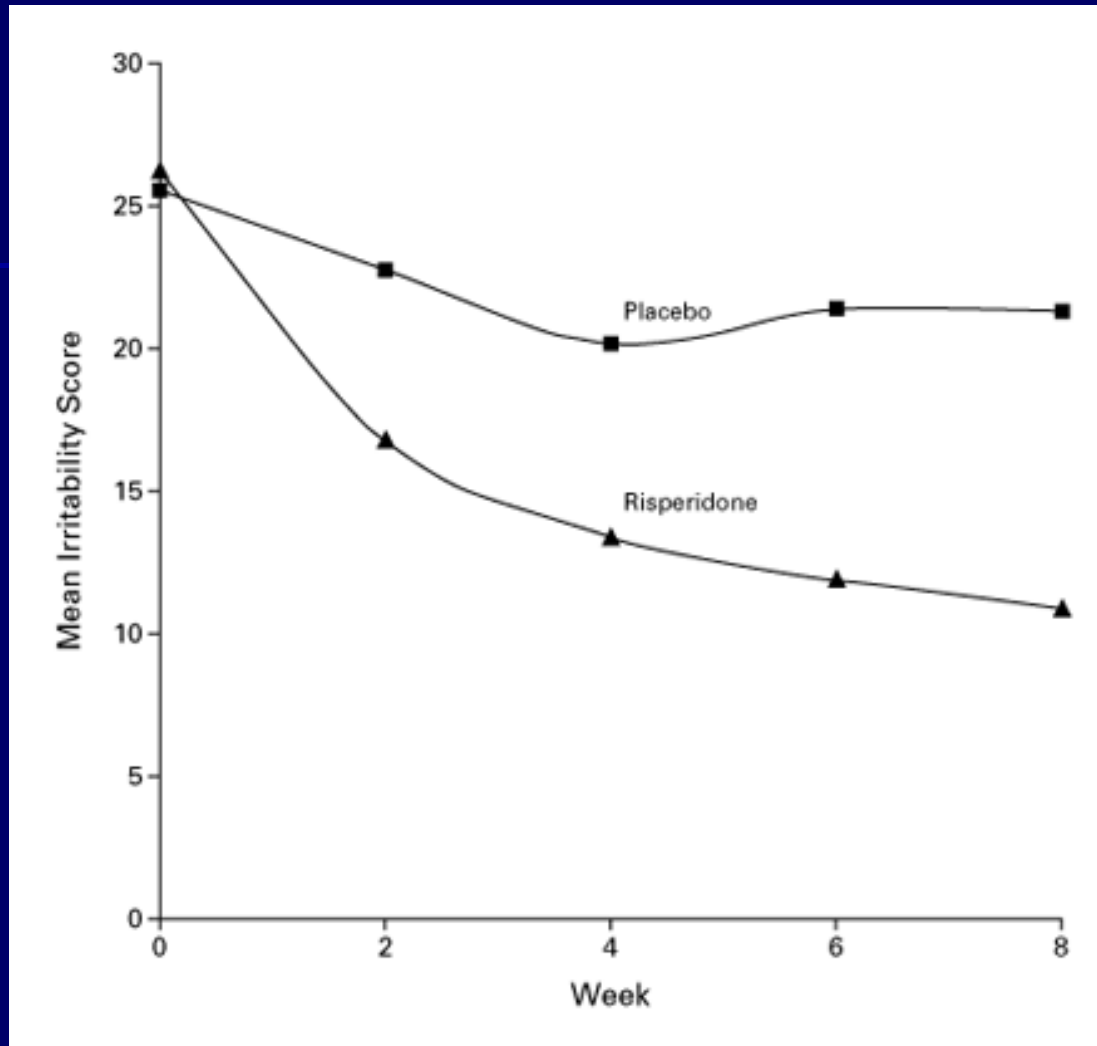
Example of single-case design (from Hoch & Taylor, 2008, *JABA*)



Group Designs

- Random assignment to groups
- One group receives treatment; other groups receive no treatment or an alternate treatment
- When possible, treatment is double-blind, placebo-controlled (experimenters and participants do not know who is getting treatment and who is not)

Example of Group Design (McCracken et al., 2002, *NEJM*)



Data are for all 101 children (49 assigned to the risperidone group and 52 assigned to the placebo group). Higher scores indicate greater irritability.

Potential 'Red Flags:' Determining the Validity of a Treatment

(Finn et al., 2005, Am J Speech-Language Pathology)

1. Does the evidence rely on personal/anecdotal accounts?
2. Is the Tx approach disconnected from well-established scientific models?
3. Is the Tx untestable or unfalsifiable?
4. Does the Tx remain unchanged even in the face of contradictory evidence?
5. Is the rationale based only on confirming evidence, with disconfirming evidence ignored or minimized?

Defeat Autism Now!

http://www.autism.com/treatable/adams_biomed_summary.pdf

This summary generally follows the DAN! philosophy, which involves trying to treat the underlying causes of the symptoms of autism, based on medical testing, scientific research, and clinical experience, with an emphasis on nutritional interventions. Many of the DAN! treatments have been found by listening to parents and physicians.

ARI Survey of Parent Ratings of Treatment Efficacy

Most of the treatments listed on the following pages were evaluated as part of the Autism Research Institute (ARI) survey of over 23,000 parents on their opinion of the effectiveness of various treatments for children with autism.

3. Evidence-Based Treatments

- Although ASD is a neurobiological disorder, behavioral and educational interventions are the primary treatments
 - Applied behavior analysis (ABA) is the best studied of these treatments
- Medications may help some individuals with ASD who also have other specific problems:
 - Severe disruptive behaviors: Substantial short-term benefits in most cases, though long-term effects are uncertain
 - Severe hyperactivity: modest benefits in some cases
 - Severe repetitive behaviors, depression, anxiety, mood swings: possible modest benefits (not well studied)

4. Other Plausible Interventions

- Under-researched
- Target known problems in ASD and use methods similar to ones that have been studied
- Examples:
 - Teaching and Educating Autistic Children and the Communicatively Handicapped (TEACCH)
 - Emphasizes structured teaching and environmental modifications
 - Developmental Individual-difference Relationship-based Model (DIR, “Greenspan”)
 - “Floortime”—following the child’s lead and encouraging communication during play activities

TEACCH

- Some uncontrolled case series suggesting gains (Lord & Schopler, 1989, JADD; Mukaddes et al., 2004, Autism)
- One quasi-experiment showing possible benefits of home services (Ozonoff & Cathcart, 1998, JADD)
- Large well-designed study underway (Odom, Strain)

DIR

- Self-published chart reviews
 - Greenspan & Wieder (1997, JDLD) described gains in social engagement and creativity
 - Wieder & Greenspan (2005, JDLD) reported continuing gains 10-15 years later
- Peer-reviewed case series (Solomon et al., 2007, Autism)
 - 68 children receiving home consultation on DIR (half day monthly for 8-12 months)
 - Significant improvement on Functional Emotional Assessment Scale
 - 46% described as having good or very good outcomes
- One case study showing better results in ABA (Hilton & Seal, 2007, JADD)

Research ongoing on other developmental treatments

■ Examples

- Social Communication, Emotion Regulation and Transactional Support (SCERTS) (Wetherby and colleagues)
- Denver Model (incorporating elements of ABA and developmental approaches) (Rogers and colleagues)
- Interpersonal synchrony (Landa)

5. Controversial and Alternative Treatments

- Many anecdotal reports of effectiveness
- Do not target known problems in ASD or use established methods
- Have not been studied carefully

Popular controversial and alternative treatments

■ Sensory-Motor Therapies

- Auditory Integration Therapy, Sensory Integration Therapy, Facilitated Communication, Vision Therapy, Rapid Prompting Method

■ Complementary and Alternative Medicine (CAM)

- Diets, vitamin therapy, nonvaccination, secretin, chelation

Sensori-Motor Therapies

- Theory: Sensory processing or motor planning problems underlie other problems in ASD
- Facilitated Communication refuted (Mostert, 2001, JADD)
- All others under-studied
 - “There exists so few studies that conclusions [about sensory integration’s effectiveness] cannot be drawn.”
 - Dawson & Watling (2000)

CAM

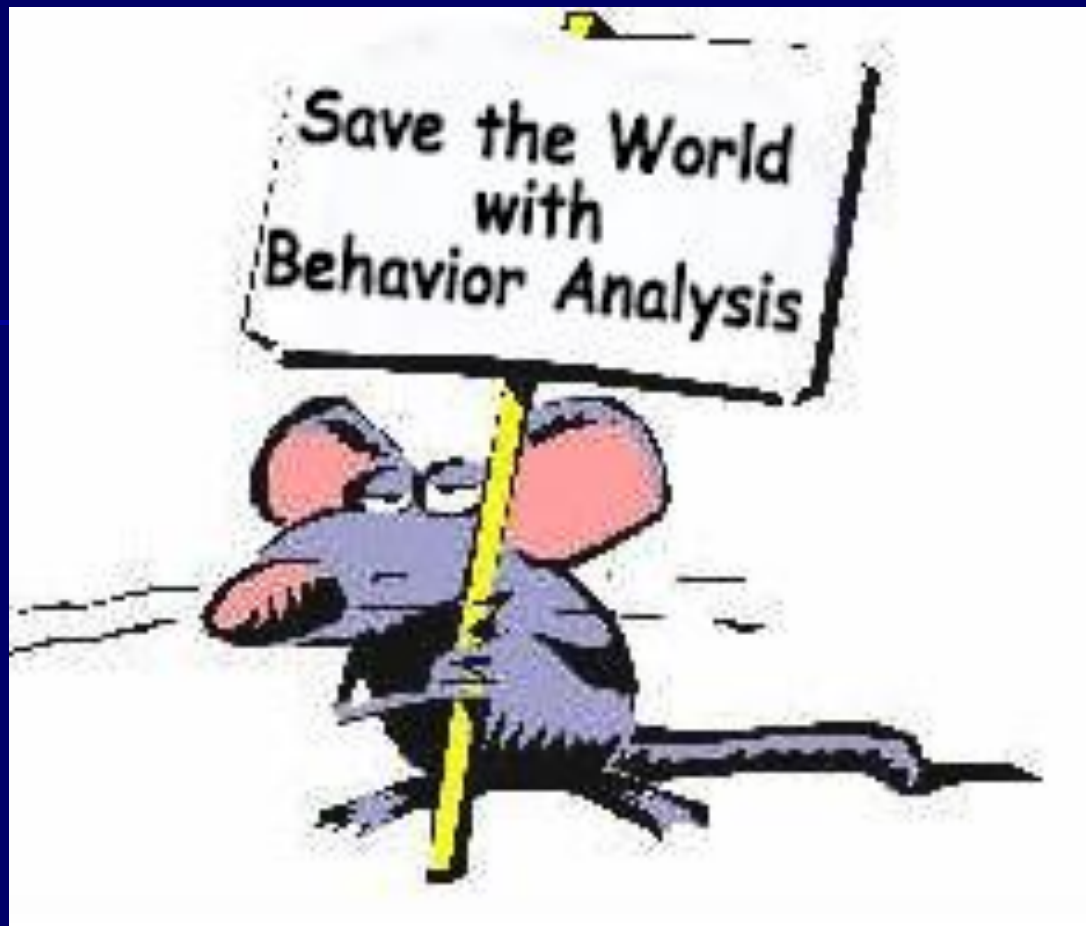


- Secretin and nonvaccination refuted (Demichelli et al., 2005; Williams et al., 2005, Cochrane Reports)
- Chelation implausible and risky (Kane, 2006, Pittsburgh Post-Gazette)
- Other CAM interventions under-researched
 - Available evidence not encouraging (e.g., Elder et al., 2006, JADD, on gluten-free, casein-free diet)
 - Additional research underway

Hyperbaric Oxygen Therapy

- Intended to reduce oxidative stress
- Involves presenting pure oxygen at high atmospheric pressure





**University of Houston-Clearlake &
Downtown**

The Rap on Applied Behavior Analysis

- Most extensive and careful research on interventions for individuals with autism
- *BUT* evidence and benefits often exaggerated, according to critics
(*e.g., Herbert et al., SRMHP, 2002*)



Initial Efficacy Studies

Demonstrate that intervention may produce change

Provide opportunities to hone treatment techniques

Feasible in a variety of settings

Sometimes may suffice to demonstrate potential utility of intervention

- e.g., intervention is a straightforward, stand-alone procedure such as an approach for teaching self-help skills

Examples of skills-focused interventions with initial efficacy data

Discrete trial training (*Smith, 2001, Focus*)

- highly structured procedure with short and clear teacher instructions, methods for prompting correct responses and fading responses, and giving immediate reinforcement

Script fading (*Bellini et al., 2007, JADD*)

- presenting a script for a social interaction or other skill and then removing the script

Incidental teaching (*Delprato et al., 2001, JADD*)

- instruction embedded in naturally-occurring activities

Skills-Focused Interventions (cont.)

- Functional Communication Training (Horner et al., 2002, *JADD*):
 - teaching communication skills to replace challenging behavior
- Differential reinforcement for appropriate vs. inappropriate behavior (Horner et al., 2002)
- Peer-mediated social skills training (Schwartz & Strain, 2001, *Focus*)
 - coaching peers to model or tutor social skills
- Discrimination training procedures (Green, 2001, *Focus*; Walker, 2008, *JADD*)
- Parent involvement (Odom et al., 2003, *Focus*)

Example of Comprehensive Intervention: Early Intensive ABA

- Much interest focused on early intensive behavioral intervention (EIBI)
- 20-40 hours of individual instruction
- Beginning at age 4 years or younger and lasting 2-3 years



EIBI

- Many EIBI models, but UCLA/Lovaas approach most extensively studied



Children with Pervasive Developmental Disorder

Smith, Groen, & Wynn (2000, AJMR)

Participants: N = 28, 14 with autism, 14 with PDDNOS

- Chronological age \leq 42 months
- Ratio IQ between 35 and 75
- Absence of other major medical problems (e.g., cerebral palsy)

Groups: Stratified random assignment

- Intensive Treatment ($n = 15$):

Intended: 30 hrs/wk of one-to-one-treatment for 2-3 years

Actual: $M = 24.52$ hrs/wk for 33.44 months

- Parent Training ($n = 13$):

5 hrs/wk of individualized, in-home training for 3 months

Measures

Intake/Follow-up Assessments

Bayley/Stanford-
Binet

Merrill-Palmer

Reynell

Vineland

Intake Only

Family Background

Follow-up Only

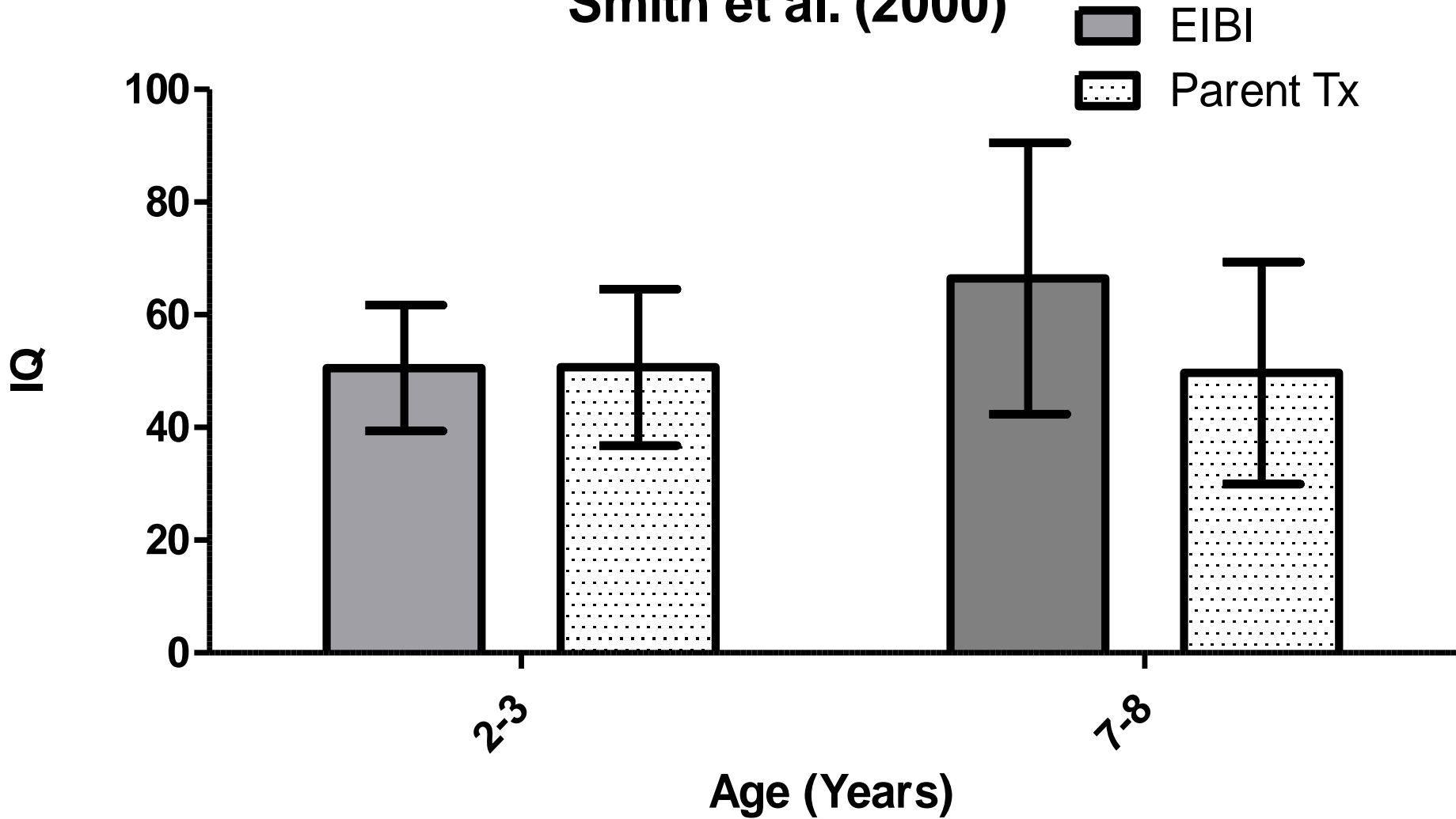
Parent Satisfaction

Wechsler Individualized
Achievement Test

Child Behavior Checklist

Teacher Report Form

Smith et al. (2000)



Results of Smith et al. (2000)

- At follow-up, EIBI group outperformed comparison group in several important areas:
 - +16 IQ points
 - +27 points on test of academic achievement
 - +15 months in visual-spatial skills
 - 4 of 15 fully included in general education (compared to 0 of 13 in comparison group)

Additional Results

- Trend toward higher language scores in EIBI group
- High parent satisfaction in both groups
- *But* no significant difference between groups in adaptive behavior (Vineland) or problem behavior

Subsequent EIBI Research

- Many more EIBI studies, especially after 2005

UCLA Model

Eikeseth, Smith et al. (2002, 2007, BMod)

Sallows & Graupner (2005, AJMR)

Eldevik, Smith et al. (2006, JADD)

Cohen, Amerine-Dickens & Smith (2006, JDBP)

Hayward et al. (2009)

Other EIBI Programs

Howard et al. (2005, RIDD)

Reed et al. (2007, JADD)

Remington et al. (2007, AJMR)

Zachor et al. (2007, RASD)

Magiati et al. (2007, AJMR)

Perry et al. (2008, RASD)

EIBI Studies

- 2 randomized clinical trials (both on the UCLA model)
- 10 quasi-experimental studies (3 on UCLA Model)
 - Studies with EIBI group and non-EIBI group
 - Children assigned to groups based on parent preference or availability of EIBI rather than at random
- 10 studies with only an EIBI group
 - No control for progress that might have occurred without treatment

Does EIBI work?

Most reviewers say “yes”

Spreckley & Boyd (2009) disagree, citing insufficient evidence

Most reviewers note serious

methodological limitations such as:

- Unclear amounts of treatment
- Limited range of outcome measures
- Small sample sizes

If EIBI does work, how big are the effects?

- Estimates from meta-analysis (statistical synthesis of research findings):
- Reichow & Wolery (2009)
 - Mean effect size for IQ = 0.69
 - Average child in EIBI has more favorable outcome than 75% of children not in EIBI
 - Considered fairly large effect

Effect size (cont.)

- Eldevik et al. (2009)

Average effect size of 1.10 for IQ

- Average child in EIBI has higher IQ than 86% of comparison children
- Average effect size of 0.66 for adaptive behavior
 - Average child in EIBI has more advanced adaptive behavior than 75% of comparison children

Effect size (cont.)

Eldevik et al. (2010):

- Individual children making reliable change:
 - IQ: 27.1% in EIBI vs. 9.9% in comparison groups
 - Adaptive behavior: 19.2% in EIBI, 7.0% in comparison groups
- Number Needed to Treat: 4.5 for IQ, 7.0 for adaptive behavior

Possible Active Ingredients (*Kasari, 2002, JADD*)

Amount of treatment

- How many hours per week for how long?

Intervention method

- Most studies on discrete trial training, but would other, more child-led ABA approaches be better?

Content

- What skills should be taught?

Amount of treatment

Some writers conclude that the most intensive programs (30+ hours) may be most effective (Eldevik et al., 2009; Reichow & Wolery, 2009)

- However, others say this conclusion is premature (Rogers & Vismara, 2008)

Most changes may occur in the first year (Howlin et al., 2009)

Method and Content

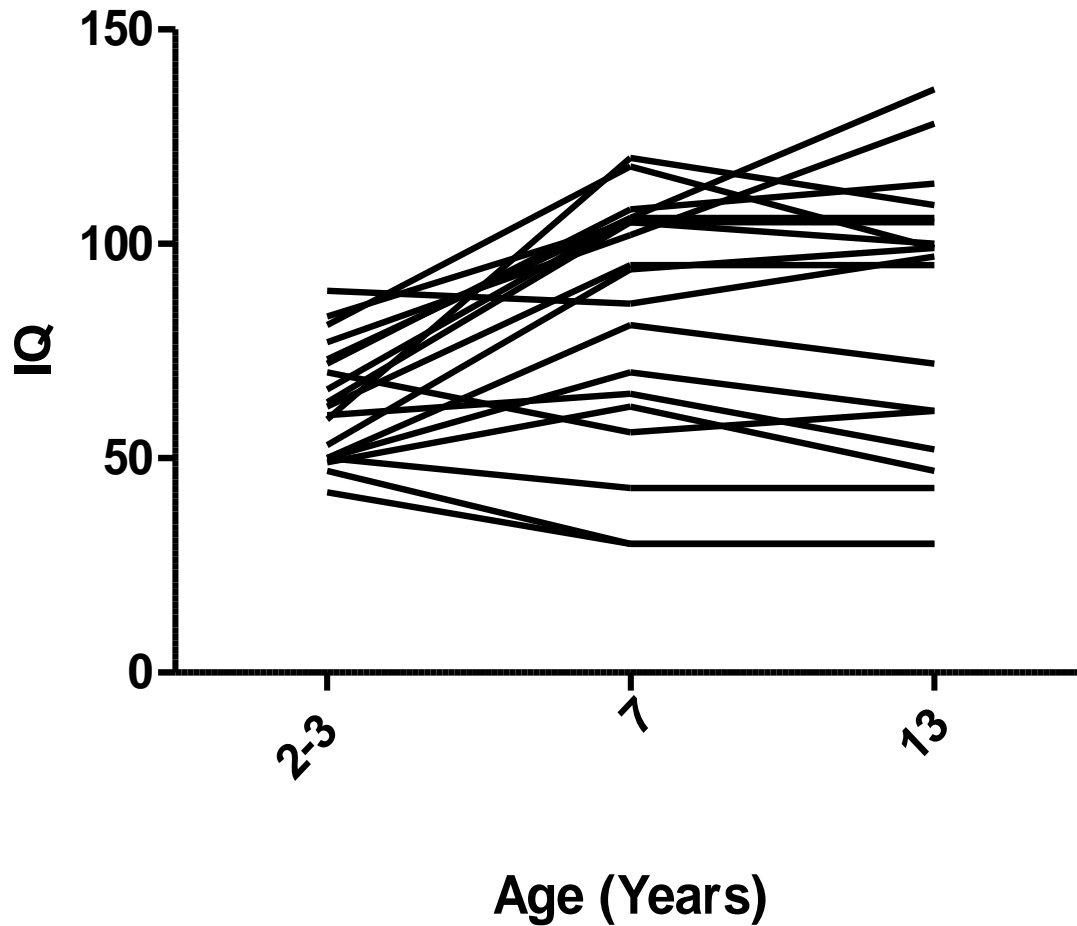
No studies currently available

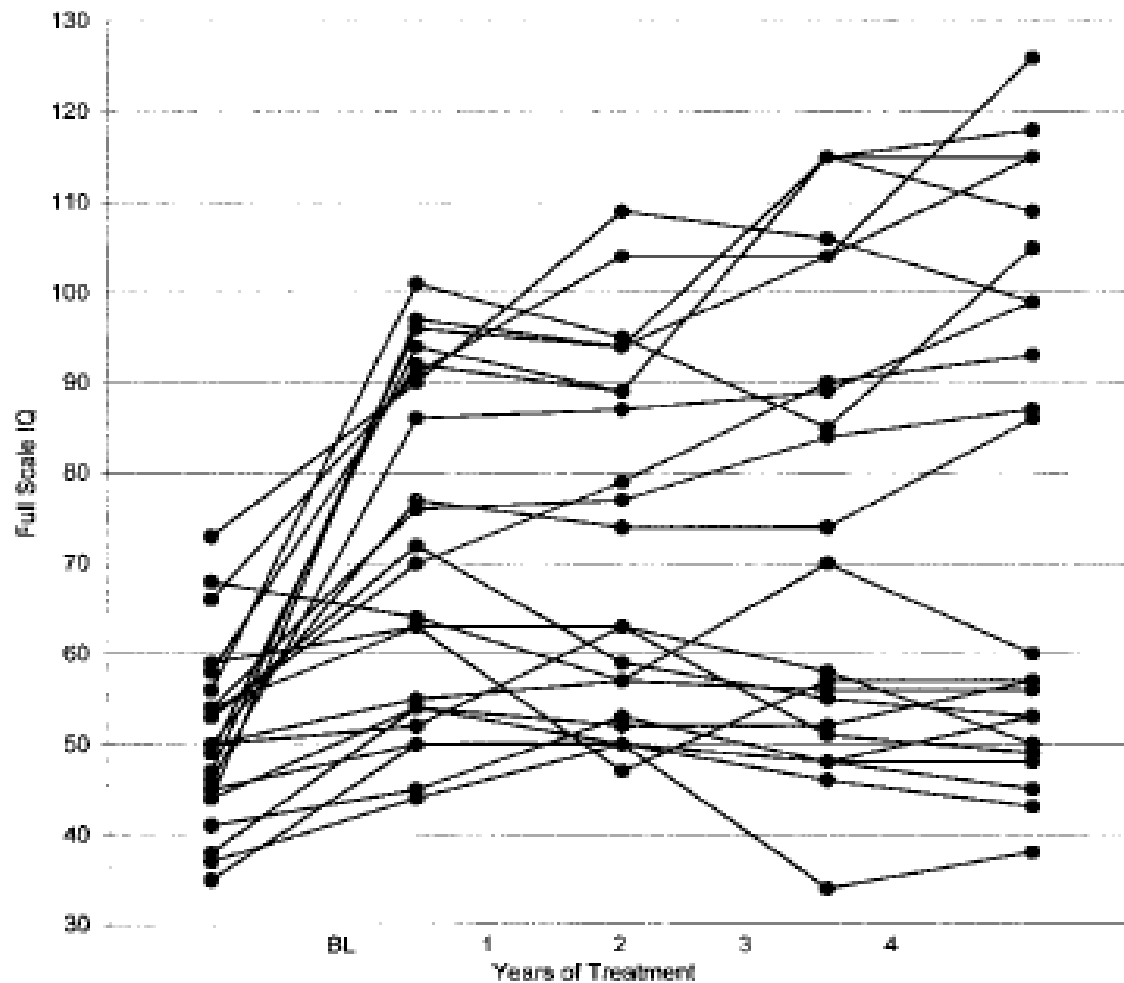


Individual differences

All studies report wide individual differences in outcome

IQ of Individual EIBI Children in Lovaas (1987)





Sallows & Graupner, (2005)

Figure 1. Changes in Full Scale IQ during 4 years of behavioral treatment.

Predictors of Response

Still not entirely clear

Some evidence that children who are higher-functioning initially may benefit more

Age not associated with outcome among preschoolers

Predicting outcome of EIBI

(Smith, Klorman, & Mruzek, 2009, in progress)

Case series of 71 children with autism in EIBI

- M(SD) age = 3.24 years (0.69)

Predicting outcome of EIBI (cont.)

Predictors:

- Age
- IQ
- Social communication (measured by observation and parent report)
 - Imitation
 - Joint attention
 - Requesting

Independently of IQ, social communication predicts 1 year outcome

Conclusions

- Most evidence indicates that EIBI works
 - UCLA/Lovaas Model is the most extensively tested EIBI approach
- EIBI may be most effective for higher functioning children and when given intensively
- Little information on other active ingredients
- Still need well-designed clinical trials with large samples and an array of predictors and outcome measures

For more information, please go to the main website and browse for workshops on this topic or check out our additional resources.

Additional Resources

Online resources:

1. Association for Science in Autism Treatment: www.asatonline.org
2. National Institute of Mental Health: <http://www.nimh.nih.gov/health/publications/autism/complete-index.shtml>
3. Society of Clinical Child and Adolescent Psychology website: <http://effectivechildtherapy.com>

Books:

1. Smith, T. (2011). Applied behavior analysis and early intensive intervention. In D. G. Amaral, G. Dawson, & D. H. Geschwind (Eds.), *Autism Spectrum Disorders* (pp. 1037-1055). New York: Oxford University Press.

Selected Peer-reviewed Journal Articles:

1. Eikeseth, S., Smith, T., Eldevik, S., & Jahr, E. (2007). Outcome for children with autism who began intensive behavioral treatment between age four and seven: A comparison controlled study. *Behavior Modification, 31*, 264-278.
2. Eldevik, S., Hastings, R. P., Hughes, J. C., Jahr, E., Eikeseth, S., & Cross, S. (2009). Meta-analysis of early intensive behavioral intervention for children with autism. *Journal of Clinical Child and Adolescent Psychology, 38*, 439-450.
3. Lord, C., Wagner, A., Rogers, S., Szatmari, P., Aman, M., Charman, T., et al. [Smith, T., 20th author] (2005). Challenges in evaluating psychosocial interventions for autistic spectrum disorders. *Journal of Autism and Developmental Disorders, 35*, 696-708.
4. Remington, B., Hastings, R. P., Kovshoff, H., degli Espinosa, F., Jahr, W., Brown, T., et al. (2007). A field effectiveness study of early intensive behavioral intervention: Outcomes for children with autism and their parents after two years. *American Journal on Mental Retardation, 112*, 418-438.
5. Rogers, S. J., & Vismara, L. A. (2008). Evidence-based comprehensive treatments for early autism. *Journal of Clinical Child and Adolescent Psychology, 37*, 8-38.
6. Sallows, G., & Graupner, T. (2005). Intensive behavioral treatment for autism: Four-year outcome and predictors. *American Journal on Mental Retardation, 110*, 417-436.
7. Smith, T., Groen, A., & Wynn, J. W. (2000b). Randomized trial of intensive early intervention for children with pervasive developmental disorder. *American Journal on Mental Retardation, 104*, 269-285.

