Evidence-Based Practices for Children with Autism Spectrum Disorders

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Conflicts of Interest / Disclosure

- Conflict of Interest:
  - Receive royalties from publications.
  - But no conflicts of interest
Overview

- Background and overview of Evidence-Based Practice
  - Google and EBP
- EBP&Ts in Autism
- Conclusions and future directions
- Additional readings, resources, and references
Evidence-Based Practices
Evidence-Based Practice

- Early (and still relevant) definition of evidence-based medicine (Sacket et al., 1995)
  - Three areas
    - Best research evidence
    - Clinical expertise
    - Patient values
Evidence-Based Practice

• Evidence-based practice (EBP)
  – Sometimes termed evidence based medicine (EBM)
  – Uses best empirical data as a basis for systematic decision making
  – Data/results that support EBP can come from several sources
    • These range in levels of rigor and significance from:
      – Meta-analytic studies and reviews of double blind, placebo controlled trials to
      – Much less controlled studies, e.g., without blind or control, or of case series
      – Single case reports
      – Accepted knowledge

• Origins of EBP
  – A. Cochrane (1972) *Effectiveness and Efficiency: Random Reflections on Health Services* subsequent development of Cochrane Collaboration
  – McMaster Group (Sackett and Guyatt – latter coined term)
EBP: Best Research Evidence

- Part of EBP is evaluating the quality of research
- Multiple standards for EBP
  - Vary by defining organization
  - One “gold standard”
    - At least 2 randomized controlled trials
  - Multiple other standards
  - Discrepant findings and recommendations
  - Has been especially problematic in ASDs
Some Thoughts on EBP

• Evidence-Based Practice movement gaining steam
  – Education
  – Insurance
  – This has advantages and disadvantages
• When possible, it is probably best to choose EBP
• Continued efforts to identify EBP in Autism
  – Much progress has been made
  – Within this work is an emphasis on finding the participant characteristics and treatment characteristics most likely to produce optimal outcomes
• Even with EBPs, data must be collected to ensure treatments are having the desired effect
  – Not all EBPs are effect for all children
When EBPs Don’t work...

- I strongly advocate choosing an EBP whenever possible
  - Sometimes practices “classified” as EBP might not work for your student
    - No treatment in ASD works for all children
- Sometimes, especially in ASD, you will have to chose a non-EBP
  - There are likely treatments that are effective that aren’t classified yet as EBPs
Now on to: Patient Values and Choice
Health Information

- Old way = doctor or other professional
- New way = Internet

<table>
<thead>
<tr>
<th>Search Queries</th>
</tr>
</thead>
<tbody>
<tr>
<td>sore throat and fever</td>
</tr>
<tr>
<td>sore throat and fever in adults</td>
</tr>
<tr>
<td>sore throat and fever and body aches</td>
</tr>
<tr>
<td>sore throat and fever and headache</td>
</tr>
<tr>
<td>rash and mouth ulcers</td>
</tr>
<tr>
<td>rash and mouth</td>
</tr>
<tr>
<td>rash and mouth pain</td>
</tr>
</tbody>
</table>
Patient Knowledge

- People now turn to the Internet (WWW)
  - Searching for medical information one of most common uses of Internet
    - 2005 study, was most common method for parents of children with autism (McIntosh et al)
  - Many (and increasing) number of websites on ASDs
    - 1999 – ~100,000 websites (Charman)
    - 2012 - ~ 20,000,000 to 82,000,000 (Reichow et al.)
    - March 13, 2017
      - 92 million hits on google.za
  - Information is uncensored
  - Information quality is mixed
    - Eysenbach et al. 2002
    - Reichow et al., 2012, 2013
Assessment of Website Quality

Results

• Two statistically significant associations between characteristics and website quality estimates – both related to poor quality
  – Product for sale
    • $r_s = -.43$, $p = .018$
  – Promotion of non-EBP
    • $r_s = -.73$, $p < .001$
• These two characteristics highly correlated
  – $r_s = .68$, $p < .001$
    • 6 sites had both, 1 only product, 2 only non-EBP
Assessment of Website Quality

Website Quality Estimate

Product or Service for Sale
Yes
No
Assessment of Website Quality

Website Quality Estimate

Promotion of Non-Evidence-Based Practice
Yes
No
Conclusions Across Studies

- World Wide Web could be a great resource for evidence-based practice
  - Increase consumer knowledge
  - Much information is quite good
- Website quality remains a concern
- No easy method for evaluating website quality
  - Extant scales are difficult to use
- Search engine results constantly changing
Conclusions

Definitive Recommendation

• World Wide Web should not replace other sources of information
  – Can supplement, but NOT supplant
Practical Considerations in Determining Evidence-Based Practices for Children with Autism
Specific issues in EBP for autism

- MANY different disciplines involved
  - Different language, terms, histories, and approaches to research
  - Variability of individuals with autism
    - Within the person (areas of strength/weakness)
    - Across people (range of syndrome expression is enormous)
    - Over time (developmental issues and change)
Multiple Treatments in ASDs

• Most children with ASDs are receiving multiple treatments at once
  – Mean 7 at once (Green et al., 2006)
    • Range 1-47
  – Can make interpretation of research problematic and difficult (Smith, 2000)

• When using multiple treatments, need to monitor treatment's effects to ensure desired results are being achieved
  – And to ensure a new treatment is not adversely affecting current regime

Publications
2015 – almost 5000 papers, would need to read >10 per day to keep up

Data presented in 5 year blocks, source: Medline
Accumulating Evidence . . .

Can be a bit overwhelming...
High quality reviews will be essential
Research Practice Gap

• Social skills group for ASD
  – First described ~ 1984 (Mesibov)
  – These photographs 2002
  – First meta-analysis 2012 (Reichow et al.)
AND YOU MUST BE CAREFUL ...
Garbage In, Garbage Out

• Reviews are only as good as the research it is reviewing

• Stated differently, you can’t make bad research good by combining it with other bad research
Not everything can (should) be combined!
562 + 2150 + 1951 = 4663 **BUT**, people + height + year = nothing
Meta-analyses in Autism

- Watch out for apples and oranges
- Very few meta-analyses have been done on autism interventions
  - Much of what has been done has been done using questionable methods
    - Especially work done on studies using single subject research designs
    - Even some of the work done on interventions studied using group research designs
      - Weaknesses should be acknowledged
Evidence-Based Treatments for Individuals with ASDs:
Comprehensive Programs
Comprehensive Programs

- Evidence-Based Treatment
  - Early Intensive Behavioral Intervention
  - Pivotal Response Treatment
- Preliminary evidence awaiting replication (confirmation)
  - LEAP
  - ESDM
- Awaiting (definitive) empirical evidence
  - TEACCH
  - Floortime (DIR)
  - RDI
Pivotal Response Treatment

- EBT status: Possibly efficacious (Rogers & Vismara)
  - Evidence-Based based on collection of evidence from single subject experimental design studies
- No large scale (group comparison) study to date
- Treatment aims to improve “pivotal” behaviors
  - i.e., behaviors that if changed will cause additional behaviors to change
- Behaviorally based treatment using many naturalistic and incidental methods
- Often delivered through parent training and education
[Intervention Review]

**Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders (ASD)**

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Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders (ASD)

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ABSTRACT

Background
The rising prevalence of autism spectrum disorders (ASD) increases the need for evidence-based behavioral treatments to lessen the impact of symptoms on a child's functioning. At present, there are no curative or psychopharmacological therapies to effectively treat all symptoms of the disorder. Early intensive behavioral intervention (EIBI), a treatment based on principles of applied behavior analysis delivered for multiple years at an intensity of 20 to 40 hours per week, is one of the more well-established treatments for ASD.

Objectives
To systematically review the evidence for the effectiveness of EIBI in increasing the functional behaviors and skills of young children with ASD.

Search methods
We searched the following databases on 22 November 2011: CENTRAL (2011 Issue 4), MEDLINE (1948 to November Week 2, 2011), EMBASE (1980 to Week 46, 2011), PsycINFO (1806 to November Week 3, 2011), CINAHL (1937 to current), ERIC (1966 to current), Sociological Abstracts (1952 to current), Social Science Citation Index (1970 to current), WorldCat, metaRegister of Controlled Trials, and Networked Digital Library of Theses and Dissertations. We also searched the reference lists of published papers.

Selection criteria
Randomized control trials (RCTs), quasi-randomized control trials, or clinical control trials (CCTs) in which EIBI was compared to a no-treatment or treatment-as-usual control condition. Participants must have been less than 6 years old at treatment onset and assigned to their study condition prior to commencing treatment.

Data collection and analysis
Two authors independently selected and appraised studies for inclusion and assessed the risk of bias in each included study. All outcome data were continuous, from which standardized mean difference effect sizes with small sample correction were calculated. We conducted random-effects meta-analysis where possible, which means we assumed individual studies would provide different estimates of treatment effects.

Main results
One RCT and four CCTs with a total of 203 participants were included. Reliance on synthesis from four CCTs limits the evidential base and this should be borne in mind when interpreting the results. All studies used a treatment-as-usual comparison group. We synthesized the results of the four CCTs using a random-effects model of meta-analysis of the standardized mean differences. Positive effects in favor of the EIBI treatment group were found for all outcomes. The mean effect size for adaptive behavior was g = 0.69 (95% CI from 0.38 to 1.01; P < 0.0001). The mean effect size for IQ was g = 0.76 (95% CI from 0.40 to 1.11; P < 0.0001). Three measures of communication and language skills all showed results in favor of EIBI: expressive language g = -0.50 (95% CI from 0.05 to 0.95; P = 0.03), receptive language g = -0.57 (95% CI from 0.20 to 0.94; P = 0.03), and daily communication skills g = -0.74 (95% CI from 0.30 to 1.18; P = 0.0099). The mean effect size for socialization was g = -0.42 (95% CI from 0.11 to 0.73; P = 0.0008), and for daily living skills was g = -0.55 (95% CI from 0.24 to 0.87; P = 0.0005). Additional descriptive analyses of other aspects related to quality of life and psychopathology are presented. However, due to the inclusion of non-randomized studies, there is a high risk of bias and the overall quality of evidence was rated as 'low' using the GRADE system, which rates the quality of evidence from meta-analyses to determine recommendations for practice.

Authors' conclusions
There is some evidence that EIBI is an effective behavioral treatment for some children with ASD. However, the current state of the evidence is limited because of the reliance on data from non-randomized studies (CCTs) due to the lack of RCTs. Additional studies using RCT research designs are needed to make stronger conclusions about the effects of EIBI for children with ASD.

PLAIN LANGUAGE SUMMARY

Early intensive behavioral intervention (EIBI) for increasing functional behaviors and skills in young children with autism spectrum disorders (ASD)

Early intensive behavioral intervention (EIBI) is one of the most widely used treatments for children with autism spectrum disorder (ASD). The purpose of our review was to examine the research on EIBI. We found a total of five studies that compared EIBI to generic special education services for children with ASD in schools. Only one study randomly assigned children to a treatment or comparison group, which is considered the 'gold standard' for research. The other four studies used parent preference to assign children to groups. We examined and compared the results of the five studies. A total of 203 children (all younger than six years old when they started treatment) were included in the five studies. We found that children receiving the EIBI treatment performed better than children in the comparison groups after about two years of treatment on tests of adaptive behavior (behaviors that increase independence and the ability to adapt to one's environment), intelligence, social skills, communication and language, autism symptoms, and quality of life.

The evidence supports the use of EIBI for some children with ASD. However, the quality of this evidence is low as only a small number of children were involved in the studies and only one study randomly assigned children to groups.

Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders (ASD) (Review)

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EIBI for ASD

- Cochrane Database of Systematic Reviews
  - Protocol 2011, Full review 2012
- Included RCTs and CCTs
  - 5 studies included (1 RCT, 4 CCT)
- All participants < 6 years old
- Primary outcome: Adaptive behavior
- Multiple secondary outcomes
- Meta-analysis of CCTs (random effects model)
- GRADE Profile
EIBI for ASD: Primary Outcome (Adaptive Behavior)

### Study or Subgroup

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>EIBI Mean</th>
<th>SD</th>
<th>Total</th>
<th>TAU Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith 2000</td>
<td>62.1</td>
<td>29.7</td>
<td>15</td>
<td>58.5</td>
<td>16.6</td>
<td>13</td>
<td>0.0%</td>
<td>0.14 [-0.60, 0.89]</td>
<td>2000</td>
</tr>
<tr>
<td>Howard 2005</td>
<td>81.3</td>
<td>11.1</td>
<td>25</td>
<td>69.3</td>
<td>12.9</td>
<td>16</td>
<td>22.3%</td>
<td>1.00 [0.33, 1.66]</td>
<td>2005</td>
</tr>
<tr>
<td>Cohen 2006</td>
<td>79.0</td>
<td>19.7</td>
<td>21</td>
<td>67.1</td>
<td>14.3</td>
<td>21</td>
<td>25.5%</td>
<td>0.68 [0.05, 1.30]</td>
<td>2006</td>
</tr>
<tr>
<td>Remmington 2007</td>
<td>202.8</td>
<td>62</td>
<td>23</td>
<td>182.9</td>
<td>58.9</td>
<td>21</td>
<td>28.0%</td>
<td>0.32 [-0.27, 0.92]</td>
<td>2007</td>
</tr>
<tr>
<td>Magiati 2007</td>
<td>57.5</td>
<td>10.1</td>
<td>28</td>
<td>48.6</td>
<td>10.7</td>
<td>16</td>
<td>24.1%</td>
<td>0.85 [0.21, 1.49]</td>
<td>2007</td>
</tr>
</tbody>
</table>

### Total (95% CI)

- Mean: 97, SD: 74, 100.0%
- Std. Mean Difference: 0.69 [0.38, 1.01]

Heterogeneity: Tau^2 = 0.00; Chi^2 = 2.49, df = 3 (P = 0.48); I^2 = 0%
Test for overall effect: Z = 4.29 (P < 0.0001)
## Summary of Findings for the Main Comparison

**Early intensive behavioral intervention for increasing functional behaviors and skills for young children with autism spectrum disorders (ASD)**

**Patient or population:** Young children with ASD  
**Settings:** Home  
**Intervention:** Early intensive behavioral intervention

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Relative effect (95% CI)</th>
<th>No of Participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assumed risk</td>
<td>Corresponding risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Early Intensive Behavioral Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adaptive behavior</strong> (composite)</td>
<td>The mean adaptive behavior composite score in the control groups was 0.36 standard deviations lower at post-treatment compared to pre-treatment (0.78 lower to 0.05 higher)(^1)</td>
<td>The mean adaptive behavior composite score in the intervention groups was 0.69 standard deviations higher (0.38 to 1.01 higher)(^2)</td>
<td>171 (5 studies(^4))</td>
<td>★★☆☆☆</td>
<td>low(^5,6)</td>
</tr>
</tbody>
</table>

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).  
CI: Confidence interval

**GRADE Working Group grades of evidence**

- **High quality:** Further research is very unlikely to change our confidence in the estimate of effect.
- **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- **Very low quality:** We are very uncertain about the estimate.

---

\(^1\) This is a difference in standard deviations calculated for the TAU group from change scores before and after the intervention period.  
\(^2\) Relative effect for TAU calculated on pre-post change for control groups from Cohen, Howard, and Magiati studies (Remington excluded because only raw scores were reported).
EIBI for ASD: Secondary Outcomes

- IQ: $d = .76$ (95% CI .40-1.11)
- Expressive language: $d = .50$ (95% CI .05-.95)
- Receptive language: $d = .57$ (95% CI .20-.94)
- Socialization (VABS): $d = .42$ (95% CI .11-.73)
- Quality of life (DLS VABS): $d = .55$ (95% CI .24-.87)
EIBI for ASD (2012)

- Test of homogeneity
  - $Q(3) = 2.5, p = .48$
  - $I^2 = 0\%$
  - Underpowered
  - Limited number of studies would not have allowed moderator analyses regardless of heterogeneity
- Not enough studies to examine publication bias
  - Current Cochrane policy is 10 or more for funnel plot
- Collectively, results provide evidence EIBI is an EBP for improving functional skills for young children with ASD
EIBI Meta-Analyses Limitations

- Caveat Emptor: Apples and Oranges
- Reviews inconsistently characterized (defined) EIBI treatments
  - Across 7 meta-analyses, overlap of 0 studies in statistical synthesis
Evidence-Based Treatments for Individuals with ASDs:
Selected Focal Treatments
Behavioral Packages

• EBP Status:
  – Established (NAC, 2009; Powers et al., 2011; NPDC)
  • For increasing academic skills, communication, interpersonal skills, learning readiness, personal responsibility, play skills and self regulation and decreasing problem behavior, repetitive behaviors, and regulatory behaviors for individuals with autistic disorder and PDD-NOS between the ages of 0 and 21-years-old

• Description:
  – use of basic behavioral principles and techniques to reduce unwanted behaviors while increasing functionally equivalent alternative behaviors

• Examples – discrete trial training, functional communication training, differential reinforcement
Imitation and Modeling

- EBP Status:
  - Established (NAC, 2009; NPDC); Promising (Reichow & Volkmar, 2010; Ferraioli & Harris, 2011)
  - For increasing communication, higher cognitive functions, interpersonal skills, learning readiness, personal responsibility, and play skills and for decreasing problem behaviors and for individuals with autistic disorder, Asperger’s syndrome, and PDD-NOS between the ages of 3 and 18-years-old

- Description:
  - Can be live (in vivo) or video
  - Adult or peer provides a visual and/or oral demonstration of the desired behaviors, which is followed by an opportunity for child with ASD to repeat and be reinforced.
  - Often paired with other behavioral techniques
Naturalistic Teaching Strategies

• EBP Status:
  – Established (NAC, 2009; NPDC)
  • For increasing communication, interpersonal skills, learning readiness, and play skills for individuals with autistic disorder and PDD-NOS from birth to 9-years-old

• Description:
  – Typically, a child directed interaction is used to set the stage for a learning opportunities, that is then structured using behavioral techniques such as modeling, providing choices, and successive reinforcement of approximations
  – aka, incidental teaching, milieu teaching, responsive teaching, embedded learning
Peer Training / Mediated Strategies

- EBP Status
  - Established (NAC, 2009; NPDC); Promising (Ferraioli & Harris, 2011)
  - For increasing communication, interpersonal skills, and play for individuals with autistic disorder and PDD-NOS between the ages of 0 and 21-years-old

- Description:
  - teaching children without disabilities how to facilitate play and social interactions with their peers with ASD

- Examples (techniques):
  - Peer buddies, peer networks, circle of friends, play groups, peer initiation training
Visual Support and Schedules

• EBP Status
  – Established (NAC, 2009; NPDC)
    • For increasing self-regulation for individuals with autistic disorder between the ages of 3- and 14-years-old

• Description:
  – presenting the child with a sequence of activities (daily schedule) or a task analysis of how to complete an activity (activity schedule). The form of the schedule is typically individualized to the learners cognitive level and might include a schedule using written words, pictures, photographs, or objects. Often, schedules can be incorporated into work systems

• Examples to follow
**Daily Schedule: Cameron**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:50</td>
<td>Breakfast</td>
<td></td>
</tr>
<tr>
<td>9:20</td>
<td>Morning Groups</td>
<td></td>
</tr>
<tr>
<td>10:00</td>
<td>Reading Centers</td>
<td>Ms. Osborne</td>
</tr>
<tr>
<td>11:10</td>
<td>Math Centers</td>
<td>Ms. Osborne</td>
</tr>
<tr>
<td>11:30</td>
<td>Carve Pumpkin</td>
<td>Mr. Reichow</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td>Mr. Reichow</td>
</tr>
<tr>
<td>12:45</td>
<td>Story</td>
<td>Ms. Osborne</td>
</tr>
<tr>
<td>1:00</td>
<td>Dismissal</td>
<td>Mr. Reichow</td>
</tr>
</tbody>
</table>
Schedules
Schedules

Make Valentines Card

Fold

Cut

Glue

Write Happy Valentines

Write Jeremy
Work Systems

- Emerging evidence on the effectiveness of work systems
- Based largely on the work of TEACCH (Mesibov et al., 2005)
- Helps a child understand 4 things (Mesibov):
  - How much do I need to do?
  - What work do I do?
  - When is the work finished?
  - What do I do next?
- Can increase independence
- Often used in special education settings
  - Can be incorporated into general education and home settings
Organization – Work Systems
Work Systems

(Bennett, Reichow et al. 2011)
Work Systems

(Bennett, Reichow et al. 2011)

Figure 3. Percentage Data for Evette

Figure 4. Duration Data for Evette
Visual Structure
Social Stories / Social Narratives

• EBP Status:
  – Established (NAC, 2009; NPDC); Promising (Ferraioli & Harris, 2011)
  • For increasing interpersonal skills and self-regulation for individuals with autistic disorder between the ages of 6- and 14-years-old

• Description:
  – a written description of the situations under which specific behaviors are expected to occur. Stories may be supplemented with additional components (e.g., prompting, reinforcement, discussion, etc.). Social Stories™ are the most well-known story-based interventions and they seek to answer the “who,” “what,” “when,” “where,” and “why” in order to improve perspective-taking
Social Stories / Social Narratives

Let's talk

Talking is one of the many things that I can do when I am with my friends.

Sometimes Joey writes a story about the same topic for many days. In first grade students write about different topics everyday. Joey will write about different topics everyday too. Ms. Westland, Ms. Vaughn, Ms. Potter, and Ms. Odum will all help Joey learn how to write about different topics in first grade. On Monday mornings, Ms. Odum will help Joey choose five different topics to write about during the week. Joey and Ms. Odum will write down these topics and put the list inside of Joey’s writing folder. Each day of the week will have a different topic for Joey to write about. Joey will write a story about a different topic everyday.
Talking to other people is something that all people do. People talk to other people for different reasons. Some people talk to others to find out information. Some people talk to others to have a conversation. Other people talk to people to tell them what they want. Many people enjoy talking to other people. Joey enjoys talking to other people.
Social Skills Group Interventions

• Cochrane Review Reichow, Steiner, & Volkmar (2012)
  – Included 5 RCTs
  – Findings:
  • On average, it appears individuals receiving social skills groups interventions make limited progress on standardized measures of social behavior
    \[-g = .47\]
  • 2 studies looked at emotional recognition \((g \sim .4)\)
  • 2 studies looked at loneliness
    \[-tx \text{ less lonely}\]
  • 1 study looked at parental and child depression
    \[-\text{no change (difference)}\]
Social Skills Group Interventions
# Cochrane Review – SSG: Social Competence

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laugeson 2009</td>
<td>18.1%</td>
<td>0.81 [0.10, 1.52]</td>
<td>2009</td>
</tr>
<tr>
<td>Frankel 2010</td>
<td>37.8%</td>
<td>0.48 [-0.00, 0.96]</td>
<td>2010</td>
</tr>
<tr>
<td>Lopata 2010</td>
<td>20.2%</td>
<td>0.68 [0.01, 1.35]</td>
<td>2010</td>
</tr>
<tr>
<td>Koenig 2010</td>
<td>23.9%</td>
<td>0.03 [-0.58, 0.65]</td>
<td>2010</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>100.0%</td>
<td><strong>0.47 [0.16, 0.78]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.01; Chi² = 3.17, df = 3 (P = 0.37); I² = 5%

Test for overall effect: Z = 2.99 (P = 0.003)
Effect sizes much smaller than clinical problem – $d \sim 3.0$!
EBP in Autism

- Treatments that are Established EBP (National Standards Project; NAC, 2009)
  - 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
EBP in Autism

• Treatments that are emerging EBP
  (National Standards Project; NAC, 2009)
  – AAC, CBT, RDI, exercise, exposure package, imitation-based interactions, initiation training, language training (production), language training (production and understanding), massage/touch therapy, multi-component package, music therapy, peer-mediated instructional arrangement, PECS, reductive package, scripting, sign, social communication intervention, social skills package, structured teaching, technology-based treatment, theory of mind training
Common Focal Treatments Not Yet Established as Evidence-Based
Important Consideration…

- When synthesizing research, what is done with:
  - Studies that do not show effects?
  - Studies that show negative effects?

- Lilienfeld (2005)
  - Scientifically Questionable Treatments (SQT)
    - Somatic (e.g., secretin, elimination diets, etc)
    - Psychosocial interventions (FC, SI)
Mixed or Inconclusive Evidence

• Sensory integration
  – Schaaf (2011)
    • Individual components have little support (e.g., weighted vests, sensory diet, Wilbarger)
    • Integrated package including good teaching starting to accumulate supporting evidence

• Weighted Vests
  – Frequently used treatment
  – Much (most) evidence suggest ineffective
    • Reichow et al., Cox et al., see Carter review
Treatments Shown Not to Work

• Facilitated Communication
  – SIGN (2007)

• Secretin
  – One of most studied treatments in autism
    • Far and away “treatment” studies using most RCTs
  – All reviews suggest no positive effects:
    • SIGN (2007)
    • Hyman & Levy (2011)
    • Cochrane Review (2009)
Concluding Thoughts
Outcomes for Individuals with ASD

- Generally closely related to level of cognitive ability
- It is probably (almost certainly) the case that outcome is improving – probably reflect a range of factors
  - Earlier diagnosis and intervention (prevention of secondary disabilities)
  - Changes in diagnostic practice also may contribute
  - This is NOT a trivial economic (much less human) problem
- The status of evidence base
  - Reasonably good for screening instruments
  - Much more variable for treatment studies
    - The latter partly reflects a (relative) dearth of research on interventions AND the complexities of research in this area and with this population
Outcome studies: 1956-1974  (Howlin 2005)
Why does change occur?

Contributions from/to Development

Autism

Development

Autism has an impact on development
Development has an impact on autism
Developmental issues in treatment

Autism

Development

Minimize the impact of autism
Maximize developmental gains

We believe that early diagnosis and intervention will give us the best opportunity for maximizing and realizing this outcome.
Additional Resources

• National Autism Center
• National Standards Project
• EBP and Autism in the Schools
• Parent’s guide to EBP and Autism
Additional Resources

- Scottish Intercollegiate Guidelines Network
- Guideline 98
- http://www.sign.ac.uk/guidelines/fulltext/98/index.html
  - See also quick guide (2 page summary)
Additional Resources

- NICE Guideline 128
- http://www.nice.org.uk/C G128
  - Mostly about recognition and diagnosis, more updates upcoming
  - Full guidelines, short version, and PARENT version
Additional Resources

- AHRQ
- Effective Health Care Program
  - Comparative Effectiveness Review 26
    - Therapies for Children with ASD
    - Designed for Parents
Additional Resources

- Online Resources
  - Autism Internet Modules
    - http://www.autisminternetmodules.org
  - National Professional Development Center
    - http://autismpdcenter.fpg.unc.edu/
  - National Autism Center
    - http://www.nationalautismcenter.org/
  - Cochrane Collaboration (Library)
    - http://www.cochrane.org
  - Research Autism
    - http://www.researchautism.net
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• Questions: breichow@coe.ufl.edu

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