Applied Behavior Analysis (ABA) for the Treatment of Autism
Wendy Machalicek, Ph.D., BCBA-D
Associate Professor, Special Education
I am a past member and current chair of the Oregon Behavioral Analysis Regulatory Board (BARB), but this presentation reflects best practices in the field of ABA for autism and my own opinions. I am in no way speaking on behalf of the Oregon Health Licensing Office or the BARB.
Agenda

1. Core features of applied behavior analysis
2. ABA service delivery for children with autism
3. What to look for when determining if services are behavior analytic
Behavior Analysis

**Behavior Analysis**

*Scientific study of principles of learning and behavior*

- **Experimental analysis of behavior**
  - *Basic science*

- **Applied behavior analysis (ABA)**
  - *Application of behavior analysis to address socially important issues.*
Applied Behavior Analysis (ABA)

• Assumptions:
  • **Human behavior is understandable**
    • There are fundamental principles of behavior
  • **Human behavior is changeable**
    • Changing features of environments can result in change in behavior patterns
  • **Engineering effective environments will require manipulation of behavioral principles**
Core Behavioral Concepts

• 5 basic elements of behavior
  • Response, Antecedent stimulus, Consequence, Contingency, Setting Event (Establishing Operation)

• 9 key principles of behavior
  • Stimulus control, positive reinforcement, negative reinforcement, positive punishment, negative punishment, extinction, transfer, generalization, maintenance
Five Elements of Behavior

5  2  1  3
Setting Event --> Stimulus--> Response--> Consequence
(Contingency)

4

Illness --> Demand --> Whine --> Escape Demand
(3 out of 5 times)
Principles of Behavior

- Physiology
- Learning History
- Social Context
CB more common when child has seasonal allergies

Mom's attention is diverted

Child climbs on bookshelf

Mom scolds child and then sits with him awhile watching TV

? Attention maintained CB?
Mom had a terrible, long day at work. Child climbs on furniture to obtain Mom's attention while preparing dinner. Mom gives stern talking to child and then sits with him awhile watching TV. Child temporarily stops climbing on furniture.
More attention prior to times when it will be diverted when allergies are present/allergy meds

Allergies → Mom’s attention is diverted

Child climbs on bookshelf → Mom gives stern talking to child and then sits with him awhile watching TV

Differential Reinforcement of alternative and incompatible behavior

Set up child at dining room table in view of mom w/fav toys/choices

Teach child new way to ask for attention, independent play activities
WHAT IS AND IS NOT ABA?
Some examples of ABA in practice

• Discrete Trial Training (DTT)
• Natural Environment Training (NET)
• Picture Exchange Communication System (PECS)
Behavior identification assessment by Masters/PhD level professional (includes standardized assessments, curriculum based assessment, behavioral observation, caregiver interview, interpretation & discussion, prep of report)

Observational behavioral follow up assessment by technician

Technician time

Exposure behavioral follow-up assessment

Adaptive behavior treatment by protocol by technician

Group adaptive behavior treatment by technician

Family adaptive behavior treatment by Masters/PhD level professional (child not present)

Multiple-family group adaptive behavior treatment by Masters/PhD level professional (child not present)

Adaptive behavior treatment social skills group by Masters/PhD level professional (child not present)

Exposure adaptive behavior treatment with protocol mod. Requiring 2 or more technicians for severe maladaptive behavior

**in accordance with Federal Mental Health Parity regulations, beginning on July 1, 2014, the limit of 360 hours per calendar year for ABA services was eliminated.**

Not considered educational services, but **medically necessary** ABA therapy

EXCLUSIONS

ABA treatment is not...

Psychological testing

Long term counseling

**Speech therapy-children should still receive speech therapy and other services**

Occupational therapy

Vocational rehabilitation

School based IFSP or IEP services
Core Behavioral Concepts

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Two major categories of intervention

Comprehensive treatment models (e.g., Early Start Denver Model, Lovaas, May Institute)

Focused intervention (e.g., DTT, visual supports, FBA & behavioral package)

e.g., Odom et al., 2010; Vismara & Rogers, 2010
“Comprehensive interventions are like salads...some common ingredients, but individual ingredients and amounts of ingredients. Each is comprised of different ingredients (focused individualized interventions) that could be eaten on their own”

-Tracy Raulston, M.Ed., BCBA (my doctoral student)
Characteristics of comprehensive treatment models

- Address multiple core symptoms of autism rather than targeting 2-4 behaviors at a time
- Often focus on core deficits: joint attention, imitation, language, and symbolic play
- Intensive (generally 20 or more hours/week) and one to one
- Natural settings
- Active family involvement
- Use manuals and checklists to guide the use of procedures
- Evidence of effectiveness (e.g., strongest have RCT, body of research)

OUTCOMES

- Increase IQ scores
- Positive improvement adaptive behavior
- Improved communication, social skills, play, challenging behavior decreased
- Some evidence long-term improvement, loss of diagnosis
> 30 comprehensive treatment models in the United States (Odom et al., 2010)

• Procedurally well-documented, replicated, experimental evidence of efficacy
  • Lovaas Institute
  • TEACCH
  • Denver
  • LEAP
  • May Institute
  • Princeton Child Development Institute (PCDI)

**New addition: Early Start Denver Model (ESDM)**
Characteristics of focused intervention practices

• Individual interventions or intervention packages that target specific skills or behaviors
• Evidence-based treatments
• Examples: visual supports, discrete trial training
• Are used individually and as components of comprehensive treatment programs
• Assess where child is, set specific goals, select EBP most likely to promote behavioral change, implement intervention with fidelity, take data on behavioral change

OUTCOMES

- Positive improvement adaptive behavior
- Improved communication, social skills, play, challenging behavior decreased
- Short term improvement
Number of evidence-based practices identified to treat symptoms of autism spectrum disorder (National Autism Center 2011, National Professional Development Center on ASD; NPDC 2010 and 2014; Wong et al., 2015)

**STRENGTH OF EVIDENCE**
- 2 or more RCT or quasi-exp designs
- 5 of more single-case research designs
- Combo of at least one RCT and three single-case research designs

*Spans DSM diagnosis & individuals with comorbid diagnoses*
Key considerations

• Earlier interventions have greater impact (e.g., Eikeseth, Smith, Jahr, & Eldevik, 2007).

• For older children, treatment plans may be focused on behaviors or deficits related to ASD that are significantly interfering with social communication, language or adaptive behaviors
  • time-limited and focused ABA interventions have been shown to improve challenging behavior and functional adaptive behavior in school age individuals with autism, including teens (Machalicek et al., 2007; McDonald & Machalicek, 2013)
Intensity of service delivery

• Current professional recommendations are that early intensive behavioral intervention > effective than less intensive EIBI and less intensive EIBI > effective than treatment as usual
• Services may have an intensity of 25 – 40 hours/week (National Research Council, 2001), not to exceed 3 years of service.
  • ABA services of more than 40 hours per week have not been shown to be effective.
• One-to-one setting by an ABA provider
  • As child progresses, treatment in small group settings with several children with ASD may be appropriate.
Some Clinical (ABA) Practices

- discrimination training
- prompting, fading, shaping, chaining
- behavioral momentum
- activity schedules
- behavioral skills training package
- functional communication training
- discrete-trial teaching
- incidental teaching
- self-management
- different types of reinforcement and schedules of reinforcement
- differential reinforcement
- extinction
- generalization and maintenance procedures
- functional assessment and experimental functional analysis
- preference assessments

among a multitude of others (see the BACB Fourth Edition Task List)
Research based models for treating ASD

- Comprehensive early intensive behavioral intervention (EIBI)
- Functional behavior assessment and experimental functional analysis and behavioral packages to decrease challenging behavior
- Applied verbal behavior approach
- Discrete trial training
- Naturalistic interventions based on ABA including natural environment training (NET; Rogers-Warren & Warren, 1980), mand-model (Halle, Alpert, & Anderson, 1984) including EMT and PMT
- The Early Start Denver Model (ESDM)
What should you look for regarding quality of treatment plan?

- Objective, measureable, operationalized goals based on comprehensive educational and behavioral curriculum-based assessments that address identified concerns.
- Goals should utilize small units of behavior that will build upon larger, more significant changes in behavior/skill development.
  - For each goal, this should include baseline measurement using structured behavioral observation and reliable measurement procedures resulting in quantifiable data for analysis.
- Defined programs for teaching each targeted skill based on behavior analytic methods including utilization of reinforcement and other behavioral principles and excludes methods or techniques that lack consensus in peer-reviewed literature on their effectiveness.
- Progress to date as assessed through analysis of continuous behavioral observation data that includes graphed data for a minimum of each week of service.
- Anticipated timeline for achievement of goals based on initial assessment and continued data tracking.
Behavior support

• The treatment of challenging behavior should include implementation of both indirect and direct methods of functional behavior assessment, which includes experimental functional analysis as a gold standard of assessment

• Behavior support plans are linked to the function(s) of the challenging behavior
Treatment of ASD has included these (and other) theoretical orientations/approaches

- **Behaviorism/Applied behavioral analysis (ABA)**
  - B.F. Skinner discovered basic principles and Ivar Lovaas applied many to teach children w/ASD
- **Developmental**
  - Piaget & Vygotsky-self-reflection & discovery, autonomy, stages of learning, zone of proximal development
    - Blended (ABA + Developmental)
      - ESDM, TEACCH model (evidence)
      - SCERTS (no evidence)
- **Bowly-attachment theory**
  - Relationship Development Intervention (RDI) (no evidence)
  - DIR/Floortime (no evidence)
Majority of effective treatment models for use with young children use standard ABA methods (Matson & Jang, 2014)

- Majority of treatment models followed Lovaas/UCLA model methods
- All used standard ABA methods
  - Discrete trial training (DTT)
  - Modeling
  - Prompting
  - Social and edible reinforcers
  - Fading and shaping

(Odom, Boyd, Hall, & Hume, 2010; National Research Council, 2001; Odom et al., 2003; Rogers, 1998)
Eclectic approaches

- Treatment plans that combine ABA with other procedures that lack scientific evidence for addressing the symptoms of ASD should be considered eclectic and should not be funded (Tristram & Wick, 2008).
- Research suggests that a smaller dose of ABA yields better outcomes than a similarly sized dose of an eclectic approach (Dillenburger, 2011; Eldevik et al., 2006; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005).
Curriculum-based assessment

- Curriculum-based assessment with scope and sequence of skills based on typical developmental milestones and targeting the symptoms of autism

Iovanne, Dunlap, Huber, & Kinkaid, 2003; Wallace & Rogers, 2010
Some examples of such curriculum-based measures

• For instance...
  • Assessment of Basic Learning and Language Skills-Revised (ABLLS-R)
  • Shaping Knowledge Through Individualized Life Learning Systems (SKILLS) Index (CARD-Center for Autism & Related Disorders, Inc. assessment)
  • Early Start Denver Model
  • Essentials for Living
  • PEAK Relational Training System
  • Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP)
  • Interviews, rating scales, functional behavior assessment and experimental functional analysis, preference assessments
Documentation of individual treatment plan

- Objective, measureable, operationalized goals
- Baseline measurement resulting in quantifiable data for analysis
- Defined programs for teaching each goal based on behavior analytic methods
  - reinforcement and other behavioral principles
  - excludes methods/techniques that lack consensus in peer-reviewed literature on their effectiveness
- progress to date as assessed through graphed data
- anticipated timeline for achievement of goals based on initial assessment and continued data tracking
Commonly assessed domains

- Social interaction
- Language
- Challenging Behavior
- Listener responding
- Academic skills
- Motor skills
- Play
- Self-help
- Imitation
Potential treatment goals

• Prerequisite skills to obtaining benefit from EIBI
  • compliance, interfering challenging behaviors, attending to instructional stimuli, choice making, imitation skills, joint attention, and following directions (Frea & McNerney, 2008)

• Addressing general symptoms such as social communication deficits, restricted, repetitive and nonfunctional patterns of behavior, interests, or activity

• Compliance with medical, dental or hygiene procedures

• Sleep, feeding disorders, delayed toilet training

• Severe challenging behavior
  • self-injury, aggression, threats of harm to self or others, pica, elopement, feeding disorders, stereotypic motor or vocal behavior, property destruction, maladaptive social behavior, noncompliance, etc.
Clearly written objectives

**Requesting**

1. When asked, “What do you want?” (with items present and with the use of ASL cues), J will sign [or exchange a picture] to a communication partner to obtain a tangible item for 10 different items over 5 consecutive days. (ABLLS-R, F2)

2. Upon seeing and wanting an item and with the picture of that item in reach, J will pick up the picture, reach to the person holding the item, and release the picture in to that person’s hand [note: if J signs for the item, that will be accepted also] in 10 of 10 opportunities when trainer is in 1 foot for 5 different reinforcers across 2 adults and 3 activities. (PECS Phase I)

**Compliance**

J will follow adult requests with ASL cues (“stand up,” “sit down,” “come here,” “wait”) with 80% accuracy across 10 consecutive days.

**Motor Imitation**

1. Upon request, J will imitate a motor activity with an object (e.g., pretend to drink from a cup, rock a baby doll, etc.) for 10 different actions with 75% accuracy across 5 consecutive school days. (ABLLS-R, D1)

2. Upon request, J will imitate gross motor movements for 5 different actions with 75% accuracy across 5 consecutive days. (ABLLS-R, D3)

**Eating Skills**

J will feed herself with a spoon/fork [adaptive] when given cut food with gestural and verbal prompts for 3 minutes of a meal over 8 consecutive breakfast/lunch sessions. (ABLLS-R, V4)
Progress monitoring

I. Baseline developmental status measured by standardized assessments with age-specific norms (e.g., Vineland Adaptive Behavior Scale)
   I. developmental status as measured by standardized assessments every 1 to 2 years thereafter
   **IQ scores and other global standardized assessments are not appropriate as sole determinants of an individual’s response or nonresponse to ABA treatment.

II. Clinically significant progress in social communication skills, language skills, and adaptive functioning documented by curriculum based measure and/or analysis of graphed data
   • progress assessment (visual and statistical analysis of graphed data for each treatment goal) at least every 6 months
   • Goals must be reported as met, not met, or modified (with explanation)
<table>
<thead>
<tr>
<th>Target Domain and Skill</th>
<th>Previous Level of Performance</th>
<th>Resources/Procedures</th>
<th>Current Level of Performance</th>
<th>Mastery Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication: Manding (requesting) new mands without specific training.</td>
<td>Emits at least 4 different mands without prompts, but the desired item can be present, and the verbal prompt, &quot;What do you want?&quot;</td>
<td>$S^D$: (not required) Discriminative stimulus ($S^D$): “What do you want?”</td>
<td>Emits approximately 4 independent prompts within a 20 minute session.</td>
<td>Emits 10 different mands without prompts (except, &quot;What do you want?&quot;)-the desired item can be present..</td>
</tr>
<tr>
<td>VB MAPP Level 1: Milestone 5</td>
<td></td>
<td>Methods: Environmental arrangement/incidental teaching (essential piece to continue activity/play with toy if is missing, in sight but out of reach, or offered in inadequate portions) Most to least prompting (Say “_” with 3 s time delay before providing full verbal model to fade verbal prompt</td>
<td>Examples: Don’t break the ice I want the ice cube Two ice cubes I want help Big ice cube I want big ice cube I want big ice cube Can I have the ice cube Take it out Blow bubbles</td>
<td></td>
</tr>
</tbody>
</table>
Data Analysis/Progress Summary:
The graph above depicts the number of independent mands (requests/protests) that child said to peers at School during each 30-minute observation. Child has requested items or information from peers as many as 11 times during the 30-minute observations. On 1/30/15 (behavioral therapist) observed for 30 minutes prior to facilitating social skills training, which resulted in a decrease in independent mands (requests/protests) for that date. On 3/13/15 Therapist also observed for 30 minutes prior to facilitating social skills training but no relative decrease in child’s use of independent mands (requests/protests) occurred. Accordingly, there continues to be an increasing trend in child’s independent mands (requests/protests) to peers. Anecdotally, child has engaged in requests to peers such as “Build it higher!” and “Trace ______ hand”, as well as others. He is continuing to progress very well in this area.
<table>
<thead>
<tr>
<th>TARGETED DOMAIN AND SKILL</th>
<th>LEVEL OF PERFORMANCE AT LAST REPORTING PERIOD</th>
<th>CURRENT LEVEL OF PERFORMANCE</th>
<th>MASTERY CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication:</td>
<td>New goal</td>
<td>is beginning to spontaneously mand for information. He has done so using the mand “Where?” a total of 7 times in the last four weeks. In contrived teaching sessions MA independently mands for information using “Where” with an average</td>
<td>will spontaneously mand for information 2 times during a 1 hour observation period over 3 consecutive days.</td>
</tr>
<tr>
<td>Manding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VBMAPP Level 3:11</td>
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</table>

**MA's Mands for Information Using "Where"**

![Graph showing the percentage of independent mands during contrived teaching sessions and the frequency of spontaneous mands for information over a series of dates from 6/7/2012 to 6/27/2012.](image)
<table>
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<tr>
<th>Targeted Domain and Skill</th>
<th>Level of Performance at Last Reporting Period</th>
<th>Current Level of Performance</th>
<th>Mastery Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressive Language: Tact</td>
<td>New Goal</td>
<td>J verbally tact 10 actions.</td>
<td>J will verbally tact actions for 10 different actions in 4 of 5 consecutive DT sessions.</td>
</tr>
<tr>
<td>VB-MAPP Level 2:8</td>
<td></td>
<td>MASTERED</td>
<td></td>
</tr>
</tbody>
</table>

**Action Tacts Mastered in June**

- Week 1: 3 items mastered
- Week 2: 4 items mastered
- Week 3: 4 items mastered

**Number of Items**
<table>
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<tr>
<th>TARGETED DOMAIN AND SKILL</th>
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<th>CURRENT LEVEL OF PERFORMANCE</th>
<th>MASTERY CRITERIA</th>
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<tbody>
<tr>
<td>Receptive Language: Listener Responding</td>
<td>New Goal</td>
<td>J chooses 8 pictures by feature, function, or class.</td>
<td>J will choose the correct picture by feature, function, or class from a messy array of 8 in 4 out of 5 consecutive DT sessions.</td>
</tr>
<tr>
<td>VB-MAPP Level 2:7</td>
<td></td>
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</tbody>
</table>

**Receptive Identification by Feature, Function, and Class**

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Items</th>
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<tbody>
<tr>
<td>June</td>
<td>8</td>
</tr>
<tr>
<td>May</td>
<td>4</td>
</tr>
<tr>
<td>April</td>
<td>2</td>
</tr>
<tr>
<td>March</td>
<td>2</td>
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<td>Intraverbal</td>
<td>J will complete 8 different fill in the blank statements (not including songs). Little progress has been made on this goal due to the new behavior of staring/scripting.</td>
<td>J completes 14 <em>intraverbal</em> fill in the blank phrases (not including songs) consistently (4 out of 5 consecutive DT sessions).</td>
<td>J will verbally complete 25 different fill in the blank statements (not including songs) in 4 out of 5 consecutive DT sessions.</td>
</tr>
<tr>
<td>Fill in the blank phrases not including songs</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VB-MAPP Intraverbal 2:8</td>
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<td></td>
</tr>
</tbody>
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**Intraverbals**
(not including songs)

<table>
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<tr>
<td>February</td>
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<tr>
<td>January</td>
<td></td>
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<tr>
<td>December</td>
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• Behavior support plans are linked to the function(s) of the challenging behavior
Credentialed ABA providers

- **BCBA-Board certified behavior analyst**
  - In OR, must also hold designation as Licensed Behavior Analyst to bill insurance
- **BCBA-D-Board certified behavior analyst at PhD level**
  - In OR, must also hold designation as Licensed Behavior Analyst to bill insurance
- **BCaBA-Board certified assistant behavior analyst**
- **RBT-Registered Behavior Technician**
  - Considered Behavior analyst interventionist (BAI) in OR
Training and credentialing for ABA providers

• Undergraduate Degree in any discipline
• Approved college coursework in ABA (9 credits)
• Pass BCaBA licensing exam
• Must be supervised by BCBA/BCBA-D @ least 1 hr/month
• Can supervise work of RBTs/other technicians

MOST COMMON ROUTE

• At least a Masters Degree in Education, Psychology, ABA (used to include communication disorders)
• Approved college coursework in ABA (about 27 credits)
• 1500 hr supervised exp or 750 intensive supervised exp
• Pass BCBA licensing exam (2014 pass rate of 60%)
• Continuing edu-36 hr/2 yrs

• 40 hr online training in ABA
• Pass competency assessment
• Must be supervised by BCaBA/BCBA
Questions or clarifications about these slides
or permission to use slides

wmachali@uoregon.edu
ABA Professional websites

Autism Society of Oregon
http://autismsocietyoregon.org/resources/helpful-links/
Medicaid waivers http://medicaidwaiver.org
Private insurance www.autismspeaks.org/advocacy/states
The Association for Behavior Analysis - www.abainternational.org
The Association for Science in Autism Treatment - www.asatonline.org
The ABA Autism Special Interest Group - www.autismsig.org (or www.abainternational.org/Special_Interests/autism.asp).
The ABA Parent Professional Partnership Special Interest Group -
www.pppsig.org (or www.abainternational.org/Special_Interests/parent_professional_partnership.asp).
The Behavior Analyst Certification Board - www.BACB.com
The Cambridge Center for Behavioral Studies - www.behavior.org
Standards for Autism Treatment


• National Professional Development Center on Autism Spectrum Disorders (2013). Retrieved from http://autismpdc.fpg.unc.edu/content/briefs
  • Infant and toddler modules http://asdtoddler.fpg.unc.edu


http://bacb.com/asd-practice-guidelines/
Other relevant literature (including citations from this presentation)


