Using ABA to Teach Social Cognition and Executive Function Skills to Children with Autism

Scope of Treatment

If there is something that a child with an ASD needs to learn how to do, it’s our job to figure out how to teach it.

Criticisms

• Misrepresentation of the ABA perspective:
  – “Children with autistic spectrum disorders can’t learn the fundamentals of relating, communicating and thinking, so the best you can do is try to teach them to change their behaviors.”
  – This is NOT the ABA perspective!!!

Complex Behavior

• Relating, communicating, and thinking are things that people DO, they are skills, they are behaviors
• How do we teach someone to DO something?
• Use scientifically validated principles of learning to guide curriculum construction

Common Myths

• “ABA is rigid and robotic”
  – ABA is only as rigid as you make it
  – ABA is defined as using positive reinforcement and other teaching procedures to systematically teach what you want to teach
  – ABA is not just discrete trial – discrete trial is one of many scientifically validated ABA teaching procedures

Common Myths

• ABA can’t deal with complex skills, it just teaches scripted, robotic, rote responses
  – ABA is the perfect approach to teaching flexible learning and avoiding rote memorization because we have 80 years of research that shows exactly how rote learning occurs and exactly how concept formation occurs
Rote Learning versus Concept Formation

- Myth: ABA only teaches rote or memorized behaviors
- How to teach rote learning:
  - Prompt and reinforce one particular behavior in response to one particular stimulus
- How to teach concept formation:
  - Prompt and reinforce behaviors in the presence of many stimuli, all of which are examples of the concept you are teaching
  - Fade out the prompts
  - Check for generalization

Example: teaching the concept of bigger / smaller

The process for learning “bigger” and “smaller” is the same way we learn perspective-taking and executive functioning

- You have to learn MANY different examples of a concept until you derive the general concept
- This is called “multiple exemplar training” in behavioralese

Now Let’s Discuss Executive Functions…

- What is executive function?
  - Brain functions that control goal-directed behavior
- Goal Directed Behavior Involves…
  - Visualizing situation
  - Identifying desired objective
  - Determining plan to meet objective
  - Monitoring progress to goal
  - Inhibiting distractions
- These are all things people do and they can all be taught, just like any other skill

Common problems associated with executive function

- Teacher says “Everyone go to your cubby, take your folder out of your backpack, get out yesterday’s assignment and continue working on it”
- Child who knows how to do everything he needs to do but can’t keep track of himself
- Never follows anything through to the end
- “Absent minded professor” syndrome
Executive Function Curriculum Areas

Inhibition
- Waiting
  - Physical/Motor
  - Vocal
  - Pencil/Paper

Flexibility
- Set-Shifting
  - Nonsocial Set-Shifting
  - Social Set-Shifting
  - Social Cognitive Set-Shifting

Attention
- Response Inhibition
- Joint Attention
- Determining Saliency
- Alternating Attention

Memory
- Visual Memory
- Auditory Memory
- Associative Memory
- Working Memory
- Episodic Memory

Meta-cognition
- Self-Awareness
- Metamemory
- Emotion Control
- Self-Management

Teaching Inhibition
- Goal: NOT to establish rote ability to inhibit a particular behavior, given a particular instruction
- The goal is to teach the general ability to inhibit behaviors, when necessary
  - Programs requiring the child to wait for a desired stimulus
  - Programs promoting the child’s ability to stop a pattern of responding when the response is no longer earning reinforcement
- Same teaching approach as everything else in ABA: start small and teach many, many examples until the you get generalization

Inhibition
- What is inhibition?
  - The ability to
    1. Stop oneself when about to do something,
    2. allowing time to make a decision about whether to do it, and
    3. allowing for the opportunity for to do something different
- Example: Thinking before speaking – “testing out” what something will sound like to oneself before saying it aloud

Forms of Inhibition
- Different forms of inhibition
  - Vocal inhibition
    - Ex: vocal stereotypy in the form of humming, scripting, singing the same song repeatedly, calling out every time a specific stimulus is observed, etc.
  - Non-Vocal Inhibition
    - Physical/Motor
      - Ex: jumping in a specific spot every time the child walks by a specific area, picking at a scab, handflapping, etc.
    - Paper-Pencil Task
      - Ex: Need to do all math problems in order, every time the child draws a vertical line it needs to be made into an “E”

Teaching Inhibition
- Examples:
  - “Draw a tree but don’t use the color brown”
  - “Draw a car with no wheels”
  - “Count to 10 without saying 7”
  - “Sing Old MacDonald without saying the word farm”
- Teach MANY examples, until the child can do new examples without prompting or errors
- Then, practice with MANY real-life scenarios in natural settings (outside teaching / therapy)
- Then increase complexity and difficulty

Stroop Activities
- red blue orange purple
- orange blue green red
- blue purple green red
- orange blue red green
- purple orange red blue
- green red blue purple
- orange blue red green
- green purple orange red
Flexibility

- What is flexibility?
  - Willingness to do things differently from how one has in the past
  - Ability to be creative and do things in new ways
  - Willingness to tolerate and work with uncertainty
  - Behavioral perspective: Allowing one’s behavior to remain fluid and to adapt to ongoing changes in one’s environment

Teaching Flexibility

- Expose the child to many, many different circumstances where novelty, uncertainty, and flexibility don’t result in disaster and actually produce GOOD outcomes
- Start easy and then gradually increase the need for flexibility by presenting situations where the child is NEVER flexible
- Don’t forget to generalize to novel and natural situations

Teaching Flexibility

- Teaching examples:
  - Present an ambiguous picture and ask “What do you think this could be? What else could it be?”
  - Present a nonsense word (e.g., “Blathery”) and ask “What do you think that means? What else could it mean?”
  - Present blocks to build with and require new combinations of blocks each turn
  - Invent new rules each day for common games

Sample program: “Range”

- Start with a specific topic/category where the child is able to demonstrate a range of likes and interests
  - HATE-------------------LOVE
- Use a paired reinforcement strategy to have the child rank specific foods. From this they will be able to identify “gray” areas such as “like,” “okay,” “don’t like but will eat,” “really don’t like,” “hate,” etc.

Real Flexibility Data
What is working memory?
- Ability to store and use information in the short-term, while adjusting to the current circumstance on an ongoing basis

Examples:
- Being able to hear a phone number and write it down a short time later
- Staying on task while doing many things at once

Behavioral perspective
- Being able to do these things is yet another skill that can be taught

---

Examples:
- Have child repeat chains of unrelated words
  - “Say cat, radio, rug, sky, thirteen, a, nicely”
- Make a statement and ask child to recall words in particular order
  - “What does a cat say?” “What was the first word of what I just said?” “What was the last word?”
- Short-term delays with matching
  - Show a picture of a dog and then hide it for 5 seconds, then present five pictures and ask child to find the original one

---

Again, repeat many different novel teaching tasks which all require the child to attend carefully to details of the materials and then respond to those details a short time later

- Start very simple to encourage success
- Use big reinforcers
- Make it more complex and more delayed as the child is successful
- Vary the materials! No rote learning!

---

Used “counting span” task
- Used positive reinforcement to increase accuracy
- Removed reinforcement to test for maintenance
- Tested untrained stimuli and untrained quantities to test for generalization
Self-Monitoring

- Self-monitoring is important for many everyday skills
- Helps child decrease maladaptive behaviors
  - Tics
  - Stereotypy
  - Hair pulling
- Helps child increase good behaviors
  - Fluency at academics
  - Staying on-task

Self-Monitoring Example

- Homework example: want to teach a child to stay on-task with homework
  1. Teach child to vocally identify on-task and off-task behavior in himself and others via live observation and video (e.g., MotivAider)
  2. Teach child to record his/her behavior at regular intervals
  3. Teach child to evaluate his/her record of his/her behavior at regular intervals
  4. Teach child to deliver or recruit reinforcement for when record indicates criterion is met

Planning

- Planning is where all the other skills are put together!
- Planning involves
  - Identifying a goal
  - Describing chain of steps (behaviors) needed to achieve the goal
  - Self-monitoring and self-correcting of ongoing progress

Teaching Planning

- Same process:
  1. Start small with easily accomplished goals
  2. Gradually increase complexity when child is successful
  3. Teach MANY different examples, materials, settings, problems, etc.
  4. Generalize to natural environment
Teaching Planning

• Maze example:
  – Start simple (present two turn maze)
  – Prompt child to point to and name start and end of maze
  – Prompt child to state goal (e.g., “I want to get to the end of the maze”)
  – Prompt child to plan by tracing correct path with finger
  – Prompt child to state plan “First I turn right then I turn left”
  – Prompt child to do maze with pencil
  – Prompt child to catch own errors and correct them
  – Reinforce correct responding at each step
  – Fade out prompts
  – Increase complexity of maze once child can do it with no errors
• Do other examples too (e.g., making a sandwich, setting up a playdate, fixing a broken toy, etc.)

Now, let’s move on to Cognition…

Cognition Curriculum

• Purpose:
  – To teach children with autism to:
    1. Be aware of their own mental states
    2. Be aware and respond to the mental states of others
• Perspective-taking
• “Theory of mind”

Cognition

• Why do we care about being able to respond to others’ mental states?
  – Because good social skills depend on being able to understand others’ perspectives
  – Children with autism often have difficulty with social cognition, even after they have achieved age-appropriate verbal behavior

Perspective-Taking

• Examples of problems with perspective-taking
  – Getting upset when someone accidentally bumps into you because you think it was on purpose – not understanding others’ intentions
  – Telling someone news that they already know – not understanding others’ knowledge
  – Trying to physically show someone something on the telephone – not understanding what others can see
  – Talking about the same topic over and over, even though it’s boring to your friend – not understanding and responding to others’ preferences

The purpose of the CARD cognition curriculum is to identify which mental states our clients need to respond to in their peers
• Then identify which stimuli or cues are hopefully correlated with them
• Then teach our clients to understand and respond successfully to those cues
**CARD Cognitive Curriculum**

**Overview**

1. Progression from simple to complex:
   - 1st Person: child learns about his/her own perspective (self-awareness)
   - 3rd Person: child learns about other people's perspectives (social cognition)
   - Increase subtlety and difficulty
   - Apply new learned skills to real environments
     - Role-playing with therapists
     - Teach "rules" for effective social interaction
     - Test (and teach) in the real environment with peers

2. Sensory Perspective Taking

   - **Purpose**
     - Teach children to identify what other people can and cannot see, hear, smell, feel, taste
     - Why? Because what someone knows depends on what they saw, heard, etc.
   - **Procedures**
     - 1st Person: teach child to identify what he/she senses
     - 3rd Person: teach child to identify what others sense
     - Application to natural environment (ensure generalization)
     - Test for generalization to untrained examples!!!

3. Sensory Perspective Taking Example: "Who sees the cat?"

   ![Sensory Perspective Taking Example](image)

---

**CARD Structure of Programs**

- Progression from simple to complex:
  - 1st Person: child learns about his/her own perspective (self-awareness)
  - 3rd Person: child learns about other people’s perspectives (social cognition)
  - Increase subtlety and difficulty
  - Apply new learned skills to real environments
    - Role-playing with therapists
    - Teach “rules” for effective social interaction
    - Test (and teach) in the real environment with peers
Sensory Perspective Taking Example

- Used 2 dimensional stimuli to teach children with autism to identify what others can see
- Assessed generalization to other 2D stimuli and to natural environment

Sensory Perspective Taking

- "What animal does he see?"

Sensory Perspective Taking Example

Knowing

- Purpose
  - Child learns to identify what he & others know
  - And then to apply what others know to social interaction
- Prerequisites
  - Sensory Perspective Taking

Knowing

- 3rd Person: Others’ Knowledge
- Example:
  - Therapist puts a toy in the bag either with or without a third person watching
  - Therapist asks "Does (name) know what's in the bag?" or "Who knows what's in the bag?"
  - Then therapist puts a different object in the bag without showing the child and asks same question
- J.tarbox@centerforautism.com
Seeing Leads to Knowing: Practicing with Books

Knowing

Applications of Knowing
• Teach rules for application of knowing concept:
  – “If someone does not know something, I can
tell them about it / show them / etc.”
  – “If someone already knows, I should not tell /
  show them / etc., because that is boring”
  – Rehearse and test in natural environment with
  peers
  – Do not repeat same script over and over!

Conclusion
• So-called social cognition and executive
functions are names for stuff people do
• That is, they’re behaviors and can be
  taught just like any others
• Don’t forget to do multiple exemplar training
  and program for generalization from the
  very start

John Galle
j.galle@centerforautism.com