Flexible and Focused: Teaching Executive Function Skills to Individuals with Autism

Jonathan Tarbox, PhD, BCBA-D
Berkshire Association for Behavior Analysis and Therapy, October 11th, 2017

University of Southern California
FirstSteps for Kids
INTRODUCTIONS

• I am the director of the new Master of Science in ABA program at the University of Southern California

• Research director at FirstSteps for Kids, a service delivery agency based in Los Angeles, CA

• We use Applied Behavior Analysis (ABA) to help children with autism achieve their greatest potential

• My PhD is in behavior analysis, from Linda Hayes, at University of Nevada, Reno

• Audience?
  • ABA folks?
  • Teachers?
  • Parents?
  • SLPs, OTs, PTs?
• Intro to executive functions and relevance to autism
• Conceptual foundations: Radical behaviorism, Relational Frame Theory, and Secondary Repertoires
• Assessing executive functions
• General teaching strategies for generalization / concept formation
OUTLINE

• Programming areas
• Inhibition
• Working memory
• Flexibility
• Self-monitoring
• Planning
• Problem-Solving
A. Persistent deficits in social communication and social interaction:

1. Deficits in social-emotional reciprocity
2. Deficits in nonverbal communicative behaviors used for social interaction
3. Deficits in developing, maintaining, and understanding relationships
B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history:

1. Stereotyped or repetitive motor movements, use of objects, or speech

2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior

3. Highly restricted, fixated interests that are abnormal in intensity or focus

4. Hyper- or hyporeactivity to sensory input or unusual interest in
Where would you say we spend the majority of our time programming?
If we want to make sure we’re addressing the core diagnostic aspects of autism, where else should we also focus?
**Social Communication**

- Back-and-forth Conversation
- Sharing of Interests
- Emotions
- Initiating + Responding
- Nonverbal Communication
- Body Language + Gestures
- Facial Expressions
- Understanding Relationships
- Adjusting Bx to Social Context
- Sharing Pretence
- Interest in Peers

**Restricted Behavior**

- Insistence on Sameness
- Inflexible | Routines
- Rigid Thinking
- Fixated Interests
- Perseverative Behavior
SOCIAL COMMUNICATION

- Back-and-forth Conversation
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SOCIAL PROGRAMMING

- Play Skills
- Perspective-Taking
- Social Skills Interventions
SOCIAL COMMUNICATION

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• Sharing of Interests
• Emotions
• Initiating + Responding
• Nonverbal Communication
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RESTRICTED BEHAVIOR

• Insistence on Sameness
• Inflexible | Routines
• Rigid Thinking
• Fixated Interests
• Perseverative Behavior
Executive Functioning

Restricted Behavior

- Insistence on Sameness
- Inflexible | Routines
- Rigid Thinking
- Fixated Interests
- Perseverative Behavior
EXECUTIVE FUNCTIONING
How did we get here today?
WHAT IS EXECUTIVE FUNCTIONING?

Turning Neuroscience into Observable Behaviors
EXECUTIVE FUNCTIONS

• Definition: Umbrella term used to describe the “chief operating system” localized in the prefrontal regions which includes higher level cognitive processes necessary for future oriented, goal-directed behavior.

  - Working Memory
  - Sustained Attention
  - Inhibitory Control
  - Cognitive Flexibility
  - Planning + Goal Setting
  - Organization
  - Persistence, Self-Monitoring
  - Problem Solving
EXECUTIVE FUNCTIONS

• Clinical populations with EF Challenges
  - TBI results in loss of EF once present
  - ADHD
  - Dyslexia
  - LD
  - ASD
EXECUTIVE FUNCTIONS

- Definition: Umbrella term used to describe the “chief operating system” localized in the prefrontal regions which includes higher level cognitive processes necessary for future oriented, goal-directed behavior.

- Working Memory
- Inhibitory Control
- Sustained Attention
- Cognitive Flexibility
- Planning + Goal Setting
- Organization
- Initiation
- Problem Solving
- Persistence, Self-Monitoring, etc.
Traditionally, EFs are considered brain functions.

But all EFs involve behavior.

Behavior is learned and it can be strengthened.

If EF involves behavior, we should be able to improve it.

We are not denying the brain.

We are making the most of it.
RADICAL BEHAVIORISM

- How do we address mental and cognitive events as learned behavior?
- How do we retain our natural science foundation?
- Radical behaviorism: Mental events, if anything, are private stimuli and behaviors, nothing else
- Private stimuli can include discriminative stimuli and rules
- Private responses include complex verbal behavior and visualizing behavior
MENTALISM

- Mentalistic words are problematic as causes of behavior (e.g., “He had a tantrum because he was angry”)

- Mentalistic words are less problematic as names for behaviors or stimuli and nothing else (e.g., thinking = private verbal behavior)

- Private verbal behavior (i.e., thinking) should be the same as public verbal behavior (i.e., talking).

- Still needs to be explained in terms of behavioral principles
- Relational Frame Theory (RFT) is a contemporary behavior analytic approach to complex human behavior (Hayes, Barnes-Holmes, & Roche, 2001)

- Accounts for responding to the relation between stimuli
Many classes of relational behavior (aka, relational frames)

- Equivalence (A = B)
- Distinction (A is different from B)
- Opposition (A is the opposite to B)
- Comparison (A is bigger/better/shorter/colder/ than B)
- Hierarchy (A is a type of B)
- Temporal (A is before B)
- Conditional / causal (A caused B)
- Deictic (I / you)
• Relational behaviors are generalized operants
• Relational behavior is LEARNED VIA MULTIPLE EXEMPLAR TRAINING
• Emergence of untrained behavior is a defining characteristic
- Most important point: Do multiple exemplar training until you get generalization to untrained exemplars

- A very precise, detailed analysis of all of the EF skills is possible with RFT

- Or just teach lots of exemplars of the skill you are trying to teach
WHO’S THE EXECUTIVE?

• Skinner’s self-control: Two repertoires of behavior (primary and secondary repertoires)

1. The “controlled self:”
   Normal ongoing behavior

2. The “controlling self:”
   Behaviors you have learned that control your other behavior

- Skinner: One can control one’s own behavior in the same way as other’s behavior: *By changing the environment in ways that affect the behavior*
SECONDARY REPERTOIRES OF BEHAVIOR

- Neuroscience: EF brain mechanisms control our behavior

- Behavioral approach: We learn to control our own behavior by using other “secondary” behaviors to do it

- Practically speaking, these approaches can be complimentary, not contradictory
TYPICAL EF DEVELOPMENT

From around 15 years old
Working memory, shifting attention and inhibitory control relatively stable and close to adult level.

EF PROGRAMMING OVERVIEW

- ASSESSMENT
- TEACHING PROCEDURES AND GENERAL RECOMMENDATIONS
- PROGRAMMING AREAS
STANDARDIZED ASSESSMENTS

• Behavior Rating Inventory of Executive Function (BRIEF)
  - Ages 5-18

• Behavior Rating Inventory of Executive Function - Preschool (BRIEF-P)
  - Ages 2-5, Parent and Teacher Forms

• Test of Problem Solving (TOPS)
  - Ages 6-12

• Wisconsin Card Sorting Test (WCST)
  - Ages 6.5-89

• Stroop Test (children)
  - Ages 5-14
• Standardized, norm-referenced multi-rater assessment of “real world” executive functions

• Parents and teachers report problems with 8 domains of executive functioning:
  - Inhibition
  - Shifting
  - Emotional Control
  - Initiating
  - Working Memory
  - Planning
  - Organizing
  - Monitoring
• Useful tool for reporting general EF performance

• Provides a standardized score, to compare to average population
STANDARDIZED ASSESSMENTS

• Strengths
  - Well respected, valued by funding agencies
  - Indicates child’s skills compared to the general population

• Limitations
  - Does not give child-specific information on what or how to treat
  - Needs to be supplemented with observations in the natural environment
Questionnaires

• Some published EF curricula / models offer useful questionnaires to help assess general EF skills to guide programming

  - **Executive Skills Questionnaire for Children - Smart but Scattered** - Dawson & Guare (2009)

  - Includes separate EF skill-based questionnaires for different age-ranges (Pre/K, Early Elementary, Upper Elementary, Middle School)

  - Organized by developmentally-appropriate EF tasks, in different skill domains
INDIRECT ASSESSMENTS
## EXECUTIVE FUNCTIONING INTERVENTION

1. **EF Skill Building**
   - Exercises to try to improve deficient EF Skills

2. **Teaching Compensatory Strategies**
   - Strategies that may learn to implement him/herself to reduce the impact of EF deficits

3. **Environmental Supports**
   - Accommodations + Modifications to reduce the impact of EF deficits

4. **Real-Life Application**
   - Rehearsing combination of all the above
   - Fading to natural contingencies
## EXECUTIVE FUNCTIONING SKILL BUILDING

<table>
<thead>
<tr>
<th>Analogue Practice</th>
<th>Real-Life Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrived, more-controlled setting</td>
<td>Natural, less-controlled setting</td>
</tr>
<tr>
<td>Many practice opportunities</td>
<td>Fewer opportunities (either surreptitiously planned or naturally occurring)</td>
</tr>
<tr>
<td>Easy to control difficulty</td>
<td>Difficult to control difficulty level</td>
</tr>
<tr>
<td>Easy to control anxiety level</td>
<td>Difficult to control anxiety level</td>
</tr>
<tr>
<td>Generalization is a major concern</td>
<td>Generalization is more likely (but not guaranteed!)</td>
</tr>
</tbody>
</table>
ANALOGUE VERSUS NATURAL SETTINGS

- Analogue practice is like a musician practicing scales
- Naturalistic training is like a musician rehearsing whole songs
- Both are necessary to get you ready for the big concert
- Musicians in training spend LOTS OF TIME doing both
- If we want our clients to be great at EF skills, we need to allow lots of time for both
BRING THE FUN

- Like all other learning, people are going to learn EF skills more effectively if learning is FUN

- Two general approaches to bringing the fun:
  1. Big positive reinforcement
  2. Change the antecedents:
     - Make the task fun (e.g., games)
     - Intersperse with other fun tasks
     - Incorporate choice
     - Make sure instruction is upbeat and fun
FOCUS ON GENERALIZATION

- We are interested in established flexible, generalized operant skills
  • No rote learning!
- Multiple exemplar training should be used throughout
  • Not as an afterthought!
- These skills are meaningless if they don’t generalize
MULTIPLE EXEMPLAR TRAINING

- Best way to get generalization of a skill
- DO NOT teach just one example of a skill
- Teach more and more new examples
- Test new examples to see if the learner is generalizing
- Keep teaching new examples until the learner can respond correctly to untrained examples
CURRICULA

Flexible and Focused
Teaching Executive Function Skills to Individuals with Autism and Attention Disorders

Adel C. Najdowski

SMART but SCATTERED
Boost Any Child's Ability to:
- Get Organized
- Resist Impulses
- Stay Focused
- Use Time Wisely
- Plan Ahead
- Follow Through on Tasks
- Learn from Mistakes
- Stay in Control of Emotions
- Solve Problems Independently
- Be Resourceful

Peg Dawson, EdD, and Richard Guare, PhD
INHIBITION
• Inhibitory Control includes inhibiting, resisting, or not acting on impulses
• And the ability to stop one’s own behavior at the appropriate time
INHIBITION

- Inhibition, as a skill, is not merely the absence of a behavior
- It is *doing something* that then prevents one from doing something else or stopping current behavior

- We need to establish discriminative stimuli to cue clients to use these secondary repertoires of self-control behavior
- **Important note:** When we use extinction or punishment to decrease a behavior, we are not directly teaching inhibition skills.
INHIBITION

• Related to flexibility
  • Sometimes requires inhibiting old, rigid ways of responding

• Related to stereotypy
  • Doing something new often requires inhibiting doing something old
INHIBITION

1. EF Skill Building

- Draw a tree but don’t use green
- Sing ABCs without saying the letter “m”
- Simon Says
- Reading underlined word silently
- Jenga
1. Inhibition Skill Building: Analogue Practice

- Happy cupcake
2. Compensatory Strategies

- Self-talk
- Plan an alternative behavior
- Priming
- Stop-Think-Do
INHIBITION: STOP-THINK-DO

Self-Control Strategy: Stop-Think-Do

- Train in analogue setting at first
- Use visual support
- Fade prompts
- Fade visual support
- Fade to natural setting
INHIBITION

4. Real Life Application

• Not raising hand for X minutes while teacher talks

• Not finishing sentence when someone says “I get it”

• Not engaging in stereotypy when you hear a particular song or see a particular picture
WORKING MEMORY
"Working Memory" is the term used to refer to the ability to:

- Hold +
- Manipulate

Information in the "mind" for short periods of time.
WORKING MEMORY

Evan

1. Stand up
2. Turn 360
3. Beat your chest
4. Sit Down

12 9

What was the second gross motor instruction?
• Not at all obvious to me
• You contact stimuli now
• Then time passes (i.e., a delay) and you contact other stimuli during that delay
• Then you contact new stimuli that cue you to respond to the old stimuli from before the delay
• Later stimuli cue responding to temporal dimensions (e.g., “What phone number did I tell you BEFORE?”, “What was the FIRST number you heard?”)
Responding correctly in contexts described as “working memory” requires excellent *attending behavior*.

Some researchers think there is no legitimate distinction between working memory and attention.

So improving working memory very likely involves strengthening attending behavior.
WORKING MEMORY

1. EF Skill Building

- Digit | Letter | Word Recall
- + Reversals
- Following Multi-Step Instructions
- Delivering a Message
- Running Errands
- Card Games
- Online Memory Games

- Board Games
  - Memory
  - Pictureka
  - Hulabaloo
  - Battleship
Addressing working memory in children with autism through behavioral intervention

Lisa Baltruschat a, Marcus Hasselhorn b, Jonathan Tarbox c, Dennis R. Dixon c, Adel C. Najdowski c, Ryan D. Mullins c, Evelyn R. Gould c
1. EF Skill Building:

- Backward Span Task
1. EF Skill Building
2. Compensatory Strategies

- List Writing
  - textual or Iconic
- Repetition | Rehearsal
  - whisper under breath
- Visual + Physical Cues
  - string on a finger | Post-Its
- Finger Cues | Counting
Further analysis of the effects of positive reinforcement on working memory in children with autism

Lisa Baltruschat\textsuperscript{a, b}, Marcus Hasselhorn\textsuperscript{c}, Jonathan Tarbox\textsuperscript{b, *}, Dennis R. Dixon\textsuperscript{b}, Adel C. Najdowski\textsuperscript{b}, Ryan D. Mullins\textsuperscript{b}, Evelyn R. Gould\textsuperscript{b}
WORKING MEMORY

4. Real-Life Application

- Memorizes phone number and dials number
- Spelling tests / Listen and write tasks
- Mental arithmetic
- Reading comprehension tasks
- Following multi-step directions
FLEXIBILITY
FLEXIBILITY

• Ability to switch between thinking about two different concepts
• And to think about multiple concepts simultaneously
• Also referred to as “Set Shifting”
FLEXIBILITY: BEHAVIORAL INTERPRETATION

- Variability in behavior, while behavior remains relevant to task
  - Not random variability
- Sensitivity to ongoing environmental changes
- Sensitivity of rule-deriving repertoire to changes in ongoing environment
  - *When the environment changes, your descriptions of it and what behaviors you should do changes too*
- A better term would be “Behavioral Flexibility”
IMPORTANCE OF FLEXIBILITY

• Necessary for creativity
• Necessary for problem solving
• Related to diagnostic features of ASD
• Rigidity can be aversive to others - it’s bad for making friends!
FLEXIBILITY

• Variability, per se, can be reinforced (Neuringer, 2004)

• But, for some children with autism, variability seems to be aversive

• How do we make something less aversive???
COGNITIVE FLEXIBILITY

I. EF Skill Building

• Exposure and response prevention
  • Helps decrease aversive functions for “inflexibility stimuli”
  • Expose child to many exemplars of inflexibility stimuli
  • Prevent “fixing” or escaping from it
  • Reinforce calmly tolerating
  • Keep training new exemplars until generalization to untrained inflexibility stimuli
FLEXIBILITY: SAMPLE CLINICAL DATA

BL  Multiple Exemplar Training  Post

- First trial
- Training with Caregiver

Caregiver

Remo
FLEXIBILITY

I. EF Skill Building - Analogue Practice

• Making up nonsense words
• Making up many different meanings for nonsense words
• Changing rules for known games
• Making up new games
• “Backwards day”

• Optical Illusions
• Changing the words to songs
• Changing schedule
• Having breakfast for dinner and vice versa
• Going by a “silly name” for the day
• Say word over and over till it loses its meaning
1. Flexibility Skill Training: Analogue Practice
2. Compensatory Strategies

- Positive self-talk
- “What else could I do?”
- “It’s fun/silly to mix it up”
- Guided breathing
- Count to ten
- Imagery

3. Environmental Supports

- Access to “ambiguous” play materials
- Blocks I Clay I Fabric
- Art Materials
• General tips
  • Start with easy tasks
  • Gradually increase the frustration level, only as he/she is success at the previous level
  • Actively program for frequent practice
  • Continue training more examples until learner generalizes to untrained tasks
COGNITIVE FLEXIBILITY

4. Real Life Application

- Tolerates change of plans
- Tries new food, new toy, new situations
- Able to learn from mistakes
- Can suggest alternative endings to stories, alternative rules for games
- Symbolic / Imaginary play
- Artistic expression
SELF-MONITORING | SELF-REGULATION
SEFF-MONITORING

• Skinner: We become conscious of our own behavior when our verbal community teaches us to notice what we are doing
  • “What did you do?”
  • “What are you doing?”
  • “Why are you doing it?”
- Skinner’s Self-Awareness / Self-Consciousness:
  - Tacting your own behavior
  - Tacting the variables of which your behavior is a function
SELF-MONITORING

• Self-monitoring can be conceptualized as a secondary repertoire of behavior

• The behavior of looking at your own behavior

• Everyday examples:
  • Running pace
  • Checking your daily work calendar
  • Keeping a food intake log
SELF-MONITORING

I. EF Skill Building

• Many empirically validated interventions involve self-monitoring
  • Habit reversal
  • Goal setting and feedback
  • Self-evaluation in training

• Occasionally, self-monitoring training, alone, changes behavior sufficiently
Self-Monitoring Training: Sample Clinical Data

- Taught child to self-record his stereotypy
- Taught one behavior at a time
- No change in consequences for stereotypy
- First included prompting to self-monitor
- Then removed prompting
SELF-MONITORING

1. EF Skill Building: Steps for Teaching

- Teach client to observe their own behavior
- Watch video
- Look in mirror
- Teach client to record own behavior
- Crayon, pencil, tallier
- Teach client to review total number of behaviors in specified period of time, compare to criterion
- Teach client to recruit reinforcement
SELF-MONITORING

3. Environmental Supports

- Use of video for guided training
- Provide lists | definitions of target behavior
- Teach use of monitoring devices
- Access to reinforcement for use of self-monitoring procedures
- Add cues to work to prompt self-monitoring
4. Real Life Application

- Increase complexity of task across multiple real-life settings
- Monitor generalization to untrained tasks
- Shoot for the client demonstrating they can create their own novel self-monitoring procedures
PLANNING AND GOAL-SETTING
PLANNING

• Anticipating future events
• Setting goals
• Developing strategies
PLANNING: BEHAVIORAL INTERPRETATION

• The behavior of talking about your own future environment and behaviors
• Deriving rules that describe likely antecedents, your own behaviors, and the likely consequences those behaviors will produce
• Complex chain of many antecedents, behaviors, and consequences
• Involves deriving new rules (not just following old rules)
PLANNING

Steps

1. Identify goal
2. Describe steps needed to reach goal
3. Identify potential problems
4. Begin planned sequence of steps
5. Monitor progress
6. When problems come up, generate potential solutions
7. Achieve goal, i.e., get reinforcement!
CREATING PLANNING STEPS

• Start small, any board game

  • Before each turn, have learner say out loud what will happen if he makes various moves

• This is a plan with a single step
• Shopping
• Packing for a picnic
• Legos
• Putting a game back into a box
• Story Mapping
• Prepare a preferred snack

• Minecraft
• Setting the table
• Dealing Cards
• Organize materials needed for project
• Plan a playdate
• Make a gift for mom
PLANNING: PLAYING FRIENDLY TRICKS

- Fun way to teach perspective taking, creativity, and planning

- Successful trick playing involves
  - Identifying what others know
  - Identifying behaviors that will prevent others from knowing
  - Doing something new that the other person will think is fun
  - And executing all this in a way that maintains the deception
PLAYING TRICKS

• Clients
  • Children with autism who needed to work on perspective taking
  • Highly verbal
  • Couldn’t keep secrets or surprises

• Task analysis
  • Create a new trick
  • Describe it and why it’s a trick
  • Execute without “giving it away”
  • End the trick appropriately, e.g., “Gotcha!” or “Tricked ya!”
• Taught rule “A trick is when you play a joke on someone for fun. If you make someone sad, it’s mean, it’s not a trick”
• Multiple exemplar training across tricks
• Initially taught same tricks
• Then moved to novel tricks every session
• Provided props occasionally
PUTTING IT ALL TOGETHER

The Art of Problem Solving
PROBLEM-SOLVING

• B. F. Skinner: A problem is a situation where an outcome would be reinforcing, if only you had a behavior needed to produce it

• In lay terms, you know what you want but you don’t know how to get it
Problem-solving as a Class of Behavior:

- Behaviors you engage in that result in identifying the behavior needed to bring about the desired outcome.

- In other words, it’s the skill of figuring out what you need to do to get what you want.
THE ROLE OF RULE DERIVING

Contextual Cues for Conditional Relating

“IF” “Antecedent” “THEN” “Behavior” “THEN” “Consequence”

Transforms the function of the actual antecedent to cue the behavior, as though it were an Sd for that behavior
THE ROLE OF RULE DERIVING

"IF"  "My toy doesn't work"

"THEN"  "I put new batteries in it"

"THEN"  "I can play with it"
INCOMPLETE RULES

“IF” “My toy doesn’t work” “THEN” “I can play with it”

“THEN”
THE ROLE OF FLEXIBILITY / CREATIVITY

- Problem solving seems to be the repertoire of behavior of creatively and flexibly deriving possible behaviors for incomplete rules.
- Poor problem solving skills may be:
  - Nonexistent / inadequate rule deriving repertoire
  - Rigid / inflexible / repetitive rule driving repertoire
PROBLEM SOLVING + AUTISM

• Solving novel problems is critical to human functioning

• Previous research has shown that many children with ASD have deficits in problem solving skills (Minshew et al., 1997)

• Very little previous research has evaluated procedures for teaching problem solving skills to children with ASD
PROBLEM-SOLVING VS PLANNING

• Problem-solving is similar to planning

• Both involve deciding what you need to do in the future, in order to produce a particular outcome

• Planning is what you do before there is a problem

• Problem solving is what you do when a problem comes up
## PROBLEM-SOLVING VS PLANNING

<table>
<thead>
<tr>
<th>Planning</th>
<th>Problem-Solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare for a play date</td>
<td>Make your friend feel better after you accidentally hurt his feelings</td>
</tr>
<tr>
<td>Planning how to complete a school project</td>
<td>The tool you need for a project breaks while you are working on the project</td>
</tr>
<tr>
<td>You buy a new skateboard and plan how to assemble the parts</td>
<td>A bolt on your skateboard breaks and you need to fix it</td>
</tr>
</tbody>
</table>
SELF-DETERMINED LEARNING MODEL OF INSTRUCTION

- Intellectual disabilities in general education (Agran et al, 2006)
- Middle school students with developmental disabilities (Agran et al, 2002)
- Limited to one problem, in school setting
- Solutions are usually doing what teacher says
Trained typically developing preschoolers to use category names to prompt themselves to state intraverbal animal names

“Tell me 12 animals”

“ZOO: elephant, zebra, giraffe, FARM: cow, pig, chicken, OCEAN: fish, whale, dolphin”

Didn’t generalize to other categories

Not really a problem that mattered to the students
PROBLEM-SOLVING BEHAVIORAL CHAIN

1. Identify problem
2. Explain why it’s a problem
3. Generate potential solutions
4. Choose a solution and implement it
5. Monitor progress
6. If unsuccessful, choose a new solution
7. Problem solved - get reinforcement!
# PROBLEM-SOLVING EXAMPLES

<table>
<thead>
<tr>
<th>Problems</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crayon breaks</td>
<td>Tape it back together</td>
</tr>
<tr>
<td></td>
<td>Pick a different color</td>
</tr>
<tr>
<td></td>
<td>Use it anyway</td>
</tr>
<tr>
<td>Bottle of glue is jammed</td>
<td>Squeeze harder</td>
</tr>
<tr>
<td></td>
<td>Poke it with a paper clip</td>
</tr>
<tr>
<td></td>
<td>Use tape or staples instead</td>
</tr>
<tr>
<td>Can’t open a box that is taped shut</td>
<td>Get scissors to cut tape</td>
</tr>
<tr>
<td></td>
<td>Peel tape off</td>
</tr>
<tr>
<td></td>
<td>Tear box</td>
</tr>
<tr>
<td>Not enough chairs for everyone to sit</td>
<td>Use something else as a chair</td>
</tr>
<tr>
<td></td>
<td>Sit two people on one chair</td>
</tr>
<tr>
<td></td>
<td>Find another chair</td>
</tr>
</tbody>
</table>
PROBLEM-SOLVING: SKILL BUILDING

I. EF Skill Building

• Teach chain of problem-solving steps
  • Forward chaining
  • Backward chaining
  • Total task
PROBLEM-SOLVING: SKILL BUILDING

• Prompting and Fading
  • Use ample prompting at first
  • Big reinforcers
  • Fade out prompts
  • Use “leading question” prompts rather than directive or echoic

• “What do you think might work?”
• “Is that going to fix it or make it worse?”
• “I wonder what would happen if you did X....”
• Slow acquisition for first client
• Generalization to novel problems for all clients
• Parents reported generalization outside of session
• Did not evaluate social problems
2. Compensatory Strategies

- Stay Calm - slow breathing, positive self-talk, count to calm
- Get out Problem Solving handouts to guide process of finding solution(s)
- Use class resources - computer, books, handouts
- Calmly ask for help if needed

3. Environmental Supports

- Visual prompts and guides
  - Steps to problem solving
- Peers may be recruited for help
- Class resources - books, computer, etc.
- Brain development and functioning is of course critical to EF skills
- Folks with ASD have not acquired many EF skills, possibly due to biological factors
- It’s our job to maximize skill development
Our clients with ASD appear to have significant EF deficits

• Behavior often rigid and inflexible; an “insistence on sameness,”
• Tend to fail to be “future oriented”

Many other populations could likely benefit as well

• ADHD
• Behavior disorders
• Typically developing adults!
CONCLUSION

- Using ABA to analyze and teach EF skills will likely:
  - Establish useful skills for individuals with autism
  - Expand the science of behavior analysis to be a more comprehensive science of psychology

- Final thoughts
  - Multiple exemplar training works!
  - Don’t forget to focus on generalization, no rote learning
  - Have fun!