Sensory Integration and Applied Behavior Analysis: A Mixed Methods Approach

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Objectives

- Discuss purpose of behavior
- Review definitions and relevant research in regards to treatment of autism spectrum disorders using Applied Behavior Analysis and Sensory Integration theories
- Receive examples of integrative treatment approaches which emphasize sensory strategies as a tool within an ABA framework
- Review case study
- Learn how to advocate for integration of SI theories into a behavioral program
What is behavior?

- Definition:
  - The way an individual reacts to an internal or external stimulus
  - When it is maladaptive, therapists are challenged to change it

- 4 functions of behavior for the child with autism
  - Attention: from peers, adults
  - Escape: from person, task
  - Tangible: desire for an item or activity
  - Sensory: the action feels good (self stimulatory) or meets a sensory need

- How do we determine the function?
  - Interview of caregivers
  - Direct observation
  - Functional Hypothesis (Tracking ABC data: antecedent, behavior, consequence)
  - Functional Behavioral Assessment

- Treated using either Applied Behavior Analysis or Sensory Integration theories, if severe will often require formally written “behavior plans”

Applied Behavior Analysis

- Principles developed by B.F. Skinner based on Darwin’s natural selection
  - Behaviors that produce favorable consequences will continue to occur, and behaviors that produce unfavorable consequences will decrease over time

- Ivar Lovaas theorized these principles should be practiced in an early and intensive behavioral intervention model (EIBI)
  - 5-7 days a week for several hours per day progressing from one-to-one to group based with the focus of eliminating atypical behavior and development of new skills

- Emphasizes the concepts of “Discrete Trial Teaching”
  - Repetitive trials of skills while minimizing extraneous language and providing positive reinforcement for desired response
  - Utilizes ‘errorless learning’
  - Silent prompting
  - Often done in trials of 10, producing a percentage of correct trials

- Objective data collected and graphed to track progress and goal mastery over time
  - Skill data vs. Prompt data
Applied Behavior Analysis

- Uses the prompting hierarchy from least invasive to most invasive in order to complete a task
  - **Natural prompt**: occurs in context without manipulation of the environment
  - **Visual prompt**: pictures, text, or video cues
  - **Gestural prompt**: pointing or gesturing to assist in task completion
  - **Positional prompt**: manipulating the environment or materials during a task
  - **Faded physical**: physical prompt needed to complete part of the task
  - **Full physical**: physical assistance for the entire task (hand over hand)
  - **Verbal prompt**: therapist stating what or how to complete (previously thought to be the most invasive)

Applied Behavior Analysis

- Practiced by trained professionals in schools, autism centers, outpatient clinics, and in homes
- Widely recognized in multiple meta-analyses and systematic reviews to have strong empirical support
Sensory Integration

- Traditional Sensory Integration Theory developed by Jane Ayres
- Perceiving, modulating, organizing, and interpreting sensation in order to perform well-regulated occupations which produce a functional outcome
- Difficulties modulating sensation cause interruptions in ADLs, social emotional health, and meaningful activity
- Commonly utilized in the treatment of ASD
  - Atypical sensory responses are a part of diagnostic criteria
- Formally assessed utilizing the Sensory Integration and Praxis Test (SIPT), Sensory Profile, and Sensory Processing Measure (SPM)
- Limited research within OT practice, possibly due to wide variety of features that can present across multiple disorders

(OTA, N.D.), (Hannat, 2016)

Choosing a Style for Treatment

When treating individuals with autism, practitioners such as psychologists, special educators, PTs, OTs, and SLPs will need to develop their own style of treatment to combat maladaptive behavior.

It is a common misconception that Applied Behavioral Analysis, an evidence based approach for autism, cannot live in the same world as Sensory Integration.
Why do ABA and Sensory Styles Conflict?

- Traditional ABA therapists’ views of SI
  - Common misconceptions
    - There is no evidence for sensory interventions
    - Sensory strategies are given whenever and where ever the child needs them regardless of context and age appropriateness
    - Sensory input that as craved should be withheld and only be used as reinforcement, because it is internally motivating
    - Sensory diets cannot be taught to independence and rely on therapists direction to complete
  - Considerations for these therapists
    - Many effective sensory strategies are already utilized in ABA studies under different terms
    - Evidence for ABA interventions are mostly based in early intervention (Matson et. Al, 2012)
    - Sensory strategies can be implemented in appropriate context
    - Severe sensory needs cannot be ignored and are equally as important as nutritional needs, SLP intervention, immunotherapy, etc.
    - Sensory diets can be taught as routines which a child can participate in independently

Why do ABA and Sensory Styles Conflict?

- Traditional SI therapists’ views of ABA
  - Common misconceptions
    - ABA is like dog training
    - ABA turns child into a robot
    - Lack of opportunity to generalize to different contexts and situations
  - Considerations for these therapists
    - Insurance push toward evidence based treatment forces us to implement ABA principles as best practice
    - ABA focuses on appropriate social interaction
    - Movement toward acceptance of naturalistic cues and verbal cues as less invasive in current research
    - Generalization is often built into interventions as last step toward goal mastery
A Mixed-Methods Approach

- Child centered
- Uses sensory strategies within ABA framework
- Should be interdisciplinary
- Uses functional communication training to teach child to express sensory needs
  - Ex: Children need to independently express feeling overstimulated and request a change in environment or stimulus
- Utilizes the concepts of positive reinforcement on a regular basis
  - Can be verbal, tangible item, edible (intrinsically motivating), or adult attention
- Uses the prompting hierarchy to develop skill building
- Uses short, simple directives that limit extraneous language

Examples of Using Sensory Strategies in an ABA Framework
Treating Chronic Skin Picking due to Tactile Hyposensitivity

A study was conducted by Matson et al. using differential reinforcement of other behaviors (DRO) where reinforcement was self-administered was highly effective in decreasing skin picking.

DRO: delivering reinforcement whenever the problem behavior does not occur during a predetermined amount of time.

Ex: Non-verbal child taught to use SGD to request “fidget bag” when feeling the urge to pick skin. Access to bag is provided unconditionally with successful requests. Following incidence of skin picking, child is prompted to request via SGD. With absence of skin picking within 5 minute intervals, child reinforces self with token on token board to earn chosen item.

Treating Proprioceptive Hyposensitivity

- Bruxism: Matson et al. reported pairing a vocal and physical cue (“say ah”, and pressure to the jaw with index finger for 3 seconds on an interval basis) as effective strategy to decrease teeth grinding
  - Recommend to be paired with DRO for absence of teeth grinding

- Tensing on objects: Spio compression vest worn to increase impulse control shown to be effective (Lin, 2014).
  - Recommend data collection on frequency of slouching on desk, amount of time spent engaged in tensing, hitting behaviors, etc.
  - Recommend to be paired with verbal praise, tangible or edible positive reinforcement
Treating Elopement due to Vestibular Hyposensitivity

- Planned ignoring
- Modifying the environment to prevent elopement
- Prompting requests to take a break/use SGD to request
- First/Then boards to rotate seated work with gross motor break
- Seat wedges or yoga ball to provide vestibular input during seated work
- Providing non-contingent gross motor breaks in regular timed intervals to decrease craving for movement
  - Jumping jacks
  - Taking a brisk walk
  - Carrying heavy materials
  - Wall Push Ups

Case Study

- 12 y.o. male diagnosed with autism spectrum disorder, verbal apraxia, anxiety, pulmonary valve stenosis, and PANDAS
- Classroom observations:
  - Increased fidgeting
  - Decreased attention to task
  - Elopement from teaching area
  - Off task behavior: visual gazing, seeking pressure input from objects including: desks, sinks, playground equipment, other people
Case Study (continued)

- **Intervention:**
  - **Sensory Based:** OT assessed student using the Sensory Processing Measure (home form and classroom form) to determine specific sensory deficits. Fit for Spio vest to provide deep pressure input to decrease off task behaviors.
  - **ABA Based:** OT suggested behavior probe to be completed by classroom behavior therapists (CBTs) to determine efficacy of Spio vest on decreasing behaviors. Baseline interval data collected by CBTs to determine how often behaviors typically occur.
  - **Integrated Approach:** Data collected by CBTs and OT throughout the day with Spio on during school hours (not to be worn during recess and exercise). Data was evaluated following 2 week intervention to determine efficacy.

### Case Example: PK (cont)

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<tr>
<th></th>
<th>Aggression</th>
<th>Off Task</th>
<th>Tantrum</th>
<th>Elopement</th>
<th>SIB</th>
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<td><strong>Baseline Rate</strong></td>
<td>9.9%</td>
<td>69.4%</td>
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<td><strong>Treatment Rate (VEST)</strong></td>
<td>10.6%</td>
<td>59.0%</td>
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<td><strong>% Reduction</strong></td>
<td>-7.2%</td>
<td>15.0%</td>
<td>42.9%</td>
<td>34.4%</td>
<td>35.7%</td>
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How to Develop an Integrative Approach

- Educate yourself on ABA methods and integrate into your treatment style
- Recognize that both ABA and Sensory Integration are continually evolving
- Understand the function of the behavior
- Utilize reinforcement
- Utilize the prompting hierarchy in OT/PT/SLP treatment
- Become more data oriented

How to advocate for using ABA and Sensory Integration together (continued)

- Educate the ABA team on sensory integration, and advocate for the child’s sensory needs in a non-threatening way
- Work with adjunct therapists: music therapists, counselors, teachers, parents, to develop a data collection method for chosen strategy to combat behavior
- Evaluate, implement, re-evaluate, and re-structure your treatments based on objective and subjective data
- Utilize data collected on previous individuals for “evidence” to trial similar sensory strategies for similar children
Helpful Tools:

- ABC Data Tracking Form
- Motivation Assessment Scale
  [https://sites.ualberta.ca/~vs1edpy/EDPY%20497%20Educating%20Autism/MotivAssessScale.Durand.pdf](https://sites.ualberta.ca/~vs1edpy/EDPY%20497%20Educating%20Autism/MotivAssessScale.Durand.pdf)

Questions?
References


ABC DATA COLLECTION SHEET

NAME: _________________________
DATE: _________________________

OPERATIONAL DEFINITION OF BEHAVIOR:

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<th>Time of incident</th>
<th>Distal/environmental antecedent</th>
<th>Immediate antecedent</th>
<th>Target behavior</th>
<th>Consequence</th>
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