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# Sensory-processing Strategies and ASD Children

Abby Khou, OTS



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Let me introduce myself!



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**Introduction**

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by challenges in social communication and the presence of restricted, repetitive patterns of behavior, interests or activities (American Psychiatric Association [APA], 2013).



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**What is Sensory Processing Disorder?**

Also termed "sensory integrative dysfunction," it falls under two major categories: sensory modulation dysfunction and dyspraxia. (Bundy and Lane, 2020)



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## Sensory Processing Disorder - categories

- Sensory Modulation Disorders
  - Sensory Underresponsivity
  - Sensory Overresponsivity
  - Sensory Seeking/Craving
- Sensory Registration and Discrimination Deficits
  - Postural-ocular control (Vestibular, Prop)
  - VBIS (Vestibular, Prop)
  - Somatodyspraxia (Prop, Tactile)
  - Visuodyspraxia (Tactile, Visual)




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## Sensory Processing Disorder - categories

**MODULATION DYSFUNCTIONS**

- Vestibular Overresponsivity
  - Gravitational Insecurity
  - Aversion to movement
- Sensory Seeking/Craving (Underresponsivity)
  - Tactile/Vestibular/Proprioception Seeking




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## Sensory Processing and ASD Children

- ASD Symptoms
  - Social Communication and Interaction
    - Engagement, response, eye contact
    - Deficits in nonverbal responses or body language
    - Inability to develop and maintain relationships
    - Hypo or hyperresponsiveness to sensory input
  - Relationship to Sensory Processing
    - Social functioning
    - Tactile difficulties linked to attention
    - Hyperresponsiveness and sensory seeking linked to decreased socialization




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### Sensory Processing and ASD Children

- ASD Symptoms
  - Repetitive and Restrictive Behaviors
    - Echolalia, repetitive movements, repetitive play habits
    - Poor transitioning and rigidity
    - Narrow interests
  - Relationship to Sensory Processing
    - Maladaptive behaviors
    - Hyperresponsiveness to tactile input leads to rigidity, stereotypy, repetition and hyper focusing
    - "Somatosensory discrimination leads to motor deficits" (Blanche, et. al, 2021)




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### Sensory Processing and ASD Children

- ASD-related impairments lead to challenges in daily participation, including hyper and hypo-responsiveness to input:
  - Tactile
  - Auditory
  - Vestibular
  - Olfactory
  - Proprioceptive
  - Visual
- Affects emotional regulation, attention, language, social communication and motor performance (Blanche, et. al, 2021)




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### Sensory Processing and ASD Children

- Sensory Processing-related Occupational Challenges
  - Sensory-related challenges with attention, regulation, affect, activity
  - Withdrawal from, and avoidance of sensory experiences
  - Sensory seeking
  - Poor self-efficacy, self-esteem
  - Avoidance of engagement in motor activities
  - Poor gross, fine, and visual motor coordination
  - Poor organization (Blanche, et. al, 2021)




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- ASD children present difficulties in:
  - Feeding
  - Interactive play
  - ADLs and IADLs
  - Social and leisure participation
  - Learning to write and read
  - Self-regulation
  - Community participation
- ASD adults present difficulties in:
  - Participation in leisure activities
  - Social communication
  - Obtaining and maintaining employment
  - Academic IADLs

Blanche, et. al, 2021, p. 52

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### How Sensory Processing Deficits Affect Play

- Problems in sensory processing involves "heightened, diminished or fluctuating responses to sensation" and makes play participation difficult, contributing to "social withdrawal and isolation"
  - **Tactile defensiveness:** Restricts early stages of play which include a lot of tactile exploration
  - **Auditory sensitivities:** Affects play with toys that emit sounds (such as cause and effect toys)
  - **Gravitational insecurity:** Restricts play that involves moving and using the body to explore
  - **Vestibular-bilateral and sequencing disorders:** children seek activity with more intense movement; in school age years may have difficulty in occupations such as bike riding, skateboarding, ball play
  - **Dyspraxia:** Difficulties in ideation, planning and execution of actions (motor planning) affecting many aspects of play (Parham & Fazio, 2008).

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### What is Ayres' Sensory Integration?

Jean Ayres defined sensory integration as "the neurological process that organizes sensation from one's own body and from the environment and makes it possible to use the body effectively within the environment" (Bundy and Lane, 2020)



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## Sensory Integration and the Adaptive Response

Focus on Tactile, Vestibular and Proprioceptive Sensory Systems

Sensory Input (Just-Right-Challenge) ↔ Sensory Integration (Registration, Modulation, Discrimination)  
 ↔ CNS ↔ Behavioral Organization ↔  
**ADAPTIVE RESPONSE**

Bundy and Lane, 2020

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### Basic sensory-based interventions for ASD

- Visual schedule
- Social stories
- Video modeling

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#### When I'm Frustrated

Sometimes I get really frustrated and mad.

I want to throw things, hit people, yell, and cry.

If I act that way I can get in trouble and people won't want to be my friend.

When I am frustrated, I need to take a deep breath. I can ask for a break, take a walk, get a drink of water, or put my head down.

I tell people around me, "I am frustrated right now." I use my words. Soon I will feel better.

#### Ask to Play

Sometimes my friends are playing a game without me.

I want to play too but I shouldn't just go and start playing.

I can walk over and ask, "Can I play too?" I need to wait for them to answer.

If they say yes - I say "thank" and start playing. If they say no - I say "no problem, maybe next time."

My friends are happy when I ask if I can play. We can have fun!

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### Self-calming strategies for ASD children

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|---|---|---|
| <br><b>Prosody</b><br>Self-soothing through sing-song self talk    | <br><b>Activities</b><br>(For older children)<br>Meditation, drama, arts           | <br><b>Breathing</b><br>Children's yoga (age 7 up), playing a wind instrument      |
| <br><b>Role-playing</b><br>Reinforce socially acceptable responses | <br><b>Tactile</b><br>Fidgets, stress ball, textured pillow, weighted vest/blanket | <br><b>Environment</b><br>Modify environment or help modulate response (earphones) |

(Garland, 2014, p. 30-39)

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### SIT strategies for ASD Children

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| <br><b>Child-led</b><br>Let child approach therapy equipment first                           | <br><b>Vestibular</b><br>Gentle, linear swinging OR active, rotary swinging             | <br><b>Adaptive Seating</b><br>Have child sit on bouncy seat to help regulate for tabletop activities        |
| <br><b>Wait &amp; Modify</b><br>Modify strategy if child is not producing adaptive response | <br><b>Deep pressure</b><br>Weighted blanket, therapy ball, squeeze shoulders and arms | <br><b>Burrito</b><br>Child lays on crash pad, therapist wraps it around and rolls for proprioceptive input |

(Garland, 2014, p. 30-39)

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### Creating a sensory-rich life

- Sensory box, rice, bean or sand bin
- Visual fidgets
  - Kaleidoscope, lava lamp, mind jars
- Sensory nest/sensory corner
  - Safe, quiet and comfortable space using tent, pillows, weighted blanket, soft lighting, music device, toys and fidgets, and stuffed animals
- Movement breaks
  - Linear and rotational
  - Vestibular cravings
- Mindfulness strategies
  - Being aware of breathing
  - Meditation (Garland, 2014)






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### Play as occupation

Play is a child's way of learning and an outlet for his innate need of activity. It is his business and his career. In it he engages himself with the same attitude and energy that we engage ourselves in our regular work.  
-Norma Alessandrini, AJOT, 1940

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### Theories of Play



#### Biological Theories of Play

- Evolutionary Biology of Play by Burnhardt (2005)
  - General Function of Play
    - Maintenance
      - Neural Processing
      - Behavioral Flexibility
      - Physical Fitness
      - Perceptual and Motor Coordination
    - Generativity
      - Neural and behavioral development
      - Transformation of physical to mental activity
      - Reorganization of behavior patterns
      - Social success
      - Novel behavior and creativity

Parham & Fazio, 2008

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### Theories of Play



#### Arousal modulation theories of play

- "Play and exploration were seen as secondary to behaviors that serve to reduce basic drives, such as those aimed at reducing hunger, cold or thirst" (Parham & Fazio, 2008, p. 10)
- Intrinsic motivation theory of play according to Berlyne (1969): "Play was associated with exploration and explained in terms of its role in the modulation of arousal states within an organization" (Parham & Fazio, 2008, p. 10)
- Diverive exploration as essence of play by Ellis (1973): "Behavior is motivated by the need to elevate the level of arousal towards the optimal" (Parham & Fazio, 2008, p. 10)
- Novelty in play influences interaction of organism with environment by Hutt (1970): "In the play the child asks, "what can I do with this object?" (Parham & Fazio, 2008, p. 11)

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## Theories of Play

**Psychodynamic theories of play**

- Functions of play according to Freud (1961):
  - Wish fulfillment (be in a position of power or other people's shoes)
  - Mastery of traumatic events where children can take an active position in situation where they were rendered passive victims previously
- Erikson (1963): "In play, children create situations in which they can deal successfully with anxieties and uncertainty, leading to their ability to master reality" (Parham & Fazio, 2008, p. 12)

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## Theories of Play

**Cognitive-developmental theories of play**

- Play as a cognitive process that contributes to cognitive development
- Focus on children's formation of and manipulation of concepts and symbols
  - Sutton-Smith (1967): Pretend play, children re-purpose items and pretend they are something else
    - Leads to creativity, role flexibility and feels of autonomy
  - Bruner (1972): Opportunity for establishment of new motor patterns "particularly the manual and handling skills required for tool use" (Parham & Fazio, 2008, p. 12)
    - Leads to enhanced problem solving, adaption, widening of play skill repertoire

Parham & Fazio, 2008

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## Theories of Play

**Cognitive-developmental theories of play**

- Development of creativity in play
  - First 2 years:
    - Acquire knowledge about the physical and social world "through the use of their senses, and the consequences of their actions" (Gardner, 1982)
  - Ages 2-7:
    - Symbolic forms of information (speech and language)
    - Hand and body gestures
    - Music, numbers and pictures (Gardner, 1982)
  - Preschool as the "golden age of creativity"

Parham & Fazio, 2008

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## Theories of Play

**Sociocultural Theories of Play**

- Play as having a reciprocal relationship with culture
  - "Play contributes to the socialization and enculturation of children" (Schwartzman, 1978)
  - "Human collective behavior is organized through play" (Sutton Smith, 1980)
  - "Culture is expressed or embodied in play" (Roopnarine & Johnson, 1994).
  - "Play mirrors or, indeed, parodies the socialization process of society" (Schwartzman, 1978)

Parham & Fazio, 2008

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## Theories of Play

**Sociocultural Theories of Play**

- **Play as socialization**
  - Learning of rules and norms through play
  - Because of rules, child able to predict what happens and adjust behavior
  - Leads to development of self-identity and the concept of a "generalized other" (Mead, 1934).
- **Play as communication**
  - Play as "metacommunication" (Bateson, 1972)
  - Wrestling as an example: when preceded by the signal "this is play"
  - Play not as an agent of socialization
  - "Play itself is the skill required to function within the real world of daily life (Sutton-Smith, 1980).

Parham & Fazio, 2008

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## Play as occupation

**What does play look like in everyday life?**

- Observe play as it occurs in natural environments
- Participant observation, interview and questionnaire methods

**Play in relation to disability**

- Powerful influence of environmental context
- "Environment played a particularly influential role in [this group's] observed playfulness" (Parham & Fazio, 2008 p. 27)
- Children with SI problems often "have play difficulties"
- "Preschoolers with sensory integrative dysfunction were found to express strong preferences for the the types of play in which their play skills were the strongest" (Parham & Fazio, 2008 p. 27)

**Culture and Play**  
The assumption that play is a child's major occupation may not be a universally held belief (Bazyk, Stalnaker, Llerena, Ekelman & Bazyk, 2003).

Parham & Fazio, 2008

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## ★ Play in evidence-based practice ★

- "For play to emerge and flourish, a child needs to **feel physically and emotionally safe** and to have an adequate level of physiological stability and metabolic resources" (Parham & Fazio, 2008, p. 29)
- "[Humphry] advocates simultaneously considering **cultural practices, social interactions, and individual engagement patterns** in generating multiple therapeutic strategies" (Parham & Fazio, 2008, p. 29)
- "Research by Hess and Bundy found that **playfulness was strongly related to coping skills** among adolescents with severe disturbance, as well as typical adolescents, who were more playful and had better coping" (Parham & Fazio, 2008, p. 29)

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## ★ Quantitative Study ★

Xu W, Yao J, Liu W. **Intervention Effect of Sensory Integration Training on the Behaviors and Quality of Life of Children with Autism**. *Psychiatry Danubina*. 2019;31(3):340-346. doi:10.24869/psyd.2019.340

**Background:** Sensory integration dysfunction is closely related to autism. Therefore, the effect of Sensory Integration Training (SIT) on the behaviors and quality of life of children with autism was explored in this study.

**Subjects and methods:** From September 2017 to December 2018, 108 patients from Fuzhou Fourth Hospital and Xiangtan Fifth Hospital were included in the intervention group (group A) and the control group (group B), with 54 members in each group. The 54 members in group B, with an average age of 5.18±2.94, received routine treatment. In addition to the same routine treatment, the members in group A also received sensory integration training and physical exercise intervention, which lasted for three months.

**Results:** After the treatment, statistically significant differences were observed in the CARS and ABC scores.

**Conclusions:** SIT intervention had a certain effect and is of great value for the future development of SIT courses or intervention programs for children with autism.

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## ★ Qualitative Study ★

Peña M, Ng Y, Rissal J, Anagnostou E. **Brief Report: Parent Perspectives on Sensory-Based Interventions for Children with Autism Spectrum Disorder**. *Journal of autism and developmental disorders*. 2021;51(6):2109-2114. doi:10.1007/s10803-020-04644-9

Recommended Sensory-based Interventions Implemented by ASD Parents

An online survey was sent to 399 families; response rate was 39%. The most frequently therapist-recommended interventions were trampoline (54.8%), massage (47.8%), and oral-motor tools (43.8%). Highest use was reported for massage (96.3%), trampoline (89.2%) and joint compressions and brushing (89.2%).

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## In-clinic Case Study: ASD Child

**Intervention for Vestibular Hyporesponsiveness: Vestibular Sensory Input**

- Hypotheses: Child demonstrates vestibular hyporesponsiveness and poor postural control. Child prefers rotary "merry go-round" close to the ground than bolster or bucket swing. Apparent aversion to bolster or bucket swing may be due to TD (tactile defensiveness).
- OTS recommends rotary movements close to the ground such as rotary movement and bouncing on bolster swing while touching the floor, rotary movement on merry go-round and jumping on trampoline.

**Evidence basis: A Preliminary Study on the Characteristics and Standard Diagnosis and Treatment of Vestibular Dysfunction in Children (Hariri, et. al, 2022)**

- Compares efficacy, limitations and clinical implications for various interventions for postural control on ASD children.
- Interventions considered were: martial arts, water-based interventions, animal-assisted therapies, trampoline, balance training, vestibular therapy
- Conclusion: Enhancing motor skills, cerebellum function and sensory input integration were some of the main mechanisms of these interventions to improve postural control in ASD children.

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### Conclusion

Sensory-based strategies and sensory integration therapy can be effective in behavior regulation and sensory modulation in order to support the occupation of play in ASD children, when applied based on evidence-based practice and against measures of intervention fidelity.

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### Next: Case Study

Let's strategize and use our intervention planning skills!

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## Interactive Activity: Case Study

Max is a 2-year-old child who attends his school district's early intervention program. He has been referred to occupational therapy primarily because of parent-reported gross motor skill deficits, refusal to drink out of cups without lids and difficulty with dressing. The occupational therapist has observed unsteady ambulation. The OT also observed that Max tends to become dysregulated when transitioning from a preferred activity to a different activity in-clinic. Max demonstrates other rigid, stereotypical ASD behaviors such as tending to focus on objects rather than peers and repeatedly turning wheels on car toys. He also dislikes diaper changes and being touched by people he is not familiar with. He is able to tolerate large amounts of swinging in the clinic but is only able to sit up on a swing with moderate assistance.

Hypotheses: **Tactile defensiveness, hyposensitiveness to vestibular sensory input and poor postural control.** These sensory processing and modulation problems are interfering with his play occupations in-clinic, at school as well as at home.

- What types of sensory-processing strategies would you apply in-clinic to increase the quantity and quality of Max's play participation?
- What types of sensory-processing strategies would you recommend to parents?

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Xu W, Yao J, Liu W. Intervention Effect of Sensory Integration Training on the Behaviors and Quality of Life of Children with Autism. *Psychiatra Danubia*. 2019;31(3):340-346. doi:10.24869/psych.2019.340

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## Thanks!

Do you have any questions?  
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