

SENSORY PROCESSING INTERVENTIONS

CHARACTERISTICS OVERVIEW CHART

Verbal Skills	Grade Levels	Cognitive Level	Areas Addressed
<input checked="" type="checkbox"/> Nonverbal	<input checked="" type="checkbox"/> PK	<input checked="" type="checkbox"/> Classic	<input type="checkbox"/> (Pre)Academic/Cognitive/Academic
<input checked="" type="checkbox"/> Mixed	<input checked="" type="checkbox"/> Elementary	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Adaptive Behavior/Daily Living
<input checked="" type="checkbox"/> Verbal	<input checked="" type="checkbox"/> Middle/High	Functioning	<input checked="" type="checkbox"/> Behavior
			<input type="checkbox"/> Communication/Speech
			<input type="checkbox"/> Social/Emotional

BRIEF INTRODUCTION

A growing body of evidence is showing that young people with autism (AU) are challenged by a variety of sensory processing deficits (Case-Smith, Arbesman, & Scheinholtz, 2008; Dunn, Myles, & Orr, 2002; Myles et al., 2004). Results of recent research indicate that children can be hyper- and/or hypo-sensitive to any one or more of the seven sensory systems of the body (tactile, vestibular, proprioception, visual, auditory, gustatory, and olfactory). These processing deficits are often linked to disruptive behaviors.

DESCRIPTION

Occupational therapists are trained to evaluate sensory processing capabilities and formulate individualized plans of therapeutic interventions that can then be carried out by teachers, parents, and other support personnel. It is important to remember that sensory processing interventions are still being examined for efficacy on young people with autism, so they should only be initiated under the supervision of trained professionals.

Slant board and seat cushion to help with sensory integration



From Henry, S. Used with permission

Movement Break in the Classroom



From Henry, S. Used with permission




Student Writing in Salt to Work on Fine-Motor and Tactile Issues







From Henry, S. Used with permission

Interventions that are frequently seen in the school setting include therapy balls as alternative seating, slant boards, weighted vests, gross-motor exercise or use of occupational therapy equipment in a supervised setting, and environmental modifications that allow students to be more successful in the classroom. Little controlled research has been conducted on sensory interventions and additional research is needed before definitive conclusions can be drawn.

The following table briefly describes the sensory areas, their location, their function, and interventions that an occupational therapist or other professional trained in sensory integration can provide.

Sensory Systems, Locations, Function, and Intervention Samples			
System	Location	Function	Sample Interventions
Tactile (Touch) 	Skin – density of cell distribution varies throughout the body. Areas of greatest density include mouth, hands, and genitals.	Provides information about the environment and object qualities (touch, pressure, texture, hard, soft, sharp, dull, heat, cold, pain).	Weighted vests, weighted blanket, resistive putty, handheld fidgets, holding something cold, writing in sand or salt.
Vestibular (Balance) 	Inner ear – stimulated by head movements and input from other senses, especially visual.	Provides information about where our body is in space, and whether or not we or our surroundings are moving. Tells about speed and direction of movement.	Jumping on a trampoline, hanging upside down on a jungle gym, sitting on a therapy ball, rocking on a rocker, swinging on a swing, twirling and spinning.
Proprioception (Body Awareness) 	Muscles and joints – activated by muscle contractions and movement.	Provides information about where a certain body part is and how it is moving.	Movement (i.e., handing out books, running an errand), exercise, weighted backpack, pushing a cart, wheelbarrow walk, seat cushion.

Sensory Systems, Locations, Function, and Intervention Samples (Continued)			
<p>Visual (Sight)</p> 	<p>Retina of the eye – stimulated by light.</p>	<p>Provides information about objects and persons. Helps us define boundaries as we move through time and space.</p>	<p>Sunglasses, cap with bill, highlighting pen, elevated slant board, lights turned off, study carrel.</p>
<p>Auditory (Hearing)</p> 	<p>Inner ear – stimulated by air/sound waves.</p>	<p>Provides information about sounds in the environment (loud, soft, high, low, near, far).</p>	<p>Earplugs, headphones, music, chimes, squeeze toys, books on tape, talking calculator.</p>
<p>Gustatory (Taste)</p> 	<p>Chemical receptors in the tongue – closely entwined with the olfactory (smell) system.</p>	<p>Provides information about different types of taste (sweet, sour, bitter, salty, spicy).</p>	<p>Eating crunchy foods, blowing bubbles, drinking cold water, playing a musical instrument, sucking a thick liquid through a straw.</p>
<p>Olfactory (Smell)</p> 	<p>Chemical receptors in the nasal structure – closely associated with the gustatory system.</p>	<p>Provides information about different types of smell (musty, acrid, putrid, flowery, pungent).</p>	<p>Scented pens or markers, scratch-and-sniff stickers, scented candles, nose plug.</p>

From Myles, B. S., Cook, K. T., Miller, N. E., Rinner, L., & Robbins, L. A. (2000). *Asperger Syndrome and sensory issues: Practical solutions for making sense of the world*. Shawnee Mission, KS: Autism Asperger Publishing Company. Used with permission.

BRIEF EXAMPLE

Chu, a 12-year-old with classic autism, often exhibited behavior challenges. A functional assessment determined that when he entered a novel environment these behaviors were likely to occur.

Interventions included (a) music provided through headphones to help him remain calm and (b) a handheld fidget to serve as a distraction. Data showed that when Chu entered new environments with these interventions, his behavior challenges decreased.

SUMMARY

Sensory interventions initiated by an occupational therapist can impact the functioning of individuals with autism.

RESEARCH TABLE

Number of Studies	Ages (year)	Sample Size	Area(s) Addressed	Outcome
40*	3- adult	930	Weighted vests, therapy balls as alternative seating, sensory integration therapy, auditory integration therapy, Snoezelen multisensory environments, sensory and motor interventions	Mixed

*Note: This number includes the results from three reviews.

STUDIES CITED IN RESEARCH TABLE

1. Bonggat, P.W. & Hall, L.J. (2010). Evaluation of the effects of sensory integration-based intervention by a preschool special education teacher. *Education and Training in Autism and Developmental Disabilities, 45(2)*, 294-302.
 This study compared rates of time on task for three elementary school students (1 with ASD) between a sensory-integration condition (being brushed using a deep-pressure technique) and an attention condition where no sensory events were provided. There were no differences in rates of on task behavior between conditions for any of the three participants.
2. Fava, L. & Strauss, K. (2010). Multi-sensory rooms: Comparing effects of the Snoezelen and the stimulus preference environment on the behavior of adults with profound mental retardation. *Research in Developmental Disabilities, 31*, 160-171.
 The purpose of this study was to determine the effects of exposure to two kinds of multi-sensory room and experience on three groups of participants -1 with severe ASD. While the Snoezelen room was reported to lead to reduced aggression and stereotypic behavior for the 3 ASD participants who experienced it, that conclusion cannot be supported since there was no baseline measurement of those behaviors collected and the participants did not experience either the other sensory room OR an appropriate control condition with no sensory room present which would have allowed a meaningful comparison of behaviors across different settings.

3. Reichow, B., Barton, E.E., Sewell, J.N., Good, L., Wolery, M. (2010). Effects of weighted vests on the engagement of children with developmental delays and autism. *Focus on Autism and Other Developmental Disabilities, 25(1)*, 3-11.
This study investigated the effects of a weighted vest on the engagement levels of three children with ASD (4, 5, & 5). Using an alternating-treatments design, no difference in engagement was seen between conditions in which the vest was present or absent.
4. Wuang, Y., Wang, C., Huang, M., Su, C. (2010). The effectiveness of simulated developmental horse-riding program in children with autism. *Adapted Physical Activity Quarterly, 27*, 113-126.
This study reports the effects of a 20 week long program of simulated horseback riding on the motor and sensory skills of 60 children with ASD. During the 20-wk treatment children were rated daily on motor function and sensory integration using survey instruments. While in the treatment condition the authors report improved motor and sensory function but do not provide any direct behavioral measures to support the survey results. In addition, no measures of academic, social, or daily living skills were reported, so it is impossible to determine if the intervention had any impact on functional skills needed by the children.
5. Cox, A. L., Gast, D. L., Luscre, D., & Ayers, K. M. (2009). The effects of weighted vests on appropriate in-seat behaviors of elementary age-students with autism and severe-profound intellectual disabilities. *Focus on Autism and Other Developmental Disabilities, 24(17)*, 17-26.
The purpose of this study was to evaluate the impact of weighted vests on the amount of time three elementary-age students with autism, intellectual disabilities, and sensory processing challenges engaged in appropriate in-seat behavior. Because weighted vests did not have an effect on appropriate in-seat behavior for any participant, a second experiment was conducted. Noncontingent reinforcement (NCR) was assessed and had positive effect on the participants' in-seat behavior.
6. Nwora, A. J., & Gee, B. M. (2009). A case study of a 5-year-old with pervasive developmental disorders-not otherwise specified using sound-based interventions. *Occupational Therapy International, 16(1)*, 25-43.
The aim of this study was to determine the efficacy of The Listening Program (TLP), an auditory integration program, in treating a child with PDD-NOS. Using a single-subject case study design, one child with PDD-NOS was administered a 20-week TLP intervention. Results of the study indicated improved behavior and sensory tolerance, receptive/expressive listening and language, motor skills, and behavioral/social adjustment at the post-intervention assessment.
7. Case-Smith, J., & Arbesman, M. (2008). Evidence based review on interventions for autism used in occupational therapy. *The American Journal of Occupational Therapy, 62(4)*, 416-429.
This review of literature examined sensory-based interventions and concludes that sensory

interventions are philosophically aligned with interventions for individuals with autism, including pivotal response training, social interventions, and behavioral interventions.

8. Morrison, E. (2007). A review of research on the use of weighted vests with children on the autism spectrum. *Education, 127*, 323-327.
While many occupational therapists advocate the use of weighted vests, there is little evidence for the effectiveness of this intervention or for the proper procedures associated with the use of a weighted vest. Three empirical investigations that included 12 students with autism showed that the use of weighted vests for young people with autism is primarily based on the therapist's observation and experience.
9. Schilling, D. L., & Schwartz, I. (2004). Alternative seating for young children with autism spectrum disorder: Effects on classroom behavior. *Journal of Autism and Developmental Disorders, 34*, 4, 423-432.
This study was conducted with four preschool-age children with autism who were allowed to sit on therapy balls while working in the classroom. Each student could move or use the ball as they saw fit, in some cases bouncing vigorously and in others rocking back and forth gently. Therapy balls were recommended to supplement the educational curriculum, not replace it. Students made improvements in on-task behaviors and engagement.
10. Baranek, G. (2002). Efficacy of sensory and motor interventions for children with autism. *Journal of Autism and Developmental Disorders, 32*, 397-422.
This review summarized the sensory and motor difficulties often manifested in autism and evaluated the scientific basis of 29 studies of 757 individuals with autism on sensory and motor interventions used with this population. Recommendations for educational settings included developmentally appropriate sensory-motor experiences, consultation with knowledgeable professionals, environmental modifications based on documented sensory processing or motor deficits, individualized approaches to application of interventions, and integration of interventions into daily routines in a natural setting. The authors suggest a conservative approach to sensory-based interventions by trained professionals using accepted data collection and evaluation methods.

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- Reichow, B., Barton, E.E., Sewell, J.N., Good, L., Wolery, M. (2010). Effects of weighted vests on the engagement of children with developmental delays and autism. *Focus on Autism and Other Developmental Disabilities*, 25(1), 3-11.
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- Wuang, Y., Wang, C., Huang, M., Su, C. (2010). The effectiveness of simulated developmental horse-riding program in children with autism. *Adapted Physical Activity Quarterly*, 27, 113-126.

RESOURCES AND MATERIALS

These materials all provide information on how to address sensory processing needs in a student's program.

- Kranowitz, C. S., Szklut, S., Balzer-Martin, L., Haber, E., & Sava, D. I. (2002). *Answers to question teachers ask about sensory integration: Forms, checklists, and practical tools for teachers and parents*. Las Vegas, NV: Sensory Resources.
- Oden, A. (2006). *Ready bodies: Learning minds*. Spring Branch, TX: Ready Bodies, Learning Minds.
- Williams, M. S., & Shellenberger, S. (1996). *How does your engine run? A leader's guide to self-regulation*. Albuquerque, NM: Therapy Works.
- Williams, M. S., & Shellenberger, S. (2001). *Take five: Staying alert at home and school*. Albuquerque, NM: Therapy Works.

GENERAL RESOURCES

- Autism Internet Modules (AIM) www.autisminternetmodules.org. The Autism Internet Modules were developed with one aim in mind: to make comprehensive, up-to-date, and usable information on autism accessible and applicable to educators, other professionals, and families who support individuals with autism spectrum disorders (ASD). Written by experts from across the U.S., all online modules are free, and are designed to promote understanding of, respect for, and equality of persons with ASD.
- The Autism Web Course: http://cdd.unm.edu/swan/autism_course/about/index.htm. This web course was developed out of materials from the Interactive Collaborative Autism Network (ICAN). The Autism Programs at the University of New Mexico has updated and added information to this web course.
 - Characteristics
 - Assessment
 - Academic Interventions
 - Behavioral Interventions
 - Communication Interventions
 - Environmental Interventions
 - Social Interventions
 - Family Support Suggestions
- Indiana Resource Center for Autism (IRCA) <http://www.iidc.indiana.edu/irca/fmain1.html>. The Indiana Resource Center for Autism staff's efforts are focused on providing communities, organizations, agencies, and families with the knowledge and skills to support children and adults in typical early intervention, school, community, work, and home settings.
 - IRCA Articles: <http://www.iidc.indiana.edu/index.php?pageId=273>
- Texas Statewide Leadership for Autism www.txautism.net. The Texas Statewide Leadership for Autism in conjunction with the network of Texas Education Service center with a grant from the Texas Education Agency has developed a series of free online courses in autism. Please check the training page, www.txautism.net/training.html, for update lists of courses, course numbers and registration information. Current courses include the following:
 - Asperger Syndrome 101
 - Augmentative and Alternative Communication and the Autism Spectrum
 - Autism for the General Education Teacher
 - Autism 101: Top Ten Pieces to the Puzzle
 - Classroom Organization: The Power of Structure for Individuals with ASD
 - Communication: The Power of Communication for Individuals with ASD
 - Futures Planning for Students with Autism Spectrum Disorder
 - Navigating the Social Maze: Supports and Interventions for Individuals with ASD
 - Solving the Behavior Puzzle: Making Connections for Individuals with ASD