Functional Behavioral Assessment

Overview of Instruments

Research suggests that sensory processing differences are prevalent in children with autism spectrum disorder (ASD; Baranek, 2002; Hilton, Garver, & LaVesser, 2007; Kern et al., 2008; Kern, Garver, Carmody, et al., 2007; Myles et al., 2004). While sensory differences have long been included in the IDEA and state definitions of Autism or Other or Pervasive Developmental Disorders, they did not become part of the diagnostic manual until the release of the DSM-5 (American Psychiatric Association, 2013). Beginning with DSM-5, sensory differences were included as a core characteristic of ASD. Not all of the sensory processing or sensory integration measures reviewed in this summary have been standardized for children with ASD. The Sensory Profile series as well as the Sensory Processing Measure (SPM) are both caregiver questionnaires that inquire about the child’s sensory processing and behaviors across various childhood environments including home, school, and the community. Both measures have been piloted on children with ASD. Other assessments such as the Sensory Integration and Praxis Test (SIPT) and the DeGangi-Berk Test of Sensory Integration are observation-based standardized tests, which involve the child performing specified tasks. Although the SIPT and DeGangi-Berk Test of Sensory Integration were not piloted specifically with children with ASD, they may be useful for evaluating sensory processing skills in children who are capable of understanding instruction.

The following summary of sensory processing assessments is not intended to be all-inclusive. Rather, the assessments were selected based on their prevalence within clinical and academic settings as well as their relevance to children with ASD.

THE ADOLESCENT/ADULT SENSORY PROFILE

The Adolescent/Adult Sensory Profile (Brown & Dunn, 2002) is a standardized assessment that measures sensory processing among adolescents and adults ages 11 years and above. It elicits information about the adolescent’s or adult’s responsiveness to various sensory stimuli and identifies processing deficits in the sensory systems that may inhibit the individual from participating in daily activities.

The profile is a judgment-based self-questionnaire consisting of 60 items rated for frequency of the behavior at home or in the community. Items use a 5-point Likert scale and inquire about Taste/Smell Processing, Movement Processing, Visual...
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Processing, Touch Processing, Activity Level, and Auditory Processing. As with the other Sensory Profile assessments, it is to be scored by an occupational therapist or professional trained in sensory processing theory. Items are factored into four sections based on Dunn’s Model of Sensory Processing: Low Registration, Sensation Seeking, Sensory Sensitivity, and Sensation Avoiding. Scores that fall within one standard deviation of the mean for each category represent “Typical Performance.” Scores that fall between one to two standard deviations below the mean fall into the “Probable Difference” category. Finally, scores that fall more than two scores below the mean indicate a “Definite Difference.” Scores that fall in the probable or definite difference categories may warrant intervention. The scores are placed on a grid that visually represents how the individual’s sensory processing compares to that of typical adolescents or adults ranging from “Much Less Than Most People” to “Much More Than Most People.” The Adolescent/Adult form is a unique sensory measure in that it is a self-questionnaire.

THE DEGANGI-BERK TEST OF SENSORY INTEGRATION

The DeGangi-Berk Test of Sensory Integration (DeGangi & Berk, 1983) is a criterion-referenced assessment of sensory integrative functions of children ages 3 to 5 years who demonstrate delays in sensory, motor, and perceptual skills, or who are suspected of having learning problems. It consists of three domains: Postural Control, Bilateral Motor Integration, and Reflex Integration. The test is clinician-administered and takes approximately 30 minutes. The DeGangi-Berk Test of Sensory Integration is designed to be a diagnostic tool when administered by an occupational therapist or physical therapist who is knowledgeable about sensory integration. If administered by special educators, motor developmental specialists, or therapy assistants, the test may be used as a screening tool to determine if a child warrants a more thorough sensory evaluation.

Children are asked to perform the desired task and are rated on a weighted numerical point system ranging from 0-1 to 0-4 depending on the degree of difficulty for the item. One of the major advantages of the DeGangi-Berk Test of Sensory Integration is that it allows the examiner to observe and rate the child’s performance on crossing midline, maintaining various postural positions, producing co-contraction of opposing muscle groups, and motor planning for various tasks. The test was piloted on 38 children with developmental delay, but not specifically on children diagnosed with AU. The Reflex Integration domain was found to have less than desired rigor for validity and reliability and, therefore, should be used cautiously from a diagnostic standpoint. Another possible drawback of the DeGangi-Berk Test of Sensory Integration is that the child must be
able to demonstrate sustained attention to perform test items and also be able to interpret verbal instructions. Therefore, it may only be useful for children with autism who have good attention and receptive language skills.

THE SENSORY INTEGRATION AND PRAXIS TESTS (SIPT)
The Sensory Integration and Praxis Tests (SIPT; Ayres, 1989) are a clinician-administered, norm-referenced series of tests designed to evaluate children ages 4 years to 8 years, 11 months on sensory integration and praxis. The SIPT is a standardized group of 17 tests developed to test various aspects of praxis, perception of visual, tactile, and kinesthetic input, and the behavioral manifestations of deficits in the integration of sensation. The entire battery requires approximately two hours to administer. Individual tests can be individually administered in 10 minutes. Additional time is required to prepare the paperwork for computerized scoring by Western Psychological Services.

To use this test, therapists must have extensive training in sensory integration theory, administration and interpretation, and be certified to administer the test by Western Psychological Services or Sensory Integration International. Children who have significant behavioral issues may not be appropriate for this test. Likewise, children with difficulty following verbal directions and/or learning from demonstration of trial items may not be appropriate for testing with the SIPT. The SIPT provides extensive information about sensory processing and praxis, but the full battery of tests is extremely expensive to administer and time-consuming to score and interpret.

THE SENSORY INTEGRATION INVENTORY – REVISED (SII-R)
The Sensory Integration Inventory – Revised (SII-R; Reisman & Hanschu, 1999) is a non-standardized checklist that can be used to screen and rule out serious maladaptive behaviors that are not due to sensory dysfunction. The SII-R can be completed in 30 to 60 minutes by a therapist who knows the child well. Alternatively, it can be used to interview a child’s teacher or parent. Items are separated into four categories (tactile, vestibular, proprioceptive, general reactions) and are answered by checking “yes,” “no,” or “unsure” based on the typical response of the client. It is not standardized; therefore, the therapist must look for patterns of response that may indicate dysfunction in sensory integration. The authors report that the SII-R screens out individuals who have serious behavior issues for reasons other than sensory integration dysfunction.
The SII-R was originally developed with a group of adults with cognitive disabilities, but therapists have found it to be useful with a variety of clients who cannot fully cooperate in a testing situation, from children with AU to adults with schizophrenia or Alzheimer’s. One of the major advantages of the SII-R is the cluster of self-stimulatory items listed for each of the sensory areas. Because children with AU have been reported to exhibit increased sensory stimulation behaviors, the SII-R can be helpful due to its ability to illustrate that self-stimulatory behaviors may be sensory based. If numerous self-stimulatory behaviors are found within one sensory system versus another, the probable cause for the self-stimulation is sensory related.

THE SENSORY PROCESSING MEASURE (SPM) and SPM-P

The Sensory Processing Measure (SPM; 2007); and Sensory Processing Measure – Preschool (SPM-P; 2010) (Glennon, Miller-Kuhaneck, Henry, Parham, & Ecker, 2007 and 2010) measure sensory processing difficulties in children from the ages 2 through 12.

The SPM is a norm-referenced assessment that produces standard scores for praxis, social participation, and five sensory systems (visual, auditory, tactile, proprioceptive, and vestibular function). Three forms comprise the SPM: the Home Form, Main Classroom Form, and School Environments Form. The Home Form contains 75 items and is completed by the child’s parent or primary caregiver at home. The Main Classroom Form comprises 62 items and is to be completed by the child’s primary teacher. The School Environments Form contains 10 to 15 items for each of the school environments. This form may be completed by school personnel who are familiar with the child in the context of the environment being assessed.

For each scale on the SPM, scores fall into one of three ranges: Typical, Some Problems, or Definite Dysfunction. The Environment Difference score provides a comparison of sensory functioning at school and at home. For each sensory system, information on specific difficulties such as over- or under-responsiveness is provided.

The SPM-P yields a t-score for each scale: Social Participation; Vision; Hearing; Touch; Body Awareness; Balance and Motion; Planning and Ideas; and Total Sensory Systems. The SPM consists of two forms: Home and School. Use of the two forms allows comparison of functioning across the two environments.
THE SENSORY PROFILE 2

The Sensory Profile 2 (Dunn, 2014) is a set of norm-referenced, standardized questionnaires designed to assess the sensory processing patterns of children from birth through 14 years, 11 months. The Sensory Profile 2 can be administered through paper-and-pencil or online. It provides five different forms selected based on age. The forms are: 1) Infant Sensory Profile 2 – Birth to 6 months; 2) Toddler Sensory Profile – 7 to 35 months; 3) Child Sensory Profile 2 – 3 to 15 years; 4) Short Sensory Profile 2 – 3 to 15 years; and 5) School Companion Sensory Profile 2 – 3 to 15 years.

The information obtained from the Sensory Profile 2 is very useful for determining what sensory systems the child may be having difficulty processing, as well as gaining overall information on how the child is interpreting sensory information, adapting to sensory stimuli in the environment, and reacting to or participating in daily activities. According to Dunn’s theory of sensory processing, some of these sensory traits are static and not expected to vary significantly over time. Thus, using the Sensory Profile 2 to measure outcomes following sensory integration intervention may be problematic.
## Summary

<table>
<thead>
<tr>
<th>Name of Tool/Author</th>
<th>Age Range*</th>
<th>Method of Administration/Format</th>
<th>Approximate Time to Administer</th>
<th>Subscales</th>
<th>Availability</th>
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<tbody>
<tr>
<td>DeGangi Berk Test of Sensory Integration DeGangi &amp; Berk (1983)</td>
<td>3–5</td>
<td>Criterion-referenced; clinician-administered; 36 items assess postural control, bilateral coordination, and reflexes Child-performed items are numerically rated on a scale of 0-1 or 0-4 based on the difficulty of the item Yields scores that fall into Normal, At Risk, and Deficient categories</td>
<td>30 min.</td>
<td>Postural Control Bilateral Motor Integration Reflex Integration</td>
<td>Western Psychological Services, <a href="http://www.wpspublish.com/store/Search?Q=DeGangi-Berk">http://www.wpspublish.com/store/Search?Q=DeGangi-Berk</a> Test of Sensory Integration%26%3A2 (TSI%E2%84%A2)</td>
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### Functional Behavioral Assessment

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<tr>
<td>Sensory Integration and Praxis Tests (SIPT) Ayres (1989)**</td>
<td>4–9</td>
<td>Norm-referenced; clinician-administered; series of 17 tests designed to measure sensory integrative and praxis skills including visual, motor, tactile, and kinesthetic tasks Requires specialized training in sensory integration theory and administration of the SIPT. May be administered as a full battery or as individual subtests Score sheets are submitted to WPS and returned to examiner with results</td>
<td>Approximately 2 hrs. to administer all 17 tests; additional time is needed for setup and scoring</td>
<td>Space Visualization Figure Ground Perception Standing Walking Balance Design Copying Postural Praxis Bilateral Motor Coordination Praxis on Verbal Command Constructional Praxis Post-Rotary Nystagmus Motor Accuracy Sequencing Praxis Oral Praxis Manual Form Perception Kinesthesia Finger Identification Graphesthesia Localization of Tactile Stimuli</td>
<td>Western Psychological Services, <a href="http://www.wpspublish.com/store/p/2971/sensory-integration-and-praxis-test-sipt">http://www.wpspublish.com/store/p/2971/sensory-integration-and-praxis-test-sipt</a></td>
</tr>
<tr>
<td>Sensory Integration Inventory – Revised (SII-R)</td>
<td>Children and adults</td>
<td>Non-standardized checklist completed by occupational therapist or by interview of teacher or parent; each section has items related to self-stimulatory behaviors. Useful tool for clients who cannot participate in standardized testing such as (AU, schizophrenia and Alzheimer’s disease). Examiner checks “yes,” “no,” or “unsure” to reflect how the client typically responds to an event. Value depends on interpretive skill of therapist.</td>
<td>30–60 min.</td>
<td>Tactile Vestibular Proprioceptive General Reactions</td>
<td>Therapro, Inc., <a href="http://www.therapro.com/Sensory-Integration-Inventory-Revised-for-Individuals-with-Developmental-Disabilities-P7658.aspx">http://www.therapro.com/Sensory-Integration-Inventory-Revised-for-Individuals-with-Developmental-Disabilities-P7658.aspx</a></td>
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<tr>
<td>Sensory Processing Measure – Preschool (SPM-P) 2010</td>
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<td>Home Form</td>
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<td>Parham, &amp; Ecker 2007 and 2010</td>
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<td>Main Classroom and School Environments Forms</td>
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<td>Miller, Kuhaneck, Henry, &amp; Glennon (2007 and 2010)</td>
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<table>
<thead>
<tr>
<th>Name of Tool/Author</th>
<th>Age Range (in years)</th>
<th>Sample Size</th>
<th>Subscales</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>Ermer &amp; Dunn (1998)</td>
<td>3–15</td>
<td>38: Autism 61: ADHD</td>
<td>Validity of Infant/Toddler Sensory Profile, Sensory Profile, Short Sensory Profile, Adolescent/Adult Sensory Profile</td>
<td>Discriminant analysis: MANCOVA – 85% of items differentiated between autism and non-autism; 90% of cases correctly identified: disabilities vs. without disabilities – only significant discriminator: inattention/distractibility, AU/PDD vs. ADHD – discriminators: sensory seeking, oral sensory, sensitivity, fine-motor/perceptual</td>
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Research
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<table>
<thead>
<tr>
<th>Study</th>
<th>Age</th>
<th>N</th>
<th>Instruments</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Kientz &amp; Dunn (1997)</td>
<td>3–10</td>
<td>32</td>
<td>Validity of Infant/Toddler Sensory Profile, Sensory Profile, Short Sensory Profile, Adolescent/Adult Sensory Profile</td>
<td>82% of participants demonstrated some degree of sensory processing difficulty, Pearson’s Correlation analyses: SSP/DBC-P and SSP/VABS maladaptive behavior – strongly negatively associated, positive correlation between total SSP and VABS daily living skills</td>
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<tr>
<td>Watling, Deitz, &amp; White (2001)</td>
<td>3–6</td>
<td>40</td>
<td>Validity of Infant/Toddler Sensory Profile, Sensory Profile, Short Sensory Profile, Adolescent/Adult Sensory Profile</td>
<td>Factor analysis: Scores of children with autism were significantly different from those of children without autism on 8 of 10 factors</td>
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### Misconceptions

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<th>Myth</th>
<th>Reality</th>
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<tr>
<td>Occupational therapists are not necessary/essential members of autism evaluation teams.</td>
<td>According the DSM-5, sensory differences are now included as a core characteristic of ASD (American Psychiatric Association, 2013). Sensory differences have long been included in the IDEA and state definitions of Autism or Other or Pervasive Developmental Disorders. Motor skills deficits are an associated feature of autism spectrum disorder. Both motor and sensory differences impact functioning at a very basic level. Occupational therapists have unique training necessary for evaluation of and treatment planning for motor and sensory issues (cf. Aspy &amp; Grossman, 2011; Baranek, 2002; Baranek, Parham, &amp; Bodfish, 2005; Ozonoff, et al., 2008; Scaaf &amp; Miller, 2005).</td>
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</table>
If a child does not display an immediate reaction to a particular sensory stimulus while at school, the child does not have sensory processing issues that need to be addressed at school.

Reactions to sensory events can be cumulative. A child may be able to tolerate a certain level of sensory discomfort from individual events; however, once a certain threshold is met, he or she may have a reaction at a later time. This is important to know and may indicate a need for sensory intervention throughout the day to prevent a meltdown later in the day (Dunn, 1999; Glennon, Miller-Kuhaneck, Henry, Parham, & Ecker, 2007).

References


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Resources and Materials

Adamson, A., O’Hare, A., & Graham, C. (2006). Impairments in sensory modulation in children with autism spectrum disorder. *British Journal of Occupational Therapy, 69*(8), 357–364. *This study did not yield any significant predictors such as child’s age, diagnosis (Asperger Syndrome versus autism), gender, or underlying medical condition that were indicators of future sensory modulation problems.*