



Baltazar Mori, A., Clippard, H., del Pilar Saa, M., & Pfeiffer, B. (2016). A review of pediatric assessment tools for sensory integration. *SIS Quarterly Practice Connections*. 1(3), 7–9.

By Annie Baltazar Mori, OTD, OTR/L; Heidi Clippard, MOT, OTR/L; Maria del Pilar Saa, OTD, OTR/L; and Beth Pfeiffer, PhD, OTR/L, BCP

The original work of Jean Ayres provided a strong foundation for assessing specific areas related to sensory integration and their effect on occupational performance and participation (Ayres, 1979, 1989). Her work has continued to evolve over the past few decades through the inquiry and efforts of several occupational therapy researchers (Blanche, 2010; Blanche, Bodison, Chang, & Reinoso, 2012; Dunn, 2014; May-Benson & Cermak, 2007; Parham & Ecker, 2007; Pfeiffer, Coster, & Tucker, 2016).

One goal of these collective research efforts is to place appropriate measurement tools in the hands of therapists for sound clinical application. A comprehensive evaluation of the occupational effect sensory integration deficits have on participation and performance requires both proximal and distal measures that directly and indirectly identify these deficits.

Comprehensive evaluations are inclusive of non-standardized assessments such as interview and clinical observations, as well as standardized assessments with established psychometric properties. The interpretation of the comprehensive evaluation is essential in guiding a clinician's treatment plan and subsequent intervention (Parham & Mailloux, 2014; Watling, Koenig, Davies, & Schaaf, 2011). Careful consideration and selection of tools to use at initial assessment, as well as pre- and post-intervention, is crucial for determining outcomes. Accurate evaluation and clear communication of these outcomes advance the existing body of evidence and justify further development and revision of interventions in sensory integration theory and practice (Mailloux et al., 2007; Parham et al., 2011; Schaaf et al., 2014; Watling & Hauer, 2015).

The purpose of this work is to provide clinicians with a current, comprehensive list of robust pediatric assessment tools specific to sensory integration. Information about available tools, as well as those in development, is included. A case example is embedded to demonstrate clinical selection and application of the tools. An overview is provided of tools that assess the impact of sensory integration on performance or participation of children (see Tables 1 and 2).

Clinical Case Application

The following case example provides a description of the clinical reasoning process of assessment selection. Ella, a 7-year, 3-month-old girl, was referred for an occupational therapy evaluation at a private pediatric clinic because of issues with sensory processing affecting performance and participation in daily activities. She refused to wear socks and closed-toe shoes, a safety requirement at her school. Her intense reaction to the feel of socks and shoes affected her independence in daily morning routines in preparation for school. Additionally, Ella's play and social skills were identified as a major concern. Her parents reported that she seemed to engage in play that is typical for a younger child, and this affected her friendships with other children her age. Based on referral information, a comprehensive occupational history questionnaire adapted from Schaaf and Mailloux (2015) and the Sensory Processing Measure (SPM) Home Form (Parham & Ecker, 2007) were selected for completion by Ella's parents. Clinical observations and standardized testing with the Sensory Integration and Praxis Tests (SIPT; Mailloux, 1990) were used during evaluation by the occupational therapist. With the SIPT Ella showed average scores with visual perception (i.e., space visualization, figure-ground perception) and visual-motor skills (i.e., design copying, motor accuracy). Ella had below average scores in areas of tactile perception (i.e., manual form perception, graphesthesia), praxis (i.e., constructional praxis, oral praxis, postural praxis), and on the Post Rotary Nystagmus test. Additional review of Ella's SIPT testing identified below average time scores on visual tests and part scores (e.g., jogs, segmentations, right-left, rotation) on design copying and constructional praxis tests, respectively. Results of these tests are correlated with vestibular spatial functions. Tests of tactile functions also share a relationship with visual spatial orientation functions. Ella's SIPT scores were consistent with responses on the SPM, which identified some problems or definite dysfunction in the areas of tactile, body awareness, planning and ideas, and social participation.

| Table 1. Assessment Tools of Sensory Processing and Integration | | | | | |
|---|--|---|--|--|---|
| Test | Descriptions | Publisher | Administration | Age | Standardization/Psychometrics |
| Standardized Direct Measures (Performance Based/Administered With Child) | | | | | |
| Clinical Observations of Proprioception (Blanche et al., 2012) | Assesses two main areas of proprioceptive function: behavior and sensory motor abilities. | Online access | 15 minutes | 2–8.11 years | Criterion referenced <i>Reliability:</i> Interrater reliability for the total test score .91 (Interclass Correlation Coefficient [ICC]) <i>Validity:</i> Good |
| Sensory Integration and Praxis Tests (Ayres, 1989) | A set of 17 tests that assess sensory processing and praxis functions. | Western Psychological Services | 1.5–2 hours to administer and 30–45 minutes to score | 4–8.11 years | Nearly 2,000 children in the 1980s <i>Reliability:</i> Test–retest between .48 and .93 (ICC) (only 5 of the tests had scores below .70). Praxis tests had the highest test–retest reliability. Interrater reliability between .94 and .99 (ICC) for all of the tests. <i>Validity:</i> Good |
| Test of Ideational Praxis (May-Benson & Cermak, 2007) | Assesses a child's ideational skills based on ability to demonstrate recognition of object affordances. | Online access after training | 5–10 minutes | 3–8 years | 84 children in 2005 <i>Reliability:</i> Interrater reliability for the total test score .85 (ICC) with 5- to 8-year olds and higher with 2- to 5-year olds <i>Validity:</i> Good |
| Standardized Indirect Measures (Parent and Teacher Report) | | | | | |
| Sensory Processing Measure (Parham & Ecker, 2007) | A system of parent and teacher rating scales that assesses sensory processing, praxis, and social participation. | Western Psychological Services | 15–20 minutes | 5–12 years | 1,051 children in the early 2000s <i>Reliability:</i> Internal consistency > .75 for all scales (Cronbach's Coefficient Alpha [CCA]). Test–retest reliability > .94. <i>Validity:</i> Good ability to differentiate between clinical and typical samples |
| Sensory Profile 2 (Dunn, 2014) | Standardized parent or teacher rating forms that assess sensory processing patterns. | Pearson | 20–25 minutes | Birth–14.11 years | 1,791 children in 2014 <i>Reliability:</i> Test–retest between .87–.97 (ICC) Internal consistency: .60–.90 (CCA) <i>Validity:</i> Good |
| Sensory Experiences Questionnaire Version 3.0 (Little et al., 2011) | Caregiver report instrument designed to characterize sensory features in children with autism spectrum disorder (ASD) and/or developmental disabilities in social and non-social contexts. | Currently used in research settings. Not available yet for clinical use. | 15–20 minutes | 2–12 years with ASD, developmental disabilities, or typically developing | <i>Reliability:</i> Test–retest .92 (ICC). Internal consistency .80 (CCA). <i>Validity:</i> Good |
| Participation-Based Direct Measure | | | | | |
| Goal-Oriented Assessment of Lifeskills (Miller, 2013) | Assesses functional motor abilities needed for daily living. Consists of seven activities based on real occupations of a child's daily life. | Western Psychological Services | 45–60 minutes | 7–17 years | 616 children <i>Reliability:</i> Internal consistency for all scales >.75 (CCA). Internal reliability for Progress Score .90 (ICC). Test–retest reliability .76 and .75 (ICC) |

Ella's initiation and approach in play skills were observed in a novel clinic setting. Structured clinical observations of sensory integration were conducted. Results from clinical observations identified that Ella exhibited strong excited emotional reactions to vestibular sensation. She sought proprioceptive input through climbing and jumping. Her tactile play was characterized by brief initial hesitance followed by appropriate engagement and play. Observations of Ella's play skills were consistent with testing results identifying concerns in the area of praxis and reports on the SPM of difficulties in planning and ideas. Her play was simplistic for her age, consisting of one-step activities. Ella donned socks and shoes and was observed to grimace without verbal complaints. Ella was observed to consistently tap her feet on the floor until she was asked to remove her socks and shoes. Results from the evaluation identified concerns in sensory reactivity, praxis, and body and spatial awareness because of poor tactile and vestibular processing, resulting in specific clothing and play choices that limited her ease in transitions and social participation. Treatment addressing the concerns identified in the evaluation process resulted in Ella's use of more complex play schemes and increased engagement in play with her peers, as well as an increase comfort in wearing shoes and socks.

This case provides an example of assessment selection and implementation to direct the treatment process based on the child's unique needs and characteristics. Appropriate assessment selection based on the expertise of the evaluator and service delivery model is essential to direct precision treatment and identifies subsequent outcomes of interventions.

References

| Test | Descriptions | Publisher | Administration | Age | Standardization/Psychometrics |
|--|--|--|----------------|------------------------------------|---|
| Evaluation of Ayres Sensory Integration (Z. Mailloux, personal communication, March 24, 2016) | Assesses sensory perception, sensory responsiveness, postural/ ocular/ bilateral integration, and praxis. | Free in an accessible format anticipated | In development | 3–12 years expected | In development |
| Sensory Environment and Participation Questionnaire (Pfeiffer et al., 2016) | Caregiver rating scales that assess the effect of the sensory environment on participation in daily activities in home and community environments. | Online access anticipated in 2017 | 20 minutes | 3–5 years old with and without ASD | 150 children in 2015; Ongoing development <i>Reliability:</i> Test–retest between .79 and .99 for all scales (Canonical correlation). Internal consistency .76–.91 (CCA). <i>Validity:</i> Content validity established through 34 qualitative interviews and extensive review of the literature. |
| Sensory Processing Three Dimensions Scale (L. J. Miller, personal communication, March 23, 2016) | A performance assessment and respondent inventory that evaluates sensory processing abilities measuring three dimensions: Sensory Modulation, Sensory Discrimination, and Sensory-based Motor Abilities. | Western Psychological Services | Under 1 hour | 3–12 years old | In development Standardization occurring in 2016–17 |

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Annie Baltazar Mori, OTD, OTR/L, is an occupational therapist and owner of PlaySense, Inc. in Redondo Beach, California. She can be reached at otannieb@gmail.com.

Heidi Clippard, MOT, OTR/L, is an occupational therapist at the Cincinnati Children's Hospital Medical Center in Cincinnati.

Maria del Pilar Saa, OTD, OTR/L, is an occupational therapist and owner of Interplay Therapy in Palm Beach, Florida.

Beth Pfeiffer, PhD, OTR/L, BCP, is an associate professor in the Department of Rehabilitation Sciences at Temple University in Philadelphia.

Correction: In the print version of this article, the Sensory Integration and Praxis Tests (SIPT) were omitted from the table of assessment tools of sensory processing and integration. The table has been updated to reflect this error. The Sensory Integration Special Interest Section feels strongly about sound and scientific measurement in occupational therapy. The SIPT, a significant contributor to our practice area, is considered the gold standard in assessment of sensory functions as well as occupational therapy's current and only standardized assessment of pediatric tactile and praxis functions.

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