

The Sensory Processing Measure–Preschool (SPM-P)—Part One: Description of the Tool and Its Use in the Preschool Environment

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School-based and early intervention occupational therapy evaluation is influenced by federal policy and prevailing ideas regarding best practice. Current best practice considers a child's performance in appropriate contexts and natural environments, as well as the impact of the environment on occupational functioning and participation across settings. As a recent report suggested 3.4% to 15.6% of children in a community sample of 4-year-olds may demonstrate sensory processing difficulties, occupational therapists should be familiar with multiple methods of assessment to address these concerns. One such assessment tool, the Sensory Processing Measure–Preschool (SPM-P) for children 2- to 5-years old, provides 8 scaled scores: Vision, Hearing, Touch, Body Awareness, Balance and Motion, Total Sensory System Score, Planning and Ideas, and Social Participation. Through discussion on the development, usage, and implementation of both Home and School forms, this article illustrates how the SPM-P provides a mechanism for preschool educational teams to meet best practice initiatives.

Keywords Sensory, assessment, preschool, collaboration, context

School-based occupational therapy evaluation and assessment is influenced by federal policy and prevailing ideas regarding best practice. Current best practice in educational assessment considers a child's performance in appropriate contexts and natural environments (Bagnato, 2007; Hanft & Pilkington, 2000; Stewart, 2009), the impact of the environment on occupational functioning and participation across school settings (Bazyk & Case-Smith, 2010; McConnell, 2000), and assessment of the environmental aspects of occupational functioning and participation across school settings (Block & Chandler, 2005; Swinth & Muhlenhaupt, 2004). Completing an evaluation via team collaboration is preferable, as each team member brings varied expertise, perspectives, and insights to the evaluation process (Bagnato, 2007; Bazyk & Case-Smith, 2010; National Association of School Psychologists, 2005; Nochajski 2002).

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Best practice within the occupational therapy profession in general—and school-based practice in particular—calls for using assessment tools that allow occupational therapists to contribute their knowledge of the sensory integrative frame of reference in ways that are useful to an educational team (Miller Kuhaneck, Henry, Glennon, & Mu, 2007). According to an American Occupational Therapy Association (AOTA) official statement regarding the use of sensory integration theory within school-based practice (Smith Roley, Bissell, & Frolek Clark, 2009), occupational therapy personnel should select and utilize a variety of tools, including those that can identify occupational and sensory strengths and weaknesses. Thereafter, the “occupational therapist interprets the test findings relative to the child’s performance skills, patterns of engagement, and ability to participate” (Smith Roley et al., 2009, p. 439). When an evaluation focuses on sensory components, it should include “performance measures of the child’s ability to adapt, organize, and integrate sensory information in the environment that affects participation in academic and nonacademic activities at school” (Smith Roley et al., 2009, p. 439). As a result, early childhood educational teams may be asked to determine whether a child has difficulties with sensory processing and to examine whether those difficulties are affecting the child’s performance in the educational environment. A recent report suggests that as many as 3.4% to 15.6% of children in a community sample of 4-year-olds may demonstrate sensory processing difficulties (Gouze, Hopkins, LeBailly, & Lavigne, 2009); thus, occupational therapy practitioners should be familiar with multiple methods of assessment to address these concerns. Only with this knowledge can occupational therapy personnel complete a comprehensive evaluation that contributes to a collaborative team process focused on developing and implementing appropriate support strategies for the child.

As the use of collaborative strategies across stakeholders becomes the preferred practice for teamwork within educational systems, occupational therapy practitioners wishing to embed sensory integrative concepts within the classroom environment are at a unique juncture. Appropriate assessment tools such as the Sensory Processing Measure—Preschool (SPM-P) can guide occupational therapists, educators, and parents in a collaborative assessment process (Miller Kuhaneck, Ecker, Parham, Henry, & Glennon, 2010). Thus, this special issue regarding collaborative practices within the educational system includes a discussion on the development, usage, and implementation of the SPM-P for preschool education teams.

Description of the SPM-P

The SPM-P is a rating scale with two forms—the Home Form (Ecker & Parham, 2010) and the School Form (Miller Kuhaneck, Henry, & Glennon, 2010)—each with 75 items for the parent/caregiver and teacher/daycare provider, respectively, to complete. The items on the forms are designed for children age 2 to 5 years old who have not yet entered kindergarten. For those children who are 5 years old but attend kindergarten, the original Sensory Processing Measure (SPM; Parham, Ecker, Miller Kuhaneck, Henry, & Glennon, 2007) should be utilized as the items are more reflective of kindergarten classroom activities. As with the original SPM, both the Home Form and School Form of the SPM-P provide eight scaled scores: Vision, Hearing, Touch, Body Awareness (nontechnical term for proprioception), Balance and Motion (nontechnical term for vestibular), Total Sensory System Score, Planning and Ideas (aka praxis), and Social Participation. Because the normative data were gathered on the same set of children for both forms, use of the Home and School forms together is considered optimal as it allows for comparison of the child’s performance across the two environments.

Each form takes approximately 15 to 20 min for the rater to complete, the parent for the Home Form and an individual who has known the child for at least 1 month in his or her preschool environment for the School Form. Once completed by the rater, an occupational therapy practitioner can score either form in approximately 5 to 10 min, yielding raw scores, *T* scores, and percentile ranks for each of the eight scales previously mentioned. Although each form can be used independently, it is recommended to use the two forms together to provide the team with a comprehensive view of the child's performance across environments. Both forms are organized in the same format—an autoscore form using carbon paper to automatically transfer the rater responses into the scoring worksheet and a summary sheet with graphic representation of standard scores—thus making the process of scoring and visually presenting the assessment results easy and efficient.

The original SPM utilizes additional forms for environments outside the main classroom (i.e., recess, cafeteria, music, art, physical education, and bus). For a preschool child, other than the playground area, the children remain primarily in one room, with all activities occurring in “centers” supported/monitored by one primary teacher or child-care provider. Thus, the SMP-P School Form includes varying types of activities, such as playground, dress up, blocks, and art. Additionally, as preschool teachers or aides often accompany their students to the restroom, items for behaviors that would occur within the bathroom environment were included on the School Form.

Psychometric Properties of the SPM-P

The Home and School forms of the SMP-P were standardized using a demographically representative sample for the United States. A total sample of 651 typically developing children were assessed during this standardization process. Additionally, to ensure that the tool could discriminate between children with and without clinical disorders, a separate sample of 242 children receiving occupational therapy intervention were included.

A variety of procedures were used to examine reliability and validity of the tool. Both Home and School forms demonstrate adequate internal consistency. This means that all

Table 1
Chronbach's alpha ratings for the SPM-P

	Home: Standardization	Home: Clinical	School: Standardization	School: Clinical
Social Participation (SOC)	.89	.90	.93	.93
Vision (VIS)	.82	.82	.79	.82
Hearing (HEA)	.81	.84	.79	.78
Touch (TOU)	.79	.84	.76	.76
Body Awareness (BOD)	.76	.75	.89	.86
Balance and Motion (BAL)	.75	.76	.72	.80
Planning and Ideas (PLA)	.81	.90	.85	.92
Total Sensory Systems (TOT)	.93	.94	.94	.93

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of the items on each scale measures the same dimension, as the average inter-correlations between items on a specified scale was statistically calculated to show how items “hang together” or measure one construct. To calculate this correlation coefficient, Chronbach’s alpha was utilized (Table 1 shows Chronbach’s alpha scores for the SPM-P). For rating scales such as the SPM-P, Chronbach’s alpha should be .70 or above to be considered acceptable internal consistency, and .80 or above is considered ideal (Portney & Watkins, 2000). Reliability was also examined with test–retest correlation coefficients. These were all above .90, indicating excellent stability over 2 weeks’ time. The procedures used to examine content and construct validity of the SPM-P are described in detail in the manual (Miller Kuhaneck, Ecker, et al., 2010). These included expert review; factor analysis; comparison with the Sensory Profile and Infant Toddler Sensory Profile; and examination of the tool’s ability to detect children with clinical disorders and, specifically, disorders of sensory integration. The outcome of these procedures is that the SPM-P comparative and scale analyses support the developed scale scores and that the tool is able to distinguish between typically developing children and those with disorders.

Purpose of the SPM-P

Every assessment is designed with a specific purpose in mind. The SPM-P, like the original SPM for kindergarten through fifth grade, is based upon the Ayres theory of sensory integration. Both tools were developed to provide educational teams with a mechanism to collaboratively assess a student’s functioning within different contexts (environments) and during varying activities. A child’s client factors are identified, as are the environmental barriers and/or facilitators to functional engagement from a sensory perspective. This information prompts team discussion regarding the possible role of environmental stimuli on student performance within the home and school settings (Figure 1).

The SPM-P, like the original SPM, is designed to support a team’s determination as to whether a child’s difficulties with sensory processing hinder educational performance. Therefore, in addition to looking at the functioning of each sensory system, the SPM-P also provides information related to praxis. The relationship between sensory processing, praxis, and educational performance is one that was first hypothesized by Ayres (Ayres,

Janey was noted by her mother to refuse to eat certain foods, gag or vomit in response to foods of certain textures, and refuse to use toothpaste on the toothbrush. The preschool teacher, however, indicated that Janey never refused to eat her food or snack. Conversations with the occupational therapy practitioner revealed that Janey’s mother packed only snacks that she knew Janey enjoyed, thus there was no difficulty noted in this area at preschool. Additionally, the preschool teacher indicated that Janey refuses to wear “dress-up” clothing and avoids finger paint, sand, clay, and other messy items. All of these observations led the practitioner to identify tactile defensiveness, help the team understand how it “shows itself” in different environments, and illustrate how accommodations could be made to avoid defensive responses. For example, allowing Janey to use a paint brush rather than her fingers, letting her wear rubber or gardening gloves when handling messy substances, and providing princess dresses without netting/crenolin, elastic ribbing on the sleeves, or “prickly” fabric.

Figure 1. Janey.

1972, 1979; Parham, 1998), and the SPM-P may provide a mechanism to investigate this concept further as it specifically considers the impact of dyspraxia on educational performance. As praxis issues are often missed in typical educational evaluations which focus solely on activity completion without regard to the process taken to complete the task, assessing praxis is critical to planning appropriate support strategies (Glennon, Henry, & Herzberg, 2010).

As previously stated, occupational therapy evaluation procedures are influenced by federal policy, research, and prevailing ideas regarding best practice. The Individuals with Disabilities Education Act (IDEA) mandates two different service systems for children 2 to 5 years old (Part C “Early Intervention Program” and Part B 619 “Special Education and Related Services”). It was important, therefore, to create a single tool that addressed three situations: children in early intervention programs, children receiving special education and related services in their local school districts, and children transitioning from one system to the next. The latter situation was of particular importance for two distinct reasons. First, it afforded school-based teams the ability to utilize the same assessment tool for initial eligibility and again upon exit from preschool. Second, the SPM-P could be the mechanism to facilitate collaboration and strong relationships between families and educational teams, thus making the transition from home-based, early intervention services to preschool services a less stressful experience for the family (Podvey & Hinojosa, 2009; Rous, 2008). The authors of the SPM-P encourage practitioners to use the structured nature of the assessment tool as a mechanism to include families as integral members of the team and to promote discussion about a child’s sensory strengths and delays in order to develop effective education plans with common goals and objectives (Figure 2).

Use of the SPM-P to Support Collaborative Processes

There are many collaborative processes that are considered best practice in pediatrics, and the SPM-P and the original SPM were designed to foster many of these practices. This section will illustrate the use of the SPM-P in various collaborative processes to support

Lea, a 2 ½ year old receiving Birth-to-Three services once a week at home and once a month within her preschool program for 2 year olds at the YMCA, also went to childcare at a local agency 2 days per week. When attempting to determine eligibility for school-based services, the team asked the parent to complete the SPM-P Home Form, and the preschool teacher at the YMCA and childcare provider to each complete the SPM-P School Form. The 20-year-old childcare provider quickly indicated that she knew nothing of Lea’s difficulties. Rather, she only had her 2 days a week so that the mother could work. As this information was important, the occupational therapy practitioner reviewed some of the items with the childcare provider (i.e., “squints, covers eyes, or complains about. . .sunlight,” “shows distress when others sing or use musical instruments,” and “accidentally breaks glue sticks, crayons, or pencils, or tears paper from too much force”). After this discussion, the childcare provider became more at ease knowing that she was only asked to provide information with how Lea functioned in her childcare setting.

Figure 2. Lea.

parent–professional partnerships, collaboration among school staff, and intra-/interagency coordination.

Parent–Professional Partnerships

The value of professional–parent partnerships, a critical component of collaborative teaming, is considered a best practice within occupational therapy and family advocacy literature (Chandler, 2010; Hanft & Pilkington, 2000; Turnbull et al., 2010; Turnbull, Turbiville, & Turnbull, 2000). The occupational therapy evaluation process for children must include, incorporate, and value the observations, perceptions, and concerns of parent(s) and other key caregivers. Until recently, there was not a standardized occupational therapy preschool assessment tool that relied solely upon the parent’s perceptions of the child, as does the SPM-P Home Form. Rather than the occupational therapy practitioner making “skilled” observations of the child, parent and teacher observations drive the evaluative and intervention process. The combined information from the Home and School forms would then be utilized for planning support services. With either scenario, Home Form administered alone or Home and School forms both administered, the outcome is that parents feel valued and legitimately included in their child’s therapeutic or educational process.

Collaboration Among School Staff Within Education

Simply stated, collaborative teaming occurs when two or more people work together toward a common goal. Recent articles on the original SPM discussed how use of both Home and Main Classroom forms assisted with the collaborative process between clinic- and school-based occupational therapy practitioners (Henry, Ecker, Glennon, & Herzberg, 2009; Henry & Miller Kuhaneck, 2009; Miller Kuhaneck & Henry, 2009). Though this type of collaboration is also available to the users of the SPM-P, this article focuses on collaborative teaming within the educational system, which is an interactive process among all partners involved in the student’s program (Hanft & Shepherd, 2008).

Attempting to smoothly integrate the contributions of general education, special education, and related services staff so that all team members have parity and are truly instrumental members of the team with shared leadership is a complicated process. Therapists report that true collaboration can be difficult (Bose & Hinojosa, 2008). Occupational therapy personnel possess expert knowledge of sensory integration. How this information is effectively utilized and implemented within an education environment, however, requires collaborative teaming.

The SPM-P and the original SPM can assist the team in several ways. First, having the teacher and/or parent complete the corresponding form (and other elementary school personnel for the original SPM) affords each rater the opportunity to systematically review each sensory system and begin to understand sensory processing concepts. The visual organization of the forms also allows raters to begin organizing these observations into sensory systems, motor planning, and social participation constructs. The Joey example (Figures 3 and 4) illustrates how parents and teachers feel empowered with their new understanding of sensory integrative concepts, thus allowing for greater participation in the discussion of the child’s sensory strengths and concerns.

Case Joey (see Figures 3 and 4) illustrates how the knowledge of and responsibility for reporting observations of sensory functioning is more equally distributed among team members, rather than held solely by the occupational therapy practitioner. As team

Joey was part of a preschool program in the local school secondary to a speech delay. Although the speech therapist explained what Mrs. C. recalls as “some expressive problem,” she didn’t really know what they were doing in the school to fix Joey’s speech. When the Home Form of the SPM-P arrived for Mrs. C. to complete, she was happy to help the team understand how Joey functioned at home. When completing items in the Body Awareness section, a light bulb went off inside Mrs. C. as Joey appeared to have many of these issues (i.e., he grasped objects too loosely and they dropped out of his hand; seemed unsure of how far to raise or lower his body during movement activities; and seemed driven to activities such as pushing, pulling, dragging or lifting objects). When the team met to discuss the outcome of the Home and School forms, Mrs. C. finally understood that knowing how your muscles work contributes to fine motor development and intelligible speech.

Figure 3. Joey, part 1.

As the conversations continued, it also became clear to both the parent and school staff that Joey had difficulty with Planning and Ideas. At home, he could not complete the proper sequence of everyday routines, always played with the same activities over and over, and couldn’t complete activities with multiple steps. At school, the teacher reported the Joey had difficulty coming up with new ideas during play activities, had difficulty imitating the movements to songs and games (i.e., Simon Says), and had difficulty using both hands for cutting and other tasks. The occupational therapist explained that you need to know your body well (body awareness) before you can efficiently plan how to use it (planning). Suddenly, Mrs. C. understood why Joey always had difficulty with movement activities. With this understanding, the whole team was now ready to outline sensory strategies to support Joey and establish goals to measure the expected changes in functional participation.

Figure 4. Joey, part 2.

members’ knowledge expands, so does their responsibility for utilizing the information collected. For example, a preschool teacher identifies that a child breaks glue sticks, slams doors, and bangs on musical instruments too roughly and, through the process of completing the School Form, can identify that these issues fall in the category of body awareness. When the occupational therapist discusses body awareness concerns, the teacher now has some observations to contribute to the discussion. Thereafter, supported with additional knowledge and actively engaging in the conversation, the teacher can play a part in the intervention planning piece of the discussion. During this phase of the teaming process, the teacher can also identify other difficulties the child might be having in the body awareness domain. The occupational therapist and teacher could together consider how accommodations could be implemented within the classroom routine or how school activities could facilitate the development of body awareness (e.g., retrieving the bucket of blocks from the storage closet and carrying it to the play area, washing the lunch table with a large car sponge, or moving the tables to the edge of the room so that the floor could be washed).

Last, as a teacher collaborates by engaging in team discussions about sensory integration, new concepts are learned and more appropriate referrals can be made for other

students. As the teacher begins to understand the actions and behaviors that therapeutic staff might view as indicative of a sensory integrative issue, he or she now may be able to identify other children in the classroom who might need additional occupational therapy support.

The end result of collaborative teaming can be quite valuable to the educational team in their efforts to facilitate a child's educational performance. Reducing the barriers to the child's participation in school activities, embedding related services into the school day, and facilitating social interactions among young children are all potential positive outcomes (Jackson, 2008; Snell & Janney, 2005).

Intra- and Interagency Partnerships

Read and Hanft (1999) discuss the concepts of coordination with regard to promoting interagency services between two or more organizations serving children with disabilities. It is clear that local birth-to-3 organizations must have a positive and productive working relationship with the local school district. Read and Hanft go on to highlight how collaborative organizations share resources to achieve common goals. A smooth transition from birth-to-3 to school-based programming would certainly qualify as a common goal. Therefore, if a birth-to-3 team used the SPM-P in their ongoing assessment process, the results could then be used to plan accommodations and services in advance of a child's arrival in a public preschool program. For example, a child who is very defensive to environmental stimuli may need a quiet zone or cozy corner in the classroom to help manage the increased arousal level, particularly during the first few weeks in the new school environment. Completing both the Home and School forms before a child transitions from an early intervention program could begin the process of sharing parent and staff perspectives with the local educational team upon referral of the child to Part B "Special Education Services." The SMP-P could prompt the exchange of ideas between the two organizations regarding the impact of sensory processing issues for the referred child and others.

The concept of interagency collaboration can also be applied within a single organization, such as a school system, where two or more departments operate with different budget streams. The organization identifies how certain services/resources from one department could assist the operations of the other department. Within an educational system, special education budgets are considered separate from general education budgets. With the IDEA mandate for educating as many students with disabilities to the extent possible within the general education curriculum (20 U.S.C. 1412[a][5]), occupational therapy practitioners, who were historically part of the special education staff, are being called upon to support general education initiatives. For example, occupational therapy personnel are now involved in response-to-intervention discussions and planning sessions (Cahill, 2007).

Occupational therapists should advocate for collaboration by sharing occupational therapy resources (i.e., the SPM-P) with general education programs and procedures. One example is screening all incoming kindergarten students to determine readiness and assign the best-fit teacher. The SPM-P could be used as part of this screening process, with the occupational therapy practitioner interpreting the results and discussing the information with parents and kindergarten staff. The SPM-P could also help identify the type of classroom environment most appropriate for a specific child, which teaching strategy might work best, or which teacher might be most appropriate.

Conclusion

Collaboration, a complex team process, results in the development of mutual goals, shared responsibility for key decisions, and shared accountability for implementation of strategies and their outcomes (Friend & Cook, 2010). Collaboration among team members using the SMP-P as a shared assessment tool leads to a joint understanding of the influence of sensory issues and development of appropriate strategies to support a child's performance and participation in school. The SPM-P facilitates the interactive processes of teams, including parents, to enhance the functional performance of young children. Parent and teacher forms provide a mechanism for both to contribute to a team discussion using a common language about a child's strengths and challenges related to sensory functioning. Thus, administration of the SPM-P can serve as an organized and structured mechanism for teams to collaborate on assessing and implementing intervention for sensory processing issues, to educate team members about sensory integrative concepts, and to facilitate understanding of how each team member can support a child with sensory integrative disorders to successfully participate in educational activities.

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