



Using the Sensory Processing Measure (SPM) in Multiple Practice Areas

Figure 2. Chair balls are used for students with vestibular-seeking behaviors and postural control issues.

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Since its publication in 2007, the Sensory Processing Measure (SPM)¹ has received positive reviews for applicability in both clinical and school-based practice, in part because it can be scored quickly and easily. This article illustrates usage through case examples, as well as discusses important psychometric properties of the tool.

FOCUS ON COLLABORATION

The SPM is unique in that it was standardized on the same group of children in their home and school environments. Rating forms for both parents and school staff affords everyone a chance to document their perspectives of the child within their respective

The SPM is a quick, easy-to-use, reliable measure of children's sensory processing and praxis at home and in school environments.

environments. As one teacher stated, "The SPM provides a 'bird's eye view' of the student's sensory processing performance in various environments, including those where I do not see the student." This format helps clinicians realize that the adults in each of the child's environments have important perspectives that must be considered. In addition to the home and main classroom, the perspectives of staff members in that student's art, music, and physical education (PE) classes; during recess; on the bus; and in the cafeteria can be quickly taken into

consideration via six SPM environment (reproducible) forms. Each contains only 15 questions, except the Bus form, which contains 10. The following case examples illustrate the importance of obtaining information from others in order to gain insight into the student's daily sensory processing challenges, as well as to collaborate for developing strategies.

SCHOOL-BASED SERVICES

Case Example: Cafeteria Intervention

Before the findings of the SPM had been implemented, 8-year-old Bob, a

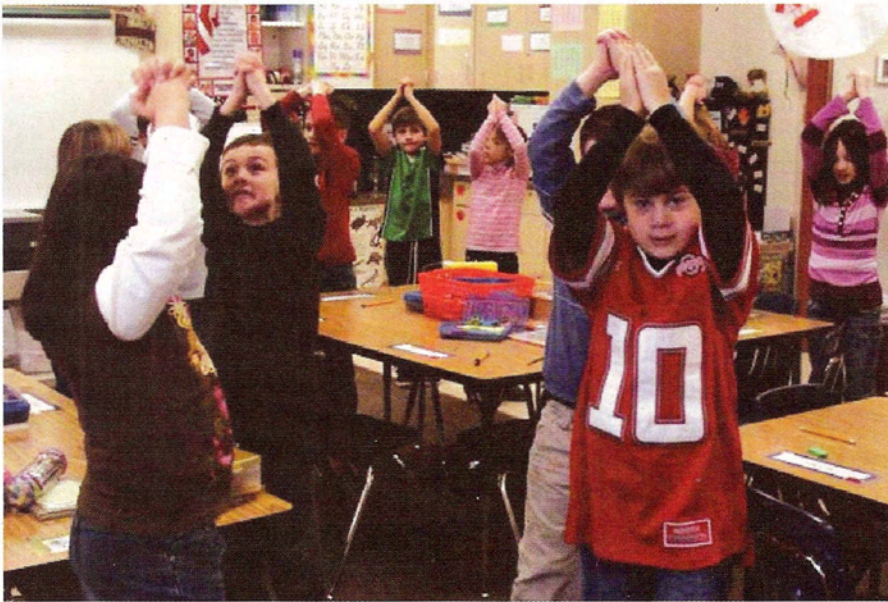


Figure 1. Students engage in shakes and wiggles as part of a movement break.

student with attention deficit hyperactivity disorder, was being reprimanded daily in the cafeteria, unbeknownst to other school personnel or his parents. Bob was self-initiating activities he had learned in occupational therapy and speech therapy (e.g., sucking apple-sauce through a tiny straw), but the cafeteria worker had not been privy to Bob's oral-motor and sensory-seeking needs. Taking seriously her responsibilities to keep the cafeteria clean and orderly, she was concerned that Bob's oral motor activities often caused a mess and did not "appear" to be appropriate behavior in the cafeteria.

Although the team discussed Bob's activities as appropriate sensory seeking/proprioceptive input, the cafeteria worker who completed the SPM Cafeteria form² helped the team realize that Bob was not demonstrating appropriate behavior based on what she expected in the cafeteria. At the same time, completing the SPM afforded the worker the opportunity to understand why Bob was demonstrating what she considered inappropriate behavior. She became aware of Bob's sensory processing challenges and their impact on his occupational performance throughout the school day. This mutual understanding opened the door for implementing a successful intervention plan within *all* environments, including the cafeteria. Progress measured via the SPM posttest 5 months later

revealed that the strategies, listed below, were working.

- Bob learned to *appropriately* explain his sensory needs.
- A sport bottle for sucking was made available to Bob throughout the day.
- Bob used an oral motor transition tool *on the way* to lunch.
- Bob drank thick yogurt through a straw, using a cup with a lid to obtain oral motor input while keeping the contents from spilling over.
- Bob took responsibility for cleaning up after himself.

Case Example: Response to Intervention (RtI)

Student Study Teams (SST), often composed of classroom and special education teachers, a school administrator, and hopefully an OT, meet to develop early intervention services when there is a problem behavior in a classroom. Under RtI, an SST used the SPM to identify potential sensory barriers to a class of children maintaining attention, resulting in the team suggesting more movement opportunities throughout day. In fact, many teachers report that breaks in general are essential for alertness and that increased movement experiences positively influence cognition. The staff in this school implemented movement breaks (e.g., shakes and wiggles) (see Figure 1) as a Tier 1 intervention (general education strategies for all students) and provided chair balls for desk work to students

who demonstrated vestibular seeking behaviors and postural control issues (a Tier II intervention) (see Figure 2 on p. 9). This strategy was supported by research on chair ball use in the classroom, which reported improved in-seat behavior and legible word productivity.³

Case Example: Gym Class

The SPM (including the PE form) was used for Lucas, a student with autism, and revealed proprioceptive concerns, vestibular challenges, poor bilateral integration, difficulty with praxis, and decreased social participation. Although Lucas was successfully included in his 4th grade classroom, he was unable to participate in many PE activities, including volleyball. He was unable to maintain focus on the ball, or to motor plan the timing and sequencing of his movements to volley back and forth. Lucas's school occupational therapist, PE teacher, and clinic-based occupational therapist (at his mother's suggestion, as Lucas had received Ayres sensory integration intervention during the summer) collaborated and created a plan to have Lucas be a PE helper as part of his special education support plan (Tier III intervention). The ability of the SPM to promote collaboration between school- and clinic-based therapists yielded positive results for Lucas. For example, during volleyball, he indicated which team was serving by pushing a milk crate with weighted materials from one side of the net to the other (see Figure 3 on p. 11). Several sensory and praxis goals were addressed in this way, and his self-esteem increased as he assisted his teacher in this functional task. This strategy served as a mechanism for Lucas to stay engaged in the game, interact with the other students, and obtain the sensory input he needed.

CLINIC-BASED SERVICES

Regardless of setting, the SPM can facilitate a team approach, help guide discussion, and provide a *quantifiable picture* of the child's sensory processing, with statistical assurance that the SPM is measuring sensory processing. The SPM has been instrumental in helping many families and medical teams to reframe children's behaviors. Many parents have described a sense

of relief and empowerment when their descriptions of their children were quantified to demonstrate sensory processing problems. The following section highlights some of SPM's clinical uses.

Case Example: Quantifying Dysfunction for Professionals

Jared, a 6 year old, avoided using any public bathrooms because of the sound of the toilet, had bitter fights over teeth brushing, and had a prolonged morning routine because of discomfort with his clothing. His pediatrician responded to these concerns by prescribing anti-anxiety medication and providing instructions to Jared's parents on setting limits. When Jared's parents later found an occupational therapist trained in sensory integration and completed the SPM Home form, they finally had quantifiable information that Jared had "some problems" for hearing and "definite dysfunction" for touch. In communications with the pediatrician, the occupational therapist was able to reframe Jared's functional problems by identifying the underlying sensory



Figure 3. Lucas pushes a milk crate with weighted materials to indicate which team is serving, which allowed him to participate while addressing his sensory needs.

processing problems, thus demonstrating that the behavior issues were not caused by "poor parenting." With the support of the pediatrician Jared began participating in occupational therapy, with positive functional outcomes in the initially identified areas of concern.

Case Example: Reframing Symptoms of Sensory Processing Disorder

At school, 8-year-old Thomas was having trouble with social relationships, following directions, and sitting still. Because he performed academically at grade level and his school psychologist

and teacher felt he just had behavior problems, he did not qualify for occupational therapy services in school. At the suggestion of a friend, Thomas's mother contacted an occupational therapist in a clinic setting. As part of the assessment, both the Home and Main Classroom SPM forms were completed. The results confirmed that Thomas's challenges at school were related to sensory processing. When Thomas's mother completed the SPM, she realized that Thomas had extreme responses to sensory input in his home and community that she had never noticed before, because she had been unknowingly accommodating him. For example, Thomas was bothered by the feel of his sheets and clothing; seemed to not get dizzy; leaned on other people; and tended to do everything with too much force, including petting his neighbor's dog and hugging his mother and sister. The SPM results enabled the clinic-based therapist to identify goals that would be medically relevant and reimbursed by the insurance carrier (i.e., in 6 months, Thomas will demonstrate increased body awareness when hugging his mother and sibling as demonstrated by appropriate force, lack of injury, and no expression of pain or discomfort from either recipient, 90% of the time). In addition, the SPM enabled the clinic-based occupational therapist to provide suggestions for sensory-based activities that could be infused into Thomas's school day (i.e., more movement opportunities between deskwork activities because his SPM scores reflected dysfunction in his vestibular and proprioception systems. These suggestions resulted in Thomas being able to listen more attentively and sit still more often.

Case Example: Food Sensitivity

Seven-year-old Sera was referred to occupational therapy because of her narrow, unhealthy repertoire of foods. Her scores on the SPM fell in the typical range, potentially indicating that there were other reasons for her disordered eating. However, as the SPM manual indicates, the therapist should examine individual items if there is any reason for concern.¹ A review of the SPM questions with Sera's parents, and clinical observations, indicated sensory

FOR MORE INFORMATION

OTA CEonCD™: Response to Intervention: A Role for Occupational Therapy Practitioners
By G. Frolek Clark, 2008. (Earn .2 AOTA CEUs [2 NBCOT PDUs/2 contact hours.] \$68 for members, \$97 for nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org>. Order #4826-MI.)

FAQ on Response to Intervention
American Occupational Therapy Association, 2008. Bethesda, MD: Author.
<http://www.aota.org/Practitioners/PracticeAreas/Pediatrics/Browse/School/FAQ-Response-to-Intervention.aspx>

Online chat between school and clinic based therapists hosted on www.otexchange.com by Deanna Iris Sava and Diana A. Henry. Go to www.ateachabout.com home page and click on Discussion chat about the SPM.

Sensory Processing Measure Web site
www.sensoryprocessingmeasure.com

integration problems. For example, Sera's parents commented that she "never" had certain responses to sensory input because she had "overcome" her sensitivities. When answering the SPM item, "Does your child show distress at smells that other children do not notice?" they reported that she was not distressed, but she noticed the slightest fragrances or odors. The SPM item analysis indicated slight variations in scores, thus clinical reasoning yielded additional information, allowing for a more specific intervention plan and leading Sera to tolerate and accept a greater range of different nutritious foods, with less tension during meals.

PSYCHOMETRIC STRENGTH OF THE SPM

For an assessment tool to be reliable for clinical practice, it must provide accurate and consistent information. This section summarizes evidence demonstrating that the SPM is a valid and reliable measure of sensory processing, praxis, and social participation.

The SPM was developed with a large, demographically representative normative sample, consisting of 1,051 typically developing children, ranging in age from 5 to 12 years. The normative sample was roughly divided among males and females, ethnically diverse, and representative of various levels of socioeconomic status.

A *normative sample* provides clinicians with the expected SPM scores for typically developing children. There-

fore, when determining whether a child has a sensory processing disorder, the clinician simply compares the SPM scores to the average scores of the normative sample. This comparison classifies the child into one of three SPM interpretive ranges: (1) typical, (2) some problems, or (3) definite dysfunction.

Some measurement error is possible in all tests. When developing the SPM, a premium was placed on establishing high reliability, or reducing the amount of measurement error as much as possible. One important aspect of reliability is *internal consistency*, which expresses how well the items of the SPM "hang together" to measure clear, well-defined aspects of sensory processing. For example, the SPM Hearing scale is intended to measure problems with auditory processing. If some of the items on the Hearing scale had measured some other construct (e.g., attention span, aggressiveness, etc.), the Hearing scale's internal consistency would have been lower. Internal consistency is expressed as a correlation coefficient that ranges in value from 0 to 1, with higher values indicating greater reliability. In the SPM normative sample, all of the scales on the Home and School forms have internal consistency greater than .70 (and most are greater than .80), indicating that they are reliable enough to support clinical assessment.

Another important aspect of reliability is *test-retest reliability*, or temporal stability. The SPM and other behavioral rating scales are presumed to measure characteristics of children that are stable over short periods. For example, one would not expect a child's level of dysfunction in auditory processing to change appreciably over 2 weeks, all else being equal. The 2-week test-retest correlations for the SPM scales are almost all .95 or above, indicating excellent temporal stability.

The validity of an assessment has various facets, some theoretical and some practical. *Discriminant validity* refers to the SPM's ability to differentiate between typically developing children and those with sensory processing dysfunction. As part of the SPM development research, a clinical sample was collected, consisting of 345 children

who were currently receiving occupational therapy intervention for sensory and motor problems. These children had a wide range of conditions, from sensory processing disorder, to attention deficit disorder, to autism.

The SPM scores of the children in the clinical sample were significantly higher (worse) on all eight scales than the scores of typically developing children from the normative sample. A measure of effect size was used to determine whether these SPM score differences were clinically meaningful, in addition to being statistically significant. In every instance, the effect size of these differences exceeded .8, which is the threshold for a large, clinically significant effect.⁴ These results allow clinicians to use the SPM with the confidence that it identifies children who need treatment for sensory processing disorder.

CONCLUSION

The applicability of the SPM in both school- and clinic-based practice is clear. In addition to providing first-hand information from those who are part of the child's life and facilitating team communication, this statistically sound assessment tool gives therapists the ability to document the need for occupational therapy services and design appropriate interventions. (Case studies under development with the Sensory Processing Measure—Preschool [SPM-P, for 2- to 5-year-olds] are indicating that it too will aid clinicians who support children in various environments.) ■

Acknowledgments

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References

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CONNECTIONS

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Ten Ways to Implement RtI with Sensory Strategies

Course Description:

This webinar offers a unique opportunity to see and hear an **assistant school superintendent, a school principal, RtI team leader, several classroom teachers (kg, 2nd and 4th grade), a PE teacher, music therapist, occupational therapist AND parent** collaborate to implement Response to Intervention (RTI) with sensory strategies. The **Sensory Processing Measure (SPM)**, a well-researched, statistically sound assessment tool is threaded throughout the school community and home to assist in developing sensory strategies for all.

You will hear how collaboration between all who work with students including in the cafeteria, on the bus, on the playground, in the principal's office and even in outpatient clinics supports the principles of RtI for students in general education as well as those with autism.

A student with **autism**, his mother, teachers and therapists highlight how he has been integrated throughout the school community and at home using strategies based on sensory integration and sensory processing. A **playground** built to meet the sensory needs of typical students as well as students with sensory processing disorders is also described.

Objectives:

At the completion of this course, participants will be able to:

1. List and explain the three tiers of Response to Intervention (RtI)
2. List the eight environments covered in the Sensory Processing Measure (SPM)
3. Identify sensory strategies used in general education as well as with students with autism