Evidence Summary for Pediatric Rehabilitation Professionals

Outcome Measures: The Sensory Profile

1. Summary

**Type:** Norm-referenced  
**Purpose:** Discrimination  
**Population:** Children at risk of sensory processing difficulties  
**Age:** 0 to 3 years (Infant/Toddler Sensory Profile), 3 to 10 years (Sensory Profile), 11 years and up (Adolescent/Adult Sensory Profile)  
**Time to Complete:** 30 minutes for Sensory Profile (10 minutes for Short Sensory Profile); 15 minutes for Infant/Toddler Sensory Profile; 10-15 minutes for Adolescent/Adult Sensory Profile  
**Equipment Needed:** Questionnaire, manual, score form, pen/pencil

2. Overview

Three versions of the Sensory Profile exist: the original Sensory Profile\(^1\) (SP) for children 3 to 10 years old, the Infant/Toddler Sensory Profile\(^2\) (ITSP) for children 0 to 36 months of age, and the Adolescent/Adult Sensory Profile\(^3\) (AASP) for individuals over 10 years of age.

a. Sensory Profile

The purpose of the Sensory Profile (SP) is to evaluate the contributions of sensory processing to a child’s daily functional performance, to determine the child’s tendencies to respond to stimuli, and understand which systems are likely contributing or providing challenges to the child’s performance.\(^3\) The SP consists of 125 item caregiver questionnaire that probes the frequency of certain behaviors. The 125 items are grouped into three main sections:

i. Sensory processing: Targets child’s responses to basic sensory processing systems:
   - Auditory
   - Visual
   - Vestibular
   - Touch
   - Multi-sensory
   - Oral sensory processing

ii. Modulation: Reflects child’s regulation of neural messages including:
   - Sensory performance related to endurance/tone
   - Modulation related to body position and movement
   - Modulation of movement affecting activity level
   - Modulation of sensory input affecting emotional responses
   - Modulation of visual input affecting emotional responses and activity level

iii. Behavioral and emotional responses: Reflects child’s behavioral outcomes of sensory processing including:
   - Emotional/social responses
   - Behavioral outcomes of sensory processing
   - Items indicating thresholds for response
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Items on the caregiver questionnaire form nine factors:

1. Sensory seeking
2. Emotionally reactive
3. Low endurance/tone
4. Oral sensory sensitivity
5. Inattention/distractibility
6. Poor registration
7. Sensory sensitivity
8. Sedentary
9. Fine motor/perceptual

The SP is meant to be administered by a variety of professionals including occupational therapists, teachers, psychologists, speech-language pathologists and physicians, as well as researchers. Interpretation of scores should be completed by individuals with an understanding of sensory processing and how it impacts performance.¹

Questionnaire administration involves asking a caregiver who is familiar with the child to answer the frequency with which they see the behaviors described in all of the questionnaire items: always, frequently, occasionally, seldom, or never. Scoring the questionnaire involves assigning a point score to each of the responses with ‘always’ receiving 1 point and ‘never’ receiving 5 points. A section raw score is calculated by adding the item scores within each section. Item raw scores can then be transferred to the factor grid to determine factor raw score totals which can allow each of the nine factors to receive a classification of ‘typical performance’ (at or above one standard deviation below the mean), ‘probable difference’ (between just below one standard deviation and two standard deviations below the mean), or ‘definite difference’ (below two standard deviations below the mean). A section summary can be completed to provide a visual summary of the child’s abilities. In addition, low and high threshold items can be examined. High threshold items measure lack of response or need for more intense stimulation where as low threshold items measure if a person notices or becomes annoyed with sensory stimulus.¹

A Short Sensory Profile (SSP) is also available and is composed of 38 items that target sensory modulation. The SSP is best used for screening and in research.¹

b. Infant/Toddler Sensory Profile

The ITSP is similar in purpose, administration, and scoring to the original SP but was created for children up to 36 months of age. The ITSP consists of 36 items for children birth to 8 months and 48 items for children 7 to 36 months. Children 0 to 6 months receive four quadrant scores and one combined quadrant score where as children 7 to 36 months receive five sensory processing section scores (auditory, visual, tactile, vestibular, and oral sensory processing), four quadrant scores, and one combined quadrant score. A general sensory processing score is not calculated due to the items not meeting adequate levels of reliability.²

Administration and scoring of the ITSP is similar to that of the SP with the exception of filling out a quadrant grid and summary instead of a factor grid.²

Scores for children birth to 6 months of age will have their sensory processing abilities described as ‘typical performance’ or ‘consult and follow-up’. Children 7 to 36 months will have their sensory processing abilities classified into the same three categories as the SP, i.e. ’typical performance’, ‘probable difference’, or ‘definite difference’.²
c. Adolescent/Adult Sensory Profile

The AASP is similar in purpose, administration, and scoring to the SP and is composed of a 60 item self-questionnaire with four quadrants covering taste/smell, movement, visual, touch, activity level, and auditory. Administration and scoring of the AASP is similar to that of the SP with the exception of filling out a quadrant grid, summary, and profile instead of a factor grid. Scores for the AASP can be classified as follows: ‘much less than most people’, ‘less than most people’, ‘similar to most people’, ‘more than most people’, and ‘much more than most people’. Areas of concern emerge if scores/classifications are not compatible with individuals’ desired or necessary life choices.

3. Standardization Sample

a. Sensory Profile

Data for the SP is based on scores collected between 1993 and 1999 from 1200 American children with and without disabilities between 3 and 14 years of age and of diverse backgrounds although no information is given regarding the representativeness of the sample. Children with disabilities had diagnoses of attention deficit hyperactivity disorder (ADHD), autism/pervasive development disorder (PDD), Fragile X syndrome, or a sensory modulation disorder. Children were excluded if they received special education services and were on regular prescription medication.

b. Infant/Toddler Sensory Profile

Data for the ITSP is based on scores collected between 1998 and 2002 from more than 1500 American children aged 0 to 36 months with and without disabilities and of diverse backgrounds although no information is given regarding the representativeness of the sample. Children with disabilities had diagnoses of developmental delay (DD), PDD, cerebral palsy (CP), Down syndrome (DS), reflux, sensory integrative dysfunction (SID), amongst others. Children were excluded if they received special education services and/or were on regular prescription medication.

c. Adolescent/Adult Sensory Profile

Data for the AASP is based on scores collected from 950 individuals without disabilities living in the United States. The sample was primarily white and from the mid-west.

4. Measurement Properties

a. Reliability

Standard error of measurement and confidence intervals were measured for all three versions of the Sensory Profile. Limited evidence of reliability is available for the SP. Internal consistency was measured using Cronbach’s coefficient alpha and results indicate a wide range of values from 0.47 to 0.91. Limited evidence of reliability is available for the SP. Internal consistency was measured using Cronbach’s coefficient alpha and results indicate a wide range of values from 0.42 to 0.86 for

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children between 7 and 36 months of age and from 0.17 to 0.83 for children 6 months and younger. Since the coefficients for the younger children suggest poor overall consistency, section scores for these children are not provided.2

Test-retest reliability was assessed by having 32 caregivers rate their 7 to 36 month old child twice at 2 to 3 week intervals. Correlation coefficients were 0.86 for the sensory processing section scores and 0.74 for the quadrant scores.2

iii. Adolescent/Adult Sensory Profile

Limited evidence of reliability is available for the SP. Internal consistency was measured using Cronbach’s coefficient alpha and results indicate a range of values between 0.64 and 0.78.3

b. Validity

All three versions of the Sensory Profile have established content validity. Content validity was established by basing the SP items on clinical experience and research findings, by consulting with therapists considered to be experts in sensory processing, and by having experienced therapists assist in the categorization of items.1-3

In addition, more specific examinations of validity were conducted.

i. Sensory Profile

Examination of the criterion-validity of the SP involved exploring the test’s convergent and discriminant validity by comparing scores from the ITSP with Infant/Toddler Symptom Checklist (ITSC).6 As expected, high correlations were found between the ITSC and ITSP for sections related to low threshold areas (sensory sensitivity, sensation avoiding, and combined low threshold).2 As expected, low correlations were found between the ITSC and ITSP high threshold areas (low registration and sensation seeking).2

SP scores were also examined for special groups. As expected children with DD, health impairments and metabolic disorders, PDD, SID, and reflux, had significantly lower scores than their typical peers. Children with language
disorders did not have any significant overall differences in ITSP scores and children with DS only had lower scores in the auditory processing section of the ITSP, when compared to typical peers. Results for children with CP could not be analysed due to incomplete data.²

### iii. Adolescent/Adult Sensory Profile

Examination of the criterion-validity of the SP involved exploring the test’s convergent and discriminant validity by comparing scores from the AASP with New York Longitudinal Scales (NYSL) Adult Temperament Questionnaire.⁷ The authors of the AASP contend that the correlations with the different subscales of the NYLS Adult Temperament Questionnaire provide both evidence of discriminant and convergent validity of the AASP.

Further evidence of convergent validity is provided by studies that compared scores on the AASP with skin conductance responses, which are often used as a physiological measure of response to sensory information. As expected, people with low neurological thresholds (sensory sensitivity and sensation avoiding) had greater responsivity than those with high thresholds (low registration and sensation seeking) and individuals with high scores in sensation avoiding and low registration habituated more quickly to the stimulus than those with high scores in sensory sensitivity and sensation seeking.³

AASP scores were also examined for individuals with schizophrenia. As expected, individuals with schizophrenia had higher scores in sensation avoidance and low registration and lower scores in sensation seeking than their peers without mental illness. Unexpectedly, however, there were no differences in sensory sensitivity between individuals with schizophrenia and individuals without mental illness.³

### 5. Further Considerations

Researchers examined the suitability of the SP in Chinese children. Results demonstrated different response rates in a majority of items (64.8 percent) when compared to American children. The author therefore urges users to exercise caution when using this test with Chinese children living in Hong Kong.⁸

The SP, and to a lesser extent the SSP, ITSP, and AASP, have been used extensively in research evaluating the effectiveness of various therapeutic interventions in children⁹-¹¹ as well as to better understand sensory processing and its effects in children with possible sensory processing deficits,¹² ADHD,¹³,¹⁴ Fragile X,¹⁵,¹⁶ and particularly children with PDD.¹⁶-²⁴

Further investigation into the tests’ psychometric properties would be beneficial. In particular, the low levels of reliability of the ITSP should be considered.

### References


This evidence summary is one part of a series on pediatric rehabilitation outcomes measures. Other summaries in this series include:

- Outcome Measures: A Primer
- Outcome Measures: The Alberta Infant Motor Scale (AIMS)
- Outcome Measures: The Bayley Scales of Infant Development, 3rd Ed. (BSID-III)
- Outcome Measures: The Bruininks-Oseretsky Test of Motor Performance, 2nd Ed. (BOT-2)
- Outcome Measures: The Developmental Test of Visual-Perception, 2nd Ed. (DTVP-2)
- Outcome Measures: The Gross Motor Function Measure (GMFM)
- Outcome Measures: The Movement Assessment Battery for Children, 2nd Ed. (MABC-2)
- Outcome Measures: The Peabody Developmental Motor Scale, 2nd Ed. (PDMS-2)