

Characteristics of Idiopathic Sensory Processing Disorder in Young Children



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Background

Purpose: To explore the developmental and behavioral profiles of children with idiopathic Sensory Processing Disorder (ISPD). ISPD was identified if a child displayed symptoms of one or more of the types of SPD as described by Miller et al. (2007) including sensory modulation disorder, sensory discrimination disorder, and sensory-based motor disorder BUT did not meet criteria for any other neurodevelopmental, or mental health disorder. Relations among types/subtypes of SPD, adaptive behavior and psychosocial-emotional functioning were examined to increase our understanding of the characteristics, and developmental profiles of children with ISPD, and our understanding of SPD as its own diagnostic entity.

Research Methods

- ❖ **Procedures:** A retrospective, non-experimental design was used. With data obtained from an existing data set. Data was compiled from the medical records of children who had participated in a developmental and/or diagnostic evaluation from 2014-2017 at a clinic in the Northeastern US. All children had been evaluated by an interdisciplinary team using developmental, and diagnostic measures. Cases selected for analyses were: a) the child be between 15 and 72 months of age; b) SPD symptoms based on scores from the Sensory Profile, Child or Infant/Toddler version with at least 2 sensory area scores in the probable difference range or one score in the definite difference range c) no reported co-existing neurodevelopmental or mental disorders. Children with unspecified developmental delays were included.
- ❖ **Participants:** Of 198 child cases, data from 36 males and 15 females (N=51) ranging in age from 15 to 61 months were included. Mean age was 45.9 months (13.3 SD) with children ranging in age from 3 to 5 years. The children were primarily from Caucasian families (81.1%).
- ❖ **Measures:** Sensory Profile and Sensory Profile 2, infant/Toddler and Child versions, (Dunn, 2014), Vineland Adaptive Behavior Scales-2, (Sparrow et al., 2005) and Child Behavior Checklist (CBCL, Achenbach, 2000)
- ❖ **Data analyses:** Data were analyzed using SPSSver24, and included descriptive statistics, and correlation analyses to examine relations between types and subtypes of sensory processing disorders, and developmental, and behavioral variables.

Results

Sensory Processing Types

- ❖ The most common SPD type was Sensory Modulation Disorder with SOR and SUR being the most frequent
- ❖ The tactile and vestibular/proprioceptive systems were the most often impacted
- ❖ Most children displayed more than one SPD type/subtype

Frequency of Sensory Processing Disorder Types/Subtypes

SPD Patterns	Definite score of 2		Mild score of 1		Typical score of 0	
	N	%	N	%	N	%
Seeking	21	41.2	12	23.5	18	35.3
Overreactive	28	54.9	12	23.5	11	21.6
Under reactive	27	52.9	10	19.6	14	27.5
Discrimination	17	33.3	20	39.2	14	27.5
Sensory Based Motor	20	39.2	15	29.4	16	31.4

Frequency of Deficits by Sensory System

Sensory System	Participants with score of 2		Participants with score of 1		Participants with score of 0	
	N	%	N	%	N	%
Visual	12	23.5	16	31.4	23	45.1
Auditory	21	41.2	15	29.4	15	29.4
Tactile	22	43.1	17	33.3	12	23.5
Vestibular/proprioception	27	52.9	12	23.5	12	23.5

Discussion

- ❖ As SPD severity increased performance in adaptive behavior decreased and the presence of atypical behaviors increased.
- ❖ Children with ISPD would benefit from interventions that address undesirable behaviors and problems in occupational performance
- ❖ Atypical behaviors consistent with a variety of mental health disorders are common in children with ISPD even though they do not meet criteria for such disorders
- ❖ Subtle differences in the behavior and developmental profiles were noted across SPD type/subtypes. However, concerns were seen in all SPD types and these differences did not appear clinically significant
- ❖ An important limitation of this study is that a reputable standardized diagnostic measure was not available to classify the SPD types/subtypes

Behavior Profiles & DSM IV Symptomology

- ❖ For all SMD subtypes the mean scores were in the dysfunctional range for externalizing and PDD
- ❖ For the sample as a whole mean standard scores for externalizing, internalizing and total behaviors were borderline significant (65, 64, and 67 respectively)
- ❖ SPD severity and all types of atypical behaviors were positively correlated.
- ❖ Internalizing, Externalizing, PDD, and ADHD had moderately high correlations with SPD type/subtypes (.440, .504, .455, .554 respectively).

CBCL Atypical Behavior Profiles By SPD Type/Subtype

CBCL Atypical Behavior Scales	Seeking (SC) N=20		Overreactive (SOR) N=27		Under-reactive (SUR) N=25		Discrimination (SDD) N=16		SB Motor (SBMD) N=19		TOTAL N=49
	M	sd %dys	M	sd %dys	M	SD %dys	M	SD %dys	M	SD %dys	
Externalizing	73.7	9.9 70	70.3	12.9 56	72.1	11.7 64	73.3	11.6 75	74.2	9.6 68	65 13.9 41
Internalizing	68.9	9.8 55	68.8	10.4 56	69.5	10.2 60	69.4	11.5 56	69.6	10.0 58	64 10.9 35
Total Probs	74.3	9.6 70	72.7	12.2 63	74.5	11.1 68	74.4	12.9 69	75.4	9.6 68	67 12.9 47
Affective	69.3	9.8 55	67.9	11.2 56	70.5	9.8 64	69.7	10.6 63	69.9	9.8 58	65 10.9 39
Anxiety	65.1	11.6 40	67.3	12.8 48	68.4	12.9 52	66.2	12.5 44	66.9	13.1 47	62 12.1 29
PDD	75.3	6.9 80	75.8	8.8 74	76.1	8.2 80	75.5	9.5 82	76.2	7.2 79	71 9.5 55
ADHD	68.1	7.2 50	65.7	8.6 40	66.6	8.2 48	68.4	8.3 56	68.1	7.3 53	62 9.1 25
ODD	68.5	8.2 55	66.7	9.8 44	67.6	9.1 44	68.2	9.0 56	68.8	7.2 53	64 10.3 33

*%dys= percent in dysfunctional range
*CBCL= Child Behavior Checklist

Adaptive Behavior

- ❖ For each SPD type and subtype the mean scores fell in the dysfunctional range for all four domains on the VABS-2
- ❖ The SUR subtype was the most prevalent type of SMD
- ❖ All domain areas were equally affected in the sample as a whole
- ❖ In the SBMD type there were more people in the dysfunctional range in daily living and motor than communication.
- ❖ SPD severity was negatively correlated with all areas with the strongest correlation being the social domain (-0.30)

Adaptive Behavior Performance by SPD Type/Subtype

Vineland Adaptive Behavior Scale Domains	Seeking N= 21			Overreactive N= 28			Under reactive N= 27			Discrimination N= 17			Sensory Based Motor N= 20			Total N= 51		
	M	SD	%dys	M	SD	%dys	M	SD	%dys	M	SD	%dys	M	SD	%dys	M	SD	%dys
Communication	80.1	10.3	57	79.5	11.5	61	79.6	11.4	67	76.3	11.0	76	80.4	10.8	55	79.9	12.7	61
Daily Living	80.0	12.3	62	80.4	11.5	68	80.1	11.7	63	77.5	11.7	76	79.3	12.3	70	82.6	10.9	61
Social	80.3	11.1	57	81.1	13.0	61	78.6	11.2	74	78.5	12.3	65	79.2	11.4	60	83.7	12.8	57
Motor	80.4	12.3	67	81.1	12.8	68	80.5	13.2	70	78.4	12.9	76	78.9	13.1	70	82.8	12.6	63
Composite Score	77.3	9.3	76	77.6	8.9	79	76.7	9.2	85	74.6	8.9	82	76.5	9.3	80	79.3	9.6	73

Directions for Research

- ❖ Developing measures specifically for identifying SPD types and subtypes such as the sensory processing 3-dimensions measure (SP3D; Mulligan et al., 2019) is an important next step.
- ❖ A better understanding of the brain mechanisms involved in ISPD
- ❖ A better understanding of the similarities and differences between ISPD and other mental disorders