
Background: Screening for autism spectrum disorder (ASD) in children is of critical importance. In Japan, the government has recommended the implementation of a 5-year-old health check, with the goal of nationwide adoption by 2028. Effective screening tools are essential for this initiative. While many ASD screening questionnaires have been developed, most focus on social communication and restricted, repetitive behaviors. Previous research has shown that approximately 74% of children with ASD exhibit sensory processing difficulties and 89% show problems with motor coordination. Therefore, incorporating the assessment of sensory processing and motor coordination may improve the accuracy of ASD screening. In this study, we used a sensory–motor questionnaire developed by our group to identify items related to sensory processing and motor coordination that effectively discriminate between children with ASD and typically developing (TD) children, and we calculated the discriminative accuracy.

Objectives: The objective of this study was to develop an ASD screening tool for 5-year-old children using questionnaire items related to sensory processing and motor coordination.

Methods: Parents of 21 children aged 5 years 0 months to 5 years 11 months who had been diagnosed with ASD completed the sensory–motor questionnaire. The questionnaire consisted of 70 items on sensory processing and 29 items on motor coordination. Sensory processing items were rated on a 5-point scale: 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always. Motor coordination items were rated on another 5-point scale: 0 = performs well, 1 = can do, 2 = slightly poor, 3 = poor, 4 = very poor. Data from the 21 children with ASD were compared with those from 21 age- and sex-matched typically developing children. Items showing significant group differences were summed to form a composite score, which was used to evaluate discriminative performance between groups.

Results: Significant group differences were found in nine sensory processing items (e.g., “Does not notice being touched when concentrating on something”) and ten motor coordination items (e.g., “Maintains balance”). When the total score of these 19 items was calculated and a cutoff value of 23 points or higher was set as “at risk,” the sensitivity was 90%, specificity was 86%, and the area under the curve (AUC) was 0.874, indicating good discriminative ability.

Conclusions: Several sensory processing and motor coordination items showed significant score differences between children with ASD and typically developing children. Using these items enabled accurate discrimination between the two groups at age five. These findings suggest that these questionnaires could serve as a useful supplementary screening tool for ASD in 5-year-old health checks. However, because the sample size in this study was small, further research with larger samples is needed to validate these results.

427.090 Toe Walking Is Associated with a Specific Sensory Profile. Results from a Neural Network Analysis on Sensory Profile 2 Data.

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Background: Autistic children and adolescents often demonstrate motor dysfunctions, prominently including toe walking (TW). Prior investigations have identified persistent TW (i.e., TW that fails to resolve autonomously by the ages of 3-7 years) as being correlated with increased cognitive deficits, delays in language development, and orthopaedic issues, whereas the evidence pertaining to atypical sensory processing remains less uniform. These factors are characterised by non-linearity, complexity, and fuzzy interaction, necessitating a machine learning approach.

Objectives: The goal of this study is to describe the overall schema of natural relationships between clinical variables (i.e., four quadrants and six sensory systems) of Sensory Profile 2 (SP-2) scores in a sample of autistic children and adolescents with and without TW, using fourth-generation artificial neural networks.

Methods: The caregivers of 40 children and adolescents with ASD (12 females, 28 males; mean age = 8.5 years, SD = 2.54), 16 with TW and 24 without TW, filled out the SP-2. The CARS-2 scale was used to classify the severity of autism. To illustrate the most important connections among the variables, a non-supervised artificial neural network called Auto-CM, coupled with a Minimum Spanning Tree filter, developed a Semantic Connectivity Map of the variables in the study. According to SP-2 user manual, three classes of variables pertaining to SP-2 were formed as data preprocessing: a class with values in the range of "just like the majority of cases" (Typical), a class with values in the range of "more or much more" (More), and a class with values in the range of "less or much less" (Less), with an appropriate transformation.

Results: The semantic connectivity map developed by the Auto-CM system clearly shows a high level of complexity with many variables acting as hubs with three or more links.

The map revealed a clear separation between the presence/absence of TW. The TW-present node was directly linked with the cluster of SP-2 subscales "More" values through SP-2 sensitivity. The hierarchy of SP-2 subscales with "more" values according to degrees of separation was as follows: sensitivity (first level), auditory and registration (second level), avoiding, touch and seeking (third level), body position and movement (fourth level), and visual (fifth level).

The TW absent node was directly linked with the cluster of SP-2 "Typical" subscales through SP-2 body position. These connections remained unchanged after progressive addition of other variable domains, like motor domain (Developmental Coordination Disorder Questionnaire scores) and autism severity, underlying an elective association between TW and showing "more" and/or "much more" sensitivity than neurotypical persons (Figure 1). The only SP-2 subscale not showing this elective association was "oral sensitivity".

Conclusions: These results highlight the strong dependence of TW on atypical sensory processing in which sensitivity, auditory and registration/bystander play a major role. Further research on a larger sample is warranted to confirm the results.



427.091 Trajectories of Family Accommodation of Restricted and Repetitive Behaviors Among Young Autistic Children

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