Exploring the Relationship Between Sensory Integration and Handwriting in Elementary Students

Denise K. Donica, DHSc, OTR/L, FAOTA, BCP[1], Larymi Beck, Katie Hill[2]

[1]*East Carolina University, Greenville, NC, USA;* [2]*ECU, Greenville, North Carolina, United States*

DOI: 10.5014/ajot.2024.78S2-PO23

Date presented: March 22, 24

Primary Author and Speaker: Denise K. Donica, donicad@ecu.edu

While research suggests that sensory integration impacts handwriting skills, there are limited performance-based sensory integration outcomes and their impact on handwriting legibility documented. Ayres hypothesized that motor deficits observed in children may result from continuous incorrect sensory processing, specifically with tactile and/or proprioceptive input (somatodyspraxia). This inadequate feedback for motor learning leads to ineffective and inconsistent motor patterns (Chu, 2020; Reeves & Cermak, 2002). Therefore, occupational therapists have had limited ability to determine if handwriting deficits were impacted by sensory integration abilities. A cross-sectional design was used where third and fourth grade students were separated into two groups (based on scores from the Handwriting Legibility Scale) for comparison of praxis, tactile perception, and motor-related functions: students with handwriting difficulties (HD) and students without HD. The groups were compared using 10 tests of the Evaluation in Ayres Sensory Integration which measures sensory integration through performance-based tasks. The non-parametric Mann-Whitney U test was used for analysis and effect size r was calculated. Preliminary analysis of 33 students (n=6 with HD and n=27 without HD) showed students with HD had significantly lower scores on three areas of praxis (positions, sequences, and ocular praxis; p<=.02, r=0.39-0.44), all areas of tactile perception (localization, designs, and shapes; p<=.045, r=0.35-0.46), and two areas of motor-related function (ocular motor and bilateral integration; p<=.02, r=0.39). Areas without significant differences include balance, ideation, and following directions. These preliminary findings show that sensory integration may play a role in handwriting skills. It is important for occupational therapy practitioners to evaluate underlying sensory integration skills to understand their possible impact on handwriting skills.

References

Chu, V. W. T. (2020). Brief Report – Pilot study to measure deficits in proprioception in children with somatodyspraxia. *American Journal of Occupational Therapy, 74*, 7405345010. https://doi.org/10.5014/ajot.2020.040709

Reeves, G. D., & Cermak, S. A. (2002). Disorders of praxis. In A. C. Bundy, S. Lane, E. A. Murray, & A. G. Fisher (Eds.), Sensory integration: Theory and practice (2nd ed.), 71–100. Philadelphia: F. A. Davis