The Relationship Between Somatosensory Processing and Handwriting Proficiency

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Somatosensory Processing & Handwriting Proficiency

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BACKGROUND

- Somatosensory processing and proficient handwriting.
- The researchers hypothesized a positive correlation between somatosensory processing and handwriting proficiency in typically developing second grade students.

Objectives

The objective of this study was to examine the relationship between somatosensory processing and handwriting proficiency in typically developing second grade children.

The researchers hypothesized a positive correlation between somatosensory processing and proficient handwriting.

Methods

Research Design: Exploratory Correlational
Setting: The Friends School in San Francisco, CA & Bacich Elementary School in Kentfield, CA
Participants: 74 typically developing second grade students between the ages of 7.0-8.11 years
Independent Variable: Somatosensory Processing
Dependent Variable: Handwriting Proficiency
Data Administration: In class individual and small group testing was completed. Teacher and parent/guardian questionnaires were also completed. Interrater reliability in test administration was established at the .98 level prior to testing.
Data Analysis: Descriptive Statistics, Pearson Product Moment Correlation Coefficient (p = .05), SPSS Version 22.0

Assessment Measures

Minnesota Handwriting Assessment (MHA): This assessment measures handwriting size, form, alignment, legibility, spacing, and speed. Test range: 1st-2nd graders.

- Beery-Buktenica Developmental Test of Visual Motor Integration, Sixth Edition: Motor Coordination Subtest (VMI-MC): This assessment includes three part test that measures visual motor integration, visual perceptual ability, and motor coordination. The motor coordination subtest was used to measure the precision of motor output that is informed by effective tactile discrimination and proprioception. Test range: 2-180 years.

Quick Neurological Screening Test, 3rd Edition (QNST-3): This assessment measures motor coordination and sensory integration. The three subtests used to measure somatosensory were finger to nose (proprioception and kinesthesia), rapid reversing hand movements (kinesthesia and proprioception), and palm and form recognition (tactile discrimination and haptic skill). Test range: 4-80 years.

Results

Sample Size: N=74

Statistically significant correlations:
- Quick Neurological Screening Test - Finger to Nose Subtest (QNST-FN) and Minnesota Handwriting Assessment Components: Form, Size, and Alignment (MHAcomp3) (r = .257, p < .05)
  - As the student becomes more able to precisely touch the tip of the nose with the index finger, handwriting proficiency also increases.
- Quick Neurological Screening Test - Finger to Nose Subtest (QNST-FN) and Minnesota Handwriting Assessment Size Component (MHA-Size) (r = .267, p < .05)
  - As the student becomes more able to precisely touch the tip of the nose with the index finger, handwriting size becomes more effective.

Discussion

Our research revealed two statistically significant links between somatosensory processing and handwriting proficiency. Therefore, somatosensory processing is a necessary component required to produce legible handwriting.

- Proficiency in somatosensory skill is necessary for children’s development and may contribute to handwriting proficiency.
- Understanding the relationships between somatosensory skill components and their contribution to handwriting ability can help occupational therapists provide effective, evidence-based interventions to students who have difficulties with handwriting.

Additional research is recommended to examine the links between somatosensory processing ability and handwriting proficiency.

Further research should focus on somatosensory skills as they relate to handwriting performance in specific handwriting components such as legibility, form, size, alignment, and spacing.

Development of new assessments to measure somatosensory components and how they apply to handwriting development and proficiency are indicated.

IMPLICATIONS