

# Fine Motor Intervention Program- A Response to Covid-19

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## BACKGROUND

- Covid-19 had a negative impact on overall physical activity (Solmi et al., 2022; Moore et al., 2020)
- Decrease in physical activity led to decrease in fine motor skill development
- Fine motor skills and the development of muscles of the hand are necessary for successful handwriting (Seo, 2018)
- Increase in overall OT referrals including school-based referrals after pandemic
- A handwriting intervention program can be beneficial for students struggling with legible handwriting (Saleem & Gillen, 2019)

## LITERATURE REVIEW

According to Creek (2014, as cited in Cho, 2022), the Developmental Frame of Reference proposes that development is a sequential process where each new skill learned is built on the one mastered in a previous stage and that incomplete mastery at any level will have a negative impact on future skill acquisition. Many skills are required for successful handwriting, but experts agree that the development of foundational fine motor skills is essential for good handwriting legibility (Griffin OT, 2019; Carazo, 2021).

The negative impact of Covid-19 on overall physical activity (Solmi et al., 2022; Moore et al., 2020) created a gap between current developmental abilities and expected academic skills for elementary school children. Many students have not yet developed the skills necessary for academic success which include the fine motor skills needed for good handwriting legibility. These academic demands which include good handwriting have caused an increase in school-based OT referrals. In fact, handwriting is a common reason for OT referral in schools and can signify up to 40% of all school OT referrals (McCloskey & Rapp, 2017; Saleem & Gillen, 2019)

Saleem & Gillen (2019) found that handwriting intervention programs are necessary to reduce the negative impact of handwriting issues on a student's occupational performance. Therefore, if elementary students who are struggling with the fine motor skill of handwriting are encouraged to participate in a fine motor intervention program, confidence and academic skills are likely to improve. Schunk (1996 as cited in Matera & Traver, 2020) notes that when students enjoy themselves during intervention programs, independence, belief in oneself, and motivation improve which has a positive impact on academic skills and mastery.

## PIO Question

*Does participation in a fine motor intervention program improve handwriting legibility among elementary students identified by teachers as potentially at-risk for academic delay?*

## SIGNIFICANCE

The Occupational Therapy Practice Framework: Domain and Process- Fourth Edition (American Occupational Therapy Association, 2020) defines occupation as everyday activities that people do to occupy time and bring meaning and purpose to life. Children in formal education settings participate in academic activities in the occupational role of student. Therefore, occupational therapists can and should address issues which limit a student's ability to find success in the academic world. Writing is an important academic skill and is identified as one of the Texas Essential Knowledge Skills for Kindergarten (Texas Education Agency, 2017). Additionally, the Occupational Therapy Scope of Practice (American Occupational Therapy Association, 2021) recognizes that occupational therapists are tasked with identifying methods to establish or remediate skills that have not yet been developed as well as create interventions that promote performance in the development of physical and neuromuscular skills.

Information from this project will be used to inform future fine motor intervention strategies for occupational therapy in the school-based setting serving students with and without identified disabilities.

## METHODS

### Setting

- Preston Smith Elementary School, Lubbock, Texas

### Participants

- Six elementary students- Three first grade and three second grade students
- Participants seen in small groups of three students per group
- Regular Education students
- Identified by teacher as at-risk for delay in academic progress
- Poor fine motor skills and handwriting legibility

### Instrument

- Test of Handwriting Skills- Revised (THS-R, Milone, 2007) measures how a student writes letters in manuscript or cursive from memory, by copying and from dictation as well as numbers, words and sentences. Specifically, the test measures:
  - Legibility (formation, sizing)
  - Speed of writing
  - Letter reversals
  - Case substitutions

### Data Collection

- THS-R administered before participation in the fine motor intervention program and percentile rank was recorded.
- Students participated in four, 15-minute fine motor intervention sessions. Each session focused on a different foundational fine motor component for handwriting including hand strength, bilateral coordination, in-hand manipulation/dexterity and pencil grasp and pre-writing strokes.

THS-R Pre-Intervention Percentile Rank

Student 1	Student 2	Student 3	Student 4	Student 5	Student 6
18	61	32	42	37	19

Figure 1

### Data Analysis

- Raw scores converted to standard scores and percentile rank using THS-R manual.
- Pre and post intervention standard scores and percentile rank were compared to determine clinically significant change

## RESULTS

- All post intervention scores were higher than pre-intervention program scores.

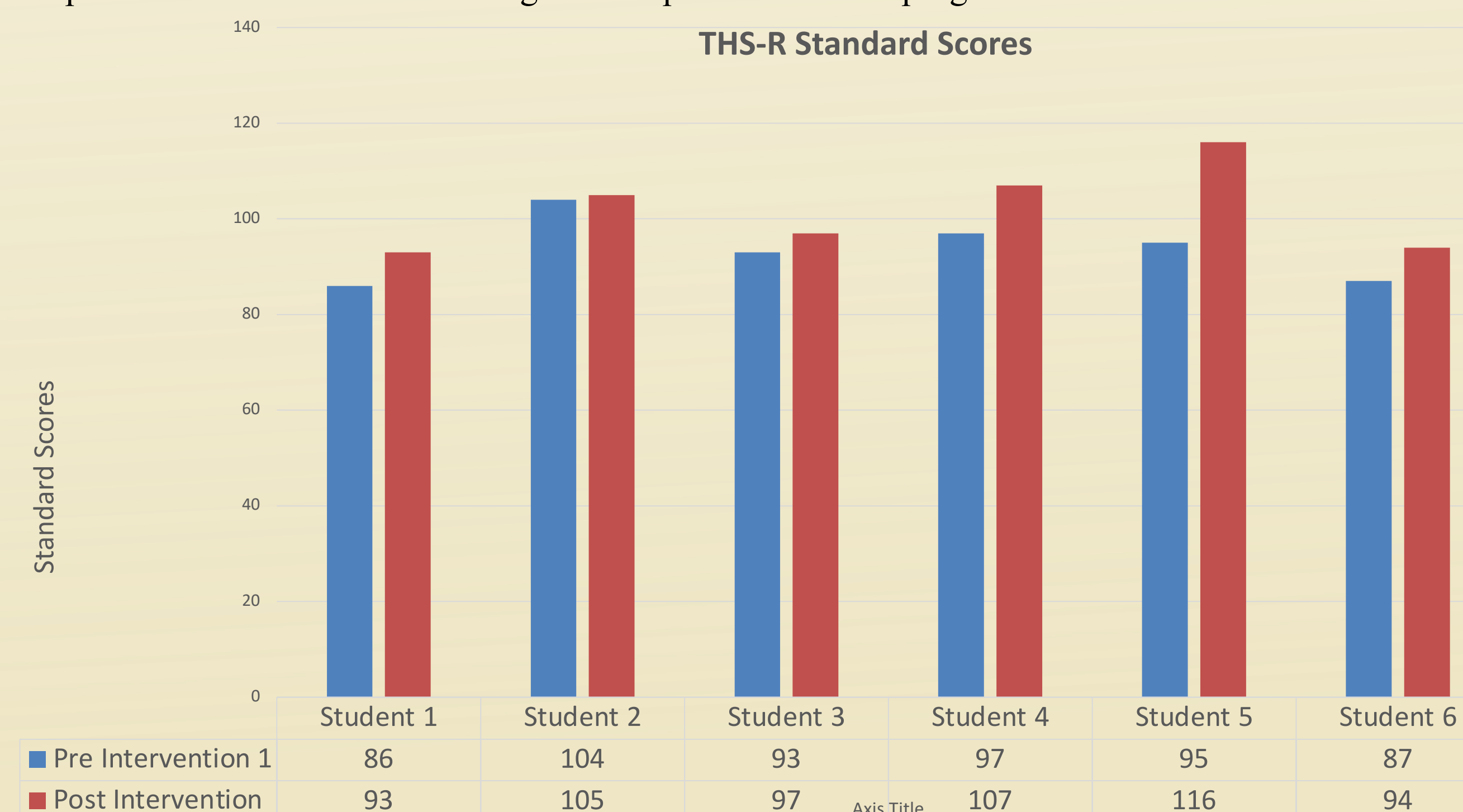


Figure 2

- Post intervention program standard scores were higher than pre-intervention scores
- Standard scores improved 5.8 points overall **Figure 2**

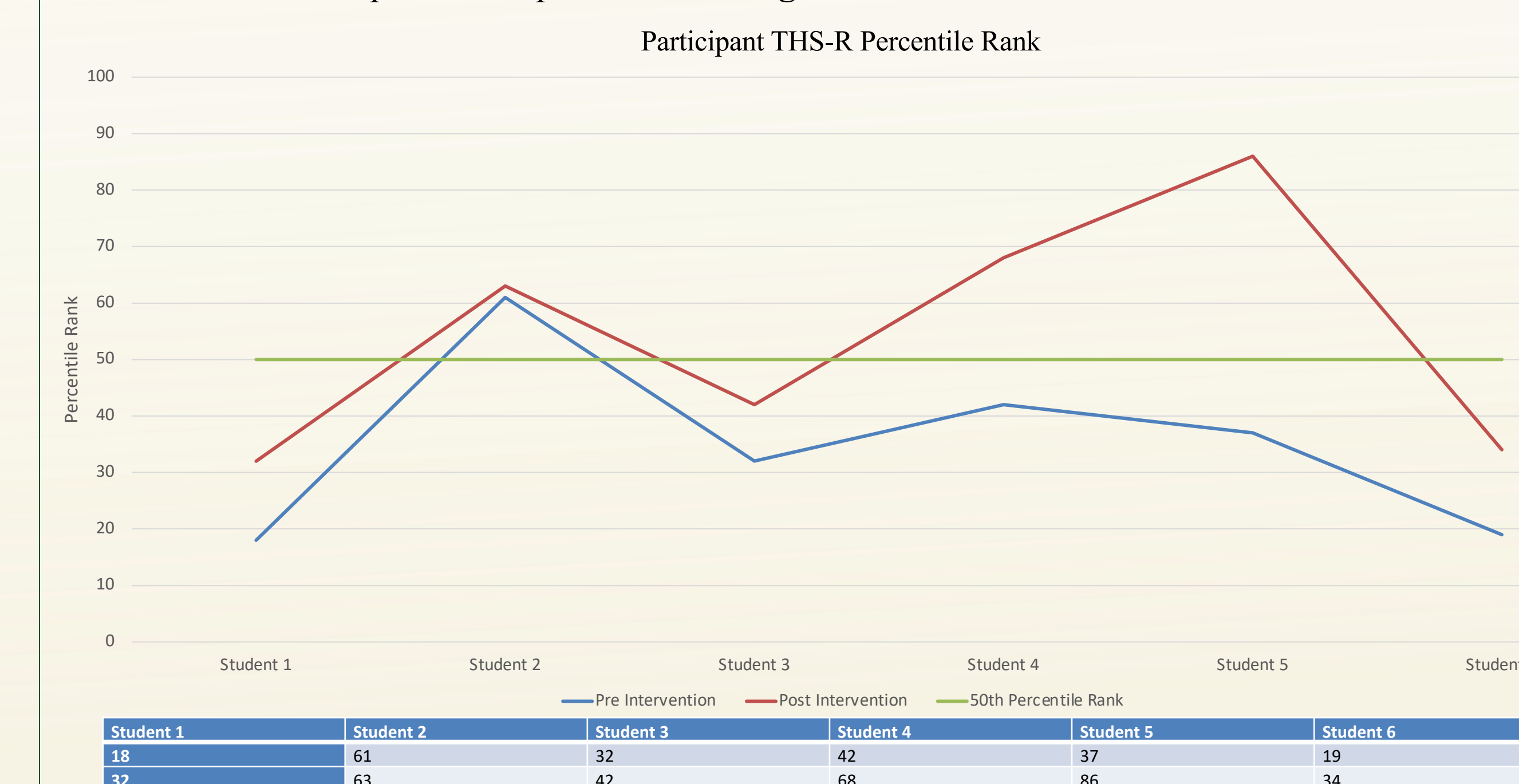


Figure 3

- All participant percentile rank scores were higher after participation in the fine motor intervention program
- Three participants finished above the 50<sup>th</sup> percentile rank **Figure 3**
- THS-R scores show a positive relationship between participation in a fine motor intervention program and improved handwriting legibility.
- Clinically significant change demonstrated as all student scores went up after participation in the program, general visual assessment of student work shows improvement, and students demonstrate more confidence in their written work

## LIMITATIONS

The number of fine motor sessions was limited to four sessions due to the time constraints of the project and may have been too small to determine a true relationship between improved fine motor skills and improved handwriting legibility. Also, the small number of total participants, all from the same school, may have demonstrated a trend that may not otherwise exist in a more diverse student population. The THS-R does not exclusively measure handwriting legibility so an improvement in fine motor skills may not be reflected in overall score changes. The results of this study only suggest that an improvement in fine motor skills has a positive relationship with handwriting legibility but does not necessarily mean that academic performance will also improve.

## SUMMARY

Results of this study support participation in fine motor intervention programs to help improve handwriting legibility among students identified as at-risk for delay by teachers. Improving fine motor skills that are foundational components of good handwriting legibility can have a positive impact on overall academic performance and reduce the negative impact of Covid-19 among elementary students. Occupational therapists identifying and incorporating methods to develop fine motor skills that improve academic performance supports children in their occupational role as student.

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