Improved Fine Motor Skills and School Readiness in Pre-Kindergarteners After Summer Treatment Program
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Background and Aims

- Early motor skills can have cascading effects on academic performance. 1-3
- Fine motor manipulation and writing skills in preschool are predictive of reading and math achievement on standardized tests in second grade 2, as well as reading and math outcomes in 5th grade. 3
- Early school readiness interventions that provide an important role for the development of fine motor skills may be beneficial for children’s academic achievement.

Aims: 1) Assess the effect of an early intervention on fine motor skills and school readiness, and 2) Assess the relationship between fine motor skills and school readiness after intervention.

Methods

Participants: 51 children (38 male) aged 4 – 5 years. Sample was drawn from a low income community. 87% were African American, 83% had a diagnosis or disability (e.g., ADHD, Conduct Problems).

STP-PreK: 7 week school readiness intervention focused on improving academic and behavioral outcomes. Included a writing intervention “Handwriting Without Tears®”, which targeted emerging writing skills using multisensory learning (e.g., tracing, sing-alongs, play-doh letter construction, “Wet-Dry-Try” method).

School Readiness: assessed via the Bracken School Readiness Assessment 3rd Edition (BSRA-3).

Fine Motor Skills: fine motor manipulation skills (FM) and fine motor writing skills (FW) assessed using the Learning Accomplishment Profile-Diagnostic Edition (LAP-D).

BSRA-3 and LAP-D FM and FW were measured at pre- and post-STP-PreK participation.

Analyses: Paired samples t-tests were conducted to identify pre- and post-STP-PreK differences on the BSRA-3 (Figure 1) and the LAP-D FM and FW subscales (Figure 2). Regression analyses were conducted to assess the relationship between school readiness and fine motor skills post-STP-PreK, controlling for age (Table 1 & 2). Multiple imputation was used for missing data.

Results and Discussion

Fig. 3. BSRA scores pre-/post-intervention.

$ t(50) = -6.12, p < .001, d = .86$

Table 1. Hierarchical regression using age at post, post FW and post FM on post BSRA scores.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$R^2$</th>
<th>$R^2$ change</th>
</tr>
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<tbody>
<tr>
<td>Age at post</td>
<td>.010</td>
<td>-</td>
</tr>
<tr>
<td>Post FW</td>
<td>.499</td>
<td>.489*</td>
</tr>
<tr>
<td>Post FM</td>
<td>.535</td>
<td>.036</td>
</tr>
<tr>
<td>Final Model</td>
<td>F(3,47) = 18.36*</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$

Table 2. Standardized betas for age at post, post FW and post FM on post BSRA scores.

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at post</td>
<td>.089</td>
<td>-.325*</td>
</tr>
<tr>
<td>Post FW</td>
<td>-.359*</td>
<td>-.739*</td>
</tr>
<tr>
<td>Post FM</td>
<td>-.325*</td>
<td>.617*</td>
</tr>
</tbody>
</table>

Fig. 4. FM and FW scores pre-/post-intervention.

FW-subscale, $t(50) = -3.16, p = .002, d = .51$

FM-subscale, $t(50) = -3.50, p = .001, d = .65$

Take-Home Points:

✓ School readiness and fine motor skills improve after the 7 week STP-PreK intervention.
✓ Writing significantly predicted school readiness scores after STP-PreK participation.
✓ Fine motor manipulation did not significantly predict school readiness scores after STP-PreK participation.
✓ Future directions: quantify individual differences in potential exposure to writing activities during STP-PreK.

References and Acknowledgements

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