

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



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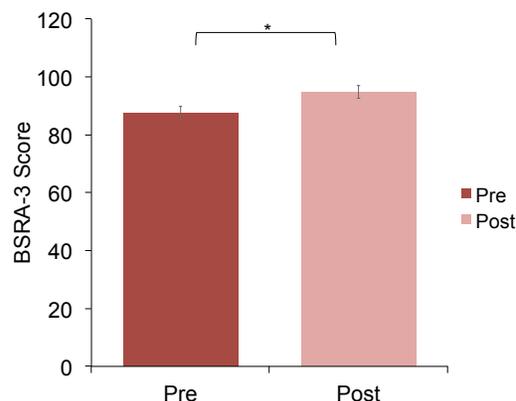
## Background and Aims

- Early motor skills can have cascading effects on academic performance.<sup>1-3</sup>
- Fine motor manipulation and writing skills in preschool are predictive of reading and math achievement on standardized tests in second grade<sup>2</sup>, as well as reading and math outcomes in 5th grade.<sup>3</sup>
- 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.

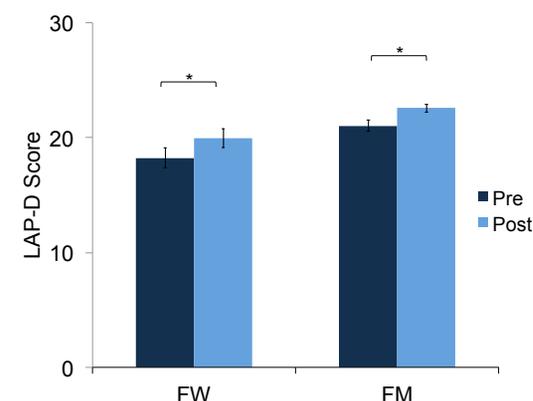
## Methods

- **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<sup>4,5</sup>:** 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-3 scores pre-/post-intervention.**  
 $t(50) = -6.12, p < .001, d = .86$



**Fig. 4. FM and FW scores pre-/post-intervention.**  
FW-subscale,  $t(50) = -3.16, p = .002, d = .51$   
FM-subscale,  $t(50) = -3.50, p = .001, d = .65$

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

Predictor	R <sup>2</sup>	R <sup>2</sup> change
Age at post	.010	-
Post FW	.499	.489*
Post FM	.535	.036
Final Model	F(3,47) = 18.36*	

\*  $p < .05$

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

	Step 1	Step 2	Step 3
	$\beta$	$\beta$	$\beta$
Age at post	-.089	-.325*	-.359*
Post FW	-	.739*	.617*
Post FM	-	-	.228

\*  $p < .05$

### 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

- <sup>1</sup> Bornstein et al., (2013), DOI: 10.1177/0956797613479974
- <sup>2</sup> Dinehart & Manfra (2013), DOI: 10.1080/10409289.2011.636729
- <sup>3</sup> Grissmer et al., (2010), DOI: 10.1037/a0020104
- <sup>4</sup> Graziano & Hart (2016), DOI: 10.1016/j.jsp.2016.07.004
- <sup>5</sup> Hart et al., (2016), DOI: 10.1177/1053815116645923

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