



Preliminary Effects of the Arrowsmith Intensive Program on Student Cognitive Functioning

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Introduction

Background.

- Children with neurodevelopmental disorders often experience learning challenges, with underlying weaknesses in cognitive processes (Spratt et al., 2012)
- Designing effective interventions to enhance cognition has proven one of the most promising yet difficult challenges for neuropsychologists (Cioni et al., 2016)

Arrowsmith Program.

- Novel training program that targets multiple cognitive domains
- Students receive an intervention on a single task which is involved in understanding the relationships among two or more ideas or concepts and designed to strengthen the integration of information

Objective.

- To examine the cognitive outcomes associated with the participation on Arrowsmith cognitive intensive program (CIP)

Method

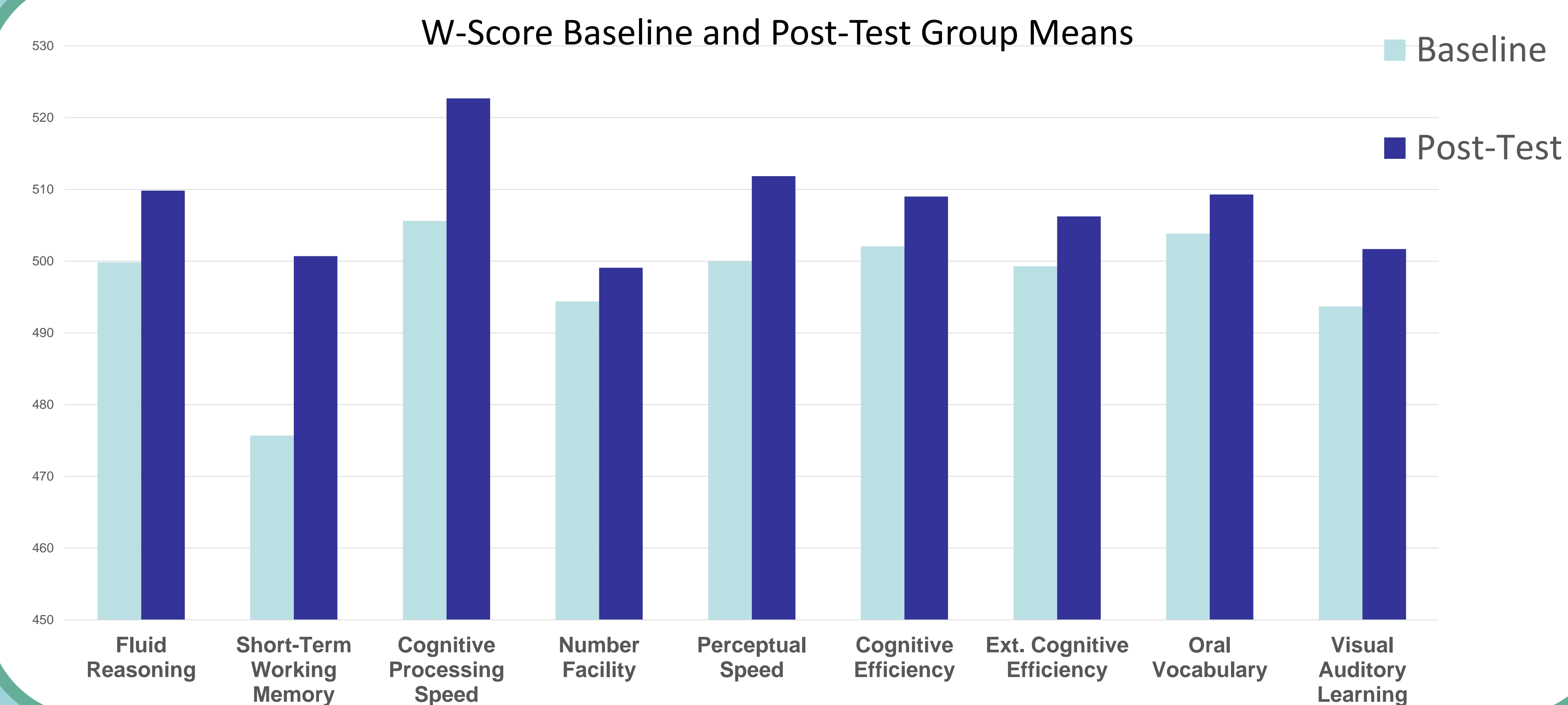
Participants and Intervention.

- 13 students ranging in age from 9-16 (M = 12.91 years; SD = 2.06), Mean IQ = 93.53 (SD = 21.68)
- Pre-intervention data was gathered within one week of the beginning of the training and post-intervention data was obtained immediately after the training was completed
- The intervention consisted of a 6-week period of intensive practice of the Arrowsmith Symbol Relations Task which is a computer-based exercise requires the student to use relational reasoning to conceptually and automatically process increasingly complex relationships using an analog clock

Measures.

- Woodcock-Johnson IV Test of Cognitive Abilities (WJ-IV-COG)
- A repeated-measures MANOVA analysis conducted to evaluate the improvements in several cognitive domains
- W scores were used to track participants' growth over time

Results



- Significant multivariate effect for time (Wilk's $\lambda = 0.09$, $F(9, 4) = 4.21$, $p < 0.001$, $\eta_p^2 = 0.90$)
- Univariate effects for Fluid Reasoning, Cognitive Processing Speed, Perceptual Speed, Ext. Cognitive Efficiency, Oral Vocabulary and Visual Auditory Processing

* $p < .05$; ' $p > .10$

Results of a repeated-measures MANOVA analysis

Subscales	F	Sig.	η_p^2
Fluid Reasoning*	10.16	.008	.459
Short-term Working Memory '	.176	.682	.014
Cognitive Processing Speed*	26.04	.000	.685
Number Facility '	.802	.388	.063
Perceptual Speed*	11.42	.005	.488
Cognitive Efficiency '	2.63	.131	.180
Ext. Cognitive Efficiency*	5.71	.034	.323
Oral Vocabulary*	9.91	.008	.452
Visual Auditory Learning*	7.46	.018	.383

Discussion

Conclusions.

- This exploratory study considered the potential benefits of a novel approach to cognitive interventions
- This suggests that, overall, students improved after 6 weeks of Cognitive Intensive Program relative to their own baselines
- Further research is warranted to more specifically examine mechanisms of this training program and its clinical utility

Limitations.

- Lack of control group
- Relatively small sample size

Acknowledgments

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References

- Cioni, G., Inguaggiato, E., & Sgandurra, G. (2016). Early intervention in neurodevelopmental disorders: underlying neural mechanisms. *Developmental Medicine & Child Neurology*, 58, 61-66.
- Spratt, E. G., Friedenberg, S. L., Swenson, C. C., LaRosa, A., De Bellis, M. D., Macias, M. M., ... & Brady, K. T. (2012). The effects of early neglect on cognitive, language, and behavioral functioning in childhood. *Psychology (Irvine, Calif.)*, 3(2), 175.