

Neuropsychological Assessment Outcomes following Cognitive Rehabilitation Training for Children and Adults with Traumatic Brain Injury

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INTRODUCTION

Background. Cognitive struggles often persist beyond the TBI recovery period. Deficits typically involve memory, processing speed, and reasoning skills. LearningRx is a clinician-delivered cognitive rehabilitation training program that targets multiple cognitive skills through repeated engagement in game-like but rigorous mental tasks in 90 minute training sessions at least 3 days per week. The current study examined neuropsychological and functional outcomes following 95 hours of LearningRx training with 329 clients post-TBI.



Research Problem We have reported improvements in cognition and/or neural connectivity in multiple studies on LearningRx cognitive training programs^{1,2,3,4,5} but no studies using LearningRx for Traumatic Brain Injury (TBI) have examined differences in quantitative and qualitative outcomes between children and adults.

METHODS

Using a quasi-experimental design, we examined changes in IQ score, individual cognitive skills, and everyday functioning following 95 hours of cognitive training for 329 clients with Traumatic Brain Injury.

The intervention included more than 100 exercises that target working memory, long-term memory, processing speed, attention, visual processing, auditory processing, and reasoning skills delivered one-on-one by a clinician.

Training intensity was tightly controlled by the clinician using a metronome, timer, and deliberate distractions to "load" the participant with several simultaneous tasks. A metronome added to the intensity and ensured that mental breaks were minimized.

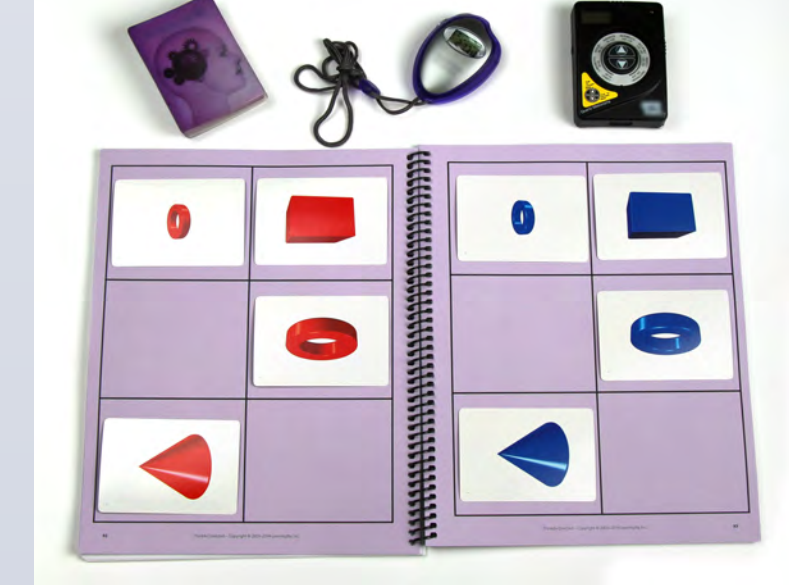
Clients attended three 90-minute training sessions per week for an average of 95 hours over 6-9 months.

Assessments included the Woodcock Johnson Tests of Cognitive Abilities and the LearningRx Client Survey

Example of a visual processing training task



Example of a working memory training task



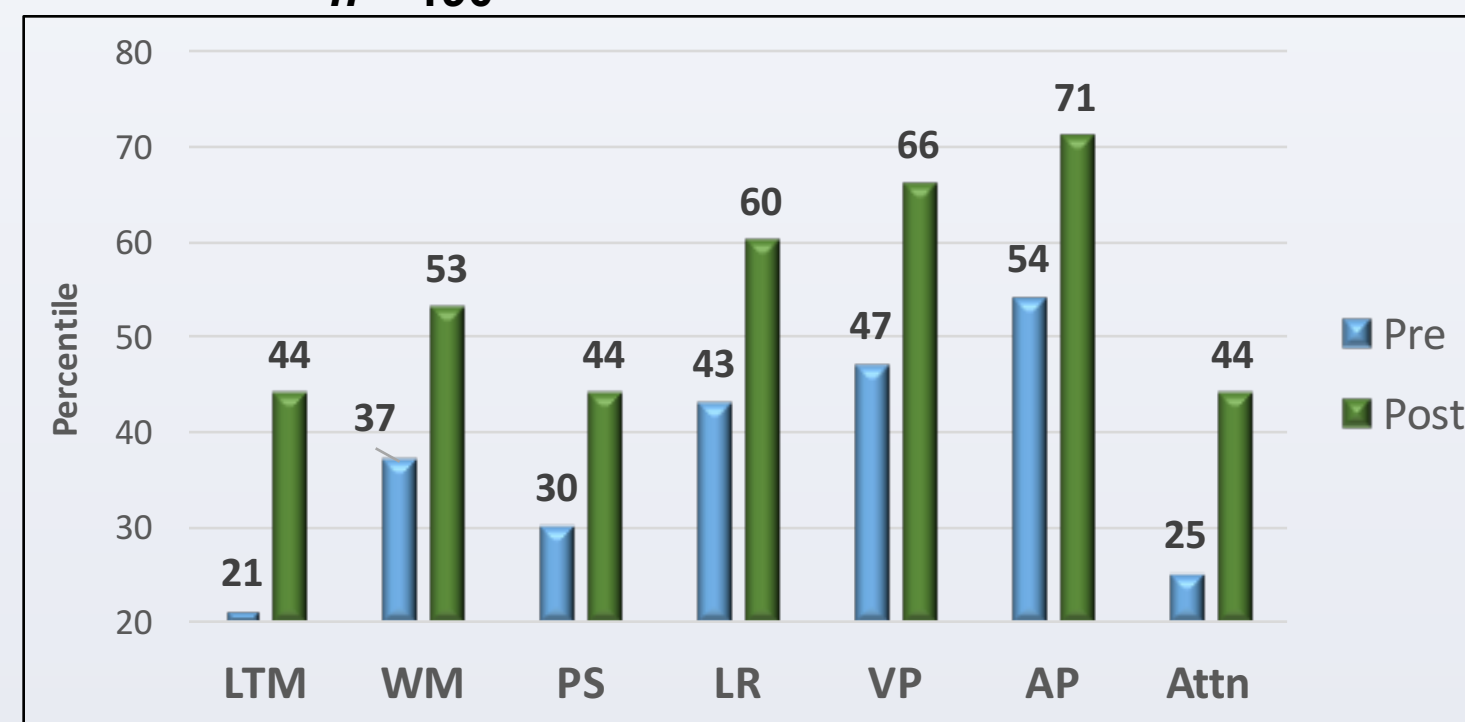
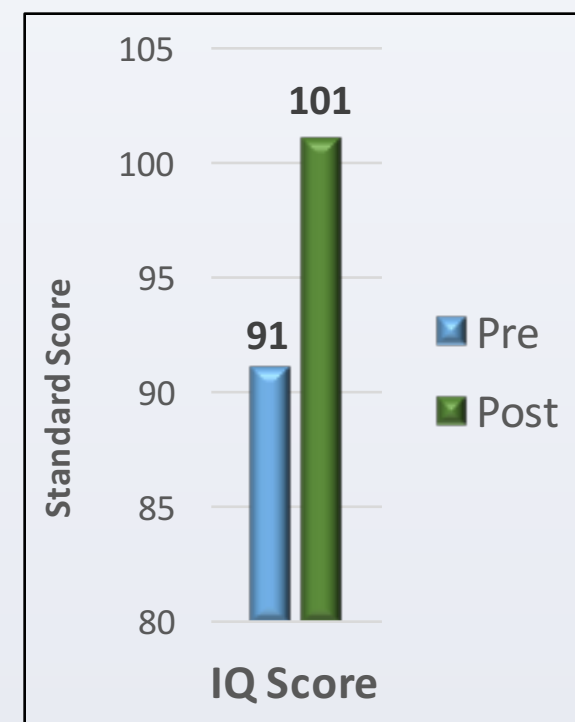
SAMPLE

- Nationwide sample from 42 LearningRx clinics in 27 states
- n = 329 clients at least 3 months post-TBI (mild to moderate)
- Ages 6-87, Mean = 26.4
- 39% Female / 61% Male

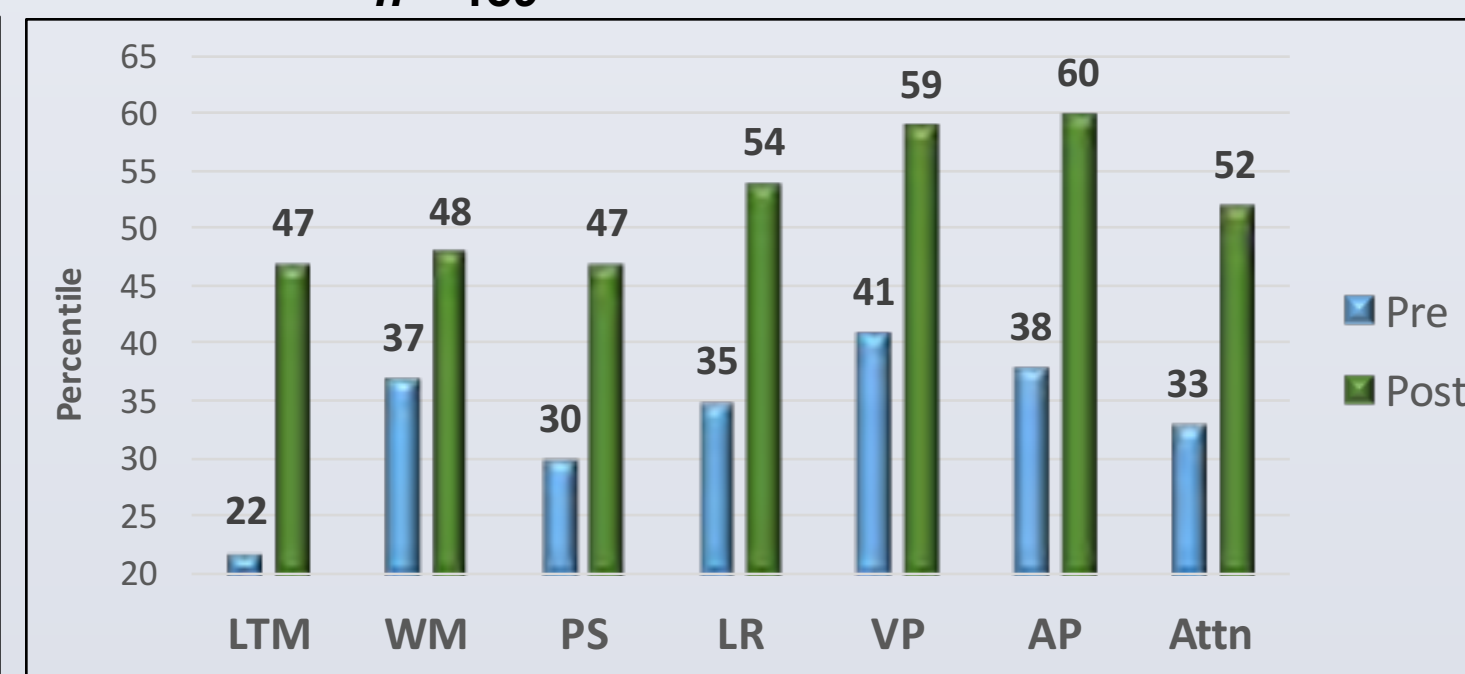
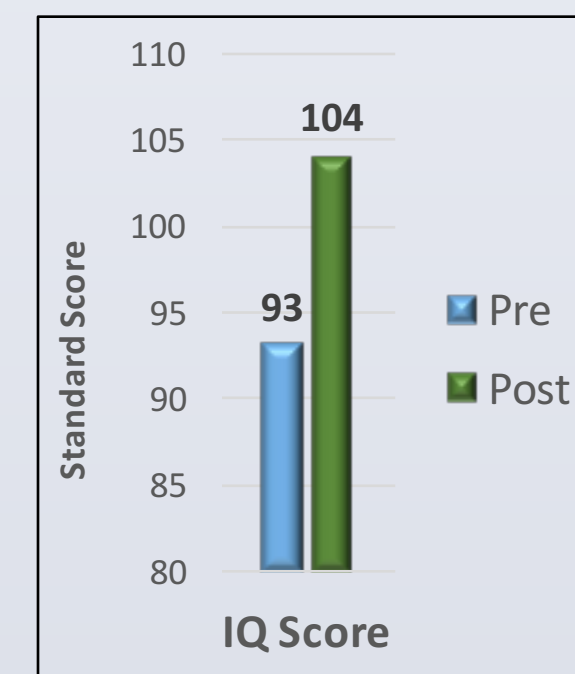
Age	n	%
6-12	70	21.3
13-17	69	21.0
18-29	87	26.4
30-55	77	23.4
56+	26	7.9

NEUROPSYCHOLOGICAL TESTING RESULTS

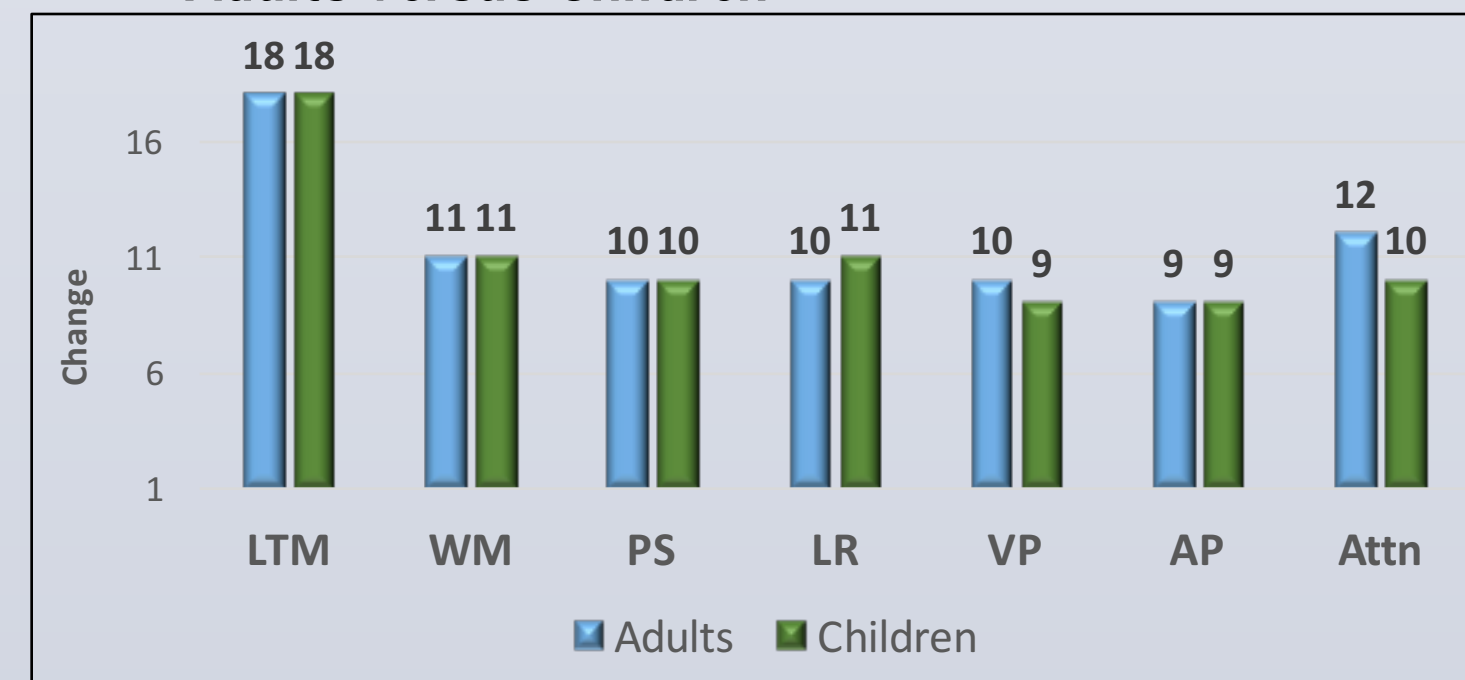
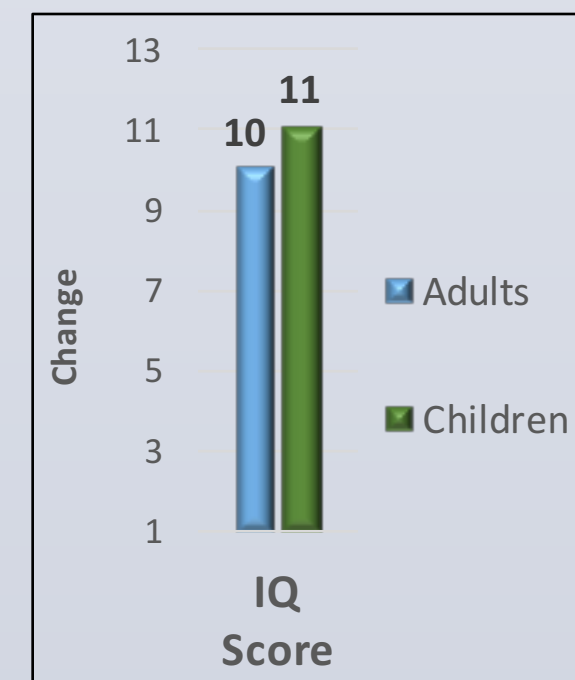
ADULTS (Ages 18+) n = 190



CHILDREN (Ages 6-17) n = 139



Difference in Standard Score Change* Adults versus Children



*MANOVA revealed no statistically significant differences between children and adults on any of the outcome variables (all p values > .05).

LTM = long-term memory, WM = working memory, PS = processing speed, LR = logic & reasoning, VP = visual processing, AP = auditory processing, Attn = sustained attention

TRANSFER TO REAL LIFE CHANGES

ADULTS

- Improved work performance: Writing, organizational skills, productivity
- Greater self-discipline, diligence, & coping skills when challenged
- Increased confidence, positive outlook, hope, & optimism
- Better driving ability
- Improved focus, attention, memory, & processing speed
- Improved social skills

CHILDREN

- Improved academic performance: Reading, comprehension, writing, math, social studies, & homework skills
- Greater self-discipline, organization, initiative, & decision-making skills
- Increased confidence, optimism, self-esteem, & positive outlook
- Improved focus, attention, memory, & processing speed

CONCLUSIONS

- Improvement of **cognitive skills** was achieved with LearningRx cognitive rehabilitation training for children and adults recovering from mild to moderate TBI.
- Transfer to **functional outcomes** was achieved with LearningRx cognitive rehabilitation training for children and adults recovering from mild to moderate TBI.

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