

# Effect of One Season of Tackle Football on Young Athletes' Cognitive Function:

## A Novel Use of NIH Toolbox Cognition Battery

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### Background

- 1.1 million to 1.9 million US youth 5 to 18 years old sustain sports- and recreation-related concussions each year
- Recent media attention on negative effects of concussion has led to much effort and attention on reducing concussion rates in football<sup>1,2</sup>
- Many have theorized long-term effects from accumulation of subconcussive blows even in absence of concussion<sup>3</sup>



### Purpose

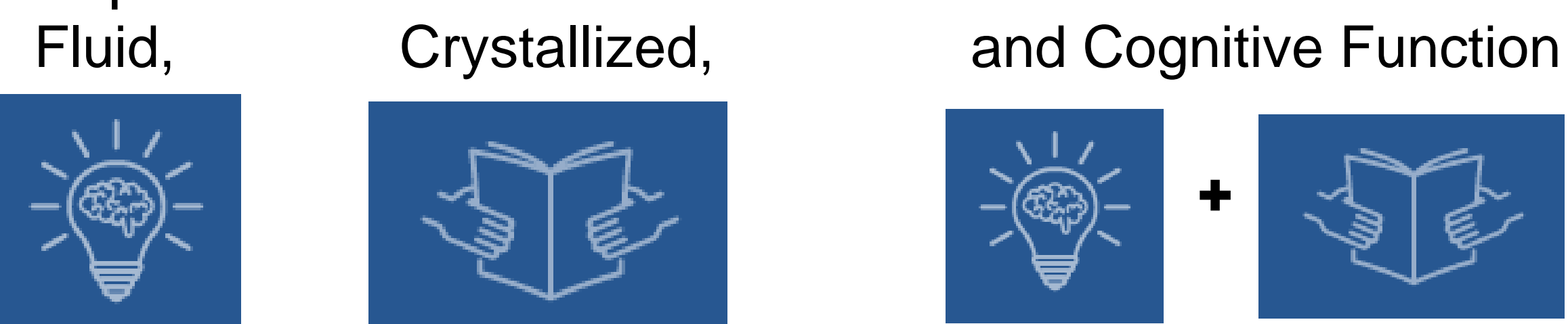
- Novel application of the NIH Toolbox Cognition Battery on youth football players in a community setting
- Evaluate the effects of a season of football on cognitive function in children and adolescents



*Hypothesis: No negative impact on cognitive function from a season of football*

### Methods

- 7-14 year old English-speaking male youth football players from community football league invited to participate
- Testing at beginning and end of 2018 football season (12 weeks)
- 44 completed pre- and post-season testing; 40 with complete demographic information
- Age-Adjusted and Fully-Adjusted Composite Scores Computed:



- Paired T-Tests (p=0.05) between pre- and post-season scores

### Results

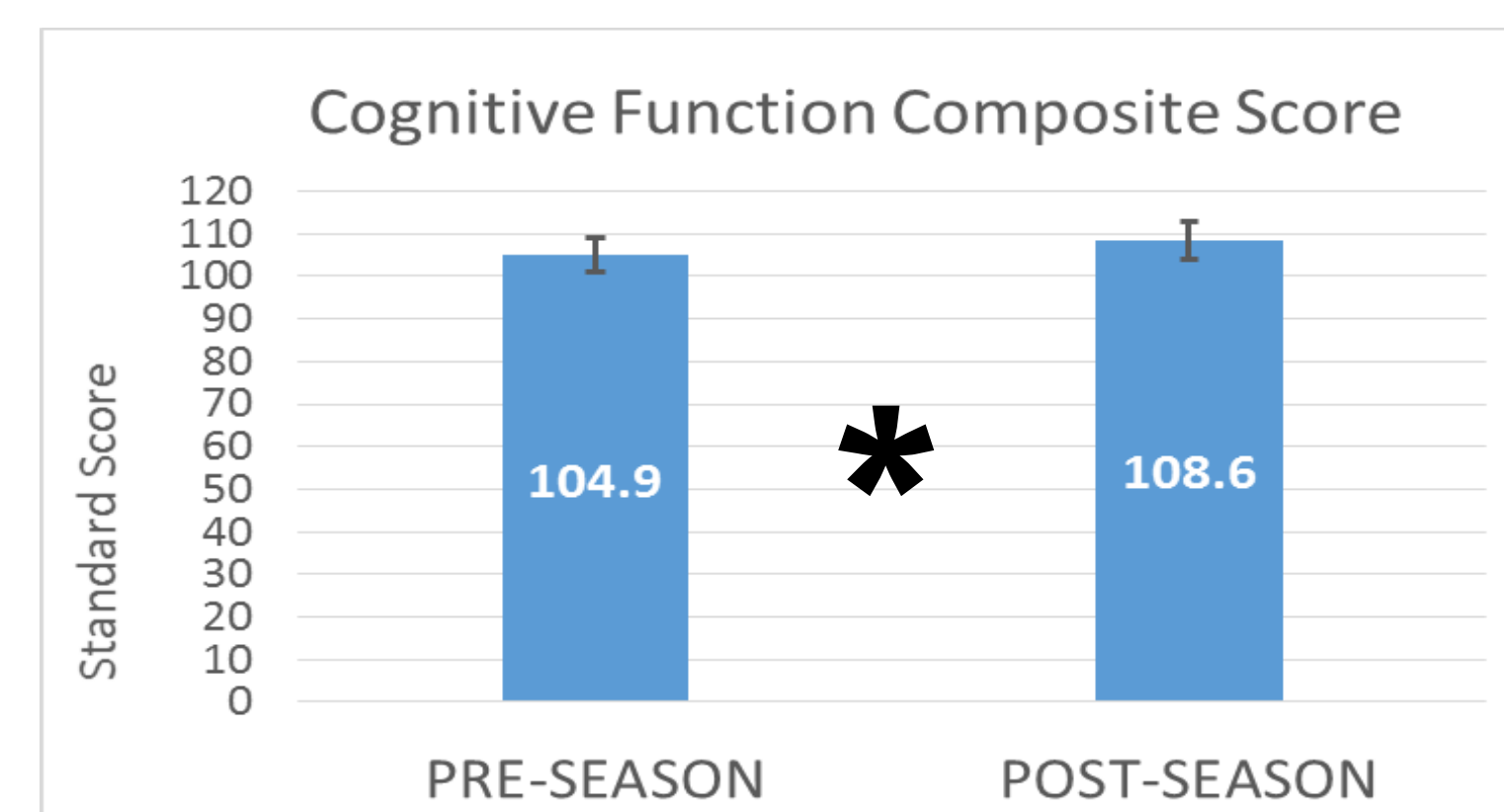
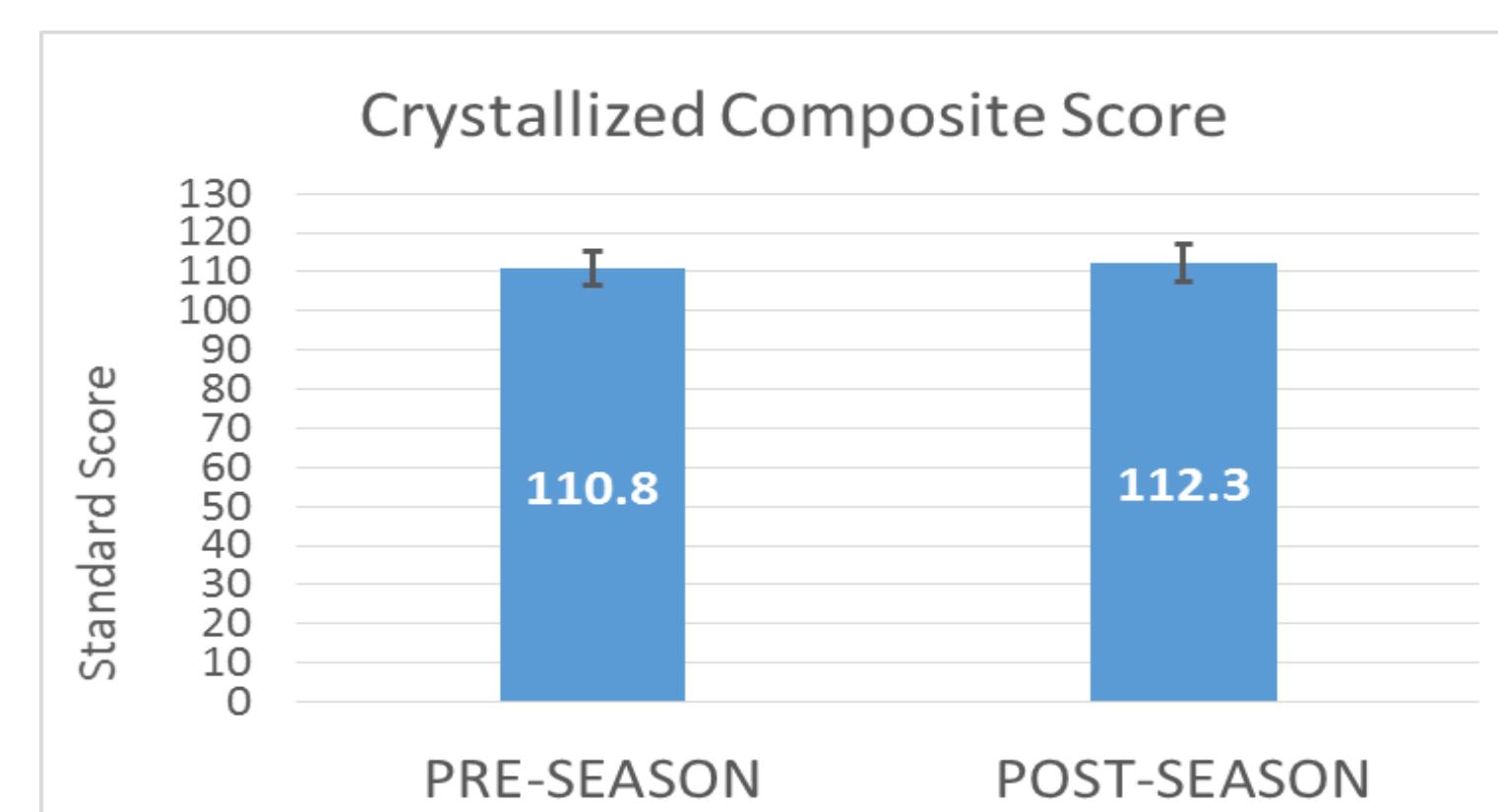
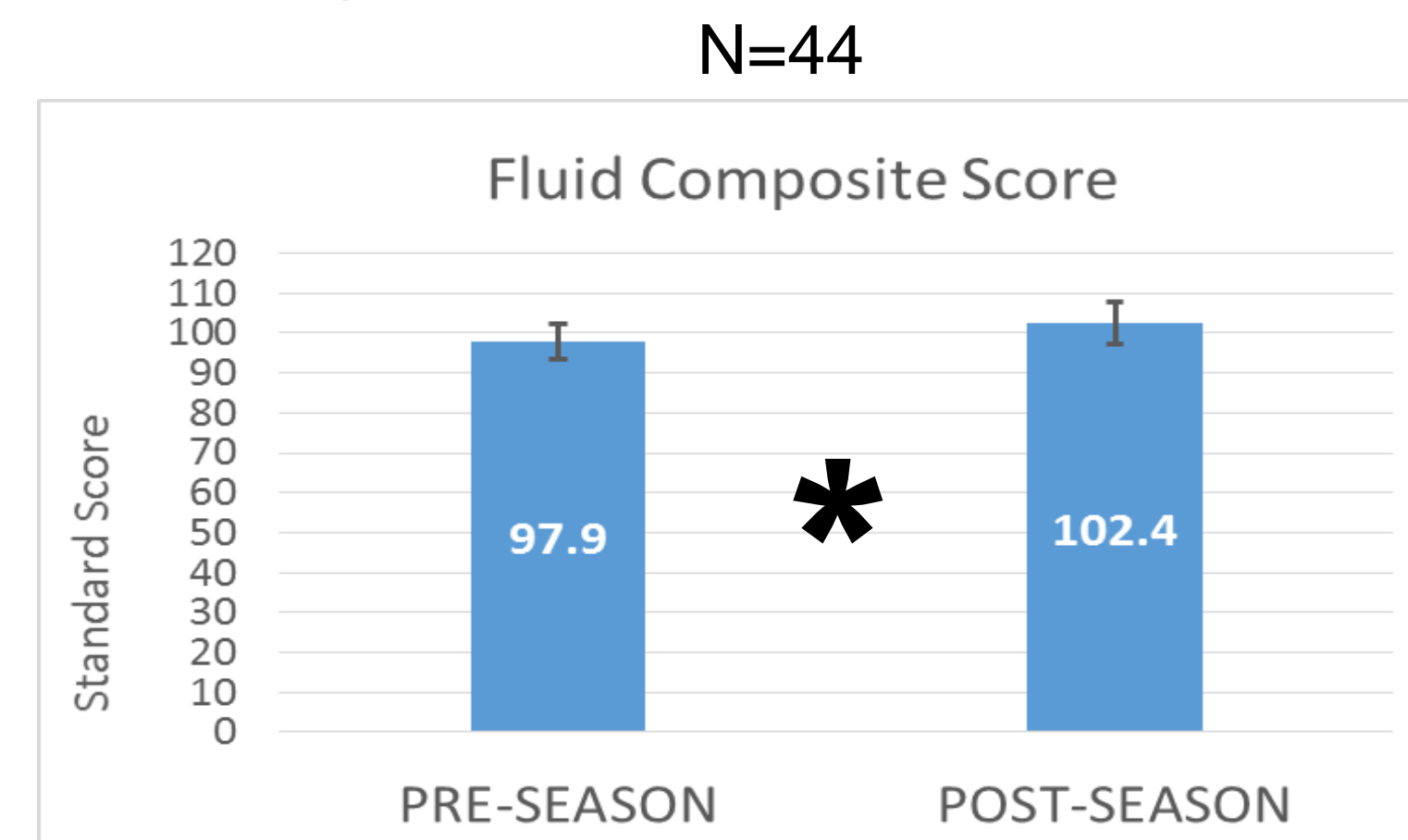
#### Subject Characteristics

Age: median (range)	11 (7-14)
Gender, N (%)	
Female	0 (0)
Male	40 (100)
Self-reported Ethnicity, N (%)	
Hispanic or Latino	6 (15)
Not Hispanic or Latino	32 (85)
Self-reported Race, N (%)	
White	26 (65)
Black or African American	4 (10)
Asian	2 (5)
American Indian or Alaska Native	0 (0)
Native Hawaiian or Other Pacific Islanders	0 (0)
Other including multiple races	8 (20)

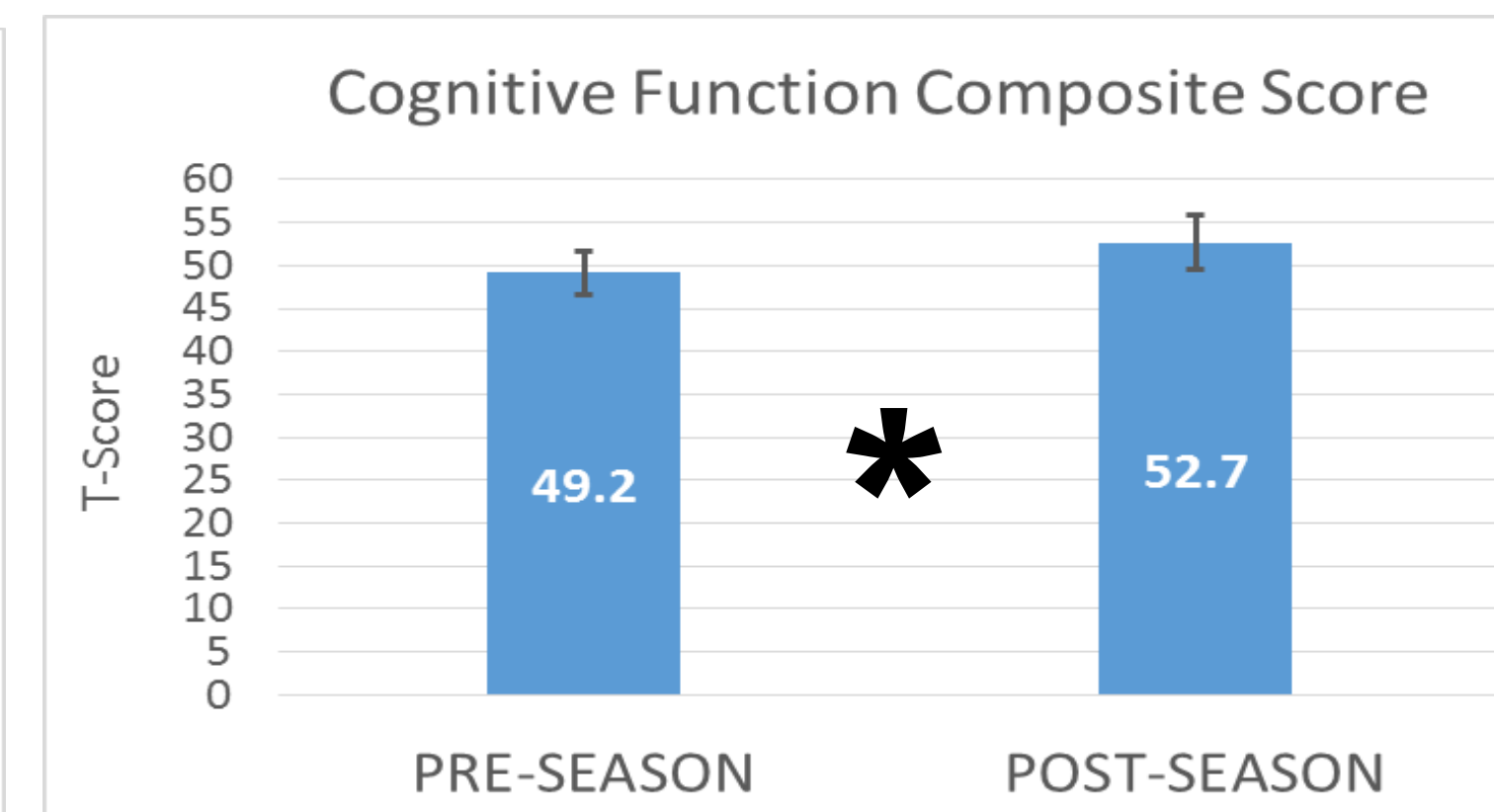
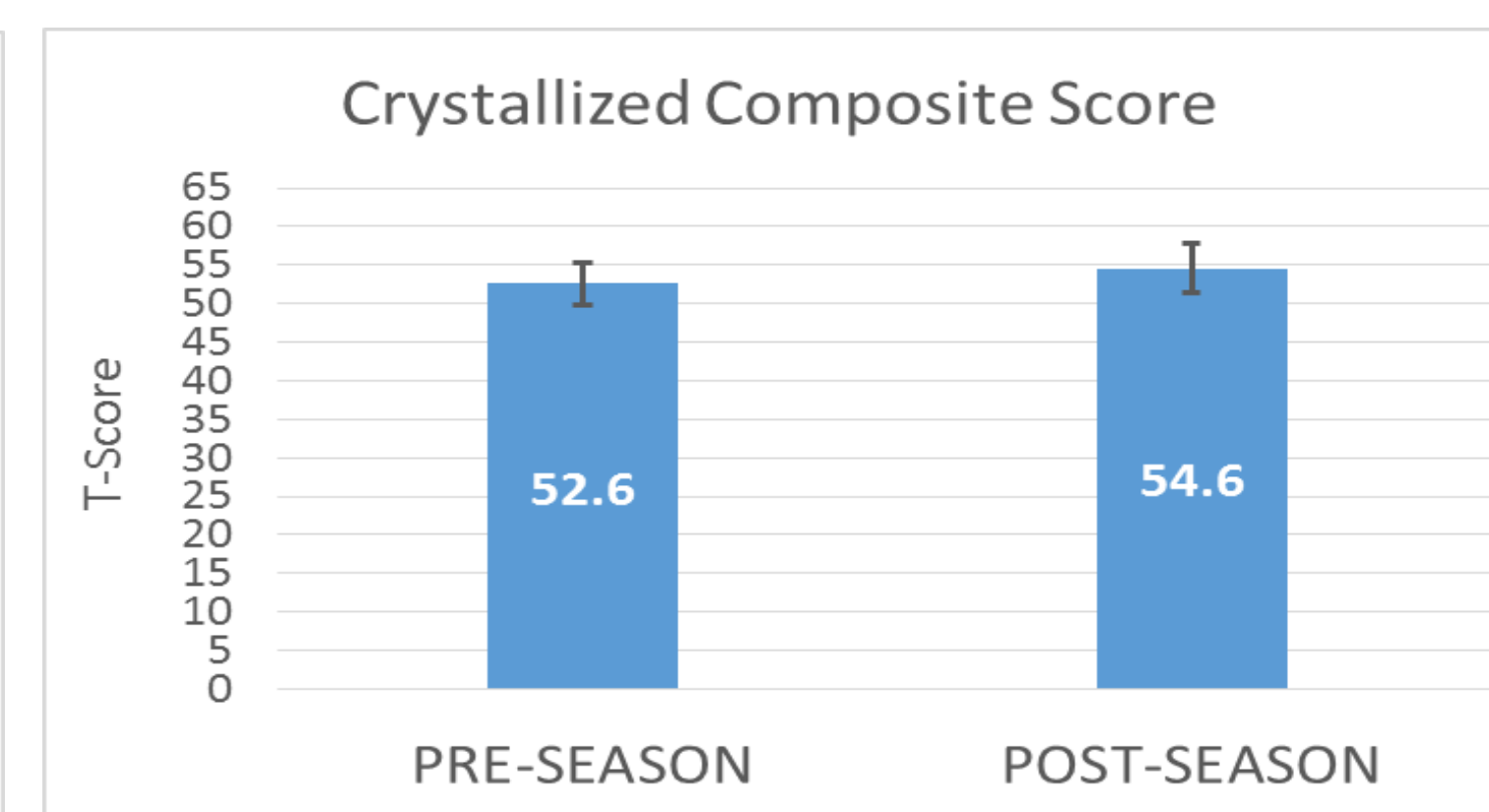
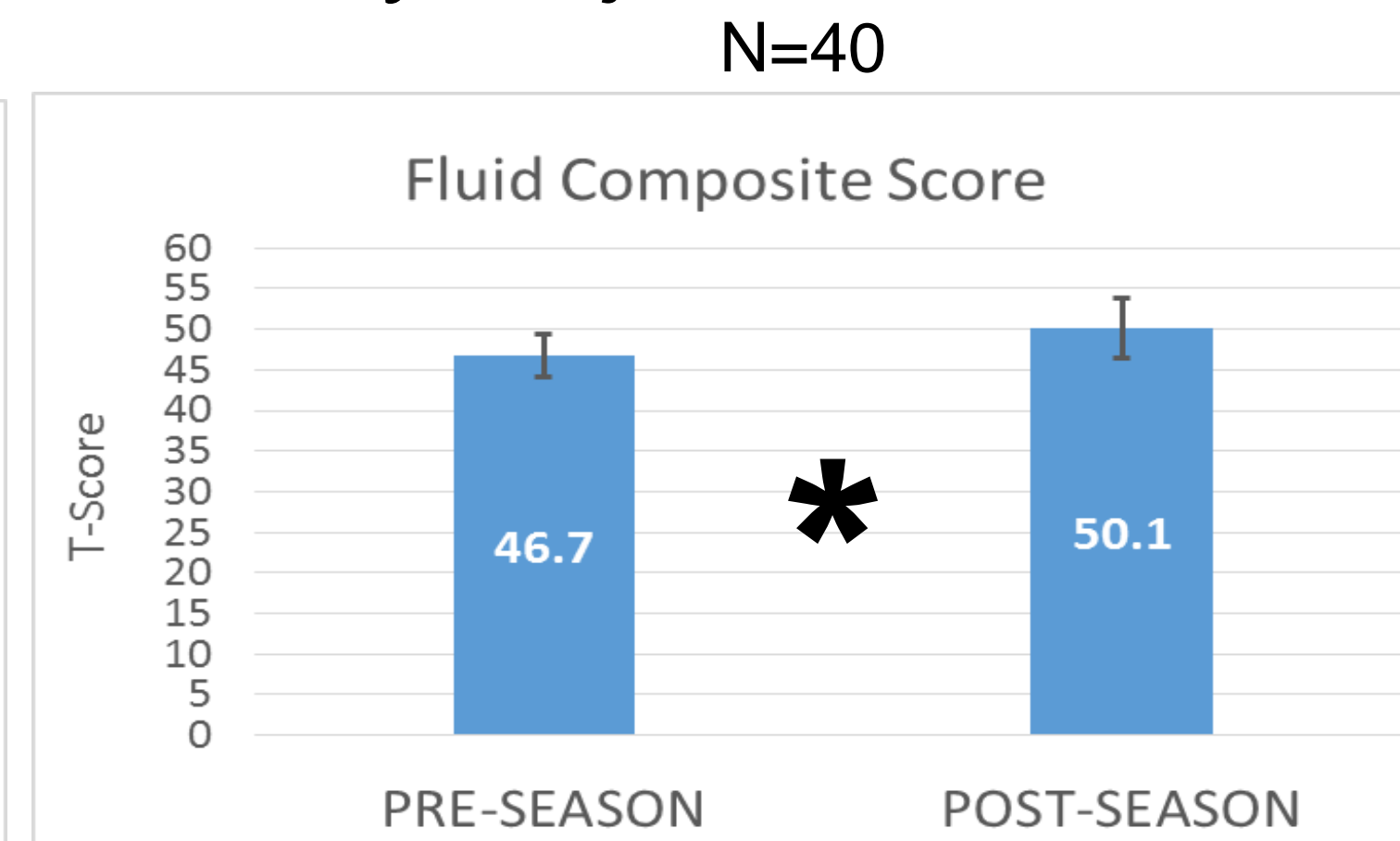


- No head injuries were sustained during the season

#### Age-Adjusted Scores



#### Fully-Adjusted Scores



#### Summary:

- No significant decreases in fluid, crystallized, or overall cognitive function composite scores
- Significant increases in fluid and overall cognitive function composite scores
- No significant increases in crystallized composite scores

### Discussion

- NIH Toolbox Cognition Battery successful in community setting
- Practice effects expected with repeated measures
- No evidence of cognitive impairment after season of play
- Extensive literature documenting benefits of youth sports participation
  - Teamwork
  - Mental health<sup>4</sup>
  - Physical activity<sup>1</sup>

### Limitations

- Lack of control group
- Noisy testing environment
- Forces of impact not measured
- No reported concussions

### Future Directions

- Control group
- Longitudinal follow-up
- Bigger, more inclusive cohort including athletes with documented concussions

### Acknowledgements



- Northside Youth Football participants and their families and director Mike Lohman
- Orthopaedics and Sports Medicine Research Group members, past & present

### References

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