RISE RESEARCH INNOVATION SCHOLARSHIP ENTREPRENEURSHIP

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The Relationship Between Fitness and Cognition in Young Adults with ADHD

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Background, Motivation, and Goals

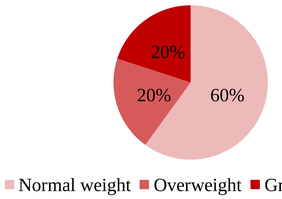
- Untreated ADHD can lead to negative outcomes, with many not responding to or tolerating medication
- ADHD symptoms are associated with decreased fitness in young adults
- Therefore, we investigated how physiological fitness markers correlate with ADHD symptoms in young adults

Process and Methods

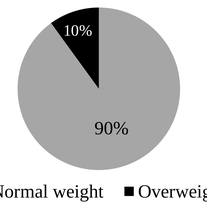
Young Adult Fitness Dataset

- ADHD participants were matched with typically developing participants based on sex, age, and years of education

ADHD BMI



TD BMI



Demographics	ADHD (N = 10)	TD (N = 10)
Sex (M/F)	7/3	4/6
Age (years, mean)	20.84	20.89
Average years of education	2.2	2.4
Medication use (Yes/No)	4/6	-/-

Cardiorespiratory Fitness (CRF)

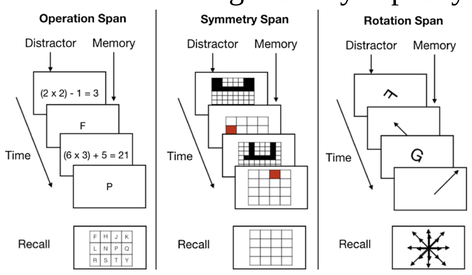
- Quantified through VO_2 max
- VO_2 max: the maximum amount of oxygen available for use during maximal exercise
- VO_2 max is the gold standard measure for CRF

Body Mass Index (BMI)

- An indirect, population-based measurement of body fat

Complex Span Tasks

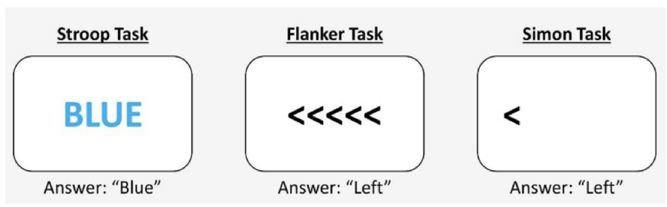
- Measures working memory capacity



Adapted from Burgoyne et al. (2023)

Engle Squared Tasks

- Measures attentional control



Indicate: color
Disregard: meaning

Indicate: central arrow direction
Disregard: flanking arrows

Indicate: arrow direction
Disregard: arrow location

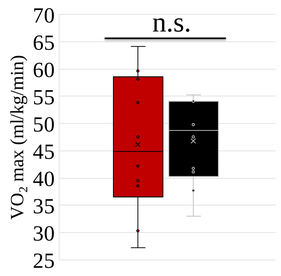
Adapted from Foster et al. (2023)

Statistical Analysis

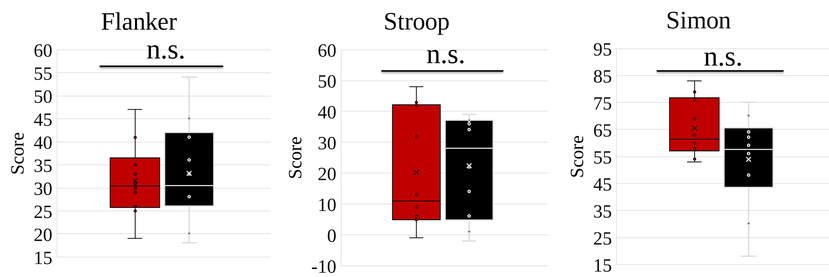
- Independent sample t-tests were performed between groups
- Correlations were performed between BMI and cognitive task scores

Findings and Products

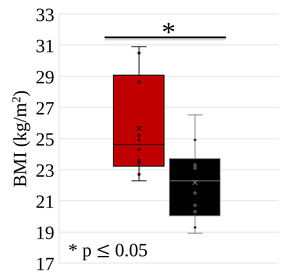
VO_2 max Relative



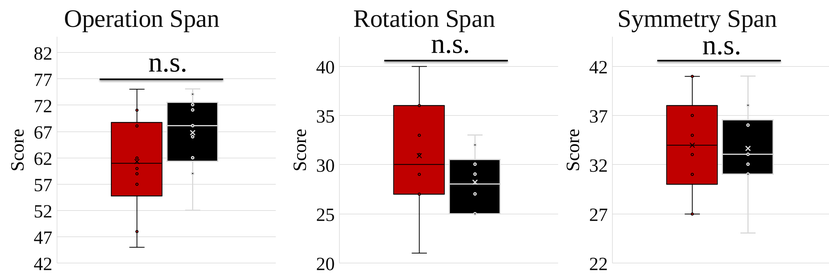
Engle Squared Tasks



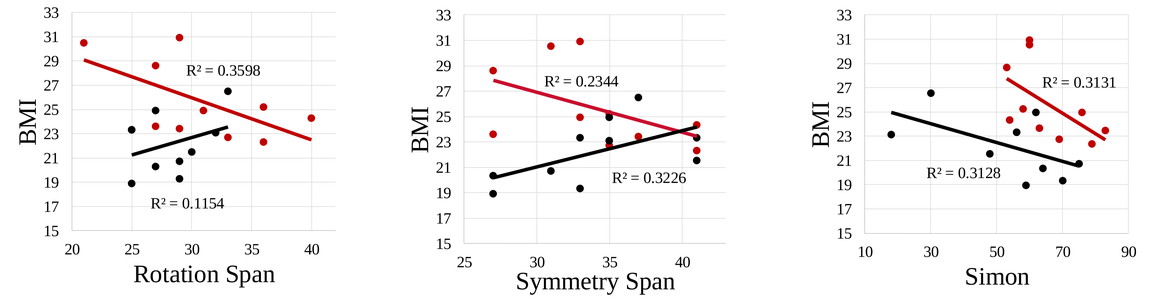
Body Mass Index (BMI)



Complex Span Tasks



Correlations for Body Mass Index (BMI) and Cognitive Tasks



Conclusion and Next Steps

- BMI in the ADHD group was significantly higher compared to BMI in the TD group
- Negative correlation between BMI and cognitive task performance in ADHD
- Executive functions underlying health behaviors may be dysregulated in ADHD
- Interventions targeting BMI may improve cognitive function in ADHD
- Limited by a small Northeastern student sample with self-reported ADHD diagnoses
- Future studies should explore exercise and dietary interventions in a larger, more diverse ADHD sample

Works Cited

Burgoyne, A. P., Tsukahara, J. S., Mashburn, C. A., Pak, R., & Engle, R. W. (2023). Nature and measurement of attention control. *Journal of Experimental Psychology: General*, *152*(8), 2369.

Foster, J. L., Shipstead, Z., Harrison, T. L., Hicks, K. L., Redick, T. S., & Engle, R. W. (2015). Shortened complex span tasks can reliably measure working memory capacity. *Memory & Cognition*, *43*(2), 226-236.