Acute Effects of Exercise in College Students With ADHD

The overall objective of this study is to examine physical exercise as an intervention for ADHD. The rationale for the proposed study is that physical exercise could serve as an effective treatment for college students with ADHD that has low costs, low risks, and ancillary health benefits and may address the limitations of existing treatments. The central hypothesis is that college students with ADHD will exhibit greater degrees of improvement in executive functioning (i.e., sustained attention, working memory) immediately following sprint interval training (SIT), relative to non-ADHD peers. This hypothesis was formulated based on preliminary studies demonstrating reduced ADHD symptoms and improved executive functioning following physical exercise. Multiple 2 (ADHD vs. control) x 2 (male vs. female) x 2 (exercise vs. none) repeated measures ANOVAs will be conducted to compare students with ADHD (n = 24) to controls (n = 24).

The expected outcomes are to confirm this hypothesis and demonstrate the need for further study of physical exercise. If confirmed, the results will provide pilot data for a larger NIH grant proposal aimed at further examining the acute effects of physical exercise (i.e., improved cognitive functioning immediately following exercise) and also the chronic effects of physical exercise (i.e., improved functioning after engaging in regular exercise for an extended period). This outcome is expected to have an important positive impact because physical exercise may serve as an effective treatment for college students with ADHD that is less risky than stimulants, less time-consuming than therapy, and provides ancillary health benefits (i.e., increasing physical fitness, decreasing obesity).
Study Type: Interventional (Clinical Trial)
Estimated Enrollment: 48 participants
Intervention Model: Single Group Assignment
Intervention Model Description: This is a within-subjects design where participants complete outcome measures with and without exercise intervention.
Masking: None (Open Label)
Primary Purpose: Treatment
Official Title: Acute Effects of Exercise in College Students With ADHD
Estimated Study Start Date: September 15, 2018
Estimated Primary Completion Date: May 15, 2019
Estimated Study Completion Date: May 15, 2019

Resource links provided by the National Library of Medicine
MedlinePlus related topics: Exercise and Physical Fitness, Memory
U.S. FDA Resources

Arms and Interventions

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| Experimental: Sprint Interval Training | Behavioral: Sprint Interval Training
Participants will be scheduled for two in-lab experimental appointments: sprint interval training (SIT) and Non-SIT. During the SIT appointment, the researcher will lead the participant through a set of stretches and three minutes of low-intensity cycling on a Schwinn AD2 Airdyne leg-cycling and arm-cranking ergometer to warm up and increase blood flow to active muscles. Participants will then complete 16 minutes of SIT, consisting of eight bouts of 20 seconds of cycling followed by 100 seconds of rest. Participants will complete computer-based tests of sustained attention and working memory during both the SIT (15 minutes following the exercise) and Non-SIT appointments. | Participants will attend two experimental appointments, during which they will complete two identical executive functioning tasks (i.e., sustained attention, working memory). During one appointment, participants will receive the sprint interval training manipulation prior to completing the tasks. |

Outcome Measures

Primary Outcome Measures:

1. Change in Continuous Performance Test (CPT) from appointment 1 to 2 [Time Frame: Completed at each experimental appointment over a period of two weeks]

The CPT is a standardized computer-administered test consisting of brief (250ms) 360 letter presentations on a computer screen. Participants are tasked with pressing the spacebar when any letter, except "X," appears. Participants will complete the CPT as a measure of sustained attention at each
experimental appointment. For the SIT appointment, participants will complete the CPT 15 minutes after exercise termination.

2. Change in Reading Span (Rspan) from appointment 1 to 2 [Time Frame: Completed at each experimental appointment over a period of two weeks]

A reading span task (Rspan; Unsworth et al., 2005) will be used to measure the executive function domain of working memory. This computer-administered task requires participants to read and analyze sentences while remembering a set of unrelated letters. Participants will complete the Rspan working memory task at each experimental appointment. For the SIT appointment, participants will complete the Rspan 15 minutes after exercise termination.

Secondary Outcome Measures:

1. Depression, Anxiety, and Stress Scale-Modified (DASS-M) [Time Frame: Completed the day after each experimental appointment over a period of two weeks]

This scale includes 21 questions to measure current mood and stress levels. Items include a choice of four responses from "Did not apply to me at all," to "Applied to me very much." Participants will receive the survey via text and email the morning after their experimental appointment. They will be instructed to complete the DASS-M regarding their emotional experiences of depression, anxiety, and stress from "yesterday (from the time after your lab appointment until you went to bed)."

2. Barkley Adult ADHD Rating Scale-Modified (BAARS-M) [Time Frame: Completed the day after each experimental appointment over a period of two weeks]

The BAARS includes 18 items that closely follow the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; APA, 2013) criteria for ADHD. Participants will be asked to rate their current behavior over the past 6 months from 0 (Never/Rarely) to 3 (Very Often). Participants will receive the survey via text and email the morning after their experimental appointment. They will be instructed to complete the BAARS-M regarding their ADHD-related behavior from "the previous day."

Eligibility Criteria

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Choosing to participate in a study is an important personal decision. Talk with your doctor and family members or friends about deciding to join a study. To learn more about this study, you or your doctor may contact the study research staff using the contacts provided below. For general information, Learn About Clinical Studies.

Ages Eligible for Study: 18 Years to 25 Years (Adult)
Sexes Eligible for Study: All
Accepts Healthy Volunteers: Yes

Criteria
Inclusion Criteria:
• Age between 18 and 25 years.
• University of Wyoming (UW) or Laramie County Community College (LCCC) student.

Exclusion Criteria:
• Predominantly hyperactive/impulsive presentations of ADHD (ADHD-HI), as this presentation is unusual in adulthood.
• Use of medications that negatively affect cognitive performance (e.g., sedatives, antipsychotics).
• Pregnancy or trying to become pregnant.
• Non-ambulatory or relying on walking aids for ambulation.
• History of a stroke or an aneurysm.
• High risk for physical exercise contraindications due to genetic/medical conditions (e.g., cardiovascular or pulmonary disease).
• Exercise or physical activity restrictions imposed by a health provider.

Contacts and Locations
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Please refer to this study by its ClinicalTrials.gov identifier (NCT number): NCT03666416

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