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The effect of exercising in a hot environment on memory

Submission date	Recruitment status	[_] Prospectively registered
07/10/2026	No longer recruiting	[_] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
09/10/2026	Completed	[_] Results
Last Edited	**Condition category**	[_] Individual participant data
08/10/2026	Other	[X] Record updated in last year

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Principal investigator, Scientific, Public

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Additional identifiers

Study information

Scientific Title
The effects of mild exertional heat stress on verbal memory

Study objectives
The aim of the study is to investigate the effect of exercise in the heat on verbal memory.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 10/03/2025, Central Michigan University Institutional Review Board (104 Foust Hall, Mount Pleasant, 48859, United States of America; +1 (0)9897746401; cmuirb@cmich.edu), ref: 2024-121

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Open (masking not used)

Control
Dose comparison

Assignment
Parallel

Purpose
Basic science

Study type(s)

Health condition(s) or problem(s) studied
The influence of heat stress on memory in health adults

Interventions
Participants were randomized by simple randomization to either to exercise in the heat or room temperature. They completed one trial only. After each intervention, a verbal memory test was performed. Details of each trial are provided below.

Heat trial:
Participants entered an environmental chamber (36 oC or 96.8 oF, 40% humidity, wet-bulb globe temperature [WBGT] = 29C) and began treadmill exercise at an energy production rate of 425 watts (i.e., moderate intensity) equal to approximately 1.2 l of O2 per minute. Treadmill speed and grade was adjusted to achieve this target intensity for each participant. Every 5 minutes, core temperature and heart rate were recorded. Every 10 minutes perceived exertion (subjective scale of 6-20) and thermal tolerance (subjective scale of -3 to +3) were recorded. At the end of the rest interval, the memory test was administered

Room temperature trials:
All procedures were followed as the Heat trial except participants exercised at room temperature (20 oC, 30% RH).

Intervention Type
Other

Primary outcome(s)

1. Verbal memory measured using the Rey Auditory Verbal Learning Test at post exercise

Key secondary outcome(s)

Completion date
02/05/2025

Eligibility

Key inclusion criteria
English speakers who performed physical activity for at least 30 minutes 5 days a week (150 minutes per week)

Healthy volunteers allowed
Yes

Age group
Adult

Lower age limit
19 Years

Upper age limit
40 Years

Sex
All

Total final enrolment
38

Key exclusion criteria
1. Cardiovascular, metabolic, kidney, and pulmonary diseases.
2. Pregnant individuals
3. People on any heart rate medications
4. Previous heat illness

Date of first enrolment
11/03/2025

Date of final enrolment
14/04/2025

Locations

Countries of recruitment
United States of America

Sponsor information

Organisation
Central Michigan University

ROR
https://ror.org/02xawj266

Funder(s)

Funder type

Funder Name
Central Michigan University

Alternative Name(s)
Central Michigan Normal School and Business Institute, Central Michigan Normal School, CMU

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
United States of America

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available