ISRCTN18115608 https://doi.org/10.1186/ISRCTN18115608

The effect of fatigue on postural control and cognitive performance

Submission date 05/08/2025	**Recruitment status** No longer recruiting	[_] Prospectively registered [X] Protocol
Registration date 05/08/2025	**Overall study status** Completed	[_] Statistical analysis plan [X] Results
Last Edited 21/09/2026	**Condition category** Other	[_] Individual participant data

Plain English summary of protocol

Background and study aims
The ability to maintain attention and react quickly is essential for military personnel, especially after physical exertion. This study aims to investigate whether the level of cardiorespiratory fitness (CRF) affects changes in vigilance and reaction time after intense physical exercise in trained soldiers.

Who can participate?
Healthy male soldiers aged 25–40 years, with normal or corrected vision, who had passed the Annual Military Physical Fitness Test, and had no neurological, sensory, postural or gait disorders.

What does the study involve?
Participants performed a computer-based attention test (go/no-go Psychomotor Vigilance Task) before and immediately after a maximal incremental treadmill running test to exhaustion. Reaction time, commission errors, and omission errors were recorded. The treadmill test followed the Bruce protocol with continuous gas exchange measurement. Based on VO_2max results, participants were classified into high or low CRF groups.

What are the possible benefits and risks of participating?
This research can help improve training strategies to optimise cognitive performance after physical exertion in military and similar professions. Risks are minimal but may include temporary fatigue, dizziness, or mild gastrointestinal discomfort, which typically resolve within 12 hours.

Where is the study run from?
The Exercise Physiology Laboratory, Faculty of Physical Activity and Sport Sciences, University of Valencia (Spain)

When is the study starting and how long is it expected to run for?
September 2014 to June 2015

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
Dr Jose Luis Bermejo Ruiz, j.luis.bermejo@uv.es

Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Protocol serial number
H1402563451425

Study information

Scientific Title
Cardiorespiratory fitness modulates the effect of acute exercise on vigilance performance in trained soldiers

Acronym
CRF-Cognition

Study objectives
Primary objective:
To determine whether cardiorespiratory fitness level modulates the effect of acute maximal exercise on vigilance performance in trained soldiers.

Secondary objectives:
1. To compare changes in reaction time, commission errors, and omission errors before and after maximal exercise between high- and low-fitness groups.
2. To analyse whether the magnitude of improvement in vigilance differs according to baseline fitness level.

Study hypothesis:
Acute maximal exercise will improve vigilance performance in trained soldiers, and the magnitude of improvement will differ depending on cardiorespiratory fitness level.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 25/07/2014, Ethics Committee of the University of Valencia (Av. Blasco Ibáñez, 13, Valencia, 46010, Spain; +34 (0)96 16 25 834; ceih@uv.es), ref: H1402563451425

Primary study design
Interventional

Study design
Interventional non-randomized controlled within-subject design

Study type(s)
Other

Health condition(s) or problem(s) studied
Cognitive performance, vigilance, and reaction time in healthy trained soldiers under acute physical fatigue

Interventions
Participants completed a maximal incremental treadmill running protocol to exhaustion, followed by immediate post-exercise assessment of vigilance performance using a go/no-go psychomotor vigilance task (PVT). The same task was performed before exercise as baseline. Participants were classified into high- or low-cardiorespiratory fitness groups according to ACSM guidelines.

Intervention Type
Behavioural

Primary outcome(s)
Reaction time (milliseconds) is measured using a computer-based go/no-go Psychomotor Vigilance Task (PVT) at baseline (pre-exercise) and immediately after completion of the maximal incremental treadmill test (post-exercise)

Key secondary outcome(s)
1. Commission errors (%) are measured using the same go/no-go PVT at baseline and immediately post-exercise
2. Omission errors (%) are measured using the same go/no-go PVT at baseline and immediately post-exercise

Completion date
30/06/2015

Eligibility

Key inclusion criteria
1. Male soldiers aged 25–40 years
2. Passed Annual Military Physical Fitness Test (AMPFT)
3. Normal or corrected-to-normal vision
4. No neurological, sensory, postural, or gait disorders
5. No history of neuropsychological impairment

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
25 Years

Upper age limit
40 Years

Sex
Male

Total final enrolment
34

Key exclusion criteria
1. Cardiovascular disease or other contraindications to maximal exercise
2. Recent musculoskeletal injury
3. Consumption of stimulants or alcohol within 24 hours prior to testing

Date of first enrolment
01/09/2014

Date of final enrolment
30/06/2015

Locations

Countries of recruitment
Spain

Study participating centre
University of Valencia
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Sponsor information

Organisation
Universitat de València

ROR
https://ror.org/043nxc105

Funder(s)

Funder type
Other

Funder Name
Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated and/or analysed during the current study are not publicly available due to participant confidentiality but are available from the corresponding author on reasonable request. All shared data will be fully anonymised, and requests will be considered for research purposes only, subject to approval by the research team and in compliance with institutional and ethical guidelines.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		03/06/2026	21/09/2026	Yes	No
Participant information sheet			05/08/2025	No	Yes
Protocol file			05/08/2025	No	No