

The effect of fatigue on postural control and cognitive performance

Submission date 05/08/2025	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
Registration date 05/08/2025	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
Last Edited 05/08/2025	Condition category Other	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year

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 $\text{VO}_{2\text{max}}$ 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

Contact name

Dr Jose Luis Bermejo Ruiz

ORCID ID

<https://orcid.org/0000-0002-1550-0564>

Contact details

University of Valencia

Faculty of Physical Activity and Sport Sciences

C/ Gascó Oliag, 3

Valencia

Spain

46010

+34 (0)686225802

j.luis.bermejo@uv.es

Additional identifiers

EudraCT/CTIS number

Nil known

IRAS number

ClinicalTrials.gov number

Nil known

Secondary identifying numbers

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

Study design

Interventional non-randomized controlled within-subject design

Primary study design

Interventional

Secondary study design

Non randomised study

Study setting(s)

Training facility/simulation, University/medical school/dental school

Study type(s)

Other

Participant information sheet

Not available en web format, please use contact details to request a participant information sheet and consent form.

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 measure

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)

Secondary outcome measures

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

Overall study start date

01/09/2014

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

Age group

Adult

Lower age limit

25 Years

Upper age limit

40 Years

Sex

Male

Target number of participants

34

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**

Faculty of Physical Activity and Sport Sciences

C/ Gascó Oliag, 3

Valencia

Spain

46010

Sponsor information**Organisation**

Universitat de València

Sponsor details

Faculty of Physical Activity and Sport Sciences

C/ Gascó Oliag

Valencia

Spain

46010

Sponsor type

University/education

Website

<https://www.uv.es>

ROR

<https://ror.org/043nxc105>

Funder(s)

Funder type
Other

Funder Name
Investigator initiated and funded

Results and Publications

Publication and dissemination plan
The results of this study will be disseminated through publication in peerreviewed scientific journals, including the current submission to Scientific Reports. Findings will also be presented at national and international conferences in the fields of sports science, exercise physiology, and cognitive neuroscience. In addition, summaries of the results will be made available to participants upon request, and data will be shared with the research community in line with the University of Valencia’s open science policy, ensuring that confidentiality and ethical guidelines are respected.

Intention to publish date
31/12/2025

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
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet			05/08/2025	No	Yes
Protocol file			05/08/2025	No	No