

# Face masks do not impair indicators of cognitive performance when performing moderate physical work in hot environments

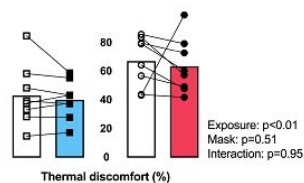
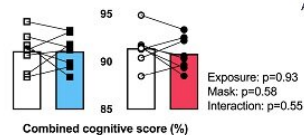
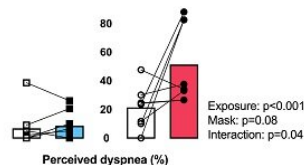
October 7 2020, by Kristian Levring Madsen



## BRIEF FACEMASK USE DURING REST IN THE HEAT

### MAIN FINDINGS

- NO CHANGES IN DYSPNEA
- NO EFFECT ON COGNITIVE CAPACITY
- NO ADDED THERMAL DISCOMFORT
- NO EFFECT ON CORE TEMPERATURE
- NO EFFECT ON SKIN TEMPERATURE



## PROLONGED FACEMASK USE DURING WORK IN THE HEAT

### MAIN FINDINGS

- MAJOR INCREASE IN DYSPNEA
- NO EFFECT ON COGNITIVE CAPACITY
- HIGHER CORE AND SKIN TEMPERATURES AS WELL AS THERMAL DISCOMFORT DUE TO PROLONGED DURATION AND LIGHT WORK, BUT FACEMASK DID NOT AGGRAVATE THESE EFFECTS



Findings related to the use of facemask when working in hot environments.  
Credit: Andreas Flouris

A novel study shows that face mask use does not affect indicators of cognitive performance when the wearers are resting or performing moderate physical work in hot environments. However, wearing a face mask does make it more difficult to breathe when performing moderate physical work in a hot environment. The study is conducted by researchers at the Department of Nutrition, Exercise and Sports,

University of Copenhagen in collaboration with the European research consortium HEAT-SHIELD.

Face masks are mandatory by law in many countries and recommended by the World Health Organization (WHO) to prevent spreading of the COVID-19 virus. However, experts and lay people alike have raised concerns that working with a face mask may aggravate [heat stress](#), thermal discomfort and increase perceived breathlessness (dyspnea), which eventually could impair cognitive function, concentration and jeopardize occupational safety.

## **The only measure worsened by wearing a mask was feelings of breathlessness**

Now, a study shows that face mask use has milder consequences on indicators of cognitive performance than expected when the wearers are resting or performing moderate physical work in normal workwear in hot environments. This cognitive testing battery consisted of four math and fine motor skill tasks that were performed in a random order on a computer.

During testing, body temperature and thermal discomfort did increase in both trials, but not to a greater degree while wearing a mask. However, the study also showed that wearing a face mask does make it more difficult to breathe when performing moderate physical work in a hot environment.

Lars Nybo, professor in human physiology at the University of Copenhagen and coordinator for the HEAT-SHIELD project, explains: "We used an experimental setup that mimics tasks completed in many occupations and a protocol previously used to explore how heat-stress and dehydration markedly impair performance in tasks relying on the

ability to concentrate and conduct complex motor-cognitive tasks. Although prolonged exposure with [face masks](#) while wearing normal workwear in a thermal-stressing environment elevated thermal discomfort in both trials, it did not lower scores in any of the motor-cognitive tasks that the participants completed. Indeed, the only measure worsened by wearing a mask was feelings of breathlessness."

The researchers therefore conclude that face [masks](#) do not directly impair concentration or indicators of cognitive performance—but they may restrict physically demanding work when the restraint on respiration becomes an issue.

## Facts about the study

Eight healthy, active males, aged 27–41, participated in the study. On two occasions, one with a face mask and one with no mask, participants sat in a climatic chamber regulated at 40°C and 20% humidity for 30 min to become accustomed to the testing conditions. Then they exercised for 45 minutes at an intensity that simulates occupations with manual work.

Physiological, perceptual (thermal comfort and breathlessness) and motor-cognitive measurements (consisting of four different computer tasks relying on math ability and fine motor precision) were taken immediately before and after the bout of exercise.

The study, titled "Prolonged face mask use in the heat worsens dyspnea without compromising motor-cognitive performance" has been published in the scientific journal *Temperature*.

**More information:** Prolonged face mask use in the heat worsens dyspnea without compromising motor-cognitive performance. *Temperature* (2020). [DOI: 10.1080/23328940.2020.1826840](https://doi.org/10.1080/23328940.2020.1826840)

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