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# Impact of prolonged cognitive load on cortical activity: An fNIRS investigation with healthy adults

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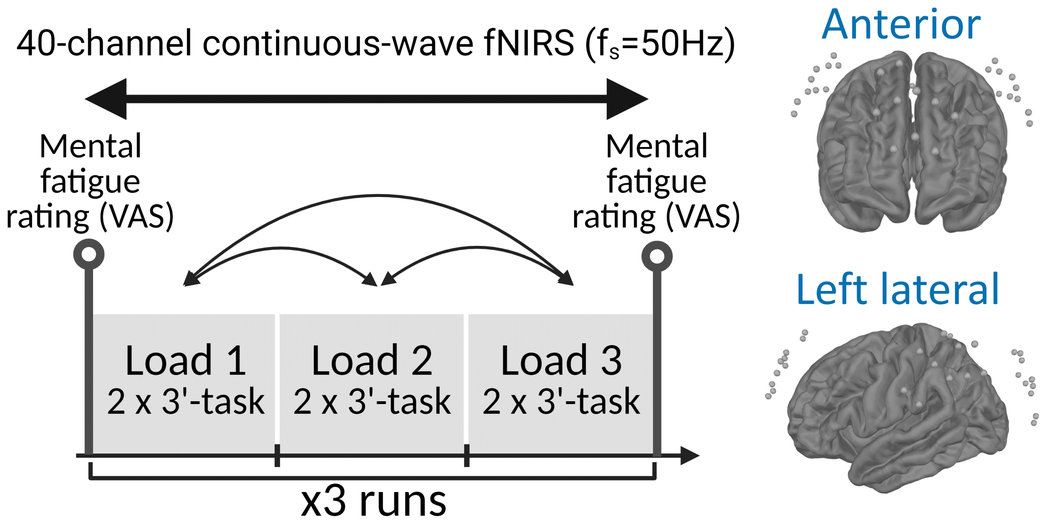
## BACKGROUND

- Prolonged cognitive load can lead to mental fatigue, increasing the risk of errors and work-related accidents.
- Functional near-infrared spectroscopy (fNIRS) reveals that an increase in cognitive load results in elevated oxygenated hemoglobin concentration ([HbO]) in the frontal and parietal areas, indicating the allocation of attention resources to maintain cognitive executive functions.

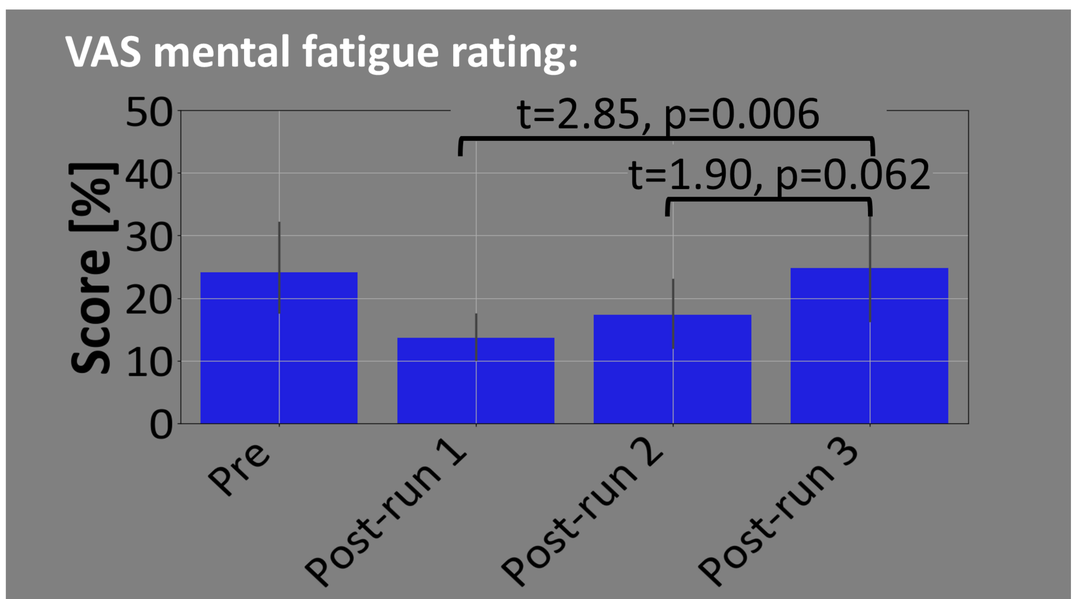
## AIMS

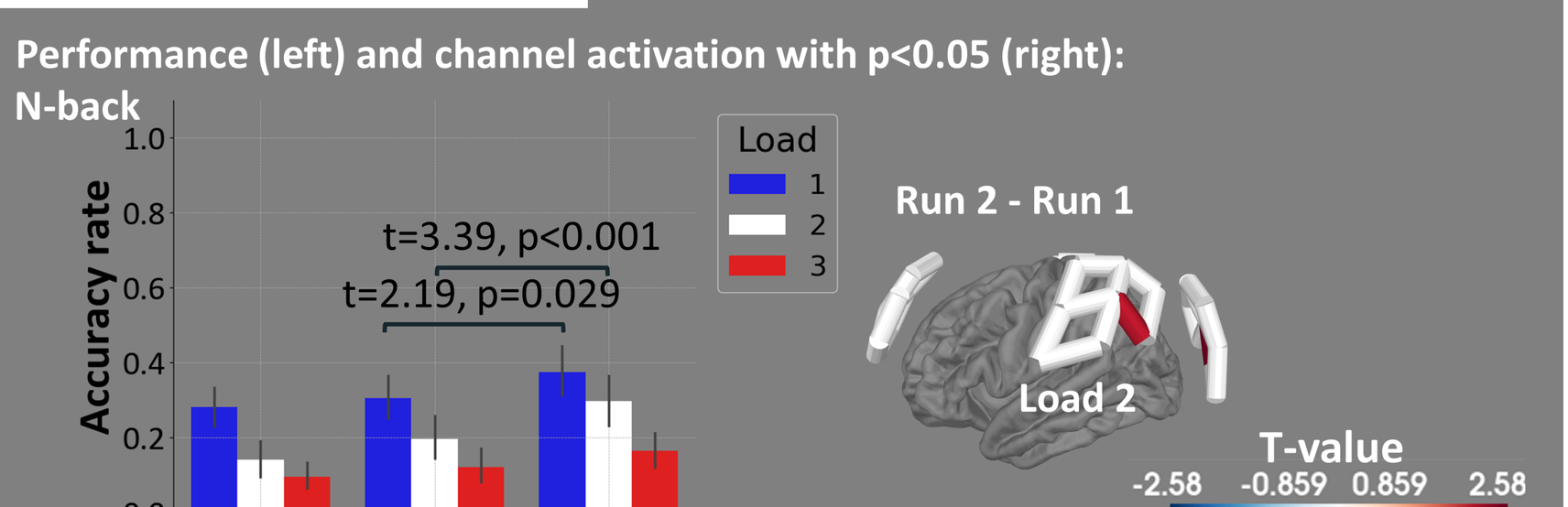
This research aims to examine the impact of prolonged cognitive load on fNIRS signals, specifically in relation to cognitive executive functions. The study was conducted with 36 healthy adults aged 25 to 45.

## METHODS




## RESULTS




## CONCLUSION

Prolonged cognitive load leads to mental fatigue and a strategic shift. In the Stroop task, this strategic shift is evident through improved performance and reduced controlled attention at higher load levels. Conversely, the n-back task shows maintained performance without a decrease in frontoparietal activity, suggesting a continued reliance on controlled attention.

Further research is needed to confirm whether the strategic shift involves automated processing by posterior regions, e.g., occipital region.

These insights have the potential to inform interventions aimed at enhancing cognitive and mental health in real-world settings.

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