Quantifying and Inducing Mental Fatigue: a Narrative Review with Best Evidence Recommendations

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Résumé

Mental fatigue is a psychobiological state that is typically induced by prolonged demanding cognitive activity, leading to a significant decrease in subsequent cognitive and physical performance (Habay et al., 2021). There have been numerous studies that have investigated mental fatigue, each with their own methods to induce and quantify mental fatigue (Habay et al., 2023; Habay et al., 2021). This variability makes it hard to compare findings across studies and draw well-supported conclusions. This might also be the reason that there is still no clear understanding of the mechanisms of mental fatigue, with some researchers even questioning the validity of previous findings (Holgado et al., 2023).

To address these issues, a review of the literature was conducted, which gives an overview of the currently used methods to induce and quantify mental fatigue. These methods are then thoroughly discussed using the most recent available evidence. The discussion of the induction methods of mental fatigue focuses on the "tree task properties framework", showcasing the three principles of cognitive task design (i.e. duration, difficulty and nature) and their interconnection. Moreover, the discussion on the quantification methods elaborates on benefits and drawbacks of tools used within the main mental fatigue measurement domains (i.e. subjective, behavioural and (neuro)physiological), along with possible confounders. Last, the

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review presents a possible way forward, identifying next steps in the field of mental fatigue, along with the construction of the SPeCIFY reporting guidelines, which incorporate the MF induction and quantification frameworks and address essential aspects such as environmental settings and protocol specifics.

Overall, the present review provides information on the most commonly induction and quantification methods of mental fatigue, and discusses the most optimal use of these methods. This will make sure that future articles can better be compared, to further investigate the impact and background of mental fatigue.

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