INPLASY

Inducing Mental Fatigue in Six Minutes? The Transcription Task in Mental Fatigue Intervention Studies: A Systematic Review and Meta-Analysis

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INTRODUCTION

Review question / Objective In studies on mental fatigue and recovery strategies, a common approach is to use a single cognitive load task to induce mental fatigue, followed by measurement or restorative interventions. Given the current literature's discrepancies regarding induction methods and task duration, as well as the potential and controversies surrounding transcription tasks, their advantages and challenges as a promising short-term induction tool in mental fatigue research warrant further investigation. This review aims to systematically evaluate the effectiveness and applicability of the transcription task for inducing mental fatigue, and to propose operational recommendations.

Condition being studied Mental fatigue is primarily manifested as tiredness, exhaustion, lack of energy, decreased attention, reduced motivation, and aversion to subsequent tasks. These symptoms hinder individuals' ability to sustain disciplined and focused effort, leading to declines in cognitive and behavioral functioning across a variety of dynamic tasks. As a psychophysiological state that is highly prevalent in daily life, work, and education, the study of mental fatigue holds significant value not only in psychology but also in providing practical insights for fatigue management in education, sports, and everyday life.

METHODS

Search strategy Six electronic databases were systematically searched: Web of Science, PubMed, Scopus, EBSCOhost (including SPORTDiscus and Psychology and Behavioral Sciences Collection), and PsycInfo. To minimize the risk of missing relevant studies, we also performed manual screening of grey literature through Google Scholar. The search string was: (transcription OR copying) AND ("mental fatigue" OR "cognitive fatigue" OR "mental effort" OR "cognitive effort" OR "mental exertion" OR "ego depletion").

Participant or population Healthy participants.

Intervention Transcription task (mental fatigue induced task).

Comparator No transcription task or different forms of transcription tasks.

Study designs to be included (Outcomes) Mental fatigue or ego depletion; (Study design) Quantitative studies only.

Eligibility criteria All included studies were required to be published in English in academic journals, with no restrictions on publication date.

Information sources Web of Science, PubMed, Scopus, EBSCOhost (including SPORTDiscus and Psychology and Behavioral Sciences Collection), PsycInfo and Google Scholar.

Main outcome(s) Transcription tasks can significantly increase mental fatigue, and their effectiveness as a laboratory induction tool can be confirmed through systematic review and meta-analysis. Subgroup analyses can reveal differences in the task's induction effects across populations, suggesting that factors such as background, motivation, and task execution ability may contribute to these variations.

Additional outcome(s) We plan to propose a standardized protocol for transcription tasks and offer recommendations for future efforts to adapt them to different languagesystems.

Data management After implementing the search strategy, all retrieved records from the different databases were imported into EndNote 20 for management and screening. Duplicate studies were removed, and two authors independently and blindly screened the remaining studies according to the predefined inclusion and exclusion criteria. The results were cross-checked, and any disagreements were resolved through discussion with a third author until consensus was reached.

Quality assessment / Risk of bias analysis Risk of bias in the included studies was assessed using the Risk of Bias 2 (RoB 2) tool, following the Cochrane guidelines (Sterne et al., 2019). The tool evaluates five domains using signaling questions, with judgments categorized as "Low risk," "Some concerns," or "High risk." An overall risk-of-bias judgment was then derived for each study. Two authors independently and blindly conducted the assessments using the Excel tool for RoB 2 (including macros; available at http://

www.riskofbias.info). The results were cross-checked, and any disagreements were resolved through discussion with a third author until consensus was reached.

Strategy of data synthesis Meta-analysis was conducted using RevMan 5.4 software, including pooled effect size estimation, heterogeneity testing, forest plot generation, and publication bias assessment (funnel plot). If the number of studies included in the meta-analysis was ≥ 10, Egger's test was applied to examine whether there was significant asymmetry, thereby further confirming publication bias. Since both mental fatigue and ego depletion are continuous variables, the standardized mean difference (SMD) with 95% confidence intervals (CIs) was selected as the effect measure. Specifically, means and standard deviations (SD) were used to calculate effect sizes for each outcome under mental fatigue and control conditions. If studies did not report means and SDs, conversions were performed based on standard errors or 95% CIs. Heterogeneity was assessed using the I^2 statistic, with thresholds of 25%, 50%, and 75% indicating low, moderate, and high heterogeneity, respectively. A random-effects model was adopted for the meta-analysis. Interpretation of effect sizes followed Cohen's standards: values below 0.2 were considered small, around 0.5 moderate, and above 0.8 large.

Subgroup analysis RevMan 5.4 software for subgroup analysis.

Sensitivity analysis Leave-one-out method.

Language restriction Exclude non-English articles.

Country(ies) involved Malaysia and China.

Keywords Mental fatigue, Cognitive fatigue, Ego depletion, Intervention, Randomized controlled trials.

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