

## Effects of a wearable-enhanced neuroempowerment protocol on higher cognitive functions in managers

Successful response to workplace demands notwithstanding personal and environmental stressors depend on efficient and flexible cognitive functioning. Consequently, empowerment protocols aimed at improving neurocognitive efficiency are growingly deemed as valuable opportunities to support professionals and impact work-related quality of life, with relevant neuroethical implications (Balconi et al., 2020; Crivelli et al., 2019; Dubljević et al., 2020; Fronda et al., 2018; Nagel, 2014). This study aimed at investigating potential effects of a wearable-enhanced neuroempowerment protocol on higher cognition in professionals systematically exposed to work-related stress. 18 expert managers were randomly divided into experimental (EXP) and active control (AC) groups. EXP completed an embodied awareness protocol based on mindfulness exercises enhanced by wearable neurofeedback. AC completed an alternative protocol based on breathing and static apnoea exercises. Participants also underwent multimethod neuroassessment sessions pre/post-training. Neuroassessment included: psychometric testing to assess perceived stress and impulsiveness; neuropsychological tests to assess attention regulation and higher executive functioning; electrophysiological markers (EEG bands and event-related potential - ERP) to assess mental workload and efficiency in orienting neural resources on challenging tasks. Data analysis highlighted, at the end of training, general stability of impulsiveness levels and reduction of perceived stress. Besides, we observed increased cognitive flexibility scores for the EXP group. Both groups showed increased accuracy at a computerized Stroop task, though only EXP was associated to improved physiological markers of attention orienting (N2 ERP). Finally, at the end of the training, EXP showed reduced think-times to solve Tower of Hanoi trials, paired with lower frontal Beta-power with respect to AC. Findings provide evidence that, besides a generalized positive effect on stress level, wearable-enhanced protocols based on embodied awareness may foster neurocognitive efficiency and optimized use of neural resources, likely due to implicit training of awareness and attention skills (Balconi et al., 2017; Cleeremans & Jiménez, 2002).

### References

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