

Neurocognitive Enhancement at Workplace: The potential of a Technology-Supported Neurofeedback Training Program

Giulia Fronda (Catholic University of the Sacred Heart, Milan), **Davide Crivelli** (Catholic University of the Sacred Heart, Milan), **Michela Balconi** (Catholic University of the Sacred Heart, Milan)

Recently, implications of neurocognitive enhancement have been investigated in various research areas (Farah et al., 2004). Neurocognitive enhancement consists of improving cognitive performance through neuroscientific tools that can modulate brain activity and cognitive behavior. In recent years, numerous studies have shown how different neurocognitive enhancement techniques can improve cognitive skills such as attention and memory (Crivelli, Fronda, Venturella, & Balconi 2019b; Lucke & Partridge, 2013). The development of tools for neurocognitive enhancement has made more relevant neuroethical questions, in order to investigate ethical implications of mental and physical enhancement techniques and the impact on perceived quality of life in professionals (Bostrom & Sandberg, 2009; Crivelli, Fronda, Venturella, & Balconi 2019a; Fronda, Balconi, & Crivelli, 2018; Fronda, Crivelli, Venturella, & Balconi, 2018; Nagel, 2014). Moving from such framework, this study aimed at investigating potential effects and ethical implications of a neurocognitive enhancement training at workplace, in a sample of 16 healthy middle-aged professionals occupying managerial positions. Professionals underwent a brief intensive mindfulness program supported by a neurofeedback device. Such program aimed at improving cognitive efficiency and reducing work stress levels, which cause deterioration of performance. To evaluate training effects, participants' cognitive performance and resting electrophysiological activity were evaluated at the beginning and the end of the program. Analysis of data showed that at the end of the program there was an increase of attention and concentration and a decrease of perceived stress levels. Consistently, it was also observed an increase of participants' alpha/beta ratio (an electrophysiological marker of relaxation vs. agitation) and vagal tone. In addition, the perceived quality of life at workplace was consistently improved. Findings suggest that the tested program might act as a valuable opportunity to better performances and wellbeing of professionals exposed to work-related stressors. The ethical impact was also considered as a consequence of these results.

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