Perspectives in Neuro-Enhancement: Supporting Mindfulness Mental Training with Wearable Devices

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Neurocognitive enhancement can be defined as a voluntary attempt to improve one's own cognitive skills and performance by means of neuroscience techniques and methods (Balconi & Crivelli, *in press*). In the last years, the strive to improve personal potential and cognitive efficiency has lead to the revival of mental training. By regularly practicing self-observation and bodily awareness activities it seems indeed possible to empower self-monitoring and attention regulation skills, as well as stress management skills. Recently, it has been suggested that such practices may benefit from the support of wearable body-sensing devices, able to foster practisers' commitment and to make practice more easily accessible to the modern users (Balconi, Fronda, Venturella, & Crivelli, 2017). The present study aimed at testing the potential for cognitive enhancement of a mental training intervention supported by a novel brain-sensing wearable device. Sixty volunteers took part in the study and were divided in active control and experimental groups. Groups were involved in a mental training intervention, which lasted 4 weeks, was constituted by brief daily activities, and – as for the experimental groups – was supported by brain-sensing devices. Short-term effects of the intervention on cognitive performances and electroencephalographic measures of neural activity improving (both resting-state and task-related) have been explored by comparing pre- and post-intervention assessments. Analyses highlighted increased electrophysiological responsiveness indices and frequency profiles consistent with a focused mindset in experimental groups. The technology-mediated intervention seemed also to help optimizing attention regulation and control skills, as marked by an increase in performance at challenging computerized cognitive tasks. Findings are consistent with available evidences on cognitive and neural effects of mental training practice (Cahn & Polich, 2006; Lutz, Slagter, Dunne, & Davidson, 2008). Further, they hint at the potential of intensive technology-mediated mental training interventions for neurocognitive enhancement and improvement of the efficiency of cognitive processes.

References

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