Title: Acute and Long-Lasting Cortical Thickness Changes Following Intensive First-Person Action Videogame Practice

Authors: Davide Momi, Carmelo Smeralda, Giulia Sprugnoli, Salvatore Ferrone, Simone Rossi, Alessandro Rossi, Giorgio Di Lorenzo, Emiliano Santarnecchi

PII: S0166-4328(17)31642-X
DOI: https://doi.org/10.1016/j.bbr.2018.06.013
Reference: BBR 11470

To appear in: *Behavioural Brain Research*

Received date: 18-10-2017
Revised date: 1-6-2018
Accepted date: 18-6-2018

Please cite this article as: Momi D, Smeralda C, Sprugnoli G, Ferrone S, Rossi S, Rossi A, Di Lorenzo G, Santarnecchi E, Acute and Long-Lasting Cortical Thickness Changes Following Intensive First-Person Action Videogame Practice, *Behavioural Brain Research* (2018), https://doi.org/10.1016/j.bbr.2018.06.013

Acute and Long-Lasting Cortical Thickness Changes Following Intensive First-Person Action Videogame Practice

Running title: Cortical thickness changes following videogame practice

Davide Momi[1,2]*, Carmelo Smeralda[1]*, Giulia Sprugnoli[1], Salvatore Ferrone[1], Simone Rossi[1,4,5], Alessandro Rossi[1,5], Giorgio Di Lorenzo[6], Emiliano Santarnecchi[1,2]

1 Brain Investigation & Neuromodulation Lab, Department of Medicine, Surgery and Neuroscience, Neurology and Clinical Neurophysiology Section, University of Siena, Italy
2 Berenson-Allen Center for Non-Invasive Brain Stimulation, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA
3 Siena Robotics and Systems Lab (SIRS-Lab), Engineering and Mathematics Department, University of Siena, Italy
4 Human Physiology Section, Department of Medicine, Surgery and Neuroscience, University of Siena, Siena, Italy
5 Department of Medicine, Surgery and Neuroscience, University of Siena, Siena, Italy
6 Laboratory of Psychophysiology, Chair of Psychiatry, Department of Systems Medicine, University of Rome "Tor Vergata", Rome, Italy

* These authors contributed equally

Corresponding author:
Emiliano Santarnecchi
Berenson-Allen Center for Non-Invasive Brain Stimulation
Beth Israel Deaconess Medical Center
Harvard Medical School, Boston, MA, USA
office +1-617-667-0326
mobile +1-617-516-9516
esantarn@bidmc.harvard.edu

ABSTRACT

Recent evidence shows how an extensive gaming experience might positively impact cognitive and perceptual functioning, leading to brain structural changes observed in cross-sectional studies. Importantly, changes seem to be game-specific, reflecting gameplay styles and therefore opening to the possibility of tailoring videogames according to rehabilitation and enhancement purposes. However, whether if such brain effects can be induced even with limited gaming experience, and whether if they can outlast the gaming period, is still unknown. Here we quantified both cognitive and grey matter thickness changes following 15 daily gaming sessions based on a modified version of a 3D first-person shooter (FPS) played in laboratory