

Inhibitory Control Training to improve health

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Inhibitory control (IC) is involved in a wide range of tasks necessary to the everyday life, but its maintenance is heavy on resources and necessary to control inappropriate desires. Training IC has thus been proposed as a potential approach to improve behavior associated with IC. By capitalizing on the different types of plasticity IC training (ICT) can induce, this thesis focused on two ways to better health in two socially relevant problematics: 1) the cognitive decline of healthy aging, and 2) the overvaluation of unhealthy food.

Cognitive training has been suggested as a solution to healthy cognitive decline, but whether and how IC is sensitive to training-induced plasticity is unresolved. In this first study entitled “Aging modulates prefrontal plasticity induced by executive control training” (Najberg et al., 2021a), we compared training’s effect on older adults trained for three weeks to a gamified ICT to both an active control training and to younger adults. Results suggest a change of behavior toward more impulsive response strategy without improvement of IC performance. This was still accompanied by an increase in the neural network’s efficiency during the engagement of the inhibition command when compared to the active control training. Furthermore, configurational modulations of the network were observed during the solving of the inhibition conflict and initiation of the inhibition command when compared to younger adults. This indicates that ICT improved the efficiency of the inhibition process, but in a different way from young adults when coping to the task’s demands. However, this improvement was not mirrored in our measures of impulsivity traits nor quality of life, indicating no generalization of ICTs to everyday life scenarios.

In the second registered report entitled “Modifying food items valuation and weight with gamified executive control training” (Najberg et al., 2021b), we capitalized on the effect executive control training has on changing the trained items’ valuation. By combining the parallel practice of a gamified food Go/NoGo task and cued approach training for four weeks, we found a larger decrease in palatability ratings of the trained unhealthy items in the experimental than in the control group, without changes in the healthy items’ ratings or participants’ weight. A third ongoing registered report (Najberg et al., in principle acceptance), is trying to further the application of these results by shifting the trained items to sweet beverages and targeting a more ecological consumption variable.

The combined results of this thesis show promising effects of gamified ICT to better health. The gamification aspect was well received and allowed us lengthy online trainings.

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