

The aim of the "BrainHeart" project is to investigate the influence of heart rate variability biofeedback (HRV-BFB) training on cognitive functioning, including attention and divergent thinking. Nowadays medicine experiences in a way a renaissance of alternative, natural and traditional methods of treatment. Nevertheless, safe, effective and scientific application of these therapies requires prior investigation of the mechanism of action behind the intervention's beneficial influence. Recent times have witnessed growing popularity of heart rate variability (HRV) training. Such a training is possible thanks to application of biofeedback (BFB), a technique involving the use of sensors registering biological signal from the body and presenting it back to the trainee. In the case of HRV-BFB such feedback information includes the heart rhythm. Because of biofeedback one can gain knowledge about the state of their internal processes, and therefore subject the latter to voluntary control. The functioning of cardiovascular and respiratory system is closely connected and correlated in order to ensure the most efficient gas exchange between the air in the lungs and the blood. Because of this fact, one the best methods to influence heart rate is breathing control. Every person is characterizes by their own, individual breathing frequency, that allows to achieve maximum HRV. This state results in restoration of functional homeostasis of the body and mind, as well as improves the adaptive capabilities of the organism. HRV-BFB training is designed to results in such a state via restoring the maximum HRV. Several studies confirm the beneficial effects of HRV-BFB as a therapeutic method for various different diseases and disorders, both physical and mental. Moreover, This technique was found to have a positive influence on human functioning; under stress, cognitive, requiring increased attention or creative abilities. Nevertheless, despite several proves of beneficial action, the mechanism behind it remains unclear. Many implications seem to point at a central effect on the central neural system level. Therefore, this project came to life in order to investigate the influence of HRV-BFB on brain functioning. Application of electroencephalographic (EEG) neuroimaging allows to analyse neural processes. The BrainHeart project is dedicated research the influence of HRV-BFB training on attentional processes and divergent thinking, which is assumed to be the form of cognitive activity best representing creative processes. Functioning will be tested via cognitive task solving performed upon EEG signal recording. Comparing the recorded brain activity and task performance outcomes obtained before and after the training, and subsequently comparing these results with control group will allow to indicate changes in neuronal processes related to the intervention. Gaining this information will lead to more precise, scientific application of HRV-BFB in medicine and psychology, as well as individually, since it is a method that is save and easily applicable.