

Abstract

Name: Electrical cerebral activity changes during targeted emotional stimulation, evaluated by sLORETA

Goals: The main goal of this thesis is the comparison of electrical brain activity changes during targeted emotional stimulation.

Method: The research was conducted by measuring electrical cerebral activity using Natus Neurology 32-channel Nicolet™EEG Wireless Amplifier 32/64 device. The activity measurements were taken by an EEG Electro-cap with a total of 19 flat registration electrodes (Fp1, Fp2, F7, F3, Fz, F8, T5, T3, C3, Cz, C4, T4, T6, P3, Pz, 36 P4, O1, O2), placed in accord with the internationally used 10-20 system. The impedance resistance did not exceed 10 kΩ, with a sampling frequency of 512 Hz and a bandpass of 0,5–70 Hz. Resulting data was then processed using NeuroGuide programme. A 30s long, zero-artifact EEG section was then chosen to be exported to sLORETA programme.

Probandes were divided randomly into three research groups – positive, neutral and negative. Each proband was asked to pass the VVIQ imagination vividity questionnaire. In the next phase, each participant was asked to undergo a three week long imagination training programme, consisting of watching VR videos and targeted imaginations of walking, three times a week. While in the VR simulation, music and sound effect were being played to the probands to further increase the immersion of the simulation. A music which should evoke positive feelings was played to one group of probands, the reverse for the second, and no additional music was played during VR to the third group. To enhance reliability, the measurements were taken two times.

In the next step, the former and control EEG measurements were compared using sLORETA. The programme was also used to compare the groups.

Results: The research confirmed a statistically significant differentiation of the EEG-sensed signal as a function of emotional stimulation in the group with negative stimulation in the gamma frequency band at BA 47 during VR monitoring. No change was confirmed in the neutral and positive groups. The results of the VVIQ test did not show that emotional stimulation affected the test result.

Keywords: brain activity, movement imagination, visual stimulation, mirror neurons, VVIQ