

An EEG Study of the Effects of Music Stimulation on Emotional Valence Response

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ABSTRACT

There is growing interest among scientists in the effects of music on the brain due to its emotional impact on listeners. Better understanding of music-evoked emotions and their neural correlates can lead to a more systematic and effective use of music in therapy of brain disorders. The interaction of music with the brain is very often reflected in the reorganization of the spectral power (SP) of the human brain potentials. The presented study aimed to evaluate electroencephalographic (EEG) measures and spectra reorganization for the emotional valence of different type of music. Seven participants listened to four music tracks with different emotional content among which two melodies were evaluated by the participants as extremely pleasant and unpleasant, respectively. Quantitative analysis of EEG signals (QEEG) under these two stimuli proved that the patterns of cortical regions activation, common for the both of melodies, could be defined (common music related response - CMRR), as well as the specific patterns that differ in regard with the music stimulation type and emotional valence (specific music related respond - SMRR). The results of the spectra analysis showed that listening to pleasant music produces a significant increase of the spectral power in low frequencies (delta) in the most of cortical regions while unpleasant music produces an increase of spectral power in high frequencies (beta and gamma). The elements of the model of circular emotional reaction (CER), perception, apperception and valorization in QEEG could be defined by CMRR, while SMRR is reflection of specific emotional reaction on music stimuli. There is a significant difference of frontal asymmetry index in regard with emotional valence in music. These findings gave the basic inputs and suggest further analysis of more specific parameters for detailed patterns of changes in cortical micropotentials which could be associated with the induced psychoemotional state.