

ABSTRACT

Music, an integral part of our life can induce strong emotions, positive or negative. The research aimed to analyze emotional responses to music using Electroencephalography, its associated changes in cardiovascular parameters and task performance. Self-reported scales evaluated subjective feelings for emotion assessment and affective moods. Valence and arousal were estimated by analyzing frequency bands of EEG signals and correlation with changes in autonomous nervous system was established. Concurrent studies used related and independent sample design with 62 non-musician healthy adults. Comparing positive valence low arousal-pleasant and negative valence high arousal-unpleasant music showed asymmetrical decrease ($p<0.05$) in alpha energy in left frontal electrodes (F3, F7) compared to right (F4, F8). Frontal theta increase and high beta were observed during pleasant and unpleasant music respectively. Music had a similar effect on induced and perceived emotion. Task performance was determined by calculating the errors of commission ($p=0.008$) and omission ($p<0.05$) for Go and No-Go trials which were higher for unpleasant music. Unpleasant music led to significant increase ($p<0.05$) in cardiovascular parameters, impaired performance while the opposite was observed with pleasant music. The study emphasizes that when experimenter selected music, only Carnatic and Jazz showed significant effect on midline electrodes (Fz, Pz and Cz) and improved task performance. Self-selected like music reduces cardiovascular parameters, induces positive emotions improving performance. Dislike music does not induce negative emotions but increases cardiovascular parameters, impairs performance. Participant chosen Indian Classical instrument (Malahari) and Indo Jazz (Kapi) music, perceived as positive affect (mood), pleasant/high arousal improved attention and performance. Raga Dharmavathi, perceptible as positive affect (mood), pleasant/low arousal resulted in no conceivable changes. All three music induced positive emotion and reduced pulse rate compared to silent condition. Thus, high valence, high arousal music can be used to improve cognitive task and induce calmness.

Keywords: *Music, Emotion, Valence, Arousal, Electroencephalography*