

Abstract EFAS/DGA 2007

EEG activity while listening to piano music with and without out-of tune tones – a study on musicians

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The level of human EEG activity depends on the afferent inputs and the processing of sensory stimuli. Here we investigated the effects of single out-of-tune tones in well-known music pieces on the activity in spontaneous EEG while listening to the music. We supposed that differences exist in the auditory processing of musical stimuli in musicians versus non-musicians that could be reflected in different alterations of the levels of EEG activity. The experiments were performed in 10 normal hearing non-musicians (aged 18-30 years) and in 16 normal hearing musicians (aged 25-41 years). With a questionnaire, we asked for the instruments the musicians played, the duration of daily practise and the duration of playing in the orchestra. The auditory stimuli were piano pieces. In the pieces only single tones were out-of-tune. The music was presented via two active loudspeakers at 70 dB SPL. We recorded the electrocardiogram (Wilson, V1, V2). The EEG was recorded from 28 channels (Brain Products GmbH, Munich) for 10 minutes while the music was played. We analyzed the EEG by FFT (Brain Analyzer, Brain Products GmbH, Munich). First results showed significantly changed levels in EEG activity towards higher frequencies in musicians, when out-of-tune tones were presented in the piano piece. In non-musicians the EEG activity was unchanged and they were unable to tell whether they had heard dissonant tones. We conclude therefore that musicians are trained to percept and to process musical signals in a more specific manner than non-musicians. This information is relevant to assess hearing ability in musicians.

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