Effects of subjective musical experiences on the brain: Evidence from fMRI

Gaeta F¹, Vitale A¹, Di Salle F¹, Esposito F¹,*
¹Department of Medicine and Surgery, University of Salerno, Baronissi (SA), Italy
(*faesposi@unisa.it)

Abstract - The effects of music on the brain are subject of many studies. In recent years music is used as aid in many diseases, such as autism, dementia, pain control [1] and movement disorders (Parkinson Disease, PD) [2]. Recent studies propose to use the response to musical stimuli in the evaluation of consciousness in vegetative states [3]. The present study aims to investigate the brain areas involved in selected musical experiences using functional magnetic resonance (fMRI).

Nine healthy subjects, not musicians, were involved in the study, and listened to different music tracks during two fMRI sessions at 3 Tesla. Music tracks were songs with (without) particular meaning in subjects' lives or pieces with (without) empathic content. A multi-subject general linear model analysis was conducted to detect activations of music listening in the contrast between the two experimental conditions in each session. Regional effects were considered statistically significant for compact clusters with 20 or more voxels exceeding the threshold t(8)=2.3 (p<0.05).

We found differential activations in response to subjective meaning and empathic content in cortical areas that are respectively involved in the control of movement (supplementary motor cortex, Broadmann Area BA6, Fig.1) and in consciousness processes (posterior cingulate cortex, BA31, Fig.2).

Our results suggest that music experiences can trigger movement and consciousness brain processes [4]. These findings may gather a new perspective in the use of music stimuli in movement and consciousness disorders, encouraging the development of novel techniques for treating movement and consciousness disorders and for music-based training in autism [5].

Keywords: music, fmri, brain, emotion, music processing, movement disorders, autism

REFERENCES


