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# Time-frequency EEG differences between patients with depression and healthy controls during the anticipation of neutral and emotional faces

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## Abstract

In the present study we applied time-frequency analysis to the electrical brain activity elicited by the cue presented before neutral or emotional face in the implicit emotion recognition task. 128-channel EEG was recorded in healthy volunteers (12 female and 7 male) and depressed patients (12 female and 7 male) while they pressed different buttons for human and animal faces. Half of the images were neutral and half were showing aggressive people or animals. The pictures were preceded by the cue (simple abstract pattern, one for each picture category), which meaning was not explained to the participants. Morlet wavelet-transform was performed in 3-45 Hz range for EEG recorded between cue and picture, and analyzed for human faces only: HN (human neutral) and HE (human emotional). The statistical comparison of HE vs. HN resulted into several time-frequency clusters in 10-20Hz, 20-35 Hz, and 33-45Hz. The number of clusters in controls was lesser than in patients. The spectral power was higher during the anticipation of emotional faces for all frequencies, which is consistent with literature sources on real aversive stimuli presentation. In the control group, HE vs HN differences were observed in the right hemisphere, whereas in the patient group the differences were mainly located in the right anterior and left posterior scalp regions. It looks like the differences in the induced activity in patients and controls during the neutral vs. emotional face expectation display patterns of brain areas similar to those observed in our slow wave (CNV) analysis of the same data.

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