Research report

Electrophysiological evidence of a typical cognitive distortion in bipolar disorder

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Abstract

Patients suffering from bipolar disorder often report negative thoughts and a bias towards negative environmental stimuli. Previous studies show that this mood-congruent attentional bias could be mediated by dysfunctions in anterior limbic regions. The Error-Related Negativity (ERN), which originates in the anterior cingulate cortex (ACC), has been used to research this negativity bias in depressed patients, and could also help to better understand the underlying mechanisms causing the negativity bias in bipolar patients.

In this study we investigated error processing in patients with bipolar disorder. Acute depressive bipolar patients (n = 20) and age-matched healthy controls (n = 20) underwent a modified Eriksen Flanker Task to assess test performance and two error-related event-related potentials (ERPs), i.e., the ERN and Error Positivity (Pe) were measured by EEG. Half of the patients were measured again in a euthymic state.

We found similar ERN amplitudes in bipolar patients as compared to healthy controls, but significantly reduced Pe amplitudes. Moreover, acutely depressed bipolar patients displayed an ERN and Pe even if they responded accurately or too slow, which indicates that correct responses are processed in a way similar to wrong responses. This can be interpreted as a psychophysiological correlate of typical cognitive distortions in depression, i.e., an erroneous perception of personal failures. This biased error perception partially remained when patients were in a euthymic state.

Abbreviations: ERN, Error-related negativity; Pe, Error-related Positivity; ACC, anterior cingulate cortex; MADRS, Montgomery Asperger Depression Rating Scale; YMRS, Young Mania Rating Scale.

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Together, our data indicate that aberrant error processing of bipolar patients may be regarded a trait marker possibly reflecting a risk factor for depressive relapses in bipolar disorder.
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