

How do happiness and sadness circuits contribute to bipolar disorder?

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Bipolar disorder is a severe mood disorder characterized by unpredictable and dramatic mood swings between the highs of mania and lows of depression. These mood episodes occur among periods of 'normal mood', termed euthymia.

Prior research has clearly shown that brain emotion circuitry is dysregulated in individuals diagnosed with bipolar disorder. It is thought that these disturbances impair one's ability to control emotion and contribute to mood episodes.

Continuing this line of research, the January 15th issue of [Biological Psychiatry](#) reports the results of a study conducted by scientists from Indiana University School of Medicine. These investigators used functional [magnetic resonance imaging](#) (fMRI) to investigate which areas of the brain showed abnormal activation while patients in different mood phases of bipolar disorder tried to control their response to emotional and non-emotional material.

This allowed them to analyze [brain activation patterns](#) based on patient mood (manic, depressed, or euthymic) and stimuli type (emotion versus no emotion and happy versus sad). Because medication effects on brain activation have been observed in some studies, the researchers recruited only unmedicated volunteers.

They found that bipolar depressed patients abnormally activated brain areas when they had to withhold responses to sad faces. Manic patients,

on the other hand, had abnormal activation regardless of whether they were trying to withhold response to sad faces, [happy faces](#) or non-emotional material. Even the euthymic bipolar subjects showed abnormal activation of cortical areas of the brain while withholding responses to emotional faces.

These findings suggest that distinct circuit dysfunctions may contribute to different features of emotion dysregulation in bipolar disorder.

Professor and senior author Dr. Amit Anand said, "This study provides important information regarding [brain areas](#) that may be important in controlling response to emotional material and the functional abnormalities in these areas in mood disorders."

"It is interesting that subtly different circuits distinguish symptomatic and non-symptomatic patients with bipolar disorder when they are suppressing their happy and sad reactions," commented Dr. John Krystal, Editor of *Biological Psychiatry*. "These findings may have implications for the refinement of circuit-based treatments for bipolar disorder including neurostimulation and psychotherapy."

More information: Hummer, T. Emotional Response Inhibition in Bipolar Disorder: A Functional Magnetic Resonance Imaging Study of Trait- and State-Related Abnormalities. *Biological Psychiatry*, Volume 73, Issue 2 (January 15, 2013). [doi: 10.1016/j.biopsych.2012.06.036](https://doi.org/10.1016/j.biopsych.2012.06.036)

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