

# Brain patterns in ADHD and bipolar disorder

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Researchers identify unique and shared brain patterns in ADHD and bipolar disorder, which could aid diagnosis and treatment in the future.

A new King's College London study has identified both unique and shared [brain patterns](#) in attention-deficit/hyperactivity disorder (ADHD) and [bipolar disorder](#) (BD), which could, in the future, help clinicians more accurately diagnose and treat the conditions. The research is published today in *Psychological Medicine*.

ADHD and BD are common psychiatric conditions in adults and both are associated with severe impairment and high risk for negative outcomes. Due to the overlap of certain symptoms, including emotional instability, restlessness and distractibility, there can be uncertainty regarding the distinction between the two disorders in some cases, which can lead to incorrect diagnosis and treatment.

King's researchers recorded the [brain activity](#) of 20 women with ADHD, 20 women with BD and 20 women without either disorder using EEG (electroencephalography), which measures patterns of brain activity using non-invasive electrodes placed on the scalp.

These brain patterns were assessed while participants performed a computerised cognitive task. Participants were asked to respond to the letter 'X' following an 'O' and to withhold their responses if 'O' did not precede an 'X'. This assessment was designed to measure levels of attention and the ability to inhibit an incorrect response.

Women in the control group showed an expected increase in brain activity when withholding (or inhibiting) their responses, whereas a significantly smaller [brain response](#) was observed in both women with ADHD and women with BD. This suggests that when the ADHD and BD groups needed to inhibit incorrect responses on the tasks, their brains were not processing the information in the same way as controls. According to the authors, this abnormal brain response may explain the inhibition deficits and impulsivity found in both disorders.

However, it was women with BD who showed an additional impairment. Compared to the ADHD and control groups, they displayed a weaker brain response related to the ability to monitor their own performance and select correct responses. The researchers suggest that, for [women](#) with BD, their brains may work less efficiently when it comes to monitoring their own performance on a task.

Giorgia Michelini, PhD Student in the MRC Social, Genetic and Developmental Psychiatry Centre at the Institute of Psychiatry, Psychology & Neuroscience (IoPPN), King's College London, said: 'Assigning the correct diagnosis for ADHD and bipolar disorder is absolutely crucial as the treatment options for these conditions are different - whether that be stimulant medication for ADHD or mood stabilisers for BD.'

Professor Jonna Kuntsi, also of the IoPPN at King's College London, said: 'The identification of distinct brain patterns between these disorders may in the future serve as a 'biomarker' to aid in the accurate diagnosis of ADHD and BD in the case of people presenting with features of both conditions.'

**More information:** Timothy E. Wilens et al. Understanding Attention-Deficit/Hyperactivity Disorder from Childhood to Adulthood, *Postgraduate Medicine* (2010). [DOI: 10.3810/pgm.2010.09.2206](https://doi.org/10.3810/pgm.2010.09.2206)

Provided by King's College London

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