

# Bipolar disorder: Mind-body connection suggests new directions for treatment, research

May 24 2011

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A new study by motor control and psychology researchers at Indiana University suggests that postural control problems may be a core feature of bipolar disorder, not just a random symptom, and can provide insights both into areas of the brain affected by the psychiatric disorder and new potential targets for treatment.

Problems with balance, postural control and other [motor control](#) issues are frequently experienced by people with mood and psychiatric disorders such as bipolar disorder and schizophrenia, and neurological disorders such as Huntington's and [Parkinson's disease](#), but research into the connections is scant.

If problems with postural control -- maintaining balance while holding oneself upright -- are a core component of bipolar disorder, as the study indicates, the researchers say it is possible that the motor abnormalities could appear before other symptoms, signaling an increased risk for the disorder.

It raises the question of whether therapies that improve motor symptoms may also help mood disorders, said Amanda R. Bolbecker, lead author of the study "Postural control in bipolar disorder: Increased sway area and decreased dynamical complexity," published last week in the *"Public Library of Science ONE."*

"For a number of [psychological disorders](#), many different psychiatric treatments and therapies have been tried, with marginal effects over the long term. Researchers are really starting to look at new targets," said Bolbecker, research scientist in the Department of Psychological and Brain Sciences in IU's College of Arts and Sciences. "Our study suggests that [brain areas](#) traditionally believed to be responsible for [motor behavior](#) might represent therapeutic targets for bipolar disorder."

The "[PLoS One](#)" article is available at <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0019824>.

Try as we might, humans cannot stand perfectly still.

"Instead, we make small adjustments at our hips and ankles based on what our eyes, muscles, ligaments, tendons, and semi-circular canals tells us," said S. Lee Hong, assistant professor in the Department of Kinesiology in IU's School of Health, Physical Education and Recreation and a study co-author. "The better these sensory sources are integrated, the less someone sways."

The study begins with the understanding that areas of the brain that are critical for motor control, mainly the cerebellum, basal ganglia and brain stem, also aid in mood regulation and are areas where abnormalities often are found in people with bipolar disorder. Postural sway -- a measure of the degree of endless adjustments people make in an attempt to stand still -- is considered a sensitive gauge of motor control that likely is affected by these abnormalities.

In the study, participants who had bipolar disorder displayed more postural sway, particularly when their eyes were closed, than study participants who had no psychological disorders. The troubles, which involved the study participants' proprioception, or ability to process non-visual sensory information related to balance, were not affected by their

mood or the severity of their disorder.

"It appears that people with bipolar disorder process sensory information differently and this is seen in their inability to adapt their movement patterns to different conditions, such as eyes open vs. eyes closed or feet together vs. feet apart," said Hong, whose research focuses on how humans control motion. "The different conditions will cause people to use the information their senses provide differently, in order to allow them to maintain their balance."

Bipolar disorder, formerly known as manic-depressive illness, is a severe psychiatric disorder characterized by extreme, debilitating mood swings and unusual shifts in a person's energy and ability to function.

The study involved 16 people (seven women) with bipolar disorder and 16 age-matched people (nine women) who had no psychiatric disorders. They each stood barefoot and as still as possible on a piece of equipment called a force platform, which measured various aspects of postural sway as they stood with their eyes open and feet close together, eyes open and feet shoulder-width apart, eyes closed and feet together, and eyes closed and feet apart. The measurements during each 2-minute pose included such factors as the area covered by a person's circular sway, how quickly they revolved and the degrees by which the sway moved more front to back or side to side.

Here are more findings from the study:

- The study is unique, the researchers say, because it does not suggest a "global motor deficit," where people with bipolar disorder have movement problems all around. Instead, it suggests a specific problem adapting to changing sensory input -- when people close their eyes, they rely on a different sources of

sensory information, such as proprioception and the vestibular system.

- The study participants with bipolar disorder displayed a large decline in postural control when their eyes were closed, regardless of the position of their feet.
- A significant difference between the study groups involved their side-to-side postural control, which is largely a factor of the hips. The participants with bipolar disorder had less control. This difference was not seen in the front-to-back control, which relies on ankle adjustments. It is possible, the researchers wrote, that the participants with bipolar disorder might not have fully developed the control of posture using their hips, which is consistent with developmental factors contributing to bipolar disorder.

Research involving motor control, mood and [psychiatric disorders](#) is complicated by the fact that the primary treatment for these disorders is medication, which can have severe side effects including motor control problems. A limitation of Hong and Bolbecker's study is that they could not factor out the effects of the various kinds and combinations of medications taken by their study participants with [bipolar disorder](#).

Provided by Indiana University

Citation: Bipolar disorder: Mind-body connection suggests new directions for treatment, research (2011, May 24) retrieved 25 April 2024 from <https://medicalxpress.com/news/2011-05-bipolar-disorder-mind-body-treatment.html>

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