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EXTREME IRRITABILITY: IS IT CHILDHOOD BIPOLAR DISORDER?  
Brain's electrical signals provide clues.

Results of a new study may help improve the diagnosis and treatment of two debilitating childhood mental disorders -- pediatric bipolar disorder (BD) and a syndrome called severe mood dysregulation (SMD). When the brain's electrical signals were measured during mildly frustrating situations, researchers from the National Institute of Mental Health (NIMH), of the National Institutes of Health, found a very different pattern in children with SMD, compared with children who had BD. The results indicate that different brain mechanisms may lead to irritability in children with SMD, suggesting that they may have an illness other than BD and may require different treatments.

"These aren't children with the occasional bad moods you see in most kids. They're typically very ill, with symptoms that interfere with their lives in major ways. Establishing clear diagnostic criteria is an essential step toward making sure they get the help they need," said NIMH Director Thomas R. Insel, M.D.

Children have a comparatively low rate of BD, but the rate increases with age, to approximately 1 percent among adolescents. About 3 percent of pre-adolescent and adolescent youth are estimated to have SMD. Mood-stabilizing and antipsychotic medications are used to treat children with BD, although the data on their effectiveness are limited and several studies are underway. Since SMD was only recently defined, there are no systematic studies on its treatment, and children with SMD are often treated as if they have BD.

Defining pediatric BD is a major issue in child psychiatry, because the disorder tends to be severe in this age group and the rate of diagnosed cases is rising. Until recent years, most studies of BD were conducted in adults. Some researchers maintain that pediatric BD should be defined more broadly to include children with SMD, an assertion countered by the new finding. Results of the study were published in the February 2007 issue of the "American Journal of Psychiatry."

The classic definition of BD  
<<http://www.nimh.nih.gov/publicat/bipolarupdate.cfm>> includes extreme, sustained mood swings that range from over-excited, elated moods and irritability -- the manic phase of the disorder -- to depression. In contrast, children with SMD are extremely irritable and hyperactive, but

do not have clear-cut manic episodes.

One component of irritability is the tendency to get acutely frustrated when a goal is not met. Thus, through electroencephalograms (EEGs), the researchers could observe the brain's electrical signals that occurred during frustration while children with either disorder performed simple tasks.

The new study shows that clinicians some day could use biological measurements, such as EEGs, to help make psychiatric diagnoses, in combination with clinical symptoms. Currently, clinicians diagnose mental illnesses based on symptoms alone. The difficulty of diagnosing BD in children is compounded by the frequent co-occurrence of one or more other mental disorders.

"We're approaching the day when we'll be able to use neuroscience techniques to improve psychiatric diagnoses. Pediatric BD has some of the most pressing needs in this regard, because of its severity and because of questions about how to best make the diagnosis," said senior author Ellen Leibenluft, M.D., Chief of the Unit on Bipolar Spectrum Disorders in the Emotion and Development Branch of the NIMH Mood and Anxiety Disorders Research Program.

In this study, scientists obtained EEGs of 35 children with classic BD, 21 children with SMD, and 26 healthy children (average age 12 to 13) while they performed a task repeatedly; each time they did the task, they won or lost 10 cents. The task was frustrating because the children often lost money.

The researchers found that while both the children with BD and those with SMD became more frustrated than did healthy children performing the same task, the brain mechanisms associated with their frustration differed. Children with BD had an abnormality in the brain's P3 electrical signals, which measure ability to purposefully direct attention, but children with SMD had abnormalities in N1 signals, which occur when a stimulus grabs someone's attention. Both abnormalities suggest deficits in the brain's attention-related activity, but in different phases of that activity.

"If future research indicates that BD and SMD are two separate disorders, this could guide parents and physicians toward the right treatments," said first author Brendan Rich, Ph.D., of the NIMH Unit on Bipolar Spectrum Disorders. "A good example is that medication prescribed for symptoms seen in SMD, such as stimulant medication, might be inappropriate for a child with classically defined bipolar disorder," he said.

NIMH scientists Mariana Schmajuk, B.S., and Daniel Pine, M.D., also contributed to the research, as did University of Maryland scientists Koraly E. Perez-Edgar, Ph.D., ("currently at George Mason University") and Nathan A. Fox, Ph.D.

The National Institute of Mental Health (NIMH) mission is to reduce the

burden of mental and behavioral disorders through research on mind, brain, and behavior. More information is available at the NIMH website: <http://www.nimh.nih.gov/>.

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