

# Anxious girls' brains work harder

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This electrode cap was worn by participants in a Michigan State University psychology study that suggests anxious girls' brains work harder than boys'.  
Credit: Michigan State University

In a discovery that could help in the identification and treatment of anxiety disorders, Michigan State University scientists say the brains of anxious girls work much harder than those of boys.

The finding stems from an experiment in which college students performed a relatively simple task while their brain activity was measured by an [electrode](#) cap. Only girls who identified themselves as particularly anxious or big worriers recorded high [brain activity](#) when they made mistakes during the task.

Jason Moser, lead investigator on the project, said the findings may ultimately help [mental health professionals](#) determine which girls may be

prone to anxiety problems such as [obsessive compulsive disorder](#) or [generalized anxiety disorder](#).

"This may help predict the development of anxiety issues later in life for girls," said Moser, assistant professor of psychology. "It's one more piece of the puzzle for us to figure out why women in general have more [anxiety disorders](#)."

The study, reported in the *International Journal of Psychophysiology*, is the first to measure the correlation between worrying and error-related [brain responses](#) in the sexes using a scientifically viable sample (79 female students, 70 males).

Participants were asked to identify the middle letter in a series of five-letter groups on a computer screen. Sometimes the middle letter was the same as the other four ("FFFFFF") while sometimes it was different ("EEFEE"). Afterward they filled out questionnaires about how much they worry.

Although the worrisome female subjects performed about the same as the males on simple portions of the task, their brains had to work harder at it. Then, as the test became more difficult, the anxious females performed worse, suggesting worrying got in the way of completing the task, Moser said.

"Anxious girls' brains have to work harder to perform tasks because they have distracting thoughts and worries," Moser said. "As a result their brains are being kind of burned out by thinking so much, which might set them up for difficulties in school. We already know that anxious kids – and especially anxious girls – have a harder time in some academic subjects such as math."

Currently Moser and other MSU researchers are investigating whether

estrogen, a hormone more common in women, may be to blame for the increased brain response. Estrogen is known to affect the release of dopamine, a neurotransmitter that plays a key role in learning and processing mistakes in the front part of the brain.

"This may end up reflecting hormone differences between men and women," Moser said.

In addition to traditional therapies for anxiety, Moser said other ways to potentially reduce worry and improve focus include journaling – or "writing your worries down in a journal rather than letting them stick in your head" – and doing "brain games" designed to improve memory and concentration.

Provided by Michigan State University

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