

Study suggests girls can 'rewire' brains to ward off depression

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Stanford researchers are using fMRI machines to monitor the brains of girls at risk of depression and learn more about their responses to stress.

(Medical Xpress) -- What if you could teach your brain to respond differently to things that make you feel sad, down or stressed out? What if doing that helped ward off depression?

Early findings from an ongoing Stanford study of [girls](#) at risk of becoming depressed suggest that such rewiring is possible – and is surprisingly easy.

The results show a promising new strategy to prevent the onset of [depression](#) – one that researchers hope to eventually apply to anyone at risk of suffering the debilitating disease.

The study, led by psychology Professor Ian Gotlib, focuses on 10- to

14-year-old girls whose mothers are, or have been, depressed. Previous research has shown that these girls have a significantly higher risk of developing depression than do children with no family history.

In one experiment, researchers use a functional magnetic resonance imaging (fMRI) machine to see, in real time, how the girls' brains react when they look at disturbing images, such as photos of accidents.

The brains of people who are depressed or at risk of becoming depressed overreact to negative experiences. Their bodies respond with increased heart rate, blood pressure, cortisol production and other physical indicators of stress. A depressive episode may not be far behind.

During the scan, the researchers watch how much blood flows to each part of the brain. They pay particular attention to the amygdala region.

"Everybody activates the amygdala to some extent when they see a negative picture. We have found that depressed adults and children at risk for depression activate it a lot more. And that can impair their day-to-day functioning," Gotlib said.

While undergoing the fMRI, the girls watch the level of their brain activity on a graph. The researchers then ask the girls to try to dampen the response by thinking about more positive experiences, such as going to the beach or playing with pets.

"They see a line and we say to them, 'We'd like you to make it lower,'" Gotlib said. "Many of us would think it's impossible – how can we change the level of activation in a particular part of our brain without affecting the level of activation in another part of our brain?"

But most of the time, the girls do it – much to their surprise and that of the researchers.

"Most of the girls are self-satisfied," said Paul Hamilton, a postdoctoral researcher working on the study. "They're happy but they also come across as a little amazed they were able to do it."

Hamilton said most people think of the brain as very hard to control.

"But, in fact, the [brain](#) is a very dynamic organ," he said. "We're happy we've been able to give them a potentially adaptive strategy to cope" when they are confronted with negative things.

The second experiment involves what appears to be a video game. Psychologists call it a "dot-probe task."

Hooked to a computer with wires attached to her head and wrist, a girl sees two faces appear on the screen. The faces are in pairs of neutral and happy or neutral and sad. A dot appears on the screen, and as the girl clicks on it, she is led away from a negative image and toward the positive. The task helps the girls learn to keep their brains from overreacting to negative stimuli.

Previous studies have shown that this type of activity is effective in helping people with generalized anxiety disorder.

Both experiments appear to help the girls tone down their brains' response to negative situations.

Gotlib said that when the girls are brought back to the Stanford Mood and Anxiety Disorders Laboratory several days after the experiments and put through a series of tests intended to induce stress, their bodies react differently.

"Their heartbeats are lower, their skin response is less. They've learned by doing these activities to be less reactive in the face of a stressor," said

Gotlib, who directs the lab. "That's a critical step in learning how to prevent the onset of a depressive episode."

The study, which is funded by the National Institute of Mental Health, has been under way for less than a year and builds on peer-reviewed experiments examining risk factors for becoming depressed and the family connections of the disease.

There have been about 20 participants so far in the current study, but Gotlib said that over the course of the study, which could last for five or 10 more years, more than 100 girls are expected to take part.

Despite the small sample, the early results suggest the girls can change their reactivity to negative information and lower their stress levels, which should help ward off depression.

"None of this is to cure depression," Gotlib said. "But my hope is we can prevent the onset of a first episode."

Provided by Stanford University

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