

Depression saps endurance of the brain's reward circuitry

21 December 2009, by Mel Charbonneau

A new study at the University of Wisconsin-Madison suggests that depressed patients are unable to sustain activity in brain areas related to positive emotion.

The study challenges previous notions that individuals with depression show less [brain activity](#) in areas associated with positive emotion. Instead, the new data suggest similar initial levels of activity, but an inability to sustain them over time. The new work was reported online this week (Dec. 21) in the [Proceedings of the National Academy of Sciences](#).

"Anhedonia, the inability to experience pleasure in things normally rewarding, is a cardinal symptom of depression," explains UW-Madison graduate student Aaron Heller, who led the project.

"Scientists have generally thought that anhedonia is associated with a general reduction of activity in brain areas thought to be important for positive emotion and reward. In fact, we found that depressed patients showed normal levels of activity early on in the experiment. However, towards the end of the experiment, those levels of activity dropped off precipitously.

"Those depressed subjects who were better able to sustain activity in brain regions related to positive emotion and reward also reported higher levels of positive emotion in their everyday experience," Heller continues.

"Being able to sustain and even enhance one's own positive [emotional experience](#) is a critical component of health and well-being," notes the study's senior author, Richard Davidson, professor of psychology and psychiatry and director of both the UW-Madison Center for Investigating Healthy Minds, and the Waisman Laboratory for Brain Imaging and Behavior. "These findings may lead to therapeutic interventions that enable [depressed individuals](#) to better sustain positive emotion in their daily lives."

During the study, 27 depressed patients and 19 control participants were presented with visual images intended to evoke either a positive or a negative emotional response. While viewing these images, participants were instructed to use cognitive strategies to increase, decrease or maintain their emotional responses to the images by imagining themselves in similar scenarios. Heller and colleagues used functional magnetic resonance imaging (fMRI) to measure [brain](#) activity in the target areas. The scientists examined the extent to which activation in the brain's reward centers to positive pictures was sustained over time.

Provided by University of Wisconsin-Madison

APA citation: Depression saps endurance of the brain's reward circuitry (2009, December 21) retrieved 11 October 2022 from

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