

Brain imaging reveals reduced brain connections in people with generalized anxiety disorder

September 4 2012, by Susan Lampert Smith

(Medical Xpress)—A new University of Wisconsin-Madison imaging study shows the brains of people with generalized anxiety disorder (GAD) have weaker connections between a brain structure that controls emotional response and the amygdala, which suggests the brain's "panic button" may stay on due to lack of regulation.

Anxiety disorders are the most common class of mental disorders and GAD, which is characterized by excessive, uncontrollable worry, affects nearly 6 percent of the population.

Lead author Dr. Jack Nitschke, associate professor of psychiatry in the UW School of Medicine and Public Health, says the findings support the theory that reduced communications between parts of the brain explains the intense anxiety felt by people with GAD.

In this case, two types of scans showed the amygdala, which alerts us to threat in our surroundings and initiates the "fight-or-flight" response, seems to have weaker "white matter" connections to the prefrontal and [anterior cingulate cortex](#) (ACC), the center of [emotional regulation](#).

The researchers did two types of imaging—[diffusion tensor imaging](#) (DTI) and functional magnetic resonance (fMRI)—on the brains of 49 GAD patients and 39 healthy volunteers. Compared with the healthy volunteers, the imaging showed the brains of people with GAD had

reduced connections between the prefrontal and anterior cingulate cortex and the amygdala via the uncinate fasciculus, a primary "white matter" tract that connects these [brain regions](#). This reduced connectivity was not found in other white matter tracts elsewhere in their brains.

"We know that in the brain, if you use a circuit you build it up, the way you build muscle by exercise," says Nitschke, a [clinical psychologist](#) who treats patients with [anxiety disorders](#) and does research at the UW-Madison's Waisman Center.

Nitschke says that researchers wonder if this weak connection results in the intense anticipatory anxiety and worry that is the hallmark of GAD, because the ACC is unable to tell the amygdala to "chill out." It also suggests that behavioral therapy that teaches patients to consciously exercise this emotional regulation works to reduce anxiety by strengthening the connection.

"It's possible that this is exactly what we're doing when we teach patients to regulate their reactions to the negative events that come up in everyone's lives," Nitschke says. "We can help build people's tolerance to uncontrollable future events by teaching them to regulate their emotions to the uncertainty that surrounds those events.

Other UW-Madison members of the study team include Do Tromp, Daniel Grupe, Desmond Oathes, Daniel McFarlin, Paric Hernandez, Tammi Kral, Jee Eun Lee, Marie Adams, and Andrew Alexander.

The study was published today in the *Archives of General Psychiatry*, a journal of the American Medical Association.

Provided by University of Wisconsin-Madison

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