

# Tired and edgy? Sleep deprivation boosts anticipatory anxiety

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Sleep deprivation can drive up anticipatory anxiety in even healthy adults, new study shows. Credit: iStockphoto

(Medical Xpress)—UC Berkeley researchers have found that a lack of sleep, which is common in anxiety disorders, may play a key role in ramping up the brain regions that contribute to excessive worrying.

Neuroscientists have found that [sleep deprivation](#) amplifies anticipatory anxiety by firing up the brain's amygdala and [insular cortex](#), regions associated with emotional processing. The resulting pattern mimics the abnormal [neural activity](#) seen in [anxiety disorders](#). Furthermore, their research suggests that innate worriers – those who are naturally more anxious and therefore more likely to develop a full-blown anxiety disorder – are acutely vulnerable to the impact of insufficient [sleep](#).

"These findings help us realize that those people who are anxious by nature are the same people who will suffer the greatest harm from [sleep](#)

[deprivation](#)," said Matthew Walker, a professor of psychology and neuroscience at UC Berkeley and senior author of the paper, to be published tomorrow (Wednesday, June 26) in the *Journal of Neuroscience*.

The results suggest that people suffering from such maladies as [generalized anxiety disorder](#), panic attacks and post-traumatic stress disorder, may benefit substantially from [sleep](#) therapy. At UC Berkeley, psychologists such as Allison Harvey, a co-author on the *Journal of Neuroscience* paper, have been garnering encouraging results in studies that use sleep therapy on patients with depression, bipolar disorder and other [mental illnesses](#).

"If sleep disruption is a key factor in [anxiety disorders](#), as this study suggests, then it's a potentially treatable target," Walker said. "By restoring good quality sleep in people suffering from anxiety, we may be able to help ameliorate their excessive worry and disabling fearful expectations."

While previous research has indicated that sleep disruption and psychiatric disorders often occur together, this latest study is the first to causally demonstrate that [sleep loss](#) triggers excessive anticipatory brain activity associated with anxiety, researchers said.

"It's been hard to tease out whether [sleep loss](#) is simply a byproduct of anxiety, or whether sleep disruption causes anxiety," said Andrea Goldstein, a UC Berkeley doctoral student in neuroscience and lead author of the study. "This study helps us understand that causal relationship more clearly."

In their experiments, performed at UC Berkeley's Sleep and Neuroimaging Laboratory, Walker and his research team scanned the brains of 18 healthy young adults as they viewed dozens of images, first after a good night's rest, and again after a sleepless night. The images were either neutral, disturbing or

alternated between both.

Participants in the experiments reported a wide range of baseline anxiety levels, but none fit the criteria for a clinical anxiety disorder. After getting a full night's rest at the lab, which researchers monitored by measuring neural electrical activity, their brains were scanned via functional MRI as they waited to be shown, and then viewed 90 images during a 45-minute session.

To trigger anticipatory [anxiety](#), researchers primed the participants using one of three visual cues prior to each series of images. A large red minus sign signaled to participants that they were about to see a highly unpleasant image, such as a death scene. A yellow circle portended a neutral image, such as a basket on a table. Perhaps most stressful was a white question mark, which indicated that either a grisly image or a bland, innocuous one was coming, and kept participants in a heightened state of suspense.

When sleep-deprived and waiting in suspenseful anticipation for a neutral or disturbing image to appear, activity in the emotional brain centers of all the participants soared, especially in the amygdala and the [insular cortex](#). Notably, the amplifying impact of sleep deprivation was most dramatic for those people who were innately anxious to begin with.

"This discovery illustrates how important sleep is to our mental health," said Walker. "It also emphasizes the intimate relationship between sleep and psychiatric disorders, both from a cause and a treatment perspective."

Provided by University of California - Berkeley

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