

# Once a shy monkey, always a shy monkey? New study shows persistence of anxiety

July 2 2008

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We all know people who are tense and nervous and can't relax. They may have been wired differently since childhood.

New research by the HealthEmotions Research Institute and Department of Psychiatry at the University of Wisconsin School of Medicine and Public Health (SMPH) and published in *PLoS ONE* indicates that the brains of those suffering from anxiety and severe shyness in social situations consistently respond more strongly to stress, and show signs of being anxious even in situations that others find safe.

Dr. Ned Kalin, chairman of the UW Department of Psychiatry and HealthEmotions Research Institute, in collaboration with graduate student Andrew Fox and others, has published a new study on anxious brains in the online journal *PLoS ONE* on July 2.

The study looked at brain activity, anxious behaviour, and stress hormones in adolescent rhesus monkeys, which have long been used as a model to understand anxious temperament in human children. Anxious temperament is important because it is an early predictor of the later risk to develop anxiety, depression, and drug abuse related to self medicating. The researchers found that those individuals with the most anxious temperaments showed higher activity in the amygdala, a part of the brain that regulates emotion and triggers reactions to anxiety, such as the fight or flight response. These anxious monkeys had more metabolic activity in the amygdala in both secure and threatening situations.

"The brain machinery underlying the stress response seems to be always on in these individuals," said Kalin, "even in situations that others perceive as safe and secure."

Rhesus monkeys were graded on their anxious temperament, then exposed to situations that ranged from being secure at home with their cage-mates, to being alone, to being confronted by an unfamiliar person. This unknown person stood in front of the monkey presenting her facial profile to the monkey while avoiding any eye contact.

The adolescent monkeys received an injection of FDG, a radioactive substance similar to glucose that lights up the active parts of the brain when the monkeys are imaged with Positron Emission Tomography (PET). Whether in a secure environment or a more uncertain and possibly scary one, the nervous monkeys had more brain activity in the amygdala and surrounding "stress response" parts of the brain. The increased amygdala activity corresponded to higher levels of "freezing" behaviour, fewer vocalizations and higher levels of the stress hormone cortisol in the anxious monkeys.

When the monkeys were retested a year and a half later, the results were the same: the anxious monkeys still were more stressed out than their calmer peers when judged by the behavioural and physiological measures.

"We're looking for better ways to diagnose and treat mental illness," explains Kalin, about his ongoing work at HealthEmotions. "We're trying to understand how the brain influences mood, reactions to stress and physical health."

Psychiatrists have long known that an anxious temperament in childhood is a risk factor for developing anxiety disorders, depression and substance abuse. These new findings in young rhesus monkeys point to a

brain mechanism that is present early in life that predisposes to this disposition.

The current research suggests that the reason is it is hard for some one with an anxious temperament to "calm down" is because they are wired in a way that tends to keep them tense and anxious.

Source: Public Library of Science

Citation: Once a shy monkey, always a shy monkey? New study shows persistence of anxiety (2008, July 2) retrieved 2 May 2024 from <https://medicalxpress.com/news/2008-07-shy-monkey-persistence-anxiety.html>

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