

Men Are From Mars

Neuroscientists Find That Men And Women Respond Differently To Stress

April 1, 2008 — Functional magnetic resonance imaging of men and women under stress showed neuroscientists how their brains differed in response to stressful situations. In men, increased blood flow to the left orbitofrontal cortex suggested activation of the "fight or flight" response. In women, stress activated the limbic system, which is associated with emotional responses.

There are many books and movies that highlight the psychological differences between men and women -- Men are From Mars, Women are From Venus, for example; but now, neurologists say they have brain images that prove male and female brains do work differently -- at least under stress.

Same species, different genders ... And now, a new high-tech scientific study reveals the differences between men and women may really start at the top. Researchers at the University of Pennsylvania used a high-tech imaging method to scan the brains of 16 men and 16 women. The subjects were placed inside a functional magnetic resonance imaging machine, or fMRI.

"Using this state-of-the-art functional magnetic resonance imaging technique, we try to directly visualize what the human brain does during stress," Jiongjiong Wang, Ph.D., a research assistant professor of radiology and neurology at the University of Pennsylvania in Philadelphia, told Ivanhoe.

Researchers then purposely induced moderate performance stress by asking the men and women to count backward by 13, starting at 1,600. Researchers monitored the subject's heart rate. They also measured the blood flow to the brain and checked for cortisol, a stress hormone.

When the scans were completed, neuroscientists consistently found differences between the men's stressed-out brains and the women's. Men responded with increased blood flow to the right prefrontal cortex, responsible for "fight or flight." Women had increased blood flow to the limbic system, which is also associated with a more nurturing and friendly response.

Doctors say this information may someday lead to a screening process for mood disorders. "In the future, when physicians treat patients -- especially depression, PTSD -- they need to take this into account that really, gender matters," Dr. Wang explains.

Other experts caution that hormones, genetics and environmental factors may influence these results, bringing to light yet another difference between men and women. Neuroscientists say the changes in the brain during stress response also lasted longer in women.

WHAT IS fMRI? Magnetic resonance imaging (MRI) uses radio waves and a strong magnetic field rather than X-rays to take clear and detailed pictures of internal organs and tissues. fMRI uses this technology to identify regions of the brain where blood vessels are expanding, chemical changes are taking place, or extra oxygen is being delivered.

These are indications that a particular part of the brain is processing information and giving commands to the body. As a patient performs a particular task, the metabolism will increase in the brain area responsible for that task, changing the signal in the MRI image. So by performing specific tasks that correspond to different functions, scientists can locate the part of the brain that governs that function.

FIGHT OR FLIGHT: Certain events act as "stressors," triggering the nervous system to produce hormones to respond to the perceived danger. Specifically, the adrenal glands produce more adrenaline and cortisol, releasing them into the bloodstream. This speeds up heart and breathing rates, and increases blood pressure and metabolism. These and other physical changes help us to react quickly and effectively under pressure.

This is known as the "stress response," or more commonly, as the "fight or flight response." But if even low levels of stress go on too long, it can be detrimental to one's health. The nervous system remains slightly activated and continues to pump out extra stress hormones over an extended period, leaving the person feeling depleted or overwhelmed, and weakening the body's immune system.

STRESS-REDUCING TIPS: There are several easy, practical things people can do to reduce the amount of stress in their lives. (1) Be realistic and don't try to be perfect, or expect others to be so. (2) Don't overschedule; cut out an activity or two when you start to feel overwhelmed. (3) Get a good night's sleep. (4) Get regular exercise to manage stress -- just not excessive or compulsive exercise -- and follow a healthy diet. (5) Learn to relax by building time into your schedule for reading or a nice long bath.