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Harmful Effects of Emotional Stress

Emotional Stress and Weight Gain

Under normal circumstances, cortisol is released in a diurnal cycle (day-night pattern) with morning levels (6 a.m.–8 a.m.) elevated (to get going) and evening levels lower (to support restful sleep). Emotional stress anxiety alters natural diurnal rhythms and excessive cortisol release (as a result the stress), causes glucocorticoids to break down protein into blood sugar (gluconeogenesis) and convert adipose tissue into fatty acids (lipogenesis). When the extra fatty acids are not burned up through physical exercise, the excess fats are stored as triglycerides on stomach and waistline (metabolic syndrome) to form extra belly fat. Metabolic Syndrome (documented by the American Heart Association, Mayo Clinic, etc.) affects 64% of adults over 20 years old – that's over 100 million Americans who struggle with their weight. In addition, metabolic syndrome is documented to be a direct threat to the cardiovascular system and coronary vascular disease and general heart health by raising cholesterol levels, blood pressure, and the threat of type 2 diabetes. Stress affects everyone, triggering a cortisol response that makes your body gain those love handles and belly fat that make you feel bad about yourself.

Medical Study Links Hostility and Heart Disease

The *Journal of the American Medical Association* published the results of a study of 374 men and women, aged 18-35 years old, which showed that individuals who rated high in anger, aggression, cynicism and other forms of hostility were more likely to develop hardening of the arteries at an early age. The test subjects were given the Cook-Medley hostility test (a well-established psychological test) at the beginning of the program, and then 5 and 10 years after initial testing. Medical researchers used an electron-beam tomography to measure heart artery calcification (hardening of the arteries). Scientists found those subjects with hostility scores above average had 2.5 times the risk of having coronary artery calcification (a form of cardiovascular disease) than individuals with below average scores. Doctors expressed hope that the results will convince young people to learn how to manage their emotional anger, aggression, cynicism and other forms of hostility to reduce their risk of heart attacks later in life.

Chronic Stress and Anxiety

Being stressed out for a long period of time (chronic stress) might increase anxiety. A new study published in *Behavioral Neuroscience*, the cause on stress hormones (such as cortisol and corticotropin-releasing hormone), which help people respond to immediate threats. However, if stress remains high, those hormones can boost anxiety and lead to mood disorders.

In their study, researchers spiked laboratory mice's drinking water with corticosterone, a stress hormone. Then the researchers exposed the mice to a high-frequency sound. They anticipated that constant corticosterone exposure would result in an exaggerated reaction to the loud sound. However, the mice under long-term exposure to corticosterone had a dulled reaction to the loud sound the first 10 times they heard it. The study suggests that long-term stress effects may have left those mice less equipped to handle a stressful event instead of improving their stress reactions. These findings may hold important clues about how chronic stress impacts mood disorders.

Loneliness

Research at the University of Chicago shows that loneliness is as unhealthy for the heart as being overweight or sedentary. Middle-aged and older adults reporting a high-degree of loneliness had blood pressure levels *10mm Hg - 30 mm Hg* higher. While the effects of loneliness on blood pressure increased with age, loneliness still remained a significant predictor of blood pressure

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Loneliness - continued

even after adjusting for age, alcohol use and depression. Although the physical mechanism isn't known for certain, previous studies have found greater peripheral vascular resistance in lonely individuals. **This resistance to blood flow could dangerously raise blood pressure over time.**

Chronic Stress Hormones Causes Mood Disorders

Medical researchers at Harvard Medical School (and its affiliate McLean Hospital) have produced research, appearing in *Behavioral Neuroscience* (published by the American Psychological Association) that provides "smoking gun" evidence confirming how long-term exposure of high levels of cortisol directly leads to the symptoms of depression. The experiment compared the impact of chronic corticosterone with the effects of acute corticosterone on stress anxiety behavior.

In their experiment, Paul Ardayfio, PhD candidate, and Kwang-Soo Kim, PhD (both of the Molecular Neurobiology Laboratory at McLean Hospital), exposed mice to short-term and long-term periods of stress hormones (in rodents cortisol manifests as corticosterone). Fifty-eight mice were given the stress hormone in their drinking water (rather than confusing results with stress inducing injections) for 17 to 18 day periods. The mice displayed pronounced fearful behavior, reluctance to explore new environments and dulled reactions to an alarming stimulus indicating that their nervous systems were overwhelmed. The conclusive evidence confirms a central axiom – stress hormone cortisol can directly trigger anxiety (which always appears with depression) and that **chronic exposure to cortisol has detrimental stress effects on brain and behavior.**

Stress and Aggression Reinforce Each Other, Creating a Vicious Cycle

In a study that appears in *Behavioral Neuroscience* (published by the American Psychological Association), scientists report they have discovered a fast, mutual, positive feedback loop between stress hormones and a brain-based aggression-control center in rats, whose neurophysiology is similar to humans. In an experiment involving 53 male rats, medical researchers examined whether stimulating the brain's aggression mechanism raised blood levels of a stress hormone and whether higher levels of the same stress hormone led to the kind of aggression elicited by that mechanism.

Using electrical stimulation of an aggression-related part of the rat hypothalamus (a mid-brain area associated with emotion), the rats suddenly released the stress hormone corticosterone (similar to cortisol, which humans release under stress) -- even without another severe stress related influence present. While it's well known that stress hormones prepare the body's physiology to fight or flee during stress, the results of the experiment show the very same hormones 'talk back' to the brain in order to facilitate fighting. In other words, stimulating the hypothalamic attack area led to higher stress hormones and higher stress hormones led to aggression, creating a feedback loop.

In conclusion, the authors stated, "Such a mutual facilitation may contribute to the precipitation and escalation of violent behavior under stressed conditions." They add that the resulting vicious cycle "would explain why aggressive behavior escalates so easily and is so difficult to stop once it has started, especially because corticosteroids rapidly pass through the blood-brain barrier." These conclusions can also explain why people who are not typically violent become violent in settings previously associated with aggression – their stress hormones rise, triggering the initiation of aggression, causing them to behave violently in somewhat benign circumstances.

Stress and Aggression Reinforce Each Other, Creating a Vicious Cycle - continued

These findings may help to explain **why the cortisol stress response that accompanies conflict may override the effect of therapies aimed at reducing violent behavior.**

Coronary Artery Spasm

A coronary artery spasm (as opposed coronary artery disease), is a temporary tightening (contraction) of the muscles in the artery's walls. This can result in a narrowing – and perhaps a brief closing – of heart coronary arteries, diminishing or even disrupting the blood flow to the myocardium (part of the heart muscle). If the spasm lasts long enough, it can lead to chest pain (angina) and possibly a heart attack (myocardial infarction). Coronary artery spasms may be triggered by extreme emotional stress anxiety and the use of illicit stimulant drugs, such as amphetamines and cocaine.

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