

# Chronic stress heightens vulnerability to diet-related metabolic risk

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New research out of UC San Francisco is the first to demonstrate that highly stressed people who eat a lot of high-fat, high-sugar food are more prone to health risks than low-stress people who eat the same amount of unhealthy food.

"Chronic [stress](#) can play an important role in influencing biology, and it's critical to understand the exact pathways through which it works." said Kirstin Aschbacher, PhD, an assistant professor in the UCSF Department of Psychiatry and lead author. "Many people think a calorie is a calorie, but this study suggests that two women who eat the same thing could have different metabolic responses based on their level of stress. There appears to be a stress pathway that works through diet – for example, it could be similar to what we see in animals, where [fat cells](#) grow faster in response to junk food when the body is chronically stressed."

Metabolic syndrome is a cluster of abnormalities— increased blood pressure, a high blood sugar level, excess body [fat](#) around the waist and abnormal cholesterol levels—that occur together, increasing a person's risk of heart disease, stroke and diabetes.

While this stress-junk food pathway has been well mapped out with rodents and primates, this study is the first to suggest the same pathways may be at work in chronically stressed humans, according to the researchers.

"We can see this relationship exists by simply measuring stress and dietary intake, and looking inside at metabolic health," said senior author Elissa Epel. "Diet appears to be a critical variable that can either amplify or protect against the metabolic effects of stress, but we still don't know the details of how much it takes. It will be helpful to see what happens in our next study, when we have high stress people eat a high sugar diet for a couple weeks."

The study, published online in the journal *Psychoneuroendocrinology*, looked at a group of 61 disease-free women; 33 were chronically stressed women caring for a spouse or parent with dementia, and 28 were women with low stress. Over the course of a year, the women reported their consumption of high sugar, high fat foods.

The researchers evaluated key biological markers associated with elevated metabolic risk. They measured participants' waistlines and their fat distribution, using ultrasound scans to assess deep abdominal fat deposits. They tested participants' insulin resistance, one of the core drivers of obesity and diabetes. They also used a blood test to measure stress hormones and oxidative damage to lipids and cell RNA, a marker that has predicted higher rates of death from diabetes. Oxidative damage of the genome is also an important outcome because it is one factor that can contribute to faster cellular aging.

"We found that more frequent high fat, high sugar consumption significantly predicted a larger waistline, more truncal fat, higher oxidative damage, and more insulin resistance, but only among the group of women exposed to [chronic stress](#)," said Aschbacher. "The chronically stressed women didn't report eating more high sugar, high fat foods than the low stressed [women](#); however, they did have higher levels of a stress-related biomarker, peripheral Neuropeptide Y (NPY)."

Based on what is known from animal studies, stress triggers greater

peripheral NPY which, in combination with [junk food](#), creates larger abdominal fat cells, and these cells may be more prone to metabolic dysregulation.

"The medical community is starting to appreciate how important chronic stress is in promoting and worsening early disease processes," said Aschbacher. "But there are no guidelines for 'treating' chronic stress. We need treatment studies to understand whether increasing stress resilience could reduce the [metabolic syndrome](#), obesity or diabetes."

Provided by University of California, San Francisco

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