

New study exploring the connection between short-term stress and resilience

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By Nina Bai [1]



Ancient practices like tai chi and yoga have long focused on breathing as a way to control the body's energies, and in recent years, they've been touted as antidotes to the stress of modern life. But can simply inhaling and exhaling a certain way fight stress and boost your health? Are there evidence-based interventions to reduce stress?

Researchers at UC San Francisco are launching a study to examine the impact of short-term positive-stress interventions, including breathing techniques, on mood and physiological health. They say it is the first to look at how brief periods of controlled stress could protect the body from long-term stress.

Chronic stress ? perhaps from a high-pressure job or caring for a sick relative ? has been linked with depression and earlier signs of aging, such as high inflammation and shorter telomere length, as well as earlier onset of diseases like cardiovascular disease and diabetes. The hope is that practices that promote so-called stress resilience may prevent or reverse these harmful changes, said Elissa Epel, PhD [2], professor of psychiatry, who is one of the leaders of the study.

The stress paradox



Mark Coleman (right), a Buddhist meditation teacher at Spirit Rock Insight Meditation Center, visited the lab of Elissa Epel (left), PhD, to work with her research team that is studying the impact of short-term positive-stress interventions on mood and physiological health. *[Photo by Susan Merrell]*

Epel thinks certain practices may activate a seemingly paradoxical process, known as hormesis, in which exposure to short-term stress actually makes cells more resilient. Unlike long-term stress from work or relationships, which wears out cells, brief periods of stress could do just the opposite.

?What we know from studies in cells and worms and mice is that short-term stress is life-lengthening,? said Epel.

In humans, short intense workouts or hyperventilation and breath-holding ? when done safely ? could create a healthy stress response in the body. But until now no one has rigorously tested this in humans.

“We are testing whether, when we apply stress in a manageable way, that’s improving cell-aging – such as turning on activities in the cell that clean out junk and debris and creating a younger cell,” said Epel.

Epel believes the effect should extend beyond cells to mood as well. “Short-term stress training may elevate positive mood and make us less vulnerable to feeling anxious or depressed when stressful things happen in our life,” she said. The new study is supported by a \$1.1 million gift from the John W. Brick Mental Health Foundation, which supports evidence-based research on how holistic treatments – such as exercise, nutrition, healthy lifestyle choices, and mind-body practices – benefit mental health.

Stress resilience takes practice

The researchers are recruiting healthy women experiencing high levels of psychological stress [3] to test out different daily habits and will assess their effect on stress, mood, and physical health. Every morning for several weeks, one group will meditate, another will do a brief, intense aerobic workout, and other groups will practice breathing techniques. One breathing technique, for example, involves a series of quick deep breaths followed by periods of breath-holding. These breathing techniques are becoming popular, but are relatively untested.

The researchers will examine how these three daily practices affect the women’s response to future stressors – how well their bodies regulate and maintain balance in the autonomic nervous system, the immune system, and metabolism, for example.

“This is a unique opportunity to test whether short-term stressors on the body can accumulate to long-term effects in psychological and physical resilience,” said Wendy Berry Mendes, PhD [4], Sarlo-Ekman Endowed Chair in the Study of Human Emotion, professor of psychiatry, and a co-leader of the study. “This logic is, in principle, similar to why exercise has benefits for our physical health, however, in this study we are looking at non-metabolically demanding tasks and examining if the same benefits might accrue.”

Evidence-based treatments



Victor and Lynne Brick, fitness executives, started their mental health foundation in memory of Victor's brother, John Brick. The foundation's first big project is the UCSF stress resilience study.

The researchers plan also to examine how the practices might relieve depressive symptoms and optimize interventions to help people with major depression. "The most commonly used treatments for depression are pharmaceuticals," said Epel. "But now it's clear that they don't work for the vast majority of people with depression, and their side effects can be serious. This underscores the need for both prevention and biobehavioral treatments."

Breathing strategies could be an accessible way for anyone to build their stress resilience. But until the study results come in, Epel said it's still a "big leap" to claim human health benefits of short-term stress based on worms, animals, and anecdotes. "That's why we're being extremely rigorous," she said. "We are grateful to the Brick Foundation for supporting innovative studies that could lead to new knowledge and treatments."

"We are very excited to sponsor this UCSF study," said Victor Brick, co-founder of the Brick Foundation. "We want to change the way people treat mental health and we think that evidence-based research is the best way to do that."

Further information

- [UCSF Stress and Resilience Study website](#) [3]

About UCSF Psychiatry

The UCSF Department of Psychiatry [5], UCSF Langley Porter Psychiatric Hospital and Clinics [6], and the Langley Porter Psychiatric Institute are among the nation's foremost resources in the fields of child, adolescent, adult, and geriatric mental health. Together they constitute one of the largest departments in the UCSF School of Medicine and the UCSF Weill Institute for Neurosciences, with a mission focused on research (basic, translational, clinical), teaching, patient care, and public service.

UCSF Psychiatry conducts its clinical, educational and research efforts at a variety of locations in Northern California, including UCSF campuses at Parnassus Heights, Mission Bay and Laurel Heights, UCSF Medical Center, UCSF Benioff Children's Hospitals, Zuckerberg San Francisco General Hospital and Trauma Center, the San Francisco VA Health Care System, and UCSF Fresno.

About the UCSF Weill Institute for Neurosciences

The UCSF Weill Institute for Neurosciences [7], established by the extraordinary generosity of Joan and Sanford I. "Sandy" Weill, brings together world-class researchers with top-ranked physicians to solve some of the most complex challenges in the human brain.

The UCSF Weill Institute leverages UCSF's unrivaled bench-to-bedside excellence in the neurosciences. It unites three UCSF departments—Neurology, Psychiatry, and Neurological Surgery—that are highly esteemed for both patient care and research, as well as the Neuroscience Graduate Program, a cross-disciplinary alliance of nearly 100 UCSF faculty members from 15 basic-science departments, as well as the UCSF Institute for Neurodegenerative Diseases, a multidisciplinary research center focused on finding effective treatments for Alzheimer's disease, frontotemporal dementia, Parkinson's disease, and other neurodegenerative disorders.

About UCSF

UC San Francisco (UCSF) [8] is a leading university dedicated to promoting health worldwide through advanced biomedical research, graduate-level education in the life sciences and health professions, and excellence in patient care. It includes top-ranked graduate schools of dentistry, medicine, nursing and pharmacy; a graduate division with nationally renowned programs in basic, biomedical, translational and population sciences; and a preeminent biomedical research enterprise.

It also includes UCSF Health [9], which comprises three top-ranked hospitals — UCSF Medical Center and UCSF Benioff Children's Hospitals in San Francisco [10] and Oakland [11] — as well as Langlely Porter Psychiatric Hospital and Clinics, UCSF Benioff Children's Physicians, and the UCSF Faculty Practice. UCSF Health has affiliations with hospitals and health organizations throughout the Bay Area. UCSF faculty also provide all physician care at the public Zuckerberg San Francisco General Hospital and Trauma Center, and the San Francisco VA Medical Center. The UCSF Fresno Medical Education Program is a major branch of the University of California, San Francisco's School of Medicine.

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Links

[1] <https://www.ucsf.edu/bio/nina-bai>

- [2] <https://profiles.ucsf.edu/elissa.epel>
- [3] <https://www.stressresilience.net/>
- [4] <https://profiles.ucsf.edu/wendy.mendes>
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