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Stanford researchers find mental health prescription: Nature

Study finds that walking in nature yields measurable mental benefits and may reduce risk of depression.



BY ROB JORDAN

[Stanford Woods Institute for the Environment](#)



Stanford Woods Institute for the Environment



A Stanford-led study finds quantifiable evidence that walking in nature could lead to a lower risk of depression

Feeling down? Take a hike.

A new study finds quantifiable evidence that walking in nature could lead to a lower risk of depression.

Specifically, the [study](#), published in *Proceedings of the National Academy of Science*, found that people who walked for 90 minutes in a natural area, as opposed to participants who walked in a high-traffic urban setting, showed decreased activity in a region of the brain associated with a key factor in depression.

“These results suggest that accessible natural areas may be vital for mental health in our rapidly urbanizing world,” said co-author [Gretchen Daily](#), the Bing Professor in Environmental Science and a senior fellow at the [Stanford Woods Institute for the Environment](#). “Our findings can help inform the growing movement worldwide to make cities more livable, and to make nature more accessible to all who live in them.”

More than half of the world’s population lives in urban settings, and that is forecast to rise to 70 percent

within a few decades. Just as urbanization and disconnection from nature have grown dramatically, so have mental disorders such as depression.

In fact, city dwellers have a 20 percent higher risk of anxiety disorders and a 40 percent higher risk of mood disorders as compared to people in rural areas. People born and raised in cities are twice as likely to develop schizophrenia.

Is exposure to nature linked to mental health? If so, the researchers asked, what are nature's impacts on emotion and mood? Can exposure to nature help "buffer" against depression?

Natural vs. urban settings

In the study, two groups of participants walked for 90 minutes, one in a grassland area scattered with oak trees and shrubs, the other along a traffic-heavy four-lane roadway. Before and after, the researchers measured heart and respiration rates, performed brain scans and had participants fill out questionnaires.

The researchers found little difference in physiological conditions, but marked changes in the brain. Neural activity in the subgenual prefrontal cortex, a brain region active during rumination – repetitive thought focused on negative emotions – decreased among participants who walked in nature versus those who walked in an urban environment.

"This finding is exciting because it demonstrates the impact of nature experience on an aspect of emotion regulation – something that may help explain how nature makes us feel better," said lead author [Gregory Bratman](#), a graduate student in Stanford's Emmett Interdisciplinary Program in Environment and Resources, the Stanford Psychophysiology Lab and the Center for Conservation Biology.

"These findings are important because they are consistent with, but do not yet prove, a causal link between increasing urbanization and increased rates of mental illness," said co-author [James Gross](#), a professor of psychology at Stanford.

Nature's services

It is essential for urban planners and other policymakers to understand the relationship between exposure to nature and mental health, the study's authors write. "We want to explore what elements of nature – how much of it and what types of experiences – offer the greatest benefits," Daily said.

In a previous [study](#), also led by Bratman, time in nature was found to have a positive effect on mood and aspects of cognitive function, including working memory, as well as a dampening effect on anxiety.

The studies are part of a growing body of research exploring the connection between nature and human well-being. The [Natural Capital Project](#), led by Daily, has been at the forefront of this work. The project focuses on quantifying the value of natural resources to the public and predicting benefits from investments in nature. It is a joint venture of the Stanford Woods Institute for the Environment, The Nature Conservancy, the World Wildlife Fund and the University of Minnesota's Institute on the Environment.

Coauthors of "Nature Experience Reduces Rumination and Subgenual Prefrontal Cortex Activation" include J. Paul Hamilton of the Laureate Institute for Brain Research and Kevin Hahn, a psychology research assistant at Stanford.

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