AMERICAN PSYCHOLOGICAL ASSOCIATION

FEATURE

Nurtured by nature

Psychological research is advancing our understanding of how time in nature can improve our mental health and sharpen our cognition

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Key points

- Spending time in nature is linked to both cognitive benefits and improvements in mood, mental health and emotional well-being.
- Feeling connected to nature can produce similar benefits to well-being, regardless of how much time one spends outdoors.

- Both green spaces and blue spaces (aquatic environments) produce well-being benefits. More remote and biodiverse spaces may be particularly helpful, though even urban parks and trees can lead to positive outcomes.

Be honest: How much time do you spend online each day?

With the internet becoming increasingly central to Americans' daily lives, 9 in 10 U.S. adults now say they go online every day, according to a 2024 report from the Pew Research Center. (https://www.pewresearch.org/internet/2024/01/31/americans-use-of-mobile-technology-and-home-broadband/) This includes 41% who report using the internet almost constantly. Some groups, including young adults and teens, are more likely to be constantly online than others: About 6 in 10 adults ages 18 to 29 (62%) say they are constantly online, compared with smaller shares of those in older age groups, including only 15% of those 65 and older.

Our increasing reliance on technology, combined with a global trend toward urban living, means many of us are spending less time outdoors—even as scientists compile evidence of the value of getting out into the natural world.

From a stroll through a city park to a day spent hiking in the wilderness, exposure to nature has been linked to a host of benefits, including improved attention, lower stress, better mood, reduced risk of psychiatric disorders, and even upticks in empathy and cooperation. Most research so far has focused on green spaces such as parks and forests, and researchers are now also beginning to study the benefits of blue spaces, places with river and ocean views. But nature comes in all shapes and sizes, and psychological research is still fine-tuning our understanding of its potential benefits. In the process, scientists are charting a course for policymakers and the public to better tap into the healing powers of Mother Nature.

"There is mounting evidence, from dozens and dozens of researchers, that nature has benefits for both physical and psychological human well-being," says Lisa Nisbet, PhD, a psychologist at Trent University in Ontario, Canada, who studies connectedness to nature. "You can boost your mood just by walking in nature, even in urban nature. And the sense of connection you have

with the natural world seems to contribute to happiness even when you're not physically immersed in nature."

*[**Related:** Bringing nature into treatment (/monitor/2020/04/nature-sidebar)]*

Cognitive benefits

Spending time in nature can act as a balm for our busy brains. Both correlational and experimental research have shown that interacting with nature has cognitive benefits—a topic University of Chicago psychologist Marc Berman, PhD, and his student Kathryn Schertz explored in a 2019 review. They reported, for instance, that green spaces near schools promote cognitive development in children and green views near children's homes promote self-control behaviors. Adults assigned to public housing units in neighborhoods with more green space showed better attentional functioning than those assigned to units with less access to natural environments. And experiments have found that being exposed to natural environments improves working memory, cognitive flexibility, and attentional control, while exposure to urban environments is linked to attention deficits (*Current Directions in Psychological Science*, Vol. 28, No. 5, 2019 (https://doi.org/10.1177/0963721419854100)).

Researchers have proposed a number of ideas to explain such findings, as Nisbet and colleagues described in a review of the benefits of connection with nature (Capaldi, C. A., et al., *International Journal of Wellbeing*, Vol. 5, No. 4, 2015 (https://doi.org/10.5502/ijw.v5i4.449)). The biophilia hypothesis argues that since our ancestors evolved in wild settings and relied on the environment for survival, we have an innate drive to connect with nature. The stress reduction hypothesis posits that spending time in nature triggers a physiological response that lowers stress levels. A third idea, attention restoration theory, holds that nature replenishes one's cognitive resources, restoring the ability to concentrate and pay attention.

The truth may be a combination of factors. "Stress reduction and attention restoration are related," Nisbet points out. "And because of the societal problems we're dealing with in terms of stress, both of these theories have gotten a lot of attention from researchers."

Experimental findings show how impressive nature's healing powers can be—just a few moments of green can perk up a tired brain. In one example, Australian researchers asked students to engage in a dull, attention-draining task in which they pressed a computer key when certain numbers flashed on a screen. Students who looked out at a flowering green roof for 40 seconds midway through the task made significantly fewer mistakes than students who paused for 40 seconds to gaze at a concrete rooftop (Lee, K. E., et al., *Journal of Environmental Psychology*, Vol. 42, No. 1, 2015 (https://doi.org/10.1016/j.jenvp.2015.04.003)).

Even the sounds of nature may be recuperative. Berman and colleagues found that study participants who listened to nature sounds like crickets chirping and waves crashing performed better on demanding cognitive tests than those who listened to urban sounds like traffic and the clatter of a busy café (Van Hedger, S. C., et. al., *Psychonomic Bulletin & Review*, Vol. 26, No. 2, 2019 (https://doi.org/10.3758/s13423-018-1539-1)).

Nature and happiness

While such laboratory experiments are intriguing, they don't fully capture the diverse benefits that go hand in hand with time spent in the outdoor world, says Cynthia Frantz, PhD, a professor of psychology and environmental studies at Oberlin College in Ohio. "Spending time in nature has cognitive benefits, but

it also has emotional and existential benefits that go beyond just being able to solve arithmetic problems more quickly," she notes.

In a review of the research, Gregory Bratman, PhD, an assistant professor at the University of Washington, and colleagues shared evidence that contact with nature is associated with increases in happiness, subjective well-being, positive affect, positive social interactions, and a sense of meaning and purpose in life, as well as decreases in mental distress (*Science Advances*, Vol. 5, No. 7, 2019 (https://doi.org/10.1126/sciadv.aax0903)).

Other work suggests that when children get outside, it leaves a lasting impression. In a study of residents of Denmark, researchers used satellite data to assess people's exposure to green space from birth to age 10, which they compared with longitudinal data on individual mental health outcomes. The researchers examined data from more than 900,000 residents born between 1985 and 2003. They found that children who lived in neighborhoods with more green space had a reduced risk of many psychiatric disorders later in life, including depression, mood disorders, schizophrenia, eating disorders, and substance use disorder. For those with the lowest levels of green space exposure during childhood, the risk of developing mental illness was 55% higher than for those who grew up with abundant green space (Engemann, K., et al., *PNAS*, Vol. 116, No. 11, 2019 (https://doi.org/10.1073/pnas.1807504116)).

There is even evidence that images of nature can be beneficial. Frantz and colleagues compared outcomes of people who walked outside in either natural or urban settings with those of people who watched videos of those settings. They found that any exposure to nature—in person or via video—led to improvements in attention, positive emotions, and the ability to reflect on a life problem. But the effects were stronger among those who actually spent time outside (Mayer, F. S., et al., *Environment and Behavior*, Vol. 41, No. 5, 2009 (https://doi.org/10.1177/0013916508319745)).

More recently, scientists have begun exploring whether virtual reality nature experiences are beneficial. In a review of this work, Mathew White, PhD, an environmental psychologist at the University of Exeter in England, and colleagues concluded that while the real deal is best, virtual reality can be a worthwhile substitute for people who are unable to get outdoors, such as those

with mobility problems or illness (*Neuropsychiatric Disease and Treatment*, Vol. 14, 2018 (https://doi.org/10.2147/NDT.S179038)).

Nature might also make us nicer—to other people as well as to the planet. John Zelenski, PhD, a professor of psychology at Carleton University in Ontario, Canada, and colleagues showed undergraduates either nature documentaries or videos about architectural landmarks. Then the participants played a fishing game in which they made decisions about how many fish to harvest across multiple seasons. Those who had watched the nature video were more likely to cooperate with other players, and also more likely to make choices that would sustain the fish population (*Journal of Environmental Psychology*, Vol. 42, No. 1, 2015 (https://doi.org/10.1016/j.jenvp.2015.01.005)). In another experiment, Zelenski and his colleagues found that elementary school children acted more prosocially to classmates and strangers after a field trip to a nature school than they did after a visit to an aviation museum (Dopko, R. L., et al., *Journal of Environmental Psychology*, Vol. 63, No. 1, 2019 (https://doi.org/10.1016/j.jenvp.2019.05.002)).

Those generous behaviors weren't attributed to students' moods, Zelenski and his colleagues found, so it wasn't simply that spending time in nature made them happier and therefore more giving. Another plausible (though unproven) explanation is the emotion of awe. "There are some hints that awe is associated with generosity, and nature can be a way to induce awe," he says. "One of the things that may come from awe is the feeling that the individual is part of a much bigger whole."

Experience vs. connection

With so many benefits linked to nature, people naturally wonder: How much time outside is enough? White and colleagues took a stab at answering that question by studying a representative sample of nearly 20,000 adults across the United Kingdom. They found people who had spent at least two recreational hours in nature during the previous week reported significantly greater health and well-being. That pattern held true across subgroups including older adults and people with chronic health problems, and the effects were the same whether they got their dose of nature in a single 120-minute session or spread out over the course of the week (*Scientific Reports*, Vol. 9, No. 1, 2019 (https://doi.org/10.1038/s41598-019-44097-3)). "We're not saying we've

cracked this nut yet, but this is a first step toward making specific recommendations about how much time in nature is enough," White says.

The amount of time one spends in nature isn't the only element to consider—it's also beneficial to feel connected to the natural world even when you're stuck at a desk. Researchers call this feeling by a variety of names, including nature relatedness, connectedness to nature, and inclusion of nature in self, and they've developed a number of scales to measure the trait.

Whatever you call it, connectedness to nature seems to benefit mood and mental health. In a meta-analysis, Alison Pritchard, PhD, ABPP, at the University of Derby in England, and colleagues found that people who feel more connected to nature have greater eudaimonic well-being—a type of contentment that goes beyond just feeling good and includes having meaningful purpose in life (*Journal of Happiness Studies*, Vol. 21, No. 3, 2020 (https://doi.org/10.1007/s10902-019-00118-6)).

Zelenski and Nisbet studied whether connection itself is the magic ingredient. They assessed the overlap between connectedness with nature and a general sense of connectedness, such as feeling in tune with one's friends or community. They found that feeling connected to nature was a significant predictor of happiness even after controlling for the effects of general connectedness (*Environment and Behavior*, Vol. 46, No. 1, 2014 (https://doi.org/10.1177/0013916512451901)). "People who feel that their self-concept is intertwined with nature report being a bit happier," says Zelenski. "Nature connectedness isn't the biggest predictor of happiness, but [the association between the two] is quite consistent."

In fact, nature might help to buffer the effects of loneliness or social isolation. White and his colleagues surveyed 359 U.K. residents about their social connectedness and proximity to nature over the previous week. Social isolation is typically associated with worse subjective well-being. But the researchers found that when people with low social connectedness had high levels of nearby nature, they reported high levels of well-being (Cartwright, B. D. S., et al., *International Journal of Environmental Research and Public Health*, Vol. 15, No. 6, 2018 (https://doi.org/10.3390/ijerph15061238)). "There are people who don't necessarily want to spend their time with others, but they feel connected to the natural environment, and that can enhance their well-being," White says.

Green and blue spaces

It's clear that getting outside is good for us. Now, scientists are working to determine what types of environments are best. Much attention has gone to green spaces, but White has studied a variety of marine and freshwater environments and found these blue spaces are also good for well-being (Gascon, M., et al., *International Journal of Hygiene and Environmental Health*, Vol. 220, No. 8, 2017 (https://doi.org/10.1016/j.ijheh.2017.08.004)). In fact, he says, they may even be slightly more restorative than green spaces.

There may also be value in trekking to remote locations. In a survey of 4,515 U.K. residents, White found that people reported more connection to nature and felt more restored after visiting rural and coastal locations than they did after spending time in urban green spaces. Areas deemed to be "high environmental quality"—such as nature reserves and protected habitats—were also more beneficial than areas with low biodiversity (Wyles, K. J., et al., *Environment and Behavior*, Vol. 51, No. 2, 2019 (https://doi.org/10.1177/0013916517738312)). In other work, White and his colleagues found that people who watched nature videos with a diverse mix of flora and fauna reported lower anxiety, more vitality, and better mood than those who watched videos featuring less biodiverse landscapes (Wolf, L. J., et al., *PLOS ONE*, Vol. 12, No. 1, 2017 (https://doi.org/10.1371/journal.pone.0170225)).

But there's an important caveat, White adds: "If you have a break from work and you've only got half an hour, then a wild remote place is no use to you at

all." Urban parks and trees also produce positive outcomes. Just like a little exercise is better than none, we should take advantage of green and blue spaces wherever and whenever we can. That's easier said than done, though, especially for people at a socioeconomic disadvantage. Poorer neighborhoods, White notes, are seldom the ones with leafy groves and ocean views.

Yet policymakers, city planners, environmental organizations, and government agencies are coming around to the importance of natural spaces, and psychologists are offering them their expertise, says White, who has presented his research to groups such as the U.K.'s Department for Environment, Food, and Rural Affairs. Organizations and cities are expressing interest in this research, Zelenski says, though many policymakers are waiting to see the results of intervention studies before investing in green infrastructure. One of the United Nations' sustainable development goals includes the target of providing universal access to safe, inclusive, and accessible green and public spaces by 2030.

There is urgency in fostering these connections, says Nisbet. Because while people benefit from their connection with the natural world, the environment also benefits when people feel connected and committed to caring for the Earth —and between climate change and habitat loss, the planet is in serious need of some care. "When people are disconnected from nature, they aren't motivated to work on wicked problems like climate change. We're losing the environments that contribute to our flourishing," she says. "The key question is, how do we help people feel connected to nature so we're motivated to protect the places that will help us thrive?"

Further reading

Environmental Neuroscience (https://doi.org/10.1037/amp0000583)
Berman, M. G., et al., *American Psychologist*, 2019

Nature and Mental Health: An Ecosystem Service Perspective (https://doi.org/10.1126/sciadv.aax0903)
Bratman, G. N., et al., *Science Advances*, 2019

Ecotherapy: Theory, Research and Practice (https://www.bloomsbury.com/us/ecotherapy-9781137486875/)

Jordan, M., & Hinds, J. (Eds.), Bloomsbury Academic, 2016
