

# This Side of Paradise

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Today, Central Park seems as essential to Manhattan as the Empire State Building, the Statue of Liberty, or Woody Allen. But when the street grid for the island was first mapped out in 1811, no plans were made for the 843-acre green sanctuary at its center. The commissioners in charge of designing the city set aside remarkably few parcels of parkland. They didn't think the residents would need it. After all, they reasoned, the Hudson and East rivers that flank Manhattan render the island "in regard to health and pleasure ... peculiarly felicitous."

A few brave souls — we'll call them "brave," though other descriptors come to mind — find recreation in these waters today. The rest of us are fortunate that the city reconsidered, and that the man who designed Central Park had an understanding, far ahead of his time, of nature's psychological impact. "It is a scientific fact," wrote Frederick Law Olmsted in 1865, seven years after his plan for the park was chosen, "that the occasional contemplation of natural scenes of an impressive character ... is favorable to the health and vigor of men" (Hartig, 2007).

As awareness of humanity's relationship with the environment has increased in the past few decades — buoyed of late by the larger popular concern about climate change — so has empirical evidence for nature's psychological benefits. Back in 1865, Olmsted thought exposure to natural environments would prevent a "softening of the brain," "irascibility," and "melancholy." Nearly 150 years later, scientists now know that nature has a remarkable ability to restore attention, that it soothes aggression, and that it may even ease mild depression.



**Reinvigorating the Brain through A.R.T.**

The most significant understanding of nature's salutary effect on the human mind has come through studies of attention. The foundation of this work is the attention restoration theory, or A.R.T., set forth by APS Fellow Stephen Kaplan of the University of Michigan. The theory originated in the 1980s, says Kaplan, when he, APS Fellow Rachel Kaplan, and some of their students noticed that people had an

astounding preference for scenes depicting natural environments. Kaplan and his collaborators soon discovered there was much more to nature than just a pretty face — they found that exposure to these scenes had a profound restorative effect on the brain’s ability to focus.

The tenets of A.R.T were established in a 1995 paper by Kaplan. Briefly put, a person can engage in two types of attention: involuntary and voluntary. Involuntary attention is a rather effortless form of engagement with the world. Voluntary (or directed) attention, in contrast, requires a good deal of focus and energy — it plays a central role in problem solving, for instance — and is therefore susceptible to fatigue. Voluntary attention can be restored through sleep, but it can also be restored during waking hours when a person’s involuntary attention becomes highly engaged, essentially giving direct attention a breather. Kaplan and his collaborators found that nature is especially conducive to our involuntary engagement.

Nature’s ability to restore human attention has since been supported by a wide range of psychological studies. In a study coauthored by Kaplan and led by Marc Berman, for instance, the researchers compared the restorative effects of natural environments with those of the city (Berman, Jonides, & Kaplan, 2008). In one trial, 38 study participants were given the “backwards digit-span task” — an established test of voluntary attention. The participants then performed a task that fatigued their voluntary attention and were randomly assigned to walk through either downtown Ann Arbor or the city’s arboretum, a substantial haven of trees and wide lawns. Afterwards, the participants took the backwards digit-span task again. Sure enough, the scores were significantly higher after the walks through the arboretum, as the researchers reported in *Psychological Science*.

“The way I think of it is that our ancestors evolved in a nature-filled environment,” says Kaplan. “[Such places] *should* feel more comfortable, more relaxed, more like home. It’s not a big leap between that and being more competent, less distracted.”

In the January 2010 issue of *Perspectives on Psychological Science*, Kaplan and Berman summarize 13 of the most influential A.R.T.-related papers (Kaplan & Berman, 2010). The findings (some of which will be discussed below in more detail) show nature’s impact on a wide variety of cognitive activity, from dampening road rage to boosting the spirits and attentional capacities of cancer patients. The authors also explain why nature does a better job restoring directed attention than another stimulus that might seem suited to distracting the mind: television.

Rather than lightening the load on direct attention, television actively captures it in an attempt to prevent the viewer from changing the channel (Mander, 1977). As a result, Kaplan and Berman report, researchers have found a direct correlation between the amount of time someone spends in front of the television and that person’s irritability. In the short-term, TV shows provide an escape from everyday trials, but over the long-term such escapism prevents the mind from engaging in much-needed reflection.

“The fascination that seems to be important in the recovery of attention is nothing like what happens on television,” Kaplan says. “Since nature is not only fascinating in this soft and gentle way but is also pleasurable, that means you can more effectively think about things that are not comfortable.”



**Positive Pockets of Green**

A logical extension of attention restoration theory is that people deprived of nature will display behaviors caused by weary minds. Shortly after his influential paper on A.R.T. appeared in 1995, two of Kaplan's disciples decided to test this conclusion. The hypothesis laid out by Frances Kuo and William Sullivan of the University of Illinois was a marvel of logic and sequence: If fatigued attention is related to irritability, and irritability leads to aggression, then perhaps people deprived of nature's restorative qualities would be overly aggressive (Kuo & Sullivan, 2001).

Kuo and Sullivan tested their premise on 145 female residents of a public housing complex in urban Chicago. The complex provided natural control and study groups: Some residents lived in buildings that overlooked "pockets of green," while others had a view of only bleak concrete. The researchers reported significantly lower levels of aggression and violence in residents with apartments near nature than in those who looked onto barren lands. When handling disputes with their partners, women in the nature group used fewer "psychologically aggressive conflict tactics" and fewer "mildly violent conflict tactics" than those whose randomly assigned housing unit was denied exposure to nature.

Aggressiveness has been linked to impulsivity, so it's not surprising that in a contemporaneous study, Kuo, Sullivan, and Illinois colleague Andrea Taylor found a relationship between exposure to nature and self-control (Taylor, Kuo, & Sullivan, 2002). In studying 169 girls living in the same housing complex, the researchers found that those with greener views performed better than those deprived of nature on several tasks related to discipline. The former group scored higher on tests of concentration, inhibited impulsivity, and ability to delay gratification.

"Those data are astounding," says Kaplan of the series of public housing studies performed by Kuo and Sullivan. "That's a miserable environment, and for [nature] to make a difference in it, that was awesome."

The findings on aggression and self-discipline appear to transfer out of the home and onto the road. In a 1998 paper, a group of Texas A&M researchers led by Russ Parsons compared the physiological responses of subjects who watched a video of driving through nature with those who watched a drive through more built-up environments (Parsons et al., 1998). Not only did the nature-road group display

lower levels of stress, they also recovered more quickly from the stress they did experience.

A related study of road rage tested the ability of subjects to tolerate frustration in various roadside settings (Cackowski & Nasar, 2003). Subjects watched one of three driving videos — one with dense roadside vegetation, one with sparse roadside vegetation, and one mixed — then were asked to solve an unsolvable anagram. The task was designed to enhance frustration, and indeed, subjects whose road trip had taken them through dense vegetation worked on the aggravating task for roughly 90 seconds longer than those in the other groups.

## **Virtual Nature**

The recognition of nature's psychological value has informed broader discussions on public health and even inspired practical applications. Building on studies showing the psychosomatic benefits of green space, a U.K. research duo reported that populations living near natural environments had less income-related health inequality than groups living away from green space — prompting calls for greener infrastructure and community planning (Mitchell & Popham, 2008). The design of Sacred Heart Medical Center at RiverBend, an Oregon hospital rebuilt in 2008, was informed by a now-classic paper that appeared in *Science* in 1984: Researcher Roger Ulrich found that patients whose hospital window overlooked nature recorded shorter postoperative stays, required less potent pain medication, and evaluated their nurses more positively after gall bladder surgery than patients who looked onto a brick wall (Ulrich, 1984).

The heightened awareness of nature's health benefits is tempered by threats to the environment posed by modernity — from the clearance of green space for buildings to the destruction caused by global climate change. To see how such changes might affect future well-being, several psychologists have begun to study whether technology can salvage some of nature's healthful properties. Three researchers from the University of Washington, led by Peter Kahn Jr., review some of this work in *Current Directions in Psychological Science* (Kahn, Severson, & Ruckert, 2009).

One of the outlined studies, led by Kahn, compared three types of nature interactions available in a modern office. Kahn and his coauthors conducted tests on three groups of 30: In one group, subjects sat near a glass window that overlooked a nature scene; in another, they viewed a similar scene on a high-definition plasma television; and in a third, they sat near an empty wall. The researchers measured heart-rates to gauge how quickly subjects in each setting recovered from stressors.

Predictably, Kahn and his colleagues found the glass window to be significantly more restorative than the blank wall (Kahn et al., 2008). When the researchers compared the results of subjects in the plasma and blank wall groups, however, they found no significant differences in recovery to stress. This came as something of a surprise. In a previous field study involving Kahn and led by Batya Friedman, plasma screens depicting a natural scene were installed on walls in real-life offices, and workers asked about the experience over a 16-week period reported higher well-being, cognitive functioning, and connection to the environment.

When the two studies are considered together, “the plasma nature window appears better than no nature but not as good as actual nature,” Kahn and his coauthors concluded in *Current Directions*. Humans will “adapt to the loss of actual nature,” they continued, but in doing so they’ll suffer “psychological costs.”



This conclusion was recently supported in a study led by F. Stephan Mayer, a professor of psychology at Oberlin College, on whether exposure to nature aided the ability to reflect on life's troubles (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009). Mayer and his colleagues asked subjects to consider a relatively minor problem in their lives, then split them into one of several groups. Over the course of three separate tests, some subjects reflected on their "loose end" while strolling through either natural or urban settings, and others did so while viewing videos of these settings.

The researchers concluded that exposure to nature increased a subject's ability to resolve a minor personal problem, but that actual nature aided this resolution more than virtual nature.

"It's not as if you can replace actual nature with virtual nature," says Mayer, who interprets the results to mean that people have an innate kinship to the natural world. "At the same time, it does seem as if virtual nature can have benefits. Some of those benefits could be very useful, in terms of people who are hospitalized — if they're not able to be outside, they could benefit from exposure to virtual nature."

### **From Social Movement to Science**

The type of work done by Mayer and Kahn falls at least partially under the umbrella of ecopsychology. Largely embraced by therapists, ecopsychology has been considered more of a social movement or worldview than a scientific discipline. But a so-called "second-generation" of ecopsychologists have emerged with a desire to ground the movement's theories in an empirical foundation.

"As I see it, it seems as if ecopsychology had clinical aspects to it initially, maybe even to some extent a philosophical aspect," says Mayer, who runs the Ecopsychology Research Project at Oberlin. "Then you have people coming out of a more social psychology tradition with a strong empirical basis, trying to take these general ideas and test them in a more systematic way."

This progression is apparent in a forthcoming book coedited by Kahn and Patricia Hasbach, a clinical therapist in Oregon. The volume's title, *Ecopsychology: Science, Totems, and the Technological Species*, was chosen as a deliberate announcement of ecopsychology's empirical "re-visioning," says Hasbach. "In sandwiching the word *totems*" — a reference to ecopsychology's symbolic, experiential roots — "between *science* and *technological species*," she says, "we're embracing ... the recognition of

the place of science for furthering the field.”

Thomas Doherty, a clinical psychologist in Portland, Oregon, who co-teaches an ecotherapy class with Hasbach at Lewis & Clark University, seconds ecopsychology’s push to embrace empirical methods. Editor of the year-old, peer-reviewed journal, *Ecopsychology*, Doherty says his goal with the publication is to “move away from the stereotype” of ecopsychology being a non-scientific endeavor. In the lead editorial of the inaugural issue, he wrote that the new generation of ecopsychology “recognizes that tending data sets and tending souls are not mutually exclusive” (Doherty, 2009).

Doherty would like to see more controlled studies on ecotherapy’s efficacy. “I’m primarily a clinician,” he says, “but I can’t function without research.” To date, such studies have been limited. The most promising was released in 2007 by Mind, a mental health organization in England that commissioned researchers at the University of Essex to study the therapeutic influence of “green exercise” on people suffering from mild depression. The researchers found that activities like nature strolls and gardening projects benefited several aspects of well-being more than did exercise in a shopping mall (Mind, 2007). In other words, a walk in the park does a body good — just as Olmsted said.

As a model of empirical rigor, the report left room for improvement — the subjects of one study were members of Mind — but as a symbol of ecopsychology’s maturation, it reflected a move toward greener pastures. “In some ways, because of ecopsychology’s counter-culture origins, it lost some traction as the world moved on to embrace scientific inquiry,” says Hasbach, “Admittedly, some things often discussed in ecopsychology are very hard to measure. We’re trying to get more creative in how to do that.” ?



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