Why Your Brain Needs More Downtime

Research on naps, meditation, nature walks and the habits of exceptional artists and athletes reveals how mental breaks increase productivity, replenish attention, solidify memories and encourage creativity.

By Ferris Jabr on October 15, 2013
Every now and then during the workweek—usually around three in the afternoon—a familiar ache begins to saturate my forehead and pool in my temples. The glare of my computer screen appears to suddenly intensify. My eyes trace the contour of the same sentence two or three times, yet I fail to extract its meaning. Even if I began the day undaunted, getting through my ever growing list of stories to write and edit, e-mails to send and respond to, and documents to read now seems as futile as scaling a mountain that continuously thrusts new stone skyward. There is so much more to do—so much work I genuinely enjoy—but my brain is telling me to stop. It’s full. It needs some downtime.

Freelance writer and meditation teacher Michael Taft has experienced his own version of cerebral congestion. “In a normal working day in modern America, there’s a sense of so much coming at you at once, so much to process that you just can’t deal with it all,” Taft says. In 2011, while finalizing plans to move from Los Angeles to San Francisco, he decided to take an especially long recess from work and the usual frenzy of urban life. He traveled to the small rural community of Barre, Mass., about 100 kilometers west of Boston, where every year people congregate for a three-month-long “meditation marathon.”

Taft had been on similar retreats before, but never one this long. For 92 days he lived at Insight Meditation Society’s Forest Refuge facility, never speaking a word to anyone else. He spent most of his time meditating, practicing yoga and walking through fields and along trails in surrounding farmland and woods, where he encountered rafters of turkeys leaping from branches, and once spotted an otter gamboling in a swamp. Gradually, his mind seemed to sort through a backlog of unprocessed data and to empty itself of accumulated concerns. “When you go on a long retreat like that there’s a kind of base level of mental tension and busyness that totally evaporates,” Taft says. “I call that my ‘mind being not full.’ Currently, the
speed of life doesn’t allow enough interstitial time for things to just kind of settle down.”

Many people in the U.S. and other industrialized countries would wholeheartedly agree with Taft’s sentiments, even if they are not as committed to meditation. A 2010 LexisNexis survey of 1,700 white collar workers in the U.S., China, South Africa, the U.K. and Australia revealed that on average employees spend more than half their workdays receiving and managing information rather than using it to do their jobs; half of the surveyed workers also confessed that they were reaching a breaking point after which they would not be able to accommodate the deluge of data. In contrast to the European Union, which mandates 20 days of paid vacation, the U.S. has no federal laws guaranteeing paid time off, sick leave or even breaks for national holidays. In the Netherlands 26 days of vacation in a given year is typical. In America, Canada, Japan and Hong Kong workers average 10 days off each year. Yet a survey by Harris Interactive found that, at the end of 2012, Americans had an average of nine unused vacation days. And in several surveys Americans have admitted that they obsessively check and respond to e-mails from their colleagues or feel obliged to get some work done in between kayaking around the coast of Kauai and learning to pronounce humuhumunukunukuapua’a.

To summarize, Americans and their brains are preoccupied with work much of the time. Throughout history people have intuited that such puritanical devotion to industrious and generate its most innovative ideas? "Idleness is not just a vacation, an indulgence or a vice; it is as indispensable to the brain as vitamin D is to the body, and deprived of it we suffer a mental affliction as disfiguring as rickets," essayist Tim Kreider wrote in The New York Times. "The space and quiet that idleness provides is a necessary condition for standing back from life and seeing it whole, for making unexpected connections and waiting for the wild summer lightning strikes of inspiration—it is, paradoxically, necessary to getting any work done."

In making an argument for the necessity of mental downtime, we can now add an overwhelming amount of empirical evidence to intuition and anecdote. Why giving our brains a break now and then is so important has become increasingly clear in a diverse collection of new studies investigating: the habits of office workers and the
daily routines of extraordinary musicians and athletes; the benefits of vacation, meditation and time spent in parks, gardens and other peaceful outdoor spaces; and how napping, unwinding while awake and perhaps the mere act of blinking can sharpen the mind. What research to date also clarifies, however, is that even when we are relaxing or daydreaming, the brain does not really slow down or stop working. Rather—just as a dazzling array of molecular, genetic and physiological processes occur primarily or even exclusively when we sleep at night—many important mental processes seem to require what we call downtime and other forms of rest during the day. Downtime replenishes the brain’s stores of attention and motivation, encourages productivity and creativity, and is essential to both achieve our highest levels of performance and simply form stable memories in everyday life. A wandering mind unsticks us in time so that we can learn from the past and plan for the future. Moments of respite may even be necessary to keep one’s moral compass in working order and maintain a sense of self.

The rest is history
For much of the 20th century many scientists regarded the idea that the brain might be productive during downtime as ludicrous. German neurologist Hans Berger disagreed. In 1929, after extensive studies using an electroencephalogram—a device he invented to record electrical impulses in the brain by placing a net of electrodes on the scalp—he proposed that the brain is always in “a state of considerable activity,” even when people were sleeping or relaxing. Although his peers acknowledged that some parts of the brain and spinal cord must work nonstop to regulate the lungs and heart, they assumed that when someone was not focusing on a specific mental task, the brain was largely offline; any activity picked up by an electroencephalogram or other device during rest was mostly random noise. At first, the advent of functional magnetic resonance imaging (fMRI) in the early 1990s only strengthened this view of the brain as an exquisitely frugal organ switching on and off its many parts as needed. By tracing blood flow through the brain, fMRI clearly showed that different neural circuits became especially active during different mental tasks, summoning extra blood full of oxygen and glucose to use as energy.

By the mid 1990s, however, Marcus Raichle of Washington University in Saint Louis and his colleagues had demonstrated that the human brain is in fact a glutton, constantly demanding 20 percent of all the energy the body produces and requiring only 5 to 10 percent more energy than usual when someone solves calculus problems
or reads a book. Raichle also noticed that a particular set of scattered brain regions consistently became less active when someone concentrated on a mental challenge, but began to fire in synchrony when someone was simply lying supine in an fMRI scanner, letting their thoughts wander. Likewise, Bharat Biswal, now at the New Jersey Institute of Technology, documented the same kind of coordinated communication between disparate brain regions in people who were resting. Many researchers were dubious, but further studies by other scientists confirmed that the findings were not a fluke. Eventually this mysterious and complex circuit that stirred to life when people were daydreaming became known as the default mode network (DMN). In the last five years researchers discovered that the DMN is but one of at least five different resting-state networks—circuits for vision, hearing, movement, attention and memory. But the DMN remains the best studied and perhaps the most important among them.

In a recent thought-provoking review of research on the default mode network, Mary Helen Immordino-Yang of the University of Southern California and her co-authors argue that when we are resting the brain is anything but idle and that, far from being purposeless or unproductive, downtime is in fact essential to mental processes that affirm our identities, develop our understanding of human behavior and instill an internal code of ethics—processes that depend on the DMN. Downtime is an opportunity for the brain to make sense of what it has recently learned, to surface fundamental unresolved tensions in our lives and to swivel its powers of reflection learning to avoid them in the future. We craft fictional dialogue to practice standing up to someone who intimidates us or to reap the satisfaction of an imaginary harangue against someone who wronged us. We shuffle through all those neglected mental post-it notes listing half-finished projects and we mull over the aspects of our lives with which we are most dissatisfied, searching for solutions. We sink into scenes from childhood and catapult ourselves into different hypothetical futures. And we subject ourselves to a kind of moral performance review, questioning how we have treated others lately. These moments of introspection are also one way we form a sense of self, which is essentially a story we continually tell ourselves. When it has a moment to itself, the mind dips its quill into our memories, sensory experiences, disappointments and desires so that it may continue writing this ongoing first-person narrative of life.
Related research suggests that the default mode network is more active than is typical in especially creative people, and some studies have demonstrated that the mind obliquely solves tough problems while daydreaming—an experience many people have had while taking a shower. Epiphanies may seem to come out of nowhere, but they are often the product of unconscious mental activity during downtime. In a 2006 study, Ap Dijksterhuis and his colleagues asked 80 University of Amsterdam students to pick the best car from a set of four that—unbeknownst to the students—the researchers had previously ranked based on size, mileage, maneuverability and other features. Half the participants got four minutes to deliberate after reviewing the specs; the researchers prevented the other 40 from pondering their choices by distracting them with anagrams. Yet the latter group made far better decisions. Solutions emerge from the subconscious in this way only when the distracting task is relatively simple, such as solving an anagram or engaging in a routine activity that does not necessitate much deliberate concentration, like brushing one's teeth or washing dishes. With the right kind of distraction the default mode network may be able to integrate more information from a wide range of brain regions in more complex ways than when the brain is consciously working through a problem.

During downtime, the brain also concerns itself with more mundane but equally important duties. For decades scientists have suspected that when an animal or person is not actively learning something new, the brain consolidates recently observed how, after a good night’s sleep, the vocab words we struggled to remember the previous day suddenly leap into our minds or that technically challenging piano song is much easier to play. Dozens of studies have confirmed that memory depends on sleep.

More recently, scientists have documented what may well be physical evidence of such memory consolidation in animals that are awake but resting. When exploring a new environment—say, a maze—a rat’s brain crackles with a particular pattern of electrical activity. A little while later, when that rat is sitting around, its brain sometimes re-creates a nearly identical pattern of electrical impulses zipping between the same set of neurons. The more those neurons communicate with one another, the stronger their connections become; meanwhile neglected and irrelevant neural
pathways wither. Many studies indicate that in such moments—known as sharp-wave ripples—the rat is forming a memory.

In a 2009 study Gabrielle Girardeau, now at New York University, and her colleagues trained rats to find Cocoa Krispies consistently placed in the same branches of an eight-armed octo-maze. Following training sessions, while the rats were either sleeping or awake and resting, the researchers mildly zapped the brains of one group of rodents in a way that disrupted any sharp-wave ripples. Another group of rats received small electric shocks that did not interfere with ripples. The former group had a much harder time remembering where to find the food.

Several studies suggest that something similar happens in the human brain. In order to control their seizures, people with epilepsy sometimes undergo surgery that involves drilling through the skull and implanting electrodes in the brain. In such cases, some patients agree to let scientists record electrical activity picked up by those electrodes—a unique situation that avoids endangering people solely for the sake of neuroscience. In a 2008 study Nikolai Axmacher of the University of Bonn and his colleagues showed epilepsy patients a series of photos of houses and landscapes and tested their memories of those pictures following one-hour naps. During the naps, the researchers recorded electrical activity in a region of the brain known as the rhinal cortex, which is crucial for certain kinds of memory. As expected, the more sharp-wave ripples pulsed through the rhinal cortex, the better patients remembered the pictures. And such ripples occurred most frequently not when the patients were napping, but rather when they were lying awake in bed in the dark shortly before or after falling asleep.

A 2009 study by Chris Miall of the University of Birmingham and his colleagues complements this research. Twenty-four volunteers scooted inside an fMRI scanner and attempted to move a cursor in the center of a computer screen toward various pixelated targets by twiddling a joystick. Half the volunteers worked with a straightforward setup: when they moved the joystick left, the cursor moved left. The other half was stuck with a frustratingly fickle contraption: imagine trying to get the hang of a computer mouse that continuously rotates clockwise—suddenly right is up and left is down. All the participants rested inside the scanner before and after focusing on their assigned task.
Activity in resting state networks of the former group did not change much from one break to the next. But in the brains of volunteers who had previously struggled with the trick joystick, activity in two resting state networks was much more in sync than usual. This coordination likely reflects strengthened connections between those two circuits, Miall suspects, which in turn indicates that during rest the brain was likely ingrafting what it had learned about working a strange and confusing tool. In contrast, the brains of volunteers that operated the conventional joystick had not learned anything new. In a yet-to-be-published follow-up experiment in which volunteers learned to press buttons in a particular sequence—and another study in which people studied a new language—Miall and his teammates reached similar conclusions about the importance of brain activity during rest for learning.

A tantalizing piece of evidence suggests that the brain may take advantage of every momentary lapse in attention to let resting state networks take over. In a study published last year, Tamami Nakano of Osaka University recorded electrical impulses in people’s brains as they watched clips of British comedian Mr. Bean. The results revealed that the brain can fire up the DMN in the blink of an eye—literally. Every time we blink, circuits we use to consciously direct attention go quiet and the DMN briefly wakes up. Exactly what the DMN accomplishes in these interludes remains unclear, but it could very well be a form of memory consolidation or a moment for attention-directing neurons to catch their breath.

All in a day’s work

That learning and memory depend on both sleep and waking rest may partially explain why some of the most exceptional artists and athletes among us fall into a daily routine of intense practice punctuated by breaks and followed by a lengthy period of recuperation. Psychologist K. Anders Ericsson of The Florida State University has spent more than 30 years studying how people achieve the highest levels of expertise. Based on his own work and a thorough review of the relevant research, Ericsson has concluded that most people can engage in deliberate practice—which means pushing oneself beyond current limits—for only an hour without rest; that extremely talented people in many different disciplines—music, sports, writing—rarely practice more than four hours each day on average; and that many experts prefer to begin training early in the morning when mental and physical energy is readily available. “Unless the daily levels of practice are restricted, such that subsequent rest and nighttime sleep allow the individuals to restore their
equilibrium,” Ericsson wrote, “individuals often encounter overtraining injuries and, eventually, incapacitating ‘burnout.’”

These principles are derived from the rituals of the exceptional, but they are useful for just about anyone in any profession, including typical nine-to-fivers. Corporate America may never sanction working only four hours a day, but research suggests that to maximize productivity we should reform the current model of consecutive 40-hour workweeks separated only by two-day weekends and sometimes interrupted by short vacations.

Psychologists have established that vacations have real benefits. Vacations likely revitalize the body and mind by distancing people from job-related stress; by immersing people in new places, cuisines and social circles, which in turn may lead to original ideas and insights; and by giving people the opportunity to get a good night’s sleep and to let their minds drift from one experience to the next, rather than forcing their brains to concentrate on a single task for hours at a time. But a recent comprehensive meta-analysis by Jessica de Bloom, now at the University of Tampere in Finland, demonstrates that these benefits generally fade within two to four weeks. In one of de Bloom’s own studies, 96 Dutch workers reported feeling more energetic, happier, less tense and more satisfied with their lives than usual during a winter sports vacation between seven and nine days long. Within one week of returning to work, however, all the feelings of renewal dissipated. A second experiment on four and five days of respite came to essentially the same conclusion. A short vacation is like a cool shower on an oppressively muggy summer day—a refreshing yet fleeting escape.

Instead of limiting people to a single weeklong vacation each year or a few three-day vacations here and there, companies should also allow their employees to take a day or two off during the workweek and encourage workers to banish all work-related tasks from their evenings. In a four-year study, Leslie Perlow of the Harvard Business School and her colleagues tracked the work habits of employees at the Boston Consulting Group. Each year they insisted that employees take regular time off, even when they did not think they should be away from the office. In one experiment each of five consultants on a team took a break from work one day a week. In a second experiment every member of a team scheduled one weekly night of uninterrupted personal time, even though they were accustomed to working from home in the
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Everyone resisted at first, fearing they would only be postponing work. But over time the consultants learned to love their scheduled time off because it consistently replenished their willingness and ability to work, which made them more productive overall. After five months employees experimenting with deliberate periodic rest were more satisfied with their jobs, more likely to envision a long-term future at the company, more content with their work–life balance and prouder of their accomplishments.

Tony Schwartz, a journalist and CEO of The Energy Project, has made a career out of teaching people to be more productive by changing the way they think about downtime. His strategy relies in part on the idea that anyone can learn to regularly renew their reservoirs of physical and mental energy. "People are working so many hours that not only in most cases do they not have more hours they could work, but there's also strong evidence that when they work for too long they get diminishing returns in terms of health costs and emotional costs," Schwartz says. "If time is no longer an available resource, what is? The answer is energy."

Schwartz and his colleagues encourage workers to get seven to eight hours of sleep every night, to use all their vacation days, take power naps and many small breaks during the day, practice meditation, and tackle the most challenging task first thing in the morning. "Many things we are suggesting are in some ways very simple and on some level are things people already knew, but they are moving at such extraordinary speed that they have convinced themselves they are not capable of those behaviors," Schwartz says.

The Energy Project’s approach was a tough sell at first—because it contradicts the prevailing ethos that busier is better—but the organization has so far successfully partnered with Google, Apple, Facebook, Coca-Cola, Green Mountain Coffee, Ford, Genentech and a wide range of Fortune 500 companies. To gauge how employees improve over time, Schwartz measures their level of engagement—that is, how much they like their jobs and are willing to go above and beyond their basic duties—a trait that many studies have correlated with performance. Admittedly, this is not the most precise or direct measurement, but Schwartz says that time and again his strategies have pushed workers' overall engagement well above the average level and that
Google has been satisfied enough to keep up the partnership for more than five years.

**Put your mind at rest**

Many recent studies have corroborated the idea that our mental resources are continuously depleted throughout the day and that various kinds of rest and downtime can both replenish those reserves and increase their volume. Consider, for instance, how even an incredibly brief midday nap enlivens the mind.

By adulthood, most of us have adopted the habit of sleeping through the night and staying awake for most or all of the day—but this may not be ideal for our mental health and is certainly not the only way people have slept throughout history. In somewhat the same way that hobbits in Tolkien’s Middle Earth enjoy a first and second breakfast, people living without electricity in preindustrial Europe looked forward to a first and second sleep divided by about an hour of crepuscular activity. During that hour, they would pray, relieve themselves, smoke tobacco, have sex and even visit neighbors. Some researchers have proposed that people are also physiologically inclined to snooze during a 2 P.M. to 4 P.M. “nap zone”—or what some might call the afternoon slump—because the brain prefers to toggle between sleep and wake more than once a day. As far back as the first century B.C. the Romans regularly took midafternoon breaks, which they called _meridiari_ from the Latin for midday. Under the influence of Roman Catholicism, noon became known as _sexta_ (the sixth hour, according to their clocks), a time for rest and prayer. Eventually

Plenty of studies have established that naps sharpen concentration and improve the performance of both the sleep-deprived and the fully rested on all kinds of tasks, from driving to medical care. A 2004 study, for example, analyzed four years of data on highway car accidents involving Italian policemen and concluded that the practice of napping before night shifts reduced the prospective number of collisions by 48 percent. In a 2002 study by Rebecca Smith-Coggins of Stanford University and her colleagues, 26 physicians and nurses working three consecutive 12-hour night shifts napped for 40 minutes at 3 A.M. while 23 of their colleagues worked continuously without sleeping. Although doctors and nurses that had napped scored lower than their peers on a memory test at 4 A.M., at 7:30 A.M. they outperformed the no-nap group on a test of attention, more efficiently inserted a catheter in a virtual simulation and were more alert during an interactive simulation of driving a car.
home.

Long naps work great when people have enough time to recover from “sleep inertia”—post-nap gogginess that, in some cases, can take more than two hours to fade. In other situations micronaps may be a smarter strategy. An intensive 2006 study by Amber Brooks and Leon Lack of Flinders University in Australia and their colleagues pitted naps of five, 10, 20 and 30 minutes against one another to find out which was most restorative. Over a span of three years 24 college students periodically slept for only five hours on designated nights. The day after each of those nights they visited the lab to nap and take tests of attention that required them to respond quickly to images on a screen, complete a word search and accurately copy sequences of arcane symbols.

A five-minute nap barely increased alertness, but naps of 10, 20 and 30 minutes all improved the students’ scores. But volunteers that napped 20 or 30 minutes had to wait half an hour or more for their sleep inertia to wear off before regaining full alertness, whereas 10-minute naps immediately enhanced performance just as much as the longer naps without any gogginess. An explanation for this finding, Brooks and Lack speculate, may involve the brain’s so-called “sleep switch.” Essentially, one cluster of neurons is especially important for keeping us awake, whereas another distinct circuit induces sleepiness. When neurons in one region fire rapidly they directly inhibit the firing of neurons in the other region, thereby operating as a sleep/wake switch. Neurons in the wake circuit likely become fatigued and slow down after many hours of firing during the day, which allows the neurons in the sleep circuit to speed up and initiate the flip to a sleep state. Once someone begins to doze, however, a mere seven to 10 minutes of sleep may be enough to restore the wake-circuit neurons to their former excitability.

Although some start-ups and progressive companies provide their employees with spaces to nap at the office, most workers in the U.S. do not have that option. An equally restorative and likely far more manageable solution to mental fatigue is spending more time outdoors—in the evenings, on the weekends and even during lunch breaks by walking to a nearby park, riverfront or anywhere not dominated by skyscrapers and city streets. Marc Berman, a psychologist at the University of South Carolina and a pioneer of a relatively new field called ecopsychology, argues that whereas the hustle and bustle of a typical city taxes our attention, natural
environments restore it. Contrast the experience of walking through Times Square in New York City—where the brain is ping-ponged between neon lights, honking taxies and throngs of tourists—with a day hike in a nature reserve, where the mind is free to leisurely shift its focus from the calls of songbirds to the gurgling and gushing of rivers to sunlight falling through every gap in the tree branches and puddling on the forest floor.

In one of the few controlled ecopsychology experiments, Berman asked 38 University of Michigan students to study lists of random numbers and recite them from memory in reverse order before completing another attention-draining task in which they memorized the locations of certain words arranged in a grid. Half the students subsequently strolled along a predefined path in an arboretum for about an hour whereas the other half walked the same distance through highly trafficked streets of downtown Ann Arbor for the same period of time. Back at the lab the students memorized and recited digits once again. On average, volunteers that had ambled among trees recalled 1.5 more digits than the first time they took the test; those who had walked through the city improved by only 0.5 digits—a small but statistically significant difference between the two groups.

Beyond renewing one’s powers of concentration, downtime can in fact bulk up the muscle of attention—something that scientists have observed repeatedly in studies on meditation. There are almost as many varieties and definitions of meditation as there turn their attention away from the outside world toward their own minds. Mindfulness meditation, for example, generally refers to a sustained focus on one’s thoughts, emotions and sensations in the present moment. For many people, mindfulness is about paying close attention to whatever the mind does on its own, as opposed to directing one’s mind to accomplish this or that.

Mindfulness training has become more popular than ever in the last decade as a strategy to relieve stress, anxiety and depression. Many researchers acknowledge that studies on the benefits of mindfulness often lack scientific rigor, use too few participants and rely too heavily on people’s subjective reports, but at this point they have gathered enough evidence to conclude that meditation can indeed improve mental health, hone one’s ability to concentrate and strengthen memory. Studies
comparing long-time expert meditators with novices or people who do not meditate often find that the former outperform the latter on tests of mental acuity.

In a 2009 study, for example, Sara van Leeuwen of Johann Wolfgang Goethe University in Germany and her colleagues tested the visual attention of three groups of volunteers: 17 adults around 50 years old with up to 29 years of meditation practice; 17 people of the same age and gender who were not longtime meditators; and another 17 young adults who had never meditated before. In the test, a series of random letters flashed on a computer screen, concealing two digits in their midst. Volunteers had to identify both numerals and to guess if they did not glimpse one in time; recognizing the second number is often difficult because earlier images mask it. Performance on such tests usually declines with age, but the expert meditators outscored both their peers and the younger participants.

Heleen Slagter of Leiden University in Amsterdam and her colleagues used the same type of attention test in a 2007 study to compare 17 people who had just completed a three-month meditation retreat in Barre, Mass., with 23 mindfulness-curious volunteers who were meditating around 20 minutes a day. Both groups were evenly matched before their training, but when the retreat was over the meditation marathoners trumped the novices. Judging by recordings from an electroencephalogram, 90 days of meditation likely made the brain more efficient, so that it used up less available attention to successfully complete the test.

of these improvements. Numerous studies have shown that meditation strengthens connections between regions of the default mode network, for example, and can help people learn to more effectively shift between the DMN and circuits that are most active when we are consciously fixated on a task. Over time expert meditators may also develop a more intricately wrinkled cortex—the brain’s outer layer, which is necessary for many of our most sophisticated mental abilities, like abstract thought and introspection. Meditation appears to increase the volume and density of the hippocampus, a seahorse-shaped area of the brain that is absolutely crucial for memory; it thickens regions of the frontal cortex that we rely on to rein in our emotions; and it stymies the typical wilting of brain areas responsible for sustaining attention as we get older.
Just how quickly meditation can noticeably change the brain and mind is not yet clear. But a handful of experiments suggest that a couple weeks of meditation or a mere 10 to 20 minutes of mindfulness a day can whet the mind—if people stick with it. Likewise, a few studies indicate that meditating daily is ultimately more important than the total hours of meditation over one’s lifetime.

In a 2007 study by Richard Chambers of the University of Melbourne, 40 people between the ages of 21 and 63 took various tests of attention and working memory, a collection of mental talents that allow someone to temporarily store and manipulate information. Half the volunteers completed the tests immediately before participating in an intensive 10-day meditation course—something they had never done before—and took the same tests again seven to 10 days after the course ended. The other half also took the tests on two occasions 21 days apart but did not practice any meditation. Whereas people who meditated performed quite a bit better on the tests the second time around, those who did not meditate showed no meaningful improvement. Similarly, in a 2007 study, 40 Chinese college students scored higher on attention tests after a mere 20 minutes of mindfulness-related meditation a day for five days, whereas 40 of their peers who did not meditate did not improve. And as little as 12 minutes of mindfulness meditation a day helped prevent the stress of military service from deteriorating the working memory of 34 U.S. marines in a 2011 study conducted by Amishi Jha, now at the University of Miami, and her colleagues.

“Mindfulness training may offer something similar for the mind. It’s low-tech and easy to implement.” In her own life, Jha looks for any and all existing opportunities to practice mindfulness, such as her 15-minute trip to and from work each day.

Likewise, Michael Taft advocates deliberate mental breaks during "all the in-between moments" in an average day—a subway ride, lunch, a walk to the bodega. He stresses, though, that there's a big difference between admiring the idea of more downtime and committing to it in practice. "Getting out into nature on the weekends, meditating, putting away our computers now and then—a lot of it is stuff we already
know we should probably do," he says. "But we have to be a lot more diligent about it. Because it really does matter."

Editor's Note: This article originally stated that researchers sometimes implant electrodes in the brains of epilepsy patients undergoing surgery. In fact, doctors implant these electrodes as part of the surgery and researchers record from them. The text has been edited to reflect this distinction.

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