

Spring 2018

THE PURSUIT OF HAPPINESS

# NOW

A focus on the present, dubbed “mindfulness,”  
can make you happier and healthier.  
Training to deepen your immersion in  
the moment works by improving attention

*By Amishi P. Jha*

*Photo Illustration by Aaron Goodman*

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**P**ULLING INTO A PARKING SPOT AT WORK, YOU REALIZE YOU HAVE NO RECOLLECTION of the drive that got you there. On reaching the bottom of a page in a book, you are frustrated that you have failed to understand what you just read. In midconversation, you suddenly become aware that you have no idea what the person speaking to you has just said.

These episodes are symptoms of a distracted mind. You were thinking about a vacation while reading a report or reliving an argument with a friend instead of paying attention to the road. Whether the mind journeys to the future or the past, whether the thoughts that whisked you away were useful, pleasant or uncomfortable, the consequences are the same. You missed the present, the experience of the moment, as it was unfolding. Your mind was hijacked into mental time travel.

Distinct from deliberate daydreaming, our mind gets off-track in this fashion almost half the time, according to studies in which people report by smartphone what they are doing, feeling and thinking throughout the day. Mental meandering away from the task at hand, referred to as mind wandering, is tied to negative mood. Chronic psychological stress, suffered by millions, is built on a mind consumed by rumination, wor-

ry or fear about many topics. This type of diffused and unstable focus impairs performance, too. In moments that demand quick decisions and action, the consequences of diverted attention and perception could be deadly.

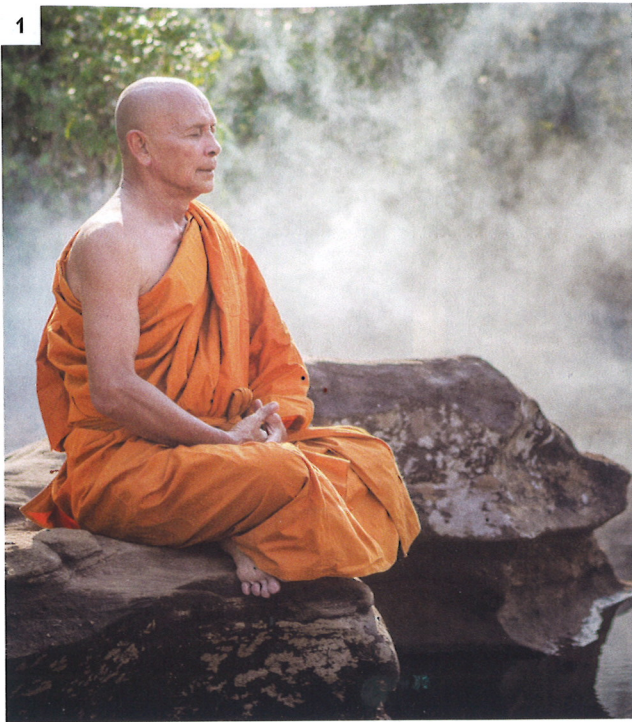
The opposite of a wandering mind is a mindful one. Mindfulness is a mental mode of being engaged in the present moment without evaluating or emotionally reacting to it. Thou-

## IN BRIEF

**Mindfulness** is a mental mode of paying attention to our present-moment experience without evaluating or emotionally reacting to it.

**More than 250 medical centers** worldwide now offer mindfulness-based programs to alleviate mood and other disorders and to improve well-being.

**Mindfulness training** works, at least in part, by strengthening the brain's ability to pay attention. This is often done by focusing on the breath.



**MODERN MINDFULNESS** practices have their roots in customs that have been integral to Eastern cultures for millennia.

sands of articles lay out evidence showing that training to become more mindful reduces psychological stress and improves both mental and physical health, alleviating depression, anxiety, loneliness and chronic pain [see box on page 60 for a sample exercise]. Many workplaces and medical centers now offer mindfulness-based programs to improve well-being.

Findings from my laboratory and others have revealed a surprising mechanism for these benefits. Mindfulness training works, at least in part, by strengthening the brain's ability to pay attention. Although video games and medication may also sharpen focus, mindfulness training uniquely builds the ability to direct attention at will through the sea of internal and external stimulation while allowing for greater awareness of what is happening in the moment.

Whether research findings in small groups of individuals can be scaled up to society at large remains to be seen. The scientific literature on mindfulness training is still in its infancy, and many scientists are calling for more rigorous research methods, such as standardizing programs and placebo-controlled designs. Yet the promise of mindfulness continues to generate much interest. The overarching message seems to be that the more people engage in such training, the happier and healthier we all will be.

**SALVE FOR SADNESS**

EASTERN CULTURES have proffered various forms of meditation as a solution to the conundrum of human suffering. Ancient texts detail precise training exercises to cultivate specific mental qualities. One form of meditation, which we now



**LEARNING** to be more mindful, or aware of what is happening now, is an antidote to rumination, worry and fear—and their effects on mental health.

call mindfulness meditation, instructs practitioners to pay attention to ongoing perceptual experience rather than conceptual trains of thought. People have been engaging in mindfulness exercises for millennia, claiming improved mental clarity and calm—and even greater longevity.

One broad category, referred to as focused-attention practices, guides individuals to select a specific sensation, tied to breathing for example, on which to focus. Instructions encourage the practitioner to notice when his or her mind goes astray and simply return attention back to his or her immediate sensations. Another type, called receptive or open-monitoring practices, coaches participants to watch what enters, then drops out of conscious awareness moment by moment. Think of hearing the faint sound of a fire truck siren in the distance. The sound becomes louder as the truck approaches, then faint-

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er again as it passes. You may notice that initially the siren is part of a vast sea of sounds, later that it is the most salient sound, only to fade into the background again. Thoughts, emotions and other sensations may similarly grow and diminish as we remain in a watchful monitoring mode. Many sages, beginning with Buddha Siddhartha Gautama, have advocated repeated engagement in these forms of meditation as a route to increasing mindfulness in daily life.

It was not until the late 1970s that research on mindfulness began to get traction in the psychological and medical sciences. At that time, biologist Jon Kabat-Zinn of the University of Massachusetts Medical School developed a secular outpatient program called Mindfulness-Based Stress Reduction (MBSR). The eight-week program emphasizes two aspects of attention: the ability to voluntarily focus attention, narrowing our thoughts to keep out distractions, and to monitor ongoing thoughts, feelings and sensations—without getting caught up in them—a phenomenon called meta-awareness. Working together, focusing and monitoring prevent our mind from wandering without our knowledge and escaping our control.

In the past decade researchers have established that MBSR and similar techniques can be used to successfully treat a wide variety of illnesses. Mindfulness-based cognitive therapy, developed by psychologist Zindel V. Segal of the University of Toronto and his colleagues, is modeled after MBSR but emphasizes the idea that the negative thoughts that can spark a depressive episode are fleeting mental events. Their transitory nature means that patients can choose to pay attention to them or not. In 2016 Willem Kuyken of the University of Oxford and his colleagues published a meta-analysis of published studies, including 1,258 patients who suffered from recurrent depression. Those patients who received mindfulness-based cognitive therapy had reduced risk of depressive relapse within a 60-week follow-up period compared with those receiving the usual care and other active treatments, including antidepressants.

After receiving mindfulness-based cognitive therapy, patients often report noticing that the experience of sadness fluctuates moment to moment and that negative thoughts lose their power over time. Mindfulness training in its various forms has similarly helped alleviate suffering from other psy-



**BY IMPROVING** the ability to direct and monitor attention, mindfulness meditation could enhance people's performance in pursuits as diverse as sports and surgery.

chological illnesses such as anxiety, panic disorders, PTSD, ADHD and phobias.

Mindfulness exercises can ameliorate bodily ills as well—most notably chronic pain. Because these exercises can lessen psychological stress, which can be fed by rumination about the past or worry about the future, they can reduce the emotional contribution to pain, which is often quite significant.

Recent data suggest that mindfulness training can also help with less severe, but still significant, psychological issues such as job-related burnout in medical professionals, first responders and teachers. Although such training is unlikely to reduce job-related demands, it may help change a person's relationship to the stressful thoughts that often accompany these demands. Indeed, there is growing evidence that mindfulness training reduces *perceived stress* and improves well-being.

Could mindfulness training protect against the harmful effects of stress on physical health? In 2016 David Creswell of Carnegie Mellon University and his colleagues examined the effects of mindfulness training on levels of a pro-inflammatory stress biomarker called interleukin 6 (IL-6). Thirty-five high-stress adults were recruited. Their stress came from the demands of seeking employment while unemployed. Participants were randomly assigned to receive mindfulness training or relaxation training

## MINDFULNESS TRAINING CAN RELIEVE SYMPTOMS OF AILMENTS THAT STRESS CAN EXACERBATE SUCH AS PSORIASIS AND FIBROMYALGIA.



**AMISHI P. JHA** and Brigadier General (now Major General) Walter Piatt review brain-wave recording procedures, along with a memory test that military service members take before and after mindfulness training.

in the form of a three-day residential retreat. IL-6 levels were measured one month before the retreat and again four months later. Over time, IL-6 levels decreased in only the mindfulness group. To track training-related brain changes, all participants were also asked to complete a five-minute functional brain scan one month before and two weeks after the retreat. While participants were in the scanner, their only instruction was to rest. Brain scans showed that the timing of the ebb and flow of brain activity in two brain regions was more synchronized after the retreat in only the mindfulness group. The two regions were the left dorsolateral prefrontal cortex, a region known to be involved in attentional control, and the posterior cingulate cortex, a region frequently activated during episodes of mind wandering. Intriguingly, individuals in the mindfulness group who had the strongest coordination between these two regions after the retreat also had the greatest reduction in IL-6 levels over time.

How are these brain activation and biomarker levels related? Creswell and his colleagues speculated that mindfulness training strengthens attentional control to promote stress resilience, which in turn leads to reductions in stress biomarkers. Yet attention was not directly measured in their study but only inferred from brain-activation patterns.

### FINDING FOCUS

AS MINDFULNESS TRAINING was gaining traction as a wellness-promotion and stress-reduction tool in the early 2000s, I began to consider, from a cognitive perspective, how it might work. As late as 2007 my field—cognitive neuroscience—had yet to weigh in on what might be changing in the brain when people engage in mindfulness training. I wondered if my own expertise on the brain bases of attention might be able to fill the gaps in our understanding. After all, there were striking parallels between current theories of distinct brain networks supporting attention and accounts from ancient texts describing practices to cultivate calm focus and open, accepting curiosity of events as they unfold.

In 2007 my research team set out to investigate. One of our first studies asked 34 medical and nursing students to perform a test of visual attention. They had to detect a target appearing at one of two locations on a computer screen. Sometimes they were told where and when the target would appear; other times they were only told when it would appear or given no warning at all. Then for eight weeks, half the subjects engaged in mindfulness exercises that required concentrated focus for 30 minutes a day. When they took the test again, these volunteers were 5 percent faster at responding during

the trials in which they were told both where and when the target would appear, indicating that they were better at directing their attention to the cued location than the untrained participants, who showed no improvement. The results were the first hint that we were on the right track in linking mindfulness training with a person's ability to willfully direct his or her attention to specific events in the external environment.

But what about our inner landscape—the terrain of private thoughts, memories and feelings? It is well-established that consciously and willfully directing our attention to the internal milieu with a sense of curiosity or just allowing our thoughts to roam freely during an evening stroll, for example, can boost positive mood and creativity. Psychologists refer to daydreaming in this way as conscious internal reflection.

In contrast, when attention is unconsciously summoned away from the task at hand, the consequences can be grim. Mind wandering, formally defined as having off-task thoughts during an ongoing task or activity, dulls the sensory input we receive from the environment, dampens mood and makes us more error-prone. What is worse is that prolonged periods of stress can increase the frequency of mind wandering.

In 2014 research scientist Alexandra Morrison, now at California State University, Sacramento, and others in my laboratory conducted a study in undergraduate students, who are known to have degraded well-being and higher levels of perceived stress by the end of the semester. We wanted to find out if students' attention would be degraded and if their levels of mind wandering increased over the semester.

We recruited 58 university students and split them into two groups. One group received mindfulness training, and the other did not. Mindfulness expert and study co-author Scott Rogers designed a series of short, weekly mindfulness training sessions for the training group. The total training time for the program was very short: seven hours over seven weeks.

At the start of the semester and before the training began, all students were asked to complete a computerized test to index their attention and mind wandering. At predetermined intervals, the task was interrupted by a question on the screen asking if their attention was "on task" or "off task." All of the students performed at roughly the same level.

Nine weeks later, when the students were tested again, performance gaps emerged between those who received mindfulness training and those who did not. The control group performed worse than they had originally. They had more performance errors and reported greater mind wandering, whereas the students who received mindfulness training had fewer performance errors and reported less mind wandering. The mindfulness program, it seemed, not only protected them from the inevitability of getting worse as the semester went on but seemed to strengthen their attention. In line with Creswell's speculation based on his brain and biomarker data, we were finding that mindfulness training was strengthening attention and reducing

## Capturing Attention

Mindfulness, a focus on the present moment without judgment, has proven benefits for health and happiness. Engaging in daily mindfulness workouts can help you assume this mental mode more often in your daily life. The following 10- to 15-minute mindfulness exercise is designed to train two types of attention: concentrative focus (a narrowing of attention and open monitoring) and a broad awareness of sensations and surroundings.

Here's what to do:

- Sit in an upright, stable position, hands resting on your thighs or cradled together.
- Lower or close your eyes, whichever is more comfortable for you.
- Attend to your breath, following its movement throughout your body.
- Notice the sensations around your belly as air flows into and out of your nose or mouth. You have been breathing all day—all of your life—and in this moment, you are simply noticing your breath.
- Select one area of your body affected by your breathing and focus your attention there. Control your focus, not the breathing itself.
- When you notice your mind wandering—and it will—bring your attention back to your breath.
- After five to 10 minutes, switch from focusing to monitoring. Think of your mind as a vast open sky and your thoughts, feelings and sensations as passing clouds.
- Feel your whole body move with your breath. Be receptive to your sensations, noticing what arises in the moment. Be attentive to the changing quality of experience—sounds, aromas, the caress of a breeze ... thoughts.
- After about five more minutes, lift your gaze or open your eyes.

—Scott Rogers, director of Programs and Training,  
UMindfulness Research and Practice Initiative,  
University of Miami



mind wandering and that it may be protective against the building stress of the semester.

We have studied many other high-stress groups from incarcerated youth, to teachers, firefighters, football players and soldiers. The results are consistent across all of these different groups. Over a high-stress interval, attentional lapses and mind wandering increase. In those receiving mindfulness training, this pattern is mitigated but only if they fully engage in daily mindfulness exercises. In other words, it is mindfulness practice that is protective, not simply sitting in a mindfulness course or listening to lectures on the merits of mindfulness training.

In some of our studies with active-duty military service members, we found that those who engaged in mindfulness exercises for 12 minutes or more every day kept their focus and mood stable over an eight-week predeployment training. The more an individual practiced, the better he or she fared, with those who practiced the most showing improvements in attention, working memory and mood by the end of the study. For a soldier, a present-focused and attentive mind may be the difference between life and death during the fog of war.

Attention may also have life-or-death consequences for our cells. In a study published in 2012 psychologist Elissa S. Epel of the University of California, San Francisco, and her colleagues found that people who self-reported a greater propensity toward mind wandering had shorter caps, called telomeres, at the ends of their chromosomes than those whose minds were more often anchored in the present. Shorter telomeres are associated with a shorter life span for an organism. As a result, the authors suggested in their paper that “a present attentional state may promote a healthy biochemical milieu and, in turn, cell longevity.”

### CULTIVATING CONSCIOUSNESS

ATTENTION IS ALMOST certainly not the only way mindfulness training works. Mindfulness techniques are most likely to alter and strengthen many other brain networks and processes. For example, studies have suggested that exercises shift the mind from a narrative mode of viewing the self, in which the central character in the story is you, to a more experiential view, in which you observe the unfolding of your thoughts, feelings and sensations over time. Whether better attention relates to this or other suggested mechanisms is not yet clear.

Whatever the mechanism, efforts to become more mindful could make a considerable dent in human suffering. Working mindfulness practices into your daily routine may bring benefits similar to those of physical exercise. Indeed, as with physical exercise, mindfulness exercises are stress-protective, and the more you do the more you benefit. As an antidote to an ambling mind, negative mood and stress, such mental workouts may have the potential to help virtually everyone live a happier, healthier and more fulfilled life. Students or athletes

who want to boost their performance, for example, and parents, teachers or caregivers wishing to be more attentive to others' needs may all find mindfulness training useful. Such training may be particularly essential, however, for people such as soldiers, first responders, surgeons and air-traffic controllers whose ability to control and monitor their attention may be a matter of life or death.

With evidence of its benefits mounting come new challenges for mindfulness training. How can access be scaled-up *and* meet the needs of specific groups? Based on our past research, my colleague Scott Rogers and I created a short-form program called mindfulness-based attention training (MBAT). Once we found the core program to be effective, we developed train-the-trainer methods to address scalability challenges. MBAT's modular structure and exercises allow for flexibility so the program can be customized for a variety of groups, such as soldiers, medical students, athletes and teachers. The linchpin of the program's success is the competency of the trainers. We are finding that more so than prior expertise in mindfulness, successful trainers must be familiar with the cultural norms, sensitivities and stressors that a particular community faces. Our research is ongoing.

No matter our profession, as we learn to grab hold of our own attention, we gain control of our own happiness and health. Perhaps the time is now for us all to consider cultivating greater awareness of our moment-to-moment experiences and the contents of our consciousness. ■

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### MORE TO EXPLORE

#### Taming a Wandering Attention: Short-Form Mindfulness Training in Student Cohorts.

A. B. Morrison, M. Goolsarran, S. L. Rogers and A. P. Jha in *Frontiers in Human Neuroscience*, Vol. 7, Article 897; January 2014.

#### Minds “At Attention”: Mindfulness Training Curbs Attentional Lapses in Military Cohorts.

A. P. Jha, A. B. Morrison, J. Dainer-Best, S. Parker, N. Rostrup and E. A. Stanley in *PLOS ONE*, Vol. 10, No. 2, Article e0116889; February 11, 2015.

#### Investigating the Phenomenological Matrix of Mindfulness-Related Practices from a Neurocognitive Perspective.

A. Lutz, A. P. Jha, J. D. Dunne and C. D. Saron in *American Psychologist*, Vol. 70, No. 7, pages 632–658; October 2015.

#### “We Are Talking about Practice”: The Influence of Mindfulness vs. Relaxation Training on Athletes' Attention and Well-Being over High-Demand Intervals.

J. Rooks, A. B. Morrison, M. Goolsarran, S. L. Rogers and A. P. Jha in *Journal of Cognitive Enhancement*, Vol. 1, No. 2, pages 141–153; June 2017.

For more resources on programs and practices, see the University of Miami's

UMindfulness Initiative Web site: [mindfulness.miami.edu/umindfulness/resources](http://mindfulness.miami.edu/umindfulness/resources)

Learn how to meditate with smartphone apps:

[www.10percenthappier.com](http://www.10percenthappier.com)

[www.getsomeheadspace.com](http://www.getsomeheadspace.com)

[www.insighttimer.com](http://www.insighttimer.com)

[scientificamerican.com/magazine/sa](http://scientificamerican.com/magazine/sa)