

IN THE NEW SCIENCE OF AWE, RESEARCHERS ARE FINDING  
THAT REGULARLY EXPERIENCING A SENSE OF WONDER  
MAY BOOST IMMUNITY, LOWER STRESS, FIGHT INFLAMMATION,  
AND EVEN ENHANCE WELL-BEING.

# the POWER of AWE

WHY YOU NEED TO START  
BLOWING YOUR MIND  
MORE OFTEN.

By Michael Behar



# LAST AUGUST 21 AT 4:30am, I ROUSED MY 7-YEAR-OLD SON,

Simon, from his bed in a creaky hotel in Cheyenne, Wyoming. In a few hours, a rare solar eclipse would occur. Dawn revealed a brilliant blue sky, promising a clear view of totality. Simon was thrilled; I felt indifferent. Neither of us had ever witnessed an eclipse. But my expectations were tempered. I'd been to Machu Picchu, Victoria Falls, the Himalayas. An eclipse is a mere two minutes of solar showmanship. Big whoop.

We scouted all morning for the perfect viewpoint, driving pockmarked jeep roads before settling atop 6,400-foot Prairie Dog Hill. Wearing protective glasses at first, we watched the sun become a black disk, a void in the heavens. Yellow tendrils danced along its circumference. A starry night sky appeared—even though it was 11:44 a.m. Crickets started chirping, and then a crimson glow swept the horizon, creating the startling illusion of a 360-degree sunrise.

"Oh my goshhh!" Simon yelled. "Oh, wow! Wow!"

Witnessing my child's pure and unmitigated elation ended my indifference, as did this cosmic spectacle that seemed to slow time. I was simultaneously energized, intellectually aroused, and overcome with unbounded optimism—as if life had suddenly revealed its infinite potential. There were about a dozen other onlookers nearby, and I had the inexplicable urge to hug each and every one of them. Nothing had ever made me feel like this.

It was awesome.

Scientists have been studying the effects of awe for some time. In 2003, psychologists Dacher Keltner and Jonathan Haidt defined the emotion as being somewhere between "the upper reaches of pleasure and...the boundary of fear."

"Awe is triggered by the perception of either perpetual or conceptual vastness," says

David Bryce Yaden, Ph.D.(c), a research fellow at the University of Pennsylvania who studies brain responses to transcendent experiences. The ocean, the Grand Canyon, and the Milky Way engage the perpetual form, which is largely visual and nature-based, he explains. Stirring TED Talks, music, and art kindle the conceptual variety, which is more cerebral and subjective to the person experiencing it. Both blow your mind, but in very different ways.

And here's the best part: Awe is not only mentally invigorating but also appears to be physiologically beneficial. Research shows that it may lower your risk of inflammation, ease stress, aid your immunity, enhance your well-being, and even improve your marriage. Compared with toiling away on a treadmill or choking down kale, feeling awe is an easy and fun way to improve your mental and physical health. Here's how it does all that, and how to use it to make your health—and entire life—more awesome.

## AWE MAY REDUCE INFLAMMATION

Chronic inflammation in the body is associated with many illnesses, including cardiovascular disease, arthritis, diabetes, cancer, and Alzheimer's. In 2015, Jennifer Stellar, Ph.D., an assistant professor of psychology at the University of Toronto, analyzed how various

emotions are associated with the blood protein interleukin-6 (or IL-6), a common indicator of inflammation.

Stellar evaluated seven emotions—joy, love, pride, amusement, compassion, contentment, and awe. Participants completed a survey on how often and intensely they experienced these emotions. Then Stellar collected saliva samples to determine their IL-6 levels. She found that people who reported feeling more awe had lower levels of IL-6.

This was the first evidence of a potential biological pathway between awe and reduced inflammation. And of those seven emotions, awe was the strongest predictor of lower levels of IL-6. Stellar is now tracking IL-6 in real time with people in the midst of awe-inspiring moments.

## AWE LOWERS STRESS AND AFFECTS IMMUNITY

Every morning as Neha John-Henderson, Ph.D., commutes to work, she makes a special effort to appreciate the stunning mountain scenery. An assistant professor of psychology at Montana State University in Bozeman, she studies the influence of stress on human immunity. And she's learned that the awe she experiences may affect how likely she is to become ill.

The reason, once again, is inflammation. People who report high levels of

stress tend to have higher levels of inflammation in their immune system; but John-Henderson's research found that people who experienced more awe had lower levels, perhaps because awe enables you to view stress from a healthier perspective.

Not only can awe be used to proactively manage stress, but it can also help depressurize you during anxious times; in fact, says John-Henderson, that's when it may have the most anxiety-reducing benefit. Feeling stressed? Take a break and do one of the things listed in "One Totally Awesome Week" at the end of this article.

## AWE INSPIRES CREATIVITY

Melanie Rudd, Ph.D., an assistant professor of marketing at the University of Houston, has done research in the Swiss Alps. There she put her volunteers either in a parking lot, which she describes as a "low-awe condition" (duh), or on a mountain summit, a "high-awe condition with this glorious panoramic landscape." She provided ample time for each group to take in the views and complete a short survey. Then she offered a choice of thank-you gifts: a bag of prepackaged trail mix or a creative chance to make their own using the same

fruit and nut selections. Those who'd ridden the gondola up the mountain overwhelmingly chose the do-it-yourself option.

Rudd later reinforced these findings by showing TV commercials that were either happy, neutral, or awe-inspiring (with images of waterfalls, whales, and astronauts in space) to another set of volunteers. "Then we asked if they wanted a coupon to buy premade chocolates for a loved one for Valentine's Day, or a recipe to make the chocolates themselves," she says. Those who viewed the awe-inspiring commercial were more inclined to embrace their inner chocolatier.

So what's going on here? Rudd showed that the experience of awe shakes our confidence in our existing knowledge and makes us more motivated to learn. And what do we do with this desire to learn? As her findings indicate, we make stuff. "Awe can enhance people's openness to learning, and as a consequence they want to create," she says.

## AWE MAY LIFT YOUR MOOD

More than 21 percent of American adults will experience a mood disorder at some point in their lives. New science sug-

gests that regularly experiencing awe might provide a potent boost to your mood and sense of well-being.

Last year, researchers scanned the brains of attendees at a weeklong spiritual retreat where they were expected to have many awe-inducing experiences. Scans from before and right after the event suggested significant changes in the function of serotonin and dopamine, neurotransmitters that are part of the brain's reward and emotional systems.

Other studies have found changes in the autonomic nervous system that connects the brain and body. Normally, the sympathetic (arousal) system and the parasympathetic (quiescent) system are yin and yang; when one rises, the other falls, maintaining your body's overall equilibrium. But that all changes with awe, because

IT ECLIPSES YOU  
Experts define awe as an emotion that exists between "the upper reaches of pleasure and...the boundary of fear."



these two systems seem to elevate simultaneously.

"So you not only have this incredible rush of energy and joy," explains study coauthor Andrew Newberg, M.D., a neuroscientist at Thomas Jefferson University, "but also a tremendous sense of calmness and bliss." The feeling of connectedness that awe induces is another possible mood lifter, adds Yaden, who was also involved in the research.

## AWE EVOKES SPIRITUALITY

Loads of scientific evidence trumpets the health benefits of spirituality—churchgoers live longer, it can enhance mental health, and it has been associated with better self-reported physical health in cancer patients. Some doctors credit the placebo effect: If you're convinced that your god has healing powers, then so is your immune system, which responds accordingly by getting you well. But you don't have to be born again to enjoy the benefits of spirituality. Several studies illustrate that awe can produce spiritual or religious-type experiences.

In a series of experiments, Piercarlo Valdesolo, Ph.D., an associate professor of psychology at Claremont McKenna College in California, played clips from the BBC's *Planet Earth* to people who were later questioned about their beliefs on two competing evolutionary theories. One theory emphasized the role of randomness in natural selection; the other depicted evolution as

# THE OVERVIEW EFFECT

Astronauts return from space with changed brains.

Awe can render profound cognitive changes in the brain that last a lifetime, says neuroscientist Andrew Newberg, M.D. "An epiphany experience literally can alter your brain forever." That was true for astronaut Scott Kelly, who spent 340 consecutive days on the International Space Station. "I was a fighter pilot trained to be a killer," he says. But after four space flights, including a year in orbit, he says his "emotional attachment to humanity" hugely intensified, curtailing his urge to shoot enemies. "When you see the Earth floating there, you realize we're all part of this shared experience and we need to work together better to advance the human condition." Kelly's transformation—known to psychologists as the overview effect—is remarkable, but unfortunately unattainable to those of us stuck on terra firma.



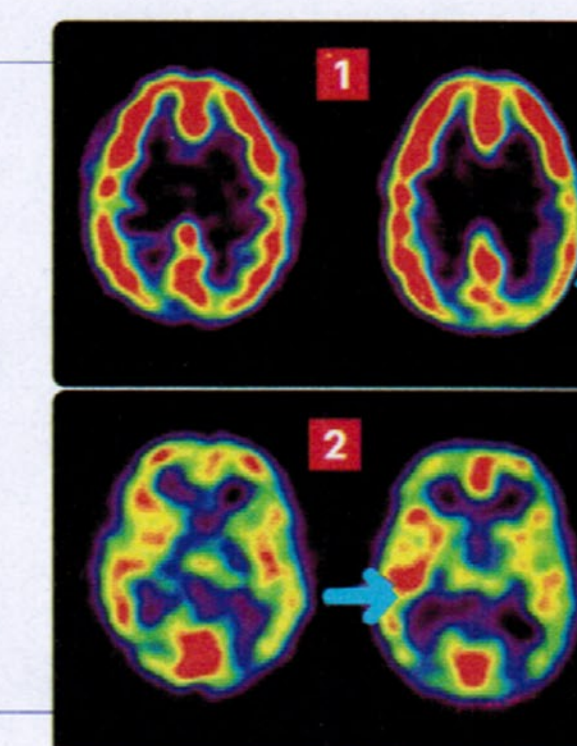
SPACED OUT  
This view makes astronauts kinder and more patient.

## What a blown mind looks like

Brain scans show what happens when you experience awesome.

"The parietal lobe [1], in the upper back part of the brain, tends to shut down while you're meditating and experiencing awe," says Dr. Newberg. This region is where we contextualize perceptions, like sights and sounds, to establish our sense of self in relation to the

world. At the same time, the limbic system becomes more active [2]. Dr. Newberg says, eliciting a very intense energy or arousal. "This helps release dopamine, a feel-good molecule, in the brain. It creates a feeling of oneness with the universe."



NASA (astronaut), courtesy Andrew Newberg, M.D. (brain scans)

Zhao Hanrong/Xinhua/Getty Images/Redux (crowd)



directed, implying that an omnipotent force in control. Valdesolo says he was amazed when participants describing themselves as “non-theists who believe in the explanatory power of science” predominantly favored the directed-evolution explanation. Put another way: Awe suddenly made them prefer theories that suggested purposeful design.

Why? Humans have an innate desire for order and explanation; we hate randomness and uncertainty. It’s stressful. “So whatever is available to alleviate that feeling of randomness or uncertainty, you’ll take,” Valdesolo says.

**AWE MAKES YOU LESS OF A DICK**

Sometimes it’s hard to be nice. When you’re stressed, angry, frustrated, or exhausted, you can become a self-absorbed dickhead. Stellar and her fellow researcher, Paul Piff, Ph.D., a psychologist at UC Irvine, wanted to know how much awe it takes to remain amiable in trying times. They recruited 93 undergraduate students and split them into two groups: a control group that was led to an area on the UC Berkeley campus with a mundane view of nothing in particular, and a second group that took an elevator to the top of a 200-foot clock tower from which they could gaze for miles. Everyone had four minutes to look at their surroundings, during which time researchers administered a survey that asked them to rank the intensity of 14 distinct emotions, with awe and humility among them.

Not surprisingly, the control group felt significantly less awe than the people in the clock tower. But those on the tower also ranked humility high. In fact, awe and humility seemed to be inextricable, with the former inducing the latter.

“Awe is the emotional vehicle that makes you feel connected to something larger than yourself,” says Piff. “Awe makes you feel less entitled, less narcissistic, and more compassionate because you feel less important. That’s the part that matters for kindness and generosity.”

**AWE STRENGTHENS RELATIONSHIPS**

Astronauts who view Earth from space often report feeling a oneness with humanity and the universe. It’s a shift in mindset that psychologists call the “overview effect.” According to Soviet cosmonaut Boris Volynov, who flew two Soyuz missions, “you begin to be more kind and patient with the people around you.”

Dr. Newberg mapped blood-flow in the brains of people experiencing a spiritual sense of awe. He found that the region in charge of establishing our sense of self in the world partially shuts down. Meanwhile, the area controlling emotions and arousal fires up, releasing

feel-good dopamine. In short, awe dissolves the boundary between self and others. We become less self-absorbed and more focused on the emotional needs of others.

Awe’s impact on intimacy soars even higher when people witness a mind-blowing event together. “Anytime you have a shared emotional experience, it’s a stronger experience and it starts to define the relationship,” says Valdesolo. Seeking out awe-inspiring moments with anyone you want to feel closer to induces feelings of open-mindedness and affection, he explains.

“It may override the boredom, the routine you get into,” adds awe researcher Amie Gordon, Ph.D. “It might help you to see that person in a different light, and feel closer and connected.”

My son and I reminisced about our eclipse odyssey for months. The next total solar eclipse visible from the United States will be on April 8, 2024. You can bet we’ll be there. ■

stay calm under duress and providing a more intimate understanding and trust of his body.

The concept of “interoception” is a hot area of study that can sound new-agey, even spiritual. Interoception, as formally defined, consists of the receiving, processing, and integration of body-relevant signals together with external stimuli to affect goal-driven behavior. That mouthful is translated by mindfulness coach Pete Kirchmer as “a sense of what’s going on in your body—hunger, thirst, pain, temperature, heart rate, fatigue, and the wisdom to respond to it. It’s a capacity that can be trained.”

A series of brain scan studies at UC San Diego with athletes and soldiers reveals that people with heightened interoception demonstrate exceptional resilience. “It’s about using your internal awareness to anticipate and prepare for stress during extreme situations so your body doesn’t overreact,” Kirchmer says. Harvard researchers found that eight weeks of mindfulness training, including meditation, decreased brain-matter density of the amygdala, the fight-or-flight center that responds to stress. Other research has found that mindfulness training can decrease the amygdala’s connectivity to the rest of the brain, reduce perceived levels of pain, and increase connectivity in brain areas associated with focus.

Kirchmer leads three-day workshops for athletes, executives, first responders, and others who are looking to perform better under stress. The cornerstones of the program are mindfulness, meditation, and movement practices designed to help

participants connect with their body and focus their mind. He recommends practicing up to 30 minutes a day. Experienced meditators feel the pain, but it doesn’t trigger a stress reaction.

“Like any kind of exercise, meditation takes time to learn, and the more time you put in, the more you get out,” Kirchmer says. Start out with three to five minutes a day using a guided app such as Insight Timer or Headspace. He also teaches his clients to check in with their body before and even during a stressful activity. Take a deep breath and ask yourself questions like, “What are my feet feeling? How is my heartbeat?” Doing this can help break the trance of anxious thinking or negativity. Be observational and nonjudgmental.

Negative self-talk can be effective in the short term, Kirchmer says, but a compassionate approach is more sustainable. Research by psychologist Kristin Neff, Ph.D., of the University of Texas at Austin, suggests that replacing fear of failure and inadequacy with an attitude of kindness and friendliness can fuel stronger feelings of self-belief. The goal is to treat yourself like you would if you were being a supportive, constructive coach to someone who’s learning something new. This approach emphasizes being an inner ally rather than an inner enemy in order to reach your full potential.

Ultimately you have to find the methods that best help you forge greater confidence. Everything from prayer and affirmative tattoos to activity monitors and meditation can play a role in helping you gain insights into yourself.

Then you just have to believe. ■

**One totally awesome week**

AWE DOESN’T HAVE TO COME IN A SINGLE MASSIVE SERVING TO BENEFIT YOUR HEALTH. SMALL REGULAR DOSES CAN HAVE AN IMPACT AS WELL. TRY IT!

**MONDAY** View a sunrise or sunset. But watch it from a different venue. “Novelty is important,” says David Bryce Yaden, Ph.D.(c). “The first time you fly is awe-inspiring. But after a few times, you shut the window.”

**TUESDAY** Take a warm bath with the lights off. “Feel the water with every inch of your body,” says *Blue Mind* author Wallace Nichols, Ph.D. The floating sensation quiets the brain’s parietal lobe and promotes connective feelings.

**WEDNESDAY** Visit a church, sports arena, or other impressive structure. “Great architecture simulates the vastness of the great outdoors,” says Dr. Newberg, and it also promotes optimism. Looking back at the International Space Station during spacewalks, Scott Kelly says he got this feeling of “hey, we’re capable of pretty amazing things if we put our minds to it.”

**THURSDAY** Watch BBC’s *Planet Earth* series. Scientists use it to induce conceptual and perceptual awe in study participants. CNN’s *Heroes* and Jason Silva’s *Shots of Awe* on YouTube are also great. The bigger the screen and the louder the audio, the better it is, says Jennifer Stellar, Ph.D.

**FRIDAY** Attend a live musical performance. Along with nature and inspirational people, music is among potent elicitors of awe, according to research by Amie Gordon, Ph.D. It shifts your attention outward, resulting in a “diminishment of self-focus,” adds Yaden.

**SATURDAY** Go for a hike. Without earbuds. “Tune into things in your environment,” says Paul Piff, Ph.D., “and the details that get you to think about the complexity of the world.”

**SUNDAY** Reminisce with a loved one about an awesome moment you shared. “Reliving an experience can trigger the same positive effects as the original event,” says Piercarlo Valdesolo, Ph.D.