

What, Me Worry?

Why you should stop sweating everyday aggravations and embrace the benefits of stress.

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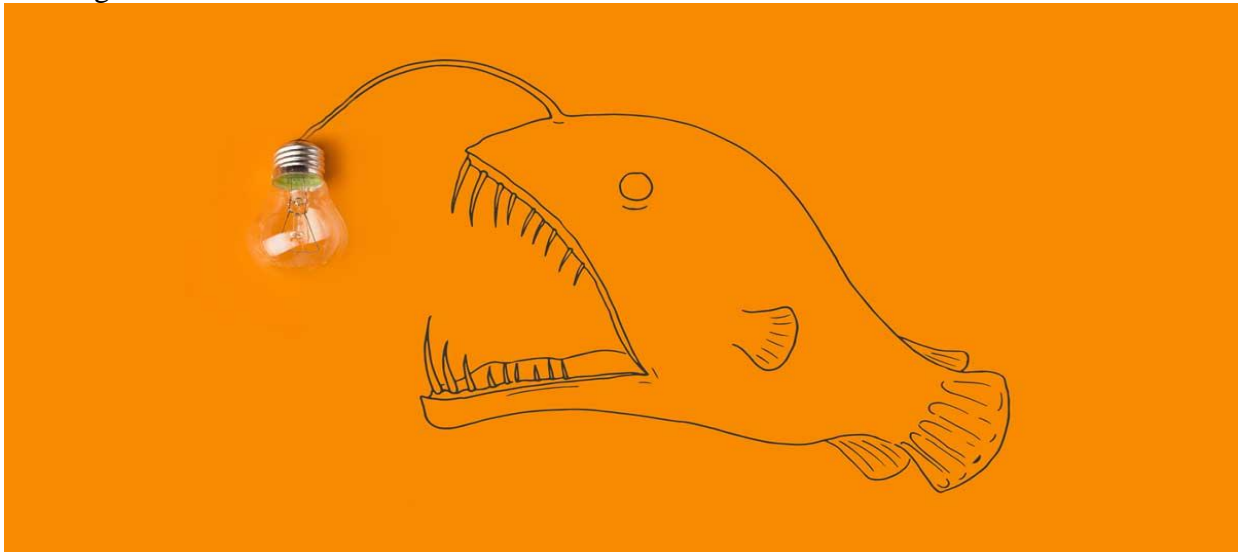


Image: Getty Images

By Kristin Sainani

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HERE YOU ARE, STUCK IN TRAFFIC. Minutes tick by as you inch the car

forward, gripping the steering wheel with white-knuckled tension. What's worse, a glance at the clock tells you you're going to be late for that big meeting and there's nothing you can do about it. You can feel your blood pressure rise and hear your rapid pulse thrumming in your ears. Then you remember something you read in a health magazine or heard from a daytime TV doctor about the dangers of stress—that it can harden arteries, kill brain cells, trigger tumors. So in an effort to be mellow, a leaf on the wind, you try to recall the breathing technique from that yoga class years ago. But it's no use: Now you're stressed about stress itself.

If this sounds familiar, you're not alone. According to a 2013 national survey by the American Psychological Association, the average stress level among adults is 5.1 on a scale of 10; that's one and a half points above what the respondents judged to be healthy. Two-thirds of people say managing stress is important, and nearly that proportion had attempted to reduce their stress in the previous five years. Yet only a little over a third say they succeeded at doing so. More discouraging, teens and young adults are experiencing higher levels of stress (5.8 and 5.7/10, respectively), and also are struggling to manage it (41 and 30 percent success).

"Stress has a very bad reputation. It's in pretty bad shape, PR-wise," acknowledges Firdaus Dhabhar, an associate professor of psychiatry and behavioral science at Stanford. "And justifiably so," he adds.

Much of what we know about the physical and mental toll of chronic stress stems from seminal work by Robert Sapolsky beginning in the late 1970s. Sapolsky, a neuroendocrinologist, was among the first to make the connection that the hormones released during the fight-or-flight response—the ones that helped our ancestors avoid becoming dinner—have deleterious effects when the stress is severe and sustained. Especially insidious, chronic exposure to one of these hormones, cortisol, causes brain changes that make it increasingly difficult to shut the stress response down.

But take heart: Recent research paints a different portrait of stress, one in which it indeed has a positive side. "There's good stress, there's tolerable stress, and there's toxic stress," says Bruce McEwen of Rockefeller University, an expert on stress and the brain who trained both Sapolsky and Dhabhar.

Situations we typically perceive as stressful—a confrontation with a co-worker, the pressure to perform, a to-do list that's too long—are not the toxic type of stress that's been linked to serious health issues such as cardiovascular disease, autoimmune disorders, severe depression and cognitive impairment. Short bouts of this sort of everyday stress can actually be a good thing: Just think of the exhilaration of the deadline met or the presentation crushed, the triumph of holding it all together. And, perhaps not surprisingly, it turns out that beating yourself up about being stressed is counterproductive, as worrying about the negative consequences can in itself exacerbate any ill effects.

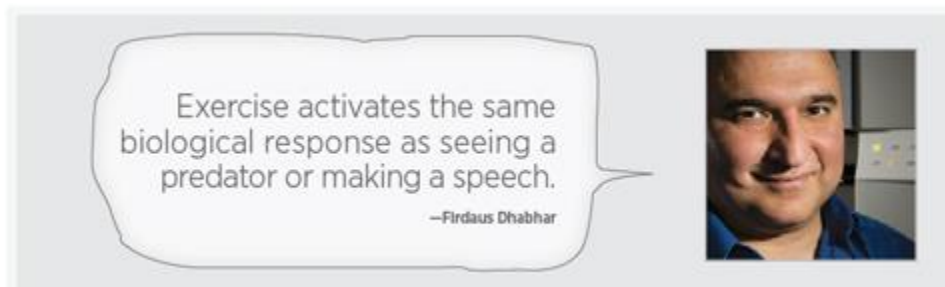


Photo: Steve Fisch

When Dhabhar was starting his graduate work in McEwen's lab in the early 1990s, "the absolutely overwhelming dogma was that stress suppresses immunity." But this didn't make sense to him from an evolutionary perspective. If a lion is chasing you, he reasoned, your

immune system should be ramping up, readying itself to heal torn flesh. It occurred to Dhabhar that the effects of acute stress, which lasts minutes to hours, might differ from the effects of chronic stress, which lasts days to years.

Dhabhar likens the body's immune cells to soldiers. Because their levels in the blood plummet during acute stress, "people used to say: 'See, stress is bad for you; your immune system's depressed,'" he says. "But most immune battles are not going to be fought in the blood." He suspected that the immune cells were instead traveling to the body's "battlefields"—sites most likely to be wounded in an attack, like the skin, gut and lungs. In studies where rats were briefly confined (a short-term stressor), he showed that after an initial surge of immune cells into the bloodstream, they quickly exited the blood and took up positions precisely where he predicted they would.

"His work was a pioneering demonstration of how important the difference is between acute and chronic stress," says Sapolsky, a professor of biology, neurology, and neurological sciences and neurosurgery. "Overwhelmingly, the bad health effects of stress are those of chronic stress."

This strategic deployment of immune cells can speed wound healing, enhance vaccine effectiveness and potentially fight cancer. In 2009, Dhabhar's team showed that knee surgery patients with robust immune redistribution following the stress of surgery recovered significantly faster and had better knee function a year later than those with a more sluggish mobilization. In other studies, volunteers who exercised or took a math test (both acute stressors) immediately prior to being vaccinated had a heightened antibody response relative to volunteers who sat quietly. And in 2010, the researchers curbed the development of skin cancer in UV-exposed mice by stressing them before their sunlamp sessions. Dhabhar speculates that giving cancer patients low-dose injections of stress hormones might help prime their immune systems to fight the cancer. "It may not work out, but if it did, the benefits could be tremendous," he says.

Moderate, transient stress may also have benefits beyond heightened immunity. In a 2013 paper that Dhabhar co-authored, women who were caregivers for husbands suffering from dementia (a chronic stressor) had more oxidative DNA damage—a marker of biological aging—than other women their age. However, women in the control group who reported moderate stress levels had less oxidative damage than those who reported low stress levels.

Dhabhar thinks the key to maximizing the benefits of stress while minimizing any negative effects is interspersing "regular hits" of acute stress with periods of low or no stress—what he calls "green zones." That doesn't mean you have to add bungee jumping or public speaking to your daily routine; rather, he advises harnessing the daily aggravations that life already throws at you. And exercising more, but maybe not for the reason you think. Exercise is widely touted as a stress reliever, but what many people don't realize is that it's also a short-term stressor, he says. "Exercise activates the same biological response as seeing a predator or making a speech." Thus, physical exertion has a dual benefit.



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Photo: Courtesy

Connor Liston

Whereas chronic stress shrinks the hippocampus (one of the brain's key memory centers), impairs cognitive function and increases risk of mental illness, short bursts of stress can paradoxically enhance memory and learning. This makes sense if you frame stress in a different way, says Connor Liston, a postdoctoral research fellow in neurosciences who also did his graduate work in McEwen's lab at Rockefeller. "If you think of stress in terms of arousal—being awake and alert and oriented to changes in the environment—this is a good thing for learning. If I'm dull, lethargic, disengaged and tired, I'm not engaging as well with the world around me."

Under certain conditions, the stress hormone cortisol appears to boost the brain's receptivity to learning, what neuroscientists call "brain plasticity." Neurons in the brain each form thousands of synapses, structures that they use to communicate with other neurons. As learning occurs, new synapses sprout and old ones are pruned. Using a microscope that can detect fluorescently labeled proteins through the skull, Liston can watch this process occur in real time in the brains of living mice. When he experimentally depleted corticosterone (the mouse equivalent of cortisol) in a group of rodents, synapse turnover—a marker of brain plasticity—ground to a halt. In this state, the mice were unable to learn a new skill. Conversely, when Liston gave another group of mice a low-dose shot of corticosterone, the rate of synapse turnover doubled.

"It's intriguing to think we can loosen up brain plasticity," says McEwen, who notes that this might have applications for helping people recover after a stroke. There's a danger in leaving the dial turned up for too long, though. When Liston exposed mice to high-dose corticosterone for 10 days, the animals experienced a net loss of synapses. It turned out that pruning outpaced synapse formation, which may help explain the effects of chronic stress on mental functions.

The good news is that stress-induced cognitive impairments may be reversible. In a 2009 study, Liston and his colleagues scanned the brains of 20 medical students who spent a month cramming for the medical licensing boards—an exam that could make or break their careers as doctors. Compared with the scans of a control group of relatively unstressed medical students, the test takers' scans revealed deficits in the prefrontal cortex, the area that supports complex thought. They also scored significantly more poorly on a test of mental flexibility. Yet, a month after the exam, their brains and performance had returned to normal. Although it underscores the futility of cramming, the study suggests that even sustained stress is not necessarily permanently damaging.

The point at which chronic stress turns toxic is when it becomes unrelenting and traumatic, and when sufferers lack control and social support. "What we tend to mean when we talk about stress

are the daily experiences of time scarcity, role uncertainty, social conflict and pressure," says Kelly McGonigal, PhD '04, a health psychologist, author and Stanford lecturer. "I've become even more convinced that the type of 'stress' that is toxic has more to do with social status, social isolation and social rejection. It's not just having a hard life that seems to be toxic, but it's some of the social poisons that can go along with stigma or poverty."



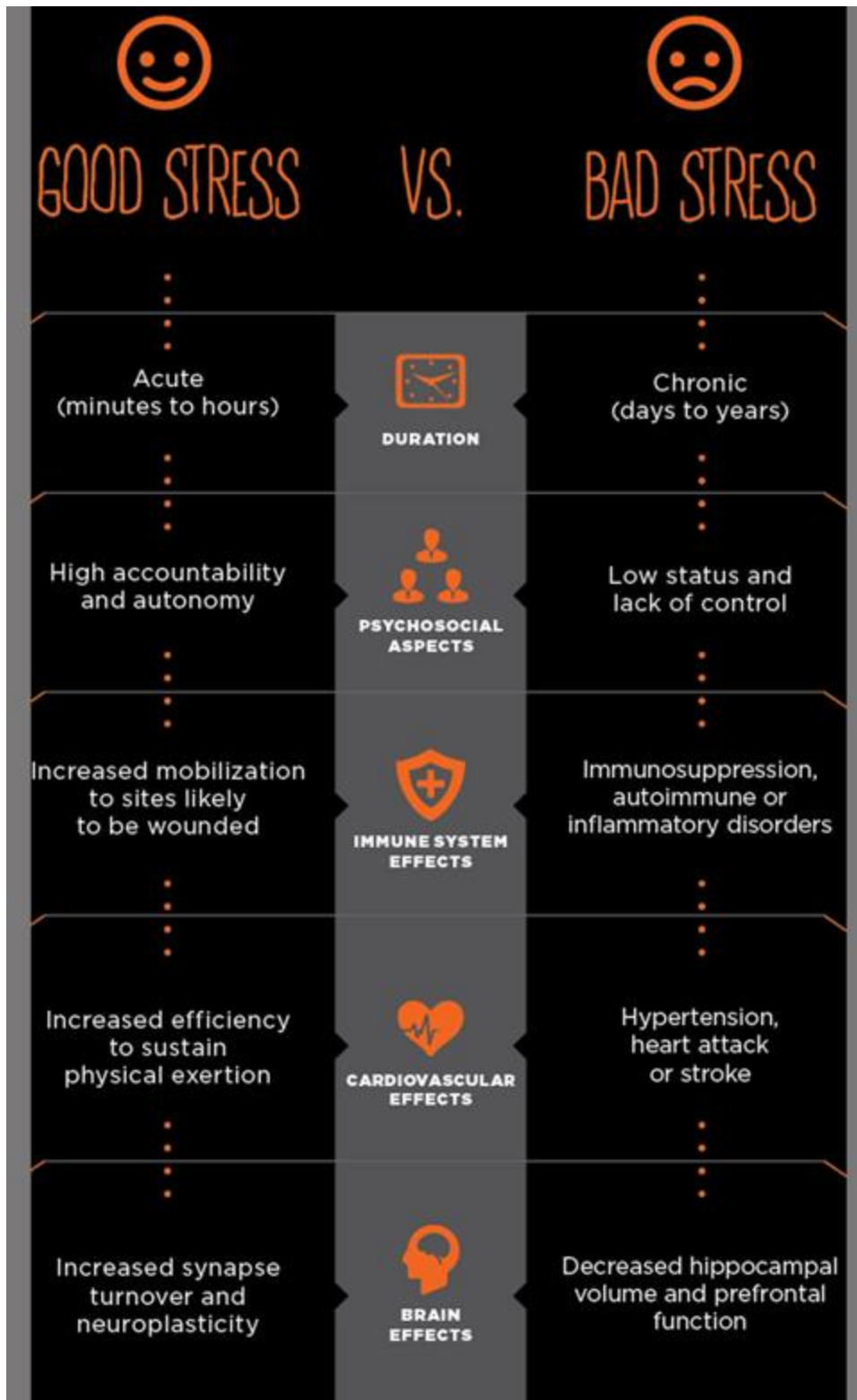
Photo: Mark

Bennington

In a series of classic studies in Britain, dubbed the Whitehall studies for the road in London where the government resides, researchers examined nearly 30,000 employees in the British civil service. All had secure jobs, livable wages and access to the same health care; they also worked within a precise hierarchy, with six levels of ranks. The researchers found that heart disease and mortality rates increased steeply with every step down the ladder. Those on the lower rungs tended to lead less healthy lives—they smoked more, for example—but even factoring in lifestyle differences, the lowest-ranking employees had twice the mortality rate of the highest-ranking individuals. The researchers attributed this disparity to the psychological stresses of low status and lack of control.

Sapolsky's studies of baboon troops in Kenya have revealed a similar effect: Those at the bottom of a stable social hierarchy have the highest resting cortisol levels, cholesterol levels and blood pressures. "I'd say that, overall, the most corrosive type of social stress in our Western world is low socioeconomic status—i.e., poverty," he says, echoing McGonigal.

High-ranking individuals may have demanding jobs, but they also enjoy a greater sense of autonomy. In a study that appeared in the *Proceedings of the National Academy of Sciences* just before the 2012 presidential election, researchers found that a group of leaders—military officers and government officials—had lower resting cortisol and self-reported anxiety than a comparable group of nonleaders. This is despite the fact that leaders appeared more taxed: They slept significantly fewer hours per night than nonleaders. Among the leaders, those who managed more people and had more authority also had lower cortisol levels and lower anxiety than those with less clout, and this association was directly related to their greater sense of control.



In the early 1990s, researchers surveyed 7,268 participants from one of the Whitehall cohorts about their current stress levels and their perceptions of the impact of stress on their health. Independent of job rank, initial health status or the level of stress reported, those who believed

that stress had a large effect on their health had double the risk of suffering a heart attack within the 18-year follow-up period compared with those who viewed stress as being unrelated to their health. Similarly, in a large U.S. study, people with high stress levels had an elevated mortality rate only if they also believed that stress greatly affects health.

Given the prevalence of messaging that any stress is bad, McGonigal worries that fear may lead people to avoid exactly the kinds of experiences that are critical for health and longevity. "We know that having a meaningful job is protective; we know that social connection is protective; we know that mastery of challenges is protective."

Additionally, how people view stress—as a threat versus an opportunity—can alter their physiologic responses to it. In a 2011 study at Harvard, volunteers were exposed to positive messages about stress—that it's adaptive and aids performance—prior to a public speaking task. They had healthier cardiovascular profiles (their hearts pumped more efficiently and their blood vessels constricted less) during the stressor than controls who were given no information or were told to suppress stressful emotions. "This shows that you can change your moment-to-moment cardiovascular physiology depending on how you think about stress," McGonigal says.

In her lectures and classes, McGonigal used to teach people how to reduce or cope with stress, as if it were something to be avoided and dreaded. But in light of this research, she's changed her tune. She no longer focuses on training people to relax, breathe and calm down in the face of stress. Instead, she encourages them to harness the stress: "Rather than trying to slow your pounding heart, why couldn't you view it as your body giving you energy?" she says.

After all, even if you could live in a stress-free bubble, you'd probably have to excise all the things that imbue your existence with happiness and meaning—like relationships, challenging work, learning and growth. "In a way," McGonigal concludes, "stress is a kind of engagement with life."

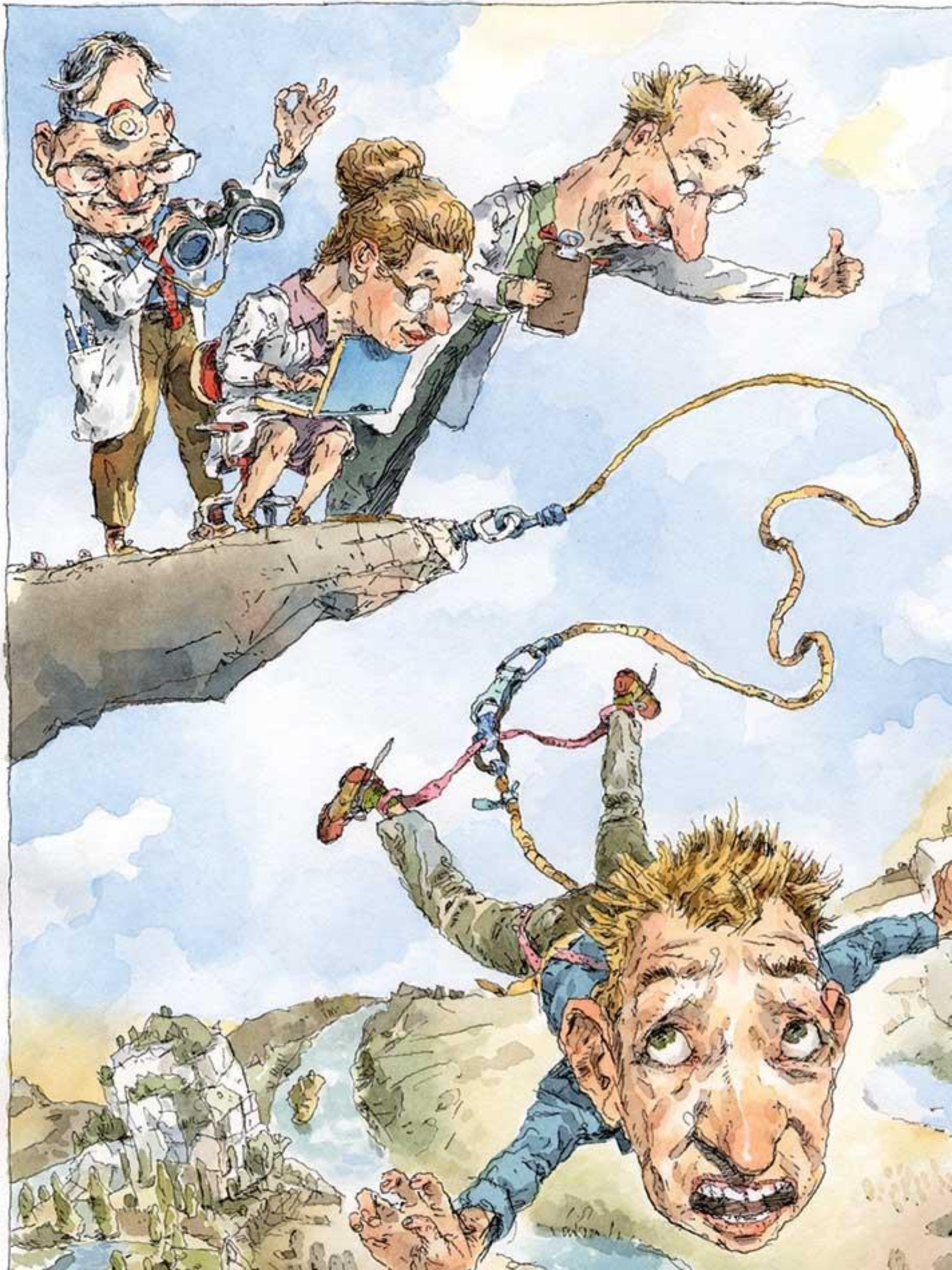


Illustration: John Cuneo

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