The Science of Why Yoga Quiets the Mind
Fitness Industry Hype Obscures Yoga’s True Benefits

I had been practicing yoga for a decade, but it took an unexplained injury to push me toward turning yoga into a daily routine. I had spent a brutally cold winter battling unexplained nerve pain in my legs, which doctors after a series of diagnostic tests eventually characterized as related to “muscle tension.”

For years as a professor and writer, my days were spent at a desk chair, slouched over a computer. I always prided myself on staying in shape, taking breaks to run and lift weights. But now it seemed the years of sitting at a computer, pressed to meet the next deadline, had taken their toll. As I worked with a physical therapist, I began to notice that the nerve pain I felt in my lower legs appeared to be connected to chronic tightness in my hamstrings and hips, and this tightness would intensify after sitting at a desk and/or under conditions of stress.

I switched to a standing desk, which helped considerably, and I quit exercising as intensely as I did when I was twenty-five years old. But it was yoga that seemed to make the most difference. As I recovered, I carefully worked my way back to an hour-long yoga practice. After a few weeks of practicing each morning, I noticed that not only did my nerve pain start to subside, but my posture, sleep, and mood improved. In comparison to any other exercise routine I had previously done, yoga was far more effective at putting my mind and body at ease. Yoga helped me become “non-reactive” to any pain I might be feeling, fending off resulting feelings of anticipation and worry, which by inducing stress would often result in increased pain.

My approach to yoga today is very different from when I first took up the practice. Ten years ago, like many Americans, I approached yoga as just another form of exercise. I recognized the calming effect yoga had on me, but I still began each practice eager to experience an intense workout. But as I have come to understand first hand, ap-
proaching yoga as an intense workout not only risks injury, it also distracts from what researchers are discovering are the true benefits, which include managing mood, controlling our fight or flight stress response, and promoting mental clarity and focus.

It's about the Breath
Even though more than 1,000 studies have been published on yoga, only a handful of high-quality studies exist. A main reason is a comparative lack of U.S. federal funding for health-related yoga research. But based on available evidence that lines up with what we know about the body, the brain, and the nervous system, there are a few things we can at least hypothesize about yoga’s health benefits.

As with other forms of exercise, practicing strenuous yoga releases endorphins, which are thought to create not only temporary forms of euphoria but also can help mask pain. Like exercise generally, practicing yoga can lower cortisol, a hormone correlated with stress, depression, and anxiety. By regulating cortisol levels, yoga may also help practitioners produce more melatonin, which can improve sleep and thereby overall mood.

But compared to running, lifting weights, or other forms of exercise, it is yoga’s focus on controlled breathing that makes the practice unique, writes New York Times science journalist William Broad (2012) in The Science of Yoga. The focus on the breath is one reason studies consistently indicate that yoga in comparison to conventional exercise is more effective at managing feelings of stress, depression, and anxiety. Almost all forms of yoga emphasize Ujjayi pranayama, a style of slow breathing. When we breathe quickly, which often occurs when we experience stress or anxiety, carbon dioxide levels in our bloodstream decrease while oxygen levels stay the same. The imbalance produced by faster than normal breathing boosts the excitability of our nerves and muscles, producing muscle spasms and tingling in our extremities, which can trigger greater feelings of anxiety.

In contrast, the slow breathing emphasized in yoga practice increases carbon dioxide levels. In response, blood vessels in the brain dilate, sending more oxygen to the brain. By enabling our brains to absorb more oxygen, the slow breathing of yoga increases calmness and alertness, writes Broad. Recent studies point to a second possible way that the effects of yoga may differ from conventional exercise. Yoga appears to uniquely boost levels of gamma-amino butyric acid (GABA). The role of this neurotransmitter is still not fully understood by scientists, but GABA is typically found at lower levels among those experiencing depression, anxiety, post-traumatic stress disorder, and chronic pain. In contrast, higher levels of GABA are correlated with more positive mood and feelings (Streeter et al. 2017).

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Moving Fast and Slow
A second way that yoga may be unique from other forms of exercise, writes Broad, is yoga’s ability to regulate autonomic features of our nervous system, functions that were once considered beyond our reach to control. Some researchers hypothesize that yoga has the unique ability to either put the brake on our sympathetic system (which generates “fight or flight” stress reactions) or boost our parasympathetic system (which controls our “rest-and-digest” functions).

By cycling through the fast and slow parts of our nervous system, a yoga practice gives our metabolism and nervous system a healthy workout, promoting greater balance. A typical hour-long yoga practice will cycle through braking the sympathetic system and boosting the parasympathetic system. Fast flowing poses stimulate our sympathetic system. More static poses that we hold for a longer period of time or in positions of relaxation put the brake on the “fight or flight” system and promote the “rest and digest” parasympathetic system.

By cycling through the fast and slow parts of our nervous system, a yoga practice gives our metabolism and nervous system a healthy workout. In other words, writes Broad, yoga seems to not only promote the body’s flexibility but also our inner flexibility, allowing us to more easily sink into a state of quietude and letting go.

Chasing Perfection
Even as scientists begin to uncover the unique benefits of yoga to mental health and overall well-being, many Americans continue to pursue yoga for the wrong reasons. It is not spirituality or mental harmony that drives their practice but “the pursuit of bodily perfection—the perfect abs, the perfect butt, the perfect back bend,” writes journalist John Philip (2009) in Yoga Inc. The message of our image-driven culture, Philip observes, is that “yoga is a method that women, mostly, can use to attain physical perfection.”

Studies consistently show that people who regularly exercise, as much as they may not admit, tend to care most about appearances. “People exercise not for the physiological benefits,” writes University of Alberta’s Timothy Caulfield (2012) in The Cure for Everything, “but for weight control and looks.” There are variations in goals by age and by the health of an individual, “but looks and weight control (for the purpose of looks) are themes in almost every study,” notes Caulfield.

Yoga is no different. More than 70 percent of yoga practitioners in the United States are women, according to a 2016 IPSOS survey commissioned by Yoga Journal magazine. Among those polled, one in five said that “losing weight” was a motivation for beginning yoga, though the true proportion is likely higher given that 50 percent of practitioners also cited “getting in shape” as a primary goal.
But as a form of exercise, yoga is not a very efficient means to lose weight. The reason, as Caulfield explains, is that our bodies are eating machines. If you want to lose weight, you have to burn more calories than you eat. If, as a 175-pound man, I practiced intense vinyasa or power yoga for sixty minutes, I might burn 350-700 calories. If I followed that by drinking a medium-sized smoothie and eating a modest salad, I would immediately consume as much if not more calories than I just burned.

For the rest of the day, writes Caulfield, I must then eat fewer calories than my body needs, or I will not lose an ounce. There's another paradox: Intense yoga, like other forms of exercise, also tends to increase our appetites. Our bodies are calibrated to stay at whatever weight we might be at the present moment. If you burn off more calories doing yoga than you consume, your body will send strong signals of hunger and craving, compelling you to try to make up the difference, unless you have the willpower to resist.

Many magazines and advertisements featuring ultra-lean women practicing yoga, combined with the competitive culture of fitness clubs and studios, can also breed unhealthy obsessions. In Yoga, Inc., for example, Phil notes studies showing a link between an extreme commitment to yoga and eating disorders, given the emphasis by some teachers on the need to practice on an empty stomach and to follow a strict diet. Rather than a calorie-burning workout, yoga's true benefits to weight loss relate to mind-body balance. If, as reviewed earlier, because of yoga an individual experiences less stress and anxiety and improved sleep, then they are less likely to overeat or seek out high-calorie carbs and sugary foods.

Risky Business
In terms of staying active, yoga's promotion of flexibility and joint mobility may also help ward off injury. But if taken to the extreme, yoga can also cause injury. Between 2001 and 2014, there were more than 29,000 yoga-related injuries in the United States, according to a study by University of Alabama researchers who analyzed data compiled from hospitals by the Consumer Product Safety Commission. During that period, as yoga grew in popularity across age groups, there was a doubling in the injury rate among those aged forty-five to sixty-four (Swain and McGin 2016).

In The Science of Yoga, Broad warns that a few popular yoga positions in rare instances may lead to severe injuries. These positions include shoulder stand, plow, wheel, and head stand, which could cause stroke or spinal and arterial injuries. Given the risk, Broad concludes that these poses add little to a practice and should be avoided.

Particularly risky may also be “hot yoga,” a vigorous practice performed in a studio heated to above ninety degrees. Phil interviewed medical experts who offered a variety of warnings about the practice. Packed into sweltering hot studios that in contrast to other yoga traditions are often lined with mirrors, we are likely to draw comparisons to others as to how far we should be stretching or what poses we should be perfecting.

Under conditions of intense heat, in competition with others we see in the mirrors, and fueled by endorphins, it is easy to stretch our muscles too far, weakening or tearing them. A common claim also is that hot yoga, by inducing buckets of sweat, cleanses the body of toxins. If you experience nausea or a headache, it is because the toxins are leaving the body. This is dangerous, pseudoscientific nonsense. The most likely trigger of nausea and a headache is dehydration, which requires immediate replacement of fluids.

Practicing Non-Doing
As I recovered from my leg pain and adopted a daily yoga routine, I practiced a slow yet vigorous form of vinyasa yoga on my own at home or outside, visiting a studio once or twice a week. Instead of a workout, my central focus was on my breath and body positioning. In doing so, I came to approach yoga as strenuous meditation-in-motion, adopting the Taoist concept of “non-doing” and “non-forcing.” During yoga, I let go of the relentless striving that rules contemporary life. I am not trying to get anywhere, or to achieve anything, but to just be.

I came to this view after reading Jon Kabat-Zinn's (2009) classic Full Catastrophe Living, his comprehensive guide to the Mindful-Based Stress Reduction program he pioneered over several decades. In the program, participants after several weeks of regular meditation move to a slow yoga practice. Yoga should be done without forcing or striving, “accepting our body, as we find it in the present, from one moment to the next,” Kabat-Zinn writes. “While stretching, lifting, or balancing, we learn to work with and dwell at our limits while maintaining moment-to-moment awareness.” From this approach we may create an “island of being in the sea of constant doing in which our lives are usually immersed, a time in which we allow all the doing to stop” (Kabat-Zinn 2009).

References