

# YOUR BRAIN ON YOGA

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By Sat Bir Singh Khalsa, PhD  
with Jodie Gould

## Table of Contents

- About the Author
- Introduction
- Chapter 1: Your Brain on Stress
- Chapter 2: Your Body on Yoga
- Chapter 3: Your Smarter Brain on Yoga
- Chapter 4: Your Mood on Yoga
- Chapter 5: Finding the right style of Yoga for You

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### Author's note:

The case examples in this book are drawn from personal interviews. Some names have been changed by request. The information in this book including the suggested yoga practices should not be construed as medical advice, and should not be used as a substitute for consultation with a qualified health care practitioner. It is safest to call your doctor for advice if you experience notable dizziness or faintness, chest pain, or joint or muscle pain during practice. Information on the suggested Kundalini Yoga techniques in this book, and in general, can be obtained from the 3HO Foundation (<http://www.3ho.org/>), the Kundalini Research Institute (<http://www.kundaliniresearchinstitute.org/>), and certified Kundalini Yoga teachers who may be helpful in providing expert guidance in these practices.

### Acknowledgement:

This book is dedicated to Yogi Bhajan, who in selfless service brought the invaluable practices of Kundalini Yoga to the West. I thank my wife Siri Krishna Kaur Khalsa for her kind assistance in compiling suggested yoga practices.

## About the Author

**Sat Bir Singh Khalsa, Ph.D.**, has been fully engaged in basic and clinical research on the effectiveness of yoga and meditation practices in improving physical and psychological health for over 10 years. He has also practiced a yoga lifestyle for over 40 years and is a certified Kundalini Yoga instructor. He is the Director of Research for the Kundalini Research Institute, Research Director of the Kripalu Center for Yoga and Health and an Assistant Professor of Medicine at Harvard Medical School at Brigham and Women's Hospital.

He has been involved in efficacy studies of yoga for a number of conditions including chronic insomnia and anxiety disorders. His current studies include clinical trials of yoga for post-traumatic stress disorder and chronic stress and ongoing research funded by the Kripalu Center for Yoga and Health evaluating a yoga program within the academic curriculum of public schools to determine the benefits in mental health characteristics such as perceived stress, resilience, emotion regulation and anxiety.

Dr. Khalsa routinely interacts internationally with other yoga researchers and he is actively working with the International Association of Yoga Therapists to promote the field of research on yoga therapy. For over 5 years he has also been teaching an elective course at Harvard Medical School in Mind-Body Medicine.

**Jodie Gould** is an award-winning writer and author of eight books, including *Beautiful Brain*, *Beautiful You*. Her articles have appeared in numerous national publications and web sites. She has a master's degree from the Columbia Graduate School of Journalism, where she was awarded a Pulitzer Fellowship and Alfred I. duPont Fellowship.

## Introduction

Can yoga help reduce the stress that makes you look and feel older than your years? Does yoga help elevate your mood and make you mentally sharper? Will meditation enhance your spiritual outlook or give you a sense of peace and calm? As a Harvard neuroscientist and a yoga practitioner for more than 40 years, I'm pleased to tell you the answers are a resounding "yes." As nearly everyone knows, life can be stressful—and it's only getting worse. In the American Psychological Association's "Stress in America" survey, nearly half of the more than 1,000 respondents reported having more stress in their lives than in the past five years.

Is avoiding all stress possible? Not really. But we can learn ways to reduce or manage our perceived stress and related anxiety through yoga and other contemplative mind-body practices, which have been scientifically proven to change our brain behavior and chemistry and, thereby, reduce our stress. Although there are a few prescription medications that have been used for stress, practicing yoga and meditation are simple and much more desirable ways to cope with stress because they address the root of the problem and do so without any negative side effects – in fact, they often have a few positive side effects.

In this book, you will learn how yoga helps build a resilience to stress so you are able to accept it, deal with it, and get on with your life. After brief sessions only 10- to 15- minutes long, you will start noticing positive physical and mental changes. If you practice regularly, you will experience positive changes in both your body and your attitudes and perceptions, which will support you in moving towards a healthier lifestyle. I will explain why yoga helps us get a deeper, more restorative sleep, which is crucial to keeping our minds and bodies vigorous as we age. When you add proper nutrition and physical exercise to this equation, all this can lead to life-altering behavior and improved mental and physical fitness.

And while yoga helps rejuvenate our bodies and minds, you can also benefit from an elevation of mood, quality of life and even a deeper sense of spirituality. Practicing yoga ultimately allows you to perceive the world in a more relaxed, non-judgmental, positive way, countering the stress reactivity that sends your nervous system into overdrive. Yoga might not literally be a fountain of youth, but it can lead to a transformative experience that will improve your quality of life, your sense of well-being and your outlook on life.

YOUR BRAIN ON YOGA will explain how yoga and meditation can change your brain and, thereby, your life. The way you think about yoga probably depends on your age. In the sixties, yoga was linked to the counterculture and to experimenting musicians like the Beatles. Those who were born in the seventies and beyond will likely picture Madonna's "yoga arms" and soccer moms—their lithe and Lululemon™-clad bodies twisting into seemingly impossible positions.

But yoga is far more than the images we see in the media. In fact, at its very essence, it encompasses a range of practices, from sitting quietly to a sweat-producing, heart-pumping physical exercise. But you don't need to begin a yoga practice with the goal of performing gravity-defying positions. The word yoga is translated from the Sanskrit word "yug" or "yuj," which means "to yoke" or "union" and traditional yoga practice had the goal of achieving a unitive state of mind in which there is balance between mind and body.

If you are new to yoga, you will find many different types to choose from, (I will describe the most popular practices and advise on selecting the one that is right for you in Chapter 5). But all traditional or classical yoga involves not only physical postures and exercises, but also breath control techniques, deep relaxation techniques, meditation and concentration practices, and the cultivation of mindfulness or awareness. For centuries yogis and saints have understood the mind-body connection, and now today's scientists are realizing its potential within medicine. To some traditional Western physicians, yoga is just another type of workout to be taught at gyms around the country along with spinning and aerobics. But yoga is far more than that.

This book will reveal compelling neuroscientific evidence that demonstrates the variety of ways yoga can change your brain, including brain activity, biochemical and even structural changes. Brain scans (fMRIs), which show pictures of our neural patterns, have demonstrated the positive changes that take place in the brains of people who practice meditation. These neural imaging studies reveal how regions of the brain that are responsible for such fundamental human traits as attention, body awareness, higher-level cognitive function and self-perception grow and become stronger—in some cases the transformation occurs immediately.

Neuroscientists are only beginning to understand yoga's role in preventive medicine, and its ability to treat

a range of maladies. I will tell you about some of the groundbreaking studies that I am conducting at Brigham and Women's Hospital/Harvard Medical School and other research institutions, some of which are funded by the National Institute of Health's National Center for Complementary and Alternative Medicine (NCCAM). Many ongoing yoga research studies internationally are examining yoga's role in improving mood, reducing perceived stress, decreasing heart rate and blood pressure, increasing lung capacity, improving muscle relaxation and body composition, and helping treat conditions, including anxiety, depression, and insomnia.

### **My Scientific and Spiritual Journey**

Although I am a member of the Sikh faith that has its origins in India, I am not of Indian descent or ethnicity, nor did I grow up practicing yoga. My journey with yoga started in the early seventies while I was an undergraduate student at the University of Toronto in Canada. During that time in my life I was deeply interested in transcendental states of consciousness. I was particularly influenced by the book *The Master Game: Beyond the Drug Experience* by Robert S. de Ropp, a biochemist who wrote about realizing human potential through contemplative practices such as yoga. De Ropp's book was in part a reaction to the mind-expanding quests of people like Timothy Leary, who experimented with LSD. But rather than supporting the idea of using hallucinogenic agents, *The Master Game* introduced the idea of practices such as meditation and yoga to more safely and effectively elevate one's state of consciousness. I continued to read literature on contemplative practices and spiritual development, including books on meditation and yoga. I discovered that yoga was a discipline that worked holistically on many levels, not just meditation for the cultivation of mindfulness/awareness, but also practice of physical postures and exercises, deep relaxation techniques, breathing techniques, and even recommendations for a healthful diet, and changing one's relationships and behavior.

I finally reached a point in my understanding when I realized it was time to stop reading and start doing. I happened to walk into a student lounge where a few friends were talking about a new yoga course being offered for credit at the University; and the synchronicity was too good to ignore. I went to my first yoga class, where the teacher was instructing in the style of Kundalini Yoga, as taught by Yogi Bhajan® – and I never looked back. I continue to practice Kundalini Yoga today, which is one of the more contemplative and meditative forms of yoga with a strong focus on cultivating one's inner development, awareness/mindfulness, and creative spiritual potential that incorporates the full range of practices in traditional yoga.

The more I practiced Kundalini Yoga, the more I gravitated to the yoga ashram (the spiritual community of Kundalini Yoga students and teachers) in Toronto, to engage in classes and in weekend workshops. My transformation of mind and spirit did not occur overnight. As young as I was, it took a number of classes before I could fold my legs properly and get more deeply into the meditation practices.

There were no dramatic revelations or fantastic experiences as I began my practice. The yoga simply uplifted and resonated with me on a deeper level. As I gradually became a part of the ashram community, I could see how yoga was positively affecting my life and my fellow yogis. I knew in my heart that it was something I wanted to commit to, so I joined the ashram community in 1973 and I've been fully involved in the yoga lifestyle ever since.

After receiving my undergraduate science degree, I left academics to work full time as a member of the yoga ashrams in Canada working with community businesses and both practicing and teaching yoga. Eventually my passion for science reemerged, and I was strongly attracted to the idea of conducting research on the psychophysiology of yoga and how these practices create such real and positive changes in people's lives.

It was clear that in order to realize my dream I would first need a doctorate in conventional physiology and neuroscience (there were very few labs doing research on yoga and meditation at the time). After completing my Ph.D., I inquired about a post-doctoral fellowship with Herbert Benson, M.D., the well-known meditation researcher and founder of the Benson Henry Institute for Mind Body Medicine at Harvard Medical School, who was one of the very few consistently engaged in meditation research, although he did not have funding to support a post-doctoral researcher. So for the next decade, I took a post-doctoral position at the University of Virginia studying circadian rhythms and sleep, followed by five years of post-doctoral research at Brigham and Women's Hospital, Harvard Medical School.

While this was fascinating and rewarding research, my ultimate goal was to align my research with my interest in yoga. In the late nineties, the academic medical world had become increasingly accepting of alternative medicine practices. As a result, the National Center for Complementary and Alternative Medicine (NCCAM) came into being within the National Institutes of Health (NIH), and began offering research grant opportunities. I submitted an application for a research career award for a study of the efficacy of yoga for the treatment of chronic insomnia—

and was fortunate enough to get it. This grant finally allowed me to begin my yoga research career in earnest and at long last (a full 25 years later) my dream finally came true.

I am currently an assistant professor of medicine at Harvard Medical School, and a neuroscientist at the Harvard-affiliated Brigham and Women's Hospital in Boston. My research focuses on the clinical effectiveness of yoga and meditation techniques on a variety of disorders, including insomnia, anxiety, depression, chronic stress, and post-traumatic stress disorder, among others, although I have now become very deeply interested in evaluating the efficacy of yoga in school settings with children and adolescents for both mental and physical health and prevention.

I am also the director of research at the Kundalini Research Institute in Espanola, NM and the research director at the Institute for Extraordinary Living at the Kripalu Center for Yoga and Health in Stockbridge, MA. I have developed strong associations with yoga researchers internationally, especially in India, and I work closely with the International Association of Yoga Therapists in facilitating yoga research through yoga research conferences. I am also leading an elective course in mind-body medicine at Harvard Medical School. Coincidentally, Dr. Benson is now a close colleague who participates in this course and I am also directly involved in a research study with him as a coinvestigator, so I have come full circle.

I think it is important to address some of the recent press about the dangers of yoga that came out in a book by William Broad in an excerpt which appeared in a *New York Times* entitled "Yoga can Wreck your Body." Can yoga hurt you? Yes, but like any activity it depends very strongly on how you are practicing it and what your physical and mental conditions are. Can it kill you? Not very likely. What has been left out of this sensationalizing article is the issue of relative risk of yoga compared to other life activities. Every life activity has risk associated with it. Examples are easy to find. Anyone walking is at risk of being hit by an automobile and being injured and even being killed. In fact, in 2009 the NHTSA put the number of pedestrians killed at over 4,000. Therefore, the relative risk of walking, which we consider a safe and benign activity, is in fact much higher than that of practicing yoga.

Consider whether a newspaper would be willing to publish an article entitled 'Walking Can Kill You'. We can take this comparison further. What is more dangerous: practicing yoga several times a week or sitting on the couch every day in front of the TV eating junk food? Obviously, inactivity and poor nutrition will put you at greater risk of getting sick or dying from cardiovascular disease. Conversely, yoga will actually reduce the risk factors for such lifestyle diseases. If you practice yoga incorrectly, you might injure yourself. But it's a lot safer, I submit, than many other physical activities such as jogging, contact sports, or skiing, which are higher impact activities with higher risks for injuries.

With the growing popularity of yoga, it is inevitable that there will be yoga teachers who are not as well-qualified as they should be. This can be particularly problematic for yoga students who have preexisting medical conditions or limitations. Furthermore, not everyone practicing yoga exercises common sense. If you have a pre-existing condition or just want to be safe, consult your doctor before practicing yoga or any new activity. Yoga is not meant to be a competitive sport. The aim of yoga is not to lunge or bend deeper than the person next to you. The goal is to enhance your own mind and body within your own reasonable and individual limits. Always be aware of discomfort and pain and stop or step it back if you feel that going too far is going to hurt you. Use your common sense and stop or change what you're doing whenever you are in pain.

I hope that the scientific and anecdotal evidence in *YOUR BRAIN ON YOGA* will help build the case for yoga and meditative techniques becoming an integral part of our culture which, arguably, is already happening if you consider that some reports suggest that one in ten people now practice yoga in the United States.

Moreover, my hope is that yoga and meditation will soon be incorporated into our medical and educational systems. Yoga is not a simply a hobby or a sport, nor is it a religion, nor can its benefits be dismissed as a placebo. My life's work and that of many others has begun to show that there is a real biological response that occurs when you practice yoga and that there is scientific evidence that a "yoga brain" and "yoga body" functions not just differently, but better than other brains and bodies.

I promise that if you follow the simple instructions outlined in this book, including the meditations and yoga poses, you can have less stress, less illness, and lead a calmer, more fulfilling life. To all of you who are reading this e-book—namaste (I bow to you) and Sat Nam (truth is my identity).

## Chapter 1: Your Brain on Stress

Artist Sigrid Olsen began doing yoga in the seventies, but took a 25-year hiatus to raise two children and run a highly successful fashion design company. "I want to say I didn't have time to do yoga, but the truth is I just didn't make time for it," admits Sigrid, now 58. She describes how she was forced to put the brakes on her on her career

after being diagnosed with breast cancer in 2005. She took a 30-day leave of absence to convalesce before plunging back into her work.

“It was the first time I had taken more than a week off in 20 years,” Sigrid says of her frenetic lifestyle. “I thought I was happy, but wasn’t paying attention to how I felt on the inside. I felt exhausted by the end of day.” Three years later, the other shoe dropped when she lost her business and, with it, a huge part of her identity. “When my business closed, I suddenly had all this time on my hands and had to figure out who I was again. I didn’t want to wallow in self-pity, regret or anger. I went through the common stages of grieving because losing my clothing business was like losing a loved one.”

Sigrid briefly took Pilates to help regain her upper body mobility after having a bilateral mastectomy, before returning to yoga. “A few months after my business went under, my husband and I went to Mexico on a yoga retreat,” she recalls. “We spent a few weeks doing yoga every day, just walking and meditating and peeling away the layers of stress that had built up over the years. That brought me back to a much more open, less complicated way of living in the world. I used to wake up every day feeling frustrated that I didn’t have control over my day. Plus, I was working my body to the bone without replenishing it, which I believe makes us susceptible to disease. I realize now that there has to be a balance in order to lead a healthier and happier life.”

Today, Sigrid operates a thriving art store in Sarasota, Florida, where she does yoga and meditation 5 or 6 days a week and continues to go on yoga retreats. “I prefer classes that are challenging, but also understand that postures are simply a method for quieting the mind and getting in touch with your breathing in order to meditate. That’s what yoga is about for me. The extra benefits are building muscle strength and stamina, which is especially great for women. I have the usual aches and pains of middle age, but I feel like my body, mind and spirit are in alignment. Now, when I’m presented with conflicts, whether it’s my business or family, I have learned to be patient and to let the universe take its course. Stress comes up in life every day, but you don’t have to let it keep you awake at night or put your stomach in knots.”

### The Toll of Stress

Much like Sigrid’s experiences, studies show that Americans struggle to balance work and home life and to make time to engage in healthy behavior, including exercise. As a result, stress not only takes a toll on our emotional and mental well-being, but also affects our physical health in a variety of ways. According to the 2010 American Psychological Association’s “Stress in America” survey of more than 1,000 adults, Americans say their stress levels remain high and exceed what they consider to be healthy. They also appear to understand the importance of healthy behaviors such as eating right and getting enough sleep and exercise, but they say that everyday life challenges stop them from putting these behaviors into action. Most report that they are “too busy to manage stress” or lack the “motivation, energy or time” to be active.

Of course, stress is not just an American problem. According to the International Labor Organization, approximately a third of the workforce in developed countries, and possibly a higher proportion in newly industrialized nations, suffer from work-related stress—a figure that seems to be on the rise.

Wherever you live and whatever you do for a living, it’s important to understand that there are different types of stress. If you feel overwhelmed, prone to outbursts, and incapable of handling your life, you are not successfully managing your stress. This kind of chronic and unmanaged perceived stress increases your risk for anxiety and depression, as well as medical conditions such as diabetes, asthma, hypertension and heart disease.

And though unmanaged chronic stress is a risk factor that can cause or exacerbate health problems, there is also stress that is positive and important. You can have a stress response on your wedding day, for example, or when your child is born. Riding a roller coaster can be horribly stressful if you’re over 50, but it’s a good stress if you are a 16-year-old. Some stress is negative and some is positive—it depends on how you manage and perceive it.

Many people believe that life would be better if we eliminated stress entirely, but as a neuroscientist I can tell you that we actually need some stress in our lives to keep our brains engaged. Let’s say you are stranded on an island with nothing to do. The boredom will likely drive you crazy. If life isn’t challenging it ceases to be fun and engaging. The critical issue is our perception and relationship to the stressors or challenges in our life, which determines how we will react to and cope with these stressors. What we’re really concerned about is *distress*, chronic stress, and unmanaged stress. And what yoga and meditation can do is to facilitate a change in your *perception* of the stress in your life and provide you with effective skills to cope with it. In fact, these skills may even allow you effectively manage more stress so you can take on additional challenges in your life.

Yogis and scientists like me have discovered that, in addition to being a great physical exercise, yoga and meditation are one of the best antidotes to the stress of modern living. I won’t go as far as saying it is a fountain of



youth (although people who practice yoga may tend to look and feel younger than their actual age), but I will say it is a fountain of calm and equanimity.

One of the classic early studies on yoga practices demonstrated that yoga could affect internal physiological and psychological states. This study was conducted in the fifties by a pair of U.S. researchers of Indian descent who traveled all over India to find and then investigate expert yoga masters. These scientists found that yogis' heart rates slowed during yogic meditation and they had acquired a skill to control the autonomic nervous system, which is a key participant in the stress response and is responsible for controlling the activity of the heart and circulatory, digestive, respiratory, and reproductive systems—an idea that was revolutionary in the western world.

More than fifty years later, numerous studies have confirmed and extended these findings and we now have a greater understanding about how yoga affects our brain and body. Exactly how does yoga help us manage stress and remain calm? By combining physical postures and exercises (asanas), breath regulation (pranayama), deep relaxation and meditation, we literally shift the balance of our stress regulation systems in our brain and our body. Practicing yoga affects the activity of our genes, lowers our heart rate and blood pressure, and decreases the production of “stress” hormones, which results in lower symptoms of mental and physical distress.

Although yogis certainly have strong, lithe bodies to show for their dedication, a shapely figure isn't the only reason most people today take up this ancient discipline.

While many people initially come to yoga to become physically fit (which is why it is taught in so many gyms), novice practitioners soon discover the psychological benefits, including an improvement in mood and well-being and reduction in day-to-day anxiety and perceived stress. A survey of beginner yoga students we conducted found that about 75 percent said they were practicing for stress management, with physical exercise and general wellness being highly rated as well. Scientific research has confirmed that, depending on the style you choose, yoga is one of the best tools we can use for mood, well-being, and stress management

### The Relaxation Response

When we perceive threats to our physical or psychological well-being, our mind and body usually initiate coordinated stress, or “fight or flight”, responses, which lead to the activation of the sympathetic nervous system and the so-called hypothalamic pituitary adrenal axis and the associated release of the stress hormones adrenaline and cortisol, respectively. This innate stress response puts our brain and body on high alert. Our attention improves, and we become acutely aware of the world around us. It is an adaptive response that helped our ancestors cope with the dangers of warring tribes or saber-toothed tigers. Today, our stressors include work, family, and financial issues, all of which can produce a similar response. Furthermore, the accumulation of multiple stress responses over a period of time can lead to chronic unmanaged stress and an associated host of stress-induced mental and physical problems.

In fact, the United States Department of Health and Human Services, reported 70 to 80 percent of all doctor's visits are about stress-related conditions, including migraine headaches, gastrointestinal conditions, obesity, depression, insomnia, asthma and skin disorders. Chronic stress can cause our heart rate and blood pressure to be high, increase our physical tension, and impair our sense of control over our lives. It also maintains the secretion of excessive levels of cortisol in our hippocampus, the part of the brain responsible for emotion, memory and learning, all of which can actually be toxic to our brain cells.

As I mentioned earlier, I am currently working with Herbert Benson, MD, the pioneer researcher who first described the relaxation response. Like the stress response, the relaxation response is a coordinated, endogenous psychophysiological response. However, it is essentially opposite in its characteristics to that of the stress response. The relaxation response can be induced by a variety of mind-body practices such as meditation, yoga, tai chi, breath regulation and relaxation techniques that leads to restorative changes in the mind and body associated with a reduction of arousal and feelings of tranquility and well-being.

We can learn to invoke the relaxation response with minimal training, and do so when we practice yoga, tai chi or meditation. But it can also be done at work, at home, while running, or even while standing in line at the supermarket. It does not require a formal practice environment such as being isolated in a quiet room, lying still, or even closing your eyes, although such settings are more conducive to invoking this state and are especially recommended for those who are beginning to learn the practice.

The more you learn the skill of eliciting the relaxation response, the sooner you will be able to develop the ability to calm your mind regardless of where you are or what is going on around you. In his early descriptions of the relaxation response, Dr. Benson described the following two steps in order to elicit the relaxation response.

### ***The Relaxation Response-A Basic Meditation Exercise:***

1. Select a word, mantra (i.e., a sound, syllable, word, or group of words), sound, prayer, mantra, thought, or activity such as your breath, and continue to repeatedly focus your attention on it in a relaxed manner.
2. When other, everyday thoughts intrude (and they will), let them go and bring your attention once again on step one in a relaxed and patient manner without frustration or judgment.

Start by doing this for five minutes and gradually increase the amount of time you spend eliciting your relaxation response. I guarantee that doing this technique on a regular basis will help calm your mind and manage your stress. Even more remarkable is that Dr. Benson's research in mind-body medicine found that people could alter their white blood cells after just eight weeks by doing the relaxation response for 25 minutes a day. (White blood cells are the ones that fight infections and cancers and mediate our body's natural response to injury.) In other words, by learning how to focus your mind, we not only find better ways to cope with and to manage the stress in our lives, but we can become healthier with stronger immune functioning as well.

### **New Meditation Research**

While scientists don't yet have all the details as to how yoga and meditation works, current studies, including ones being conducted by me and my colleagues, confirm the mental and physical brain health benefits that come with the practice. We now have advanced technology, including brain imaging scans, that have given us a clearer understanding of what happens when we do yoga and meditate, including:

#### **How the Relaxation Response Changes Our Genes**

There are many different systems in our body, and our brain and genes control all of them. Although we cannot change our DNA, certain behaviors will change which genes are turned off and which are turned on. If you smoke cigarettes, for example, you may turn on genes that elevate your cancer risk. By doing yoga and contemplative practices, you will positively impact specific gene activity, which can change your physiological state and help to regulate your stress response.

This was observed in an 8-week study of the relaxation response conducted in Dr. Benson's lab. In 2008, researchers took blood samples from yoga and meditation practitioners before and after their practice. The study found significant gene-expression changes in both short- and long-term practitioners of this meditative technique.

#### **Meditation Reduces Mental Stress**

In a 2005 German study, researchers discovered that women suffering from "mental distress" who took three months of yoga classes, reported feeling less stress, less fatigue, and less depression, as well as improved feelings of vigor and well-being. Additionally, when the researchers tested the levels of cortisol in these subjects' saliva, they found it decreased after just one yoga class.

#### **Being Mindful**

At the University of Massachusetts, where studies have been conducted on the Mindfulness-Based Stress Reduction program (MBSR), researchers investigated the effects of meditation on a group of people suffering from Generalized Anxiety Disorder (GAD), a common stress-related diagnosis. In this study, fully 90 percent of the participants documented significant reductions in anxiety after just eight weeks of practicing the technique. Furthermore, a recent follow-up study conducted three years after the initial experiment, showed that these improvements were sustained. Similarly, two of my fellow Kundalini Yoga instructors who are also clinicians have successfully applied yoga in the treatment of their GAD patients.

#### **Yoga Improves Our Mood**

Another yoga researcher, Boston University's Chris Streeter, found evidence of yoga's potential to help treat anxiety and depression. In her studies, Dr. Streeter scanned the brains of yoga practitioners and found that, compared with walking, yoga produced a decrease in anxiety and a boost in a brain chemical that enhances our mood. In a 12-week study, a group of 34 physically and psychologically healthy young men and women were randomly assigned into two groups: one that walked for an hour three times a week, and one that practiced Iyengar yoga for the same amount of time. At four-week intervals, Streeter used a technique known as magnetic resonance spectroscopy, a technique that is used to study metabolic changes in the brain to monitor the subjects' levels of a brain chemical called gamma-amino butyric acid (GABA). When elevated, GABA is associated with improved mood and decreased anxiety. The study showed that yoga boosts GABA production by a significant 27 percent. The yoga group also reported a greater boost in mood than the walking group, with GABA levels correlating with those

improvements. Although the role of GABA is still not completely understood, Streeter’s study is the first to demonstrate the GABA-mood-yoga connection by looking at actual changes in the brain. I will talk more about yoga and mood changes in Chapter 4.

### How Meditation Works

As someone who not only studies yoga and meditation, but has practiced it for decades, I can attest to the profound transformation that yogis experience. Not only does your perception of stress change, but you might also change the way you view yourself in relationship to the rest of the world and to the people around you. Many of us are disconnected from others and incapable of holding our attention for long periods of time—a problem that is exacerbated by being constantly plugged in.

Scientists at the University of Southern California’s Brain and Creativity Institute are now studying how technology, including, email, texts, tweets, video and computer games, are affecting the human brain. While many of these activities can be fun and relaxing, the problem with tech over-stimulation is that we’re exposed to information at a pace that might exceed our ability to absorb it. Being over-wired can affect our ability to make moral judgments. We read, watch, and hear news about global suffering, war, and eco-destruction, but it seems that the more we know, and the faster we know it, the less we care. This kind of overwhelming mind-consumption makes it even more imperative that we take breaks to absorb and process the constant stimuli that our brains are exposed to, lest we become numb to it all.

The good news is that meditation can act as a valuable mental time-out, which allows our often over-worked, over-stimulated brains to take a much-needed breather. When you meditate, you are controlling your attention and bringing your mental focus to bear in a relaxed, non-analytical, nonjudgmental manner. This is the opposite of the incessant mind-wandering and rumination when we are not engaged in a specific task. Your brain activity in the so-called default mode network changes, which is the mind-wandering and ruminating part of your brain; abnormal function of the default mode network appears to be associated with mental health disorders and a recent study has suggested a direct relationship between emotional reactivity and default mode network activity. When you focus and control your attention in meditation, the default mode network activity decreases and you transition into a state in which the attention networks of the brain are more engaged and active and you experience less mind-wandering.

Once you are in the attention mode, you engage the frontal lobe connections that directly impact the limbic system, which is the part of the brain dedicated to our emotions. By meditating and controlling your attention, you can establish more control over what you perceive as a significant stressor, reduce activity in your limbic system and your emotional reactivity, and thereby diminish your stress response. These are real and concrete changes in brain activity and even brain structure that occur when you meditate, and these manifest in long term changes in your stress and emotional reactivity.

### Why Meditate?

There are many reasons why meditative practices are good for us, but one of the goals for me and other yogis who practice frequently is to develop the ability to cope with stress more effectively. Again, it’s not about eliminating stress, which is impossible, it’s about improving your resilience to stress. My yoga teacher, Yogi Bhajan, would encourage us not to avoid stress and shrink from life’s challenges, but rather to improve our stress coping ability so that we could not only manage our current stress, but even expand to take on more of life’s challenges and opportunities successfully.

As Nam Kaur, a 57-year-old yoga teacher from Santa Barbara, California, explains: “As I got older and the ups and downs of life started to hit, and I realized what valuable tool yoga and meditation was for me. I find myself continually going back to my breath. I tend to tighten up my diaphragm when I am under stress, so this is where I go when I do deep breathing. I feel like a different person after I do this. I can be calm and relaxed and more neutral when I am stressed and anxious. I’ve learned to think before I speak and not be so reactive. You may feel anxious on the inside, but yoga can help you change the way to react under stress.”

### Where to Meditate

Meditation and controlled attention and breathing can be done anywhere. You do not need to be in a yoga studio, dark room, or quiet space in order to meditate. As you practice, your level of stress will drop quickly over the course of several weeks.



### ***Just Breathe: A Basic Yogic Breathing Meditation***

Breathing is an integral part of yoga. It is often described as both a form of meditation itself and part of the preparation for deep meditation. Yoga breathing quickly brings focus to the mind.

Sit with a straight spine, with the head erect and the chin lightly tucked in. Begin long, slow deep breathing through the nose. As you inhale, your abdomen (belly) should extend as though it is being filled with air. Then, as the inhale continues, your chest will expand and your shoulders lift up slightly. As you start to exhale, the chest contracts first. As the exhale continues, your abdomen will pull in as though it is being emptied of air. The breath should be steady and smooth at four breaths per minute or slower (15 seconds or longer for each breath), if possible.

Remember, it is important to do this breathing through the nose and not the mouth. Your eyes are closed during this exercise, and your mental attention is focused on the flow of the breath. Your focus can be on any aspect of the breath, such as the sound, the temperature of the air in your nostrils, or the movement of your chest and abdomen. Keep your attention on the breath in a relaxed manner. If your attention wanders, which happens frequently, especially to beginners, patiently and calmly bring your attention back to the breath. Continue for three minutes or longer.

### **Yoga & Sleep**

*“And if tonight my soul may find her peace in sleep, and sink in good oblivion, and in the morning wake like a new-opened flower then I have been dipped again in God, and new-created.”*

- D.H. Lawrence

Sleep disorders have become a major public health issue, according to the Centers for Disease Control and Prevention, which it estimates affects between 50 and 70 million Americans. The causes of insomnia (an ongoing difficulty of falling or staying asleep during the night), and interrupted sleep patterns range from round-the-clock access to technology, irregular work schedules, and of course, perceived stress. And though the depth, duration, and quality of our sleep deteriorates as we age, it isn't normal or healthy to have an ongoing sleep problem. If you have such a problem, you should seek the help of a qualified sleep doctor (there is such a well-established specialty), who can provide you with a proper diagnosis, and depending upon your condition, possible behavioral treatments for your sleep difficulty.

Remember how lightly you slept, if at all, during a particularly stressful time in your life, such as the night before a big event that you can't stop rehearsing in your mind, or if you are having financial or relationship troubles. The more stress, arousal, or anxiety you are having, the lower your quality of sleep will be. In fact, researchers have determined that chronic insomnia is related to the body's level of arousal. In a sense, insomnia has been thought of as a disorder of arousal, rather than as a disorder of sleep.

Fortunately, relaxation techniques, meditation and yoga, have been shown to be effective remedies for sleepless nights. My laboratory conducted several research trials of a Kundalini Yoga-based treatment called *Shabad Kriya* that has been recommended for insomnia. *Shabad Kriya* (“kriyas” are meditations, see below) combines a meditation practice with breath regulation. In our research studies, subjects were instructed to practice this technique daily for eight weeks just before bedtime. Overall, we observed significant average improvements in both sleep duration and quality.

There is also significant evidence that yoga can improve the quality of slumber even in those who do not have problems going to sleep. Beginning yoga students, for example, often report having deeper, more restorative sleep, as did a few adolescents in our recent studies with high schoolers. And the longer you have practiced yoga and meditation, the better you will sleep. New research has demonstrated that long-term yoga practitioners have a significantly higher quality of sleep.

According to another recent study, there is a direct relationship between the frequency of yoga practice and the quality of sleep and levels of fatigue (the poorer your sleep, the greater your fatigue). These findings are encouraging for elderly individuals who begin to practice yoga because they often have a lower quality of sleep, and there are many gentle styles to choose from for this age group.

Sleep is vitally important to our physical health and mental well-being. We spend one-third of our lives asleep, and poor sleep is not only a sign of poor health but also a risk factor for future disease conditions. The better we sleep the more functional and less fatigued we are during the day. The fact that a regular practice of yoga can improve sleep can truly be life changing.

***Meditation for Sleep (Shabad Kriya)***

The best time to practice this “kriya” (meditation) is every night before bed, but it can be done any time of the day. It is said that if practiced regularly, sleep will be deep and relaxed. After a few months, the rhythm of your breath as you sleep will be subconsciously regulated in rhythm of the mantra.

**Posture**

Sit in any comfortable posture with the spine straight and the head erect. Place your hands in your lap, palms up and cradled with the right hand over the left. The thumb tips are touching together and pointed forward.

**Eyes**

Focus your eyes on the tip of your nose, eyelids half-closed.

**Breath and Mantra**

The breathing and silent mantra repetition is regulated into a 22 beat rhythm. Inhale in 4 equal parts (or sniffs) through the nose to make one full inhale, mentally repeating the mantra syllables Sa Ta Na Ma with one syllable for each sniff. Hold your breath, mentally repeating Sa Ta Na Ma 4 times for a total of 16 beats. Exhale in 2 equal parts through the nose to exhale all of the breath while mentally repeating the mantra Wahe Guru. Adjust the pace of the beats as slow as possible within your own comfortable breathing capacity but maintain the pace evenly across the 22 beat rhythm. Continue for 11 to 62 minutes.

**Chapter 2: Your Body on Yoga*****Achieving Physical Vitality***

When Alaine’s doctor told her that she had fibromyalgia, an extremely painful nerve disease, he said the good news is that it’s not going to kill her or get worse; the bad news is that it’s never going away. The 44-year-old married mother of three from Boston said knowing this did not help her to get through the day, take care of her kids, and do her job. In fact, the pain got so bad that she privately entertained thoughts of suicide.

That’s when she decided to take up yoga and meditation. “Yoga is the bridge between the mind and body,” she says. “When I learned how to meditate, I became aware of not getting attached to my illness and my thoughts and feelings about it. I learned how to manage my illness. Before yoga I had constant painful flare-ups. Now that I do yoga and meditation regularly, I have flare ups only once or twice year.”

Although the United States comprises less than 5 percent of the world’s population, we spend 42 percent of the world’s total health-care expenses. And, contrary to popular belief, the biggest health risk Americans face is not climate change or even smoking. It’s our sedentary lifestyle.

Remarkably, as many as 50 million Americans do not engage in physical activity of any kind. Many have jobs that require little movement and are generally inactive (i.e., couch potatoes) at home. Much of their time is spent plugged in; whether it’s texting, listening to music, or staring at a TV, computer, tablet or Smartphone, we spend more than eight hours a day tethered to various electronic devices. Our remote-control obsession is a sign that people are finding ways to be even less physically active. The health hazards associated with physical inactivity include obesity, cardiovascular disease, cancer, diabetes, debilitating back pain, and more.

As much as the media has trumpeted the health benefits of exercise, it is difficult to get people who are seriously overweight, diabetic, or have osteoarthritis to get moving. But yoga has something that running or even joining a gym does not; it is a health-promoting activity that can be done virtually anywhere, whether it’s in an office or in the comfort of your own living room.

We have written about the myriad mental perks of yoga in previous chapters, yet the physical benefits are also numerous and impressive. They include improved flexibility, increased muscular strength, better posture and balance, reduced back and joint pain, less disrupted sleep, most of which can be experienced within a few weeks of regular practice. Yoga can also produce physical feelings of vigor, reduce fatigue, build up stamina, and boost your libido.

Experts have known for years that aerobic exercise strengthens muscles and elevates the heart rate to improve cardiovascular function. Similarly, yoga often involves vigorous movements that increase the heart rate and improves one’s fitness levels, although not perhaps to the same degree. There is much more of a focus in yoga on developing flexibility and balance, and practices involving inversions, isometric postures and breath regulation. What also makes yoga different from other forms of exercise is that it also requires practitioners to quiet the mind.

When you're running or riding a bike, or even swimming, you're free to ruminate, letting the worries and distractions of the day percolate. Not so with yoga. There is a level of focus and concentration that is emphasized in yoga practice that is not a part of most other kinds of physical activity. When the mind is fully present, we are more capable of experiencing peace, calmness, and joy, all of which, as we have said, can lead to a reduction in stress.

For those people who are overweight or suffering from certain debilitating diseases like arthritis and fibromyalgia, yoga is a good alternative to other strenuous activity that can be painful. There is something about practicing yoga that creates a sensation of physical well-being and comfort, which ultimately can improve your quality of life. The following are some just a sampling of studies and anecdotes that illustrate yoga's health benefits:

### **Yoga Boosts Your Immune System**

People who have cancer are under substantial chronic stress, which is known to have a negative impact on one's immune system, a critical physiological function important for cancer recovery. Two independent studies in cancer patients have shown the benefits of yoga for immune function. In one randomized controlled trial, a 4-week self-practice yoga intervention by cancer patients before and after surgery showed that, in addition to improvements in mood and quality of life, the yoga group also experienced better outcomes compared to control groups in two different measures of immune function. In yet another study, cancer patients practicing a yogic breathing intervention showed improvements in another important immune function after 12 weeks. It also helped a number of patients break their tobacco habit.

#### ***Immune Boosting Breathing Exercise***

Sit up straight in an easy pose or on a chair with your hands resting on your knees and your chin in and your chest out. Stick your tongue all the way out and keep it out as you rapidly breathe in and out through your mouth. This is called Lion or Dog Breath. Continue panting using your diaphragm (above your belly) for 3-5 minutes. When done, inhale deeply and hold your breath for 15 seconds while pressing your tongue hard against your upper palate. Exhale. Repeat this sequence two more times.

This exercise is said to bring energy to your immune system, which helps fight infection. If you feel a tingling in your toes, thighs, and lower back, it is an indication that you are doing the exercise correctly.

### **Yoga Reduces Blood Pressure**

Evidence suggests that yoga not only reduces high blood pressure in patients, but it has been demonstrated to lower blood glucose level, cholesterol level and body weight, risk factors for major heart and other diseases that affect Americans today, according to recent study conducted by the Medical Center of Central Georgia in Macon, and Kennesaw State University, Georgia. As the 2012 article reviewing studies of yoga on blood pressure in hypertension patients states: "This review is significant because yoga presents an effective method of treating hypertension that is nonpharmacologic (i.e., without the use of medications) and therefore has no adverse effects in addition to having other valuable health benefits."

### **Forever Young**

Researchers from the University of California at Los Angeles, including a renowned Nobel Laureate, investigated how intensive brief daily yogic meditation practice over just 8 weeks could affect an enzyme called telomerase, which is strongly associated with aging. The Kundalini Yoga practice they used called Kirtan Kriya is described below. A rigorous, randomized controlled study of 39 participants, found the meditators had a 43% increase in telomerase activity. The scientists concluded that the positive effects of meditation may well reduce the aging of cells and also increase cellular longevity.

#### ***Anti-Aging Meditation Exercise (Kirtan Kriya)***

This Kundalini yoga practice is said to have youth promoting affects. Start by sitting up straight in an easy pose (can be done cross-legged or in a chair) with your eyes focused on the mid-point of your brow. The backs of your hands should be resting on our knees with your thumb and pointer forming a circle (like an OK sign). Make five primal sounds:

- SAA (Infinity, cosmos, beginning)
- TAA (Life, existence)
- NAA (Death, change, transformation)
- MAA (Rebirth)

You must meditate on the primal sounds in the “L” form. This means that with each sound you should imagine or feel an inflow of energy in through the top of the head and then out through the brow point. Experienced meditators can begin the kriya in a normal voice for 5 minutes; then whisper for 5 minutes; then go deep into the sound, vibrating silently for 10 minutes. Then come back to a whisper for 5 minutes, then aloud for 5 minutes. Novices can vary the duration of the meditation for as long as they want, but should maintain the loud, whisper, silent, whisper, loud, sequence and ratio.

### **Yoga Heats Up Your Sex Life**

Because sex is one of the ultimate mind-body experiences, it makes sense that yoga, which fosters flexibility, increases blood flow, and reduces stress, is also a catalyst for better sex. It has been suggested that many women feel they have a problem remaining focused during sex, which can make sex feel boring or unemotional. Yoga may work well in the bedroom because it may help couples to stay in the moment. The mindfulness you learn during yoga can help you enjoy lovemaking more when you are more able to stop worrying and ruminating about petty anxieties and immerse yourself more completely in the activity with greater joy and satisfaction. A recent study has reported on improvements in female sexual function with yoga, suggesting a number of possible ways in which yoga is working including improvements in muscle tone, mood, well-being and stress. In fact, there is a significant history of ancient yogic practices specifically aimed at improving the quality of all of the aspects of sexual activity.

### **Sexual Breathing**

Try this breathing technique, which will help raise your energy to the top centers of your body by taking three breaths in and one out. This can be done during meditation to increase your energy flow. Whenever you are feeling tired, this breathing technique will give you an energy boost. Make sure your neck is slightly tucked in like a soldier, so the energy won't be blocked at the neck.

Using this breathing technique can also can enhance your love-making by using the energy of arousal. Pump your rectal area, sexual organs and navel while taking short breaths. You might find that you can take more than three breaths in. Take as many as you can on the inhale and then exhale one out. You may experience feelings of intense energy rustling up the spine into the brow and top of the head. It is said that this can be an exhilarating experience that can help to prolong the orgasm and even produce multiple orgasms.

## **Chapter 3: Your Smarter Brain on Yoga**

### **Improving Your Mental and Cognitive Performance**

Julie Peters, 28, has been practicing yoga on and off since she was 12 years old. But the Vancouver, BC native began in earnest while getting her master's degree in English Literature. “I can be a workaholic, and yoga gave me a loophole for taking a break from my work to practice,” Julie writes in her blog. “Yoga made me smarter, more focused, and more efficient. Not only was the work done faster, it was better. It was more creative, more expansive, and more fun to do. I found creative ways to write the most technical essays, and I understood the poetry on levels that I hadn't before thought possible.”

Anecdotes like Julie's might be greeted with skepticism by some, but there is irrefutable scientific evidence about how yoga and meditation can actually make our brains function more efficiently. Part of it has to do with the ways that we handle stress, whether its work, family, health or financial issues. The musician who is about to perform might feel sick to her stomach before she steps on the stage. The mother who is juggling a job and young children might lash out at her husband or reach for some form of anxiety medication. I submit that there are better, healthier and proven ways to deal with the stress in our lives.

My Kundalini Yoga and meditation practice has helped me develop the physical, mental and spiritual strength to cope with my stress. Almost everything in my personal and professional life revolves around yoga and it has been my quest to document the therapeutic, intellectual and spiritual potential of this ancient practice.

As I explained in the previous chapter, our response to stress can manifest in a variety of ways -- physically, psychologically, and physiologically, which can vary from person to person. One thing that we all have in common, however, is that the stress response originates in the brain and from our perception and interpretation of a challenge; it involves common mechanisms in the brain and body's autonomic nervous system, the so-called hypothalamic-pituitary-adrenal axis, as well as the stress hormones released by these two systems.

Those of us who regularly practice yoga and meditation can ultimately train our brains to modify our perception of stress as well as the intensity of our stress response. This is important in considering our overall brain functioning because the activation of the stress response uses significant energy and internal resources that would otherwise be available for other activities. In short, learning to cope with stress more effectively allows my brain to function more effectively and efficiently.

### **Meditation and Yoga Changes Our Brain**

As I mentioned, there is increasing evidence that meditation can improve our memory and attention, all of which helps us to function at a higher level at work, home or in school. Furthermore, these benefits occur whether you're new to yoga and meditation or a long-time practitioner, and, studies show, might even help stave off age-related neural decline. The reason, neuroscientists have discovered, is that certain areas of our brain undergo positive structural changes when we meditate. Because the brain exhibits plasticity, which means it has the ability to change, whatever you experience will be reflected in and have impact on your brain structure.

Several groundbreaking studies have shown how meditation, especially when practiced over the long-term, can produce significant changes in the structure and mass within certain brain regions. For example, continued meditation practice can produce a thickening of the cerebral cortex, the part of the brain that plays a key role in memory, attention, awareness, thought, and language. Like a body builder who pumps iron, the bigger his biceps get, the heavier weights he can lift. Likewise, when we meditate, we exercise the parts of the brain that involve the regulation of emotion and mind-body awareness that lead to changes in brain activity and structure, which in turn improve our memory and attention.

One of my fellow researchers, Dr. Sara Lazar of the Psychiatric Neuroimaging Research Program at Massachusetts General Hospital, found these brain changes to be especially apparent in long-time meditators. In her 2005 study, for example, fMRI brain scans were used to assess cortical thickness in participants with extensive meditation experience (averaging about 9 years of experience and 6 hours per week of meditation practice), and a control group that did not practice yoga or meditation. Dr. Lazar found the brain regions associated with attention, sensory, cognitive and emotional processing were thicker in meditation participants than those in the control group who did not engage in yoga or meditation.

This was the first significant study (of now more similar studies) to provide evidence for a link between long-term meditation practice and structural brain changes. Equally exciting is that the greater prefrontal cortical thickness found in the meditation group was most pronounced in older participants, suggesting that extensive meditation might also offset age-related cortical thinning. It appears that the brain regions associated with attention and sensory processing, which frequently diminishes over the years, can remain more youthful in those people who continue to practice meditation.

In another interesting study conducted at the Laboratory of Neuro Imaging at UCLA, differences in the brain's anatomy and structure called *gyrification* (or cortical folding) were also discovered in people who meditated. Although the implications of this research remain to be fully established, the findings from this study support the possibility that meditation can lead to changes in regulation of activities including daydreaming, mind-wandering, and projections into past or future and a possible integration of autonomic, emotional, and cognitive processes.

And while research reveals long-term meditation can produce structural changes in specific areas of the brain that enhance our ability to learn, one does not have to practice for thousands of hours to reap the positive brain benefits. Dr. Lazar also found that these increases in grey matter in some regions of the brain occurred after just 8-weeks of Mindfulness-Based Stress Reduction (MBSR), a formal program involving meditation and some yoga practice. These results suggest that even short-term participation in meditation-related practices can lead to changes in grey matter concentration in brain regions that are involved in learning and memory processes, as well as in emotion regulation, something I will discuss in my chapter on yoga and mood.

#### **Yoga-Brain Fact**

If you practice yoga and meditation techniques on a regular basis, your brain will be better able to cope with stress and emotion. This brain enhancement will help you to maintain higher levels of levels of learning and memory.

### **Yoga Makes Us Smarter**

Think about how we feel when we are stressed. We might eat more, lose our appetite, sweat profusely, or simply want to bury our troubles in mindless television or computer games. What happens to our brains when we are under stress is that our bodies increase the secretion of cortisol, a well-known stress hormone. When faced with sustained,



high levels of chronic stress, the associated high levels of cortisol can actually be toxic and even fatal to our brain cells. Because our hippocampus, the part of the brain responsible for memory and learning, is particularly vulnerable to high sustained cortisol levels we may ultimately compromise our learning and memory capacities when faced with uncontrolled chronic stress. By managing stress through yoga and meditation, you can actually improve your memory, concentration, and your ability to learn.

While researching the effects of long-term yoga and meditation, I found an intriguing study that reported improvements in attention, mood and stress over a very short time period. When a group of 40 undergraduate students were given 5 days of 20-minute meditation training, this group showed significantly better attentional abilities and control of stress than a similar control group of 40 students given only relaxation training, including greater improvement in attention, lower anxiety, depression, anger, and fatigue, and an elevated mood. There was also a significant decrease in stress-related cortisol.

These studies, which are just a few of those being conducted today, clearly show a strong relationship between our ability to maintain attention and our responsiveness to stress and emotional reactivity. In other words, the more one practices the contemplative skill of controlling attention through meditation and yoga, the more one has a manageable stress response and improved emotional reactivity. Ultimately, our cognitive performance is most efficient and at its optimal level when we are more in control of our stress and emotions.

#### **Yoga-Brain Fact**

Sustained, high-levels of stress can be toxic to our brain cells. The more you practice yoga and meditation, the more efficiently your brain will function.

#### **The Effects of Yoga on Memory and Decision Making**

Yoga and meditation not only makes our brain more efficient, it also improves our executive function—the brain activity related to decision-making and cognitive performance. In a research study conducted at the University of Illinois at Urbana, scientists compared the effects of a yoga exercise session to aerobic exercise, the results showed that the memory retention and cognitive performance after yoga was significantly superior (i.e., shorter reaction times, increased accuracy) to aerobic exercise.

The reason yoga can be better for the brain than aerobics (although both are good), is that it allows us to cope with stress and emotions more effectively. Sports performance experts know that if you are highly stressed or emotionally compromised about the outcome of the activity you are engaged in, you are more likely to fail. I have found this to be true regardless of the sport or activity. If you are successfully able to maintain your attention and emotional equanimity, you will perform better.

#### **Long-term yoga improves concentration, processing and motor speed**

Research clearly indicates that yoga and meditation, especially long-term practice, improves the way our brain functions, including our ability to concentrate and perform well on certain tests. In one study comparing 15 yoga practitioners with a control group of non-practitioners and involving a series of tests for attention, the yoga group performed significantly better. Long-term practitioners of yoga and meditation showed greater attention span, processing speed, attention alternation ability, and performance in interference tests.

Another recent study also showed improvement in cognitive functioning and dexterity among 57 research volunteers who were given tasks requiring attention, visual scanning and motor speed. Each participant was assessed before and after three types of sessions: yoga meditation, supine rest, and control (no intervention). The results showed that the yoga condition was associated with the greatest improvements in psychomotor functioning with no improvement in test skills for those who did not practice yoga and meditation.

#### **Yoga and meditation can help rewire brains of those with attention-related disorders**

Those who suffer from Attention Deficit Hyperactivity Disorder (ADHD) have a problem with inattentiveness, over-activity, and/or impulsivity. In the United States alone, ADHD affects 4.5 million children between the ages of 5 and 17. These children face social isolation and have difficult relationships with teachers, which makes them more vulnerable to a host of problems, including poor academic performance, troubled relationships and low self-esteem which can lead to behavioral problems including dropping out of school and even violent behaviors. The reason is that the part of the brain that is responsible for focusing and impulse control functions differently in children with ADHD.

Given that yoga has been shown to improve the control of attention, it makes sense that the practice may also be useful to those with these disorders. The good news is that yoga and meditation can actually improve ADHD symptoms, making it possible for them to function more normally. In one 2004 study, for example, a group of 18 boys diagnosed with ADHD were randomly assigned to do either yoga or a group activities that required a structured cooperation intervention. After 20 sessions the collective behavior of the kids who did yoga was markedly improved, including significant improvement in their ability to focus attention. Additionally, these boys displayed less oppositional behavior, restlessness, and impulsivity.

The control group did not show improvements. This study shows that yoga may have merit as a complementary treatment for boys with ADHD who have been stabilized on medication, particularly in the evening when the effects of medication have worn off. Although more studies need to be done on larger groups, yoga remains an investigational treatment for ADHD.

A Columbia University study also found yoga to be an effective educational tool for students with ADHD in U.S. public high schools. Over 90% of the volunteers who participated in a yoga program showed improvement in their academic performance after 6 weeks in the program, further evidence that yoga can be an effective alternative to medication that is currently being used to control ADHD symptoms in students.

### ***Meditation for Mental Control***

Sit in easy pose with a straight spine and neck and arms crossed in front of your chest, elbows with a 90° bend; arms parallel to the ground. Place your right palm on top of the left upper arm and the top of the left hand under the right upper arm, fingers together and straight. In this position, close the eyes, balance the posture, and stretch the arms out from the shoulders as much as possible. The breath will become very slow. Begin with 3 minutes and gradually increase to 11 minutes. This meditative exercise is said to help give you control over your mental faculties.

### ***Do the Math—Yoga Improves Computation Skills***

Many people believe that equation solving and memorization are the most effective ways to improve one's mathematical aptitude—all of which can be extremely time-consuming and, to math phobics, feel like an ordeal. The fact is, that 20-minute sessions of yoga and Tai Chi can also sharpen your mathematical ability. These were the findings of a 2010 University of Miami School of Medicine study in which 38 adults participated in a session that included 10 minutes of Tai Chi movement and 10 minutes of sitting, standing, and lying down yoga poses. The researchers measured self-reported anxiety and math computation skills of each participant before and after the session. The findings showed that the Tai Chi/yoga participants had lower anxiety and performed better on basic math skills after the workout. Why? The increased relaxation may have contributed to the increased speed and accuracy noted on math computations following the Tai chi/yoga class.

### ***Yoga as learning tool for students around the world***

Another study providing preliminary evidence that yoga may improve academic performance of children in schools was done on 800 teenagers in India. The students in this study who were engaged in a yoga program performed better academically than those who did not do yoga. Researchers selected 159 high-stress students and 142 low-stress students. Both groups were given tests in mathematics, science, and social studies. Those who participated in a 7-week yoga program of asanas (poses), pranayama (breathing exercises), and meditation performed better in academics than those who did not do yoga. The study also concluded that low-stress students performed better than high-stress students, showing, once again, that indelible connection between stress and academic performance.

### ***Meditation for Brain Drain***

If you have a hard day, this meditation will not only reenergize you, but it will balance your most hard-working, effective computer -- the brain. It is the best thing to do for so-called "brain drain." Sit with your spine straight in a comfortable meditative posture. Interlace your fingers with your right thumb on top. Hold your hands several inches out from your diaphragm with your ring fingers together and pointing upward at 60°. Close your eyes. Inhale deeply and powerfully exhale as you chant the mantra ONG (OOOONNNNNNNNNNNNG) emphasizing the nasal resonating "NG" sound that makes your forehead vibrate. Keep your mouth open, but let all air flow through your nose. The sound is far back and up in your soft palate. Use your own breathing rhythm. Repeat 5 times. This meditation should only be done when you can relax afterwards!

When you consider the body of evidence cited in this chapter describing the cognitive and psychomotor performance improvements associated with yoga practice, a compelling argument can and should be made for incorporating a yoga and meditation program into our school system. Education should be about more than just getting good grades and getting into good schools—it should also be about providing the skills for children to

become more emotionally balanced, well-adjusted, resilient and engaged citizens of the world. Because the practice of yoga can also lead to improvements in well-being and even spirituality, which I will discuss later in the book, building character is an additional positive outcome that one gets with the inclusion of contemplative practices in their education.

Our schools currently have little if anything in the way of skill building for managing and coping with stress and life challenges. I believe that yoga is just such a skill and that routinely implementing yoga in our schools is ultimately possible. Take the example of dental hygiene – the skill of brushing our teeth and flossing. Our schools teach it, doctors recommend it, and parents reinforce it, and it has become a part of our basic skill set as a society and a culture. Consequently we have good oral health. Similarly, implementation of yoga education and practice in our schools would lead to students and adults who would be physically, emotionally, and intellectually healthier, and also perform better and be more functional and productive. Imagine the positive transformation in our society after a few generations of incorporating this new skill set.

Divya Sachdev, who teaches yoga at Art for Living, a non-profit educational and humanitarian institute with centers around the world, wrote the following about the intellectual growth she experienced as a yoga practitioner: “It was the year 2005. I was sitting comfortably on a yoga mat on a Sunday morning. I was very peaceful and calm. I had felt the same way often in the past few years since I had started practicing yoga. The time I stretched through yoga postures simply flew. Later I sat with a book of Physics and started reading. Something was different. I realized I could grasp more and more. I had seen a major improvement in my grades lately. I knew yoga was working well for me in high school when I became one of the top students in my class. I wasn’t sure how, but I realized that the practice of yoga asanas was helping me cope with my studies.

As a child, I was always told that I had to study hard to enjoy life, but while studying I found I was hardly able to enjoy life. With my daily schedule for school and coaching classes, I would get very little time for leisure. Somehow books, assignments, exams, presentations would only add to my phobia of not getting good grades and then a good college and then a good job and most importantly not making my parents happy which meant a lot to me. These thoughts were endless.

Those cold scary nights just before the exams were even worse. They would be like the dark Knights ready to kill me with their swords called books. I would sit on my study table, with a mug of coffee trying to keep myself awake, under the little lamp my aunt got me. I would open my 600-page-social science book, still wondering where to start studying. I would feel the stress increase in my body and soon I would be in my own world, far, far away from books. Inspired by the magical movies, I would dream of things like magic pencils that would write my exams for me....

Every exam I would promise myself that next exam I would study hard and get better grades. But no matter how hard I studied, it would only get worse. I knew I was getting deeper and deeper into the pit as my grades started falling class after class. I wanted to find a solution to my problem ... and I did. A combination of yoga postures, breathing techniques and meditation proved to be my best solution.”

## Chapter 4: Your Mood on Yoga

### Finding Peace and Well-being

Kathryn, 23, of Cambridge, Massachusetts, began doing Vinyasa yoga after high school. “The teachers were great and I loved it because it offered a space for me to look at what was going on in my life, which was in transition,” she recalls. “It helped me come to some kind of acceptance or peace with my life, and to be able to process the anger, hurt and the loss of relationships. I found yoga emotionally grounding.”

Much of Kathryn’s pain and sadness stemmed from a difficult childhood, where she grew up with two absent and bickering parents. “I was an only child and my parents fought constantly,” she says. “They both worked night shifts so I was home alone a lot, and when I wasn’t, my father would be watching pornography so loud that I could hear him.” Although she came to yoga because she was attracted to the physicality, she soon discovered that it helped her to release her sorrow. “Yoga taught me to tap into the emotions that I was feeling but couldn’t process at the time. I would be feeling stressed and upset without even realizing it until I got to my mat and allowed myself to let go and free my mind of all thoughts except for what is real and true.”

As she prepares for graduate school at Harvard, Kathryn practices yoga and meditation every day. “I used to do it for hours, but now I realize it isn’t the amount of time, it’s the frequency,” she explains. “Whether it’s five or 45 minutes, it’s a time to check in with myself. There will always be sorrow and pain, but on the other side there will

also be joy. Yoga helps me make space for them both and not turn away, judge or be ashamed, but rather to acknowledge and be present with my emotions.”

Americans enjoy one of the highest standards of living in the world, but we are not necessarily among the healthiest or the most satisfied. A significant number of people in the United States—as many as 57 million according to the National Institutes of Mental Health—suffer from mental health disorders, including depression and panic disorders. Clinical depression is ten times more common today than it was two generations ago. Unmanaged stress, as we have noted throughout this book, contributes to many of these problems. A common dysfunctional or maladaptive response to chronic stress is to use tobacco, alcohol, and prescription and illicit drugs, all of which can have a negative impact on our mental and physical health.

Experts who study the brain have discovered a biological component to happiness. It seems people who describe themselves as “very happy” have a larger and more active left prefrontal cortex, the part of the brain associated with positive mood (or affect), than people who are in a negative mood state. Activation in the right prefrontal cortex is associated with negative feelings. Richard Davidson of the University of Wisconsin, one of the foremost researchers to study the effects of contemplative practices on the brain, found that meditation increases the activity of the left prefrontal cortex associated with positive mood states. These changes are associated with greater levels of equanimity and happiness and well as more emotional resiliency.

The good news is you don’t necessarily have to settle for the brain you were born with. We know that we can change our brains when engaging in specific behaviors or activities through a feature of the brain called plasticity. So if you feel that you are incapable of dealing with stress, or that your mood is deteriorating, yoga and meditation is one way to climb out of this emotional abyss. As Kathryn and other yoga practitioners interviewed for this book can attest, practicing yoga and meditation can transform your mood and, in some cases, lift you out of your depression.

In his book *The Art of Happiness*, the Dalai Lama writes, “happiness is something that can be achieved by training the mind.” Does this mean that contentment is something that can be cultivated? What are the characteristics of the emotions and sensations many of us associate with feelings of well-being? Can we train ourselves to enhance those feelings and improve our quality of life? The simple answer is yes.

The desire to recapture the carefree joy of youth isn’t necessarily about wanting to relive our 20’s again. According to a number of studies and surveys, as we move from young adulthood to middle age we actually feel happier. In one such study published in the *Journal of Economic Psychology*, researchers at the University of Southern California found that happiness increases from age 18 until about age 50, at which point we become less satisfied with family life and work, and health problems begin to emerge. It’s really one of those cruel twists—just as we feel more confident about the choices we made, we have to deal with the consequences of those decisions, some of which lead to feelings of stress and anxiety.

As one Harvard oncologist tells his aging patients, “losses accumulate.” Certainly, an unhappy childhood, divorce, or a major illness can certainly make it downright impossible *not* to worry and be happy. So how does yoga help us to attain this long sought-after sense of well-being? While happiness means different things to different people, engaging in a mind-body practice such as yoga can change the part of the brain that influences feelings of contentment, affecting our mood immediately as well as over the long haul.

This was yoga instructor Lisa Langer’s experience. After a divorce and an unsatisfying stint as a lawyer, she decided to abandon nearly everything she had been taught by her parents to accomplish to follow her dream of being a full-time yoga teacher. “During my teacher training I had a mind-blowing epiphany,” the 42-year-old New Yorker remembers. “I felt connected to something larger than myself—like my soul was speaking to me loudly for the first time. I had both massive emotional outbreaks and powerful blissful states during this time. Yoga has a deep psychological component that helped me to clean up the relationships in my life. Yoga has taught me that happiness is what is going inside you right now. You can have all the things in the world that you want and still not be happy. I know what it feels like to be happy inside. It’s not an ecstatic happiness; it’s a more of a quiet bliss or calm.”

Many of the mood-elevating benefits associated with yoga are rooted in the meditative component of yoga practice, which involves the cultivation of awareness or mindfulness, which is the ability to maintain attention to what is happening in the present moment in a non-judgmental and non-analytical way. Over time, the practice of contemplative mindful practices such as yoga lead to subtle but real changes in our sense of identity, and of our relationship to both internal (thoughts and feelings) and external (life challenges) events.

It provides the experience of an altered perspective on life, with the new-found opportunity of responding to or reacting to our world in different and creative ways, rather than being locked into an automatic knee-jerk response. This means more flexibility and less rigidity and more empowerment over our lives. As my teacher Yogi Bhajan used to say, it is better to be like a flexible rubber band that can bend and stretch with stressors, rather than being

rigid and brittle and at risk of shattering. Yoga provides this flexibility both physically and emotionally. With less time spent in the stress response, positive emotion has more opportunity to be present.

This is why experts who study yoga and its effect on the brain have discovered that yoga—particularly its meditative component—can lift our mood and ultimately be an effective path to well-being. It’s important to understand that there are physical differences between the brains in people who are predisposed to happiness and those who aren’t. These differences are manifested in specific brain areas in the amount of brain tissue, the levels of neural activity and in the amount and nature of our neurotransmitters, the chemicals that transfer signals from one neuron to the next. The prefrontal cortex contains a cocktail of neurotransmitters, including dopamine, serotonin, glutamate, and gamma-aminobutyric acid (GABA), among others. Dopamine is particularly important because it is the neurotransmitter that transfers the signals associated with positive emotions between the left prefrontal area and other parts of the brain.

As Davidson discovered, yoga and meditation activate the brain’s left prefrontal cortex, a.k.a. the “happy side of the brain.” The prefrontal cortex is the part of the brain that focuses our behavior—good and bad—and allows us to express emotions. People with a higher ratio of activity in the left prefrontal cortex are generally more joyful and enthusiastic. One of these people whom Davidson studied was biologist Matthieu Ricard, the self-described “happiest man in the world.” After receiving his doctorate, Ricard moved to Nepal in the seventies to become a monk. Since then, Ricard has volunteered to have his brain patterns analyzed with neural imaging. The MRIs showed that when Ricard meditates, his left prefrontal cortex lights up in a way that the researchers have never seen before. Scientists have found similar brain patterns in other meditating monks who have essentially trained their brains to be happy.

You might say that’s all well and good for a man who lives in a monastery, far from the stresses and concerns of Western living. But you don’t have to be a practicing monk in order to change your brain and ultimately induce a state of well-being. Because our brains are plastic, we can rewire them based on our lifestyle, behavior and experiences. Just 20 minutes of daily mindful practice can change your brain and your life!

### Improve Your Mood Now

Science has revealed that yoga can actually boost positive mood, including happiness, in a short period of time. Researchers at Reed College, Oregon Health & Sciences University, and University of California, San Francisco compared the salivary cortisol levels (one of the “stress” hormones) of a group of healthy undergraduate students before and after they participated in a single Hatha yoga class. They found cortisol levels had decreased following just one 90-minute session.

In a similar study, researchers at the University of Wurzburg in Germany measured how yoga affected the heart rate, blood pressure, and the hormones in healthy women. The experiment required the experienced practitioners to participate in a 90-minute class that included asanas (physical poses), breathing, and meditation. The control group consisted of equally healthy women who read for 90 minutes. Researchers found the yoga group had significantly lower heart rates, and higher levels of life satisfaction. They concluded that the women who practiced yoga were better at coping with routine life stresses and showed less evidence of irritability and higher measures of good spirits and extroversion. Not only were the women more energized and upbeat, the yoga group used more “self-supporting” coping strategies. They were less likely to demonstrate aggression, self-pity, or use drugs.

Yoga has had a similar effect on people suffering from more intense negative emotions. In another German study, a group of 24 women who described themselves as “emotionally distressed” participated in two 90-minute yoga classes each week for three months. The women in the control group were required to abstain from starting an exercise program or engaging in a stress-reduction program during the study period. Although the yoga participants hadn’t been formally diagnosed with depression, they reported experiencing emotional distress in the weeks leading up to the study and were considered above the population norm for perceived stress, anxiety, and depression. By the end of the study, the women in the yoga group reported feeling less stress and anxiety, more energized, and an improved sense of well-being. Their depression scores improved by 50%, their anxiety scores by 30%, and their overall “well-being” scores by a whopping 65%.

Whatever your physical condition, if you want to improve your spirits, there is evidence that the mood-enhancing effects of yoga will kick in quickly. In a study conducted at the All India Institute of Medical Sciences, researchers measured levels of perceived well-being in healthy subjects, and in another group of subjects with hypertension, coronary artery disease, diabetes, and a variety of other illnesses. During a 10-day period, subjects engaged in 8 days of 3-to-4-hour sessions that included yoga classes, meditation and relaxation practices and health education including advice about stress management and diet. At the end of the 10-day period, there was significant



improvement in the perceived well-being scores of the subjects. These results suggest that yoga combined with lifestyle modification and stress management can lead to measureable improvements in perceived well-being in less than 2 weeks.

Research also shows that yoga can be especially helpful for those who have clinically significant mood disorders. In one study, scientists examined the effects of a single yoga class on a group of patients who were living in a psychiatric hospital in New Hampshire. These patients had a range of psychiatric disorders, including bipolar disorder, major depression, and schizophrenia. After just one yoga class, the majority of the patients reported lower levels of tension, anxiety, depression, hostility, and fatigue.

This was the case for Christine, a 29-year-old graduate student and yoga teacher from Oregon. She credits yoga with saving her life, which was filled with bouts of health-threatening anorexia and severe depression after being raped as a young girl. “Yoga helps me to take care of my mind, my body and my emotions,” she says. “For years I would cry in every single yoga class. I felt overwhelmed—like an emotional well was flooding. At first I felt embarrassed and ashamed, but now I accept it. I tried to stifle my tears, but a teacher would come over and put a hand on my back, which made me feel as if it was okay to cry. I always feel more comfortable with myself when I do yoga. I don’t feel the need to fix anything. I feel a sense of acceptance even if I feel sadness.”

### *There’s a Meditation for That: Techniques to Boost Joy and Happiness*

**1. Healthy, Happy, Holy Breath.** Sit in a cross-leg position, aka “easy” pose, or sit in a chair with your spine straight and feet flat on the floor. Your hands can rest on your knees, or be relaxed in your lap. The mental focus is at the brow point near the root of the nose, also known as the “third eye point.” Inhale deeply and fully through the nose and hold your breath suspended in the chest. Silently repeat the following mantra 3 times: Healthy am I, Happy am I, Holy am I. Then as you exhale, repeat the mantra once out loud. Each repetition of the phrase should last for 5 seconds. Continue for 3 to 11 minutes. Then inhale deeply and stretch your arms up over your head with the fingers interlocked and pulling up on the spine. Exhale and relax.

**2. Meditation for Finding Happiness and Peace Within.** Sit in easy pose with your spine straight, chin and chest out. Warm up first by chanting ONG (OOOONNNNNNNNNNNNG) so that it takes approximately 10 seconds to chant ONG one time. Chant with the mouth slightly open and the breath coming out only through the nostrils, making a nasal sound vibrating in the nasal cavity. Chant in this manner 5 times then gradually begin to chant ONG faster so that you are chanting one ONG every 3-5 seconds. Start with 1 minute of rapid ONG and gradually work up to 2 minutes.

**3. Smiling Buddha Kriya.** Sit in the easy pose, as described above. Curl your ring and little fingers into your palms and press them down with the thumbs, keeping the index and middle fingers straight. Bring your arms up so your elbows are pushed back and there is a 30-degree angle between the upper arm and forearm. The forearms must be parallel. The palms are facing forward. Concentrate powerfully at the third eye. Chant silently at the point of the third eye: SA-TA-NA-MA. The entire mantra means “I am Truth.” Make sure your elbows are pressed back and your chest is out. Repeat for 11 minutes, then inhale deeply, exhale and open and close your fists several times. Relax. Sa = “infinite”; Ta = Life, existence; Na = Death; Ma = Regeneration, light.

**4. Meditation for Depression.** Sit in easy pose with a straight spine, arms extended straight forward, parallel to the ground. Close your right hand into a fist, wrapping your left fingers around it, bases of the palms touching. Your thumbs should be together and pulled straight up. Keep your eyes focused on your thumbs.

Inhale for 5 seconds. Without holding your breath in, exhale for 5 seconds. Then hold the breath out for 15 seconds. Continue the cycle, starting with 3-5 minutes up to 11 minutes. Progress slowly. You can work your way up to holding the breath out for one full minute. This meditation is said to be an excellent antidote to depression.

### **Beyond Mood – Yoga and Spirituality**

Although many of us practice yoga today as a way to improve our mood and physical health, it’s important to remember that the original ancient form of yoga was created as a spiritual discipline—all of the component practices I believe were intended to support this higher purpose. In fact, the translation of the word “Yoga” as “union” actually refers to the achievement of a more profound and unitive state of consciousness called *Samadhi*. This is not a fictional historical artifact of yoga philosophy, but rather a well-known human experience.

The field of philosophy known as mysticism (not to be confused with crystal balls, tarot cards and mind readers), is dedicated to the examination of the human mystical experience, which is a central and important aspect of spirituality. This experience has a number of defining characteristics: it is so profound that it is difficult to describe

in words: it is a deeply unitive experience and the one word that comes closest to describe it is “oneness.” It is an extremely moving experience often accompanied by feelings of joy, peace, and harmony and can often leave one permanently transformed.

This experience has been described by yogis as well as by spiritual masters and practitioners in all religious traditions and spiritual paths. In fact, there is an argument to be made that it is a built-in feature of our central nervous system. Researcher Andrew Newberg who has conducted brain imaging studies on the changes that take place during contemplative practices has referred to this field of research as the “biology of spirituality” and has identified activity in specific brain regions that are associated with spirituality.

Additional evidence for this kind of neurophysiological activity comes from research at Johns Hopkins University and other institutions with hallucinogenic drugs, which can, in some individuals and circumstances, generate a similar mystical experience. Participants in these studies have reported profound changes in their lives that persist over the long term.

But before we get carried away with expectations of experiencing God in our first yoga class, let’s first put this in perspective. Chances are you will not have an overt earth-shattering mystical experience in your first yoga practice, or for that matter, possibly ever. After 40 years of yoga practice, I cannot say that I have had such an overtly profound, sustained experience with yoga, although I know individuals who have. What is more likely to take place is a very subtle transformation (and perhaps even imperceptible to you as it happens) in your overall perspective on life, your sense of life purpose, meaning, and even your values and life goals as you engage in a regular practice over the course of months and years. You might have brief glimpses of this unitive state, so-called peak experiences, during yoga and meditation practices. And these, over time, perhaps cumulatively, can lead to a transformative experience.

There is little research on the spiritual aspect of yoga practice, but what exists is intriguing and supportive. An early research study done on Harvard University undergraduates in the seventies (with then author and now well-known meditation researcher Richard Davidson), showed that there was a dose-dependent relationship between the length of one’s previous meditation practice and the experience of the psychological characteristics associated with a spiritual experience. In other words, the longer people have meditated, the more likely they are to have had these characteristic experiences.

A more recent study compared non-yoga practicing individuals with members of a yoga ashram, a community of yoga practitioners living a lifestyle dedicated to yoga practice. The yogis reported significantly greater prevalence of becoming aware of a new reality, feeling a personality change, having an experience that resulted in a change in their lives, or an experience of oneness with something divine or spiritual.

Depending upon the circumstances, it is also possible that such experiences could be achieved in a shorter time period, which is what my colleagues and I observed in our study with young musicians at the Tanglewood Music Center in Massachusetts. Music performance is a creative human activity, which is sometimes associated with a deep experience of single-minded immersion, described as a state of “flow,” a newly researched psychological phenomenon. The flow state is associated with feelings of spontaneous joy, or even rapture, while carrying out an activity and shares a remarkable similarity to the yogic Samadhi state. We employed a questionnaire that measures flow that evaluates key characteristics, including the merging of action and awareness, concentration on task at hand, sense of control, loss of self-consciousness, a sense of time transformation, and the degree to which the experience is intrinsically enjoyable. After just six weeks of Kripalu yoga classes 3 times per week, the results from this questionnaire showed that these musicians had increased the level of flow in their music performance as compared with musicians in the same group that did not practice yoga.

A small but significant fraction of people undertaking the practice of yoga do so for spiritual purposes. A survey study we conducted on students who were participating in a formal beginner’s yoga program revealed that 37% endorsed “seeking a spiritual experience” as a reason for signing up for the program. If you are wondering how this fits with your own religious affiliation, let me assure you that there is no inherent conflict between the philosophy and psychology of yoga practice and religious beliefs. There are actually a number of books that explain how yoga can enhance one’s religious beliefs and practices.

Remember, yoga is not a religion, but rather a contemplative mind-body practice. It does not require any beliefs because it is biological. In fact, in our ongoing Kripalu yoga research studies with high school teens, we have collected anecdotes from 14-year-old boys who reluctantly took yoga classes believing that it was a bunch of nonsense and something that only wimps and girls do. Yet, after just a few weeks, these boys were avid practitioners and proponents of yoga! The bottom line is, if you regularly practice yoga, especially a traditional practice that incorporates meditation, it will help you to function better as a human being physically, mentally and emotionally, with the possible added benefit of taking you to higher levels of spiritual fulfillment.

## Chapter 5: Finding the Right Yoga Style for You

No one knows exactly how old yoga is, but archeological evidence has linked it to the Indus valley civilization which ended about 1,500 BCE, so it is certainly thousands of years old. The ancient practice of yoga has become increasingly popular around the world, and many forms of it have sprouted up, a few of which reflect the trends of the times such as laughter and aerial yoga, where practitioners are suspended from harnesses. This has complicated the process of choosing a style of yoga to practice. Different styles have varying degrees of difficulty, so you should choose the one that is best for your goals and fitness level, and you should always consult your doctor if you have a preexisting medical condition such as heart disease, back or joint problems, or a pregnancy. You should also inform your instructor about any of these conditions before beginning a practice. The following are a few of the most popular styles taught in studios, gyms and privately today.

### Hatha Yoga

Hatha yoga is somewhat of a generic term that encompasses most of the common types of yoga practices in the United States. Hatha yoga includes physical postures and exercises and most will also include the other traditional components of yoga practice, including deep relaxation techniques, breathing practices (pranayama) and meditation and mind-body awareness practices that cultivate mindfulness, as well as the psychology and philosophy of yoga.

Because of the rapid growth of yoga practices, the offerings of different styles have become diversified, as does anything that becomes popular. Compare, for example, the variety of cars available today compared to when they were first introduced. As a result, you will find departures from the traditional multifaceted, multicomponent yoga instruction, which include varying degrees of inclusion of components other than postures and exercises. In fact, many yoga traditionalists have decried the appearance of yoga instruction that includes only physical postures and exercises solely for the purpose of physical fitness. They view this as an insult to the profound goals and deep philosophy inherent in traditional yoga practice. I am personally not concerned that yoga as a whole will be permanently denigrated by such limited yoga practice, although it is clear that traditional yoga practices will certainly provide more benefit to the practitioners. For beginners I always recommend the more comprehensive traditional styles that include meditation practices, especially for those that are looking for health and clinical benefits. It is possible that those starting with limited forms of yoga practice may ultimately gravitate towards a more traditional and fulfilling form of yoga practice, and some of these individuals may never have been attracted to the full traditional practice styles as their first experience with yoga. Below are descriptions of some of the more well-known styles and their major distinguishing features.

### Restorative

This is an excellent style for beginners, the elderly, and those with physical ailments or restrictions. It is one of the simplest and most relaxing forms of yoga that you do lying down with support from blankets or bolsters. You'll rest in each pose for several minutes and you will be led through a guided meditation.

### Vinyasa

The term vinyasa refers to the alignment of movement and breath, a method that involves a flow of movements or "asanas". The length of one inhale or one exhale dictates the length of time spent between asanas. Asanas are then held for a predefined number of breaths. Attention is placed on the breath and the journey between the asanas rather than solely on achieving the correct body alignment.

### Iyengar

One of the most popular forms yoga practiced today, Iyengar Yoga was founded by B.K.S. Iyengar, who began teaching yoga in 1936. He continues to practice and teach today, assisted by his son and daughter, at his Ramamani Iyengar Memorial Yoga Institute in Pune, India. In addition to developing and popularizing his style of practice, Iyengar's books are considered classic yoga texts, the best known being *Light on Yoga* (1966), which describes hundreds of yoga poses and breathing techniques. Iyengar's form of Hatha yoga emphasizes the importance of attaining proper physical alignment of the body in the poses in order to achieve the maximum benefit from their practice. One of Iyengar's novel innovations is in the use of "props", including blankets, blocks, straps, pillows, chairs, and bolsters in order to assist the student in attaining ideal alignment, even if the body is not yet open enough.

### Kundalini

This is the form of yoga that I practice. Kundalini Yoga is an ancient form of yoga that has only been practiced in the west relatively recently. In 1969, Yogi Bhajan founded 3HO Foundation (the Healthy, Happy, Holy Organization) to introduce this yoga practice to a broader population. Because there are other organizations that practice a form of Kundalini Yoga, this style is specifically referred to as “Kundalini Yoga as taught by Yogi Bhajan®”. It is a comprehensive style that incorporates all of the traditional elements of yoga practice with an emphasis on inner psychological and spiritual growth as well as physical health. It is a popular style in North and South America and Europe and although it can be a vigorous practice, it is one that is safe and can be adapted to practitioners of all levels of expertise including special populations and patients with specific disorders.

Kundalini Yoga classes are one hour in length and often the postures/exercises and breathing techniques are combined together during the practice. A rapid, energizing breath technique called Breath of Fire is often used during classes and is a distinguishing feature in this style. There are also a wide variety of specific meditations practiced in Kundalini Yoga that often combine hand and arm postures, a breath technique and a specific mantra and each of these is claimed to have specific benefits. A Kundalini practice always begins with an opening chant called the Adi Mantra, which is “Ong Namo Guru Dev Namo” chanted three times, and should be done before any Kundalini practice including the meditations and practices in this book. This is perhaps followed by a few warm-up exercises to stretch the spine and improve flexibility. The main sequence of poses at the heart of the class is taught in exactly the order originally taught by Yogi Bhajan and is followed by deep relaxation in corpse pose (shavasana). A Kundalini Yoga class may often end with a meditation and is finished with a closing song.

### Bikram

Bikram yoga (also known as “hot” yoga) was developed by Bikram Choudhury who was reared in Calcutta, India. He developed a vigorous 90-minute practice that consists of 26 postures and two breathing exercises done in a room heated to more than 105 degrees.

The idea is that muscles are more flexible when warm and will move fresh, oxygenated blood to the whole body, restoring all systems to healthy working order. This is not a good style to practice if you are heat intolerant or don’t like to sweat.

### Ashtanga

Ashtanga Yoga is a style introduced by yoga master Sri K. Pattabhi Jois (1915-2009). This method involves synchronizing the breath with a progressive series of postures and is a vigorous practice intended to produce internal heat and a profuse, purifying sweat that detoxifies muscles and organs. It includes a sequence of poses that incorporate breath regulation called *vinyasas*. The breathing style used in Ashtanga Vinyasa Yoga is *ujjayi*, a relaxed diaphragmatic breathing, characterized by an ocean sound which resonates in the throat. This specific breathing style is maintained throughout the practice along with one’s alignment with movements. The steady cycle of inhales and exhales provides the practitioner with a calming, mental focal point. The *vinyasas* and *ujjayi* together create internal heat, which leads to purification of the body through increased circulation and sweating. Another major principle of Ashtanga Vinyasa is the *bandha*, or muscle locking/contraction, which focuses energy in the body and is closely tied to the breath.

### Kripalu

Kripalu Yoga is known as the yoga of consciousness that integrates body, mind, and energy. It is also a multicomponent traditional style of practice with an emphasis on inner psychological and spiritual growth. Kripalu asks the practitioner to release stress by fully experiencing and being aware of your physical, mental and emotional state of being, through postures, breathing techniques, deep relaxation and meditation. It is a popular style of yoga in North America, and the Kripalu Center for Yoga and Health in Western Massachusetts is recognized as the largest yoga center in the United States, with a wide variety of yoga workshops and courses offered by leading teachers of most all of the different yoga styles/schools.

### Sivananda

Sivananda yoga, one of the world’s largest schools, was taught and promoted in the West by Swami Vishnu-Devananda and named for his teacher, Swami Sivananda. Sivananda yoga follows a set structure that includes five elements: pranayama (deep, conscious breathing to reduce stress); classic asanas (poses that help develop a strong, healthy body by enhancing flexibility and improving circulation); relaxation (easing worry and fatigue); proper diet (eating simple, healthful, vegetarian foods); and positive thinking (considered one of the true keys to achieving

peace of mind and eliminating negativity from our lives. This style is therefore a comprehensive traditional yoga practice. Vishnu-Devananda wrote one of the contemporary yoga classics, *The Complete Illustrated Book of Yoga*, which was first published in 1960.

### Integral Yoga

Integral is a gentle, but comprehensive traditional yoga practice, which includes breathing exercises, chanting, kriyas (cleansing exercises) and meditation. The so-called Integral method seeks to “integrate” the mind, body, and spirit, and is intended to give students the tools they need to live peaceful, healthy, joyful, useful lives. It follows the teachings of Swami Satchidananda, who founded many yoga institutes, including the Yogaville Ashram in Buckingham, Virginia. Satchidananda’s teachings go beyond the physical practice of yoga postures by inspiring students to find fulfillment in themselves and promote a peaceful existence with others. Integral yoga appeals to those who want an approach that addresses their whole life, including the physical, spiritual, intellectual, and interpersonal relationships. Classes tend to be gentle, accessible, and particularly noncompetitive.

### Viniyoga

Viniyoga (not to be confused with vinyasa) is all about adaptation. It’s based on the guru/student model, in which an experienced teacher works privately with each student, making a personalized yoga program with modifications of asanas based on the student’s health, age, and physical condition, including past or current injuries. Viniyoga is intended to be adaptable to any person, regardless of physical ability, so teachers must be highly trained and are often experts on anatomy and yoga therapy. A viniyoga practice might include asana, pranayama, chanting, and meditation. This type of yoga is especially good for those with physical limitations, as it is extremely gentle, but it can also be adapted for a more highly physical practice. There is a strong focus on alignment and poses are held for a consistent number of breaths with rest in between.

### Ananda

Ananda Yoga is designed to prepare the mind and the body for deep meditation. It provides a spiritual uplift and physical revitalization for anyone, regardless of age. It can raise one’s level of consciousness by reinforcing the natural effects of certain yoga postures. Ananda Yoga is a classical approach that includes postures, breathing, and classical meditation techniques.

Whatever style that you choose, it should be in synch with your personal philosophy, interests, level of fitness, and ultimate goals. Also, it is best that you train with a teacher that has been certified by completing a formal teacher’s training program. Take it slowly if you are a novice, and remove your ego from the practice. Yoga practice can become an integral part of your lifestyle and a continual, life-long process. It’s best that it not be primarily about attaining the perfect postures, flexibility and the best-looking body.

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