

PART I

EFFICACY AND NEUROSCIENCE RESEARCH

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Efficacy

The world is ready to give up its secrets if only we know how to knock, how to give it the necessary blow. The strength and force of the blow come through concentration. There is no limit to the power of the human mind. The more concentrated it is, the more power is brought to bear on one point. That is the secret.

(Vivekananda, 1953, p. 582)

Nathan seemed to be a client with a great deal of potential. Although his mother died when he was very young, he had grown up in a loving home with a caring, committed father. He had excelled in high school as captain of the football team and as a National Merit Scholar. He was accepted into so many great colleges that he could not decide which one to choose. So, over spring break, he and his father embarked on a driving trip together to visit each college. The trip was fun, a shared adventure. By the last days of the trip, they were a little behind schedule with two schools left to visit. Nathan urged his father to drive straight through to the next college without stopping. It was late at night as they approached their destination. Nathan drifted off to sleep for just a few minutes. He awoke in a hospital, with no memory of what had happened. He was informed that they had

been in a car accident. His father had died, whereas he survived. He recovered after a short stay in the hospital.

He felt overwhelmed by guilt over not staying awake to help keep his father alert and for having urged his father to continue driving that night. He began to dread the nearness of death, and going to college had a new meaning for him: The thought of it made him anxious.

Nathan had been to several therapists who had offered him various treatments, such as catharsis, desensitization therapy, and cognitive restructuring. He said that although each treatment was helpful in general, therapy could not remove that terrifying feeling that hung over him. So, he tried to not think about things too deeply, to help himself cope. As a result, this complex, highly intelligent young man simplified his life and worked only when he had to, at menial jobs. He lost interest in going to college, and instead, engaged in daring, dangerous extreme sports to escape his feeling concerning death. As he put it, "When I'm completely absorbed in what I am doing, with my life on the line, I really feel alive, and lose my feeling of fear about being near death." But a recent brush with death while attempting an extreme sport convinced him that this was probably not the best way for him to lose that feeling. He realized that he should attempt to change, so he decided to try a different therapy, a meditational one.

Nathan found relief as he learned to work with his mental faculties. He practiced yoga meditation and enjoyed the feeling of control he gained. He could then apply his attention fully to his therapeutic concerns, allowing him to address his problems at a level he never could before. He also appreciated yoga's integration of postures with breathing exercises, which allowed him to control his tension and fear. Then he could do some further analytical work, to help him come to terms with his guilt feelings, the meaning of college for him, and of his life in relation to his father's death. Soon, Nathan was able to ease his anxiety, engage in his life fully, and move forward. We heard from him a few years later, that he had gone to college and was pursuing a career in bioengineering. He continued to participate in sports, now as part of a college team, without the need for extreme risks.

Another client was in his early forties. He was short, with a stocky build, which had earned him the nickname "Tank." Unlike our client Nathan, Tank was unskilled. He had little education and low motivation. He lived with his sister and grandmother, barely getting by. He felt lethargic and spent much of his time sitting on the couch, watching television. He complained

of feeling bored, but he could not think of anything he wanted to do. He did not say or do too much until something got him annoyed. Then he was prone to angry outbursts, which he claimed were not a problem to him, but they were a problem to everyone in the family, who wanted him to change. So, he grudgingly agreed to try psychotherapy.

From the very beginning phases, we could see that Tank was lacking in mental tools. He could barely hold his attention on what we were saying. Nor could he reflect on his own experiences. Clearly, Tank needed to build some skills. He began by turning his attention to breathing. He was truly amazed the first time he noticed the sensations of his breathing. He told us, "I never knew you could do that!" Tank's reaction is a reminder not to take for granted self-awareness skills. Although anyone can learn to access their attention, they may not automatically do so.

Gradually, building slowly along the way, Tank learned many of the exercises in this book, which helped him improve his attentional focus. He could turn his attention inward to his sensations or outward, extending his attention as he chose. As he became more capable of being self-aware, he was able to address his anger problem, which involved resolving some of his frustrations and resentments.

In time, Tank began to feel interested in the world around him. He took a trip to the local zoo. This was a big step for him, because he rarely went anywhere. Not only did he enjoy the animals, but he was even more interested in looking at the plants. We encouraged him to go to the public library to take out a book on gardening. He did, and he then followed the directions for planting a small garden. His attentional skills sharpened, as he learned how to follow his thought into action, right in his own backyard. His self-confidence improved as well, and he enrolled in a gardening class at the local nursery. Eventually, he got a job working for a landscape company. His family told us that his temper problem was greatly improved. "Now he's even nice to be around!" his sister told us. When we last saw him, he was happy, with a healthy curiosity about the world, and he had the mental skills to pursue his interests as they arose.

Yoga has stood the test of time as an approach that fosters transformation. Modern psychotherapists need to know that the methods they employ that seem sound conceptually have also been tested empirically. Interest in meditation has increased dramatically in the West over the past 50 years. In response, scientific research on yoga and meditation methods first gathered

momentum during the 1960s. Over the past two decades, the number and quality of studies have increased significantly. Research on meditation's efficacy, along with neuroscience's evidence of real and positive effects on the brain have made it viable to include yoga in psychotherapeutic treatments. Therapists can now feel confident that these methods have an ever-growing scientific basis for helping with a wide variety of problems.

This chapter covers some highlights from the many research projects that have been done. Researchers are measuring the general effects of yoga when used therapeutically and what problems yoga can best address. Another type of research is investigating the healing factors involved. What makes yoga an effective method of treatment? How is it working? Both efficacy research and healing factors research are covered in this chapter, and the neuroscience findings are discussed in Chapter 2.

EFFICACY STUDIES OVERVIEW

Meditation and yoga were largely unknown in the West before the 1960s, except for a few isolated cases. It was not until meditation was popularized in that decade that it became broadly practiced in the West. Transcendental Meditation was one of the first meditation methods to be performed en masse, and the Transcendental Meditation organization, recognizing the importance of scientific verification, sponsored many scientific studies, some of which are included in this chapter. Although the quality of the studies may have varied, the sheer number and consistent results encouraged further investigation.

Efficacy studies usually compare yoga treatment to no treatment or to an alternative approach. These projects cover the effects of various forms of short-term yoga treatments. Some of the treatments involve postures combined with simple breathing awareness and meditative quieting. Other studies utilize more varied breathing exercises, at times combined with mantras (chanting a simple sound) and mudras (making a simple hand gesture) performed in a sitting position. And some yoga research is based solely in the use of meditation. All of these studies fall under the category of yoga research.

Neuroscience has been another boon to meditation research, offering strong scientific evidence for how meditation and yoga alter the nervous system in general and specific regions of the brain in particular. Taken together,

the meditation and yoga research provides an ever-growing body of evidence that there is a scientific basis for using these methods in therapy.

Considering the positive findings from the use of different types and combinations of yoga techniques, it is clear that therapists have a rich source for methods to add into treatment. For example, you might want to incorporate a set of breathing exercises, simple postures, meditation, or any combination of these methods integrated together. The choice of technique should be tailored to fit the client's problem as well as the individual needs, and we will guide this process in Part III.

Some General Effects

Yoga fosters certain general effects. Researchers have found that yoga meditation has a positive influence on health. A summary of medical research on yoga over a 10-year period found that yoga can provide measurable health benefits for people who are healthy as well as those who suffer from musculoskeletal or cardiopulmonary disease (Raub, 2002).

A study performed at two companies tested managers and employees who practiced meditation regularly. The participants improved significantly in overall physical health, mental well-being, and vitality when compared to control subjects with similar jobs in the same companies. Meditation practitioners also reported significant reductions in health problems such as headaches and backaches, improved quality of sleep, and a significant reduction in the use of alcohol and cigarettes, compared to personnel in the control groups (Alexander et al., 1993).

Studies of many different forms of meditation have found that the practice improves the quality of life in terms of better memory and productivity, reduced anxiety, improvements in hypertension and sleeplessness, as well as converting loneliness, usually felt as a troubling emotion, into solitude, which can be a source for personal growth and even enlightenment (Dhar, 2002). Several studies found that Transcendental Meditation (TM), a practice that involves focusing attention using a mantra, led to overall psychological health (Alexander, Rainforth, & Gelderloos, 1991). A meta-analysis of 42 independent studies considered the effects of meditation on a general increase in self-actualization. The researchers found that meditators had markedly higher levels of self-actualization as compared with other forms of relaxation (Alexander et al., 1991).

Many different yoga methods have been studied and compared over the recent decades. A healthy group of men and women, ages 18 to 30 years old, participated in a three-month-long course in yoga. The first 30 days they practiced yoga breathing exercises, and then the last two months they added a series of yoga postures. Both the women and men showed positive improvements and reductions in risk factors for metabolic and cardiovascular diseases, as measured by reduced levels of total cholesterol and triglycerides following the breathing segment of the study. The subjects maintained that improvement when measured following the addition of postures in the third month of the study (Prasad et al., 2006).

Even in the midst of difficult circumstances, yoga can help people to cope better and experience improved mental and physical well-being. For example, individuals who have had HIV/AIDS learned breathing combined with meditation methods. Of the 47 subjects who completed the study, all showed marked improvement in their feelings of well-being right after the program. In follow-up interviews with the participants, subjects described having made positive life changes, even though their quantitative measures indicated that they were under increased stress (Brazier, Mulkins, & Verhoef, 2006).

Improved Memory and Intelligence

The ancient yogis believed that yoga techniques combining stimulating postures with calming relaxation meditations would bring about a state of mental balance. Recent studies have found that this claim may be true. The researchers measured the peak latency and peak amplitude of P300 auditory event-related potentials in 47 subjects, before and after these combined yoga practices. P300 is an indicator of cognitive processing. The results showed an enhancement of the P300, indicating that the combined practice of stimulating and calming yoga methods enhanced cognitive functioning (Sarang & Telles, 2006).

Studies were performed to test memory. For example, college students instructed in meditation displayed significant improvements in performance over a two-week period on a perceptual and short-term memory test involving the identification of familiar letter sequences presented rapidly. They were compared with subjects who were randomly assigned to a routine of twice-daily rest with their eyes closed, and with subjects who made no

change in their daily routine (Dillbeck, 1982). In several studies, university students who meditated regularly showed significant improvement compared to control subjects on intelligence measures over a two-year period (Cranson, Orme-Johnson, Gakenbach, & Dillbeck, 1991; Dillbeck, Assimakis, Raimondi, & Orme-Johnson, 1986).

Large-Scale Studies: The Maharishi Effect

Under the guidance of the founder of TM, the Maharishi Mahesh Yogi (see Chapter 3 for details on the Maharishi and TM), and his organization, a group of large studies were performed in varied locations around the United States between the years of 1976 and 1993. The Maharishi pointed out that people have seen for millennia that meditation can help individuals. He sought to validate scientifically that the practice of meditation could change a whole society. In an address given by the Maharishi, he said:

When the number of people practicing the Transcendental Meditation program rises to about one per cent of a city's population, the one per cent effect comes into play immediately. Crime, illness, and all other negative aspects of social life diminish sharply, and an influence of coherence and harmony spreads throughout society.

(Mahesh, 1990, p. 32)

This phenomenon became known as the Maharishi Effect. During periods when large-scale Transcendental Meditation groups numbering more than 1% of the population were holding regular meditation sessions, researchers did find a statistically significant reduction in the rate of fatalities resulting from automobile accidents, suicides, and homicides in the United States (Dillbeck, 1980).

This TM project also investigated the effects of meditation on violence. Meditation is known to produce a feeling of inner peace and well-being. Some of these large-scale studies seem to bear out this time-honored claim. Four thousand practitioners of Transcendental Meditation assembled in Washington, D.C. from June 7 to June 30, 1993. The local police monitored the crime rate for the district. Statistics revealed that the crimes decreased 15% during this period and stayed lower for some time after the 21-day event (Hagelin et al., 1999).

Another large-group meditation study revealed a distinct improvement in the quality of life in Rhode Island. Crime rates dropped, auto accidents decreased, and there were fewer deaths resulting from cigarette smoking and alcohol consumption (Dillbeck, Cavanaugh, Glenn, Orme-Johnson, & Mittlefehldt, 1987). Meditation has even been shown to help in a wartime situation. There was a reported decrease in hostilities during the Lebanese war from collective meditation sessions (Abou-Nader, Alexander, & Davies, 1990; Davies & Alexander, 1989).

EFFICACY STUDIES FOR SPECIFIC PROBLEMS

A great many studies have been performed to test the efficacy of the use of yoga for specific problems, both physical and psychological. Yoga has been tested for high blood pressure, memory loss, movement disorders such as Parkinson's disease, and addictions, as well as for most psychological problems, including stress, anxiety, and depression. It has also been found to be helpful with children and problems of aging.

Research on Yoga for Stress

Yoga and meditation are effective ways to combat stress. Yoga exercises can help a person to take the steps needed to dramatically alter the brain's stress response, changing the mind-body balance for more comfortable coping. We present a few examples of the kind of research that is being done that shows how yoga is an effective treatment for stress.

The ability to focus attention can be helpful for better toleration of stress. Vaitl and Ott (2005) found that all altered states involve changes in the focus of attention. These changes can vary from a narrow focus of attention to a broad, extended awareness that includes all in a single grasp. Control of attention span has been shown to have many therapeutic applications, with stress being one of them.

For example, an experiment performed by Hempel and Ott (2006) tested 31 students before and after they underwent a 10-week yoga program. They found that narrowing the focus of attention using yoga methods brought significant improvement in handling an induced stressor, as indicated by psychological and physiological measures. The subjects scored higher on the TAS, a test that measures the ability to become absorbed, indicating focus

of attention. The subjects also had greater baroreflex sensitivity (BRS), which is responsible for maintaining a stable blood pressure. In addition, the subjects showed a more flexible cardiovascular responsiveness, which is linked to higher absorption (Kumar & Pekala, 1988). Thus, yoga training, which develops an improved focused use of attention and greater absorption of attention, proved helpful for tolerating and handling stress more comfortably and flexibly.

Therapists often help families who are coping with the stress of caring for an elderly loved one. The situation is demanding for the caregivers on many levels, from practical matters to emotional discomfort that must be tolerated. One study provided family caregivers a 6-session yoga meditation program to help with stress in caring for a family member suffering from dementia. The researchers found a statistically significant reduction in depression, anxiety, and improvement on perceived self-efficacy. Those caregivers who meditated longer had greater improvement in depression. They also reported that the majority of subjects felt the program helped them in their physical and emotional functioning (W. Thompson, Thompson, & Gallagher-Thompson, 2004).

One way to begin the process of establishing efficacy for a treatment is to compare it to a treatment that has already been shown to be effective. A group of researchers in Sweden did just that. A yoga treatment based on Kundalini yoga methods was compared to a stress management program based on cognitive behavioral therapy (CBT). The pool of 33 subjects was drawn from a large Swedish company. All subjects were given 10 sessions over a period of four months. The results showed that yoga was equally effective to CBT for stress management. All subjects showed significant improvement in psychological effects, such as self-rated stress and stress behavior, anger, exhaustion, and quality of life. Both groups also improved equally on physiological measures of blood pressure, heart rate, urinary catecholamines, and salivary cortisol. The researchers concluded that, similar to CBT, yoga shows promise as a method for stress reduction (Granath, Ingvarsson, von Thiele, & Lundberg, 2006).

Yoga for Anxiety

The many studies on yoga for anxiety offer optimism in integrating yoga methods into treatments for anxiety problems. In giving people specific

things to do, yoga can be reassuring and helpful for people who feel anxious. Here are a few examples of the kinds of studies being done.

A yoga technique that combined postures with prone meditation has recently been found to improve performance on attention tasks and reduce state anxiety better than simple relaxation performed lying down (Subramanya & Telles, 2009).

Yoga treatments have been studied for particular types of anxiety problems. Obsessive-compulsive disorder (OCD), which has a strong anxiety component, can be difficult to treat, but with the addition of yoga techniques, treatments can become more effective. Eight adult subjects who were diagnosed with OCD were given a specific yoga breathing pattern to practice for OCD and several others for generalized anxiety. They also received a one-year follow-up course of therapy. They all showed significant improvement on the Yale-Brown Obsessive-Compulsive scale that compared them before treatment and at 3, 6, 9, and 12 months. They also showed improvement on anxiety, global severity, and stress indexes (Shannahoff-Khalsa & Beckett, 1996).

Yoga was also used with a group of women who were experiencing anxiety and stress. The subjects underwent a program of Iyengar yoga classes involving postures that the Iyengar system identifies as reducing anxiety and stress. The subjects attended two 90-minute sessions per week for eight weeks. As compared to the control group, the subjects showed significant reductions in anxiety, stress, fatigue, depression, headaches, and back pain, along with significant increases in well-being (Michalsen et al., 2005).

Posttraumatic stress disorder (PTSD) is another problem that brings clients to psychotherapy. Yoga treatment for veterans who suffered from PTSD was studied with a group of 62 outpatient veterans, 90% men. They participated in five 90-minute sessions given once a week and were measured pre- and posttreatment. The treatment consisted of mantra practice and one-pointed awareness. Following treatment, all subjects showed significant improvement in all the outcomes, including anxiety, stress, anger, quality of life, and spiritual well-being, with the largest improvement being for anxiety and well-being. The study found additionally that stronger results were associated with greater frequency of practice (Williams et al., 2005).

Yoga is often used as an adjunct to more conventional therapeutic methods, and we encourage this most of the time, but occasionally studies find that yoga can be used alone. Chronic fatigue syndrome and anxiety are

sometimes diagnosed together. In a study of 155 subjects who suffered from chronic fatigue syndrome, several treatments were compared. Participants from a chronic fatigue syndrome clinic were offered treatment. Yoga was one of the treatments, and standard psychological support was another. After a two-year follow-up, those who did yoga had the strongest results, leading the authors to recommend yoga as a promising treatment for chronic fatigue syndrome (Bentler, Hartz, & Kuhn, 2005).

Thus, yoga can be effective for the treatment of anxiety in women and men, and it can be used for many different types of anxiety problems. It is often even more effective when combined with conventional therapy, and so can be a welcome addition to existing treatment programs.

Yoga for Depression

Yoga has been studied as a complementary treatment for people suffering from depression. A search for studies that used yoga techniques for depression was made in 2004. This meta-analysis uncovered five projects that used different types of yoga interventions. The severity of the depression ranged from mild to severe. All five studies found that yoga was helpful and had no adverse effects. For example, a study with severely depressed subjects showed improvement using rhythmic breathing and relaxation exercises (Khumar, P. Kaur, & Kaur, 1993). Another study gave depressed subjects classes in postures alone and found that the subjects' mood improved after performing the set of postures (Shapiro, Cook, Davydov, Ottaviani, Leuchter, & Abrams, 2007). The recommendation by these authors was that further investigation of yoga as a therapeutic method for depression is warranted (Pilkington, Kirkwood, Rampes, & Richardson, 2005).

Yoga and Meditation for Addiction

Yoga has been researched in the treatment of addictions for several decades. Now, many studies show success applying the different forms of yoga to treat addiction. One study performed by the Harvard Medical School found that yoga was as effective as traditional psychotherapy in assisting clients who were part of a methadone program (Shaffer, LaSalvia, & Stein 1997).

Research that combined psychiatric treatment with yoga for alcohol and drug addiction was performed using yoga and relaxation in the treatment of

alcohol-dependent women (Nespor, 2001a, 2001b). This researcher incorporated yoga practices of meditation, postures, breathing, and attention to the yamas and niyamas, to help people overcome their addictions.

A meta-study of the use of Transcendental Meditation for preventing alcohol, nicotine, and drug abuse showed effectiveness in recovery and relapse prevention (Niranjanananda Saraswati & Alexander, 1994). Some of the studies found that TM helped remove the motivation for using the drug. Treatment also helped reduce stress and strengthen the subjects' ability to handle the withdrawal process.

Herbert Benson is a prominent researcher who has studied the use of meditation for alcoholism and found that TM brought about several physiological changes that resulted in decreased sympathetic nervous system activity. His studies showed that meditation practice did result in decreased drug and alcohol use (Benson, 1974).

A group of well-known researchers in the science of TM reviewed 24 studies on the use of TM for treating and preventing substance abuse. The studies included heavy substance—using prisoners, patients in treatment programs, and noninstitutionalized subjects. The researchers concluded that meditation improved some of the underlying factors involved in chemical use and led to stress relief, increased self-esteem, personal empowerment, and general improvement in health (Gelderloos, Walton, Orme-Johnson, & Alexander, 1991).

Even the famous founder of the Iyengar system of yoga addressed the problem of addiction in his book, finding that the regular practice of yoga could help overcome addiction and prevent its recurrence (Iyengar, 2001).

Yoga and Meditation Research for Aging

Yoga and meditation have been researched extensively for problems related to aging. Meditation may actually help lessen the negative effects of aging. One recent study performed by a large group of investigators (Lazar et al., 2005) showed that people who meditate over many years have an increase in the thickness of certain important parts of the cerebral cortex. This study compared typical Western subjects who were skilled in insight meditation with a control group of people with no meditation or yoga experience. The meditators had a daily routine that included career, family, friends, and hobbies along with daily meditation. The researchers found distinctive

differences in the cortical thickness of older meditators from older non-meditators. Although the average cortical thickness did not differ, areas involved with sustained attention, sensing of inner experiencing, increased spontaneity, and visual and auditory sensing were thicker in the meditators. Normally, the entire frontal region of the cortex gets thinner as people age, but the older meditators retained thickness in these key frontal cortex areas. The average cortical thickness of the 40- to 50-year-old meditators was similar to the average thickness of 20- to 30-year-old meditators. Nonmeditators of all ages had less thickness in these brain areas. The investigators concluded that regular practice of meditation slows the rate of degeneration of these important areas of the brain.

Studies that have compared meditators to nonmeditating controls for benchmarks of aging have discovered that meditation seems to slow down the aging process in many respects. One study found that long-term meditators (five years of regular meditation) were physiologically 12 years younger than their chronological age, as measured by reduction of blood pressure, better near-point vision, and improved auditory discrimination. Short-term meditators were physiologically five years younger than their chronological age for these factors. The study controlled for the potentially confounding effects of diet and exercise (Wallace, Dillbeck, Jacobs, & Harrington, 1982).

Another meditation study compared the sleep patterns of young people, age 20 to 30 years, to middle-aged people, age 31 to 55 years. Each age group had meditators who used either Sudarshan Kriya Yoga (SKY) or Vipassana meditation compared with nonmeditating controls. Whole-night polysomnographic recordings were carried out in 78 healthy male subjects belonging to control and meditation groups. Polysomnography records brain wave changes (electroencephalogram, EEG), eye movements (electrooculogram), muscle tone (electromyogram), respiration (electrocardiogram, ECG), and leg movements while subjects were sleeping. Sleep patterns were comparable among the younger controls and the young and middle-aged meditation groups. Slow-wave sleep showed a 3.7% decline in the middle-age controls, but no such decline appeared in the middle-aged meditators. The authors concluded that meditation practices help retain slow-wave sleep and enhance the REM (rapid eye movement) sleep state in middle age. Meditators appear to retain a younger biological age as far as sleep is concerned, showing the benefits of meditation for antiaging (Sulekha, Thennarasu, Vedamurthachar, Raju, & Kutty, 2006).

Another large sleep study compared sleep patterns of 120 residents in an elderly care facility. One group given an herbal Ayurvedic treatment was compared to a yoga group who performed yoga postures, meditation, breathing, and received lectures on yoga philosophy. After six months, the yoga group showed a significant increase in the number of hours slept and had improvements in feeling rested. The herbal treatment group had no significant change (Manjunath & Telles, 2005).

Studies show that spirituality may literally help with mild cognitive impairment, the symptoms of early Alzheimer's disease. This study scanned 15 subjects who were experiencing memory loss and mild cognitive impairment pre- and posttreatment. All subjects received Kirtan Kriya yoga meditation involving repeated chanting of sounds and finger movements designed to help the mind focus and become sharper. They found increased blood flow as revealed in SPECT (single photo emission computed tomography) scan, with greater activation in the posterior cingulate gyrus, one of the first brain areas to degenerate with Alzheimer's disease (Newberg, Wintering, Khalsa, Roggenkamp, & Waldman, 2010).

Meditation was shown to reduce the activation of the sympathetic nervous system. An overly activated sympathetic nervous system is one of the markers of stress and risk for cardiovascular disease. Elderly subjects with congestive heart failure listened to a 30-minute-long audiotape for meditation twice a day for 12 weeks. They also had one weekly group meeting. The meditators were compared to a control group that had weekly meetings but no meditation tape. The meditation group had significant reduction in their sympathetic activation, measured as improved levels of noradrenaline, as compared to the control group, who had no change (Curiati et al., 2005).

Yoga Research With Children

Therapists and educators are often looking for nonpharmacological interventions to use with children. With yoga's potential to provide natural change, interest in yoga is on the rise, and research to test its effectiveness is being done. A yoga program for children tested 48 fifth-grade students, before and after yoga training. The program involved breathing exercises combined with imaginative journeys and yoga postures. The children had increased emotional balance, along with a reduction of fears, feelings of helplessness, and aggression. The participants also performed the exercises after

school, helping them to have even better control over their negative feelings (Slueck & Gloeckner, 2005). Another extensive study was performed in six elementary schools located around the United States. A yoga program was provided followed by surveys from students, teachers, and parents. The study found that yoga practice had a positive influence on academic achievement, general health, and interpersonal relationships in kindergarten through fifth-grade students who participated (Buckenmeyer & Freltas, 2007).

Yoga is being increasingly researched as an adjunct for treating children with common childhood problems, such as ADHD, autism, anxiety, and depression. It has also been tested to enhance learning ability. For example, one study performed on boys diagnosed with ADHD showed improvements in their symptoms and attention following regular yoga practice (Jensen & Kenny, 2004). Another research group (Galantino, Galbavy, & Quinn, 2008) reviewed 24 studies that used yoga with children who had different types of problems. All of the studies used breathing, meditation, and postures together as the intervention. One group of studies they reviewed showed improvement for healthy children on attentional tasks, motor performance, memory, and motor speed. Ten of the studies investigated cardiopulmonary effects, with significant improvements. Some of these studies showed reduced levels of fear, anxiety, and feelings of helplessness in traumatized adolescents. Children who were hospitalized for adjustment disorder and depression were also improved after yoga therapy. Even problems with asthma were improved. In general, the researchers recommended that yoga could be used as an adjunct for treatment of children.

FACTORS OF HEALING

If yoga helps enhance functioning and diminish problems, how does it work? Investigators have been attempting to uncover the healing ingredients that might be responsible for yoga's effects. These studies have found certain mechanisms underlying the effects, and we include a few of the possible mechanisms embedded in the methods.

Spirituality

One possible healing ingredient of yoga may be that it fosters a feeling of spirituality. Spirituality is wired into our brain, according to University of California at San Diego researcher Vilayanur Ramachandran. He has

postulated that we may have neural circuitry in the limbic system and temporal lobes that is activated during experiences of spirituality (Ramachandran et al., 1999). Therapists who are sensitive to the spiritual dimension may offer clients additional ways to intensify the therapeutic process, giving it a more deeply felt personal significance.

A group of researchers set out to compare the results from a secular form of meditation with a spiritual one, using mantra meditation. One group of participants was taught a spiritual meditation technique that focused on the mantra “God is love” while the other group used the mantra “I am happy.” Both groups practiced their mantra 20 minutes a day for two weeks and then returned to be tested. Each group performed their mantra for 20 minutes and then placed their hands in uncomfortably cold water. The spiritual group was able to withstand the discomfort twice as long as the nonspiritual group. The spiritual group also reported feeling less anxiety, having a more positive mood, and feeling a greater sense of spirituality. Interestingly, both groups had a similar decrease in heart rate (Wacholtz & Pargament, 2005).

Absorption

One healing ingredient that makes meditation so effective is its ability to foster absorption. Yoga has made the training of absorption into a highly refined science, with specific exercises for narrowing and opening attention. Recent findings show that absorption plays an important role in the psychobiology of self-regulation (Vaitl & Ott, 2005), which is a primary component for healing, according to attachment theories of therapy (Johnson, 2008). Typical brain activations and inhibitions in the cortex have been correlated with high and low absorption and different brain patterns as measured on EEG. Those subjects with high scores had changes in the occipital region, indicating a more flexible attentional style (Davidson, Goleman, & Schwartz, 1976), a useful trait to foster in people who are undergoing psychotherapy. Yoga training’s ability to foster absorption may account for its effectiveness in psychotherapy.

What is absorption? Absorption is the ability to fully engage mental and emotional processes in an object of attention. Absorption occurs spontaneously, but it can be trained. Everyone has natural moments of absorption when they are so involved in something that time slips away and everything else becomes background. The object of absorption can take many forms.

It might be interpersonal, such as a significant other. It can also be something found in the environment, such as a piece of art, a game, or a beautiful flower. Another source for objects of absorption are experiences within, such as a deep feeling of inner calm while resting in a comfortable bed or a peaceful feeling of warmth, sitting in front of a campfire.

Absorption includes two components: openness and focused attention. Openness is the component of sincere involvement in an experience. Yoga fosters this openness in the early steps, where practitioners are encouraged to engage in the process with pure and sincere intention. Attention is the means for engaging involvement and openness to situations that will foster absorption. Yoga trains attention directly, and these methods form part of the core of the practice.

Self-Regulation

Yoga breathing has been studied for its effects on a wide variety of clinical problems (Brown & Gerbarg, 2005). One of the well-documented effects is that yoga helps balance the autonomic nervous system responses. Through the practice of yoga breathing techniques, an overactivated nervous system can be returned to balance, and in this way will enhance well-being.

A second important benefit that comes from balancing the autonomic nervous system is better self-regulation. When people are angry, stressed, or anxious, the sympathetic and parasympathetic nervous systems are overactivated. By developing deliberate methods to calm these systems and return them to balance, people gain control over their responses. This ability to self-regulate can bring a strong sense of mastery. Psychological problems become easier to tackle, with the confidence that it is possible to voluntarily effect what has previously been experienced as an involuntary reaction. For example, one study showed that yoga practice reduced blood pressure and had positive effects on hypertension (Sung, Roussanov, Nagubandi, & Golden, 2001). One client of ours who lowered her elevated blood pressure using meditation methods gained a more generalized sense of mastery over her reactions, and then she was able to face the ways she was sabotaging her interpersonal relationships. With that willingness to take responsibility instead of simply blaming others, she took further steps toward change.

Self-regulation is helpful at any age. An increasing number of seniors have experimented with some kind of yoga to help improve their health,

but they gain another important ability: self-control. One study tested the impact of a six-week yoga intervention on the psychological health of senior citizens with a mean age of 77. The subjects did a gentle form of yoga where participants sat in chairs, meeting for 45 minutes once a week for six weeks. Participants were also encouraged to practice at home each day. Yoga subjects improved over an exercise group and no-treatment control group on measures for anxiety, anger, depression, well-being, general self-efficacy, and self-efficacy for daily living. The researchers concluded that changes in self-control were associated with general self-efficacy and trait anxiety changes, and they proposed that self-control is the mechanism underlying the impact of yoga on psychological health (Bonura, 2007).

The Dual Action: Relaxation and Activation

Many studies have shown that meditation can produce deep relaxation. For example, a comprehensive meta-analysis (Dillbeck & Orme-Johnson, 1987) found 31 physiological studies that compared meditation to resting with the eyes closed. The study evaluated three key indicators of relaxation and found that meditation provided a deep state of relaxation, even deeper than simple eyes-closed rest.

That meditation produces relaxation is not surprising, but what is less obvious is that meditation also produces activation. This dual pattern of physiological activity and relaxation was first observed in the 1950s in studies of seven experienced yogis. A combination of brain waves including recurrent beta rhythms of 18 to 20 hertz, generalized fast activity of small amplitude as high as 40 to 45 hertz, and slow alpha rhythms were both seen at various stages of the yogic meditation (Das & Gastaut, 1955). A modern EEG study found similar results. Yoga meditators had an increase in the faster beta wave activity that is typically associated with wakefulness and alertness (Schneider & Tarshis, 1986). In addition, the meditators showed an increase in slower alpha and theta wave activity, which is associated with relaxation (Bhatia, A. Kumar, Kumar, Pandey, & Kochupilla, 2003). These studies clearly show that meditation entails both relaxation and alertness. Typically, when people are attentive, they are correspondingly stimulated, but in meditation, people seem to be able to remain calm even though they are highly aware. Staying alert and relaxed at the same time has many potential benefits for improving performance in varied

situations and handling challenges well. Further research will undoubtedly explore the potentials and limits.

CONCLUSION

All of these studies indicate the many dimensions of yoga and meditation and how it can be helpful for therapy, but efficacy is not the only basis for yoga's usefulness to therapy. Research in neuroscience shows how yoga changes the brain, adding evidence for its therapeutic effect, as Chapter 2 describes.

