

Paper Title: Yoga and Healing: Scientific Connection

Author: Malhotra, Ashok Kumar

Institutional Affiliation: Distinguished Teaching Professor, Department of Philosophy, SUNY, Oneonta, NY

This paper was prepared for “Science and Religion: Global Perspectives,” June 4—8, 2005, in Philadelphia, PA, USA, a program of the Metanexus Institute ([www.metanexus.net](http://www.metanexus.net)).

Abstract:

Until 1950, almost all the literature dealing with the healing and other beneficial effects of yoga, meditation and contemplative practice on the human personality was theological, philosophical or popular in nature. Scientists seemingly ignored this important realm of human experience. It was only during the past 50 years that students and teachers of yoga and meditation offered themselves for scientific study. Swami Rama, Zen Priests, Himalayan Yogis, and mediators trained in Transcendental Meditation and Vipassana allowed themselves to be tested under laboratory conditions to demonstrate the efficacy of their meditative techniques. Encouraged by positive findings, scientists, who at first had approached these investigations cautiously, began to regard meditation and contemplative practice as genuine subjects of study. A number of scientific studies indicated that the yoga and meditative experience induced positive changes in the individual and social behavior of the practitioner.

This paper is divided into three parts. Part I will cite some significant scientific studies done on the effects of yoga and meditation on the various aspects of the human personality. Part II will delve into the personal reports of undergraduate students who participated in a six-week course on the theory and experiential aspects of Yoga, Zen and Mantra Meditation. The reports of four individuals will be cited as showing the significant changes brought by these meditation practices. Part III will offer evaluative comments on the state of research on meditation and personality and how this could be a model for the interface between science and religion.

Biography:

Dr. Ashok Kumar Malhotra is SUNY Distinguished Teaching Professor and East West Center Distinguished Alumnus; winner of Chancellor’s Award for Excellence in Teaching, United University Professions Excellence Award, Friends of Education Award; Bharat Excellence Award and Jewel of India Gold Award. He received PhD in Philosophy, from University of Hawaii and has published eight books: *Jean Paul Sartre’s Existentialism in Nausea*; *Jean Paul Sartre’s Existentialism in Literature and Philosophy*; *On Hindu Philosophies of Experience*; *Pathways to Philosophy (with Douglas Shrader)*; *Guidebook for Pathways to Philosophy (with Douglas Schrader)*; *Culture and Self (with Douglas Allen)*; *Transcreation of the Bhagavad Gita*; *Instant Nirvana*; and *An Introduction to Yoga Philosophy*. Other publications include more than 50 papers on Asian and Comparative Philosophy and ten poems. Dr. Malhotra is the founder of the Ninash Foundation, a charitable organization that helps build elementary schools for the impoverished children of India. He was a consultant for Warner Brothers

TV series "Kung Fu: The Legend Continues" and has made guest appearances on TV and Radio shows in Australia, Holland, India and the USA. He received the Metanexus LSI Grant to set up "Yoga and Meditation Society for the Scientific Study of Spirituality" in 2004.

Paper:

#### Section I: Scientific Research on Meditation and Healing

Until 1950 almost all the literature dealing with the healing and other beneficial effects of yoga, meditation and contemplative practice on the human personality was theological, philosophical or popular in nature. Scientists seemingly ignored this important realm of human experience. It was only during the past 50 years that students and teachers of yoga and meditation offered themselves for scientific study. Swami Rama, Zen Priests, Himalayan Yogis, and mediators trained in Transcendental Meditation and Vipassana allowed themselves to be tested under laboratory conditions to demonstrate the efficacy of their meditative techniques. Encouraged by positive findings, scientists, who at first had approached these investigations cautiously, began to regard meditation and contemplative practice as genuine subjects of study. A number of scientific studies indicated that the yoga and meditative experience induced significant changes in the individual and social behavior of the practitioner.

Two innovative studies on Yoga by Threse Brosse (1935), M. A. Wenger and B. K. Bagchi (1957) focused upon the physiological effects of yoga meditation. Their studies revealed that mediators were able to decrease heartbeat and rate of respiration. Ananda, Chhina, and Singh carried this research further by measuring the amount of oxygen consumption and carbon dioxide elimination in mediators who were "confined in a metal box." They concluded that mediators were capable of reducing significantly their oxygen consumption and carbon dioxide elimination.

In 1961, Ananda, Chhina, and Singh collaborated once again to study claims made by mediators practicing the yoga technique that they could stay in a blissful state without being affected by either inner or outer stimuli. (45) Their investigation focused upon the electro-encephalographic study of the brain activity of two groups of mediators. One group, during the practice of meditation was exposed to photic, auditory, thermal, and vibration stimuli. The second group had developed an unusually high "pain threshold" to cold water. The experimenters observed well-marked alpha activity in both groups. This activity during meditation apparently was unhindered by sensory stimuli. Furthermore, they noted that two mediators emitted alpha waves continuously while their hands were completely submerged in ice-cold water for an hour. During this interval, however, the researchers did not notice any discomfort or pain on the part of the Yogis. (46) Thus, research appeared to indicate that the yoga meditation facilitated significant changes both in the body and brain of the practitioner.

Japanese scientists Yoshiharu Akishige, Akira Kasamatsu, and Tomio Hirai between 1966 and 1970 conducted similar studies dealing with Zen meditation. A particularly enlightening study examined the responses of forty-eight Zen nuns and priests expert in the art of zazen (a form of Zen meditation meaning literally "sitting in meditation") and those of one hundred control subjects. During the experiment, the subjects sat in the zazen meditative position. Their faces were covered with masks and electrodes were

attached to their chests or heads. (47) During meditation, the priests and nuns were observed to undergo a number of physiological changes. Their rate of respiration dropped from the normal seventeen breaths a minute to five breaths, pulse fell from ten to fifteen beats a minute below average and in some cases body temperature was reduced by a few degrees. When an electric bell was sounded during meditation, control subjects sitting in the zazen posture showed an interruption of normal brain wave patterns for fifteen seconds, but with the repetition of the stimulus, habituation occurred and the subjects ceased reacting to it.

In the priests and nuns, there was found to be a continuous low level response to physiological and emotional stimuli. All stimuli appeared to have the same value and importance, and were perceived equally regardless of their nature. Dr. Kasamatsu, who held that emotionally disturbed individuals could derive maximum benefit from the practice of zazen, expressed the psychotherapeutic implications of this study. By helping the practitioner develop a sense of detachment, Zen could reduce the anxiety of former patients who were about to return to society.(48)

With the introduction of Transcendental Meditation in the West by the Maharishi, the pace of research on meditation was accelerated. From 1970 to 1972, Drs. Robert Wallace and Herbert Benson conducted research to determine the degree of physiological and psychological change brought about by the practice of Transcendental Meditation. In March 1970 issue of Science, Wallace reported the results of his study. The practice of Transcendental Meditation by subjects was found to decrease oxygen consumption and heart rate, to increase skin resistance, and to effect changes in electroencephalographic measurements. On the basis of these changes, they inferred that T.M. produced a unique state of consciousness.

In an attempt to replicate the results of this research, Drs. Wallace and Benson studied the physiological effects of meditation on 36 subjects at the Thorndike Memorial Laboratory and the University of California at Irvine.(49) In the February, 1972 issue of Science, Drs. Wallace and Benson corroborated the results of the earlier study.

Based upon these findings, Drs. Wallace and Benson concluded that Transcendental Meditation was not only conducive to significant physical changes but also made possible an altered state of consciousness. Wallace designated this state of consciousness as "hypermetabolic," which was quite different from the wakeful, dreaming, and sleeping states of consciousness. The research by Benson and Wallace revealed not only the physiological effects of meditation, but also indicated the presence of a level of consciousness, which until recently was talked of by theologians and religionists, in highly esoteric terms.

Other researchers had concentrated upon the effects of meditation on specific aspects of the human personality. Lesh (1970) reported upon the positive influence of the Zen technique on the development of empathy in counselors. Meditation was found to be an effective means toward the achievement of self-actualization, i.e., openness to experience and a self-dependence on feelings and values.

In a later study by Curtin (1973), the practice of Transcendental Meditation was found to bring about significant changes in the subject's capacity to regress adaptively. The term "adaptive regression" referred to the ability of the individual to bring to awareness the inner self or more specifically, to the suspension of the ego's defense mechanisms in order to gain access to the unconscious content of the mind.

T.M. increased one's capacity for "adaptive regression" and could, according to the author, play an important role in the enhancement and development of psychological health.

Studies by Seeman, Nidich, Banta (1972), and Polowniak (1973) reported the use of meditation in the self-actualization process. In the earlier study, an instrument measuring self-actualization was administered to control and experimental subjects prior to and ten weeks after beginning a program of T.M. There were significant difference between control and experimental groups on ten out of twelve variables measured. As hypothesized, subjects exposed to T.M. moved in the direction of self-actualization. In the Polowniak study, yoga meditation was found to bring significant changes in fourteen out of nineteen personality variables studied. Participants in meditation showed increased self-concept, greater purpose, and a higher sense of well being than the non-participating control group.

Linden (1972) employed T.M. training with 84 third grade students. His findings indicated that the training lead to greater attention functioning increased ability to cope effectively with anxiety situations, and greater achievement in reading.

Studies by Boudreau (1972), Girodo (1974), and Shapiro (1976) further established that meditation could help to eliminate specific physical, emotional, and psychological ailments. In the Boudreau study, two cases, one of claustrophobia, the other of excessive perspiration, were treated with the behavioral technique known as "systematic desensitization" in which the client was asked to relax as he imagined a hierarchy of increasingly anxiety producing stimuli. In the above situations this technique proved to have limited success. Transcendental Meditation was then introduced in one case, while in the second, yoga meditation was used as an intervention strategy. Both techniques were therapeutically successful after systematic desensitization had only partially alleviated the presenting symptoms.

In Girodo's study, yoga meditation was used to decrease anxiety symptoms in patients diagnosed as anxiety neurotic. Following the practice of yoga meditation for five months, it was found that a majority of patients exhibited a significant decline in anxiety symptoms.

An innovative study by Shapiro attempted to integrate the behaviorally oriented self-management techniques with humanistically oriented techniques of meditation. A case of generalized anxiety was treated with a combination of Zen meditation and behavioral self-control strategies. Training was done in a weekend Zen workshop; formal and informal meditation was taught, and the subject was instructed in behavioral self-observation. During the six weeks of the program, the subject reported a significant decrease in feelings of stress and anxiety. This study would appear to have implications for the integration of Western and Eastern techniques in psychotherapy.

Furthermore, Drs. Wallace and Benson in a study of 1862 drug users showed that a majority gave up using and pushing drugs after 21 months of practicing Transcendental Meditation. Their research suggested that T.M. might become a useful tool for fighting drug abuse.

Although the scientific research cited here indicates the positive effects of meditation on the human personality, there had been recent studies, which offered serious challenge to some of these claims. Because, most of the current research focused on Transcendental Meditation, a majority of critical studies were directed at this technique.

Critics argued that since followers of the technique had exclusively performed research on T.M.; studies retained a subjective character, which rendered them unreliable, one-sided, and even suspicious. Recently however, there had appeared half a dozen studies, which had countered some of T.M.'s prominent claims. We will briefly mention a few.

Two studies by Pagano et al. and Michaels et al. are the first to challenge the results presented in an article on "The Physiology of Meditation" by Wallace and Benson. Beside the physical changes occurring during meditation, Wallace and Benson reported the appearance of a unique transcendental state, which they called "wakeful hypermetabolic." Wallace argued that this state was unlike "ordinary relaxed or sleep states" and was conducive to stress reduction, heightened awareness, and an elevated sense of well-being.(50) Pagano and his coworkers interested in investigating the appearance of this unique state of consciousness during meditation observed five experienced meditators under laboratory conditions. Pagano's observations appeared to lay some doubt on Wallace and Benson's claim of a "wakeful hypermetabolic" state. Pagano noted both through subjective reports of practitioners and EEG records, that the meditators spent 40% of meditation time in sleep. He questioned therefore, whether sleep or some other aspect of the meditative process might be responsible for its beneficial effects.(51)

The second study by Michaels et al. challenges Wallace's claim from another viewpoint. Michaels and his co-workers denied not only the existence of this "hypermetabolic state" but also the claim that T.M. was unique in reducing stress. Michaels' study could be summarized as follows: blood chemical levels related to stress were measured in two groups. One group merely relaxed while the other meditated. Results indicated that the two groups did not differ significantly with regard to metabolic state. Therefore, biochemically, the state produced by meditation was observed to be similar to the state made possible by mere rest. Michaels concluded from his study that although T.M. could not biochemically reduce stress, it might produce beneficial psychological effects on its practitioners.(52)

Other scientists challenge the exclusivity of the T.M. technique while at the same time acknowledging its beneficial effects upon the body. Dr. John Laragh, a leading expert on hypertension in the U.S.A., questioned whether meditation's effect on blood pressure differs from the effects of other simpler forms of relaxation.(53) Psychiatrist Stanley Dean who expressed the sentiments of a considerable portion of the scientific community acknowledged T.M.'s importance as an additional medical tool, but maintained that the method was neither an exclusive nor an innovative way of achieving mental equanimity.(54) Studies by Travis et al.(1976) and Pollack et al. (1975) supported Laragh's and Dean's comments. Their studies reported that the physical changes, which took place during Transcendental Meditation occurred also among subjects who rested, relaxed, or used Benson's relaxation response technique. Therefore, most researchers had challenged the alleged distinctiveness of the T.M. approach.

From 1995 to 2003, a number of universities, including such prestigious institutions as Harvard, MIT and Cambridge, have supported medical research on alternative therapies such as acupuncture, tai chi, yoga and meditation. This research has led to some significant results. It has been shown that yoga, meditation and diet can reverse the build up of plaque that leads to the blockage of arteries. The American Urological Association's research indicates that meditation might be effective in slowing

down prostate cancer. Cambridge University researchers have found that a certain form of contemplative practice could help chronically depressed patients. Others have reported that meditation's healing power boosts the immune system of patients with breast cancer. Some studies suggest that meditation and yoga could replace the therapeutic use of Viagra, while others indicate that, in addition to significant physical changes, meditation is conducive to producing altered states of consciousness. (Time Magazine, August 4, 2003) More recently, Russian cosmonauts are being trained in the various forms of meditation and yoga practice so that they would learn to slow down their metabolism by reducing their respiration and heartbeat, thus becoming capable of using smaller amounts of oxygen on their long space flights to other planets.

A small sampling of the studies cited above indicates that the pace of scientific research on meditation and its healing power has been on the increase. Still a great deal of research needs to be directed towards the highly trained yoga meditators, T.M. teachers, and Zen masters to ascertain and measure their spiritual accomplishments. Though the current state of technology might be inadequate to measure these complex levels of consciousness attained by masters of meditation, attempts should be made to improve the technology by innovating better scientific methods of measuring spirituality. Although the possibility exists that a number of spiritual claims might never come under scientific scrutiny, it is equally possible that future research might be able to scientifically demonstrate their validity.

## Section II: Personal Reports

The reports of meditators further corroborate the positive research findings. The following comments are from students who participated in an interdisciplinary and innovative course on "Creative Living: An Introduction to Yoga, Zen, and Mantra Meditation" offered for six weeks during the summer session at an undergraduate college in the USA. Fifteen students met for 3 hours each day, four times a week, for six weeks. The first 2 hours were spent discussing the philosophy and method whereas the last hour was utilized in doing the yoga exercises and meditation techniques. Students were given 15 personality variables and were asked to keep a personal journal. Here they noted down the effects of yoga exercises and meditation on their personality after each class. At the end of six weeks of participation in the exercises and meditation, students reported as follows:

Smith, 43 years of age, was married and has two children. He had resumed his studies after a break of almost fifteen years. He was quiet but extremely tense and nervous. After a six-week, sixty minutes a day session of yoga relaxation exercises and meditation practice, Smith reported the following:

Initially, I felt some embarrassment during the exercise and meditation phases of the course. I had the feeling that there was no fool like an old fool. But as the course progressed, I became more calm and collected. I also became more aware of things around me. One day following the meditation class I had to walk from the college campus to the Oneonta Nursing Home to pick up the car, a distance of about a mile. Usually, I would have walked briskly along to get there and cursed the fact that I had to do it. But on this day I strolled along leisurely and was aware of the various people, objects, trees, and scenery around me. I remembered thinking how the traffic did not seem as noisy as usual. When I arrived at the nursing home, I wasn't as tired as I would

normally have been, and was somewhat sorry that I had to drive to go home. This awareness of my surroundings had steadily increased. I found that instead of becoming impatient waiting for the boss to arrive at the store in the morning, I sat and listened to the birds and watched the rays of the sun slip through the trees... I also found that I could accomplish much more at home with less effort and that I was more patient and understanding with my children. I was much more willing to listen to their ideas and not so fast to try to impose my desires on them. I found it easier to go to sleep at night and I felt more rested when I got up in the morning. I had also noted an increased openness to other people and I would listen to what they had to say without sticking my two cents worth in before they were finished. Above all there was an increasing ability to be alone with myself. When my wife was working and the children were out I don't had to turn the TV on for company.

John, another student reported the following changes in his personality.

I feel a more effortless understanding of my work, especially in sculpture class, which I am taking simultaneously with this meditation course. When speaking to people I sense a greater understanding and am able eliminate much of the pettiness and frustrations. I feel more confident about my actions and am able to set my goals at a more obtainable level. Life seems fuller and I have a craving to savor it with more developed sensitivity.

Lately, I have noticed more frustration in other people around me rather than in myself. That is a switch! Usually, I feel as if I have a million things to do, but my arms are tied behind me. Work, my creative ventures in the arts, are more humanistic, designed better, problems are solved a little faster and consequently smoothly and more effortlessly. In reference to sculpture, which I am working on this summer, I find that I can visually remember forms without a great deal of sketching, and the transitions between forms come much easier. Ideas come quickly and energy seems to be steady for getting the job done. I have grown in my awareness of the nature around me as I travel to and from school. The colors are richer and more vivid. I appreciate moments and cherish the moments I have with people. I enjoy now, rather than some idealistic venture in the future.

I have been discovering that people are friendlier. My feelings are acceptable even anger. I make it a practice to share my feelings (of course in an endearing fashion) with my wife and children. My feelings are more easily expressed and less controlled by thinking and judgments. Having developed some harmony within myself and knowing that I can freely express my emotions I am capable of being loved and to love...I am happy with meditation and feel it will get better in time (this Wednesday, I felt closest to a meditative state). I have my children doing the exercises with me, and they love to stand on their heads. Incidentally, they are better at the exercises than I. They are made of rubber.

Another participant in the meditation course was Rob. He was thirty-four years old. He had returned to school because of two heart attacks, which precluded his continuing working at his trade. Rob had moved from the hectic and stressful life of Metropolitan Washington, D.C., to the peaceful rural countryside area of upstate New York. He was married and had two children. Rob was rather high-strung and found it difficult to relax. After a week of yoga meditation, Rob reported the following:

I slept well last night. This is not earth shattering, except as a rule I do not sleep

well or soundly. The evenings, on which my exercises were done, I slept soundly and awoke early and refreshed. Those evenings when exercises were not done, I slept poorly.

After two weeks of yoga and Zen meditation, Rob observed a significant drop in his blood pressure. He went for a routine check up at the hospital and his doctor was surprised to record 120/70 and 127/72 readings for Rob. He reported the following:

My historic norm for blood pressure is 135/85. In my doctor's office, I intentionally tried to relax and did so. When my cardiologist measured my blood pressure, it was 120/70. When I told him how I lowered my blood pressure he asked me to do it again. On the second reading the blood pressure was 127/72, still a significant drop. My doctor endorsed my continued practice of yoga and meditation as long as it did not severely tense my body.

Rob's wife, who had been deeply concerned with his health, made the following comments:

Rob does seem to sleep better and is calmer. He does need to meditate throughout the day in order to remain calmer. Another good effect is that he has lost a few pounds. I have not observed any negative effects so far.

Jack, another student, reported the following changes after six weeks of continuous participation in the yoga exercises and meditation:

With the study of yoga I began to realize that many of my habits were mental modifications. The pleasurable effects of drinking alcohol and smoking hashish are certainly not natural. Ever since, I became aware of this, I have been able to curb my misuse of these substances tremendously. Now, I often turn down 'getting high,' in order to realize some 'natural highs' from doing yoga exercises. Another improvement can be seen in the light of the mild depressions associated with poor performance in school. Since the beginning of the third week of the course, I have been much more motivated and involved in my schoolwork. In this manner I have developed new and involved deeper insights into my economics course, which I am taking along with this one. This certainly gives me the feeling of achievement and helps shun feelings of being an unorganized individual. Meditation has helped me develop spontaneity and expressiveness. Jack also recorded a significant positive change in his interpersonal relationships.

The four students whose (paraphrased) statements are presented here were among thirty who reported on the effects of meditation exercises. While the reader might be tempted to challenge the validity of these self-reports as a reliable means of measuring changes in personality, s/he should be aware of the state of research in this area. At present, though hardheaded empirical investigations in this domain of meditation and healing on the increase, they are still minimal. Perhaps by themselves, these investigations could not offer us full insight into this subjective realm of human experience. However, in our study, the subject was not reduced to an object, but retained his subjectivity and participated in the research as a co-investigator. The subject was not passive, but was actively involved in monitoring changes, which were taking place within him or her. Furthermore, the subject was uniquely qualified to assume this role, for s/he had immediate access to the inner self, and could provide the deepest insight into changes in personality affected by meditation.



### Section III: Interface between Scientific and Humanistic Approaches

Although the slow-paced research of the 1970's and 1980's on meditation and healing has been quickened up during the 1990's and 2000's, still it has been limited to investigating merely the periphery of the realm of human consciousness or spirituality. By using technology (e.g., Electroencephalogram) and psychological instruments (e.g., Personal Orientation Inventory or POI) science is able to measure a number of significant physical and psychological changes resulting from meditation. However, since the human personality is a complex network of physical, emotional, intellectual, and behavioral elements, science with its entire armamentarium may not by itself, be capable of providing adequate information about the deepest aspects of human consciousness or spirituality. To obtain a wider view, the empirical approach of the sciences needs to be complemented by the humanistic approach, which utilizes the resources of the human subjects being investigated (as we did by presenting the self-reports of students who participated in the course on meditation). This humanistic approach treats the subjects as co-researchers in the investigation rather than as mere guinea pigs. The empirical approach is limited, since it informs us only about variables measurable by scientific instruments and is less capable in measuring what is valuable or significant to the individual. Thus, the blending of the two methods can give us a more comprehensive profile of the human personality encompassing the physical, emotional and spiritual components.

#### Concluding Remarks:

At present more than 10 million people in the USA practice some form of yoga, meditation or contemplative practice (e.g. physical exercises for improving bodily health, breathing exercises for cultivating emotional control, and meditation exercises for gaining spiritual strength); and the worldwide number of people who practice these disciplines is increasing at a fast pace. What appeals to people at the grassroots level is the holistic and ecological aspect of yoga and meditation that addresses not only the physical, but the psychological and spiritual health of the total person. This is an intriguing model for medical and humanistic sciences to contemplate during the twenty-first century. In the wake of the terrorist attack on the World Trade Center, more and more people have been seriously contemplating the meaning, significance, purpose and value of life. This has led to an increased scientific interest in the practice of yoga and meditation and their impact on the spiritual development of a human being, and is a primary consideration in the establishment of our proposed local society.