

Exploration

Six Sigma Unravels Science of Meditation

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ABSTRACT

A scientific explanation of how meditation works is presented. There is abundant literature in various disciplines on the health benefits of meditation. Given that meditation is known to have an impact on autonomic functions such as heart rate and respiration rate, the paper proposes that meditation works by producing an effect on the thirty-three vertebrae of the central nervous system through the use of the thirty-three plus alphabets of a language such as Sanskrit. Examples of some mantras and their effect on the photonic energy of subjects and cardiac functions are presented as corroborative evidence of the proposed thesis.

Keywords: Meditation, central nervous system, photonic energy, mantras, autonomic functions.

The day science begins to study nonphysical phenomena it will make more progress in one year than it has in the entire centuries of its existence.

Nikola Tesla after his meeting with Swami Vivekananda

INTRODUCTION

There is now a considerable body of literature on the benefits of meditation in the various walks of life. Reputed science journals, medical journals, business publications, and the mainstream media have carried full-length articles on meditation. The effect of meditation on brain scan, heart rate, heart rate variability, respiration rate, etc., has also been studied. Many of these papers are cited in the Bibliography at the end of the paper. This work presents a plausible scientific explanation of how meditation works. The work reported here is inspired by: (1) The wonderful discourses of Baba Shivanand Ji on Z-TV and his Sri Vidya Saptashati meditation program the first two authors had the privilege of attending not long ago, (2) Discussions of the first author with his Guruji, Gurumahan Maharishi Paranjothiar over the last several years, (3) The Z-TV serial, Mahadev, and (4) the ability of six sigma to tackle unwieldy problems such as the one under discussion here [1].

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In an episode of Indian TV Serial Mahadev, seven-old Hanuman Ji and his mother are in a jungle where she is collecting firewood for a yajna, when Hanuman asks, why does Mahadev's Trishul (three-headed trident) have three heads, why not four? His mother responds, it is better to accept certain things without any doubts or questions. To this, Hanuman says, I have accepted that Trishul has three heads but surely there must be a reason why it has three heads for nothing in the universe happens without a reason.

Subsequently, watching his mother collect firewood, he asks, what is this firewood for? The mother responds, for a yajna the rishis wish to perform. Hanuman asks, so many pieces for a single yajna? The mother says, the yajna has seven parts and it is necessary to keep the fire burning until all the seven parts are completed. Now, Hanuman asks, why seven parts, why not eight or six? The mother says, because it is written. Hanuman asks, by whom? The mother says, by rishis. Hanuman asks, but how do they know? His mother, used to putting up with Hanuman's incessant questions, folds her hands and says, I do not know, go give this firewood to the rishis and if you help them with their yajna, may be they will answer all your questions. And so he does and when he finds them, the half a dozen rishis are shown confounded by the difficulty of rebuilding the yajna site that had been decimated for unspecified reasons. He helps them rebuild the yajna site and then asks, they all say what happens in this life is because of our karmas from the past lives. This means, I have no control over anything in this life. If I have no control over this life, it means I am not responsible for anything in this life. And if I am not responsible for anything in this life, how and why should this life have an impact on the next life?

Had six sigma been around then, the answers to the following questions might have helped answer some of the questions: (1) what is the purpose of performing a yajna? (2) Is the outcome of Yajna directly measurable? (3) If it is not directly measurable, can it be inferred from secondary measurements? If no measurements are possible, direct or inferential, then, the yajna might as well have ten parts and there would be no way to know what is right and what is wrong. If on the other hand, the purpose of yajna is known and its outcome measurable, then it is possible to formulate it as a six sigma problem, design experiments, collect and analyze the data to determine the major impact factors, which when set at the optimal values, would deliver in the best possible performance of the selected outcome [1].

THE PROBLEM

There is a widespread belief in India that mantras have enormous power for good or bad, on ourselves or on others. This paper offers a scientific explanation and corroborative evidence of mantra meditation to do good. To begin, human beings have trillions of cells. If we break down the cells further into even smaller parts, we find that they are made up of atoms. Atoms are not solid objects, they have protons and neutrons in their nuclei and electrons orbiting them. So, a

question arises: what characteristic of an atom gives the specific character to matter? For example, why is Gold, Gold? Or, why is Iron, Iron? The answer is, vibrational characteristics of the specific atomic configuration (number of protons and neutrons in their nuclei, and electrons orbiting them). Similarly, since cells are made up of atoms, the vibrational characteristics of the specific cellular configuration is what determines the cellular structure which in turn determines if a cell is normal or not. The specific vibrational characteristics of the cells in our body determine our physiological and psychoemotional state. Vibrations can be thought of as light, not necessarily visible light, with unknown frequencies along the entire electromagnetic spectrum and hence the name, aura (light-energy). Thus the aura can also be thought of as photonic signature and they are unique for every human being.

The photonic signature (light-energy, aura) cannot be measured directly. It must be inferred from secondary measurements. Over fifteen years ago, a Russian scientist developed a device to estimate the photonic signature of humans using the principle of gas discharge visualization (GDV). Here, a harmless electrical signal is applied to the fingers of both hands (one at a time), placed on the glass plate of the GDV device connected to a digital computer with a USB cable as shown in Figure 1. The finger's response to this stimulus is a burst of photons that are captured by the software. The light-energy characteristics of the photonic discharge (pixels - intensity, area) so captured are compared with the data for tens of thousands of subjects to estimate the physiological and psychoemotional state of the subject at a high confidence level. The measurement is painless, noninvasive, and takes only a couple of minutes to complete. The GDV device was approved by the Russian Health Ministry for use as a routine medical diagnostic device in Russian hospitals and doctor's offices over fifteen years ago. The GDV results are presented in several tabs: (1) Overall energy in Joules, (2) Emotional stress level, Joules (3) Energy of the seven chakras, Joules and the chakra alignment along the central vertical line, (4) Health status, Joules, and (5) Energy reserve, Joules [2].

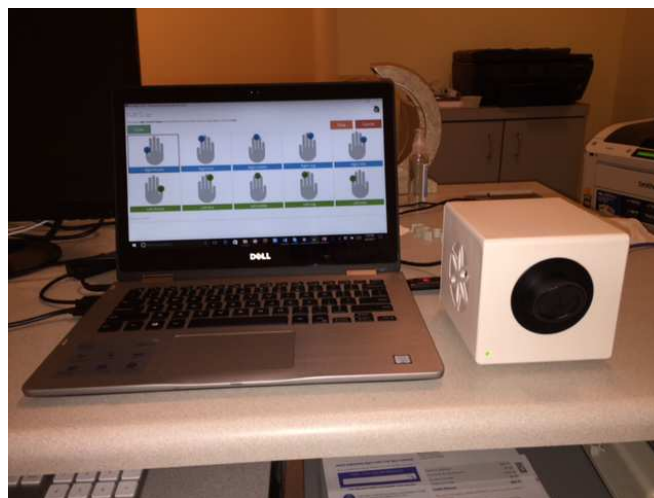


Figure 1. GDV Device Setup

The foregoing discussion of photonic signature suggests that unbeknownst to us, the human organism constantly produces vibrational signals that are reflective of its state. Computer Science and Electrical Engineering researchers at MIT realized this which helped them develop a wireless device they call EQ Radio with funding from the National Science Foundation and the US Airforce with additional support from major US corporations [3, 4]. The wireless device sends RF signals to the subject and captures and analyzes the reflected signals (see Figure 2) with a machine learning algorithm to determine the heart rate, heart rate variability (HRV), and respiration rate from which the subject's emotions are estimated, the researchers say at an accuracy of 87%. Other researchers had known about the influence of these outputs on the emotional state. The method of choice in this work is light-energy (photonic signature) in the belief that the photonic signature is the primary attribute of humans of which heart rate, HRV, and respiration rates are subsets.

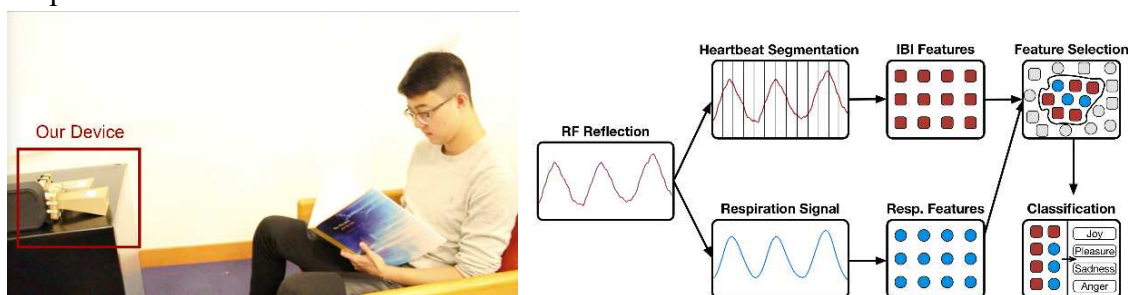


Figure 2. MIT's EQ Radio

Ancient Indian wisdom suggests that the human energy field is comprised of five sheaths: (1) The physical body, (2) Life-force sheath, (3) Mind sheath, (4) Causal Sheath, and (5) Blissful Sheath. Disturbances in any of the first four energy sheaths lead not only to diseases but also to a host of other problems in life. To explain, we inherit 23 pairs of chromosomes in our cells from our parents who in turn inherit them from their forefathers. So, there is a clear link of this life to previous lives. We not only inherit some of the genetic traits but also psychoemotional traits. What happens in this life is not only due to our past karmas but also due to our willful actions in this life which become the past karmas for the next lives. Yogis say that these Sanchet karmas are embedded in the first four energy sheaths. Negative karmas are suggested to be the principle sources of disturbances in our energy sheaths or equivalently, our photonic signature. These disturbances lead to diseases and other problems. There are only two ways to get rid of negative Sanchet karmas; either suffer from them, or eliminate them and replace them with positive karmas for a better life. Mantra meditation is suggested to be an approach for the latter. A Modern physics perspective on meditation is presented in the Appendix.

How Mantras Work. The central nervous system (CNS - brain, spinal cord, and nerves) governs the functioning of various organs and systems. If mantras are to have an effect on health, they must be shown to have an impact on the CNS. Ancient Indians came up with ingenious languages having a set of alphabets for this purpose. Taking Sanskrit as an example, there are thirty-three plus alphabets and not coincidentally, there are thirty-three vertebrae in the spine. Also, not coincidentally, there are thirty-three presiding deities as depicted in Figure 3. The

religious minded may take the deities literally or they can be thought as energy centers (chakras) of which there are seven major ones. The alphabets must be suitably combined in the form of mantras and properly pronounced to influence the vertebrae and through the vertebrae, the various organs and systems as illustrated in Figure 3. The links suggested in Figure 2 are purely for illustrative purposes only. There is a mysterious explanation about the origin of these alphabets eons ago. They are said to have come out of the Damru of Shiva. How a repercussion instrument like a Damru can produce guttural, palatal, cerebral, dental, and labial sounds remains a mystery that is worth decoding. For success, the words “Shabda” of a mantra with proper “Swara”, converted into “Spandhana (vibrations) “Naad”, then, “Shakti” (Energy), leads to creation (Brahma). Since energy is a big part of the mystery, it is useful to develop an understanding of it.

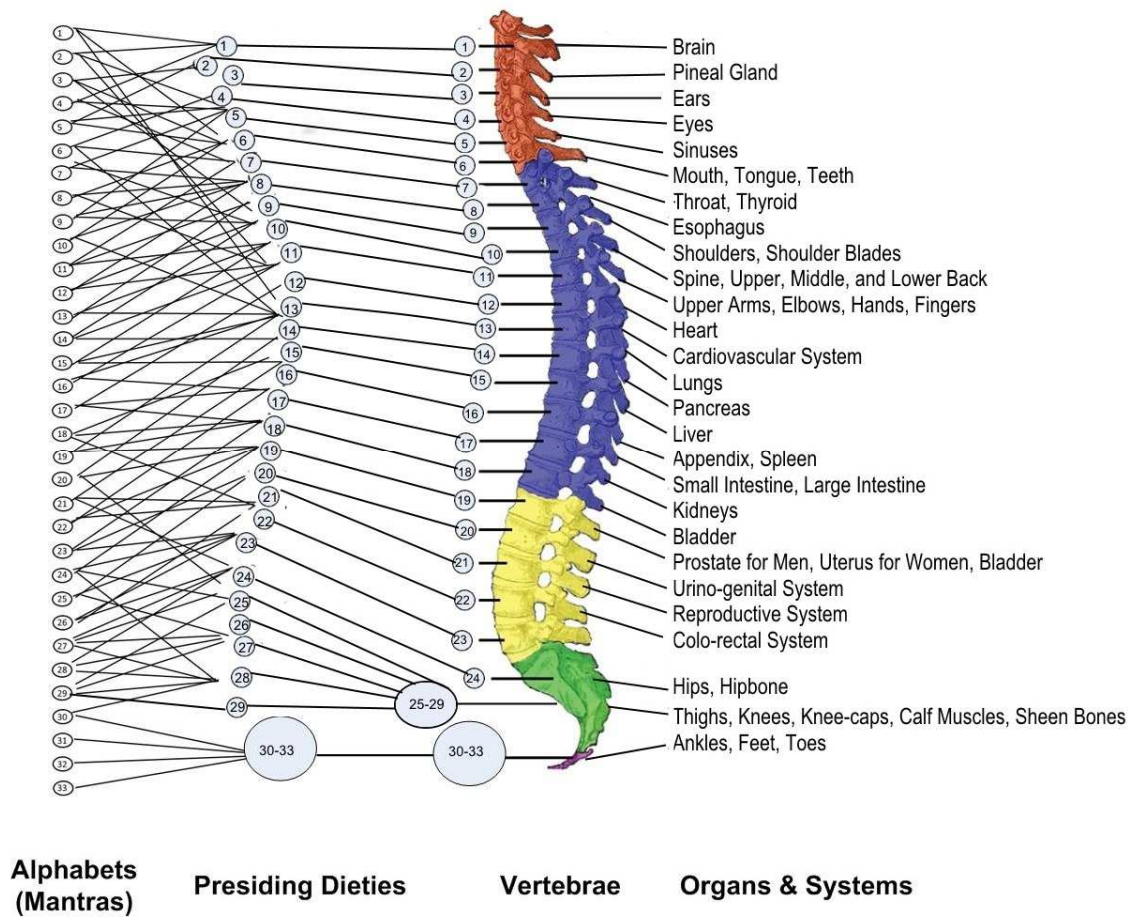


Figure 3. Linkages of Alphabets to Organs and Systems
 (The specific linkages shown are for illustrative purposes only)

INTRODUCTION TO BIOENERGY

At the moment of the Big Bang when the size of the universe was about the size of Planck's length (10^{-33} cm in diameter), only a primordial form of energy was present. At that moment, some of the energy was transformed into elementary particles which eventually led to the formation of dark matter that makes up about 27% of the universe and normal matter (galaxies, stars, planets, and the like) which makes up about 5%, and the rest, 68%, is dark energy [5, 6]. If dark energy had no bearing on life, then this topic would have been of primary interest to physicists but such may not be the case. Dark energy that affects life may be termed light-energy or bioenergy.

Visualizing Light-energy. Yogis suggest that this energy can be seen with naked eyes. Just stare at the open sky to infinity, away from Sunlight not focusing on anything in particular and it is possible to see it. After successful attempts with several individuals, we asked Arvind Bhavasar, a software professional to depict with software what he saw with his naked eyes. A YouTube video clip of his rendering is at the link in Reference 7. A screenshot of the video clip is shown in Figure 4. The first author subsequently shared the video clip with several others to inquire if this is nearly what they saw and they responded affirmatively. This said, it is impossible to scientifically prove that what is seen is in fact energy.

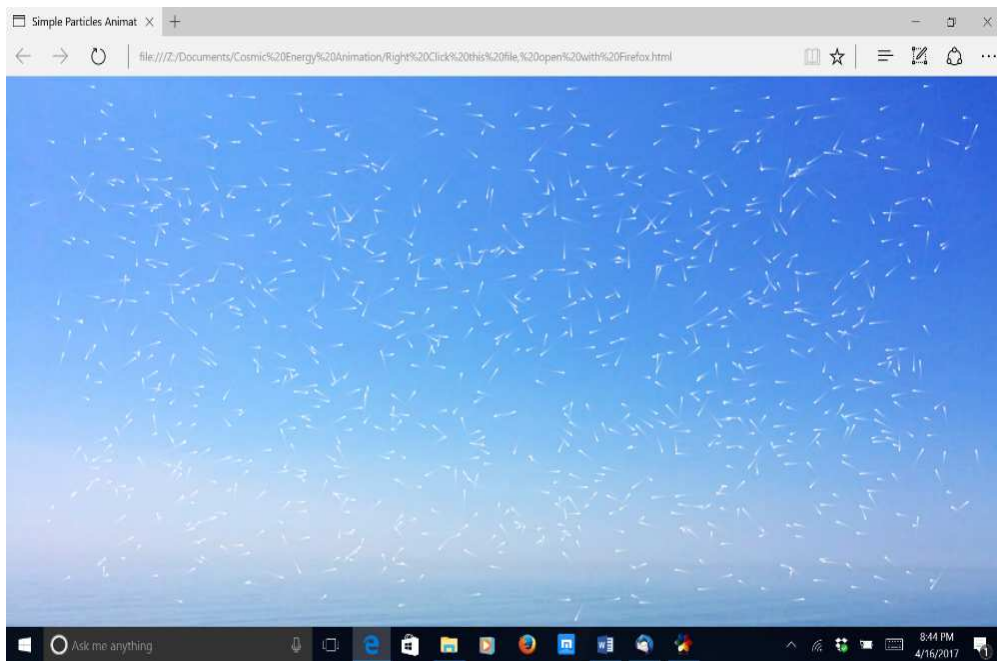


Figure 4. Screenshot of Cosmic Energy Video Clip

PREREQUISITES FOR SUCCES AND OBSTACLES TO PROGRESS

Tables I and II present a list of what are thought to be prerequisites for success and obstacles to progress.

Table I. Prerequisites for Success

No.	Description
1	Shuddha Bhavana (Pure intentions)
2	Nirmal Man, Nischal Man, Vishal Man (Pure thoughts)
3	Shravan, Manan, Sankirtan (Hear no evil, think no evil, speak no evil)
4	Shraddha, Bhakti, Vishwas, Samarpan (Faith, Devotion, Trust, Surrender)
5	Seva (Selfless service)

Table II. Obstacle to Progress

No.	Description
1	Anger, Hatred, Hostility
2	Resentment, Revenge
3	Frustration, Fear, Despair
4	Sorrow, Depression
5	Guilt, Jealousy

It is easy to see how these attributes might be influencing the four energy sheaths, positively and negatively. While conscious cultivation of positive attributes at the exclusion of negative ones is important but it is not sufficient. It is essential to change ourselves from within. The mantras have the capacity to do so. There is a mysterious aspect of mantra power that is difficult to prove scientifically at least for now and it has to do with the assessment that mantras must be in the awakened (Jagrut) state for them to have the power to deliver their full potential.

EXPERIMENTS

The results of several experiments are presented as corroborative evidence of mantra power.

1. **Aum Namō Bhagvate Vasudevaya.** In this experiment there were four subjects. Three of them chanted the given mantra for forty minutes. The before-and-after chakra system of the subjects are depicted in Figure 5. The energy of all three too had gone up. An improvement in the chakra system is seen in all three cases (First three figures from the top). The fourth subject was given an unspecified mantra. The before-and-after results now reveal

deterioration of the chakra system (Last figure on the right). Also, the subject's energy had gone down substantially.

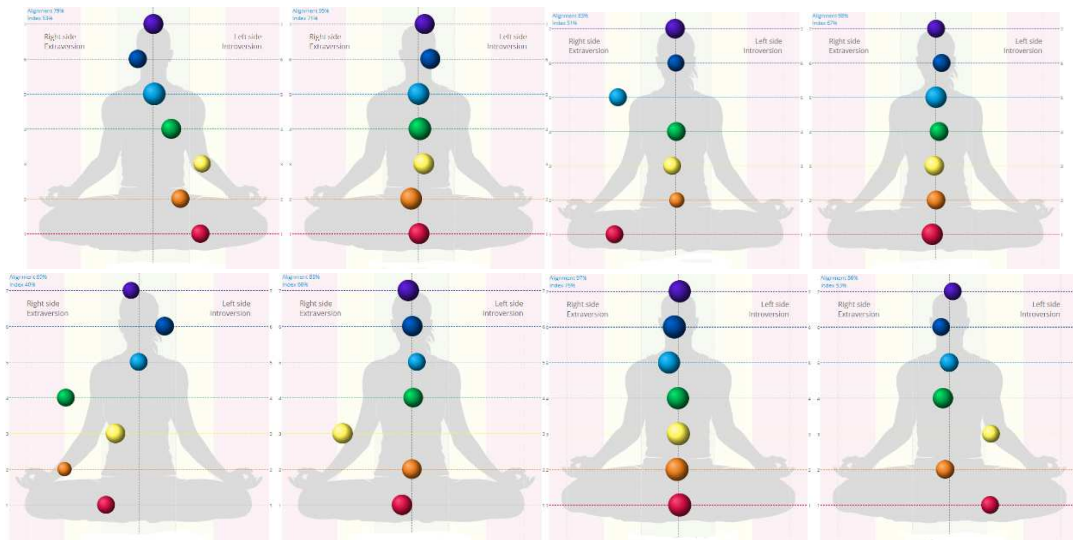


Figure 5 Impact of Mantra on Chakras

- Figure 6 depicts the before-and-after results pursuant to Baba Shivanand Ji's Sri Vidya Saptashati mantra meditation program in India the author had the privilege of attending not long ago.

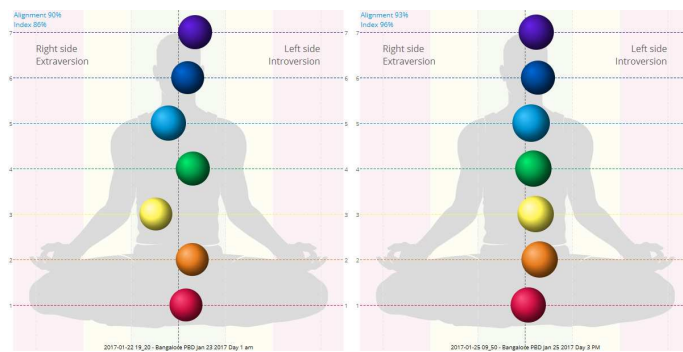


Figure 6. The Before-and-After Results of the First Author

- Vitthal Naam.** A Cardiologist investigated the impact of Vitthal Naam on the heart. Thirty subjects were given Vitthal Naam to chant for nine to ten minutes for ten days. The physician reported all around benefits in the cardiac function of the subjects [8, 9].
- Swedish Medical Study of Music Structures and Heart Rates.** In this investigators, University of Gothenburg medical investigators studied the effect of music on the heart rate variability of participants in a group setting. They found that the heart rates of participants moved towards a synchronized state in a fairly short amount of time. Their work was

published in the *Frontiers of Psychology* [10]. T A sampling of their results are depicted in Figure 7.

5. **Lifting off the Ground with Patanjali’s Sutra.** An explicit intention to lift from the ground with the push of hands from a seated position has been successful tested. To do so requires that we become sufficiently light and an appropriate mantra does this for us. Normally, it would be impossible to lift up even a couple of inches from the ground. These results are shown in Figure 8 [11].

DISCUSSION & CONCLUSIONS

The material presented is supportive of the vision of Indian Prime Minister Narendra Modi that Aura Science can become a significant input to medical science [12, 13]. Elizabeth Blackburn discovered some years ago that high levels of stress cause dwindling of telomeres which leads to accelerated aging and all kinds of diseases [14, 16]. For this work she was awarded a Nobel Prize in Physiology and Medicine in 2009. The dwindling of telomeres and the disturbances in the photonic energy field (aura) appear to be closely related. There is preliminary evidence that meditation may reverse the dwindling of telomeres and if confirmed, that would be additional scientific explanation of how meditation works.

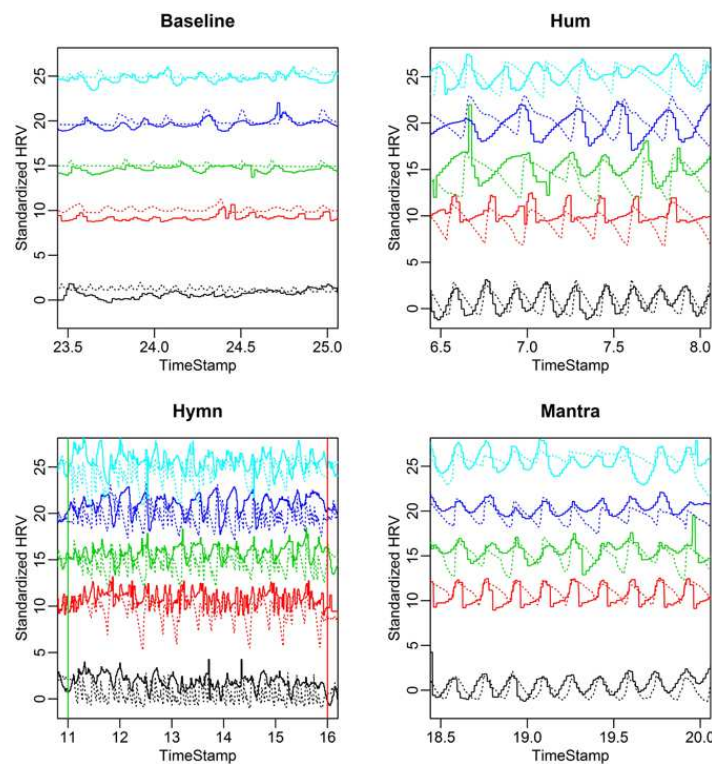


Figure 7. Music Structures Synchronize Heart Rates



Figure 8. Lifting from the Ground with Mantra Meditation

This paper is a subset of a scientific framework for external and internal excellence towards a better and a more peaceful world [17 – 21]. The followers of the late Maharishi Mahesh Yogi have done a considerable amount of research of his Transcendental meditation program. The results have been published in reputed publications [21]. This paper has attempted to shed light on the science of how meditation techniques might be working. The do's and don'ts presented in Tables I and II appear to be critically important for success. There is much about mantra meditation yet to be learned and hopefully, this paper will serve as an impetus for further scientific studies.

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APPENDIX: MODERN PHYSICS PERSPECTIVE ON MEDITATION

Six sigma being a systemic approach to problem-solving, it relies on input-output data alone for driving decisions. Indeed it is very difficult to make a direct connection between what happens at the macroscopic (human organism) level and the microscopic (atomic) or ultra-microscopic (Planck) level, and therefore, a scientific interpretation of what bio-energy actually represents (along the lines of karma) must remain speculative, but the beneficial effects of meditation for raising the level of bio-energy are undeniable. We can only trust meditation naturally leads to better karma, as is intuitively experienced. Of course, our intuition is part of our consciousness, which through the focus of our attention must connect how we live our lives to the flow of energy through the world, and so the conscious expression of our will (choice) is

directly connected to our karma (expression of emotional energy). Meditation is about learning how to focus our attention in a positive way rather than in a negative way, which creates positive energy.

There is a scientific way to understand the conscious expression of choice. Everything that can possibly happen in the world is described by a quantum state of potentiality. Physicists think of the quantum state as a sum over all paths, where every decision point on the path is a choice about which branch of the path to follow. The path has the potentiality to branch into all possible paths. In the language of quantum theory, a choice is a quantum state reduction, which is also called the collapse of the wave-function. There's a direct connection between the wave-function and the sum over all possible paths. The most likely path in the sense of quantum probability is the path of least action, which is also the classical path in the sense of the action principle. Physicists have speculated since Wigner that it is consciousness itself (the quantum observer) that makes the choice and chooses which path to follow. In the language of relativity theory, the observer follows the path of a world-line, and it is this path of a world-line that has the potentiality to branch at decision points.

In quantum gravity there is no real distinction between the quantum observer and the relativistic observer. The best way to understand how the observer makes its choices is through the focus of attention of consciousness. When the focus of attention becomes emotionally biased, as it must when the observer identifies itself with its body-based ego or mentally constructed self-concept, the choices made also become emotionally biased and can deviate from the (unbiased) path of least action in unpredictable ways. That is what may be called a negatively directed focus of attention that leads to the expression of negative (self-defensive) emotions, like fear, anger and resentment, and creates negative karma. When the focus of attention is unbiased or directed in positive ways, positive emotions are created, like non-possessive love and compassion, which creates positive karma. Without emotional bias in the focus of attention, energy tends to flow in a normal (unbiased) way, which leads to feelings of connection and expressions of creativity. In my opinion, this is what meditation achieves.

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