ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 17, Issue, 07, pp.33947-33961, July, 2025
DOI: https://doi.org/10.24941/ijcr.49260.07.2025

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

"YOGA FOR ALL" EFFECTIVENESS INDICES FOR CALIBRATING PERSONALIZED PSYCHOSOMATIC HEALTH AND WELL-BEING

Dhanjoo N. Ghista, BE, ME, PhD[1,*] and Ravi S. Sharma, BSc, MSc, PhD[2]

[1]President, University 2020 Foundation, San Jose, California, USA; [2]Professor of Technological Innovation, Zayed University Abu Dhabi, UAE and Founder-Director, CeIDE

ARTICLE INFO

Article History:
Received09th March, 2025
Received in revised form
21st April, 2025
Accepted 19th May, 2025
Publishedonline30th July ,2025

Keywords:
Cloud Devices and Systems, Psychosomatic Health and Wellness, Chakras, EEG of meditation practitioner, Yogapathy Effectiveness Index.

***Corresponding author:**
Dhanjoo N. Ghista, BE, ME, PhD

ABSTRACT

Imagine a world where, with the benefit of state-of-the-art wearable devices, AI-powered apps, cloud networks and storage, and above all, a community of practitioners may be "connected" by their common desire for wellness. This paper addresses how meditation, a key aspect of yoga, can provide healing of mind and body, gateway to overall improvement in health and well-being, resulting in mind liberation and enlightenment. This is not new age medicine or healthcare. It is a return to the roots of human wellness in the post-humanistic order of life. The paper outlines the scientific paradigm of the Cosmological cycle, on the formation of the universe and the theory of evolution, providing the basis of Meditation. A customizable smart watch, AI-enabled app, cloud storage networks, and a community of wellness practitoners could serve to monitor heart rate and breathing rate for evaluating the effectiveness of Yogapathy among subjects. This cloud and data infrastructure would be purposed to promote psychosomatic health and well-being. Going further, we can also formulate a novelYogapathy Effectiveness Index (YefI) expressed as a function of the heart-rate variability, breathing efficacy, and electrodermal activity and apply it to monitor heartrate, breathing rate, and electrodermal activity, to enable personalized health monitoring and appropriate nudges to maintain well-being. We posit that this is the path to health for all in the architecture of a cloud-based community of wellness practitioners.

Citation: Dhanjoo N. Ghista, BE, ME, PhD and Ravi S. Sharma, BSc, MSc, PhD. 2025. *"*Yoga for All" Effectiveness Indices for Calibrating Personalized Psychosomatic Health and Well-being". *International Journal of Current Research, 17, (07), 33947-33961.*

INTRODUCTION

Yoga is a way of life that unites the body, mind and soul. Therapeutic Yoga or Yogapathy constitutes the regular practice of sadhana (meditation) for the purpose of living well in consonance with the universal spirit. The Yogapathy meditation system has emerged as a holistic system for psychosomatic health and well-being, altruistic thinking and living values, promoting enlightenment and liberation of the mind from samskaras. Regrettably, despite notable exceptions (see Online Annex for the Yoga Journal's compilation of resources for the Science of Meditation), the mainstream practice has reduced yoga to an exercise form like pilates[1] and reduced meditation to mindful box breathing[2]. When mainstream and "evidence-based" publications such as Scientific American, and National Geographic dedicate probing articles on this subject, we can have the resurgence of the science of Yoga, as developed in its place of birth. Obviously speaking for the new entrants, The Economist[3] declares - *Understanding how these harmonies conjure thoughts, memories and emotions is perhaps the greatest scientific question of all—the brain seeking to understand itself—and yet the question remains unanswered after 100+ years of investigation by many of the best brains. Fortunately, there has been some progress.* With greater locus-standi and credibility, the Harvard Medical School[4] acknowledges that: *research shows 90% of all doctor visits are linked to stress-related problems. Yoga can be a perfect remedy. It's one form of*

[1]See for example https://www.tomsguide.com/wellness/fitness/pilates-instructor-shares-a-40-minute-workout-to-wake-up-your-deep-core-and-improve-your-posture where the claim is that "a 2023 report, published in the World Congress On Multi-Disciplinary Cohesion for Positive Health and Wellbeing, came to the pretty inspiring conclusion that among adults and the elderly, Pilates can improve mental health, pain, flexibility, fitness, balance, and physical function."

[2]Dr Michael Mosley popularized this idea in his regular podcast over BBC Radio 4: *Breathing does far more than just supply oxygen to the brain and body. You can change the way you think and feel with the way you breathe. It can change your heart rate, lower your blood pressure, reduce your stress levels and combat anxiety, reduce feelings of pain and even change your brain chemistry to make your mind sharper. It's no coincidence that breathing exercises form the basis of many ancient practices, from meditation to yogic breathing.* https://www.bbc.co.uk/programmes/articles/1mW6885X3N2gKnVjXT00KCj/how-to-reset-your-brain-with-your-breathing

[3]These books reveal why the brain is the biggest mystery of all (economist.com) –

[4]Introduction to Yoga - Harvard Health

exercise that helps relieve stress while improving strength, balance, flexibility, and overall health. For millennia, the Vedic Shastras have enjoined the belief in multiple forms of yoga as pathways to secure ultimate well-being – a calmness that transcends material nature to a path of bliss. In that sense, yogapathy is a process of meditation that connects the mind and chakras, endocrine and neurological systems, thereby influencing mental and physical health, and promoting well-being (Ghista 2022; Ghista *et al*. 2022). This meditation system involves (i) uplifting and rejuvenating our mind with ideation on Consciousness and (ii) energizing the chakras, for promoting psychosomatic health, wellbeing, neurological care, and spiritual development. The mind and brain are interrelated. Neurological disorders affect the mind, and psychic disorders affect our thinking and the brain. The Yogapathy Meditation System (YMS) connects the mind and brain, and is associated with mind-brain development and medicine (Ghista 2022; Ghista *et al*. 2022). Maharishi Patanjali's Yoga Sutras remain the foundational and definitive account of this wide body of contemplative knowledge. Three stanzas provide a glimpse of the deep complexities. 1. From the practice of yoga comes the destruction of impurities: therefrom comes the shine of knowledge. 2. The eight limbs of yoga are: yama (self-regulation), niyama (observances), asana (posture), pranayama (breath control), pratyahara (withdrawal of senses), dharana (concentration), Dhyana (meditation) and samadhi (bliss). 3. From mastery of that, the light of knowledge dawns. This quote offers depth to the science of yoga - *The great secret is this: it is not enough to have intuitions; we must act on them, and we must live them. Nothing is so uplifting as silent ideation on God by recognizing the presence of the Divine Entity around us. So, every morning, let us put our mind into our heart and place ourself in the presence of God all the day long.* The mind is distinct from the brain. When Santiago Ramón y Cajal, the Spanish neuroscientist, improved a way of staining that "made nerve cells visible under a microscope, revealing the brain's structure in unprecedented detail", he was awarded the Nobel Prize in 1906. But the point that was not made is, the mind is more than the brain. In a 2024 Scientific American article titled "Advanced Meditation Alters Consciousness and Our Basic Sense of Self" (Sacchet & Brewer, 2024), the idea of consciousness has finally entered the scholarly interest of western neuroscientist. As Manjunath emphasized in his article 'Yogic Feats: An Exception or a Miracle', in the International Journal of Yoga (2024), *Yoga is a multifaceted tradition encompassing physical, mental, and spiritual practices. While modern yoga often emphasizes physical postures (asanas) and breathing techniques (pranayama), traditional yoga systems delve deeper into self-discipline, meditation, and the exploration of consciousness.* Linking the mind and the physical body (or the organ systems) are subtle psychic energy centers or *chakras*, which control our mental propensities and behavioral expressions as well as the body's organs through the endocrine glands. Both mental and physical health and behavioral response of the individual depend on the proper energy balance between the *chakras*, and thereby the functions of the endocrine and nervous systems. Disease is caused by an imbalance in this energy flow between the *chakras*, and the dysfunctions of the endocrine and nervous systems. Meditation on the *chakras* affects the endocrine glands, especially the pineal and pituitary glands, and thereby the brain and the neurological system.

The Basis of Meditation: The Cosmological Cycle: The Cosmological Cycle involves (i) Cosmic Consciousness devolving into the cosmic mind, expressing the five fundamental factors to form the cosmology (or the universe), (ii) microvita converting matter into the primitive mind and life structures, (iii) the process of organic evolution from primitive life structures to simple plants and animals, and eventually to self-consciousness human beings. Figure 1 illustrates the cosmological cycle. This enables us to understand how the physical universe develops from Cosmic Consciousness, how life develops and evolves from the primitive mind into higher mind states, and how human beings can develop higher consciousness by doing meditation (Ghista & Towsey 2011, 2012). In simpler terms, the Cosmic Consciousness first devolves into Cosmic Mind, and the Cosmic Mind devolves into matter. It is through the Operative principle, that the Cosmic Mind expresses itself into the five fundamental factors (ethereal, aerial, luminous, liquid, and solid), providing the constituents of the physical universe and the basis of cosmology. This constitutes Stages 1 and 2 of the cosmological cycle, as depicted in the right half of Figure 1.

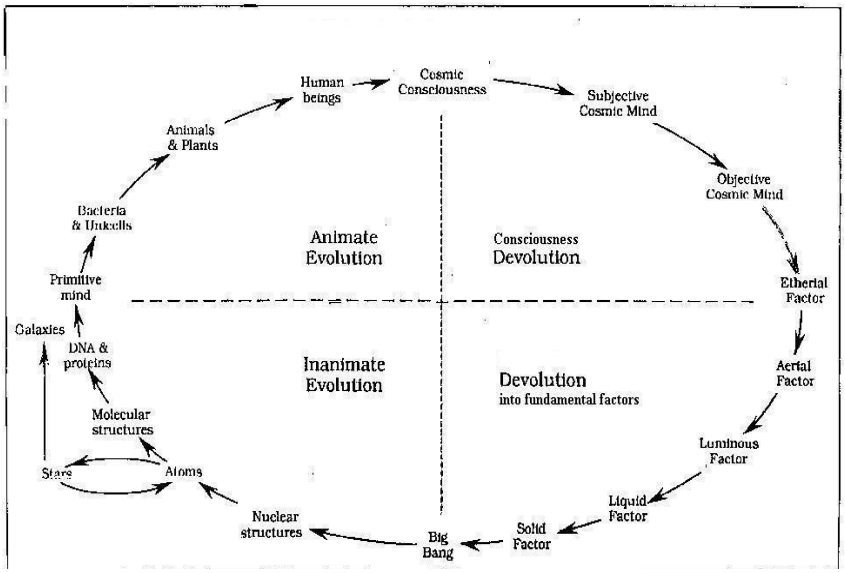


Figure 1. Classical Cosmological Cycle: (i) from Cosmic Consciousness to Cosmic Mind, to Big Bang and universe development, (ii) from the development of primitive life to plants and animals, to human beings. Propounded by Sadguru Prabhat Ranjan Sarkar (Sarkar 1993)

The entire Cosmological Cycle involves the process (i) From Cosmic Consciousness to Cosmic Mind, to Big Bang and the creation of the universe, depicted in the right half of Figure 1, and (ii) From the development of primitive life to plants and animals, to human beings, depicted in the left half of Figure 1. These five fundamental factors (5FFs) are associated with sensory properties called *tanmatras* (Towsey & Ghista, 1996), as shown in Figure 2. The subtler waves (of longer wavelength) surround and pervade the cruder waves (of shorter wavelength), but not vice versa. For example, the Ethereal Factor pervades all the other factors, but the Liquid Factor can only pervade the Solid Factor. These 5FFs are known to us through their sensory attributes. For example, the Ethereal factor carries the 'sound' sensory attribute, the origin of the primordial sound. The Aerial factor carries the 'sound' and 'touch' attributes. The Luminous factor carries the sound, touch and light sensory attributes; the Liquid factor carries sound, touch and light attributes. The Solid Factor carries the sound, touch, light, taste, and smell attributes, as indicated in figure 2. According to yogic science, the physical world consists of a spectrum of wavelengths but discrete sensory boundaries.

FUNDAMENTAL FACTORS	WAVEFORM	SENSORY PARTICLES
Etherial		sound
Aerial		sound, touch
Luminous		sound, touch, sight
Liquid		sound, touch, sight, taste
Solid		sound, touch, sight, taste, smell

Figure 2. The dual wave-particle description of the physical world according to yogic science

As regards the relationship between this wave-particle description of the physical world and that of 'new physics', we can state that corresponding to these five FFs, there are five levels of structure in the new physics (Towsey & Ghista, 1996), as provided by Figure 3.

Yoga's Description			Physics' Description		
Fundamental factor	Waveform	Sensory Attributes	Particle Type	Particle Charges	Physical Structure
Etherial		sound	vacuum state particles	?	space/time
Aerial		sound, touch	dark matter particles	flavour	galactic
Luminous		sound, touch, sight	?	?	stellar system & planets
Liquid		sound, touch, sight, taste	electron	flavour, electric	atomic
Solid		sound, touch, sight, taste, smell	quark	flavour, electric, colour	nuclear

Figure 3. A comparison of Yoga Science description of the physical world with that of Modern Physics.

All these five factors are formed by the pressure of the Operative principle (or *Prakriti*), referred to as *bala*(Sarkar 1993). As these factors get formed, they can also form structures which are (ii) invisible, containing only the ethereal, aerial, and luminous factors, and (ii) visible if they contain all the five factors: ethereal, aerial, luminous, liquid, and solid factors. In Physics, the luminous invisible universe is referred to as dark matter and dark energy, which comprises 95% of the universe, while the visible universe comprises 5% of the universe. The luminous universes keep forming into the visible universes during Stage 3 of the Cosmological Cycle (Figure 1). We may refer to the near-death experiences that are triggered during life-threatening episodes when persons under cardiac arrest in hospitals undergo such episodes. The survivors of close calls with death recount their experiences of consciousness leaving their body and rising upward, where they witness the resuscitation procedure going on below. They seem to pass through a tunnel and then emerge into a bright light. They say that in the bright light they feel comfort, joy, peace, and love so intense as to be almost palpable. Therein, they even perceive the spirits of deceased loved ones, departed relatives, and friends who seem to be there to welcome them (Raymond 2013). Based on these recorded experiences, it is conceivable that our Earth is surrounded by a luminous universe, to which people go to after their living on Earth. These experiences constitute enlightenment. Now this enlightenment experience can also be achieved by doing meditation resulting in '*samadhi'*. Now in the earlier stage of the Cosmological cycle, the Cosmic mind also emanates microvita, which now energize matter to form an ectoplasmic mind. Under the influence of microvita, matter evolves into subtler structures through synthetic reactions, thereby providing the

templates of primitive life structures, represented by primitive states of mind (and consciousness) (Ghista & Towsey, 2011; 2012). Figure 4 illustrates the process of development of the primitive mind and life structures, through the energization of matter by microvita. This also constitutes the beginning of Stage 4 of the Cosmological cycle.

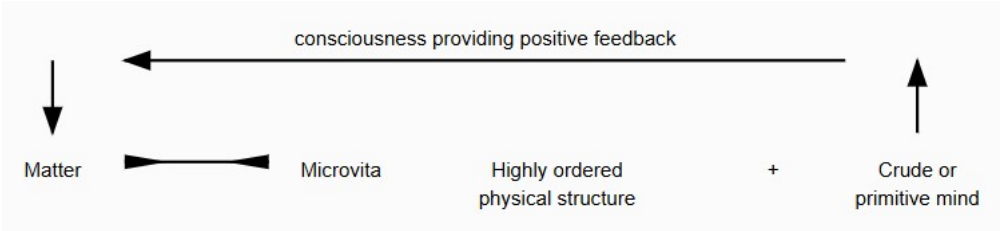


Figure 4. Emergence of a primitive mind and life structures, through energization of matter by microvita

From this point onwards in Stage 4 of the Cosmological cycle (Figure 1), the process of organic evolution begins and constitutes the 'Animate Evolution', whereby primitive unicells and bacteria give rise to simple plants and animals, and eventually to self-conscious human beings. From primitive organisms to complex organisms, there is an unfolding of Consciousness due to the increasing reflection of cosmic consciousness, with a corresponding increase in psychic dilation of the mind and concomitant increase in complexity of the nervous and anatomical structures. Increasing psychic dilation of a living being's unit mind leads to intellectual development, and eventually to parapsychic and intuitional development.The psychic dilation of the mind eventually culminates in its achieving mental liberation from the psychic propensities embedded in the subconscious mind, based on our interactions and thinking. Eventually, the human mind becomes subtle enough to merge into Consciousness—how, by doing meditation. This type of experience can be referred to as 'enlightenment'. Simply expressed, the Cosmological cycle is completed when human beings develop cosmic consciousness, by doing meditation.

Meditation Science: Yoga means union of the unit mind of an individual with the Cosmic mind. Thus, this key goal of Yoga can be achieved by ideating on the all-pervading Consciousness, for rejuvenation of mind and progressing to enlightenment. We need to recognize that the Cosmic Mind is all-pervading around us here on this Earth. So, for our unit minds to expand and evolve, we need to ideate on the Cosmic Mind or Divine Entity. The Cosmic Mind puts divine energy (i) into our bodies, by which we get psychosomatic wellness, and (ii) into our minds, by which we can become liberated from our psychic propensities and can become enlightened. This can even be validated through auras, using Kirlian Photography [https://www.lightstalking.com/what-is-kirlian-photography-the-science-and-the-myth-revealed/].

The Attractive Force of Consciousness: Thus, by effacing old psychic impressions and preventing new psychic impressions on the mind, the attractive force of Consciousness is felt on the mind, which now starts moving centripetally in the ectoplasmic field of Consciousness, as displayed in Figure 5. In the easier to understand words of Sacchet& Brewer (2024), "We envision developing specific programs that leverage insights from the science of advanced meditation to directly train people with certain clinical diagnoses. These programs could offer new therapeutic avenues for treating persistent cycles of negative thoughts in patients with major depression or the chronic worrying that characterizes generalized anxiety dis-order. The idea is not just to manage symptoms, but to foster a sense of deep and pervasive well-being that affects all aspects of a practitioner's life." As illustrated in Figure 5, the attractive force of Consciousness provides transcendence to the mind, rejuvenates the mind, and constitutes the basis of psychic expansion (or evolution) of the mind, progressing to enlightenment. When a person (or her/his mind) ideates on Consciousness (by meditation), the mind dilates *i.e.,* develops in ectoplasmic density. The mind keeps dilating until it merges into Consciousness, to attain enlightenment leading to *salvation* or *nirvana*.

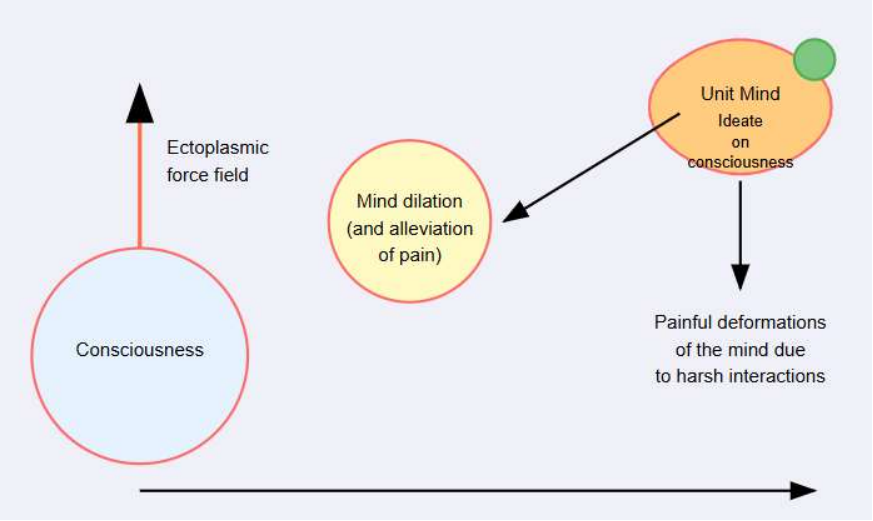


Figure 5. The Consciousness field and the presence or location of mind.

Based on figure 5, it is schematized that when a person (or her/his mind) ideates on Consciousness (by meditation), the mind dilates i.e., develops in ectoplasmic density, as it starts moving centripetally in the ectoplasmic field of Consciousness. This, correspondingly, enhances the Consciousness-field force on it and alleviates the mental pain. The mind keeps dilating until it merges into Consciousness, to attain enlightenment leading to *salvation* or *nirvana* (Ghista 2020; 2022). The BBC Radio 4 Health program (cited in footnote 2) offers a more traditional school of thought: *When you take a deep breath, it puts a break on this whole system. It is your brain's reset button. If you stop and breathe in for the count of 4 and out for the count of 6, it targets the locus coeruleus and your noradrenaline levels are brought back down, and your attention networks can work again in synchrony. "It's the most precise pharmaceutical you could ever give yourself, side effect free," says neuroscientist Prof Ian Robertson.*We now examine the Energy Centers (or Chakras) linking the Mind and Body, and promoting Mind-Body Healing.As indicated earlier, the mind and the physical body are linked by subtle energy centers called the *chakras* (plexii). The *chakras* are associated with and control specific endocrine glands, as depicted in Figure 6.

Energy Centers (or Cakras) linking the Mind and Body, and promoting Mind-Body Healing: As can be seen from Figure 6, for which there is considerable agreement among Ayurvedic practitioners, chakras regulate organ function through these endocrine glands, by stimulating their hormonal secretions; this is how the chakras influence the body. In the human mind, various thoughts are constantly emerging and dissolving. Behind these psychic phenomena are the underlying propensities (formed according to the past psychic impressions on the mind). The propensities are expressed by the vibrational expression of the chakras, which in turn affect the endocrine glands through their hormonal secretions (Figure 6). Both the expression as well as the control of these propensities is dependent upon the chakras. Emotional stresses (such as anxiety and insecurity) are known to be co-responsible for diseases, such as coronary heart disease and even schizophrenia. In meditation, we can energize the chakras by ideating on Consciousness at these chakras, and by using an appropriate (two-syllable) mantra (which synchronizes with breathing). This in turn energizes the associated endocrine glands (as depicted in Figure 6) to secrete hormones into the organs. In this way, the organ systems get affected and cured of their ailments. For example, energizing the *Anahatachakra* can help to promote the healthy functioning of the heart, and energizing the *Manipurchakra* can help to cure diabetes.

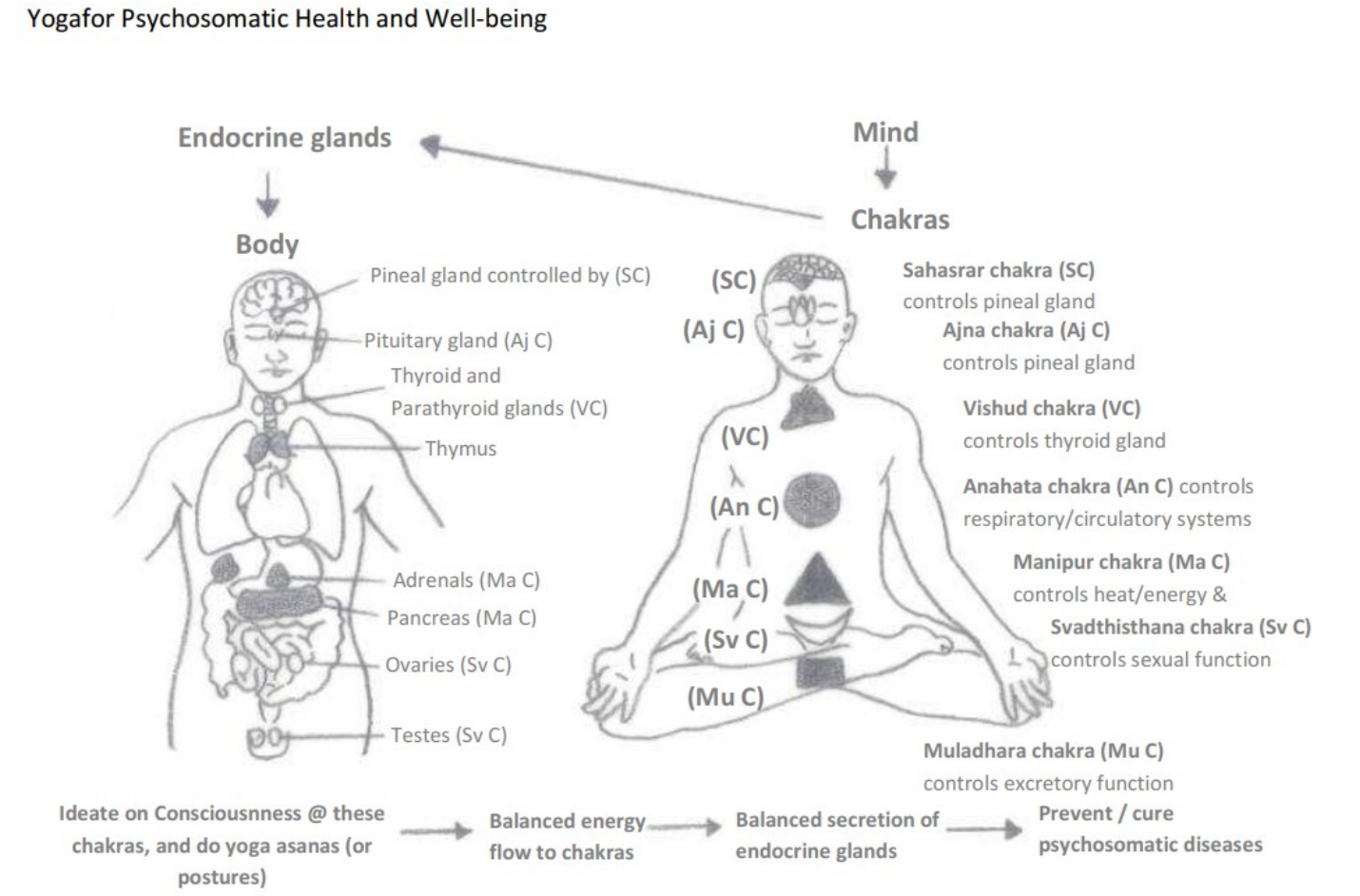


Figure 6. Chakras or Energy Centers and their association with the Endocrine Glands: Mind – body interaction mechanisms are key to preventive and curative behavioral medicine

As depicted in Figure 6, the *chakras* link the mind and body through their association with the endocrine glands. By this linkage, they also affect the organs and have a physiological curative role. Linking the mind and the physical body (or the organ systems) is done with the help of these subtle psychic energy centers or *chakras*, which control our mental propensities and behavioral expressions, as well as the body through the endocrine glands. The *chakras* are connected by subtle energy channels (or *nadis*), through which the vital (bioplasmic) energy (or *pranah*) is conceived to reach every part of the body. The *chakras* regulate the organs' functions through these glands, by stimulating their hormonal secretions; this is how the chakras influence the body. So,

by spiritually energizing the *chakras* with the *ista mantra (personalized mantra),* the associated endocrine glands cansecrete beneficial hormones into the organs. In this way, the organ systems get affected and cured of their ailments.

Box 1: Scientist links human consciousness to a higher dimension beyond our perception

A new theory by Michael Pravica, a professor of physics at the University of Nevada, Las Vegas, suggests that human consciousness might originate from hidden dimensions of the universe rather than solely from brain activity. Pravica claims that during moments of heightened awareness—like making art, practicing science, or even dreaming—our consciousness could transcend the limitations of our physical dimension and tap into these invisible realms.

At the core of Pravica's theory is hyper-dimensionality, the idea that the universe consists of more dimensions than the four we experience: height, length, width, and time. He explains this concept using a hypothetical scenario involving a two-dimensional being. "Imagine you're a two-dimensional being living in a two-dimensional world, like a character in a comic book," he stated. As a three-dimensional sphere passes through, it would appear as a dot tha

Pravica believes that just as two-dimensional beings cannot perceive three-dimensional shapes, we might be unable to detect higher dimensions that exist around us. He argues that moments of heightened awareness allow our consciousness to synchronize with these hidden dimensions, providing a flood of inspiration.

Moreover, the limitations of current technology, such as the Large Hadron Collider (LHC), pose challenges to exploring these dimensions. The LHC, which smashes particles at high speeds, allows physicists to study fundamental particles but cannot access the high-dimensional strings predicted by quantum physics. Holler states that "not even the most powerful particle accelerator in the world can provide real proof that these dimensions exist," reinforcing the need for concrete evidence.

Source: https://m.economictimes.com/news/science/scientist-links-human-consciousness-to-a-higher-dimension-beyond-our-perception/articleshow/113546667.cms

Primer on Meditation Practice: The process of ideating on the Divine Entity by recognizing the divine presence around us is the most effective form of doing meditation. This brings in divine energy flowing into one's mind, flooding it with blissful feelings and literally lighting it up. This gives immense happiness, based on the feeling of being taken care of by the Divine Entity. Through this process, over time one's mind gets cleared from its embedded impressions (or *samskaras*) formed by one's actions and reactions. This not only relieves stress but verily brings a peaceful feeling of 'oneness with Divinity', as enlightenment. In simple terms, meditation is taking the time off one's worldly involvements and spending time being with the Divine Entity, who is awaiting this union. This meditation process was propounded by Sadguru Prabhat Ranjan Sarkar, spiritually known as ShriiShriiAnandamurti (Sarkar 1993; ShriiShriiAnandamurti1994). The goal of meditation is total happiness through union (or yoga) of unit mind with Cosmic Creator. Personalized Meditation involves initiation into the process of meditation, with the assignment of personalized *Ista Chakra* and *Mantra*. A spiritual seeker begins the path of self-realization by receiving initiation into the process of meditation. It is an important event in the life of a spiritual practitioner. One learns her or his personal technique of meditation, and thereby the latent spiritual potential is awakened. It is said that when the disciple is ready, the Guru appears. Meditation used to be taught directly by the Guru, but today for practical reasons it is taught by trained teachers called a`caryas. The three important lessons of Ananda Marga meditation described here are as follows: **Lesson 1 is** Ishvara Pranidhana, meaning offering one's mental self to God (or Divine Entity) and making union with God. Lesson 2 is Pranayama, the science of Pranah, *i.e*. cosmic vital energy. Lesson 3 is Chakra Shodhana, literally meaning purification of the chakras (Ghista *et al*. 2022, Ghista 2022).

Lesson 1. Ishvara Pranidhana: The goal of this lesson is to obtain liberation from samskaras or embedded psychic impressions in the subconscious mind. Herein, the aspirant is taught how to ideate on and feel one with God (Brahma) or Divine Entity. This gives one immense happiness, based on the feeling of being taken care of by God. This is done by concentration on one's "I feeling" or Ista Chakra (mind center), and the use of a general mantra (or personal or "Ista mantra" given according to one's individual psychic vibration), to ideate on the Divine Entity. The following three steps are required to reach this stage.

Meditation Steps

Step 1 consists of recognizing and manifesting the presence of the Divine Entity around us in the form of mellow light. In this step, the meditator is only feeling the divine presence and is not aware of surrounding people or structures. *This process of mind withdrawal from the surroundings is referred to as bhutasuddhi.*

Step 2 involves developing a spirit body, to enable ideation on and union with the Divine Entity. In this step, by a special method, the mind or "I feeling" of the meditator is brought very carefully from (i) its disassociation with the external surroundings, and (ii) then from the physical body feeling, to where the "I" sits or the location of one's mind center. At this stage, one is only aware of oneself or one's mind and the Divine Entity (or Cosmic Mind) surrounding it. *This process of mind withdrawal from body feeling is referred to as a'sanasuddhi.*

Step 3 now involves the mind ideating on the Divine Entity using a 2-syllable mantra. The Mantra has a specific meaning and an acoustic sound. The general meaning of all mantras is "You are my Guide, and with your guidance, I can become divine". This 2-syllable mantra is repeated mentally in consonance with one's in-breath and out-breath. This brings divine energy flowing into

one's mind, flooding it with blissful feelings. At in-breath, the Divine Entity is infusing divinity into the mind. Then in response to this, at out-breath, one's mind expands into divine consciousness and even gets lit up, giving a feeling of being divine.

By this process over time, one's mind gets cleared from its embedded impressions formed by one's actions and interactions. Clearing the mind from its embedded impressions is referred to as Liberation. During this process of liberation, one's entire mental thinking gets transformed, one's personality and character get elevated, and one's interactions with others enter a new phase. Over time, this brings a peaceful feeling of oneness with divinity known as enlightenment. This is verily the purport and goal of this meditation lesson.

Lesson 2. Pranayama

Concept: Pranah, the Cosmic vital energy of *Brahma* is all around us. We need to take it within us to keep us physically, psychically, and spiritually rejuvenated. When we concentrate and consciously regulate our breathing, we can store up a big amount of *pranah* in the various nerve centers or *chakras.* Through *pranayama,* every part of the body becomes filled with vital energy, and all diseases can be destroyed from the root.

Performing Pranayama: The practitioners are instructed to do *bhutasuddhi* and *a'sanasuddhi* withdrawal phases, as explained in the First Lesson. Then, with the first syllable of *Ista mantra*), one visualizes that the Vital energy (pranah) is entering the body through the prescribed *chakra*. This vital energy is being used to replenish oneself physically, psychically, and spiritually. Then, as one exhales (with the second syllable of your *Ista mantra)*, one visualizes that after the vital energy has been thus utilized, it is now going out through the *chakra*; after this, the pranah is replenished again during inhalation.

Mantra based Pranayama can alleviate many diseases, such as heart disease, high blood pressure, asthma, and tuberculosis, among others. This type of breath control dissolves emotional tensions and relaxes the mind, and it also increases willpower, concentration, and self-control. Finally, if the Divine Entity's pranah is infused, one can get totally sanctified and one's ideas will be divine ideas.

Lesson 3. Chakra Shodhana (Chakra Purification)

Background: Chakras are sub-stations of the mind, as illustrated in **Figure 6**. The state of body and mind depend on the activeness of the chakras. By Chakra Shodhana, the mind and body get purified, and the whole being is sanctified.

Concept: The *chakras* are imbibed with vrittis (embedded sentiments or propensities), which are potential seeds of *samskaras* formation. Hence, we need to 'purify' our 'defective' *chakras* by stimulating them (at their central point of *ksitipiitha*) with the 'sacred idea' and*bhave* of our *istamantra*. These sacred ideas imposed on chakras are propagated through nadis to the body regions, and the body thereby gets consecrated.

As displayed in Figure 6, the chakras relate to the endocrine glands. So energizing the chakras with mantra stimulates the corresponding endocrine glands to secrete hormones into the organs, with benefitting influence on them. In practicing this lesson, the meditators become aware of the chakras and the divine light (of the Divine Entity) around them. Then they primarily concentrate on the controlling point of the *piitha.* For example, in the case of the *manipur chakra* (triangular in shape, and red in color), they can concentrate at its centroid and then stimulate it with the divine light by means of their *Istamantra*; this helps the digestive system, and also the pancreatic hormonal secretion gets affected to regulate insulin infusion. All chakras are thereby brought into the rhythm of the *ista mantra*, to create one tune leading to *Paramapurusa.*

Process: The practitioners first place their mind at the central point of *muladhara chakra* and stimulate (or energize) it with their *ista mantra 2 to 3 times,* with the feeling that in this process the divine light is purifying the *chakra* by wiping off its embedded *vrttis*.Then, they raise their mind to the *svadhisthana chakra* and likewise 'purify' it. They thus keep purifying each *chakra* up to the *sahasrara chakra.* They can now descend, purifying each *chakra* up to the *muladhara chakra.* This constitutes one trip. Like that, they can complete two to three trips.

By ideating at the controlling points of the chakras with the *ista mantra*, the practitioners can be liberated from the associated *vrittis*, and feel a sense of composure in the corresponding region. They will develop a stage of divine composure, and when they reach the *sahasrara chakra*, the divine nectar secreted from that point can make them realize complete peace pervading their body.

Energizing the chakras to regulate the organs: The chakras are associated with and control specific endocrine glands, as depicted in Figure 6. The chakras regulate organs' functions through these glands, by stimulating their hormonal secretions; this is how the chakras influence the body organs. For example, energizing the Manipur chakra can help to cure diabetes, and energizing the Ajana chakra can help to alleviate mental depression and dementia.

Physiological Characterization of the "Meditative State"

In a comprehensive meta-analysis of the efficacy of Yoga, Khajuria *et al*. (2023) have investigated the complex relationship between measures of bio-signals and specific Yoga techniques. As shown in Figure 7, Khajuria *et al* (2023) undertook a thorough examination of numerous bio-signals (e.g., alpha, beta, delta, gamma, theta waves and their antecedents), extracting various

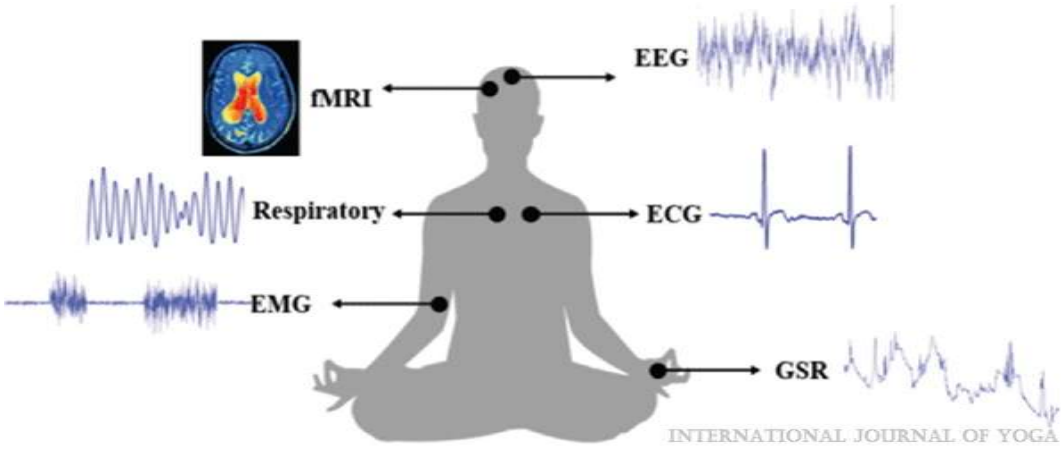
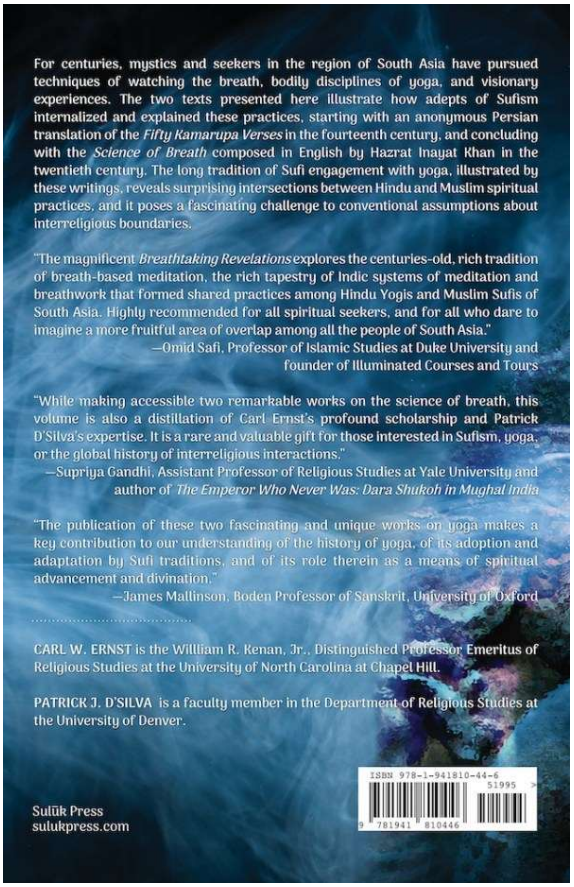


Figure 7. Bio-signals providing physiological information from our body, that can be acquired through biomedical sensors and devices to provide real time results to the physicians. EEG: Electroencephalogram, ECG: Electrocardiogram, EMG: Electromyogram, fMRI: Functional magnetic resonance imaging, GSR: Galvanic skin response. Source: Figure 1 of Khajuria *et al*. 2023

features from these signals and further explored the effectiveness of yoga practice in stress reduction. For example, EMG captures a well-established link between stress and muscle tone. ECG can demonstrate increased heart coherence during and after these practices. In summary, EEG, ECG, EMG, and fMRI can provide insights into stress reduction with yoga practice by measuring electrical activity in the brain, changes in heart rate and HRV, muscle electrical activity, and coherence between breath and heart rate patterns. The synchronization of heart and breathing patterns is associated with reduced stress and improved emotional well-being. In our studies, in Ghista (2020; 2022) and Ghista *et al*. (1976; 2022), we have assessed the impact of meditation through analysis of Electroencephalogram (EEG). This is a long-established protocol wherein states of rest, sleep, and mental activities have been characterized through the frequency analysis of electroencephalographic data (Brown 1970; Khajuria *et al*. 2023). Electrical activity from the brain is displayed in the form of brainwaves in an EEG waveform. There are three predominant categories of brainwaves based on the level of activity. Beta waves (12 to 38 Hz) are predominant during the normal waking state when one is engaged in cognitive tasks being alert and engaged in problem-solving or decision making. Alpha brainwaves (8 to 12 Hz) are dominant when the mind is quiet and also during meditation. Theta brainwaves (3 to 8 Hz) occur in deep meditation; during this state, the senses are withdrawn from the external world and focused on the internal mind. It has been noted that a mentally disturbed person (with a primarily beta EEG pattern) has a lesser proportion of alpha waveforms when compared to one with a calmer mental state (Ghista 2022).



We wish to stress that, despite its origins in its current form, Yogapathy is not a Vedic nor Buddhist precept. It may interest the reader to consult the resource captioned above and [https://youtu.be/2n6tYzwMbXw?si=UhvugUZ-2CZ6vVBO] which highlights (i) How Sufism incorporated Yoga practices, and spread in India from 8th century to 15th century, (ii) Correlation between lataifs and cakras, in meditation, and (iii) Yoga practices in the Islamic world (including Saudi Arabia).

Characterization of subjective states of mind associated with the EEG brain waves: The 'beta' state is associated with worry and anxiety; (ii) the alpha state has been noted to be associated with pleasant feeling, wellbeing, tranquility, relaxation; abundance of alpha-wave activity is considered to represent a state of relaxation and relief from concentration; (iii) progressive lower frequency states (from beta to alpha and more pronounced increased alpha-activity shift) are associated with increased relaxation and tranquility, culminating in a deep 'internalized' state (of warmth, love, and contentment) in the theta state, (v) the 'theta' state is characteristic of a blissful mind state (Ghista 2022) and is when cerebral activity such as creative pursuits may be performed optimally (Khajuria *et al*. 2023).

EEG Response Characterization of the Meditative State: The research protocols used in our study proceeded as follows (Ghista *et al*, 1976). For each subject, the EEG was recorded for 15 minutes with the subject in a relaxed but mentally active state, with the eyes closed. Then, the subject was asked to 'meditate' and the non-meditator was asked to 'concentrate', and their EEG was recorded during this period, which normally lasted for 30 min. A recording of the post-meditative or post-concentration period was also taken for 15 minutes. Frequency spectral analysis of the EEG data was carried out to determine the percentage of waves corresponding to each frequency band, as histograms(Ghista *et al*, 1976). It was observed that EEG alpha waves (8 to12 Hz) relative to beta waves (12.5 to 30 Hz) are associated with a more relaxed mental state, and EEG theta waves (4 to 8 Hz) relative to alpha waves, are associated with deeply relaxed mental state and higher consciousness feeling.

Figure 8 (extracted from Ghista *et al*, 1976, and Ghista 2022) shows the EEG wave distribution for a subject who is a meditation practitioner and instructor. The pre and post measurements show the relative abundance of EEG waves at the various bands for this subject, before, during, and after a meditation session. As can be noted, there is an abundance of waves at various frequency bands, but especially there are more waves in the lower alpha frequencies. However, during meditation, there is an increase in the amount of theta waves.

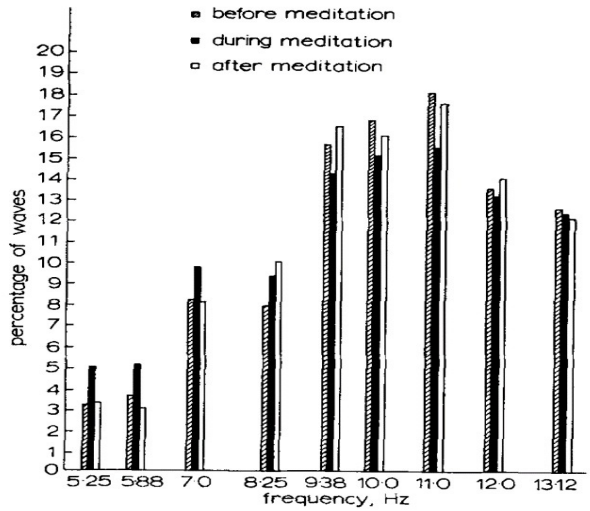


Figure 8. The relative abundance of EEG waves at the various bands for the Meditation practitioner and instructor before, during, and after a session of IP. It can be noted that during meditation there is a relative increase in the amount of theta waves.

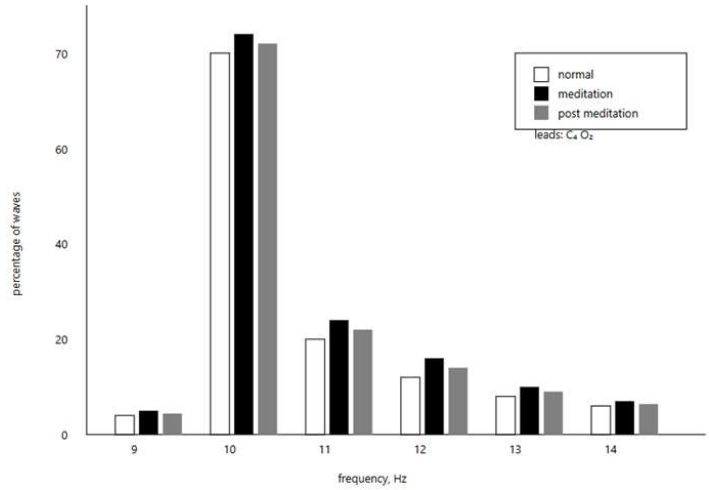


Figure 9.The relative abundance of waves before, during, and after meditation for a novice-meditator

Figure 9 shows the wave distribution for the non-meditator subject. For this subject, the frequency spectrum in a normal state was in a higher frequency band compared to that of regular meditators. Also, when this subject 'concentrated' there was no shift in the EEG frequency distribution. The distribution is grouped around the intrinsic alpha frequency of 10Hz.

EEG based Meditation Effectiveness Index: By assessment of a large number of subjects, the effectiveness of meditation can be characterized in terms of (i)decrease in the percentage of beta waves (12.5 to 30 Hz) from before to during meditation, (ii) increase in the percentage of alpha waves (8 to12 Hz) from before to during meditation, and even (iii) increase in the percentage of alpha waves (4 to 8 Hz) from before to during meditation.

Towards an Integrated Yogapathy Meditation Effectiveness Index for Wellness: EEG response to meditation is one way to demonstrate its effectiveness. It could also be represented in another simple an effective way. It is well-known that healthy living can promote decrease of heart rate (HR), stabilize breathing rate (BR), and improve the galvanic skin response (GSR) or electrodermal activity (EDA) . With off-the-shelf technologies, we can monitor these 3 metrics (HRV, BRV, EDA) during the course of yogapathymeditation by means of wearable devices[5]. Developing a composite measure of wellness using heart rate variability (HRV), breathing efficacy (BrE) and galvanic skin response (GSR) or electrodermal activity (EDA) is an interesting and potentially valuable approach.

Heart Rate Variability (HRV) Score: HRV is a well-established measure of autonomic nervous system function and stress resilience. Higher HRV generally indicates better stress adaptation and overall health. Evidence of the science behind HRV may be found in (i) Shaffer & Ginsberg (2017) who reviewed the clinical relevance of HRV, by noting its relationship with stress, depression, anxiety, and overall wellbeing; and (ii) Thayer *et al*. (2012) who demonstrated that HRV is associated with cognitive performance, emotion regulation, and health. Scoring of HRV can be carried out by monitoring and simulating the HR data from start to end of meditation, as provided below by equation (1).

Breathing Efficacy (BrE) Score: While VO2Max is an excellent measure of cardiorespiratory fitness, it requires specialized equipment. Instead, we use a more accessible measure of breathing efficacy, such as respiratory rate variability (RRV) or end-tidal CO2 (ETCO2). The scientific basis of this metric is from Courtney *et al*. (2011) who found that breathing pattern disorders are associated with various health issues and that improving breathing patterns can enhance overall wellbeing. Earlier, Ritz *et al*. (2009) showed that respiratory parameters are linked to emotional states and stress levels. The BrE score could be a straightforward normalization of RRV or ETCO2 to a 0-100 scale based on established healthy ranges, with lower scores indicating a rhythmic pattern of breathing and hence a relaxed state.

Galvanic Skin Response (GSR) Score: GSR, or its equivalent, electrodermal activity (EDA), is a sensitive psychophysiological index of changes in sympathetic arousal. The seminal report by the late Wolfram Boucsein (author of the 1992 book on Electrodermal Activity which provided the inspiration of most of the wearable monitors that track GSR or EDA) and his co-workers (Boucsein *et al*. 2012) provided guidelines for EDA measurements, highlighting its utility in psychophysiological research. Posada-Quintero & Chon (2020) reviewed the use of EDA as a measure of sympathetic nervous system activity and its applications in assessing stress and emotional states. In a recent meta-analysis of the efficacy of yoga, Khajuria *et al* (2023) found that GSR or EDA "is characterized as the alteration in the electrical characteristics of the skin… a measure of SNS activation… Sweating rises with increased mental or physical exertion or emotional stimulation, altering the characteristics of the skin by causing it to become more conductive and less resistant." As with HRV and BrE, we convert GSR / EDA readings from start to end of meditation to a 0-100 scale, with lower scores indicating lower arousal (generally associated with relaxation and well-being).

Quantification of HRV, BRV, EDA metrics during Yogapathy Meditation process, culminating in a composite measure of Yogapathy Effectiveness Index (YeffI): Now for more effective quantification of these 3 metrics (HRV, BRV, EDA) during the course of yogapathy meditation by means of wearable devices, we are developing for each metric a formula that can be implemented to provide a composite measure and scientific evidence for each component. However, it is important to note that creating validated composite measures would require extensive clinical trials.

Meditation Effectiveness Index in terms of HR variation: It is well-known that meditation can enable decrease of heart rate (HR). So let us say that we monitor the HR at the start of meditation (HRs) by means of a wearable device. Let HRt be the heart rate at time t during meditation. Now let us plot HRt v/s time, and then simulate this data by means of this expression:

HRt = HRs t^-k, to determine the value of k (1)

Let HRf be the final value of HR at the end of meditation. We can then develop the expression for

HR based Meditation Effectiveness Index (MEFI) = k [(HRs-HRf)/HRs] (100) (2)

It can be noted that greater the value of k and MEFI, the more effective will be the meditation. So, we can develop a wearable device that can determine MEFI for meditation subjects, to determine the effectiveness of their meditation. Interestingly, this will

[5] See, for example, https://www.empatica.com/platform/clinical-trials/

be the first such meditation effectiveness index. It could even enable people to assess the effectiveness of their meditation at home. We can now work on its practical implementation by conducting clinical trials.

We can derive similar analytic formulae for meditation effectiveness in terms of BrE and EDA, using the same normalization technique and ensuring monotonicity (i.e., on a scale of 0 to 100):

BrE = l [(BrEs-BrEf)/BrEs] (100)(3)

EDA = m [(EDAs-EDAf)/EDAs] (100)(4)

We can then formulate a composite measure, **Yogapathy Effectiveness Index (YeffI)** as given by the expression (5):

YeffI = (w1 * HRv_score + w2 * BrE_score + w3 * GSR or EDA_score) / (w1 + w2 + w3)(5)

where w1, w2, and w3 are weights (w1+w2+w3 = 100) assigned to each measure based on their relative importance and reliability. The weights (w1, w2, w3) in the YefI equation (5) can be validated by statistical analysis of large datasets obtained from diverse Randomised Control Trials (RCTs). This is elaborated in the next section as future work. Initially, equal weights could be used, but these can be personalized based on an individual's unique characteristics (in Ayurvedic parlance, the dosha[6] or constituency). Such a composite approach to determining wellness has precedence in the west with (i) Choi *et al*. (2017) combining HRV and GSR data to create a more robust stress detection model, and (ii) Järvelä-Reijonen *et al*. (2020) using a combination of physiological measures, including HRV and EDA, to assess stress and recovery in a workplace setting. More specifically, Validation of the YeffI would require: 1. Large-scale data collection across diverse populations; 2. Correlation studies with established wellness and stress measures; 3. Longitudinal studies to assess sensitivity to changes in wellness over time; 4. Factor analysis to refine the weighting of individual components. It is worth noting that while yoga meditation has been shown to improve each of these measures individually, the effectiveness of this composite measure in assessing our yogapathymeditation system's impact would need to be analysed in depth. In the next section, this is provided as a suggestion for further research.

Concluding Remarks and Further Research: This paper provides evidence of how yoga meditation can provide a higher state of consciousness combined with health effectiveness based on monitoring of heart rate and breath rate variability and changes in skin temperatures. This in turn results in combining well-being with a state of bliss. This feeling of bliss is not imaginary nor imagery. In an in-depth study of lived experiences" of yoga practitioners, Volger and her associates (Volger *et al*. 2023) interviewed 22 advanced practitioners of mind-body routines and reported that their sense of well-being was brought on by self-reinforcing themes ranging from the environment, functional attributes, and psychosomatic strengthening of mind-body. What was remarkable was the lived experience of practicing asanas, pranayama, and meditation which led to the application of yoga philosophy and skills. That these skills were transferable and gave practitioners an altruistic sense of giving back, brought about a continued sense of contentment and positivity.

Our advanced Meditation System: The Ananda Marga meditation system described in our paper, propounded by Sadguru Prabhat Ranjan Sarkar (Sarkar 1993; ShriiShriiAnandamurti 1994),can be classified as a far advanced meditation technique, compared to the conventional mindfulness technique. Our meditation system, described in Section IV comprises (i) IshvaraPranidhana, meaning offering one's mental self to God (or Divine Entity) and making union with God, (ii) Pranayama, the science of Pranah, i.e., breathing in Pranah, the cosmic vital energy of *Brahma* around us, and (iii) Chakra Shodhana, meaning purification of the chakras from vrittis. Then In Section V, we have demonstrated (i) development of higher state of consciousness, based on EEG monitoring. as well as provided (ii) meditation effectiveness indices.

Novelty of our Meditation technique: We now reiterate below the novelty of our paper in meditation technique as well as in determining the effectiveness of meditation.

1. Figure 5 showed the Consciousness field and the presence or location of mind in it. It is schematized that when a person (or her/his mind) ideates on Consciousness (by meditation), the mind dilates i.e., develops in ectoplasmic density, as it starts moving centripetally in the ectoplasmic field of Consciousness.

2. Figure 6 showed the Energy Centers (or Chakras) linking the Mind and Body, and promoting Mind-Body Healing. As indicated earlier, the mind and the physical body are linked by subtle energy centers called the chakras (plexii). As shown therein, the chakras are associated with and control specific endocrine glands. So when these chakras are energized by mantra, the associated endocrine glands cansecrete benefitting hormones into the organs. In this way, the organ systems get affected and cured of their ailments.

3. Figures 8 and 9 display EEG based Meditation Effectiveness. The effectiveness of meditation can be characterized in terms of (i) decrease in the percentage of beta waves (12.5 to 30 Hz) from before to during meditation, (ii) increase in the percentage of alpha waves (8 to12 Hz) from before to during meditation, and even (iii) increase in the percentage of alpha waves (4 to 8 Hz) from before to during meditation.

The Yogapathy Effectiveness Index (YefI**)** captures the Heart Rate, Breath Efficacy and EDO data of meditation practitioners with the help of their wearable monitoring device. These measures can be incorporated into a smart wearable device, to enable

[6]https://www.healthline.com/nutrition/vata-dosha-pitta-dosha-kapha-dosha

people to determine the effectiveness of their meditation practice and their general well-being—even at home to constitute personalized healthcare. We acknowledge that a single measure, however composite, cannot capture "Psychosomatic Health and Well-being". For example, meditation would decrease HRV and enhance sleep[7]; which is a known contributor of wellness. Hence there is a need for the YeffI to be used constructively and guide Personalized Healthcare. The YefI measure provides a starting point for developing a more comprehensive measure of physiological wellness using bio-sensing and validating the intervention of yoga techniques, described above. It can be seen that in equations (2, 3, 4 & 5),greater the values of the k, l, and m coefficients and YefI score, the more effective would be the meditation. So, we can develop a wearable device with an accompanying app that can compute YefI scores for meditation subjects, to determine the effectiveness of their meditation. Interestingly, this would be the first such meditation effectiveness integrated index. It could even enable people to assess the effectiveness of their meditation at home to form the basis of personalized healthcare. We now need to work on its practical implementation. Why do we need a measure for a nebulous construct such as wellness? Lord Kelvin understood the role of measurement in science which he expressed thus in his 1889 book Popular Lectures and Addresses. "When you can measure what you are speaking about and express it in numbers you know something about it." This brings us to the question posed rhetorically by Bhattacharjee (2024) - Does meditationactuallywork? In a contrarian view, M. Farias, opining in The Conversation (2024),remarked that "*The first recorded evidence for this, found in India, is over 1,500 years old. The Dharmatrāta Meditation Scripture, written by a community of Buddhists, describes various practices and includes reports of symptoms of depression and anxiety that can occur after meditation. It also details cognitive anomalies associated with episodes of psychosis, dissociation, and depersonalisation (when people feel the world is "unreal"). In the past eight years there has been a surge of scientific research in this area. These studies show that adverse effects are not rare*."

Let us leave aside the poor science – examples, i) meditation is not 1500 years old and was practiced by many cultures even before the time of the Buddha Sukyamuni; ii) the self-cited2015 book / podcast on the Buddha Pill confuses meditation with breathing techniques just as yoga should not be confused with body stretches. To return to the scientific realm, wepropose a "Gedankenexperiment" (German for "thought experiment") which is a hypothetical scenario used to explore the potential consequences of a theory or principle. It is employed across disciplines to reason about complex ideas without the need for physical experimentation which could have unintended outcomes.

Yogapathy Monitoring Cloud Platform for determining the effectiveness of meditation: For conducting multiple, large RCTs, we could deploy a medical-grade platform for such a trial comprising a wearable device, mobile app and machine-learning data analytics in the cloud, which monitor the fundamental bio-sensors described previously, such as heart rate, breath efficacy and EDO. Figure 10 shows such a platform that is ready and available for medical research. It needs to be noted that we are careful to distinguish between medical grade solutions from exaggerated, unvalidated products like https://topsmartw atchnews.com/ vitalfit/sg/

In the pilot run, we can randomly assign demographically representative participants to 4 equal groups. In the 1st group, subjects wear the tracker watch and go about their usual activities. In the 2nd group, subjects wear the watch and perform box-breathing while keeping a relaxed posture and mind. We track the HRv, BrE and EDO levels of participating subjects before, during and after the 30-minute session. To standardize control variable, we propose a morning and evening meditation session, sitting comfortably in a quiet place after 7 hours of sleep and 2 hours after a meal. The results may be tabulated as a 3-tuple of {HRv, BrE, EDO} with missing values and outliers (for days that box breathing was not practiced). As a baseline treatment, for the 3rd group, we substitute box-breathing with physical activity such as a 30-minute walk. Finally, as our intervention, to the 4th group we shall prescribe simple Yogapathy, 30-minute meditation before sunrise of silence and mentally chanting of a mantra such as 'BA-BA' (meaning divine father). From the results obtained across multiple, large RCTs, we may derive the values for w1, w2,

(source: Empatica - https://www.empatica.com/platform/clinical-trials/)

[7]How Sleep Affects Your Heart Rate (clevelandclinic.org)

Figure 10. Yogapathy Monitoring Eco-System

Treatment	*1 hour before*	*during*	*1 hour after*
No activity	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}
30 min box breathing	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}
30 min walk	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}
30 min Yogapathy	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}	YefI := f {HRv, BrE, EDO}

and w3 identified in equation (5). But more significantly, machine learning models may be used to elicit optimal values of k, l and m for subjects. In other words, we determine which intervention is most effective for the well-being of a given person; this is personalized Yogapathy. The essential Yogapathy concept for attainment of enlightenment entails recognizing and manifesting the presence of the Divine Entity around us in the form of mellow light. In this step, the meditator is only feeling the divine presence and is not aware of surrounding people or structures. Then we reach the stage of the mind ideating on the Divine Entity using a 2-syllable mantra, having the connotation of "You are my Guide, and with your guidance, I can become divine". By this process over time, one's mind gets cleared from its embedded impressions formed by one's actions and interactions, resulting in a state of bliss or freedom from anxiety. In the words of Skipper (2024): "*Anxiety had become like a habit in my life, and in long periods without distraction we default to what's habitual. In fact, when I later spoke to Judson Brewer, M.D., Ph.D., a professor and director of research and innovation at Brown University's Mindfulness Center, who wrote a best-selling book called Unwinding Anxiety, he told me that obsessive worrying is in fact a habit, in the sense that it gets wired into our brain on the same trigger-behavior-reward loop that any addiction or compulsion does: We have an anxious thought or feeling (trigger), we ruminate or worry about it (behavior), and this distracts us from the bad feeling (reward). It's counterintuitive to think of rumination as a reward, but Dr. Brewer explains it like this: "Worrying feels like we're doing something, and doing something feels better than doing nothing, even if you don't know that what you're doing is reinforcing the habit. That's the irony. If you don't know how your brain works, it's going to get stuck*."

Mindfulness Meditation is endeavoring to not have the mind occupied by one's ongoing activity but being cognizant the surroundings. This is difficult for many people to practice because there is no definitive ideation entity. This is why some practitioners have serious psychiatric problems such as depression and agitation. In comparison, our system of meditation proposed in this paper would be effective. The purport of Lesson 1 - IshvaraPranidhana is to obtain liberation from samskaras or embedded psychic impressions in the subconscious mind.

Recap of Yogapathy: The paper has presented a high-level view of yogapathy. Specifically, the scientific paradigm of the Cosmological cycle, on the formation of the universe and the theory of evolution, providing the basis of Meditation. Then the Science of meditation involves ideating on cosmic consciousness, for (i) liberation from propensities, (ii) healing of mind and body, and (iii) progressing to enlightenment. Our unique system of Meditation, propounded by Sadguru Prabhat Ranjan Sarkar, is portrayed in terms of the three lessons of meditation: Lesson 1. IshvaraPranidhana: The goal of this lesson is to obtain liberation from samskaras or embedded psychic impressions in the subconscious mind; herein, the aspirant is taught how to ideate on and feel one with Brahma (or Divine Entity). Lesson 2. Pranayama: Pranah, the Cosmic vital energy of Brahma is around you; you need to take it within you to keep you physically, psychically, and spiritually rejuvenated. Lesson 3. Chakra Shodhana (Chakra Purification) involves mantra stimulation of the chakras, to in turn energize the associated endocrine glands to secrete hormones into the organs; in this way, the organ systems get affected and cured of their ailments. Further, the physiological characterization of the meditative state by EEG is depicted for showing its therapeutic value. In our study, for each subject the EEG was recorded for 15 minutes with the subject in a relaxed but mentally active state, with the eyes closed. Then, the subject was asked to 'meditate' and the non-meditator was asked to 'concentrate', and their EEG was recorded during this period, which normally lasted for 30 minutes. A recording of the post-meditative or post-concentration period was also taken for 15 minutes. Frequency spectral analysis of the EEG data was carried out to determine the percentage of waves corresponding to each frequency band, as histograms. It was found that for a meditating subject, there was a pronounced shift from beta waves (12.5 to 30 Hz) to alpha waves (8 to12 Hz) associated with a more relaxed mental state, and to even theta waves (4 to 8 Hz) associated with higher consciousness feeling. However, when the non-meditating subject 'concentrated', there was essentially no shift in the frequency distribution of EEG. Hence, the effectiveness of meditation can be characterized in terms of (i) the decrease in the percentage of beta waves (12.5 to 30 Hz) from before to after meditation, and (ii) increase in the percentage of alpha waves (8 to12 Hz) and even theta waves (4 to 8 Hz) from before to after meditation. Meditation also has a big impact on heart rate and breathing rate. In this regard, a customizable smart watch, AI app, cloud infrastructure and a community of practitioners could be utilized to monitor heart rate and breathing rate for evaluating the effectiveness of Yogapathy among subjects, to promote psychosomatic health and well-being. The following steps were proposed:

- Step 1 consists of recognizing and manifesting the presence of the Divine Entity around us in the form of mellow light. In this step, the meditator is only feeling the divine presence and is not aware of surrounding people or structures. This process of mind withdrawal from the surroundings is referred to as bhutasuddhi.
- Step 2 involves developing a spirit body, to enable ideation on and union with the Divine Entity. In this step, by a special method, the mind or "I feeling" of the meditator is brought very carefully from (i) its disassociation with the external surroundings, and (ii) then from the physical body feeling, to where the "I" sits or the location of one's mind center. At this stage, one is only aware of oneself or one's mind and the Divine Entity (or Cosmic Mind) surrounding it. This process of mind withdrawal from body feeling is referred to as a'sanasuddhi.
- Step 3 now involves the mind ideating on the Divine Entity using a 2-syllable mantra. The Mantra has a specific meaning and an acoustic sound. The general meaning of all mantras is "You are my Guide, and with your guidance, I can become

divine". This 2-syllable mantra is repeated mentally in consonance with one's in-breath and out-breath. This brings divine energy flowing into one's mind, flooding it with blissful feelings. At in-breath, the Divine Entity is infusing divinity into the mind. Then in response to this, at out-breath, one's mind expands into divine consciousness and even gets lit up, giving a feeling of being divine.

By this process over time, one's mind gets cleared from its embedded impressions formed by one's actions and interactions. Clearing the mind from its embedded impressions is referred to as Liberation. During this process of liberation, one's entire mental thinking gets transformed, one's personality and character get elevated, and one's interactions with others enter a new phase. Over time, this brings a peaceful feeling of oneness with divinity known as enlightenment. This is verily the purport and goal of this meditation lesson.

In short, consciousness can bring usto this desired state of bliss. As Wagh(2024) reports: "*The notion that quantum physics must be the underlying mechanism for consciousness first emerged in the 1990s, when* [2020]*Nobel Prize-winning physicist*[a Professor of Mathematics]*Roger Penrose, Ph.D., and anesthesiologist Stuart Hameroff, M.D., popularized the idea that neural microtubules enable quantum processes in our brain, giving rise to consciousness. Specifically, they postulated in a 1996 paper that consciousness may operate as a quantum wave passing through the brain's microtubules. This is known as OrchOR theory, referring to the ability of microtubules to perform quantum computations through a mathematical process Penrose calls "objective reduction.*"

REFERENCES

Anandmurti SS. Discourses on Tantra. Ananda Marga Publications; 1994.

Bhattacharjee Y. Does meditation actually work? Here's what the science says. National Geographic Magazine. June 2024.

Boucsein W, Fowles DC, Grimnes S, *et al*. Publication recommendations for electrodermal measurements. Psychophysiology. 2012;49(8):1017-1034. doi:10.1111/j.1469-8986.2012.01384.x

Brown BB. Recognition of aspects of Consciousness through association with EEG alpha activity represented by a light signal. Psychophysiology. 1970;6(4):442-452.

Choi J, Ahmed B, Gutierrez-Osuna R. Development and evaluation of an ambulatory stress monitor based on wearable sensors. IEEE Trans Inf Technol Biomed. 2017;16(2):279-286. doi:10.1109/TITB.2011.2169804

The Conversation. Meditation And Mindfulness Have a Dark Side We Don't Talk About. ScienceAlert. October 24, 2024. Accessed [access date].

Courtney R, Van Dixhoorn J, Cohen M. Evaluation of breathing pattern: Comparison of a manual assessment of respiratory motion (MARM) and respiratory induction plethysmography. Appl Psychophysiol Biofeedback. 2011;36(2):91-100. doi:10.1007/s10484-011-9149-x

Ghista D. Sadhana Theory and Lessons, Practice and Benefits. PROUT Magazine. 2020;39(9-10):16,22.

Ghista D. Yogapathy: Psychosomatic preventive and curative medicine –The need of the day. Pac J Med Health Sci. 2022;4(2):21-42.

Ghista D, Subbhraam V, Towsey M. Yogapathy: Meditation science and practice, for psychosomatic health, neuroplasticity and well-being – An insight. Pac J Med Health Sci. 2022;4(1):10-24.

Ghista DN, Nandagopal D, Ramamurthi B, Das A, Mukherjee A, Srinivasan TM. Physiological characterisation of the meditative state during intuitional practice (The Ananda Marga system of meditation) and its therapeutic value. Med Biol Eng. 1976;14(2):209-213.

Ghista DN, Towsey M. Consciousness and Evolution: Unified Theory of Consciousness, Matter and Mind. Paper presented at: International Conference: Toward a Science of Consciousness; May 3-7, 2011; Stockholm University, Stockholm, Sweden.

Ghista DN, Towsey M. Consciousness, Cosmology, and Evolution: Unified Theory of Consciousness, Matter and Mind. Gurukula Network. 2012;34:11.

Järvelä-Reijonen E, Järvinen S, Karhunen L, *et al*. Effects of a psychosocial intervention on the wellbeing of overweight and obese employees: A randomized controlled trial. Int J Environ Res Public Health. 2020;17(2):435. doi:10.3390/ijerph17020435

Khajuria A, Kumar A, Joshi D, Kumaran SS. Reducing Stress with Yoga: A Systematic Review Based on Multimodal Biosignals. Int J Yoga. 2023;16(3):156-170.

Kirlian Photography. Lightstalking website. Accessed [access date]. https://www.lightstalking.com/what-is-kirlian-photography-the-science-and-the-myth-revealed/

Manjunath NK. Yogic Feats: An Exception or a Miracle? Int J Yoga. 2024;17(1):1-2.

Posada-Quintero HF, Chon KH. Innovations in electrodermal activity data collection and signal processing: A systematic review. Sensors. 2020;20(2):479. doi:10.3390/s20020479

Raymond M. Getting Comfortable with Death & Near-Death Experiences: Near-Death Experiences: An Essay in Medicine & Philosophy. Mo Med. 2013;110(5):368-371.

Ritz T, Kullowatz A, Goldman MD, *et al*. Airway response to emotional stimuli in asthma: The role of the cholinergic pathway. J Appl Physiol. 2009;108(6):1542-1549. doi:10.1152/japplphysiol.00818.2009

Sacchet MD, Brewer JA. Beyond Mindfulness. Sci Am. 2024;331(1):70.

Sarkar PR. Idea and Ideology. Ananda Marga Publications; 1993.

Shaffer F, Ginsberg JP. An overview of heart rate variability metrics and norms. Front Public Health. 2017;5:258. doi:10.3389/fpubh.2017.00258

Skipper C. The Silent Expedition into My Anxious Brain. Men's Health. October 28, 2024.

Thayer JF, Åhs F, Fredrikson M, Sollers JJ III, Wager TD. A meta-analysis of heart rate variability and neuroimaging studies: Implications for heart rate variability as a marker of stress and health. NeurosciBiobehav Rev. 2012;36(2):747-756. doi:10.1016/j.neubiorev.2011.11.009

Towsey M, Ghista DN. Towards a Science of Consciousness. In: Ghista DN, ed. Biomedical and Life Physics: Proceedings of Second Gauss Symposium. Vieweg& Sohn Verlagsgesellschaftmb H; 1996:Munich, Germany.

Vogler S, Salyer RE, Giacobbi PR. Yoga and Mental Well-being: A Qualitative Exploration of the Lived Experiences of Yoga Practitioners. Int J Yoga. 2023;16(3):192-201. doi:10.4103/ijoy.ijoy_191_23

Wagh M. Your Consciousness Can Connect With the Whole Universe, Groundbreaking New Research Suggests. Popular Mechanics. September 26, 2024.

****