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Review Article

Mind-Body Therapies

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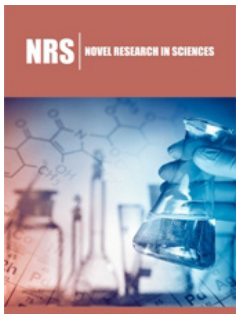

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Introduction

Biofeedback is a mind–body technique and a self-management tool in which participants learn to cultivate awareness about their unhealthy mental patterns and habits, and to improve their health by controlling bodily functions (e.g., breathing rate, heart rate, blood pressure), and to treat a variety of mental health issues, including anxiety or stress as well as asthma , heart problems , pain ,irritable bowel syndrome, and high blood pressure. Autogenic training, that is a relaxation technique developed in 1932 by Johannes Heinrich Schultz, involves simple relaxation and body awareness exercises reducing the body's stress response in order to relax the body and begin self-healing, especially to treat stress disorders, pain, and anxiety. Standard autogenic training sessions focus on teaching participants' bodies to respond to verbal commands and to "tell" their body to relax and control certain physiological responses (e.g., body temperature, heartbeat, blood pressure) on their own.

Implementation of safe and effective mind–body therapies, (relaxation, stress management, biofeedback) as an essential part of a practical, holistic, integrative approach for an array of health-related problems, such as chronic low back pain, headache disorders, insomnia, cardiac rehabilitation(prevention of postinfarction morbidity/mortality), management of treatment and disease-related symptoms in cancer, osteoarthritis, rheumatoid arthritis, hypertension, and postsurgical outcomes, give the following potential benefits [1]:

- promotion of self-efficacy
- promoting patient-centered care and empower the patient's ability to be self-directed
- realize immediate and significant cost savings
- decreased use of other clinical support systems, and health care services e.g. decrements in use of opioids and polypharmacy
- improve the function and quality of life and patient satisfaction
- early return to work,
- better health outcomes and state of health.

Medicine must shift from an exclusively "biomedical" model to a "biopsychosocial" understanding of health and illness. Searching the focus groups with physicians, medical students, and residents, the following factors emerged as possible barriers to the integration of mind-body principles and practices in medicine [2]

1. Lack of scientific evidence about efficacy of mind-body/psychosocial approaches.

2. Inadequate attention to the role of psychosocial factors and dehumanizing aspects of medical education.

3. Tendency to reduce psychosocial factors against biological/biochemical processes.

4. Creating a division between conditions that are perceived as purely biological in etiology (and therefore treatment) and those that are psychological in nature.

5. Feelings of inadequacy of competency to utilize mind-body interventions and lack of awareness of resources to refer to

6. Perceived lack of time to address psychosocial/mind-body issues.

7. Lack of third-party reimbursement for mind-body issues in the medical encounter.

8.Belief that it is not economically practical to spend large amounts of time with patients addressing the psychosocial domain.

9. Perception that psychosocial issues are beyond the immediate control.

10. Concern that more serious, life-threatening, biological aspects of patients might be underemphasized if too much weight or attention is given to the psychosocial domain.

11. Perceived lack of interest or motivation on the part of patients to address psychosocial/lifestyle issues (eg, preference for the "quick-fix" and symptom relief offered by more conventional, pharmacological approaches).

12. Belief (and the larger culture's perception) that addressing the interior lives of patients is not the domain that physicians are trained to or should address.

13. Fear that some patients might feel stigmatized if physicians suggest that psychosocial/mind-body factors may be playing some causal role in their symptoms.

Quantum Mechanics

Conventional science and quantum physics represent two different perceptions and explanations of reality. The conventional biomolecular framework assumes that biocommunication in living systems operates primarily from chemically mediated interactions. The emergence of quantum physics has led to new models for understanding subatomic interactions. Quantum field theory introduces the concept of a field that is viewed as a space-filling primary entity that creates, connects, and destroys particles. Quantum theory, that has significant implications for understanding the relationship between consciousness and human health, may be useful in a healing context by its underlying principles. Quantum physics–inspired models are proposed to describe a wide variety of psychological and physiological processes that have been difficult to explain through traditional assumptions. Clinician's awareness of the application of quantum theory to human health , has the potential to enhance relationships, trust, and open communication to facilitate an integrative approach to patient care since the bi-directional flow of energy in humans has implications for health as well as for communication between individuals. Energetic phenomena in humans may be understood through the principles of quantum physics.

Current studies on biological communication mainly focus on chemical signals. Since organisms are extremely complex, different kinds of signals may exist in the process of cell communication. The most probable candidate for alternative forms of communications within the organism may be the electromagnetic radiation. Many experiments have already confirmed that electromagnetic radiation widely exists in cells, tissues, organisms and even between organisms and their surroundings. The well-known connection between electromagnetic radiation and quantization of the energy transfer suggests that quantum can serve as a biological messenger.

Thus, concepts from quantum physics can be applied to describe information transfer and dynamic relationships within the human system. The bioenergetic aspects of human physiology include molecular energy fields in and between cells and their interactions with other energy fields. Exchange of information is vital to all living systems whether the communication is inter- or intra-cellular, organ to organ, brain to body, or individual to individual. Experimental evidence supports that some aspects of human cognitive abilities impacting communication such as intuitive judgment and awareness of context, are better explained using quantum rather than classical models. Quantum physics transcends conventional notions of signaling and transfer of information [3].

Biophysical Light

Photosynthesis converts carbon dioxide into useful biomass using sunlight. Crucial components for the photosynthetic process are antenna proteins, which absorb light and transmit the resultant excitation energy between molecules to a reaction center that transmits energy from the photon into the chemical bonds. Following the photoexcitation, energy absorbed by a molecule can be transferred efficiently over a distance up to several tens of angstroms to another molecule by the process of resonance energy transfer (RET) or electronic energy transfer (EET). Biophysical light interacts with the human self-organization of information that may be achieved by means of biomolecular, metabolic, and neural communication. Bioluminescence, the emission of photons of light by certain energized electrons dropped into a lower or ground state can be considered as an indicator of life activity. The high energy produced by the photons from the sun exciting electrons on earth, is transformed into high energy in phosphate bonds by the process of photosynthesis. The released energy stored in these bonds is the fuel of life or in other words electric current produced by the electrons, which are transferred between the molecules in a downward cascade fashion to lower the energy states , At higher frequencies than the normal visible spectrum , a luminescence emerges in the UV or microwave region. It has been shown that the human being is an emitter of various electromagnetic radiations, that are indicative of the energy state of the organism and its health [4].

Electromagnetic Field (EM)

The organization of any biological system is established by a complex electromagnetic field. This EM field is determined by its atomic physiochemical components and their behavior and

orientation. The holographic model of reality emerging from this principle provides a scientific explanation of psychoenergetic phenomena. The human body vibrates between 4 and 10Hz with amplitudes of 10 mm. The physiologic functions of the lungs and joints and bones of the body can be influenced directly by certain combinations of sound and music vibratory levels through which the human body becomes a musical instrument. Measurement of the internally produced magnetism can reveal basic physiological functions connected with internal organs from a new perspective in the development of new pathways in electromedicine by using the latent energies of the body [5].

Nonlocality

The principle of nonlocality refers to the potential for remote relationships between separate particles regardless of how large or small the system is where one part can affect the whole system concurrently and without direct connectivity. Nonlocal influences do not diminish with distance, and no known form of energy being exchanged. The principle of nonlocality can be applied to explore distant healing and prayer between individuals across space and time. Nonlocality may underlie bioenergetic aspects of human biology and can explain how the mind–body connection is impacted by intuition and intention. In the case of injury to the brain, the construction of reality by mind is seen in terms of deficits that may persist even though the related sensory information reaches the brain. For example , in agnosia, the failure of recognition that is not due to impairment of the sensory input or a general intellectual impairment, the visual agnosic patient will be unable to tell what he is looking at, although it can be demonstrated that the patient can see the object. Or prosopagnosic patients, that are neither blind nor intellectually impaired, can interpret facial expressions and recognize their friends and relatives by name or voice, yet they do not recognize specific faces, not even their own in a mirror. Electrodermal recordings show that the prosopagnosic patients respond to familiar faces without awareness, but subconsciously registers the significance of the faces. Quantum theory has reached the point where the source of all matter and energy is a vacuum, a nothingness containing all the possibilities of everything that have ever existed or could exist [6].

Entanglement

The principle of entanglement refers to how separate, objects are actually interconnected even though their spacial distance excludes this possibility. Microscopic particles that have been in contact with one another and become entangled can be observed at a distance as mirroring and providing information about the others movement or spin. When individual particles interact, a new property of the multi-particle system emerges and no longer they can be considered separate-regardless of distance. In addition, the well-documented psycho-physiological impact of the placebo effect has also been associated with the principle of entanglement. Placebo is a mind-setting psychological mechanism that could yield not only psychological but also physiological health benefits. The acute affective benefits of exercise (and some other passive treatments) may be linked to the mental interpretation of the activity that the participant is engaged in. Since the engagement in a pleasant activity is expected to yield positive effects, all life experience perceived as pleasant or beneficial may trigger global positive changes. Belief and positive expectation can modify the stress response and may lead to placebo responsiveness of many psychophysiological disorders such as hypertension, angina, inflammatory bowel disease, and asthma. Some exercisers who pursue a rigorous exercise programs often seek information about how to maximize the effect of their training. This information shapes their exercise behavior and eventually yields health and performance benefits that could be related to both altered training routine (action) and the placebo effect stemming from thought-shaping information (expectancy). The placebo effect is a mind-set based on classical conditioning and trusted information from social resources or the media. The invigorating feeling after exercise and the abundant media information about the benefits of exercise shape the individuals' expectancy mediating the psychological effects of exercise. The placebo effects are psychobiological events attributable to the overall therapeutic context. These psychosocially induced biochemical changes in a patient's brain and body may affect the course of a disease and the response to the therapy [7].

Phase Locking/Coupling

Phase locking establishes coherent oscillation among atoms and molecules in order to facilitate long-range interactions and energy storage as a key principle of energy resonance and information transfer in humans. In quantum field theory, phase locking facilitates order, coherence and collective modes of communication as an internal antenna that enables a person to exhibit self-awareness and coordination. The electrical activity of neurons oscillating simultaneously at the same frequency in separate parts of the brain is an example of phase locking. The principle of phase locking has demonstrated the role of neural synchronicities as a mechanism for neural integration of cognitive tasks. Synchronization has become one of the major scientific tools to explain biological order at many levels of organization. Synchronized subthreshold and suprathreshold oscillatory neuronal activity within and between distributed neuronal assemblies is acknowledged as a fundamental mode of neuronal information processing. Coherent neuronal oscillations correlate with all basic cognitive functions, and mediate local and long-range neuronal communication and affect synaptic plasticity [8].

Coupled states refer to the condition wherein "two uniquely different kinds of physical substances begin to significantly interact with each other." Purposeful coupling of matter and waves occurs in sub-cellular fields, resulting in self-organization. The advent of quantum information devices, and coherent ordering in the cell cytoplasm suggest that microtubules may function as quantum computational devices, and that mesoscopic and macroscopic quantum states are characteristic for living systems. Coupling is recognized as a key mechanism in information transfer between the energetic mind and the particulate brain. The exceptional electrical polarity of biological objects and long-range interactions

play a basic role in the endogenous electromagnetic field generated by the excited longitudinal polar oscillations in microtubules in eukaryotic cells. The electrodynamic field has an important role in the establishment of coherence, directional transport, organization of morphological structures, interactions, information transfer, and brain activity. Cancer transformation is a pathological reduction of the coherent energy state. Malignancy, i.e. local invasion and metastasis is a direct consequence of mitochondrial dysfunction, disturbed microtubular polar oscillations and the generated electromagnetic field [9].

Biohology

Complex information encoded in electromagnetic (EM) fields are used for coding and decoding of television and radio signals. Even more complex information can be encoded in holographic images. DNA acts as a holographic projector of acoustic and EM information which contain the informational quintessence of the bio hologram. Only 3% of human DNA encodes the physical body. The remaining 97% of the 3 billion base pair genome contains over a million genetic structures called transposons, that have the capacity to jump from one chromosomal location to another. The individuality is expressed in three million small variations in the cells, called single nucleotide polymorphisms, since 99.9% are alike in genetic legacy. Creative , novel and enriching psychotherapeutic experiences relevant to biophysics, medicine, psychobiology, psychotherapy and the holistic healing arts can lead to neurogenesis , gene expression and healing by facilitating mind body communication and its long-term transformative effect on the whole person for optimizing health, wellbeing and even self-realization [10].

Genome

The distribution of the character frequency in genetic texts is fractal, so the nucleotides of DNA molecules are able to form holographic pre-images of biostructures. This process of reading and writing the matter of human being manifests from the genome's associative holographic memory in conjunction with its quantum non-locality. The system works as a wave biocomputer. Quantum non-locality of the genetic information is directly related to laser radiation from chromosomes (coherent light), which jitterbugs its polarization plane to radiate or occlude photons. DNA and the genome as active laser like environments can be considered as a liquid crystal gel-like state that acts on the incoming light in the manner of a solitonic lattice. A soliton is an ultra-stable wave train that arises in the context of non-linear wave oscillation. The DNA reading process can be modeled as a complex mechanical oscillator, a kind of rotary pendulum capable of producing solitonic wave transmissions and can be simulated as a chain of non-linear oscillators.

The DNA can Project a field that would be experienced by other DNA in the body. The DNA molecules included in chromosomes possess a substance-wave duality similar to dualism of elementary particles and they are linked together and also to their own cell, via mechanisms of RNA transfer and enzymatic action in the cell. DNA and the RNA are in non-local communication. The entangled photons retain a mutual informational bond even at a distance through polarization and allow a kind of quantum teleportation, which has finally been experimentally verified. DNA codes an organism in two ways, both with the assistance of DNA matter and by DNA sign wave functions, including coding at its own laserardiaiton level.

The DNA in a particular cell is not totally active. It has been determined that as little as 1 %of the DNA present in nucleus of the cell acts as the determinant for the structure of the cell. The nervous sytem has the highest percentage of operating DNA of any cell system in the body, up to at least 10% of the DNA in the brain cells. The neuron nuclei are most active. The genetic apparatus is non-local at the molecular level (holographic memory of a chromosome continuum) in compliance with the Einstein -Podolsky -Rosen effect , which means that the genome, genetic and other regulatory wave information are recorded at the polarization level of its photons and are non-locally (everywhere and in no time) transferred throughout the entire space of a biosystem by the polarization code parameter able to set a quick response , information contact among billions of cells constituting the organism. The genome on the whole and the individual nucleus of the cells can generate and recognize a text associated with the regulatory structures, the application of a background principle, holography and quantum non-locality [11].

Acoustical Holography

Another process of holography called acoustical holography employs sound waves to create a movement and an optical hologram on the surface. A gene has a holographic memory (typically distributed, associative and non-local) to be read by electromagnetic acoustic fields which carry the gene-wave information beyond the limits of the chromosome structure. The non-locality of its dualistic material wave nature is valid for the holographic memory of the cerebral cortex. DNA carries a copy of itself and its own blueprint written in the genetic texts. The mechanism engineering the DNA replication is the bio photonic electromagnetic field while the letters of the genetic texts A, G, C, U are held invariant. In replication of the organism the blueprint creates the acoustic field which mechanically constructs/engineers the organisms out of the available matter, in accordance with the information held in the electromagnetic field holograms. Both the quantum entanglement and quantum teleportation can be related to quantum holography, through solitons, resonance effects and superconductivity. As a liquid crystal DNA influences the polarization of a weak bio photonic, mitogenic radiation or light emission so called biophotons known to exist in cells. Endogenous intracellular coherent light is emitted by the DNA molecule itself. The superposed coherent waves of different types in the cells are interacting to form diffraction patterns, first in the acoustic domains and then in the electromagnetic domain. This is a kind of quantum hologram. Interactions of solitonic oscillations in the liquid crystal structure of DNA and the polarization vector of the ultraweak but highly coherent bio photonic light can be a mechanism of translation between holograms in the acoustic frequency domain of short range effects and the electromagnetic domain , or vice versa [12].

Quantum Holographic Dna-Wave Biocomputer Theory

The polarization of chromosome laser photons is connected nonlocally and coherently to polarization of radio waves in which the signal can be read out without any loss of the essential formation. The liquid crystal phases of the chromosome apparatus (laser mirror analogues) can be considered a fractal environment which stores the localized photons. This creates a coherent continuum of non-locally distributed polarized radio wave genomic information. The genetic wave information from DNA recorded within the polarizations of connected photons, constitutes a broadband radio wave spectrum correlated by means of polarizations with the photons. This is the main information channel of DNA, photons and radio waves.

Fractal comes from the Latin word fractus, which means broken or fragmented. Fractals delienate a whole new way of thinking about structure and form – even the forms of the disease which take root organically in the body. Their essential fluidity of life corresponds with the fluidity of the electronic cloud in conjugated molecules. Such systems may be considered as both the cradle and the main backbone of life. Conjugate bonded molecules may interact in a variety of ways, such as the interpenetration of electron orbitals which permit an electromagnetic coupling so that activated electron energy passes from one molecule to another in the same way as a radio transmitting a message to a radio receiver. There is also the possibility of the transfer of an entire electron which is known as a charge transfer. Physiologically unassigned random biological energies' psychosomatic directing can be beneficial or deleterious to the organism.

Heisenberg explored the possible relevance of the quantum indeterminacy of elementary particles for biological systems, especially for human systems and stated that there are two places in the human system where the quantum indeterminacy of a single particle can have a profound influence: the first important effect is the mutation in the genetic code. The second important influence is the alteration of the behavior of neurons during human thought processes [13].

Tien has conceptualized the mind as a mass at relative motion and the brain as energy at relative electrical charges in motion, as if the electrons bombarding a television screen. The personality seen as a time series of scintillating frames of consciousness, becomes a reverbating input-output pattern of self-creation, seeking information or patterns of energy from the environment as well as from its own memories. The stability of any given personality of its identity is maintained by feedback upon the principle of most similarity. In this sense the personality never creates itself but creates only a close approximation due to the principle of constancy as being the same. The phenomena of unique individuality and personal continuity depend on memory. Personality transformation becomes energy pattern modification of not only scintillating consciousness but also of recent circulating memories and older stored memories of childhood [14].

The right frequencies of non-linear energies have profound healing properties according to Stanford researcher Glen Rein. Due to non-linear nature of biological systems, scalar waves are biologically more active than their linear electromagnetic counterparts. Scalar energy is transduced into linear electromagnetic energy in the body by liquid crystals in the cell membrane and solid crystals found in the blood and in several biological tissues. Clinical healing may occur several months after the initial exposure to scalar waves. A direct action of scalar energy on the body causes a subsequent change in the brain state. The scalar energy directly affects individual cells as well as the mind resulting in an altered psychological outlook which results in clinical improvement. Behavioral states modulate certain patterns of gene expression. Interaction between the genetic and behavioral levels is a two-way street. Genes and behavior are related in cybernetic loops of mind body communication [15].

Researchers have found that at the moment of ovulation there is a shift in the electrical fields of the body of the woman. The membrane in the follicle bursts and the egg passes down the fallopian tube. The sperm is negative with respect to the egg. When the sperm and egg unite, the membrane around the egg becomes hyperpolarized, shutting out other sperms. It is at this moment that the electromagnetic entity is formed. The fertilized egg cell contains all the information necessary to create a complete operational human being. The bioholgram begins to function at conception and ceases only at death. The DNA at the center of each cell creates the multicellular creature hologram by expressing the DNA in the center of the cells. The biohologram projected by the embryonic nervous system forms a three-dimensional pattern of structures that electromagnetically behave as the acoustic material waves acting as field guides to flowing matter and energy.

In the Quantum Holographic DNA-wave biocomputer theory , DNA is a self-calibrating antenna working by phase conjugate adaptive resonance capable of both receiving and transmitting quantum holographic information stored in the form of diffraction patterns (quantum holograms) which carry the essential holographic information necessary for the development of the embryo. The quantum holographic theory requires that the DNA consists of two antiparallel (phase conjugate) helices between which are located hologram planes where the necessary three spatial dimensional holographic image the data of the organism are stored. Endogenous laser illumination can turn the DNA into a series of active adaptive phase conjugate mirrors/holographic transducers. DNA functions as an antenna capable of both encoding and decoding holographic information. There is a predominance of non-linear processes in biological systems [16].

Coherence

Electromagnetic coupling is a mechanism of information transfer between individuals. Psychophysiological coherence refers to a state of synchronization between positive emotions, and the cardiovascular, respiratory, immune, and nervous systems. From a cardiovascular perspective, it is characterized by a heart rhythm pattern of elevated amplitude in low frequency heart rate variability of around 0.1Hz, indicating harmony between sympathetic and parasympathetic divisions of the autonomic nervous system. From a respiratory perspective, it relates to an optimal respiratory

sinus arrhythmia (RSA) of about 5-7 breaths per minute. From an immune and hormonal system perspective, it is associated with dehydroepiandrosterone (DHEA), recognized as an energy renewing growth hormone that balances the stress hormone of cortisol. From a neurophysiological perspective, it synchronizes with the alpha bandwidth on the electroencephalograph. Psychophysiological coherence has emotional, social, mental, ecological and performance benefits. The heart generates the most powerful, comprehensive, rhythmic electromagnetic field. The analogy is invoked of the orchestra conductor who synchronizes neurological, biochemical, biophysical and energetic information of nerve impulses, neurotransmitters, hormones, pressure waves and electromagnetic field interactions. Derived from the Latin term movere [to move], the word "emotion" literally means "energy in motion". In phenomenological terms, emotion is the experience of energy moving through the bodies that generate ANS related physiological and mental reactions, experienced in such strong feelings such as love, joy, sorrow or anger. Feelings generally refer to a vast array of more subtle conscious experiences and sensations. In itself, emotional energy is neutral. Physiological reactions, feelings and thoughts give the meaning to the emotion. Scientific research has confirmed that reactive emotional energy manifests in brain activity before thought. In simple terms, humans tend to evaluate everything emotionally, perceive first and think later. From a physiological perspective, the brain, heart and intestines contain biological oscillators known as pacemaker cells, whose rhythms can be altered through conscious intentionality. The synchronized activity underlies conscious experience itself. For the brain and nervous system to function, the neural activity, which encodes information, must be stable and coordinated and the various centers within the brain must be able to dynamically synchronize their activity in order for information to be smoothly processed and perceived.

Coherence is also used to describe the coupling and degree of synchronization between different oscillating systems. When two or more oscillatory systems operate at the same basic frequency, they can become either phase or frequency locked. This type of coherence is called cross-coherence. In physiology, cross coherence occurs when two or more of the body's oscillatory systems, such as respiration and heart rhythms, become entrained and operate at the same frequency. However, global coherence does not mean that everyone or all the parts are doing the same thing simultaneously. In complex globally coherent systems, such as human beings, there is an incredible amount of activity at every level of magnification or scale that span more than two thirds of the 73 known octaves of the electromagnetic spectrum. In living systems, there are micro-level systems, molecular machines, protons and electrons, organs and glands each functioning autonomously, doing very different things at different rates, yet all working together in a complex harmoniously coordinated and synchronized manner. The brain rhythms operate over a wide range of frequencies, exhibiting various degrees of synchronized activity with the heart, which has much slower rhythms than the brain. For example, when heart rate increases, the activity and amplitude of the brain waves also tends to increase. When the heart rhythm is coherent, heart-brain synchronization tends to increase.

The term auto-coherence describes coherent activity within a single system that exhibits sine wave like oscillations. The more stable the frequency, amplitude and shape, the higher the degree of coherence. When coherence is increased in a system that is coupled to other systems, it can pull the other systems into increased synchronization for more efficient function. For example, frequency pulling and entrainment can be seen between the heart, respiratory and blood-pressure rhythms as well as between very low frequency brain and craniosacral rhythms, and electrical potentials measured across the skin. The coherent state has been correlated with a general sense of well-being, and improvements in cognitive, social and physical performance. Coherence naturally emerges and harmony increases in the energetic system (referring to the functions that cannot be directly measured, touched or seen) with the activation of heart-felt positive emotions such as appreciation, compassion, care and love. This increased coherence and alignment facilitate the body's natural regenerative processes. Physiological coherence, also referred as heart coherence, cardiac coherence or resonance is a functional mode, measured by heart rate variability (HRV) analysis wherein a person's heart rhythm pattern becomes more ordered and sine-wave like at a frequency of around 0.1Hz (10 seconds).Another aspect of the coherence mode is the phenomenon of resonance. Resonance occurs in an oscillatory system when there is a large sudden increase in amplitude at a specific frequency. The frequency at which this large increase in amplitude occurs is defined as the resonance frequency of the system. The resonance frequency of the human cardiovascular system is determined by the feedback loops between the heart and the brain. In humans and in many animals, the resonance frequency of the system is approximately 0.1Hz. Actually, coherence and resonance are characteristic of the natural physiological state associated with heart-felt positive emotions [17]. The term physiological coherence describes the degree of order, harmony and stability in the various rhythmic activities within living systems over any given time period. This harmonious order signifies a coherent system, whose efficient or optimal function is directly related to the ease and flow in life processes. By contrast, an erratic, discordant pattern of activity denotes an incoherent system whose function reflects stress and inefficient utilization of energy in life processes. Positive emotions such as appreciation and compassion, as opposed to negative emotions such as anxiety, anger, and fear, are reflected in a heart rhythm pattern. Emotions alter the activity of the body's physiological systems, and beyond their pleasant subjective feeling, heart-felt positive emotions and attitudes provide a number of benefits that enhance physiological, psychological, and social functioning [18]. The term physiological coherence embraces several related phenomena – auto-coherence, cross-coherence, synchronization, and resonance – all of which are associated with increased order, efficiency, and harmony in the functioning of the body's systems. When one is in a coherent state, it reflects increased synchronization and resonance in higher-level brain systems and in the activity occurring in the two branches of

the autonomic nervous system (ANS), as well as a shift in autonomic balance toward increased parasympathetic activity. Psychologically, coherence reflects increased emotional and perceptual stability and alignment among the physical, cognitive, and emotional systems.

Coherence and resilience are closely related on physiological and psychological processes and both are states rather than traits that vary over time as demands, circumstances and level of maturity change. Resilience is related to self-management and efficient utilization of energy resources across four domains: physical, emotional, mental and spiritual. Physical resilience is basically reflected in physical flexibility, endurance and strength, while emotional resilience is reflected in one's ability to self-regulate the degree of emotional flexibility, positive emotions and relationships. Mental resilience is reflected in our attention span, mental flexibility, an optimistic world view and ability to integrate multiple points of view. Spiritual resilience is typically associated with the commitment to core values, intuition, and tolerance of others' values and beliefs. In a coherent state, the increased physiological efficiency and alignment of the mental and emotional systems accumulate resilience across all four energetic domains. Having a high level of resilience is important for not only recoupling from challenging situations, but for preventing unnecessary stress reactions (frustration, impatience, anxiety) that deplete the physical and psychological resources. [19]. The concept of coherence pertains to the homeostatic balance present in a healthy individual, representing harmonious interactions of the body's subsystems, external relationships, and interactions. Coherence implies a global order, structure, harmony, and alignment within and amongst systems. A commonly understood concept in physics is that coherent electromagnetic fields can form stable patterns. Coherence refers to the patterns of biological rhythms that are in coupled states, resulting in synchronized oscillations. Many bio communicative processes in biology rely on coherent oscillations to induce biochemical reactions [20].

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