

## **Heuristic psychological case study of HeartMath practice for health and physical exercise**

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### **Abstract**

Informed by HeartMath theory and praxis, this psychological case study involved a review of the author's personal HeartMath practice. A heuristic phenomenological research methodology was complemented by HeartMath records over a time period of two years, eight months, with the author reflexively functioning as both researcher and participant. Illustrated HeartMath measurements and Heart Cloud records provide evidence of learning and facilitation of personal, social and global coherence. Critical, creative and evaluative discussion focuses on psychophysiological theory and biofeedback practice. The value of the HeartMath system is endorsed for its propensity to promote resilience, health and physical activity as well as facilitate planetary survival.

**Keywords:** Heuristic psychology, case study, HeartMath, psychophysiology, biofeedback heart rate variability.

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### **Introduction**

In the context of this study, health is viewed as a coherent, dynamic integrity of various interacting energies, components and contexts (Childre, Martin, Rozman & McCraty, 2016; Wilber, 2000). Thus in addition to the traditional World Health focus on biological, psychological and social health and well-being (WHO, 1946), further emphasis is on alternative complementary, holistic orientations which include such dimensions as spirituality, ecology, energy and morality (Benson, 1996; Pert, 1997; Wilber, 2007). Health and physical activity essentially involve self-organizing, energetic processes, using diverse arrays of vibratory activity corresponding to dynamic, organ systems and correlated environmental resonant frequencies (Bohm, 1993; Childre et al., 2016). Physical exercise may be conveniently defined as a subset of physical activities that are planned and purposeful attempts to improve performance, health and/or wellness. For example, in addition to vigorous, performance driven, pursuit of athletic excellence, this includes regular, moderate intensity, exercise interventions to promote health (Berger, 2001).

In 1991, Doc Childre and a small group of professionals founded the HeartMath Institute, a non-profit research and educational organization, based in Boulder Creek, northern California (Childre & Martin, 1999). In pursuit of a central vision and mission to facilitate personal, social and global coherence, the institute pioneered integral, heart focussed research in neuroscience, cardiology, physiology, biochemistry, bioelectricity, physics and psychology (Institute of HeartMath, 2014). Major findings related to heart communication of electromagnetic, neurochemical, biophysical and hormonal information (McCraty, Atkinson, Tomasino & Bradley, 2009). Also pioneered were a system of practical, heart based tools and techniques for people of all ages to use in the moment to relieve stress and promote health, creativity, intuitive insight and zoned performance, as well as biofeedback technology to facilitate heart rate variability (HRV) coherence feedback training. Specific psychophysiological coherence promoting techniques include Heart focussed breathing, Quick Coherence, Freeze-Frame and Heart Lock-In (Childre & Martin, 1999). Tools include emWave, emWave Pro and Inner Balance (Institute of HeartMath, 2014).

A positive, global, psychological, practical and energetic approach underlies the techniques (Edwards, 2015, 2016). Emphasis is on awareness of energy depletion, renewal and resilience in preparing for challenges, as well as shifting and resetting feelings after challenges, through sustained, regular HeartMath practice. Although research has revealed that positive emotions are associated with psychophysiological coherence independently of respiration, heart focussed breathing at about 5-7 breath cycles per minute and/or 10 second cardio-respiratory rhythm remains a practical, first step in most tools. This conscious step facilitates respiratory sinus arrhythmia (RSA), a dynamic, naturally occurring, physiological mechanism, whereby heart rate increases during inhalation and decreases during exhalation. In addition, slower, rhythmic heart focused breathing facilitates identification and cultivation of a particular positive emotion (McCraty & Zayas, 2015).

In 2008, the Global Coherence Initiative (GCI) was launched to promote global health and well-being through heart-focused care (Institute of HeartMath, 2014). GCI was established to help activate the heart of humanity and facilitate a shift in global consciousness. The essential threefold mission is to: (a) conduct research on the mechanisms of interconnectivity between the earth's fields and human and animal behaviour, (b) invite people to contribute more global heart coherent care, compassion and love and (c) test hypotheses that large numbers of people creating such care, love, and compassion will generate a more coherent field. South African research collaboration with the HeartMath Institute has led to the establishment of an African Global Coherence Initiative magnetometer on a private game reserve in Kwa-Zulu Natal (Edwards, 2015, 2016). This is one of 6 monitoring systems presently operating at strategic locations on planet earth.

(See: [www.Heartmath.org](http://www.Heartmath.org), [www.glcoherence.org](http://www.glcoherence.org); [www.heartmathsouthAfrica.co.za](http://www.heartmathsouthAfrica.co.za), <https://www.heartmath.org/gci/gcms/heartmath-south-africa-global-coherence-monitoring-system-installation/> (Childre et al., 2016; McCraty, Dehle & Childre, 2012).

This study was motivated by the suggestion of a university colleague, and fellow HeartMath student and researcher. Its specific aim is to provide a heuristic psychological investigation into the author's personal experience and measurement of HeartMath, in order to provide an instructive case study for HeartMath practitioners, coaches and mentors working in health and physical activity settings. Its general aim is to promote holistic health and physical activity. Thus, while the study is objectively scientific and quantitative to the extent that it is concerned with HeartMath theory, practice, measurement and evaluation, it is heuristically psychological in its phenomenological attempt to faithfully describe the author's personal experience of HeartMath practice. The neutral term, "the author," is deliberately used to facilitate objective reflexivity.

## **Methodology**

The basic case study method involved a review of personal HeartMath practice over the past two years, eight months. The study was heuristic and phenomenological in research methodology and practical investigation, with the author functioning as both researcher and participant (Moustakas, 1994). Autobiographical approaches are subject to qualitative research criteria such as authenticity, faithfulness, integrity, credibility, dependability and transferability (Terre Blanche et al., 2006). The availability of detailed HeartMath records enhanced scientific objectivity with reference to HeartMath theory, practice, measurement and evaluation. Autobiographical work is transparent and scientific to the extent to which it conveys authentic reflexivity and is exposed to proper critical scrutiny.

## *Participant*

The author is a 66 year-old, retired, Emeritus Professor of Psychology and Research fellow. He is happily married with two children and two grandchildren. A typical academic, he holds doctoral degrees in psychology and education. Professional qualifications include South African registration as Clinical Psychologist and Educational Psychologist and United Kingdom registration as Chartered Clinical, Sport and Exercise Psychologist. As athlete, he has enjoyed various forms of sport and exercise throughout his life. He incurred major rotator cuff and spinal cord injuries in gymnastics and rugby at the age of 14 that lead to a herniated disc at age 55, which curtailed his athletic career. However, a compensation, and major therapy, for this injury and attendant emotional trauma and depression, was considerably improved heart and breath based mediation,

contemplation and prayer. Since this time, physical exercise has been health rather than performance driven.

As psychologist, some of the author's work has involved researching indigenous and/or traditional forms of healing, with special reference to the original meaning of psyche as breath, consciousness, energy etc., with its related meditational and cardiorespiratory practices. Such research led to independent use of HeartMath type techniques, without the author being aware of this institution or its techniques. For example, an African breath psychotherapeutic technique, codenamed SHISO (Edwards, 2009, 2012), which used techniques similar to heart focussed breathing and Heart Lock-In techniques, was found to be significantly effective in improving health and spirituality perceptions, as measured on standardized scales and as compared to control groups. Later studies followed literature review of the Institute of HeartMath research library and personal communication with Rollin McCraty, Director of Research at HeartMath. These later studies, which used the HeartMath emWave2 apparatus provided support for the effectiveness of the HeartMath approach, both independently as well as incorporating a SHISO type methodology. Further research collaboration with the HeartMath Institute led to the establishment of the abovementioned African Global Coherence Initiative. These studies are available on [https://www.researchgate.net/profile/Stephen\\_Edwards](https://www.researchgate.net/profile/Stephen_Edwards).

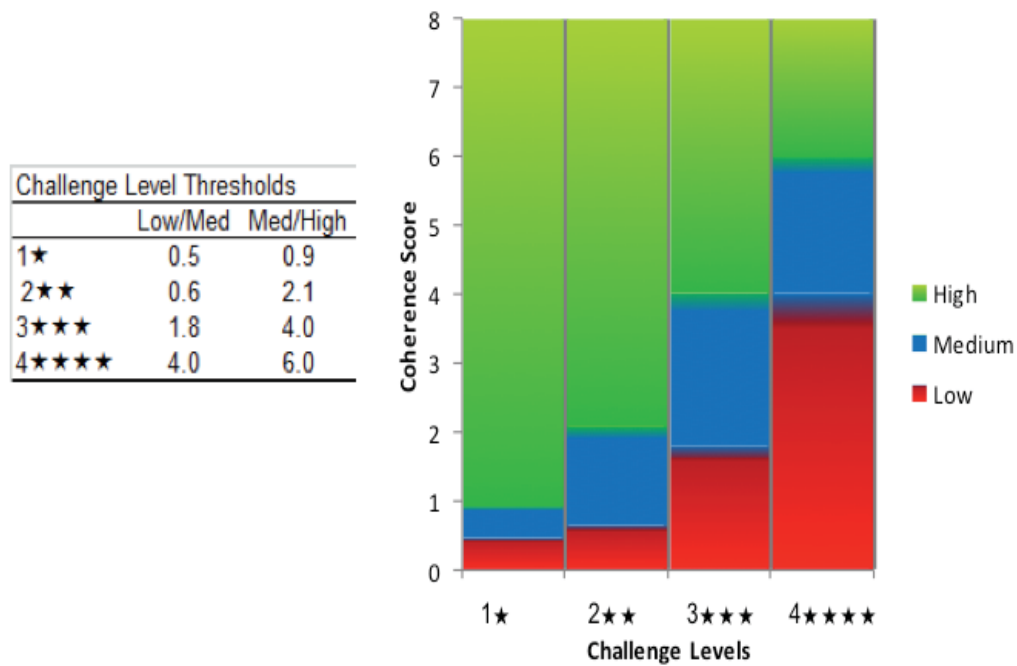
### *Ethics*

The research was approved by the University to which the author is attached. As certified HeartMath Coach/Mentor, researcher and participant, he was thoroughly informed on HeartMath research and practice.

### *Instruments*

The HeartMath biofeedback tools, Inner Balance, emWave Pro and emWave2 were used in this study. Either when used alone (Inner Balance personal trainer), or when attached to a computer, the instruments give readings as to HeartMath practice with regard to date, time, session duration, heart rate variability, average heart rate, achievement score, coherence score, challenge level; which ranges from 1 to 4; coherence ratio; in terms of percentage of time spent in low, medium or high coherence, time elapsed and graphic display of practice activity spent in a demarcated, coherent, zone of optimal, autonomic nervous system functioning. Physiological coherence biofeedback consists of an adjustable breath pacer, and red, blue and green coloured bars, with percentage indications and accompanying tones for low, medium and high coherence levels respectively, as well as coherence points accumulated. Session measurements for all tools are continuously monitored and recorded on a Heart Cloud. The Institute of HeartMath Coherence Score Guide has the following categories: 0.5 = basic –

good beginner level; 1 = good; 2 = very good; 3+ = excellent. Most regular practitioner scores fall in the 3 to 6.5 range (R. McCraty, personal communication, 31 May, 2015). Figure 1 indicates different challenge level thresholds available to the practitioner. As can be observed, the coherence score threshold is gradually increased at each challenge level. For example, the author currently practises on the highest challenge level of 4.



**Figure 1:** HeartMath Challenge Level Thresholds (<https://heartcloud.com/manuals>)

This means he has to reach a coherence score of 4 to progress from low to medium coherence and receive the corresponding feedback colour change from red to blue, and a score of 6 in order to progress from medium to high coherence level, when corresponding feedback is provided by a colour change from blue to green. Despite these different threshold and feedback zones, actual derived coherence and achievement scores are not affected by the challenge level setting.

Although the present study uses HeartMath instruments and biofeedback technology to enhance scientific rigor with regard to objective measurement and effective self-regulation, these are not essential for effective cardio-respiratory and meditation practice. Similar energetic, meditative and/or contemplative techniques, such as yoga and chi-gung, have been effectively used for millennia. However, numerous HeartMath studies, specialized technology and extensive literature reviews provide considerable and consistent evidence that such techniques and tools have never been as rigorously researched or effectively used.

Figure 2 refers to a HeartMath Power Spectrum Technique, available in Inner Balance and emWave Pro tool, indicating increased activity around the 0.1 Hz frequency range, the coherence zone, accompanied by decreased activity in both lower (sympathetic) and higher, (parasympathetic) frequency ranges respectively.



**Figure 2:** HeartMath Power Spectrum Technique (<https://heartcloud.com/manuals>)

Also observed at the top of Figure 2 are the coherence score of 2.26, session length of 1.02:57 and achievement score of 1,204 accumulated points. The participant's pulse rate of 68 beats per minute can be observed at the bottom of Figure 2. In this example, the participant must be practising in the first or second challenge level and is currently in high coherence as indicated by the green coloured dot above the power spectrum.

## Results and Discussion

### *Heart Cloud records*

To date, personal HeartMath Heart Cloud records indicate a licensed HeartMath Coach and Mentor practice of approximately 6256 sessions over a period of 2 years 9 months and 13 days or approximately 1018 days. Heart Cloud records indicate a total of 2,676,379 accumulative achievement points. Inner Balance personal practice frequency scores indicate a mean coherence score of 7.53 from a cluster of the highest ten scores, 4.8 from a cluster of median 10 scores and

0.99 from the lowest cluster of 10 frequency scores. Corresponding achievement score clusters respectively indicate an achievement mean of 3963 for a cluster of the highest ten scores, a mean of 449 for a cluster of 10 median scores and mean of 0 for a cluster of the lowest ten scores respectively. These scores also show a clear learning/training effect in the author's personal practice over time.

As GCI Ambassador, the author regularly participates in GCI meditation type sessions run through the Global Care rooms available at <http://www.globalcarerooms.org/rooms/login/gci>. Ambassadors are informed as to optimal GCI care focus times, which are scheduled to facilitate existing interconnectedness between humanity and planet earth's magnetic fields and energetic systems, as occurs, for example, during increases in solar radio flux, Schumann resonances power and full moons. HeartMath Coach as well as personal practice records are kept on a Heart Cloud, which provides readings records of individual and community achievement points on a daily and weekly basis. Over the recent Easter holiday period, when the author accelerated his personal and community Heart care practice, his one daily community achievement score reached 12,596 accumulated coherence points and his weekly score reached 59,884 accumulated coherence points. The HeartMath and GCI research library, which provides scientific evidence towards the value of such care for global coherence, health and wellbeing, is at: <https://www.heartmath.org/research/research-library>.

#### *HeartMath journal records*

The author's personal journal records of HeartMath sessions typically contain simple one line descriptions. Most entries reflect a holistic life, health and sport orientation that Wilber, Patten, Leonard and Morelli (2008) have termed Integral Life Practice (ILP), in a holistic, synchronistic attempt at exercising body, mind and spirit in self, culture and nature. It is instructive to note the process becoming less body and more mind and spirit, culture and nature orientated over time. As expected in terms of the author's age, background and research interests, journal records also typically focus on health, clinical, sport and exercise psychology, with special reference to HeartMath research and practice, consciousness, transpersonal psychology and African indigenous healing. Most sessions are done in the day and are short in duration, usually about 5 minutes. The following ten were relatively arbitrarily selected for their length, personal meaningfulness, illustrative content and relevance to this study. Another four sessions, with very brief entries, which were difficult to exclude, are also mentioned briefly in passing. The first five journal entries are clustered together in presentation as they are relatively more concerned with physical exercise and reflexive, technical matters related to personal and socially coherent HeartMath practice. These are followed by five entries relatively more concerned with psychological, spiritual and global coherence concerns.

- A. **Physical exercise induced highest coherence score.** Date: 5-9-2015; time, 8.31 am; challenge level 4; duration 7 min, 30 secs; average heart rate, 54; achievement score, 673; coherence score, 7.7; coherence ratio: low 8%, medium, 5%, high 87%. Session took place after shower and calm down period following completion of personalized exercise programme incorporating yoga, chi-gung and Pilates type core exercises, tai chi, resistance training using light weights and 4k run in beautiful scenario along promenade near beach and sea. The actual recording was taken while breathing deeply in relaxed *savasana* (Yogic corpse position). The session was accompanied by a sustained, mystical, Christian orientated contemplation, with cardiorespiratory synchronization, and positive emotions of hope and expectations as to reaching highest coherence level cultivated from the heart area. The extended description includes a typical post exercise type contemplation to gather endorphin “feel good glow”, and cultivate and harvest related energy. The author had been competitively attempting to reach post exercise performance levels above 7.5, over at least 500 accumulative score points, for some time, so this was a particularly satisfying personal performance achievement. To date this best performance/highest coherence score criterion has only been matched on one other occasion and its attainment was accompanied by the appreciative realization to the extent to which, like other performance feats, all coherence scores have multifactorial correlates.
- B. **Deep insights into HeartMath System, cardiorespiratory activity and emotion:** Date, 17-3-2016, time 5.17 am, highest challenge level, duration 72 min, 55 secs, average heart rate 49; achievement 1842, coherence score 2.2, challenge level 4; coherence ratio; low 90%, medium 10%, high 0%. Deep, engineering insights into reality as a wheel in motion, via diaphragm and heart mechanics, with diaphragm acting as a cylinder and respiratory sinus arrhythmia as plunger assisting the heart to irrigate the brain via blood chemistry, neurochemicals, biophysical resonances, electromagnetic information, emotional, Morse code type rhythms, all driven by subjective feelings and/or emotion as wheel with extreme positive emotions of ecstasy, passion, bliss, equanimity and negative emotions of depression, psychopathy, fear and violent aggression. Interesting to observe the relatively low coherence level possibly associated with this physical and mechanical engineering type insight.
- C. **Longest HeartMath contemplative session.** Date: 12-9-2015; time 2.44 am; challenge level 4; duration 70 min, 49 secs; average heart rate 51; achievement score 4531; coherence score 5.2; coherence ratio: low 23%, medium 42%, high 35%. With focus on sustained high coherence, no notes were kept of this session.



- D. **HeartMath critical question meditation session.** Date: 19-11-2015; time 2.02 am; challenge level 4; duration 48 min, 40 secs; average heart rate 48; achievement score 3286; coherence score 5.6; coherence ratio: low 11%, medium 49%, high 40%. Ken Wilber's approach of integral methodological pluralism (IMP) and related diagram of mind, body, self, other, interior, exterior, individual, collective, logic of coherence which facilitates subjective and objective, qualitative and quantitative methodologies and truth claims, was visualized (Wilber, 1997, 2007). The following critical, evaluative questions were asked of the HeartMath system and their implications for healing, psychotherapy and research. The journal entry reads: "Is there an essential central mechanism underlying effective or optimal functioning relationships? Is there a value component? Can it be used for destructive as well as beneficial purposes? Is coherence value free? What assumptions or values, principles, motivate, drive, direct and guide interventions and intentions for consciousness transformations, therapy and healing? Are we just concerned with subtle energy? At what point do correlation like mechanisms become causative inferential? Are we concerned with a missing link between body and quality and quantity of consciousness and behaviour, description and explanation? Natural, subtle and spiritual energies? What role does subtle energy play? What is its function? Is it devoid of an ethical, moral component?"
- E. **Is there a need for low coherence?** Date: 22-2-2016; time 1.10 am; challenge level 4; duration 23 min, 04 secs; average heart rate 49; achievement score 1163; coherence score 4.3; coherence ratio: low 43%, medium 44%, high 13%. The journal entry reads as follows: "Spectra of consciousness and coherence. Just like darkness, night, shadows, roots of trees, and the underground, times and places of incoherent, low and no coherence function to balance and refresh conscious awareness." This sleepy meditation session also brought the following long philosophical reflection: "Clearly life is not always coherent. It often seems as chaotic and incoherent as it is coherent. This is the reason coherence is needed and vice versa. Incoherence can shake up coherence to a new level in the continual process of development and evolution. For this reason, as Lehrer points out somewhere, it could be counter adaptation and health to be continually coherent or resonant. At another level, we would not appreciate coherence if we were continually coherent, just as we would not appreciate good or heavenly times if there were no bad or hellish times. In the spiritual tradition of Hinduism, it is the destiny of Atman to move away from Brahmin. In Christianity, although humans are supposedly made in the image of God, with soul and spirit, and can be Godlike at times, they would not be able to distinguish God, if they were continually Godlike. There would be no God or need for God. It is destiny to move away from the good, true and beautiful, to make

mistakes, feel angry, anxious, bad and sad as well as content, peaceful happy and excited, to experience hate as well as love, precisely because we are human. In fact there would not be any coherence or incoherence. We are continually developing, evolving processes with different levels of resonances or vibrations correlative with different densities of our existences. Thus we need rest and sleep as much as contemplation and action. We need death to enhance life. In creativity, things must be broken in order to be recreated. Also level of coherence does not seem to have that much of an influence on quality of insight and meaning.”

- F. **Ancestral consciousness in divine healer.** Date: 30-8-2015; time 3.56 am, challenge level 4; duration 13 min, 4 secs; average heart rate 50; achievement score 532; coherence score 4.5; coherence ratio: low 33%, medium 53%, high 14%. This is an example of a creative meditation, which provided inspiration for an article I was writing. The journal entry reads as follows: “The beautiful atmosphere of transcendence where the presence of the divine other is profoundly apprehended. Add these Zulu terms to paper to convey global coherence contribution. The authentic divine healer works at reaching that state of harmony with the ancestors and God/ Source until the divine message is clearly apprehended, felt and understood so that this sacred communication subsequently transferred can be clearly communicated to clients. Although everyone can contribute to good with heart focussed care the genuine divine healer’s message is reached through such attuned harmony. This most clearly communicates the truth, beauty and excellence of the message as well as its healing effect and value. The genuine healer judges the insight as revealed through the sacred communication as authentic to the extent to which it is apprehended as having arriving from the transpersonal realm. This is the yardstick used also to measure progress along the path of calling to be a healer. It requires continual growth and moral discernment not to abuse the gift.”
- G. **Ancestral consciousness dream of late father.** Date: 8-10-2015; time 5.34 am; challenge level 4; duration 10 min, 4 secs; average heart rate 46; achievement score 941; coherence score 6.2; coherence ratio: low 14%, medium 16%, high 70%. This personal, spiritual entry reads: “After previous meditation I slept and lucidly dreamed of an interview where I sang in response to a singer then afterwards my father was waiting before we embraced in a hall of mirrors. He had a simple, happy welcoming look. This was a wonderful homecoming experience. Then I meditated on radiating Love.”
- H. **Aesthetic meditation on environment.** Date: 15-2-2016; time 8.31 am: challenge level 4; duration 7 min, 30 secs; average heart rate 54; achievement score 385; coherence score 5.9; coherence ratio: low 36%, medium, 58%, high 6%. This entry read: “Aesthetics of silence in the rain”. An apprehension of stillness during soft rain brought many

peaceful feelings, memories of Christmas beetles singing, and thoughts on Wordsworth's poem, Tintern Abbey; Jung's book, Aion; and Assagioli's writings on Self-Realization. This session also preceded a full moon Global Care Meditation on 22-2-16.

- I. **Contemplation on God of Love.** Date: 8-3-2016; time 3.28 am; challenge level 4; duration 33 min, 15 secs; average heart rate 49; achievement score 1943; coherence score 4.9; coherence ratio: low 30%, medium, 23%, high 47%. The entry reads: Intuition of God as Love and Source of all creation, similar to Dante's 'Love that moves the sun and all the other stars' or Shiva's dance in Hindu tradition." This mystical session also particularly relates to three other sessions with the brief entries: "The spiritual heart as a transpersonal image for meditation and action," "What is this that which is always already here and now? Thou art that!" and "Resonating Presence".
- J. **Spherical model of consciousness/light/heat.** Date: 24-3-2016; time 5.11 am; challenge level 4; duration 31 min, 23 secs; average heart rate 49; achievement score 1877; coherence score 5.0; coherence ratio: low 29%, medium, 44%, high 27%. The journal entry reads: "Analogous to planet earth revolving in an infinite galaxy of suns/stars, reality may be conceptualized as a sphere, which can be cut up in different ways to reveal an infinite variety of slices. For example, a slice of consciousness could include a central point of awareness, surrounded by an infinite unconscious and/or superconscious, similar to Assagioli's egg model of consciousness. A finer slice may reveal emotional awareness and/or consciousness as in the HeartMath model.

Although some these descriptions may reflect personal experiences and thought, others are also radically social and transpersonal, for as human "representatives of the universe", both miniscule and all embracing, we have everything in us and are part of everything. It is hoped that they convey some of that absolute interconnectedness of this greater social and transpersonal reality. For further emphasis on social and global coherence the reader is referred to other publications at [https://www.researchgate.net/profile/Stephen\\_Edwards](https://www.researchgate.net/profile/Stephen_Edwards). The author's healing calling is expressed through psychological services at local and global community level. It is also hoped that these experiential descriptions convey some of the deep joy that is experienced in a life that includes some type of contemplation and action on some form of greater meaning that humanity has perennially described in many radical and mystical ways such as Love, Consciousness, Conscience, Source, Creator, God, Godhead, Ancestors, Nkulunkulu, Brahmin, Tao, Allah, Self, Supreme Synthesis, Universal Will and so on. Whether or not they have opportunity to use HeartMath tools and technology, readers are encouraged to practice consciousness of breath and heart, which facilitates centeredness and alignment to such greater Being, choice of path and everyday practical decisions. When severe pain, suffering, and

inevitable life struggles are experienced, the author's experience is that heart and breath consciousness readily provides those resonant vibrations and the required resilience to establish some re-alignment, adjustment and, ultimately, greater Self-realization. This expressed enthusiasm is based on considerable practice of the HeartMath system as well as various other forms of meditation, contemplation and prayer. Clearly any system needs continual quality checks and improvements, which is also the case with HeartMath. In addition to its continual work to further personal, social and global coherence and ongoing development of technology, its founder members continue to publish valuable articles and books, such as *Heart Intelligence* (Childre et al., 2016).

The HeartMath psychophysiological coherence model is supported by three complementary HRV related psychophysiological theories: Resonance theory, based on collaborative heart rate variability biofeedback (HRVB) research (Lehrer & Gevirtz, 2014) has indicated that maximal increases in amplitude of heart rate oscillation are produced when the cardiovascular system is rhythmically stimulated by paced respiration at a frequency of about 0.1 Hz (about 5-7 breaths per minute). Polyvagal theory (Porges, 2011), which postulates the "vagal brake" as a key, functional, social evolutionary mechanism, advocates the measurement and enhancement of respiratory sinus arrhythmia (RSA) and high amplitudes of HRV for health and well-being. The Neurovisceral Integration Model (Thayer & Lane, 2000, 2009), which describes a central autonomic network (CAN), extends polyvagal theory as to the importance of the "vagal brake" operating in relation to higher level social, cognitive, affective, and physiological regulation.

The author's practical HeartMath experience supports all the above perspectives. Along with optimal paced respiration at a frequency of about 0.1 Hz, accompanied by positive emotion, a key operative mechanism facilitating sustained high coherence levels, using the power spectrum tool illustrated in Figure 2, is to consciously use a "vagal brake" of focused relaxation whenever sympathetic arousal levels increase, as evident in the shaded, left hand side of the diagram associated with lower levels of HRV frequency. Such conscious executive functioning, supportive of the Resonance and Neurovisceral Integration Models, concurs with the authors' personal, clinical, neuropsychological knowledge, and similar cardio-respiratory, muscle relaxation, emotional imagery and zone experiences reported by other participants in other studies (Edwards, Edwards, Buscombe, Beale & Wilson, 2015; Vaschillo, Vaschillo & Lehrer, 2006).

Many studies have indicated that collective meditation, prayer, contemplation focused on positive outcomes can have measurable beneficial effects (Orme Johnson, 2000). There is converging scientific evidence for vast, energetic, interconnectivity at human, planetary and solar systemic levels (McCraty et al.,

2012). Any individual, group, community or nation motivated to promote planetary health and welfare can become GCI ambassadors at no financial cost. At present there are many thousands of GCI ambassadors from over 150 countries practicing heart focussed care, compassion and love towards improving global coherence (Childre et al., 2016). Many more such worthy initiatives are needed.

## **Conclusion**

By its very nature, this study only constitutes one limited, personal investigation, perspective and interpretation of HeartMath System. Many other possible interpretations and perspectives are needed. Further research is readily facilitated by the extensive HeartMath research library. Although the author's physical exercise is currently more health than performance driven, HeartMath technology has paradoxically facilitated the performance drive through "performance driven health activity" as measured in post-exercise, high coherence levels. The author has regularly practised various forms of meditation, contemplation and/prayer, especially since the age of about forty. He can honestly vouch for the additional structure, depth, breadth, height and meaning that HeartMath practice has brought. With the inevitable aging process and decline of physical performance abilities, HeartMath practice has facilitated further optimization of other layers of life; natural, emotional, mental, cultural and spiritual. It is hoped that this brief personal endorsement of the HeartMath system will benefit others and that this particular study will serve as inspiration and encouragement towards further HeartMath related research and practice. Despite planetary threats of nuclear war, international terrorism, global warming, overpopulation, unemployment, poverty, illness, injustice, corruption, crime and endemic violence, the author is optimistic about the long term future of all sentient beings, planet earth and beyond. He feels gratified and privileged to have been involved in furthering the HeartMath System vision and mission of personal, social and global coherence. He is of the opinion that planet earth and the wider universe needs many more of such global healing initiatives and opportunities and that it is precisely such initiatives that will help the planet and all its inhabitants survive and ultimately flourish.

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