

## Heart's Role beyond a Blood Pumping Machine: A Literature Review in Modern Perspective

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### ABSTRACT

Heart in the human body is a muscular organ that pumps blood to different organs. However, there are some studies advocate human heart related to some additional functionality included electromagnetism, intelligence, intuition, organs coherency, interaction and memory. In this article we present our initial study regarding an extra-ordinary role of the heart in the perspective of different scientific views. We reviewed the literature related to heart's communication with body organs including brain. The study also discussed the role of heart in depression, hypertension, stress and anxiety. The outcome of the study leads to the conclusion that heart is not only pumping machine but also plays extra-ordinary role in the human body.

**KEYWORDS:** Heart, Memory, Interaction, Electromagnetism, Social Relationship, Behaviour, Personality

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### INTRODUCTION

The views of the modern philosophers about the heart's role are divided. Some assigns the central role to the heart while other assigns this role to the brain. In some studies it is argued that many of the functionalities like sensation, emotion, intuition, thinking, information processing and coherence are related to the brain [1], while other studies argued that the important characteristic like thinking power, processing and many others capabilities are not restricted to brain [2, 3]. There are different opinions about heart's role, that it contains neurons which provide the ability for thinking, sensing and maintaining its operations. Heart is not only contain intra-cardiac system but also communicates with brain for performing different activities. Heart generates electromagnetic field in the surrounding which is much greater than the field generated by the brain. This field is used for coherency purposes with different internal body organs and external objects in the environment[4, 5]. According to modern and ancient study, heart takes part in psychological as well as in physiological process in the human body. In addition to these explorations, heart also participates as an intelligent organ, having memory of its own, cognition capability as well as help in predicting future events [6]. Similarly, heart also affects from daily life activities of human including interaction of people, working of employee and students during study etc. Heart exchange energy in a group of people during social activities which causes the source of coordination among them. Heart is also involved in many functionalities like treatment of patient, in learning process, regulation of emotion, and coherency and coordination. Here we present some of the important concepts about heart and its extra-ordinary role in the human body. The paper is organized as follows.

In the first section (**section 1**) we discussed role of the heart in healing. We demonstrated that how heart play its role in the treatment and healing process. In the next section (**section 2**) we revealed the role of heart in communication and interaction. In this section we point out energetic capabilities of heart and its involvement in communication with the different body organs as well as surrounding objects. We also study how heart participate in social communication and interaction. In **section 3** we mentioned the role of heart in the process of learning and education. We argued that it is not only the brain that performs the learning tasks but also heart perform partially or fully of such activities. Here we also discussed that heart is its own memory and strongly related to intelligence. In **section 4** we point out that how heart play its role in intuition which is about the prediction of future events.

#### Section 1

**Heart significance in clinical point of view.** Heart is considered distinctive with respect to its features and involvement in different fields of life. In this section we discussed the encouraging effects of heart over the healing process of physical and mental health. We also studied that the controlling of heart beats produce positive changes in the human body related to social behaviours, psychophysiological and global coherence. Further we discussed the

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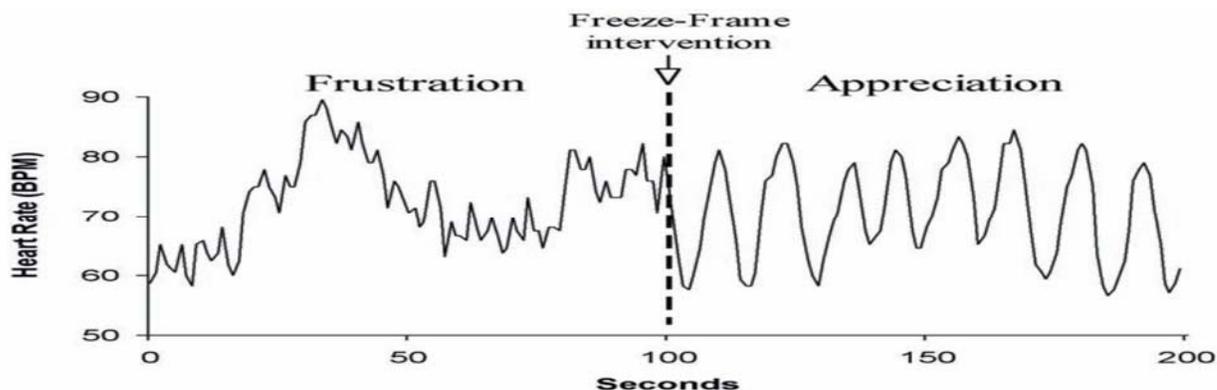
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states of heart in appreciation and negative thoughts as well as its effects on human health. So this portion dealt about uniqueness and importance of heart in biological system with respect to health and organs synchronization.

**a) Health:** Heart has significant impacts on physical and mental health of human body. Heart involvement enables one for automatic generation of health related positive emotion, psychological coherence, efficient functional-mode-appearance and stress reduction [7]. Health affects with Heart-rhythm-coherency based on heart involvement which causes self-generation, stress reduction, positive enhancement as well as helps in learning and performance [8]. Similarly, heart also takes part in sympathovagal balance which affects immunological, endocrinal and psychological changes [9]. Heart also influences human health using different variations in its states and produces positive or negative changes. For this purpose many heart based techniques are developed. Following are some tools and its application in which heart has been used as source for well-being.

- Freez-Framer is a tool used to measure heart-rate variation of human health. Human health is related to Heart-Rate-Variability (HRV), which is a variation in the heart beats. When the heart beat become coherent then it causes reduction in health-disorders including psychological diseases, depression, hypertension and panic disorder [10, 11].
- Heart-rhythm-feedback, which is used a pulse-wave-sensor to maintain physiological coherence and influence human health [12].
- Cognitive-Behavioral-Therapy (CBT) tool is used to monitor Autonomous Nervous System (ANS) variations corresponding to patient's health [13]. Such monitoring involved about patient's health related to different abnormalities including panic disorder [13]. CBT therapy resulted an improvement in controlling and Neuro-cardiac functions.
- Progressive-Muscular-Relaxation (PMR) and Mindfulness-Based-Stress-Reduction (MBSR) are also based on cardiac rehabilitation for bringing positive changes in the human health [14]. PMR technique is used to improve patient's psychological health, stress and anxious heart [15]. Where MBSR is used to train patients suffered from hypertension, pain, HIV and myocardial ischemia [16]. Bothe of these techniques are based on heart and used to produce relaxation into different anxious states
- Self-Management also a heart based technique reduces Stress, negative emotions as well as controls HRV and dehydro-epiandrosterone (DHEA) [17, 18]. In this technique, the negative emotions eliminates by increasing positive changes. It consisted of two methods "Cut-Thru" and "Heart Lock-in" that results automatic changes on the health.

These methodologies enable us to get control on physiological and psychological health. The mentioned tools are also applied for the Congestive-Heart-Failure (CHF) patients and trained them to control and manage their stress related abnormalities[19]. These heart based tools are also helpful for infected individuals to reduce their stress, anxiety, negative thoughts, fear and guilty by appreciation and increase psychological well-being. The health's related tools are actually working on the energy generated by the heart. These have been verified by Annette Deyhle in his experiment on saliva. He tested saliva crystallization under the magnetic field generates by the heart during heart-lock-in practice. From the test, he explored that the electromagnetic-field variations affects dried saliva and suggested that it influence coherency as well as emotional, physical and mental states of human body [20]. Similarly, a pilot study is also conducted by Debora Rozman for stress-reduction of those individuals having positive Human-Immunodeficiency-Virus (HIV) [21]. Stress-reduction-program can apply to an individual having positive HIV using Freeze-Framer tool. This tool is used to bring changes in mental and emotional instability of psychological symptom of HIV. Rolling McCraty studied that frustration and appreciation varies with stress, emotion and psychological coherence. Frustration and appreciation influence with heart rate variability and have significant effects on health. In **Figure-1**, the heart rate variability observed in appreciation and frustration states with intervention of Freeze-Frame [7].



**Figure 1: A shift in the heart rhythm from frustration to appreciation**

Heart also takes part in the nervous system of human body. The Autonomous Nervous System (ANS) of patients having panic disorder can also be controlled with heart rate variability. ANS functions influences with appreciation, positive emotion and love. ANS causes a shift in the electromagnetic field and enables heart to communicate positive feeling throughout the whole body [22]. Positive-feeling generates in the body corresponding to different incitement which affects immune system, neuroendocrine, autonomic function, psychological state, anxiety, depression as well as shown significant changes in salivary IgA (S-IgA) [23, 24]. So heart's electromagnetic field can be used for healing and diagnosing purposes. The recent research suggested that the damaged cell can be treated with improved heart's magnetic-field of the concerned person [25]. It has been tested both on infected and healthy cells under the same environment. The testing environment may be used the ECG signals. Infected cells included from those patient who suffered from disease like tumor. Both healthy and infected cells are analysed. After testing, the result shown about 20% growth in the healthy cells and 20% reduction in tumor cells[26]. The growth and reduction of healthy and affected cells respectively varied due to the coherent electromagnetic field. Similarly, the variations in the heart field can also be used to control physiological and psychological problems related to patients. Such abnormalities and diseases included women suffered from breast cancer also shown better results in their health during and post treatment. Coherent heart rate also used to improve the immune system of effected patients by applying stress-reduction-technique [27].

- b) Heart rate variability (HRV):** HRV is the measured of beat to beat changes or fluctuations in heart-rate. HRV can be obtained from ECG (electrocardiogram) recording by placing some electrodes or plethysmographic optical sensor with fingers or earlobes. The fluctuations affects heart-brain and other body's organs communication and coherence. When HRV shows rhythmic and coherent pattern then it cause better psychophysiological mode and emotional state [28]. HRV variations enable one to control and manage physiological coherence. It is significantly related to human personality which influences performance of physical, mental and social in clinical, workplace and academic environment [29, 30]. So heart beats variations affects human daily life activities including social and academic. In the clinical perspectives, heart's fluctuations associated with patient's health and well-being. For this purpose HRV and cardiac activity has been used to measure psychological and behavioural states in response to stress and anxiety [31]. HRV enables therapist to find the electrophysiological and emotional responses and then it can be used to control conscious and subconscious emotions [12]. These are the sensitive and autonomic functions which contributes to the treatment of patients having panic disorder (PD) regarding patients 'health, age and gender [32]. It is also applicable in many areas related to health for generating positive emotion, performance enhancement as well as decreasing stress, anxiety and hypertension [30, 33, 34]. For this purpose Freeze-Framer tool is used to bring positive characteristics in human personality [35, 36]. HRV can also be used for treatment of severe brain injuries, which enables one to regulate their emotions, enhance their thinking and psychophysiological self-regulation [37]. Psychophysiological self-regulation and heart rhythm coherency reduces hypertension and stress, which can be observed on em Wave device [38]. HRV indicates different states in considering to appreciation, love, contentment, apathy, frustration and anger. According to the research, there are six different patterns in HRV during psychophysiological interaction which is depicted in the Figure 2 [28]

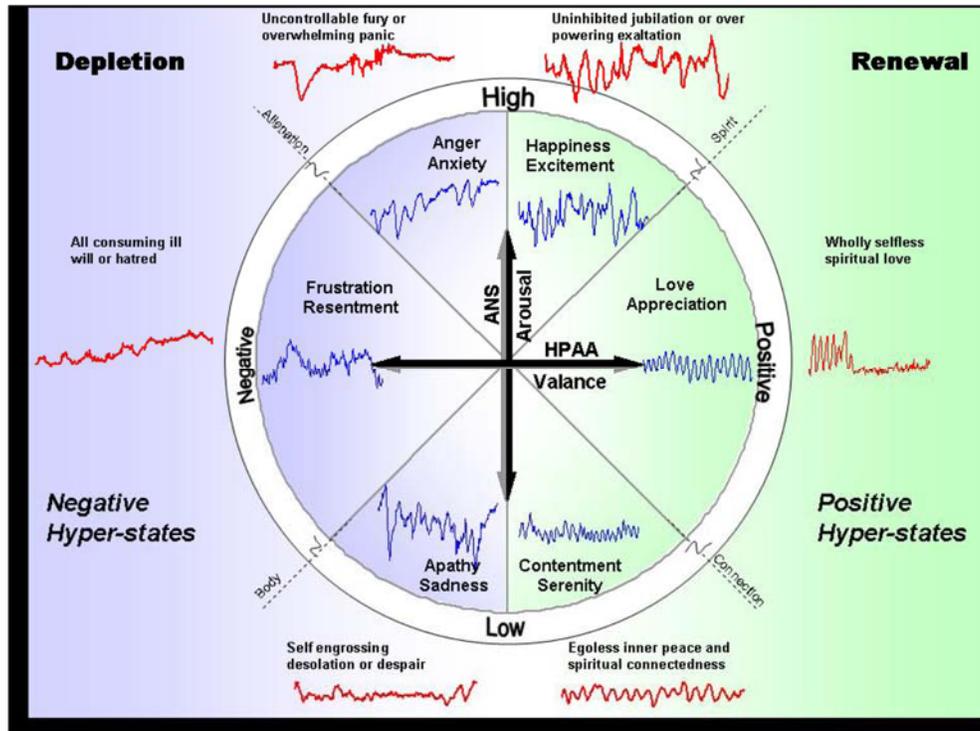


Figure 2: Six states of psychophysiological interaction of everyday life.

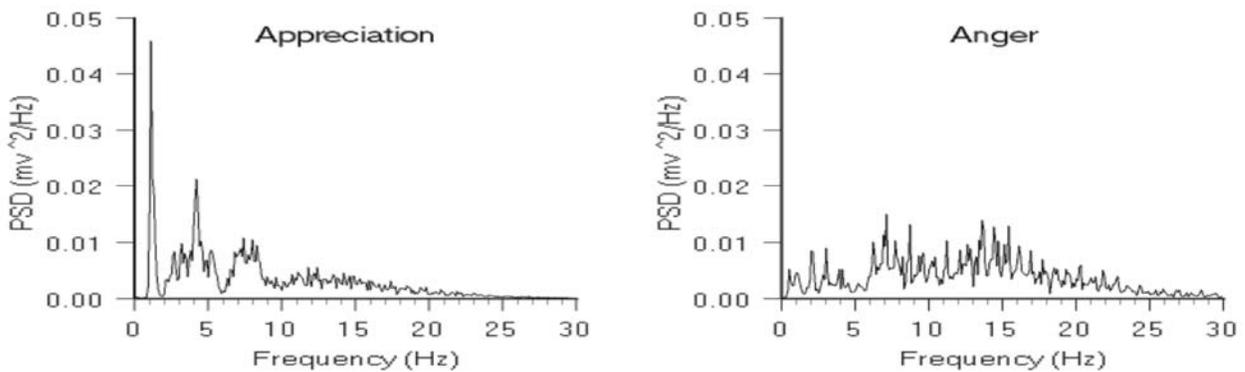
- c) **Cardiac and Psychophysiological Coherency:** Human body consist of different organs like heart, brain and intestine with biological oscillators which can be brought into synchronized form. The synchronization of biological oscillators affects mental and emotional self-control. When the heart oscillations become coherent with other body organs then it positively affects the organs related to performance and efficiency. Such cardiovascular functions are beneficial in the treatment of hypertension as well as reduction in congestive heart failure, increasing respiratory efficiency and synchronization of cells [28, 39]. David S. Jones president of Institute for Functional Medicine (IFM) suggested some new architectures as involvement of heart for many complex diseases. That heart-rate variability has many applications in science and clinical based treatment. These consisted dynamic and coherent approaches for assessment, prevention, treatment of complex and chronic diseases in the 21<sup>st</sup> century [40]. A report has been presented on the treatment of posttraumatic stress disorder (PTSD), that heart of fighters in the battle can bring in coherent state which help them to reduce their stress, controls parasympathetic emotions and regulation [40]. Similarly, it is also suggested that people during their working can also be trained to control their physiological and Psychological stress using heart-rate [41]With this training, police will be able to build self-regulation skills, enhance their communication, cooperation and dealing in a better way. In addition to external environment, the internal body structure also affects with coherent heart. That the conformation of DNA can be altered with cardiac coherency and also can be used for healing purpose of biological system [42].

The discussion of section-1 concludes that heart is greatly involved with biological system of human life related to health and well-being. Heart conditions like positive and negative emotions are also affect physical and mental states, body parts coherency and intervention in different diseases. All the above functionalities performs by the heart with using its energy. While such type of energetic capability enables inter and intra body interaction and communication.

## Section 2

**Energetic capabilities of Heart.** Heart is an energetic organ and playing its important role in clinics as well as in interaction among individuals using its energetic capabilities. Heart generates an electromagnetic field in its surrounding to exchange information and influence internal body organs as well as external objects. The regularity and irregularity in electromagnetic-field bring positive or negative changes respectively in human personality. Heart used the energetic capability to interact with different body organs and exchanging useful information. So the proceeding discussion is about the importance of heart in coherency within the body parts as well as its environment. Following discussion is also about the energetic features of heart and energy exchange between objects.

- a) **Heart is an Energetic Organ:** From the research, it is exposed that heart has sensing capabilities and nervous system which influences functions of brain through its rhythmic electromagnetic-field [43]. Heart generated electromagnetic field which is stronger than the fields generated by other organs in body i.e. the heart electric field is 60 times while magnetic field is 500 times greater than the field of brain. It can be detected in a few feet surrounding the body using specialized tools like Superconducting-Quantum-Interface-Device (SCQID) [44]. This energetic field enables heart to perform some special functions rather than only pumping the blood. It also cause the synchronization of biological system and communicating information with each cells in the body. This field also contained information having specific pattern which can be detected through Signal-Averaging-Technique [26]. The energy of heart can also be measured through electrocardiogram (ECG) machine. ECG is a waveform of energy represents an individual's cardiac features. ECG is the variations occur during heart-rate in different states of body. The relationship between heart-rate and ECG pattern also enables one to encode information in heart electromagnetic-field. Recent research explored that ECG signal contains unique pattern or features for each subject[45]. These features can also be used for identification purposes i.e. biometric. These pattern are extracted by the Dubin with analogue method [46]however recently ECG is interpreted and digitally analysed with medical instrumentations[47].In addition to these, heart's field also affects human physiology at the molecular level structure including DNA formation [8]. These findings represents that the biological structure can be altered from external environment with exchange in some form of energy.
- b) **Heart and transformation of energy between peoples:** As the heart generates the strongest electromagnetic field which can be detected on surface of body or a few feet away from the body. This electromagnetic field can be measured using Electrostatic device[48]and SQUID magnetometer[44]. Recent research has explored, that these fields causes an exchange of information between individuals during physical interaction [49]. This energetic field become coherent when an individual in the state of appreciation, care and love. The coherent energetic field also helpful in the healing process for individuals taking part in the practice process. When someone in the state of love and caring it generates a coherent field which synchronizes the fields of other body. The exchange of energy between the fields during interaction affects each other with corresponding states either positive or negative. The energy is also exchange without in touch and sometime broadcast to the surrounding objects[50]. Such type of energy-exchange is known cardio-electromagnetic in which two individuals come into the state of communication[26]. It enables an individuals to communicate, understand and affect physiologically without any verbal communication. The exchange of energy also affects conformation of water which helps the process of healing pain, wounds and improve psychological state[49]while human body consisted about 70% of water. Similarly, when people set relatively opposite to each other than the heart's signal of one person registers in other person's electroencephalogram (EEG) signal of the brain [51]. The communication between the participants using ECG and EEG also varies with setting at different angles to the body as well as hands-hold orientation, distance variations and wiring together [49]. These exchange of information can be observed through Average-Signalling tool in **Figure-3**.

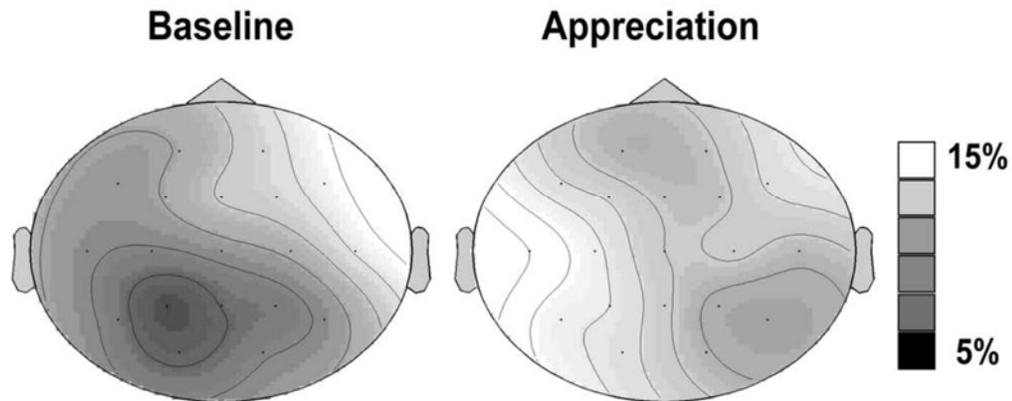


**Figure 3: ECG during different emotional state.**

- c) **Heart-Brain Interaction and Synchronization:** Heart also take part in the process of synchronization of different organs in the internal body. In addition to other body organs, heart communicates useful information with brain in regarding to perform different activities [52]. There are four types of communication channels which enable heart-brain synchronization and coherency [53].

- Neurologically, using autonomic nervous system and nerve impulses.
- Biochemically, using hormones and neurotransmitters.
- Biophysically, through pressure and sound waves.
- And energetically, by generating electromagnetic field.

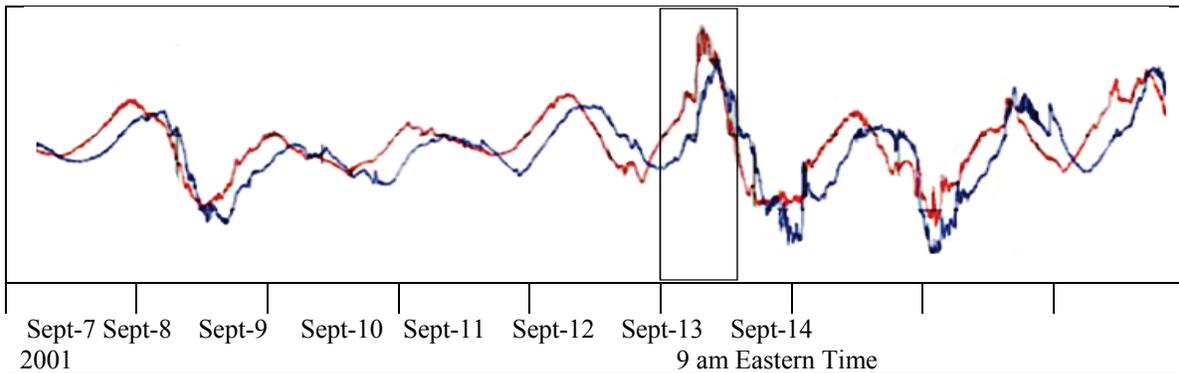
These pathways are used to communicate with brain in regarding to different tasks including thinking, memory, decision making and communication[54]. During heart-beating, heart not only pumping blood but also send out a dynamic pattern to brain and other bodily organs using the four mentioned ways of communication [55]. These information and pattern are used to helps brain in decision making purposes. Similarly the sending information is also in the form of signals via neural-pathways to influence brain electrical and central activity [52, 56]. Where such information can easily be exchanged with brain and other parts due to its placement in the middle of the body[31]. In addition to these functionalities, research also explored that the state of consciousness not only limited to brain but other organs including heart is also partially involved and acting together with brain[57]. Similarly the cortical and emotional concerns in the brain are also significantly affects with variation in the input rhythmic pattern from the body organs. So, heart has significant role in originating such rhythmic pattern. These pattern can also be transferred to brain for controlling emotional process [58]. Similarly, when heart beat and the electroencephalogram-alpha-rhythm (activity of brain) become synchronizes then it produces physiological and psychophysiological coherence. Psychophysiological coherence causes stabilizing spiritual state and enhances emotional and cognitive performance [59]. The coherency and synchronization can be enhanced with the subject self-increase in appreciation and positive emotion. The heart-brain coherency can be measured from alpha wave activity generated by the brain, in which the range of 8-12 hearts-frequency is naturally synchronized form with the cardiac cycle [55]. The synchronization of brain activity with heart beats is presented in the **Figure-4**[55]in which the lightest colour represents more coherence and increased cognitive performance. By increasing the synchronization can cause an improvement in cognition, stability and enhancement of positive emotion as well as psychosocial function. There are different techniques used for emotion reformation included Heart Math, Cut-Thru, Freeze-Frame and Heart Lock-in.



**Figure 4: Cardiac synchronization with the alpha brain activity. The right sided one with light color represents more coherence and synchronization of heart with the brain in appreciation.**

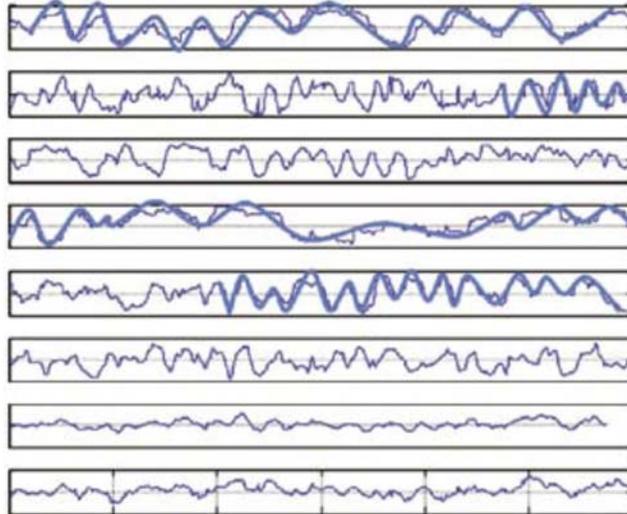
- d) **Psychological, Physiological and Global Coherence.** Coherence is “the quality of logically integrated, consistent and intelligible”. Here the coherence is discussed on the partial, individual and global level. It has been studied that objects in the universe are correlated and connected with each other. Similarly the human body has significant correlation with the objects in the universe. When the heart’s rhythm become coherent then it influences the psychological and physiological health, and spiritual perception as well as environmental objects [60]. The patterns in the electromagnetic field generated by heart are used to synchronize bodily organs. Heart interacts with organs (i.e. brain) of the body as well as with surrounding people by interfering to brain magnetic field(alpha wave). The coherency among the organs of the body enhances the decision making capability, creativity and enhancement of positive feelings. The psychological involvement of heart also causes minimization of anxiety, anger and hostility and increasing positive reception [61]. Psychophysiological coherence also give directions to the brain processing, function and enhance the performance in focus, attention and tolerance. Heart is greatly related with psychological, physiological states and human health. The heart relation with health can also be extended to Autonomous Nerve System. When psychophysiological coherence

increase, it affects Autonomous Nerve System as well as perception and emotional processing in the brain [62]. Other changes also have been noticed with heart coherency in the human body. Like Salivary-Immunoglobulin (S-IgA) which is a defence system and found significantly stimulated with positive emotion and coherency [63]. As previously discussed that heart is related to psychophysiological states but these associations are also correlated with global coherence. For this purpose, the science based project with named Global-Coherence-Initiative (GCI) has been initiated to illustrate the coherent relationship among the individual's social activities with global environment. According to GCI exploration that any disruption in global and geomagnetic activity affects human health and behaviour-coherency [64]. This study also suggested that collectively practice of people with heart-based generation of positive energy can produce a peaceful world. When the positive energy generating by living things and the earth field become coherent then it initiate global peace. Research also explored that the universe field responds to people collective coherence and energetic field. Rolling McCraty revealed in his study on GCI that an environmental shifting has been observed in the energy level with a specific worse event. The shifting and fluctuation was recorded from the earth geometric during the Nine-Eleven (9/11) attack. The data recorded in the interval from two satellites positioned at different location and found fluctuations in the geomagnetic field of the earth. Similarly, the same data was observed from the ground based magnetometer. It is also hypothesized that bidirectional information exchange between the earth energetic field and human collective-emotional-energy. The coherency of geomagnetic field of earth affects health, mental and emotional process.



**Figure 5: The data recorded from the Geostationary Operational Environmental Satellite 8 and 10 weather satellites in geosynchronous orbit over the east and west coasts of the United States in the days before, during, and after the September 11, 2001, attacks.**

- e) **Interaction Between people:** Heart takes part in the process of coherency at internal, external and global level. Such tasks either performs by interacting at internal (organs) level or external level. The research of Rolling McCraty about the energetic-heart explored that heart has an important role in bio-electromagnetic interaction between peoples [26]. The electrocardiogram (heart field) of one person can be detected in electroencephalogram (brain wave). Such detections can either be found in the range of electromagnetic fields of each other or with due to touch of the bodies. According to McCraty's experiment on "electricity of touch" that two subjects can interact with each other via heart energy generation. The energy varies during different states of the bodies including appreciation and anger. Heart's energy generation during different states (appreciation, anger etc.) is presented in the **Figure 2**.
- f) **Social Activities:** The heart involvement also has been studied for different social activities, such as working of employees. The members of a group can influence coherency of each other with their heart positive rhythmic states [65]. In a group of collective-heart-coherence and synchronization, the skilled members can affect the non-skilled members with their positive energy of heart. From the research it is concluded that the participants across a group can communicate using their heart electromagnetic fields (heart-to-heart bio-communication). One's coherent heart rhythm enhances and synchronizes the target/receiver heart's magnetic field in a small group. The heart rate coherency of subjects paired is presented in **Figure 6**[65] in which the bottom oscillation is more correlated.



**Figure 6: Oscillation of Heart rate coherency of the subject pair**

Such coherence states also helpful for removal of stress and anxiety and enhancing using heart rhythm coherence. For this purpose, the heart based activities performs like “shift the focus from brain to heart by taking deep breath” [66]. Similarly the negative emotion also causes disturbance in the heart rhythmic pattern of other members. The appreciation enhances positive effects, ability of problem solving, creativity, long term memory, satisfaction and stress reduction [67]. These interchanging feelings effect human health like immune system. For this purpose Inner-Quality-Management (IQM) tool is used to increase immunity of the body with cardiovascular coherency [68]. Cardiovascular coherency produces positive emotions in the members of a group [56]. These positive emotions of people in a group can also be enhanced the strengthening of the energetic field among individuals. The energetic field distributes information in the members and these information can be obtained from an individual’s electromagnetic field in the same group. Similarly, heart, brain and other organs are not only coherent internally but also synchronizes with social and global consistency [69]. People can harmonize themselves to bring a coherent state through their energetic field and the coherent field also affects the universe. According to the research that the geomagnetic field encodes and exchanges information with the human electromagnetic-field and causes changes related to health, local and social activities [64].

The electromagnetic field generated by the heart is used for interaction with the body parts as well as the surrounding objects. In the internal body communication, energy exchange is performed to synchronize the functionalities of the body organs. Similarly the generated field of heart also affects many internal characteristics including DNA structure. The exchange of energy among the group of people greatly influences social activities. So, this section discussed the connection of objects with the universe and how they are correlated each other. The positive energy generation also plays an important role for bringing positive transformation, enhancing learning capabilities, improve memory and thinking power.

### **Section 3: Education, Learning and Memory**

The process of learning and cognition is deeply related with heart-rate-variability and heart-brain communication. When heart generates disordered signals, it limits the learning, cognition and thinking process. So the problems in learning and training can be reduced using special tools which working on the principle of heart focus. Such technique enables one to create interest in learning with applying self-regulation and reduce stress and anxiety. Following section discusses how to enhance memory and intelligence with the heart focus.

**a) Heart perspective in Education and Learning:** In the western culture much of their focus was on brain in regarding to learning and cognition process. But the recent evidence explored that heart also play an important role in learning, psychophysiological and cognitive functioning [70]. The states of learning and performance are correlated with psychophysiological coherence and heart-rate-variability or heart-rhythm-coherence. Heart generates signal to communicate with brain for performing higher-brain functionalities which affects emotion and learning development. Besides these, heart has a functional brain of its own with having the capability of sensing, encoding and processing of information [71]. Heart also send neurological signals and rhythmic pattern to emotional and cognitive centre of the brain to control mental state of the brain. When heart send incoherent signals to the brain and nervous system then it limits thinking power, focus, remembrance and reasoning [70].

Heart also involves in the regulation of emotions, psychophysiological coherence and improvement of memory, learning and social functioning. These social, emotional and decision factors are correlated with learning. The students may face different problems related to learning, cognition, reasoning and focus. Such problems of stress and anxiety can be treated with heart focus. There are some tools used for controlling these problems which are based on the heart-rhythmic-feedback and coherency i.e. included Biofeedback, Freeze-Framer, emWave, Quantum-Intech and Boulder-Creek. Biofeedback is a heart based procedure used for student's physiological activities to enhance social strength, emotional health and academic learning [72]. This procedure also applicable for pre-school students to control and regulate their emotions and feelings related to social, emotional and cognitive growth [73]. Similarly, stress, anxiety and negative emotions in students can be handled with improvement in emotional stability, self-management as well as improvement in organization, behaviours, learning and cognition [74]. These procedures also helpful for teachers and instructors to recognize, manage and balance autonomic-nervous-system of students during learning and performance in the classrooms [75]. So heart-rate-variability helps students to reduce their stress, negative emotion and anxiety [28, 76]. From the studies it is also explored that Biofeedback is useful for college and nursing student to reduce any kind of depression during learning stages[74, 77]. It also enable students to control themselves during test and exam while they feel nervous and depressed. Sometime students behaves in irritating and harsh ways which is a hurdle in the way to build their personalities. Such student's performance can be improved by enhancing their social connections and bringing in positive emotional states during their learning and training [78]. For this purpose, signals has been taken from skin to measure blood pressure, heart-rate, brain-activity and muscles-tension [79]. Similarly with heart-focus, heart-rate-coherency and emotional-self-regulation techniques are used to improve cognitive, learning and behaviours of students suffered from stress, anxiety and Attention-Deficit-Hyperactivity-Disorder (ADHD) [80-82]. Freeze-Framer and emWave tools are used for managing psychosomatic-disorder, self-regulation, performance of those individuals and students suffered from Attention-Defect-Disorder (ADD) and ADHD [35, 36]. It is concluded and suggested that student can improve learning, academic performance, positive emotion and social emotional outcome based on heart-focus [70].

- b) Intelligence and Memory:** From the research it is explored that intelligence and memory are also associated with heart focus techniques [83]. Heart focus techniques also consisted Biofeedback, which is used to enhance the Intelligence, learning and decision making capabilities of concerned subjects. It is also used to monitor and control heart-rate-variability, visual-learning and memory in stressful situations. The heart-rate-variation are related to Autonomus-Nerve-System (ANS) of the body. Furthermore the ANS's functions affects physiological-Coherence that results a better state for learning, understanding as well as enhance mental and emotional clarity [84]. In regarding to intelligence and memory, heart send information in signal form to brain and then these information are fed to cardiac centre of the brain. Such information and statistics are further send to the intralaminar, thalamus and amygdala. Whereas, these parts are connected to the frontal lobes of brain which have been using for decision making, reasoning, feelings and sensation [84]. There are different theories and hypothesis about memory. One is Systemic Memory Theory which has the assumptions that all dynamic systems have the capability of information and energy storage up to some level of degree [85, 86]. The general assumption about memory is that, nervous and immune system are the primary storage memory. According to Living System Theory, each cell of the organs possess its memory and these organs are capable of making decision in their own [86]. Such memory of organ has been observed during heart transplantation. It has been noticed that the recipient feels changes in their living style after transplantation [87]. These information point to the conclusion that heart communicates information with brain through electromagnetic energy. The transplanted heart of donor exchange information with the recipient brain and affects the existing information.

Heart plays very important role in the human body included intelligence and memory. Heart considered to have its own functional brain which encode and process information. These information are then exchange with brain to carry out a specific task. These study also shows that heart is linked with learning and thinking as well as in decision-making process. Similarly the decision making ability enhances creativity and intuition in the human body.

#### **Section 4**

This section discussed the role of heart not only limit to intelligence and memory but also involves in intuition. Intuition deals the prediction of foreknowledge about objects and events. Intuition enables heart to access information stored in the unconscious mind. When the in-going and out-going energy field synchronizes, then the intuitive information obtain about object.

**Intuition:** It is a process by which information senses and receives outside from the range of conscious awareness and this information is about future events that not yet happened [88]. According to the research, both brain and heart involve in intuition and response to intuitive information [89]. It is postulated [90], that when heart energetic-

field and object-field become coherent then an optimal communication can happen for exchanging useful information. During this communication, heart become capable of receiving an accurate foreknowledge about the object. The intuitive information about future events process by heart, brain as well as by the Autonomic Nervous System [91]. Some of the research determined that intuition is the process to access the existing information in the unconscious-mind from forgotten experiences [92]. So heart involves in the intuition process and motivate heart-rate about future events [89]. It has been hypothesized that there are two forms of fields generated in the human body, one is out-going and the other is incoming field. Out-going field carries information from the heart to the concerned object within the range of field while in the reverse communication, the object send its information to heart. When both of these fields become coherent then an optimal channel is obtained for communication of information about the intuitive object [88]. From conclusions of Rolling McCraty research on intuition part: 2, that both heart and brain involve in intuition, where heart receive intuitive information before the brain. The intuitive information is also varies in male to female. So different stimuli appears to gender, calmness, emotional, event-related-potential (ERP) and heart-beat-evoked-potential (HBEP) [93]. The female's heart more attunes to the intuitive information with interaction between ERPs and HBEPs.

With intuition, a group of people like entrepreneurs can enhance their decision-making with future vision and rationalizes their businesses states[94]. Such decisions-making capability enable one to produce choice for future outcomes related to oneself business[95]. While the expected outcomes regarding decision making is received by the Autonomic Nervous System (ANS) about 6 to 7 seconds before the actual event. Similarly the intuitive perceiving related to future work is associated to the emotional level for the event [88].

The above section discussed that an intuition enabled one to predict about future events. Heart play very important role in intuition process. These future events are helpful in many concerns: for example, for decision making purpose for the business community.

## **CONCLUSION AND DISCUSSION**

The views of the modern philosophers about the heart's role are divided. Some assigned the central role to the heart while other allocated this role to the brain. In some studies it is argued that many of the functionalities like sensation, emotion, intuition, thinking, information processing and coherence are related to the brain [1] while other studies argued that the important characteristic like thinking power, processing and many others capabilities are not restricted to brain [2, 3]. In this paper we discussed the role of the heart beyond the conventional concept i.e pumping the blood to the different parts of the body. We discussed how heart plays its role in treatment and healing. We also mentioned heart's role in communication and interaction and explained how heart plays its role in communication with the rest of the body parts. We also discussed how heart plays its role during social communication. In this article we presented heart's role in learning and education process. We argued that it is not only the brain that performs the learning tasks but heart also plays a very important role. Here we also argued that heart is strongly related to intelligence, memory and intuition. It can be concluded from the above studies that heart not only pumps blood to body organs but also takes part in various others activities. These activities or extra ordinary role of the heart is important in various perspectives. From the research it is explored that heart has its memory and processing capabilities which coordinates brain in different functionalities and decision making. Similarly, the surrounding energy affect the internal body organism including DNA structure. Which opposing many theories about DNA structure and its variations. Furthermore, the research explored that heart and brain performs many functionalities on coordination base. Now the question is arise that up to what extent heart and brain participate in a particular processing task.

### **Future work**

The role of the heart is very important in mental and physical health. In addition to this, other healing process can also be possible with heart focus. Similarly, the pattern of the heart is unique to every individual which can be used as a biometric with less fraudulent access. Heart field effects the body DNA structure which may give us a way of linking to the DNA. Heart plays an important role in intuition which may facilitate us to predict about future events like earthquake, flood and storm etc.

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