



The Intuitive Heart

Accessing Inner
Guidance to Raise Our
Consciousness Baseline

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Abstract

This booklet explores the heart's role in emotional experience and how learning to shift into a more coherent state helps establish a new inner baseline reference and increases access to our intuitive capacities and deeper wisdom. It explores the nature and types of intuition and the connection between intuition and lifting consciousness.

It has been suggested that the process of increasing one's self-regulatory capacity and establishing "new" memories, which are sustained in the neural architecture, facilitates a stable and integrated experience of self in relationship to others and one's environment. We also will discuss implications of accessing intuition in meeting the increasingly complex demands of life with greater love, compassion and kindness, thereby lifting consciousness.

Introduction

In a world whose pace and complexity is ever increasing, where we face more and more personal and social challenges, there is a call for lifting individual and global consciousness. People want to make more intelligent choices so daily life is more tenable, personal and global relationships are stronger and more meaningful and the future of our planet is assured.¹

Raising individual and global consciousness can help us improve personal and collective health, well-being and harmony. We suggest that this begins with people taking greater responsibility for their day-to-day decisions, actions and behaviors, which can result in establishing a new and healthier physiological and psychological internal baseline reference.

To establish a baseline, it is necessary to have effective and practical strategies available for handling daily situations, making good decisions and taking meaningful and appropriate action.

Much attention has been given to identifying the many factors that go into making good decisions. Among these factors are awareness of self and others, cognitive flexibility and self-regulation of emotions. All of these are important for bringing more consciousness into our daily situations and the decisions we make.

Another factor that should be considered in decision-making and self-regulation, one we've all experienced, perhaps without being fully aware of it, is *intuition*. There is fascinating research that is beginning to uncover the nature and functioning of intuition, or what researchers refer to as *intuitive intelligence*. In a literature review of intuition, Gerard Hodgkinson of Leeds University in England, notes that despite the many conceptualizations of intuition, there is a growing body of research suggesting there are underlying nonconscious aspects of intuition.

Among these nonconscious aspects of intuition are implicit learning, or implicit knowledge, and pattern recognition, which are involved in intuitive perception.² It is commonly acknowledged that intuitive perception plays an important role in business decisions and entrepreneurship, learning, medical diagnosis, healing, spiritual growth and overall well-being.^{3,4}

Research also suggests intuition may play an important role in social cognition, decision-making and creativity.

When addressing life situations, people often default to familiar patterns of thoughts, feelings and actions in both the decision-making process and how they see others. This is how our physiology works.

Rather than responding to situations from habitual patterns that are not necessarily healthy or constructive, however, those situations could be more effectively addressed with new and creative solutions. These solutions can take into consideration the available inner resources that are congruent with one's deeper intuition and core values. In other words, we can learn to intentionally align with and access our intuitive intelligence, which can provide moment-to-moment guidance and empower what HeartMath calls heart-based living.

Self-Regulation

Adjusting or self-regulating one's responses and behavior in order to build and maintain loving relationships and a supportive social network and effectively meet life's demands with composure, consistency and integrity, arguably is central to good health and effective decision-making.⁵ It is also a key for success in lifting consciousness and living life with greater kindness and compassion in all relationships. If one's capacity for intelligent, self-directed regulation is strong enough, then regardless of inclinations, past experiences or personality traits, people usually can do the adaptive or right thing in most situations.⁶

It has been shown that efforts to self-regulate one's emotions can produce broad improvements in in-

creasing or strengthening self-regulatory capacity similar to the process of strengthening a muscle, making people less vulnerable to depletion of their internal reserves.⁶ When internal energy reserves are depleted, our normal capacity to maintain self-control is weakened and intelligent decision-making can be compromised, which can lead to inappropriate behaviors, lost opportunities and increased stress and damaged relationships. Despite the importance of self-directed control, many people's ability to self-regulate is far less than ideal. In fact, failures of self-regulation, especially of emotions and attitudes, are central to the vast majority of personal and social problems that plague modern societies. Therefore, the most important skill the majority of people need to learn is how to increase their capacity to self-regulate emotions, attitudes and behaviors. Self-regulation enables people to mature and meet the challenges and stresses of everyday life with resilience. It helps them make more intelligent decisions by aligning with their innate higher-order wisdom and expression of care and compassion, elements we often associate with living a more conscious life.

Effectively dealing with the stress of everyday challenges and sustaining one's resilience primarily involves learning to recognize and self-regulate the constant stream of thoughts and especially emotional undercurrents we have such as judgment, negative projection, insecurity and worry, all of which result in incoherence and waste energy.

By learning to replace these depleting undercurrents more frequently with more positive, regenerative attitudes, feelings and perceptions, we can establish a new inner baseline reference, a type of implicit memory that organizes perception, feelings and behavior.⁷ Creating a new baseline empowers one to sustain more beneficial attitudes, behaviors and responses that integrate the heart's intuitive perspectives and bring forth a deeper innate source of wisdom. Without establishing a new baseline reference of self-regulation that incorporates intuitive guidance, people are at risk of living their lives primarily through the automatic filters of past familiar experience.

Intuition

The origin of the word “intuition” is the Latin verb *intueri*, which is usually translated as to look inside or to contemplate.

In his article reviewing intuition, Gerard Hodgkinson concludes that “intuiting” is a complex set of inter-related cognitive, affective and somatic processes, in which there is no apparent intrusion of deliberate, rational thought. He also concludes that the considerable body of theory and research that has emerged in recent years clearly demonstrates that the concept of intuition has emerged as a legitimate subject of scientific inquiry that has important ramifications for educational, personal, medical and organizational decision-making, personnel selection and assessment, team dynamics, training and organizational development.² Another comprehensive review of the intuition literature defined intuition as “affectively charged judgments that arise through rapid, non-conscious and holistic associations.”⁸ Neuroscientist Antonio Damasio also suggests that the outcomes of intuition can be experienced as a holistic “hunch” or “gut feel,” a sense of calling or overpowering certainty and an awareness of a knowledge that is on the threshold of conscious perception.^{9,10}

Several researchers have contended that intuition is an innate ability that all humans possess in one form or another and is arguably the most universal natural ability we possess. They also say the ability to intuit could be regarded as an inherited, unlearned gift.^{11,12} A common element also found in most discussions and definitions of intuition is that of affect or emotions. Although intuitions are felt, they can be accompanied by cognitive content and perception of information. In this booklet, we suggest that emotions are the primary language of intuition and that intuition offers a largely untapped resource to manage and uplift our emotions, our daily experience and our consciousness.

As pervasive and vital as they are in human growth and day-to-day life, emotions and effective ways of self-regulating them, have long remained an

enigma to science. Many common emotion-regulation strategies operate on the assumption that all emotions follow thought and thus, by changing one’s thoughts, one should be able to gain control over one’s emotions. In the last decade, however, research in neuroscience has clearly shown that intuition and emotional processes operate at a much higher speed than cognitive processes.¹³ In many cases, emotions occur independently of the cognitive system and can significantly bias or color the cognitive process and its output or decision.^{14,15} In other words, because many emotional processes operate faster than thought processes, behaviors and decisions may be based on emotions rather than thoughtful discernment.

The quest to understand the complex interaction between different parts of the brain and how this relates to cognition and the felt experience of emotion has been addressed from many perspectives. It turns out that in order to understand brain function, it’s important to understand the important role of the heart and its unique and influential connections to the brain. This discussion explores recent scientific findings that help clarify the role of the heart in emotional experience and effective approaches for self-regulation that include shifting the rhythms of the heart, thereby enabling enhanced cognitive functioning and intuitive capacities.

The question of how intuition interacts with deliberate, conscious thought processes, has long been the subject of debate. Research in the fields of cognitive and social psychology has produced the commonly accepted dual-process theory, which suggests there are two separate processing systems. The first and most fundamental involves intricate interactions between automatic unconscious processes. The second is related to slower conscious processes.¹⁶ A number of pattern-recognition models have been developed to explain how this fast type of intuitive decision and action can be understood purely in terms of neural processes in which the brain matches the patterns of new problems or challenges with stored templates in memory based on prior experience.

The conscious state, or individual consciousness has been defined in a variety of ways. There is substantial consensus, however, that at a basic level, it can be understood as the awareness of one's self and environment and the corresponding capacity for self-directed action that is informed by input from implicit and automatic processes.¹⁷ Emerging lines of scientific thought suggest that the consistent sense of one's self is maintained in the intricate internal communication and interactions within interacting levels of neural networks and processes.¹⁸ In this context, the patterns of neural activity that are maintained in the neural networks are a type of implicit memory. These unconscious memory patterns provide a stable reference for our ongoing experience and underlie a variety of important processes that are central to optimal function, intuition and higher-functioning consciousness.

Types of Intuition

For purposes of this discussion, I will use the framework generated by our research at the Institute of HeartMath, which suggests there are three different categories or types of processes that intuition often is used to describe.

The first type of intuition, often called *implicit knowledge* or *implicit learning*, essentially refers to knowledge we've acquired in the past and either forgot or did not realize we had learned. Drawing on the neuroscience conception of the human brain as a highly efficient and effective pattern-matching device,¹⁹ a number of so-called pattern-recognition models have been developed to show how this fast type of intuitive decision-making and action can be understood purely in terms of neural processes. In this regard, the brain matches the patterns of new problems or challenges with implicit memories based on prior experience.^{2, 20, 21}

The second type of intuition is what we call *energetic sensitivity*, which refers to the ability of our nervous system to detect and respond to environmental signals such as electromagnetic fields. It is

well established that in both humans and animals, nervous-system activity is affected by geomagnetic activity.²² Some people, for example, appear to have the capacity to feel or sense that an earthquake is about to occur before it happens. It has recently been shown that changes in the earth's magnetic field can be detected about an hour or even longer before a large earthquake occurs.²³ Another example of energetic sensitivity is the sense that someone is staring at us. Several scientific studies have verified this type of sensitivity.²⁴

The third type of intuition is *nonlocal intuition*, which refers to the knowledge or sense of something that cannot be explained by past or forgotten knowledge or environmental signals. Examples of nonlocal intuition include when a parent senses something is happening to his or her child who is many miles away, or the repeated, successful sensing experienced by entrepreneurs about factors related to making effective business decisions.

The study of nonlocal intuition, which at times has been thought of as being in the same category as telepathy, clairvoyance and precognition, has been fraught with debate in the scientific community.²⁵ While there are various theories that attempt to explain how the process of intuition functions, these theories have yet to be confirmed, so an integrated theory remains to be formulated. Nevertheless, there is increasing evidence showing nonlocal intuition is a very real and measurable phenomenon.

A meta-analysis of nine experiments that measured physiological responses occurring prior to a future event (pre-stimulus responses) that could not otherwise be anticipated through any known inferential process, revealed statistically significant results in eight of the nine studies in over 1,000 subjects.²⁵ Subsequent to this, a researcher, by examining 26 studies, also concluded that a clear pre-stimulus response in physiological activity occurred prior to unpredictable stimuli, despite the fact there is not yet any known explanation of the mechanisms for this finding.²⁶

An Institute of HeartMath study independently replicated and extended previous research documenting pre-stimulus responses and found evidence to suggest the heart is involved in the processing and decoding of intuitive information, which is then communicated to the brain.^{27, 28} We found further evidence that the magnitude of pre-stimulus response to a future event is related to the degree of emotionality of that event.²⁷

Implicit Learning Processes

To gain a deeper understanding of the role of the heart in accessing intuitive intelligence and thereby lifting consciousness, it is first prudent to discuss how memories of past events play a crucial role in setting the stage for implicit types of intuition and emotional perception as well as the important role the heart plays in all three types of intuition.

A new understanding has emerged in recent years of how the brain functions and how the heart and brain interact in a dynamic and complex relationship.^{14, 29} Rather than assembling thoughts and feelings from bits of data as a digital computer does, the brain is more like an analog processor that relates whole concepts or patterns to one another and looks for similarities, differences and relationships between them.³⁰

Although dual-process theories come in a number of forms, they all have in common the distinction of including two separate processing systems. The first system is unconscious, automatic and intuitive. It processes information very rapidly and associates current inputs to the brain with past experiences. Therefore, it is relatively undemanding in terms of its use of cognitive resources. For example, when individuals have gained experience in a particular field, implicit intuitions are derived from their capacity to recognize important environmental cues and rapidly and unconsciously match those cues to existing familiar patterns. This results in rapid and effective diagnosis or problem-solving. In contrast, the second processing system is conscious in nature, relatively slow, rule-based and analytic. It places

greater demands on cognitive resources than the first system.²

The term intuition also is used commonly to describe experiences scientific literature refers to as insight. When we have a problem we cannot immediately solve, the brain can be working on it subconsciously. It is common when we are in the shower, driving or doing something else without thinking about the problem for a solution to pop into the conscious mind and which we experience as an intuitive insight. This type of implicit process involves a long gestation period following an impasse in problem-solving prior to a sudden insightful perception or strategy that leads to a solution.³¹ In contrast, intuition in the first process described above occurs almost instantaneously and is emotionally charged.³²

Implicit Process and Emotional Experience

Past experience builds a set of familiar patterns or memories within us that are established and maintained in nested feedback loops in our neural architecture. Our experience in navigating life and the associated inputs to the brain from both external and internal environments contribute to establishing and maintaining these familiar patterns. Many processes within the body provide constant rhythmic inputs with which the brain eventually becomes habituated and recognizes them as familiar. In other words, we establish sets of physiological and behavioral set points or default patterns that, once established, the brain and nervous system strive to maintain.²⁹ Although more complex, this is analogous to setting the temperature to a specific setting on a thermostat and having the heating system maintain that temperature. It should be noted that the default patterns that are established may or may not be healthy or optimal.

The internal processes that contribute to establishing these stable patterns or set points include patterns of activity in the afferent or ascending neural input from the heart, digestive, respiratory and hormonal systems to the brain, as well as patterns of muscular tension, particularly facial expressions. It's important

to note here that the heart and the body send far more information to the brain through afferent, or ascending pathways than the brain sends to the heart and body through efferent, or descending pathways. The inputs via these pathways are monitored continuously by the brain and help organize perception, feelings and behavior. Once a stable pattern is formed and stabilized in memory, all sensory input to the brain, from both the internal and external sensory systems, is compared to the stable reference patterns. When the current inputs match the baseline pattern, the brain recognizes them as familiar and we experience this as comfortable. It is important to understand that this is true even if the established reference pattern is one associated with chaos, incoherence, confusion, overwhelm, anxiety, etc. It is comfortable because it is familiar, but again, it may not be optimal.

In order to maintain stability and feelings of safety and comfort, we must be able to maintain a match between our current experience or “reality” and one of our previously established neural “programs.”³³ When we encounter a new experience or challenge, there can be a mismatch between the input patterns of the new experience and the familiar reference patterns. Depending on the degree of mismatch, it typically requires either an internal adjustment or an outward behavioral action to re-establish stability. When a mismatch is presented to the brain from either the external or internal sensory systems, a change in activity in the central and autonomic nervous systems is produced. If the response is short-lived (one to three seconds), it is called arousal or an orienting reflex. If, however, the stimulus or event is recurrent, the brain eventually adapts and we habituate by updating the memories that serve as the reference. For example, people who live in a noisy city adapt to the ambient noise and tune it out. Subsequent to this adaptation, it is only when they take a trip to the quiet countryside that the actual lack of noise seems strange and is quite noticeable. The mismatch between the familiar noisy background input and the quiet setting leads to an arousal reaction or discomfort that gets our

attention. *It is this departure from the familiar that gives rise to a signaling function that creates the experience of emotion, which alerts us to the current state of the mismatch.* It is interesting to note that in this context the word “emotion” derives from the Latin *emovere*, which is defined as “to move out or away from.”

In addition to processes that monitor the inputs and controls for maintaining stability in the here-and-now, there also are matching processes that appraise the degree of consistency or inconsistency between past events or situations and current ones, as well as between a current situation and a projected future. These appraisals of future outcomes can be broadly divided into optimistic and pessimistic³⁴ appraisals. If the appraisal does not result in a projected ability to successfully deal with a situation and return to stability, feelings of fear and anxiety can result. This appraisal could be the result of past negative experiences in similar situations or a lack of experience or insight on how to effectively deal with a projected future situation. As we successfully navigate new situations and challenges, we can apply the experience we’ve gained to them without fear. In essence, we mature through this process as we learn to more effectively self-regulate our emotions and deal with new situations and challenges.

Although inputs originating from many different bodily organs and systems are involved in the processes that ultimately determine our internal set points and influence emotional experience, it is now abundantly clear that the heart plays a particularly important role.⁷ The heart is the most consistent source of dynamic rhythmic patterns in the body. Furthermore, the afferent networks connecting the heart and cardiovascular system with the brain are far more extensive than the afferent systems associated with other major organs.³⁵ As mentioned earlier, the heart sends more neural traffic, or information to the brain than the brain sends to the heart. The inputs from the heart and cardiovascular system to the brain are major contributors in establishing the dynamics of the baseline patterns or set points against

which the “now” is compared. Once established, these internal set points are updated or adjusted according to ongoing experiences, successes and failures in meeting life’s demands and challenges. Because our psychophysiological systems are designed to maintain stability and resist change, returning to familiar set points gives us a feeling of security, while remaining in unfamiliar territory causes unrest, anxiety, fear, etc. *This is true even if the established reference is one of chaos, incoherence or confusion.* This means we can easily get “stuck” in familiar yet unhealthy emotional and behavioral patterns and that lasting improvements in emotional experience or behaviors cannot be sustained in the absence of establishing a new baseline reference, which the system then strives to maintain. If behavior change or improved affective states are desired, it is therefore critical to focus on strategies that help to establish a new internal reference. There are several effective strategies that can establish a new internal baseline, including a technique for increasing our intuitive capacities, which we will discuss in a later section.

Self-Regulation and Stability

When the current input to the brain does not match an existing program or physiological set point, adjustments must be made to maintain control and stability. One way to re-establish control is by taking an outward action. For example, we are motivated to eat if we feel hungry and take action to find a source of food. We might run away or fight if we feel threatened or do something to draw attention to ourselves if we are feeling ignored. Alternatively, we can re-establish stability and gain control by self-regulating and making internal adjustments without any overt action.

Stanford University neurophysiologist Dr. Karl Pribram and many others have conducted numerous experiments that provide evidence that the higher brain centers that monitor the pattern-matching process can self-regulate by inhibiting, or “gating” the information flowing into the brain. Where we focus our attention, for example, has a powerful

effect on modulating inputs and thus on determining what gets processed at higher levels. In a noisy room filled with many conversations for instance, we have the ability to tune out the noise and focus on a single conversation of interest. In a like manner, we can modulate pain from a stubbed toe or headache or desensitize ourselves to sensations like tickling and self-direct our emotions.¹⁹ Ultimately, when we achieve stability or establish new set points, the results are feelings of satisfaction and gratification. In contrast, failure to effectively self-regulate often results in feelings such as frustration, anxiety, panic, annoyance, apprehension, hopelessness or depression.

If the neural systems that maintain the baseline reference patterns are unstable, unsettled emotions and atypical reactions may be experienced. These neural systems can be destabilized by stress, anxiety or chemical stimulants, to name a few possibilities. Therefore, it is clear that optimal function in responding effectively to ongoing inner and outer demands and circumstances such as daily life situations, depends to a great extent on synchronization and stability of our physiological systems.^{7, 36}

There is substantial evidence the heart plays a unique role in synchronizing and stabilizing the activity across multiple systems in the body. As the most powerful and consistent generator of rhythmic information patterns in the body, the heart is in continuous communication with the brain and body through multiple pathways: neurologically through the autonomic nervous system (ANS), biochemically through hormones, biophysically through pressure and sound waves and energetically through electromagnetic-field interactions. Because of these multiple communication pathways, the heart is uniquely positioned to act as the “global coordinator” in the body’s symphony of functions to synchronize the system as a whole.^{7, 36, 37} Because of the extensiveness of the heart’s influence on physiological, cognitive and emotional systems, the heart provides a central point from which the dynamics of the psychophysiological systems can be self-regulated.

One of the research focuses of our laboratory over the last decade has been the study of the patterns and rhythms generated in various physiological systems during the experience of different thoughts, emotions and behaviors. By experimenting with numerous physiological measures, we found that heart rate variability (heart-rhythm) patterns are consistently dynamic and reflective of changes in one's emotional state (Figure 1).^{7,38}

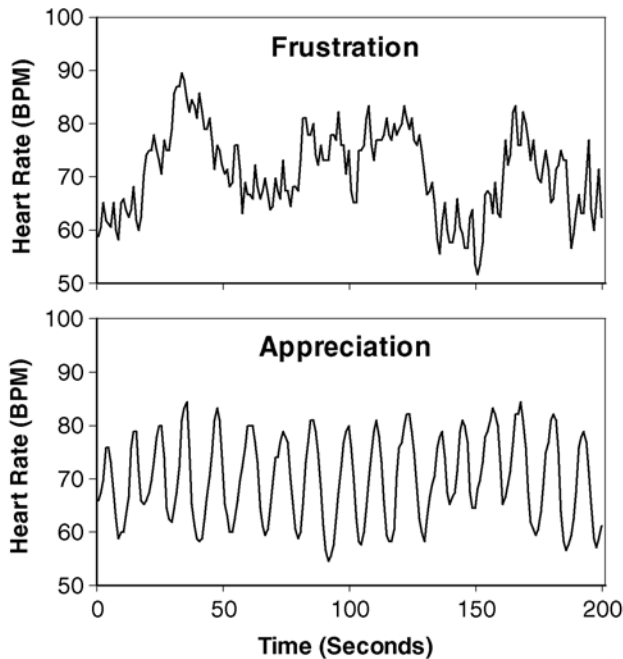


Figure 1. Emotions are reflected in heart-rhythm patterns. The heart-rhythm patterns shown in the top graph, characterized by its erratic, irregular pattern (incoherence) is typical of depleting emotions such as anger or frustration. The bottom graph shows an example of the coherent heart-rhythm pattern that is typically observed when an individual is experiencing sustained, modulated regenerative emotions, in this case appreciation. Both recordings are from the same individual only a couple of minutes apart. The amount of variability and mean heart rate are the same in both examples, illustrating how the pattern of activity contains information in the absence of changes in physiological activation.

It is important to note that although heart rate often changes with emotions, our research has found that it is the pattern of the heart's rhythm that is primarily reflective of the emotional state.^{7,39,40} Spanish researcher Enrique Leon expanded on our observations by analyzing the rhythmic patterns

that occur in heart rate variability (HRV). Leon found that by analyzing HRV patterns, as measured by a heart-rhythm monitor, he could correctly identify discrete emotional states such as anxiety versus frustration with 75% accuracy.⁴¹ These changes in rhythmic heart-rhythm patterns can be independent of heart rate, meaning that one can have varying degrees of coherent or incoherent patterns at higher or lower heart rates. Thus, it is the pattern of the rhythm rather than the rate at any point in time that is most directly related to emotional dynamics and physiological synchronization.⁷ This is important because the heart-rhythm pattern that is generated, regardless if it is incoherent or coherent, affects brain centers involved in sensory motor integration, decision-making, problem-solving, self-regulation and behavior. It also is related to our ability to access our intuition.

Physiological coherence, which also can be referred to as heart coherence, cardiac coherence or resonance, can be assessed by analyzing HRV rhythms in specific ways. A person's heart-rhythm pattern becomes more ordered and sine-wavelike at a frequency around 0.1 Hz (10 seconds).^{7,38} A coherent state reflects increased synchronization in the activity and flow of information between higher-level brain systems, more efficient activity occurring between the interactions of the two branches of the ANS (sympathetic and parasympathetic) and an increase in parasympathetic activity, or what often is called vagal tone.⁷ Importantly, there is physiological evidence that the continued practice of coherence-building techniques creates a *repatting process* in the neural architecture, where coherence becomes established as a new, stable baseline reference memory.⁴² In a practical sense, coherence becomes the new set point or default, facilitating the ability to self-regulate emotions and stress responses, a process that then becomes increasingly familiar and eventually automatic.^{43, 44, 45, 46} This makes it easier for people to maintain their "center" and increase their mental and emotional flexibility and remain in self-directed control. It also builds one's capacity to access all three types of intuition.

Energetic Sensitivity

The interaction and communication between human beings such as a mother and young child or the consultation between patient and clinician, is a very sophisticated dance that involves many subtle factors. In addition to words, most people tend to think of communication solely in terms of overt signals expressed through facial movements, voice qualities, gestures and body movements. However, evidence now supports the perspective that a subtle yet influential electromagnetic, or “energetic” communication system operates just below our conscious level of awareness and we can experience this as a type of intuition that is likely an aspect of empathy.³⁷ The ability to sense what other people are feeling is an important factor in allowing us to connect or communicate effectively with others. The ease or flow in any social interaction depends to a great extent on establishing a spontaneous entrainment, or connection between individuals. When people are engaged in deep conversation, they begin to fall into a subtle energetic dance, synchronizing their movements and postures, vocal pitch, speaking rates and length of pauses between responses.⁴⁷ Additionally, as we are now discovering, important aspects of their physiology also can become linked and synchronized. A review of the evidence for energetic communication is outside the scope of this discussion and we will thus provide only a couple of examples that illustrate this type of intuitive capacity.

One example of energetic communication is an experiment we conducted to investigate the energetic exchange and physiological linkage between people seated five feet apart. A synchronization of physiological systems between individuals was found. In conducting these experiments, the questions we wanted to answer were simple: Can the electromagnetic field generated by the heart of one individual be detected in physiologically relevant ways in another person’s brain and body, and if so, does this have any discernible physiological effects? To investigate these questions, we used signal-averaging techniques to detect signals that were synchronous with the peak of the R-wave of one participant’s

electrocardiogram (ECG) and recordings of another participant’s electroencephalogram (EEG), or brain waves.

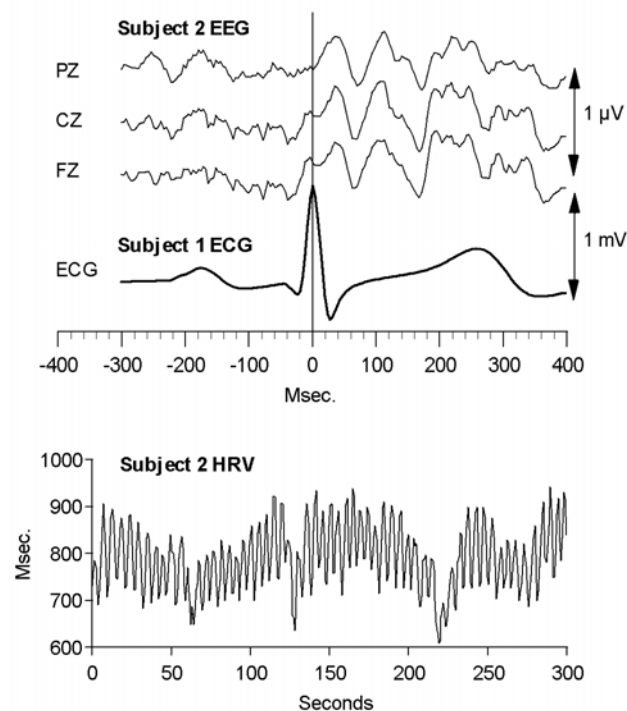


Figure 2. Heart-brain synchronization between two people. The top three traces are Subject 2’s signal-averaged EEG waveforms, which are synchronized to the R-wave of Subject 1’s ECG. The lower plot shows Subject 2’s heart rate variability pattern, which was coherent throughout the majority of the record.

Figure 2 illustrates an example of the synchronization of a study participant’s brain waves to another participant’s heartbeats (ECG signal). Power spectrum analysis of the signal-averaged EEG waveforms showed that the alpha rhythm of participant 2 was synchronized to heartbeats of participant 1. In this example, when the data was then analyzed to see if participant 1’s brainwaves (EEG) were also synchronized to other participant 2’s heartbeats, there was no observable synchronization. The key difference between these two people, was the high degree of physiological coherence maintained by participant 2 whose brainwaves were synchronized to participant 1’s heartbeats. In other words, the degree of an individual’s coherence appears to be a key factor in linking to others’ physiological activity and rhythms,

which essentially means having information about their current emotional states.

A study of a Spanish fire-walking ritual also demonstrated physiological synchronization between people. Heart-rate data was obtained from 38 participants, and synchronized activity between fire-walkers and spectators was compared. They found finely tuned synchronizations during the fire-walking ceremony between the fire-walkers and spectators who were family members or had close personal relationships to them, but not with unrelated spectators. The authors suggested that the mediating mechanism was likely informational in nature.⁴⁸

Steve Morris, a researcher in Singapore, studied the effect of heart coherence in a group setting,⁴⁹ conducting 148 10-minute trials with groups of four participants seated around tables. Three of the participants at each table were recently trained in shifting into and sustaining a coherent state, and the fourth was untrained. Morris wanted to determine whether the trained participants could collectively facilitate higher levels of HRV coherence in the untrained individual. He said the untrained participants' coherence was higher in approximately half of all matched comparisons when the trained participants were in coherent states. He found evidence of complex heart-rhythm synchronizations between all of the group participants and also that higher levels of this synchronization correlated with relational measures (bonding) among them. Additionally, he found evidence of heart-to-heart synchronization across subjects, lending credence to the possibility of "heart-to-heart biocommunications."

Positive social relations have been found to create a type of social coherence that generates heart-based wave fields of bioemotional energy. These wave fields are attuned with one another and link the group as a whole.⁵⁰ We suggest that as group members are attuned to the same resonant socio-emotional frequency, the group generates a powerful collective and receptive coherent field environment through which nonlocal information is accessed and amplified. This occurs because a stronger resonant

feedback loop is created – both to the collective group field and to each individual's personal field.⁵¹ These dynamics rest on a supportive community's capacity for coherent function, intentionality and positive emotional social intention.

Nonlocal Intuition

There is now a large body of documented rigorous scientific research on nonlocal intuitive perception that dates back more than seven decades. A variety of experiments show that it cannot be explained by flaws in experimental design or research methods, statistical techniques, chance or selective reporting of results.⁵² Two new studies have recently been published that have provided further evidence of perception of future information.^{53,54} Because these and other studies contain detailed discussions and reviews of previous research on nonlocal intuition, we will instead focus this discussion on the broader role of nonlocal intuition in lifting human consciousness and the heart's role in this process.

As mentioned earlier, the majority of studies view intuitive perception as solely being the result of implicit memories and the unconscious mind accessing forgotten information stored in the brain.^{3, 32, 55-58} As we noted, however, there are three types or categories of intuition: implicit knowledge, energetic sensitivity and nonlocal intuition. It has been suggested that the capacity to receive and process information about nonlocal events appears to be a property of all physical and biological organization and this likely is because of the inherent interconnectedness of everything in the universe.⁵⁹⁻⁶¹

Given that there is a relationship between increased heart coherence and access to intuitive signals,²⁸ the capacity to shift into a coherent state is an important factor when considering the heart's role in lifting consciousness. Intuition research suggests it's possible to access intuitive intelligence more effectively by first getting into a coherent state, quieting mental chatter and emotional unrest and paying attention to shifts in our feelings, a process that brings intuitive signals to consciousness awareness.⁶² We have found

that increased heart-rhythm coherence correlates with significant improvements in performance on tasks requiring attentional focus and subtle discrimination.⁷ We've also found that heart-rhythm coherence correlates with pre-stimulus-related afferent (ascending) signals from the heart to the brain.²⁸ It is both likely that these signals are important elements of intuition that are particularly salient in pattern recognition and that they are involved in all types of intuitive processes.

The heart plays a central role in creating coherence and is associated with heartfelt positive emotions. It is not surprising, therefore, that one of the strongest threads uniting the views of diverse cultures and religious and spiritual traditions throughout history has been a universal regard that it is the source of love, wisdom, intuition, courage, etc. Everyone is familiar with such expressions as "put your heart into it," "learn it by heart," "speak from your heart" and "sing with all your heart." All of these suggest an implicit knowledge that the heart is more than just a physical pump that sustains life. Such expressions reflect what often is called the intuitive, or spiritual heart. Throughout history, people have turned to the intuitive heart, sometimes referred to as their inner voice, soul or higher power, as a source of wisdom and guidance.

It is interesting that a Gallup poll found that 92% of Americans "believe in God." The Pew Research Center also cited this percentage. Also of note was an earlier Pew survey that found scientists who were members of the American Association for the Advancement of Science were roughly half as likely as the general public to believe in "a deity or higher power."

There is compelling evidence to suggest the physical heart is coupled to a field of information not bound by the classical limits of time and space.^{27, 28} This evidence comes from a rigorous experimental study that demonstrated the heart receives and processes information about a future event before the event actually happens.^{27, 28} The study's results provide surprising data showing that both the heart and

brain receive and respond to pre-stimulus information about a future event before it occurs (Figure 3).

Even more tantalizing are clear indications that the heart receives intuitive information *before* the brain and that the heart sends a different pattern of afferent neural signals to the brain prior to an adverse future event. This modulates the frontal cortex, a process verified through heartbeat and cortical-evoked potential analysis. In addition, when study participants were in a coherent state before the experimental protocols, they were significantly more attuned to the information from the heart.²⁸ This suggests that the heart is directly coupled to a source of information that interacts with the multiplicity of energetic fields in which the body is embedded.

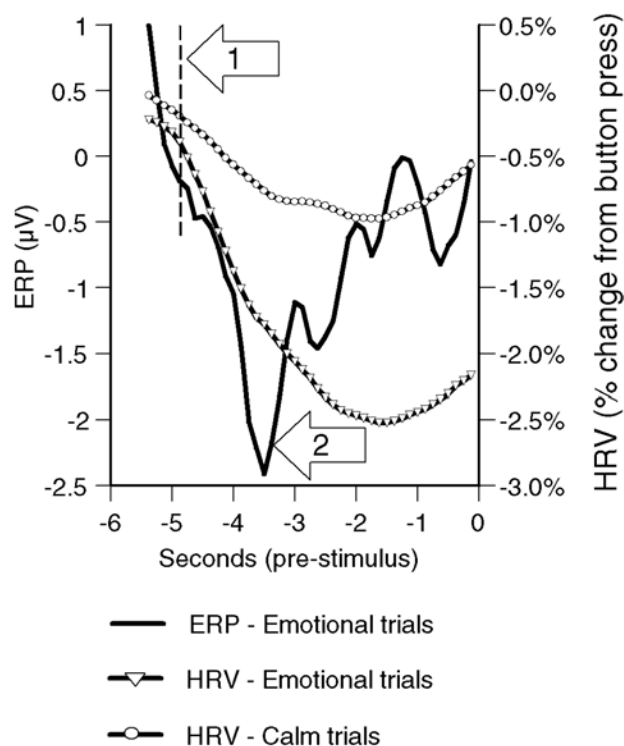


Figure 3. Example of temporal dynamics of heart and brain pre-stimulus responses: This overlay plot shows the mean event-related potential (ERP) at EEG site FP2 and heart-rate deceleration curves during the pre-stimulus period. (The "0" time point denotes stimulus onset.) The heart-rate deceleration curve for the trials, in which a negative emotionally arousing photo would be seen in the future, diverged from that of the trials that contained a calming future picture (sharp downward shift) about 4.8 seconds prior to the stimulus (arrow 1). The

emotional trials ERP showed a sharp positive shift about 3.5 seconds prior to the stimulus (arrow 2). This positive shift in the ERP indicates when the brain “knew” the nature of the future stimulus. The time difference between these two events suggests that the heart received the intuitive information about 1.3 seconds before the brain. Heartbeat-evoked potential analysis confirmed that a different afferent signal was sent by the heart to the brain during this period.²⁸

We often talk about the “intuitive heart” and “heart intelligence.” Both of these terms refer to our *energetic heart*, which is coupled with a deeper part of the self. Many refer to this as their higher self or higher capacities, or what physicist David Bohm described as our implicate order and undivided wholeness.⁵⁹ We use the term energetic systems in this context to refer to the functions we cannot directly measure, touch or see, such as our emotions, thoughts and intuitions. Although these functions have loose correlations with biological activity patterns, they nevertheless remain covert and hidden from direct observation. Several notable scientists have proposed that such functions operate primarily in the frequency domain outside of time and space and have suggested some of the possible mechanisms that govern how they are able to interact with biological processes.⁶³⁻⁷⁰

As discussed elsewhere, the physical heart has extensive afferent connections to the brain and can modulate perception and emotional experience.⁷ Our experience suggests that the physical heart also has communication channels connecting it with the energetic heart.²⁸ Nonlocal intuition therefore is transformational and from our perspective contains the wisdom that streams from the soul’s higher information field down into the psychophysiological system via the energetic heart and can inform our moment-to-moment experiences and interactions. At the Institute of HeartMath, this is what we call heart intelligence.

Heart intelligence is the flow of higher awareness and the intuition we experience when the mind and emotions are brought into synchronistic alignment with the heart. When we are heart-centered

and coherent, we have a tighter coupling and closer alignment with our deeper source of intuitive intelligence. We are able to more intelligently self-regulate our thoughts and emotions, which over time lifts consciousness and establishes a new internal physiological and psychological baseline.²⁸ In other words, there is an increased flow of intuitive information that is communicated via the emotional energetic system to the mind and brain systems, resulting in a stronger connection with our deeper “inner voice.”

It is important to note that conscious awareness of anything, including our emotions and intuitive promptings, is not possible until something has captured our attention. Sensory neurons in our eyes, ears, nose and body are in continuous action day and night, whether we are awake or asleep. The brain receives a steady stream of information about all the events the sensory systems are detecting. It would be bewildering if we were continuously aware of all the incoming information from both the external and internal environments. In fact, we completely ignore most of the information arriving at the brain, most of the time. It is when inputs are large, sudden or novel or lead to an emotional reaction that they capture and focus our attention that we become aware of them.

“Voluntary attention,” on the other hand, describes the process in which we can consciously self-regulate and determine the contents of our own awareness as well as the duration of our focus. Current evidence suggests that this self-regulatory capacity relies on an inner resource akin to energy, which is used to interrupt the stream of consciousness and behavior and alter it. When this limited energy has been depleted, further efforts at self-regulation are less successful than usual.⁷¹ With practice, however, the capacity to self-regulate can be increased and give us more energy resources to sustain self-directed control. Importantly, these practices also are key to establishing a new baseline, and once a new baseline is established, the new patterns of self-regulation become automatic and therefore do not require the same energy expenditure.

One of the most important keys to accessing more of our intuitive intelligence and inner sense of knowing is developing deeper levels of self-awareness of our more subtle feelings and perceptions, which otherwise never rise to conscious awareness. In other words we have to pay attention to the intuitive signals that often are under the radar of conscious perception or are drowned out by ongoing mental chatter and emotional unrest. A common report from people who practice being more self-aware of their inner signals is that the heart communicates a steady stream of intuitive information to the mind and brain. In many cases, we only perceive a small percentage of intuitive information or chose to override the signals because they do not match our more egocentric desires.

Accessing Your Intuition

There is a practical technique for increasing access to the three types of intuition defined in this booklet, but first, here's a little background about the HeartMath techniques.

The HeartMath System of self-regulation techniques was informed by research on heart-brain interactions and optimal function.⁷²⁻⁷⁶ The HeartMath System offers people practical and reliable techniques for increasing physiological coherence and self-regulating from a state of emotional unease or stress into a "new" positive state of emotional calm and greater stability. Studies have been conducted across diverse populations in laboratory, organizational, educational and clinical settings on HeartMath coherence-building techniques. The studies have shown these techniques are effective in producing immediate and sustained reductions in stress and its associated disruptive and dysfunctional emotions and improving many dimensions of health and well-being.^{7, 36, 46, 77-80} Collectively, results indicate such techniques are easily learned and employed, produce rapid improvements, have a high rate of compliance, can be sustained over time and are readily adaptable to a wide range of ages and demographic groups.

The Freeze Frame Technique,^{73, 76} is a five-step process for improving intuitive capacities, stopping energy drains, shifting perspective, obtaining greater clarity and finding innovative solutions to problems or issues. In essence, the Freeze Frame process helps us see a situation or issue from a more coherent or balanced perspective.

The five steps of the *Freeze Frame Technique* are:

Step 1: Acknowledge the problem or issue and any attitudes or feelings about it.

Step 2: Focus your attention in the area of the heart. Imagine your breath is flowing in and out of your heart or chest area, breathing a little slower and deeper than usual.

Suggestion: Inhale 5 seconds, exhale 5 seconds (or whatever rhythm is comfortable)

Step 3: Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or something in your life.

Step 4: From this more objective place, ask yourself what would be a more efficient or effective attitude, action or solution.

Step 5: Quietly observe any subtle changes in perceptions, attitudes or feelings. Commit to sustaining beneficial attitude shifts and acting on new insights.

Once you get comfortable with the steps, you need only remember the *Freeze Frame Quick Steps*:

- Acknowledge
- Heart-Focused Breathing
- Activate a positive or renewing feeling
- Ask
- Observe and Act

When first learning the Freeze Frame Technique, it's important to do it step by step a few times.

It will become fluid with practice, and many people find doing several of the steps eventually becomes second nature. Becoming accustomed the technique, however, does require some effort, especially simply remembering to use it.

It's best not to begin using Freeze Frame for your biggest problem or issue. Start with something smaller. In the first step, where you acknowledge the issue and any attitudes or feelings about it, you are focusing your attention and increasing your self-awareness, which increases conscious awareness of any deeper underlying feelings. The second step, Heart-Focused Breathing, starts the process of creating more coherent wave patterns in your heart rhythms, which helps calm and balance your mental and emotional systems and enables access to higher cognitive functions. The third step, the self-initiation of a regenerative feeling such as appreciation or care, deepens and helps sustain the coherent state, alignment between the mind and emotions and attunement to the ascending neural signals from the heart. In Step 4, you are actively engaging your intuitive capacities, and in Step 5, you are attuning to the inner signals that are typically conveyed through subtle shifts in your feelings and perceptions.

Be sure to notice any *subtle feelings* you may be having because these often signal a shift in perception around the particular issue you are addressing. More often than not, intuition "speaks" quietly. Even a shift in one's feelings, such as shifting from feeling frustrated or anxious to feeling patient or calm, is of great value.

Don't expect that every time you practice Freeze Frame an insight will come to you in that moment. It may come later when you are doing something else. You can always do it again at another time. Practicing Freeze Frame can increase the frequency of accessing your intuition intentionally. With some practice, most people discover they can increase their ability to access and integrate intuitive perceptions in many of life's challenging situations, which often is when it is most needed.

Because Freeze Frame was designed as an in-the-moment technique, you can use it with your eyes open. No one else needs to know you are using it, which makes it a very practical technique that can be used in many contexts. Practicing it with greater consistency and acting on insights helps establish a new and healthier baseline reference, which naturally becomes a new default setting enabling greater ability to self-regulate and access to our intuitive intelligence.

Benefits of Intuition

Access to our heart's intuition varies among people, but we all have it. As we learn to slow down our minds and attune to our deeper heart feelings, a natural intuitive connection can occur. Intuition often is thought of in the context of inventing a new light bulb or winning in Las Vegas, but what most people discover is that intuition is a very practical asset that can help guide their moment-to-moment choices and decisions in daily life. Our intuitive insights often unfold more understanding of ourselves, others, issues and life than years of accumulated knowledge. It is especially helpful for eliminating unnecessary energy expenditures, which deplete our internal reserves, making it more difficult to self-regulate and be in charge of our attitudes, emotions and behaviors in ordinary day-to-day life situations. Intuition allows us to increase our ability to move beyond automatic reactions and perceptions. It helps us make more intelligent decisions from a deeper source of wisdom, intelligence and balanced discernment, in essence elevating consciousness, happiness and the quality of our life experience. This increases synchronicities and enhances our creativity and ability to flow through life. It also increases our ability to handle awkward situations such as dealing with difficult people with more ease and promotes harmonious interaction and connectivity with others.

Conclusion

This booklet has explored different perspectives about the nature and types of intuition and the con-

nection between intuition and lifting consciousness. We suggested that increased effectiveness in self-regulatory capacity and the resultant reorganization of implicit memories sustained in the neural architecture facilitates a stable and integrated experience of self and our relationship to others and the larger environment.

We suggest that there are many benefits to be gained by a deeper understanding of the complex interactions between the heart, brain, memory and the energetic heart. Learning to access our deeper innate wisdom can help people unfold who they really are and approach personal, social and global affairs with more wisdom, compassion and positive innovation.

When we practice shifting to a more coherent state by using a technique such as Freeze Frame, it increases intuitive awareness and over time the establishment of new baseline reference patterns and sustained shifts in perception and world-views. We can discern more informed and intelligent decisions from these new patterns and shifts in perception. This process elevates our consciousness, awareness of self and connections with others as well as the capacity for self-regulation and the corresponding ability for self-directed action. As consciousness is lifted, it is possible to move from habitual reactivity based on automatic responses stemming from reliance on patterns of behavior anchored in the “familiar” into the realm of more creative, fitting and effective strategies.

As the development of physiological coherence allows increased access to intuitive intelligence and one’s repertoire of positive emotions and actions grows, it is natural that the enhanced experience of empathy and social coherence will lead to compassionate actions and behaviors that promote and support altruistic pro-social behaviors.

When more individuals in families, workplaces and communities increase and stabilize their coherence baselines, it can lead to increased social and global coherence and a corresponding lifting of overall human consciousness.

References

- Nelson, R. *Scientific Evidence for the Existence of a True Noosphere: Foundation for a Noo-Constitution in World Forum of Spiritual Culture*. 2010. Astana, Kazakhstan.
- Hodgkinson, G.P., J. Langan-Fox, and E. Sadler-Smith, *Intuition: A fundamental bridging construct in the behavioural sciences*. British Journal of Psychology, 2008. **99**(1): p. 1-27.
- Myers, D.G., *Intuition: Its Powers and Perils*. 2002, New Haven: Yale University Press.
- Bradley, R.T., et al., *Nonlocal Intuition in Entrepreneurs and Non-entrepreneurs: Results of Two Experiments Using Electrophysiological Measures*. International Journal of Entrepreneurship and Small Business, 2011. **12**(3): p. 343-372.
- Lieberman, M.D., *Social cognitive neuroscience: A review of core processes*, in *Annual Review of Psychology*. 2007, Annual Reviews: Palo Alto. p. 259-289.
- Baumeister, R.F., et al., *Self-regulation and personality: how interventions increase regulatory success, and how depletion moderates the effects of traits on behavior*. J Pers, 2006. **74**(6): p. 1773-801.
- McCraty, R., Atkinson, M., Tomasino, D., & Bradley, R. T. *The coherent heart: Heart-brain interactions, psychophysiological coherence, and the emergence of system-wide order*. Integral Review, 2009. **5**(2): p. 10-115.
- Dane, E. and M.G. Pratt, *Exploring intuition and its role in managerial decision making*. Academy of Management Review, 2007. **32**: p. 33-54.
- Bechara, A., et al., *The Iowa Gambling Task and the somatic marker hypothesis: some questions and answers*. Trends Cogn Sci, 2005. **9**(4): p. 159-62; discussion 162-4.
- Damasio, A.R., *Descartes' Error: Emotion, Reason and the Human Brain*. 1994, New York: G.P. Putnam's Sons.
- Bastick, T., *Intuition: How we think and act*. 1982, New York: Wiley.
- Moir, A. and D. Jessel, *Brainsex: The real difference between men and women*. 1989, London:: Mandarin Paperbacks.
- LeDoux, J., *The Emotional Brain: The Mysterious Underpinnings of Emotional Life*. 1996, New York: Simon and Schuster.
- Damasio, A., *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain*. 2003, Orlando: Harcourt.
- LeDoux, J.E., *Emotional memory systems in the brain*. Behavioural Brain Research, 1993. **58**(1-2): p. 69-79.
- Evans, J.S.B.T., *Dual-Processing Accounts of Reasoning, Judgment, and Social Cognition*. Annual Review of Psychology, 2008. **59**(1): p. 255-278.
- Bushman, B.J. and R.F. Baumeister, *Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: does self-love or self-hate lead to violence?* J Pers Soc Psychol, 1998. **75**(1): p. 219-29.
- Damasio, A.R., *The Feeling of What Happens*. 1999, Orlando, FL: Harcourt.
- Pribram, K.H., *Languages of the Brain: Experimental Paradoxes and Principals in Neuropsychology*. 1971, New York: Brandon House.
- Larsen, A. and C. Bundesen, *A template-matching pandemonium recognizes unconstrained handwritten characters with high accuracy*. Mem Cognit, 1996. **24**(2): p. 136-43.
- Craig, J. and N. Lindsay, *Quantifying "gut feeling" in the opportunity recognition process*. Frontiers of Entrepreneurship Research, 2001: p. 124-135.
- Halberg, F., et al., *Time Structures (Chronomes) of the Blood Circulation, Populations' Health, Human Affairs and Space Weather*. World Heart Journal, 2011. **3**(1): p. 1-40.
- Uyeda, S., et al., *Geoelectric potential changes: possible precursors to earthquakes in Japan*. Proc Natl Acad Sci U S A, 2000. **97**(9): p. 4561-6.
- Wiseman, R. and M. Schlitz, *Experimenter effects and the remote detection of staring*. Journal of Parapsychology, 1997. **61**: p. 197-207.
- Bem, D.J., *Feeling the future: Experimental evidence for anomalous retroactive influences on cognition and affect*. J Pers Soc Psychol, 2011.
- Mossbridge, J. P. Tressoldi, E, and J. Utts, *Predictive Physiological Anticipation Preceding Seemingly Unpredictable Stimuli: A Meta-Analysis*, in *Frontiers in Psychology*. 2012.
- McCraty, R., M. Atkinson, and R.T. Bradley, *Electrophysiological evidence of intuition: Part 1. The surprising role of the heart*. Journal of Alternative and Complementary Medicine, 2004. **10**(1): p. 133-143.
- McCraty, R., M. Atkinson, and R.T. Bradley, *Electrophysiological evidence of intuition: Part 2. A system-wide process?* Journal of Alternative and Complementary Medicine, 2004. **10**(2): p. 325-336.
- Pribram, K.H. and F.T. Melges, *Psychophysiological basis of emotion*, in *Handbook of Clinical Neurology*, P.J. Vinken and G.W. Bruyn, Editors. 1969, North-Holland Publishing Company: Amsterdam. p. 316-341.
- Ratey, J.J., *A User's Guide to the Brain: Perception, Attention, and the Four Theaters of the Brain*. 2001, New York: Pantheon Books.

References

31. Mayer, R.E., *The search for insight: Grappling with gestalt psychology's unanswered questions.*, in *The nature of insight*, R.J. Sternberg and J.E. Davidson, Editors. 1996, The MIT Press: Cambridge, MA. p. 3–32.
32. Hogarth, R.M., *Educating Intuition*. 2001, Chicago: The University of Chicago Press.
33. Miller, G.A., E.H. Galanter, and K.H. Pribram, *Plans and the Structure of Behavior*. 1960, New York: Henry Holt & Co.
34. Pribram, K.H., *Feelings as monitors*, in *Feelings and Emotions*, M.B. Arnold, Editor. 1970, Academic Press: New York. p. 41-53.
35. Cameron, O.G., *Visceral Sensory Neuroscience: Interoception*. 2002, New York: Oxford University Press.
36. McCraty, R., Childre, D., *Coherence: Bridging Personal, Social and Global Health*. *Alternative Therapies in Health and Medicine*, 2010. **16**(4): p. 10-24.
37. McCraty, R., *The energetic heart: Bioelectromagnetic communication within and between people*, in *Bioelectromagnetic Medicine*, P.J. Rosch and M.S. Markov, Editors. 2004, Marcel Dekker: New York. p. 541-562.
38. McCraty, R., et al., *The effects of emotions on short term heart rate variability using power spectrum analysis*. *American Journal of Cardiology*, 1995. **76**: p. 1089-1093.
39. Tiller, W.A., R. McCraty, and M. Atkinson, *Cardiac coherence: A new, noninvasive measure of autonomic nervous system order*. *Alternative Therapies in Health and Medicine*, 1996. **2**(1): p. 52-65.
40. Leon, E., et al., *Affect-aware behaviour modelling and control inside an intelligent environment* *Pervasive and Mobile Computing* doi:10.1016/j.pmcj.2009.12.002, 2010. doi:10.1016/j.pmcj.2009.12.002
41. Bradley, R.T., McCraty, R., Atkinson, M., Tomasino, D., *Emotion Self-Regulation, Psychophysiological Coherence, and Test Anxiety: Results from an Experiment Using Electrophysiological Measures*. *Applied Psychophysiology and Biofeedback*, 2010. **35**(4): p. 261-283.
42. McCraty, R., et al., *The coherent heart: Heart-brain interactions, psychophysiological coherence, and the emergence of system-wide order*. 2006, Boulder Creek, CA: HeartMath Research Center, Institute of HeartMath, Publication No. 06-022.
43. McCraty, R. and D. Childre, *The grateful heart: The psychophysiology of appreciation*, in *The Psychology of Gratitude*, R.A. Emmons and M.E. McCullough, Editors. 2004, Oxford University Press: New York. p. 230-255.
44. McCraty, R., M. Atkinson, and D. Tomasino, *Impact of a workplace stress reduction program on blood pressure and emotional health in hypertensive employees*. *Journal of Alternative and Complementary Medicine*, 2003. **9**(3): p. 355-369.
45. Alabdulgader, A., *Coherence: A Novel Nonpharmacological Modality for Lowering Blood Pressure in Hypertensive Patients*. *Global Advances in Health and Medicine*, 2012. **1**(2): p. 54-62.
46. Hatfield, E., *Emotional Contagion*. 1994, New York: Cambridge University Press.
47. Konvalinka, I. and A. Roepstorff, *The two-brain approach: how can mutually interacting brains teach us something about social interaction?* *Front Hum Neurosci*, 2012. **6**: p. 215.
48. Morris, S.M., *Facilitating collective coherence: Group Effects on Heart Rate Variability Coherence and Heart Rhythm Synchronization*. *Alternative Therapies in Health and Medicine*, 2010. **16**(4).
49. Bradley, R.T., *Dialogue, information, and psychosocial organization*, in *Dialogue and Transformation*, N.C. Roberts, Editor. 2002, Elsevier Science: London.
50. McCraty, R., A. Deyhle, and D. Childre, *The Global Coherence Initiative: creating a coherent planetary standing wave*. *Global Advances in Health and Medicine* 2012. **1**(1): p. 62-75.
51. Radin, D., *The Conscious Universe: The Scientific Truth of Psychic Phenomena*. 1997, San Francisco, CA: HarperEdge.
52. Toroghi, S.R., et al., *Nonlocal Intuition: Replication and Paired-Subjects Enhancement Effects*. *Global Advances in Health and Medicine*, 2014.
53. McCraty, R. and M. Atkinson, *Electrophysiology of Intuition: Pre-stimulus Responses in Group and Individual Participants using a Roulette Paradigm* *Global Advances in Health and Medicine*, 2014.
54. Agor, W., *Intuitive Management: Integrating Left and Right Brain Skills*. 1984, New Jersey: Prentice Hall.
55. Eisenhardt, K. and M. Zbaracki, *Strategic decision making*. *Strategic Management Journal*, 1992. **13**: p. 17-37.
56. Laughlin, C., *The nature of intuition: A neuropsychological approach*, in *Intuition: The Inside Story*, R. Davis-Floyd and P.S. Arvidson, Editors. 1997, Routledge: London. p. 19-37.
57. Torff, B. and R.J. Sternberg, *Intuitive conceptions among learners and teachers*, in *Understanding and Teaching the Intuitive Mind: Student and Teacher Learning*, B. Torff and R.J. Sternberg, Editors. 2001, Lawrence Erlbaum Associates, Publishers: Mahwah, NJ. p. 3-26.
58. Bohm, D. and B.J. Hiley, *The Undivided Universe*. 1993, London: Routledge.

References

59. Laszlo, E., *The Interconnected Universe: Conceptual Foundations of Transdisciplinary Unified Theory*. 1995, Singapore: World Scientific.
60. Nadeau, R. and M. Kafatos, *The Non-Local Universe: The New Physics and Matters of the Mind*. 1999, New York: Oxford University Press.
61. Petitmengin-Peugeot, C., *The Intuitive Experience, in The View from Within. First-person approaches to the study of consciousness*, F.J.Varela and J. Shear, Editors. 199, Imprint Academic: London,. p. 43-77.
62. Laszlo, E., *Quantum Shift in the Global Brain: how the new scientific reality can change us and our world*. 2008, Rochester, VT: Inner Traditions.
63. Mitchell, E., *Quantum holography: a basis for the interface between mind and matter*, in *Bioelectromagnetic Medicine*, P.G. Rosch and M.S. Markov, Editors. 2004, Dekker: New York, NY. p. 153-158.
64. Pribram, K.H., *Brain and Perception: Holonomy and Structure in Figural Processing*. 1991, Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
65. Tiller, W.A., J. W E Dibble, and M.J. Kohane, *Conscious Acts of Creation: The Emergence of a New Physics*. 2001, Walnut Creek, CA: Pavior Publishing. (pp. 201-202).
66. Bradley, R.T., *Psychophysiology of Intuition: A quantum-holographic theory on nonlocal communication*. World Futures: The Journal of General Evolution, 2007. **63**(2): p. 61-97.
67. Marcer, P. and W. Schempp, *The brain as a conscious system*. International Journal of General Systems, 1998. **27**: p. 231-248.
68. Pribram, K.H. and R.T. Bradley, *The brain, the me and the I*, in *Self-Awareness: Its Nature and Development*, M. Ferrari and R. Sternberg, Editors. 1998, The Guilford Press: New York. p. 273-307.
69. Schempp, W., *Quantum holography and neurocomputer architectures*. Journal of Mathematical Imaging and vision, 1992. **2**: p. 109-164.
70. Baumeister, R.F., *Ego depletion and self-regulation failure: a resource model of self-control*. Alcohol Clin Exp Res, 2003. **27**(2): p. 281-4.
71. Childre, D.L., *Freeze Frame®*, *Fast Action Stress Relief*. 1994, Boulder Creek: Planetary Publications.
72. Childre, D. and H. Martin, *The HeartMath Solution*. 1999, San Francisco: HarperSanFrancisco.
73. Childre, D. and B. Cryer, *From Chaos to Coherence: The Power to Change Performance*. 2000, Boulder Creek, CA: Planetary.
74. Childre, D. and D. Rozman, *Overcoming Emotional Chaos: Eliminate Anxiety, Lift Depression and Create Security in Your Life*. 2002, San Diego: Jodere Group.
75. Childre, D. and D. Rozman, *Transforming Stress: The HeartMath Solution to Relieving Worry, Fatigue, and Tension*. 2005, Oakland, CA: New Harbinger Publications.
76. McCraty, R., M. Atkinson, and D. Tomasino, *Impact of a workplace stress reduction program on blood pressure and emotional health in hypertensive employees*. J Altern Complement Med, 2003. **9**(3): p. 355-69.
77. Ginsberg, J.P., Berry, M.E., Powell, D.A., *Cardiac Coherence and PTSD in Combat Veterans*. Alternative Therapies in Health and Medicine, 2010. **16**(4): p. 52-60.
78. Lloyd, A., Brett, D., Wesnes, K., *Coherence Training Improves Cognitive Functions and Behavior In Children with ADHD*. Alternative Therapies in Health and Medicine, 2010. **16**(4): p. 34-42.
79. Bedell, W., *Coherence and health care cost - RCA actuarial study: A cost-effectiveness cohort study* Alternative Therapies in Health and Medicine, 2010. **16**(4).