HeartMath

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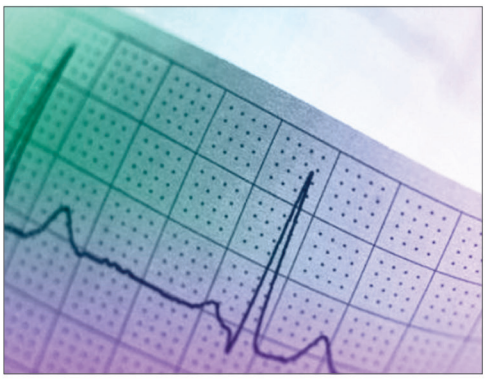
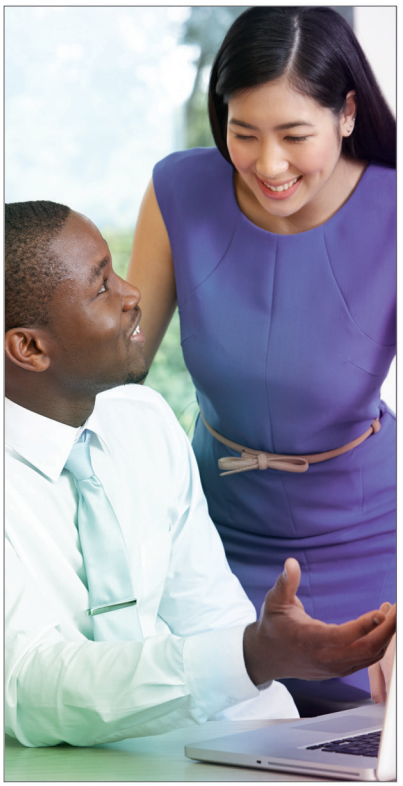
HeartMath® Interventions Program

Certification Program For Health Professionals





Establishing a new baseline for sustained behavioral change

HeartMath® Interventions Program for Health Professionals

Establishing a New Baseline for Sustained Behavioral Change

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Foreward

Welcome to HeartMath Interventions Program. This program is for doctors, nurses, counselors, therapists and other health care professionals. HeartMath Interventions is based on the HeartMath Institute's scientific research on emotional physiology, heart–brain interactions and self-regulation plus the experience of health practitioners who have many years of experience in utilizing the tools, techniques and technologies in clinical settings to help their patients or clients address a wide range of psychological or health challenges.

Stress has become omnipresent in our lives. "It's just stress" is a phrase often used to dismiss an emotional outburst, forgetfulness, headache, pain, or illness. Generalized stress or anxiety disorders comprise the most frequent diagnosis of modern illness. Indeed, "stress" is among the most widely used words in everyday discourse. People describe themselves as "stressed" in situations ranging from being stuck in traffic to the dissolution of a long-term relationship. Preparing for an examination, having difficulty communicating with a coworker, dealing with serious illness in the family or adjusting to new living or working conditions are just a few of the many experiences people classify as "stressful."

What characterizes stress? From a psychophysiological perspective, emotions are the main ingredient in our experience of stress; indeed, it is emotions—feelings such as anxiety, irritation, frustration, impatience, lack of control and hopelessness—that people experience when they describe themselves as "stressed."

Emotions, to a much greater degree than thoughts, activate and drive the physiological changes that correlate with the stress response. Thus, optimal health, resilience and vitality is related to our ability to self-regulate our emotional reactions and experience. Simply put, the emotions we tend to label "negative" disrupt optimal physiological and mental functions. Even short periods of these stress related emotions can disrupt physiological processes, inhibit mental functions and energy depletion. Conversely, the emotions we label "positive" facilitate a wide range of physiological and cognitive functions, renew our energy and optimize the body's natural regenerative processes. One of the physiological correlates of HeartMath self-regulation techniques, many of which include a conscious activation of positive emotions, is a distinctive physiological shift known as psychophysiological coherence, cardiac coherence, resonance or, simply, heart coherence.

The HeartMath Interventions program emphasizes the role of the heart as a key component of the emotional system. The heart's extensive ascending neural and hormonal communication links to the brain make important contributions to emotional experience. Thus, the model of emotion discussed in this program includes the heart, together with the brain and nervous and hormonal systems, as well as the body's energetic system to form fundamental components of a dynamic, interactive network from which emotional experience emerges.

The emotional system affects the way we think and act and is the deeper source of our passing moods and emotions. This is the reverse of most psychological models, which are based on the premise that we feel as we think, rather than we think and act as we feel. This new perspective is supported by a number of lines of evidence, including that we are emotional beings long before we are cognitive beings. Our pre-cognitive stage of development following birth is clearly dominated by our emotions. In addition, it is well established that without the development of emotional stability

during this formative period, coherent mental and cognitive development is compromised. In addition, it is well established that without the development of emotional stability during this formative period, coherent mental and cognitive development is compromised.

Most cognitive models, which focus on approaches to clarify or change thoughts, are based on the premise that emotions are essentially secondary forms of thought. Such models can only address the symptoms of deeper emotional issues by providing coping or venting mechanisms, not by truly addressing them at their core.

Seeing the emotional system at a higher hierarchical level of control allows us to focus on learning to recognize and shift ingrained and automatic emotional and attitudinal patterns. It also increases our understating of the heart as a new window through which emotional stability and maturity can be quickly facilitated in a wide range of client and patient populations.

HeartMath Interventions provides a set of tools and technologies that make it easier for clients and patients to make positive emotional and attitudinal shifts that naturally induce the coherence state. In creating and maintaining such a state, individuals can effectively initiate a re-patterning process whereby habitual emotional patterns underlying stress, illness and disease are replaced with new, healthier patterns that establish increased emotional stability, mental acuity and physiological efficiency as a new familiar baseline.

This process emphasizes the importance of helping patients and clients recognize that habitual emotional patterns either deplete or renew their physical, mental and emotional resources. It is not about denying or repressing depleting attitudes and emotions. Rather, this process helps clients learn how to generate an emotional shift which replaces depleting attitudes and emotions with those that renew and regenerate their system.

Contrary to what many assume, the mind alone doesn't have the power to shift emotional stress or change negative attitudes. The important part of the process outlined in HeartMath Interventions is learning how to shift attention to the heart while activating a positive feeling or attitude replacement. Once feelings shift, thoughts automatically become more positive.

The key to sustained attitude and behavioral change is transformation of the deeper, recurring physiological and emotional patterns that give rise to stress-producing perceptions, thoughts and feelings. Without these more fundamental changes, any relief from stress and the resulting system depletion and reduced well-being are likely to be short-lived.

Most people do not need to be convinced that the heart is intimately and deeply involved in emotional experience since most feel emotions, especially positive ones, in the area of their hearts. Additionally, most people experience heart-felt emotions in regard to their most significant, enduring and intimate relationships. We now understand the reasons for such heart-centered feelings: the new field of neurocardiology has identified a number of physiological mechanisms that take place in the heart, including the recent discovery that the heart produces as much of the bonding hormone oxytocin as does the brain. Further, the heart communicates directly with the amygdala and is involved in creating emotional experience.

As such discoveries reveal, science is in the process of unraveling the heart's mysteries, revealing its hidden power to shift perceptions and access a deeper innate intelligence that can be used to regain lost vitality, enhance the ability to think clearly, discern appropriate solutions to problems, awaken intuition and enhance relationships. New discoveries about the heart and its place in our physical, social and spiritual lives hold the promise of reconnecting us to

the enlightened understanding of the heart found in ancient cultures, which in turn can help pave the way for a new consciousness grounded in heart-based living.

With continually rising stress levels now a global problem, it is imperative for both individual and societal health that practical and effective strategies for reducing and transforming stress be made available to everyone. It is our perspective that understanding and directly addressing the internal emotional source of stress provides an important key that enables the self-activation of positive emotions. This simple, yet powerful, means of modifying and replacing engrained emotional patterns transforms a chronic state of depletion to one of renewed health and well-being.

Studies conducted across diverse populations in laboratory, organizational, educational and clinical settings demonstrate that the coherence-building techniques taught in this program are effective in producing immediate and sustained reductions in stress and its associated disruptive and dysfunctional emotions. Collectively, results indicate that such techniques are easily learned and employed, produce rapid improvements in many dimensions of psychosocial well-being, have a high rate of compliance, can be sustained over time and are readily adaptable to a wide range of ages and demographic groups.

I hope that you find personal benefit from the tools and techniques presented in this program as you learn how to teach your clients and patients ways to establish a new baseline of personal coherence for greater health and well-being.

By learning to access the intuitive intelligence of the heart, we are better able to care for ourselves, our clients, our community, and the world itself.

Rollin McCraty, Ph.D.
Director of Research
HeartMath Institute

Acknowledgments

On behalf of HeartMath, I would like to express appreciation to all of those who contributed to the development of the HeartMath Interventions Program. First and foremost, I would like to acknowledge the contribution of Doc Childre, the founder of HeartMath and originator of the HeartMath® System. Without Doc's vision and guidance, this program and the principles, techniques and technologies upon which it is based would not have been possible.

Others who made invaluable contributions include Myron Thurber and Steve Sawyer, therapists who have used HeartMath techniques and technologies with a wide variety of patients. Myron deserves special appreciation for writing the first draft and testing many of the specific protocols with his clients. Steve's contributions greatly helped inform the group therapy protocols.

Without the support and participation of these and many other caring people, this program would not have been possible.

Finally, I would like to express appreciation to the tens of thousands of people who have used the HeartMath System over the years. Their collective experience in addressing personal, relational and clinical challenges have helped validate the effectiveness of the HeartMath System in creating a more coherent world. Hopefully, HeartMath Interventions will build on their experience.

Rollin McCraty

Chapter 1

Introduction

Learning outcomes:

- List key concepts presented in the HeartMath Interventions Program.
- Describe populations that have shown benefit from HeartMath interventions.
- Explain the importance of using the HeartMath self-regulation techniques and technologies in practitioner self care.

Notes

1.1 Overview

Notes

Since 1991, the HeartMath Institute (HMI) has conducted leading-edge research on stress and emotional physiology, heart-brain interactions, the physiology of learning, optimal performance and technologies to improve emotional health and overall well-being.

Please note that ongoing research continues to refine our understanding of the scientific principles found in this manual. You can access an updated list of relevant research at https://www.heartmath.org/research/

Recent biomedical research has revealed that the heart is not merely a simple pump, but actually a highly complex, self-organized information-processing center. With each beat, the heart continuously communicates with the brain and body via the nervous system, hormonal system, bioelectromagnetic interactions and other pathways. At HMI, researchers are demonstrating that the messages the heart sends to the brain not only affect physiological regulation, but also can profoundly influence perception, emotions, behavior, performance and health.

Many contemporary scientists believe the quality of feeling and emotion we experience each moment is rooted in the underlying state of our physiological processes. This was the essence of the theory of emotion first proposed by William James more than a century ago[1]. The basis for the theory has since undergone considerable study and refinement. Recent expression of this view is expounded by neuroscientist Antonio Damasio.[2]

> The fact that we, sentient and sophisticated creatures, call certain feelings positive and other feelings negative is directly related to the fluidity or strain of the life process. The feelings we experience as “negative” are indicative of body states in which “life processes struggle for balance and can even be chaotically out of control.” In contrast, the feelings we experience as “positive” actually reflect body states in which “the regulation of life processes becomes efficient or even optimal, free-flowing and easy.[2]

The coupling of a more organized pattern of afferent neural input to the brain during coherent states which is associated with an intentionally self-generated positive emotion reinforces the natural conditioning between an efficient physiological mode and the client’s sense of well-being. Thus the client self-reinforces more healthful emotions and behaviors. This helps the therapist to facilitate the client’s shift from external motivation toward a positive internal motivation that empowers the client to self-regulate with improved awareness and resiliency.

As the ability to self-regulate emotions improves, clients and patients are able to neutralize and replace depleting emotions and shift the emotional and physiological dynamics that may be exacerbating a wide range of medical and psychological conditions.

HeartMath self-regulation techniques have been shown to be effective with very young children, adolescents, young adults and adults dealing with a variety of emotional, mental and medical challenges. Therapists, clinicians and other health-care practitioners report that they have seen improvement in perception, self-regulation and be-

HeartMath Interventions is a comprehensive program designed for health care professionals.Throughout the manual we use the terms therapist, clinician and practitioner interchangeably when referring to the professional delivering the intervention. In the same regard, the terms client or patient refer to the individual receiving the intervention. The language of this manual may seem geared toward mental health because we talk extensively of emotions, but is not intended to exclude other modalities of treatment. When referring to individuals who experience dis-ease and forms of discomfort and pain, the word feel as in “I feel pain,” may refer to the mental, emotional or physical aspects of discomfort.

havior in clients and patients with acute, chronic and recurrent pain, psychophysiological problems, learning and performance issues and chronic illness.

1.2 Key Concepts

This program is designed to help therapists and others establish a new psychophysiological baseline in their clients and patients, resulting in sustainable perceptual and behavioral changes. In many ways, this program reflects a shift from top down only model of self-regulation to one that includes a bottom up approach which helps leverage the connection between the body and mind. It provides clinicians with tools and technologies that blend increased self-awareness with emotional self-regulation skills, leading to objective and measurable improvements in physiological and behavioral functioning. HeartMath Interventions allows the clinician to implement a truly holistic treatment program.

At the end of this course, clinicians will have a better understanding of the following concepts:

1. Stress is primarily emotional unease.
2. Emotions are the primary drivers of physiology and either deplete or renew both physiological and psychological systems.
3. A psychophysiological baseline shift is necessary for achieving sustained positive behavioral change.
4. The heart is uniquely connected to the brain and body and plays a key role in emotional experience and perception.
5. Emotions have a profound impact on and are reflected in heart-rate variability (HRV) patterns.
6. Adding emotion self-regulation and coherence-building skills to other therapeutic modalities can significantly increase the effectiveness of a wide variety of treatment outcomes.
7. Heart-rhythm monitoring and feedback training are powerful adjuncts to teaching emotional refocusing and restructuring skills and provide a noninvasive window into observing the dynamics in the autonomic nervous system (ANS).
8. The HeartMath Interventions Program can be used with clients and patients for a wide range of physiological, mental and emotional challenges.

1.3 The HeartMath System

HeartMath has developed a research-based system of scientifically validated tools, techniques and technology to increase mental and emotional self-regulation. The HeartMath System has been tested in multiple health-care, educational, corporate and athletic settings around the world since 1992. In this program, you will learn the theoretical background underlying HeartMath self-regulation techniques and how to incorporate them into a therapeutic context to help indi-

viduals establish a new psychophysiological baseline while achieving and sustaining treatment objectives.

The System incorporates emotional refocusing and restructuring tools and techniques that are facilitated by heart-rhythm-coherence monitoring and feedback technology. Individuals effectively learn to reduce stress and anxiety and improve health, learning, performance and quality of life.

Quick Coherence® and Freeze-Frame® are two emotional refocusing techniques for rapid emotional shifts, in-the-moment stress reduction, impulse control, perceptual shifts and for dealing with a variety of emotional triggers. These techniques can reverse draining and inefficient physiological responses and begin altering negative behavioral patterns.

Individuals learn to identify and modify more subtle internal stressors: i.e., persistent self-defeating and energy-depleting thought patterns and feelings such as anxiety, fear, jealousy, resentment, judgmentalness, perfectionism and irrational projections about the future. They gain increased awareness of the habitual mental and emotional processes that underlie their stress, increasing their capacity to catch the onset of these feelings and patterns, thus diminishing their influence[3].

The Attitude Breathing® and Heart Lock-In® techniques are emotional restructuring techniques that facilitate establishing a new psychophysiological baseline for sustained behavioral change and reset maladaptive emotions and physiological baselines at the heart, brain and hormonal levels[4].

With persistent practice, individuals can set a strong positive intention and imprint a more positive and healthful expectation as the default emotion. This results in a positive emotion-driven shift in the heart's rhythmic patterns and thus a change in the pattern of cardiac afferent input to the brain.

Practicing these "coherence-building" skills offers a wide range of long-term benefits, including increased emotional awareness, vitality, overall well-being, cognitive flexibility and enhanced problem-solving, as well as reducing the symptoms of depression, anxiety, obsessive-compulsive disorder, post-traumatic stress disorder and other significant clinical disorders.

When they complete the HeartMath intervention, your clients will have learned how to transform stress through a set of research-based tools by:

- Neutralizing and replacing stressful emotions.
- Regaining vitality by stopping energy drains that deplete health and mental and emotional resilience.
- Leveraging the ability to think clearly and discern appropriate solutions to problems.
- Unfolding coherent, effective communication skills.

"An early example of the power of taking time for self-care happened when I had to take my two days of essay writing for my doctoral written exams. Instead of cramming facts right before the test, I went into the treatment lab and did the Heart Lock-In Technique while on the emWave technology for about 20 minutes. When I arrived at the testing center, I felt energetic, mentally clear and confident. My fellow students looked haggard at best and panicked at worst. At the end of the first day I was tired but not exhausted. I slept well that night and repeated this same procedure the next day and finished knowing I had passed. No , practicing the tools regularly helps me recapture my love for the work I do and the essence of what first brought me into the helping professions. All I have to do is remember to use and apply these techniques often." —Myron Thurber

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- Decreasing unseen friction in relationships resulting in time efficiencies and less drain from emotional drama.

Your clients will achieve these objectives by learning to establish a new baseline of personal coherence.

1.4 Self-Care

We are aware of the impact on the clinician of continually working with stressed clients experiencing pain and suffering. These interventions are not only valuable for empowering clients toward better health and resilience, but can also help the clinician stay balanced and resilient.

Make a commitment to practice the coherence-building techniques yourself. You already intuitively know that if you are centered and calm as a practitioner, your clients will benefit, but you will, too. Ever wonder what the excuse “I am too busy to take care of myself” is really about? Rarely is there a health professional who isn’t aware of the need for self-care, especially those who are overworked and may be approaching burnout.

In addition to the personal and professional benefits you will achieve from using the HeartMath System, we have found that your first-hand experience – and the appropriate sharing of your successes and challenges using coherence-building skills – greatly enhances your ability to teach others. Use the time your clients learn and practice their skills in your sessions as an opportunity to “get coherent” as well. Your ability to achieve and sustain coherence can improve the quality of all relationships, throughout your professional work and beyond. Later in this manual, we will go into more detail about the impact of coherence in the therapeutic encounter.

Chapter 2

From Depletion to Renewal™: The Energy Efficiency Model

Learning outcomes:

- Define stress.
- Recognize the sources of stress.
- Explain the relationship between thoughts, emotions and behavior.
- Identify two major bodily systems impacted by emotions.
- Describe the role of the amygdala.
- Explain how the rhythmic patterns of the heart impact brain function.
- Distinguish the functions of the sympathetic and parasympathetic branches of the autonomic nervous system (ANS).
- Identify the key to sustaining behavioral change and the role of perception.
- Describe how stress impacts the HPA axis.

Notes

2.1 Overview

Emotions influence the body's systems in ways that are either renewing or depleting at the physiological, social, behavioral and cognitive levels[4]. A key therapeutic goal of HeartMath Inventions Program is to help clients understand how their emotions can either deplete or renew their systems and how this profoundly impacts their well being, performance and relationships. With this understanding, clients learn how better to identify those depleting emotions and attitudes commonly referred to as stress and replace them with ones that facilitate renewal.

2.2 The Nature of Stress

The term "stress" has become one of the most widely used words today. People describe themselves as "stressed" when stuck in traffic as well as when they experience the dissolution of a long-term relationship. Preparing for an examination, having difficulty communicating with a co-worker, dealing with serious illness in the family or adjusting to new living or working conditions can all be stressful. What puts all these different experiences under the category of stress? What defines the essence of the experience of stress?

From a psychophysiological perspective, emotions are central to the experience of stress. Indeed, it is the emotions activated in response to perceiving a stimulus as threatening – feelings such as anxiety, irritation, frustration, helplessness or hopelessness – that are truly what we experience when we describe ourselves as stressed. All of these examples of stressors, whether minor inconveniences or major life changes, are experienced as stressful to the extent that they trigger emotions such as those listed.

Although mental processes and physical responses clearly play a role in stress, most often it is unmanaged emotions that provide fuel for their sustenance. It is the feeling of panic in a panic attack that drives the person to seek mental health assistance. It is well recognized that thoughts carrying an "emotional charge" are those that tend to be perpetuated in our conscious awareness. It is also emotions – more than thoughts alone – that activate the physiological changes comprising the stress response. Thus, most of the deleterious effects of stress on the brain and body are in fact physiological repercussions of negative emotions.[5]

In essence, stress is emotional unease, the experience of which ranges from low-grade feelings of emotional unrest to intense emotional turmoil. Stress arises not only in response to external situations or events, but also involves, to a large extent, the ongoing perceptions and internal emotional processes and attitudes individuals perpetuate, even in the absence of any identifiable extrinsic stimulus[5]. Recurring feelings of agitation, worry, guilt, anxiety, anger, judgmentalness, fear, resentment, discontentment, disconnectedness, being misunderstood, unhappiness, insecurity, depression and self-doubt often consume a large part of our emotional energy and disrupt our feeling world even as we are engaged in the flow of everyday life. Indeed, many individuals do not realize the extent to

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which these internalized, habitual emotional patterns dominate their internal landscape. They dilute and diminish positive emotional experience, relationships and motivation for change. Eventually a state of stress becomes so familiar that it essentially becomes a defining part of one's sense of self-identity.

Stress is not simply some benign complaint; it is a powerful risk factor for disease and an important predictor of health. According to an article in the *Journal of the American Medical Association* (2007), there is a documented link between stress and an increased risk for heart attacks, depression, cancer and the progression of HIV and AIDS. Notably, an accompanying article in the same issue shows that workplace stress may be as bad for one's heart as smoking and high cholesterol.[6]

There is growing evidence that stress significantly affects virtually all stages of the disease process: genesis, progression and recovery. Furthermore, patients with heart disease frequently suffer considerable emotional stress such as anger, anxiety, fear and depression.

Summary

By nature, stress is an emotionally driven experience. Negative emotions are central to the way a person experiences anxiety, depression and significant life change. In recent years, the medical community has increasingly recognized the need for effective stress- and anxiety-reduction interventions to help improve emotional health, facilitate rehabilitation in a variety of conditions and enhance disease prevention in those at risk.

2.3 Emotions, Cognition and Physiology

Recent research in the neurosciences has significantly broadened the understanding of the workings of the emotional system in itself, as well as its extensive interactions with cognitive function[2,7]. On the basis of this understanding, emotion and cognition can best be thought of as interacting functions and systems that communicate via bidirectional neural connections between the neocortex and emotional centers such as the amygdala. These connections allow emotion-related input to modulate cortical activity and cognitive input from the cortex to modulate emotional processing[8].

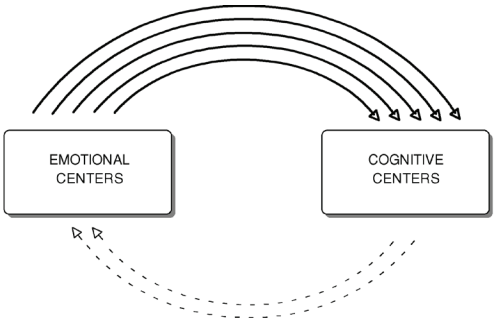

Figure 2.1 The neural connections that transmit information from the emotional centers to the cognitive centers in the brain are stronger and more numerous than those that convey information from the cognitive to the emotional centers[8].

This accounts for the powerful influence of input from the emotional system on virtually all stages of cognitive processing involved in functions such as attention, perception and memory, as well as on higher-order thought processes like logical reasoning and rational decision-making. For example, working with a person who is emotionally distraught is unproductive until the person is able to calm down to a sufficient degree that he or she can begin processing mental information.

The neural connections that transmit information from the emotional centers to the cognitive centers in the brain are stronger and more numerous than those that convey information from the cognitive to the emotional centers.[8] This fundamental asymmetry in the

amounts of communication between the cognitive and emotional centers dominates the mental landscape explaining why it can be far more difficult to willfully turn off strong feelings, like anxiety, through thought alone.[4]

Among the first modern psychophysiological researchers to systematically examine the "conversations" between the body's emotion centers and the brain were John and Beatrice Lacey. During 20 years of research throughout the 1960s and 1970s, they observed that afferent input from the heart and cardiovascular system could significantly affect perception and behavior.[9,10] They also reported that afferent input to the brain from the heart could either inhibit or facilitate the brain's activity, which, in turn, could affect perception and motor activity.[11] Later in this text we will explore how emotions are interconnected with the rhythmic patterns of the heart, but for now we'll continue to explore the effect of emotions on cognition and physiological processes.

It is now clear that the emotional system also can, for the most part, operate independently of the cognitive system. For example, studies have found that emotional processes operate at a much higher speed than thoughts and frequently bypass the mind's linear reasoning process entirely.[8] This has been described in more popular terms as "emotional hijacking."[12] In other words, not all emotions follow thoughts; emotions often occur without involvement of the cognitive system and, moreover, can significantly color the cognitive process and its output.[8,13,14]

Fear can be conditioned outside of conscious thought. Such is the case when emotional memories of past threatening experiences automatically trigger a fear-anxiety response to a future anticipated event, often circumventing the processes of conscious thought and self-control. Joseph LeDoux, a neuroscientist at the Center for Neural Science at New York University, has provided an understanding of the mechanisms involved in this process.[13] Evolving long before the neocortex, the subcortical brain circuitry involved in emotional processing is highly attuned to signs of potential danger, and it is hyperreactive to perceived threat.

The amygdala forms a key part of this subcortical circuitry and is responsible for determining what is familiar or unfamiliar in which it plays a significant role in the activation of fear.[7,8,12] Even before the higher cortex is able consciously to perceive and respond to a threat, the amygdala has already activated the body's stress response, causing a flood of biochemical and cardiovascular reactions. For example, it is a common experience of clients with panic attacks to report an inability to identify the cognitive trigger that precedes the flood of anxiety and physiological correlates.[16]

Current research has clearly shown that a purely mental activity such as cognitively recalling a past situation that provoked anger does not produce nearly as profound an impact on physiological processes as actually engaging the emotion associated with that memory – actually reexperiencing the feeling of anger.[5]

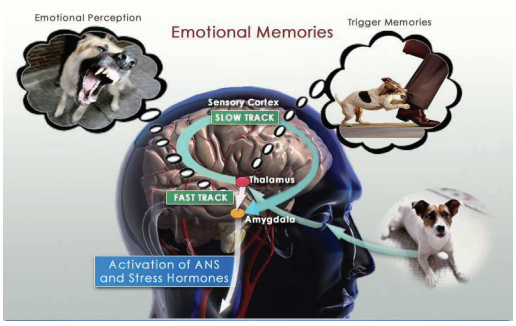

Figure 2.2 Through a process called fear conditioning, the body can learn to perceive an otherwise mundane stimulus as threatening.

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Emotion activates the ANS and hypothalamic-pituitary adrenal axis, leading to changes in the activity and function of the body's systems and organs. Thus many of the deleterious effects of stress on the brain and body are in fact physiological repercussions of negative emotions.[4]

> Activation of the stress response involves two major neural and neuroendocrine response pathways: the neuroendrocrine hypothalamic pituitary adrenal (HPA) axis and the autonomic nervous system, comprising the sympathetic and parasympathetic nervous systems. The main sympathetic neurotransmitter is norepinephrine and neuropeptide Y (NYP). The adrenal medulla is a glandular component of the sympathetic nervous system that releases epinephrine (adrenaline) into the bloodstream during activation. Together, adrenaline, released from the adrenal medulla and norepinephrine, and NPY, released from the nerve terminals, produce a variety of effects during stress. These include increased heart rate and peripheral vasoconstriction with resultant increased blood pressure and diversion of blood flow away from skin and to muscles – a pattern of cardiovascular response known as a "threat" pattern. In physiological studies the degree and pattern of sympathetic activation can be noninvasively quantitated by measures of heart rate variability (HRV). Similarly, HPA axis activation can be noninvasively quantified by measures of salivary cortisol.[17-19]
>
> The effects from activation of the sympathetic nervous system, together with behavioral responses resulting from the activation of the HPA axis, produce the physiological stress response commonly known as the "fight-or-flight" response. The parasympathetic nervous system, whose major neural pathways are the vagus nerves and whose main neurotransmitter is acetylcholine (Ach) sends signals to and receives signals from the central nervous system (CNS) and innervates the gut, liver, spleen, lungs and heart. The vagus nerve is tonically activated and generally provides a brake to the system, tending to slow heart rate and reduce blood pressure. Removal of the brake by inhibition of vagal activity, such as occurs during the stress response, is the fastest way to increase heart rate and blood flow and activate the stress response which occurs on the order of milliseconds, compared to sympathetic activation that occurs on the order of seconds and HPA axis activation that occurs on the order of minutes. The pattern of enhanced cardiac performance and reduced peripheral resistance seen during vagal activation is known as a "challenge" pattern of response. Activity of the parasympathetic nervous system can also be sensitively and non-invasively quantitated by HRV measures.[20]
>
> *Excerpt cited from reference 21.*

The "fight-or-flight" response, can be activated by the amygdala, thereby circumventing conscious cognitive processing. We see this in the common experience of people who say something in anger only to have no explanation later as to what triggered the anger. When threatened, people tend to react first and think about it later.

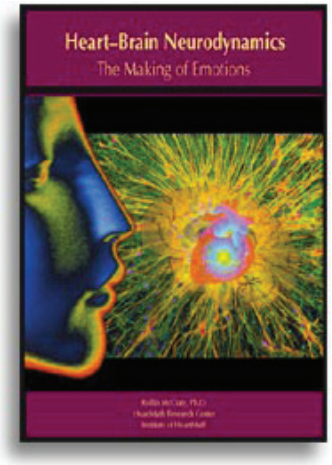
Because emotional arousal can readily dominate the mental landscape, it is more difficult to willfully "turn off" strong emotions with thought alone than it is to calm down or shift away from the negative emotion first and then think rationally. Likewise, it is generally one's emotional experience, rather than solely cognitive activity, that is the strongest motivator of attention, attitudes, decisions and behavior[5].

The hormonal system plays a key role in perpetuating the current emotional state and maintaining that state physiologically.

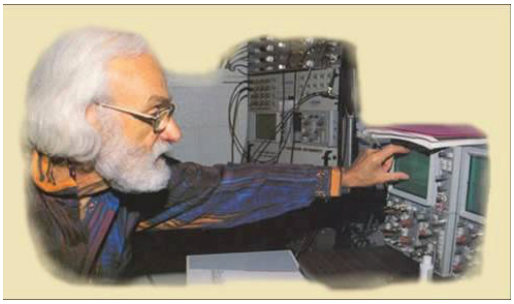
The stress response is activated when an individual's sense of control over his or her environment is challenged. In situations that elicit feelings of frustration, anxiety, despair or hopelessness the activation of the HPA axis leads to the release of the hormone, cortisol.[36]

In healthy people, levels of both cortisol and dehydroepiandrosterone (DHEA) increase in response to acute (short-term) negative emotions. However, when negative emotional activation becomes chronic (lasting days or longer), HPA axis activation persists, cortisol levels remain high and DHEA levels decrease. Because pregnenolone and progesterone are the precursors to both DHEA and cortisol, increased levels of cortisol are at the expense of DHEA levels. This results in a decreased DHEA:cortisol ratio, which is a key biochemical marker of stress and accelerated aging. Chronically high levels of cortisol are associated with depression, poor appetite, insomnia and loss of interest. A reduced DHEA:cortisol ratio is found in most major diseases and is associated with:

- Accelerated aging
- Brain cell death
- Impaired memory and learning
- Decreased bone density; Increased osteoporosis
- Reduced muscle mass
- Reduced skin growth and regeneration
- Impaired immune function
- Increased blood sugar
- Increased fat accumulation around waist and hips



For more in-depth understanding, please refer to the Heart-Brain Neurodynamics monograph.
www.heartmath.org



Neurophysiologist Dr. Karl Pribram

Summary

Emotions are faster than thoughts and impact both the ANS and HPA systems. The neurological connections between the emotional centers and the cognitive centers are more abundant than between cognitive and emotional centers. This explains why emotions affect physiological response more than thoughts alone.

2.4 Physiology of Emotional Experience: Establishing a New Baseline

In recent years we have seen the emergence of a new understanding of how the brain functions as well as of the brain–body dynamics involved in emotional processing. Rather than assembling thoughts and feelings from bits of data like a digital computer, the brain is an analog processor that relates whole concepts or patterns to one another and looks for similarities, differences and relationships between them. This new understanding has challenged long-held views of how emotions are generated.

A theory of emotion starting to gain widespread acceptance was first proposed by the late neurophysiologist Dr. Karl Pribram, professor emeritus and former director of the Neuropsychological Laboratory at Stanford. In this model, the brain functions as a complex pattern-identification and pattern-matching system.[22-24] Within the body, the patterns of activity of many processes provide constant rhythmic inputs with which the brain becomes familiar, much like a young child who can only sleep with a favorite blanket or stuffed animal. These rhythmic patterns include the heart's rhythmic activity; respiratory, digestive and hormonal rhythms; and patterns of muscular tension, particularly facial expressions. Past experience builds within us a set of familiar patterns which are maintained (stored) in the brain's neural architecture. Emotional sensations and experience result from the ongoing dynamic interaction between the heart, brain, nervous and hormonal systems.[3] The brain develops familiar patterns of emotional experience and looks for similarities, differences and relationships between patterns and then responds to these patterns.[23]

The brain continuously monitors these inputs to help organize perception, cognition, feeling and behavior. Recurring patterns form a stable reference against which current input is compared. When the brain finds within a current input (visual, auditory, olfactory, etc.) a pattern that matches a stored reference, it processes the experience as familiar or comfortable, even if it is anxiety, fear, panic or depression.[23] For example, many therapists have observed that some clients who are showing significant positive behavior changes may acknowledge their situations as improved only to return to old patterns of behavior, even if they are unhealthy.

When the current input pattern is sufficiently different from the reference, a mismatch occurs and this departure from the familiar pattern gives rise to feelings of discomfort which in turn activate physiological responses. Such responses often result in an increase in the activity of the sympathetic branch of the autonomic nervous system and a withdrawal of parasympathetic activity.[5,25]

In short, because our psychophysiological systems are designed to maintain stability, returning to the familiar reference gives us a sense and feeling of security, while remaining in unfamiliar territory causes unease, even if the unfamiliar territory may be a more desirable behavior or result in a lessening of symptoms.[5] It is important to note that this is true even if the established reference pattern is one associated with chaos, confusion or anxiety.

Excess worry can become so familiar to the brain and body that unless the individual is worrying or feeling anxious, he or she is uncomfortable. Some may describe the lack of anxiety as a feeling similar to anxiety, or they may begin to distrust the lack of anxiety and begin worrying about not worrying! Once worry or anxiety becomes the familiar reference pattern, the brain keeps defaulting to worried or anxious feelings and thoughts to maintain a sense of familiarity.

This is how self-destructive habits are formed. The brain considers the familiar to be more comfortable, no matter how irrational it may be. This is the essence of a maladaptive pattern. Without extinguishing the old maladaptive pattern and replacing it with a new, healthier pattern, sustained behavioral change is unlikely.

This point is critical when working with clients who have long-standing mental health, behavioral or emotional issues. Clients may be excited about relieving long-established symptoms, but may want to discontinue after an initial session or two because they experience new or unfamiliar feelings or sensations. Some may even describe this as increased anxiety or other strong emotions. Even if they are able to make emotional shifts and achieve some positive gains, they may feel uncomfortable at first because it is an unfamiliar state or feeling. It's important to encourage such individuals to be patient and to remind them that such feelings are normal and usually temporary, especially when learning new ways of feeling and behaving.

Some clinicians choose to be proactive with clients who need this type of reassurance. When introducing the HeartMath System they discuss the possibility of a temporary getting-worse-before–it-gets-better phase.

In Pribram's theory of emotion, the brain functions as a complex pattern identification and matching system.[23,26,27] In this model, past experience builds within us a set of familiar patterns, which are maintained in the neural architecture. Inputs to the brain from both the external and internal environments contribute to the maintenance of these patterns. Within the body, many processes provide constant rhythmic inputs with which the brain becomes familiar. These include the heart's rhythmic activity; digestive, respiratory and hormonal rhythms; and patterns of muscular tension, particularly facial expressions. These inputs are continuously monitored by the brain and help organize perception, feelings and behavior. Familiar input patterns form a stable backdrop or reference pattern, against which new information or experiences are compared. According to this model, when an input is sufficiently different from the familiar reference pattern, this "mismatch" or departure from the familiar underlies the generation of feelings and emotions.

Notes

Notes

As a primary generator of rhythmic information patterns in the human body, the heart plays a particularly important role in emotional experience.[25] In fact, Pribram has shown that without a establishing a familiar pattern, depends on a change in the inputs to the brain from the body, especially the afferents from the heart. Containing extensive neural systems, it functions as a sophisticated information encoding and processing center and possesses a far more developed communication system to the brain than do other major organs.[25]

With every beat, the heart transmits complex patterns of neurological, hormonal, pressure and electromagnetic information to the brain and throughout the body. As a pivotal point in many interacting systems, the heart is uniquely positioned as a powerful entry point into the communication network that connects body, mind, emotions and spirit.

2.5 Afferent Cardiovascular Input Influences Emotional Experience

The influence of cardiovascular afferent input to the brain on emotional processes is highlighted by recent evidence suggesting that psychological aspects of panic disorder often are created by unrecognized paroxysmal supraventricular tachycardia (PSVT), a sudden-onset atrial arrhythmia. According to one study, DSM-IV criteria for panic disorder were fulfilled in more than two-thirds of patients with these sudden-onset arrhythmias. Among those patients in whom PSVT was unrecognized at initial evaluation, symptoms were attributed to panic, anxiety or stress in 54 percent of the cases. In the majority of cases, once the arrhythmia was recognized and treated, the panic disorder disappeared.[29] Interestingly, this study confirmed the observations of pioneer ANS researcher Müller, who reported the induction of emotions by cardiac palpitations over 90 years earlier.[29]

The multiple inputs from the heart and cardiovascular system to the brain are major contributors to establishing the dynamics of the familiar baseline pattern or set point against which the current input of “now” is compared. A striking example illustrates the extensiveness of the influence of cardiac afferent input on emotional experience as well as the operation of the mismatch mechanism: when the heart rate variability patterns of such an arrhythmia are plotted, the erratic, incoherent waveform appears quite similar to the heart-rhythm pattern produced during strong feelings of anxiety in a healthy person. Because the sudden, large change in the pattern of afferent information is detected by the brain as a mismatch relative to the stable baseline pattern to which the individual has adapted, it consequently results in feelings of anxiety and panic. Likewise, our research also has shown that changing the pattern of afferent information generated by the cardiovascular system can significantly influence perception and emotional experience.[30,31]

The amygdala has been the subject of intense scrutiny in recent years. This brain center plays a key role in emotional memory, emotional processing and dreaming.[32] Several studies have investigated the effects of cardiovascular afferent input on the amygdaloid complex (i.e., the amygdala and associated nuclei). For example, in cats, spontaneous neural activity in the central nucleus of the amygdala has been shown to be synchronized to the cardiac cycle and to be

modulated by afferent input from the aortic depressor and carotid sinus nerves.[33]

Similarly, data from humans undergoing surgery for epilepsy demonstrated that cells within the amygdaloid complex specifically responded to information from the cardiac cycle.[34] Pribram, who did much of the original mapping of the functions of the amygdaloid complex, found that it has extensive projections to both the brainstem autonomic nuclei and the higher cognitive centers and is thus uniquely positioned to coordinate affective, behavioral, immunological and neuroendocrinal responses to environmental stimuli.[27,35] The observed interaction of afferent cardiac input with this brain region supports the view that visceral information not only influences emotional processing and emotional experience, but it can also influence hormonal and immune responses.[30]

Taken together with the demonstrated role of the amygdala in the regulation of viscero-autonomic activity and the resultant effects on familiarization, a new view of emotional processing and regulation emerges.

When the input to the brain does not match an existing pattern, an adjustment must be made to achieve control and return the system to equilibrium or stability. One way to re-establish stability is by executing an outward action. We are motivated to eat if we feel hungry, run away or fight if threatened, do something to draw attention to ourselves when feeling ignored, etc. We also can gain control and re-establish stability by making an internal adjustment (without any external action which is the essence of self-regulation). For example, a confrontation at work may lead to feelings of anger, which can prompt inappropriate behavior such as substance abuse, aggression, anxiety, depression, fighting, etc., or one can make a conscious choice to make an internal emotional shift.

One of the important findings of our research is that changes in the heart's rhythmic patterns can also be intentionally generated. This shift is one of the physiological correlates of using the HeartMath positive emotion-based, coherence-building techniques which combine an intentional shift in attention to the physical area of the heart with the self-induction of a positive emotional state. We have found that this process rapidly initiates a distinct shift to increased coherence in the heart's rhythms. This, in turn, results in a change in the pattern of afferent cardiac signals sent to the brain, which serves to reinforce the self-generated positive emotional shift, making it easier to sustain. Through the consistent use of the coherence-building techniques, the coupling between the psychophysiological coherence mode and positive emotion is further reinforced. This subsequently strengthens the ability of a positive feeling shift to initiate a beneficial physiological shift toward increased coherence, or a physiological shift to facilitate the experience of a positive emotion.

While the process of activating the psychophysiological coherence mode clearly leads to immediate benefits by helping transform stress in the moment it is experienced, it also can contribute to long-term improvements in emotion-regulation abilities and emotional well-

The goal of most therapies is to facilitate change from a symptomatic and less desirable state to a less symptomatic and more desirable state. The HeartMath approach is unique in that it focuses on establishing a new physiological baseline by targeting the primary source of the disorder[44]. Once a client establishes a stable, new psychophysiological baseline pattern, his or her nervous system will strive to maintain a match with the new pattern[5]. Once a new baseline is established, self-regulation becomes an automatic response, which is the key step in enabling long-term behavioral change.

Notes

being that ultimately affect many aspects of one's life. This is because each time individuals intentionally self-generate a state of psychophysiological coherence, the "new" coherent patterns – and "new" repertoires for responding to challenges – are reinforced in the neural architecture. With consistency of practice, these patterns become increasingly familiar to the brain. Thus, through a feed-forward process, these new, healthy patterns become established as a new baseline or reference, which the system then strives to maintain. It is in this way that the HeartMath System facilitates a restructuring process, whereby the maladaptive patterns that underlie the experience of stress are progressively replaced by healthier physiological, emotional, cognitive, and behavioral patterns as the "automatic" or familiar way of being.

Work in developmental neurobiology has shown that the experience of positive emotions plays a critical role in infant growth and neurological development, which has enormous consequences for later life. Research on adults has documented a wide array of effects that positive emotions have on cognitive processing, behavior, health and well-being. [37]

Positive emotions have been found to broaden the scope of perception, cognition and behavior,[38-41] thus enhancing creativity and intuition[42]. Moreover, the experience of frequent positive emotions can undo the effects of negative emotions and has been shown to predict resilience and psychological growth.[43]

By intentionally making internal adjustments, individuals can self-manage their feelings to inhibit poor behavioral responses, re-establish stability and improve health and relationships.[5]

The way to interrupt a self-defeating cycle is to introduce dynamic new patterns (efficient heart-rhythm patterns) through positive emotional shifts and to reinforce them until they become familiar, thus establishing a new efficient and effective psychophysiological reference pattern. This new pattern is established by what we will call emotional restructuring techniques. Throughout this manual, we will refer to this preferred psychophysiological pattern as coherent and that a client is achieving psychophysiological coherence.

Summary

The brain automatically strives to maintain a match between the familiar mental, emotional and physical processes and the current state whether or not the familiar state has a detrimental impact on health, well-being or behavior. Without effective intervention, anxiety, depression or other symptomatic behaviors, thoughts or emotions can become the familiar baseline reference pattern, thus becoming self-perpetuating and self-reinforcing. Once a reference pattern is established, to maintain stability, the neural systems attempt to maintain a match between established patterns and current inputs. It's important for clients to understand and therapists to be patient as clients learn to establish and sustain new patterns.

Chapter 3

Coherence: The Gateway to Change

Learning outcomes:

- Define the three types of coherence.
- Define physiological coherence and heart rate variability (HRV).
- Describe the relationship between emotions and HRV.
- Recognize five applications of HRV analysis.
- Name four risk factors that have been shown to improve with the use of coherence-building skills.
- Describe heart-brain interactions.
- Distinguish between relaxation and physiological coherence.
- Examine the relationship between breathing, positive emotions and coherence.

Notes

3.1 Overview

In this chapter we describe the relationship between different patterns of psychophysiological activity and physiological, emotional and cognitive functions by drawing on three distinct but related concepts of coherence used in physics.

The most common definition of coherence is "the quality of being logically integrated, consistent and intelligible," as in a coherent sentence. A related meaning is "a logical, orderly and aesthetically consistent relationship of parts."[25] In the following discussion we delve more deeply into the meaning of coherence.

3.2 Coherence

"Coherence in ordinary language means correlation, a sticking together or connectedness; also, a consistency in the system. So we refer to people's speech or thought as coherent, if the parts fit together well, and incoherent if they are uttering meaningless nonsense, or presenting ideas that don't make sense as a whole." [45] Thus, coherence in this context refers to wholeness and a global order: This is coherence as a distinctive organization of parts, the relations among which generate an emergent whole that is greater than the sum of the individual parts. In the example of organizing words in a coherent sentence, the meaning and purpose conveyed by the arrangement of the words is greater than the individual meaning of each word.

It is important to note that all systems, to produce any function or action, must have the property of global coherence. The efficiency and effectiveness of the function or action can vary widely, however, and therefore does not necessarily result in a coherent flow of behavior. Global coherence does not mean that everybody or all the parts are doing the same thing all the time. Think of a jazz band for example, in which individual players are each playing their respective parts, yet keeping in tune and step with the whole band. Coherence in this sense maximizes local freedom and global cohesion.[45]

In a living system global order or coherence among all parts must be sustained and maintained over time. For example, biochemist and geneticist May-Wan Ho has suggested that a whole living system is a domain of coherent, autonomous activity which is coordinated across a continuum from the molecular to macroscopic to social levels.
In physics, the concept of coherence is also used to describe the interaction or coupling among different oscillating systems in which synchronization is the key idea in this concept. Synchronization describes the degree to which two or more waves are either phase or frequency-locked together, or when communication occurs between systems or modes without obstruction.

Returning to the music example, a chord is composed of notes of different frequencies yet resonate as a harmonious order of sound waves. In physiology, coherence is similarly used to describe the degree of coupling and harmonious interaction between two or more of the body's oscillatory systems such as respiration and heart rhythms. There are modes in which they are operating at different frequencies, and modes when they become entrained and oscillate at the same

For a pre-recorded coherence lecture from Dr.Rollin McCraty go to: www.heartmath.org/coherence-course

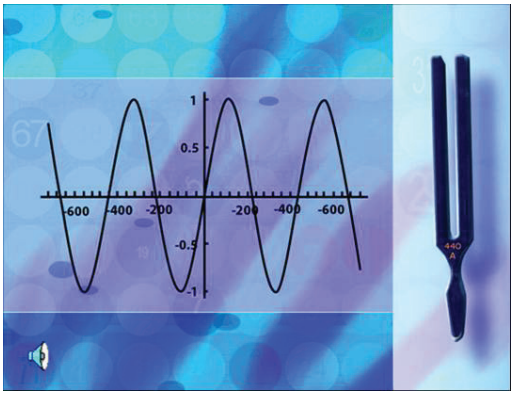


Figure 3.1 A sine wave reflects coherence in a single oscillating system.

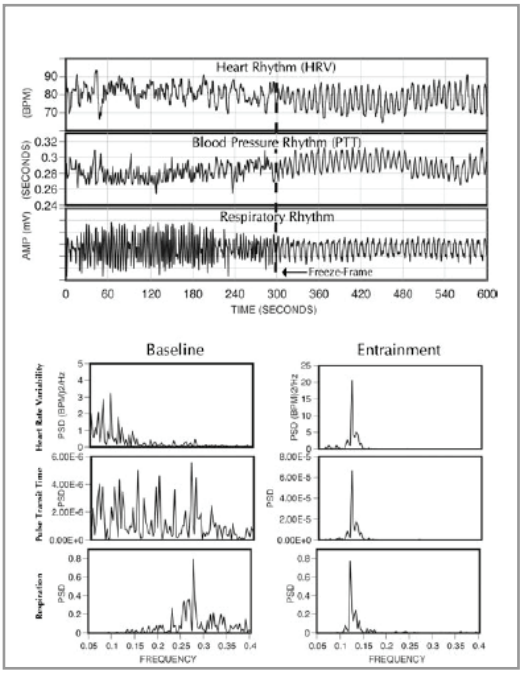


Figure 3.2 The top graphs show an individual's HRV, pulse transit time and respiration rhythms over a ten minute period. At the 300 second mark, the individual used the Freeze-Frame positive emotion refocusing technique, causing these three systems to come into entrainment (cross coherence). The bottom graphs show the frequency spectra of the same data on each side of the dotted line in the center of the top graph. Notice the graphs on the right show that all three systems have entrained to the same frequency.

The heart communicates with the brain in four ways:

- a neurological communication through the nervous system (electrical)
- a biophysical communication – the pulse (pressure wave)
- a biochemical communication – the hormones (chemical)
- an energetic communication – (electromagnetic).

frequency. This is also true for brain states in which the brainwaves can be in phase momentarily at different locations across the brain. The term cross-coherence is used to specify this type aspect of coherence.

Another example, from a physiological system's perspective, is that people's thoughts, emotions and attitudes either can be aligned and coherent or incoherent. When individuals think one way, feel another, and behave inconsistently, they are in an inefficient and ineffective state.

Another aspect of coherence relates to the dynamics of the flow of action produced by a single system.[25] This is coherence as a uniform pattern of cyclical behavior. Because this pattern of action is generated by a single system, the term auto-coherence is used to denote this type of coherence. This concept is commonly used in physics to describe the generation of an ordered distribution of energy in a waveform. An example is a sine wave, which is a perfectly coherent wave. The more stable the frequency, amplitude and shape of the waveform, the higher the degree of coherence. In physiological systems, this type of coherence describes the degree of order and stability in the rhythmic activity generated by a single oscillatory such as the heart's rhythmic activity. When coherence is increased in a single system that is coupled to other systems, it can pull the other systems into coherence or entrainment, resulting in increased cross-coherence in the activity of the other systems, even across different time scales of activity. An example of this is in the increased heart-brain synchronization that occurs in a heart coherent mode.

Summary

Within each individual are varying levels of global coherence, which vary from day to day and with our various thoughts and emotions. In many ways, we all strive for efficiency and effectiveness to increase ease and pleasure and to decrease the chaos and suffering within and around us. To facilitate our level of global coherence, we can learn to bring greater order into individual systems within our own bodies such as heart rhythms, respiration, sleep-wake cycles etc. By increasing the auto-coherence or efficiency of a single oscillating system such as heart rhythms, other systems can be pulled into synchronous activity, thus leading toward global coherence and increasing efficiency and harmony.[25]

3.3 Heart-Brain Interactions

With each beat, the heart not only acts as a pump, but also continually transmits dynamic patterns of neurological, hormonal, pressure and electromagnetic information to the brain and throughout the body. An extensive body of research has shown, moreover, that cardiac ascending input influences the activity and function of higher brain centers involved in perceptual, cognitive and emotional processing and can either inhibit or facilitate cortical functions.[9,10,46-48]

The ascending networks of nerves connecting the heart and cardiovascular system with the brain are far more extensive than the neural connections that other major organs have with the brain.[49]

It is now established that the heart is a sophisticated information encoding and processing center, with an intrinsic nervous system sufficiently sophisticated to qualify as a "little brain" in its own right.[50,51]

The heart's neural circuitry enables it to learn, remember and make functional decisions relative to the heart's activity, all independent of the cranial brain.[51,52] Most people indicate that the place where they experience positive emotions is in the area of the heart. Interestingly, clients who do not experience feelings of love, acceptance or belonging often describe their feelings as an emptiness or void in their chest.

The heart also functions as a sensory organ and is particularly sensitive and responsive to changes in a number of other bodily systems. For example, heart-rhythm patterns are continually and rapidly modulated by changes in the activity of either branch of the ANS. The heart's extensive internal network of sensory neurons also enables it to detect and respond to variations in hormonal rhythms and patterns.

The heart is itself a hormonal gland that manufactures and secretes numerous hormones and neurotransmitters. The heart was reclassified as an endocrine or hormonal gland, when, in 1983, a hormone produced and released by the heart called atrial natriuretic factor (ANF) was isolated.[50,52] This hormone exerts its effects widely: on blood vessels, kidneys, adrenal glands and a large number of regulatory regions in the brain.

More recently, it was discovered that the heart also secretes oxytocin, commonly referred to as the "love" or "bonding hormone."Beyond its well-known functions in childbirth and lactation, recent evidence indicates that this hormone also is involved in cognition, tolerance, adaptation and complex sexual and maternal behaviors, as well as in the learning of social cues and the establishment of enduring pair bonds. Remarkably, concentrations of oxytocin produced in the heart are as high as those found in the brain.[25]

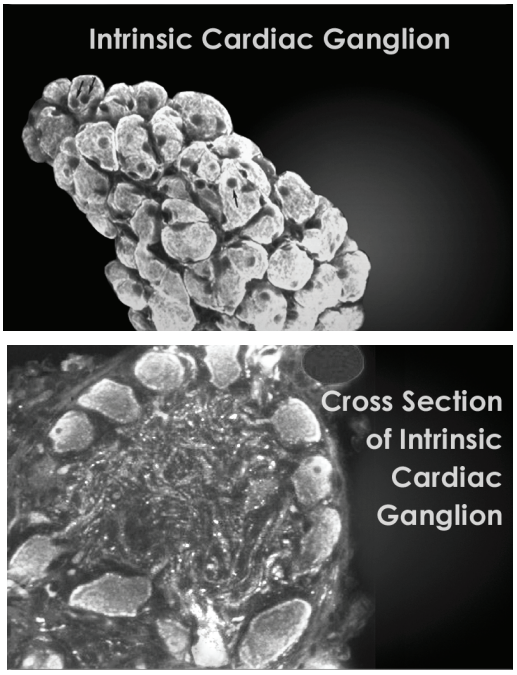


Figure 3.3 This is a highly magnified view of a cardiac intrinsic ganglia taken with a confocal microscope which is able to take images layer by layer and then build a 3D image. Ganglia are made up of groups of nerve cells (somata) that exist outside of the brain and spinal cord. Each of the smaller circular structures shown is the cell body of an individual neuron.

The bottom image represents a cross section through an intrinsic cardiac ganglion. In the center there is a mass of dendrites which interconnect individual neurons. This is the ideal structure for an independent neural processing unit.

Summary

The heart communicates with the brain and the rest of the body through biophysical interaction (changes in pressure), neural activity, hormonal secretions and energetic (electromagnetic) systems. We now understand that the sophisticated neural circuitry of the heart functions as a little brain. The heart also has been reclassified as a hormonal gland.

3.4 Coherence and Heart Rate Variability

Although the rhythmic beating of the heart at rest was once believed to be monotonously regular, we now know that the rhythm of a healthy heart even under resting conditions is surprisingly irregular. These moment-to-moment variations in heart rate are easily overlooked when average heart rate is calculated. Heart rate variability (HRV), derived from the electrocardiogram (ECG) or pulse wave, is a measurement of these naturally occurring beat-to-beat changes in heart rate.

The heart facilitates physiological coherence because as the "strongest" oscillating system in the body, when its rhythm is coherent (auto coherence), it can bring into synchrony many of the body's systems so they work in an efficient and harmonious manner and lead toward greater global coherence (cross coherence)[25].

Heart rhythms provide the main source of rhythmic activity in the body and have the ability to move the entire system toward greater synchrony and global coherence.

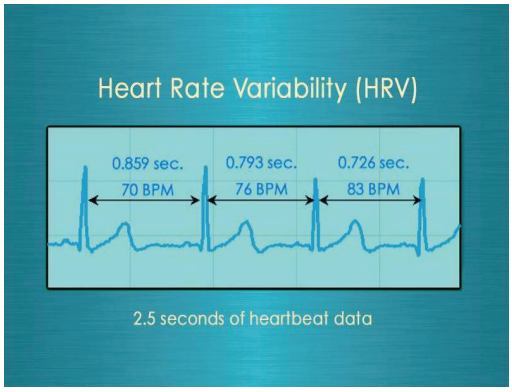


Figure 3.4 HRV is the naturally occurring beat-to-beat changes in heart rate.

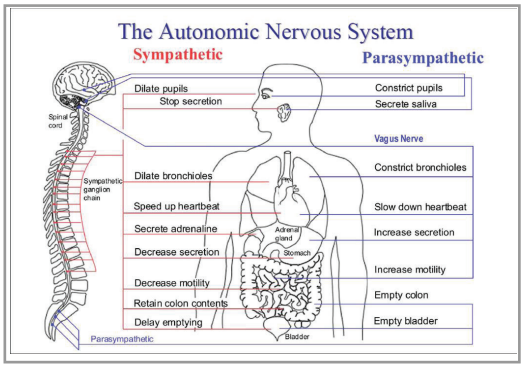


Figure 3.5 Innervation of the major organs by the autonomic nervous system. A number of health problems can arise in part due to improper function or balance in the ANS. The activity in the ANS and the balance between the two branches is greatly affected by emotions. For example, anger causes increased sympathetic activity and reduced parasympathetic.

Scientists and physicians consider HRV to be an important indicator of overall health and fitness.[54-56] As a marker of physiological resilience and behavioral flexibility, HRV reflects the ability to adapt effectively to stress and environmental demands. In this regard, HRV is an important indicator of both physiological resiliency and behavioral flexibility. Although too much instability is detrimental to efficient physiological functioning, too little variation also can be pathological. Healthy coherent function or an optimal level of variability within an organism's key regulatory systems is critical to inherent flexibility and adaptability.

In healthy individuals, the heart remains similarly responsive and resilient, primed and ready to respond when needed. Just as the shifting stance of a tennis player about to receive a serve may facilitate swift adaptation, the normal variability in heart rate is ready to respond to demand. This variability is the result of the synergistic action of both efferent and afferent pathways in the two branches of the ANS, which act through neural, mechanical, hormonal and other physiological mechanisms to maintain cardiovascular parameters in their optimal ranges and to permit appropriate reactions to changing external or internal conditions.

In a healthy individual, the heart rate at any given time represents the net effect of the parasympathetic nerves, which slow heart rate, and the sympathetic nerves, which accelerate it. HRV is more than an assessment of heart rate; it is a much deeper assessment of the complex interaction of the heart with multiple bodily systems. These changes in heart-rhythm patterns are influenced by emotions, thoughts and physical exercise.[57,5]. They also can be used to assess acute-versus-chronic conditions such as autonomic depletion, chronic stress, resiliency and systemic resiliency.

Since heart-rhythm patterns reflect autonomic nervous system dynamics and heart-brain interactions, they provide a powerful, objective and noninvasive way to explore the dynamic interactions between physiological, mental, emotional and behavioral processes. HRV provides information on the degree of synchronized activity in the ANS and higher brain systems and the degree of physiological depletion, both of which affect the brain's ability to process information, including decision-making, problem-solving and creativity.

Aging is one factor that impacts the amount of variability, with most individuals typically losing 3% to 5% every year. Abnormally low HRV relative to one's age, is a strong and independent predictor of future health problems, including all types of mortality.[58, 60] In addition, HRV is considered a psychophysiological marker of emotional regulation and psychological adjustment.

In studies of infants and children, the amount of HRV has been demonstrated to reflect a wide range of emotional expressiveness such as temperamental reactivity, empathic response, social competence, attentional capacity and aggression. In adolescents and adults, low HRV has been linked to hostility, aggression, depression, panic and eating disorders. Thus, measures of HRV include a broad range of psychological adjustment variables, both adaptive and maladaptive, that span developmental stages from infancy to adulthood.[61]

HRV analysis has many clinical uses, as reported in more than 200,000 research papers in medical literature. HRV analysis is used to:

- Determine relative balance between the sympathetic and parasympathetic nervous systems.[63]
- Predict increased risk of sudden cardiac death and all-cause mortality.[63,64]
- Indicate fitness levels.[65]
- Indicate nervous-system aging rate.[66]
- Assess moment-to-moment changes in autonomic function and balance resulting from changes in mental or emotional states or stress.[67]

A continuously updated look at current research can be accessed at: https://www.heartmath.org/research/

3.5 Heart-Rhythm Coherence

Emotions have a profound impact on HRV. HRV analyses show how distinct heart-rhythm patterns characterize different emotional states. For example, we have found that sustained positive emotions such as appreciation, care, compassion and love generate a smooth, sine-wave like pattern in the heart's rhythms. This reflects increased order in higher-level control systems in the brain, increased synchronization between the two branches of the ANS, and a general shift in autonomic balance toward increased parasympathetic activity. As shown in the figure 3.6 and demonstrable by quantitative methods, heart rhythms associated with positive emotions such as appreciation are clearly more coherent – organized as a stable pattern of repeating sine waves – than those generated during a negative emotional experience such as frustration. This association between positive emotional experience and distinctive physiological pattern is evident in studies conducted in both laboratory and natural settings and for both spontaneous emotions and intentionally generated feelings.[25]

In contrast, research has shown that negative emotions, such as frustration, anger, anxiety and worry, lead to heart-rhythm patterns that appear incoherent – highly variable and erratic.[25, 68, 69] Overall, this means there is less synchronization in the reciprocal action of the parasympathetic and sympathetic branches of the ANS and decreased coherence.[59, 60] This desynchronization in the ANS, if sustained, taxes the nervous system and bodily organs, impeding the efficient synchronization and flow of information throughout the psychophysiological systems. Furthermore, just as studies have shown that prefrontal cortex activity is reflected in HRV via modulation of the parasympathetic branch of the ANS, conversely, the increased disorder in heart-rhythm patterns is reflected in disorder of the higher brain systems.

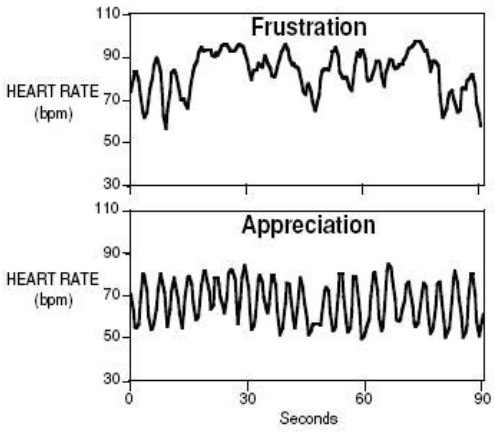


Figure 3.6 Emotions are reflected in heart rhythm patterns. The heart-rhythm pattern shown in the top graph, characterized by its erratic, irregular pattern (incoherence), is typical of negative emotions such as anger or frustration. The bottom graph shows an example of the coherent heart-rhythm pattern that is typically observed when an individual is experiencing sustained, positive emotions, in this case appreciation.

Summary

Heart rate variability (HRV), derived from the electrocardiogram (ECG) or pulse wave, is a measurement of the beat-to-beat changes in heart rate. HRV is an important indicator of overall health and fit-

We use the term physiological coherence in a broad context to describe a number of related physiological phenomena frequently associated with more ordered and harmonious interactions among the body's systems. This includes cognitive function and the respiratory, nervous, cardiovascular and hormonal systems.

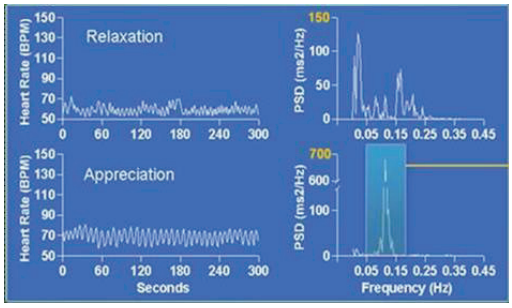


Figure 3.7 Typical heart rate variability patterns during relaxation and coherence with their correlating frequency spectra to the right.

ness. Emotions have a profound impact on synchronized activity in the ANS, which is reflected in heart rhythms. By training a person to increase HRV coherence with emotional self-regulation techniques, a practitioner can help a client improve health and well-being. Improved HRV coherence can reduce the negative impact of stress, improve self-regulatory capacity, cognitive function and help establish a new, healthier baseline for sustained physiological and behavioral change.

3.6 Relaxation, Breathing and Psychophysiological Coherence

The state of coherence is both psychologically and physiologically distinct from the state achieved through most techniques for stress management that rely primarily on relaxation. At the physiological level, relaxation is characterized by an overall reduction in autonomic outflow (resulting in lower HRV and a shift in ANS balance toward increased parasympathetic activity.

Coherence is also associated with a relative increase in parasympathetic (vagal) activity, thus encompassing the key element of the relaxation response. Coherence is physiologically distinct from relaxation, however, in that the human system oscillates at its natural resonant frequency with increased harmony and synchronization in nervous-system and heart–brain dynamics. This important difference between the two states is reflected most clearly in their respective HRV power spectra (see Figure 3.7). Furthermore, unlike relaxation, the coherence state does not necessarily involve a lowering of heart rate or a change in the amount of HRV, but rather is primarily marked by a change in the heart-rhythm pattern.[25]

In contrast, the coherence state is activated by sustained positive emotions and produces a highly ordered, smooth, sine-wave like HRV pattern which is marked by an unusually large, narrow peak in the low frequency band, centered around 0.1 hertz (note the significant power scale difference between the spectra for coherence and relaxation). This large, characteristic spectral peak is indicative of the system wide resonance and synchronization that occurs during the coherence state. Unlike relaxation, coherence does not necessarily involve a reduction in HRV and may at times even produce an increase in HRV relative to a baseline state.

Not only are there fundamental physiological differences between relaxation and coherence, but the psychological characteristics of these states also are quite distinct.[23, 70] Relaxation is a low-energy state in which the individual rests both the body and mind, typically disengaging from cognitive and emotional processes. In contrast, coherence generally involves the active engagement of positive emotions.[5] Psychologically, coherence is experienced as a calm, balanced, yet energized and responsive state that is conducive to everyday functioning and interaction, including the performance of tasks requiring mental acuity, focus, problem-solving and decision-making, as well as physical activity and coordination.[25]
Many practitioners work on helping their clients become more coher-

ent in relaxed as well as in active states. For example, you may want to work with an athlete to be coherent while running, or a musician while playing a playing their instrument or an executive while speaking on the phone.

It is important to understand the role of breathing in the generation of coherence and its relationship to the HeartMath System. Because breathing patterns modulate the heart's rhythm, it is possible to generate a coherent heart rhythm simply by breathing slowly and regularly at a 10-second rhythm (5 seconds on the in-breath and 5 seconds on the out-breath). Breathing rhythmically in this fashion can be calming and helps to initiate a shift out of the stressful emotional state and into increased coherence.[25] This type of cognitively directed, paced breathing, however, can require considerable mental effort and is difficult for some people to maintain.

Although HeartMath techniques incorporate a breathing element, paced breathing is not their primary focus and therefore they should not be thought of simply as breathing exercises. The main difference between the HeartMath System and most commonly practiced breathing techniques is the focus on the intentional generation of a heartfelt positive emotional state. This emotional shift is a key element of the techniques' effectiveness.[25] It is also the most self-rewarding aspect of their practice.

Positive emotions appear to excite the system at its natural resonant frequency and thus enable coherence to emerge and be maintained naturally, without conscious mental focus on the breathing rhythm. This is because input generated by the heart's rhythmic activity is actually one of the main factors that affect our breathing rate and patterns. When, as a result of a positive emotional shift, the heart's rhythm shifts into coherence and the breathing rhythm automatically synchronizes with the heart, thereby reinforcing and stabilizing the shift to system wide coherence.

Additionally, the positive emotional focus used in the HeartMath System confers a much wider array of benefits than those typically achieved through breathing alone. These include deeper perceptual and emotional changes, increased access to intuition and creativity, cognitive and performance improvements and favorable changes in hormonal balance.[5, 36, 48, 69, 71]

To derive the full benefits of the HeartMath System, it is therefore important to learn how to self-activate and eventually sustain positive emotions. For example, you can work with a musician to be coherent by holding a positive emotion while playing an instrument such as a trumpet or an executive can work on being coherent while talking on the phone. Improved HRV coherence in these examples are reliant on the emotional shift rather than paced breathing. For those who initially have trouble achieving or maintaining coherence, however, practicing heart-focused breathing at a 10-second rhythm, as described above, can be a useful training aid. Once individuals grow accustomed to generating coherence through rhythmic breathing and become familiar with how this state feels, they can begin

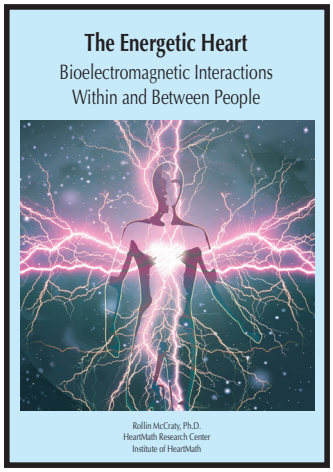


Figure 3.8 A more in-depth discussion of the energetic and physiological linkage research can be found in The Energetic Heart monograph, which is available in the HeartMath Web store. www.heartmath.org

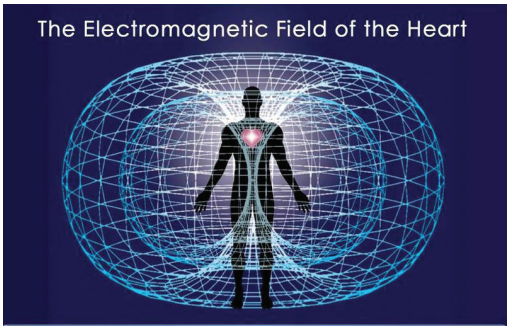


Figure 3.9 Every time the heart beats it generates an electromagnetic field, which radiates outside the body.

You can find more research on the subject of the heart-brain communication and coherence at: https://www.heartmath.org/research/research-library/

to practice breathing a positive feeling or attitude through the heart area to achieve the full benefits of the emotional shift. Eventually, with practice, most people are able to shift into coherence by directly activating a positive emotion.

Summary

Relaxation and psychophysiological coherence are two distinct states. Coherence can be achieved with breathing alone, but the HeartMath System enables the added benefits that result from establishing and sustaining a positive emotional state.

3.7 Coherence in the Therapeutic Encounter

Greater organization in one system may lead to greater organization in other systems. This process can be described as moving from a more incoherent state toward a more coherent one in the therapeutic encounter as well. To truly understand coherence and how the HeartMath System works, it is helpful to keep in mind that the most powerful rhythmic activity in the body is generated by the heart. By increasing personal awareness of and changing their own heart's rhythmic patterns by generating positive feelings like care, compassion or appreciation, clinicians also can open up new pathways to learning, feeling, perceiving and thinking to promote growth, development and health for themselves as well as their clients.

The benefits of coherence to the clinician should not be overlooked. Becoming more personally aware of the benefits of increased coherence helps clinicians teach their clients how to recognize coherence within their own system and how to apply it to everyday situations.

Many clinicians are trained to be empathic and recognize or sense the client's current emotional state. More than pacing voice, body language, emotional tone or posture, it's important that we hear beyond the spoken word and see that which our eyes cannot. It has been shown that the human nervous system is tuned to the heart fields of others and is able to detect and decode this energetic information. It has also been shown that when one is in a coherent state, one's sensitivity and awareness of this encoded information is increased. Most people have experienced walking into a room and sensing, without any verbal communication, the discomfort being experienced by others in the room. Perhaps what is being detected is the electromagnetic heart fields of those in the room, because this field, which radiates outside the body, has been shown to be modulated with emotionally relevant information.

In the therapeutic setting, clients respond differently to a clinician who is upset or stressed than to one who is coherent, calm and peaceful. Likewise, the ability to stay coherent allows the therapist to understand the client's emotional state without being pulled into it. The clinician's emotional state and ability to sustain coherence may also impact the ability to listen and respond appropriately. In one HMI study, researchers measured the impact of coherence between pairs of people described next.

3.8 Energetic Field Interactions

Thus far we have discussed the role of the heart in information processing and communication in terms of neurological, hormonal and biophysical interactions. In this section we explore how the heart also communicates information to the brain and throughout the body via electromagnetic field interactions.

The heart generates by far the most powerful and most extensive rhythmic electromagnetic field produced in the body. When electrodes placed on the surface of the body are used to measure the ECG, it is the electrical component of the heart's field that is detected and measured. This electrical voltage, about 60 times greater in amplitude than the electrical activity produced by the brain, permeates every cell in the body. The magnetic component of the heart's field, which is approximately 100 times stronger than the magnetic field produced by the brain, is not impeded by the body's tissues and easily radiates beyond the body. This field can be measured about three feet away from the body with sensitive magnetometers. These energetic radiations and interactions provide a plausible mechanism for how we can "feel" or sense another person's presence and even his/her emotional state, independent of body language and other signals.[25]

Research has shown that information about a person's emotional state is communicated not only throughout the body but also into the external environment via the heart's electromagnetic field. As described earlier, the rhythmic beating patterns of the heart change significantly as we experience different emotions. Thus, negative emotions such as anger or frustration are associated with an erratic, incoherent pattern in the heart's rhythms, whereas positive emotions such as love or appreciation are associated with a sine-wave-like pattern, denoting coherence in the heart's rhythmic activity. In turn, these changes in the heart's beating patterns create corresponding changes in the frequency spectra of the electromagnetic field radiated by the heart.

As can be seen in Figure 3.10, the electromagnetic waves generated by one person's heart can be detected in another person's brain waves and can have a measurable physiological effect. When Subject 2 sustained HRV coherence, Subject 2's brain waves synchronized with Subject 1's heartbeats. Because one's emotional state affects the information encoded in the electromagnetic wave radiated by the heart, we may infer from this example that coherence increases Subject 2's ability to be more aware of what Subject 1 is feeling.[71] This suggests that the clinician who takes a few moments to shift into coherence before or during a session is better able to listen empathically, beyond the spoken word and body language, and capture the deeper essence of the communication.

These energetic fields, influence us on a regular basis. Consider a time when you had a significantly positive day and how well your therapeutic work went throughout the day. Conversely, think about how starting the day with a client who is struggling can impact other areas of your day in a negative way. By becoming more aware of

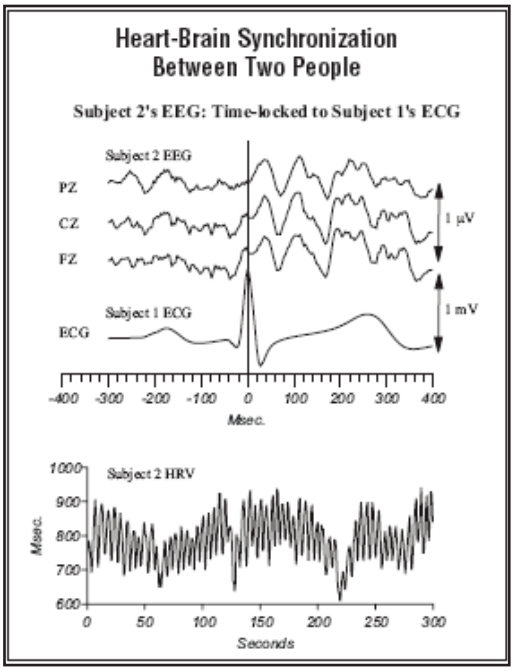


Figure 3.10 This graph shows an example of heart-brain synchronization between two different people. The data is from two participants seated facing one another at a distance of 5 feet, with no physical contact. The participants were asked to do the Heart Lock-In Technique. There was no intention to "send energy" to one another and participants were unaware of the purpose of the experiment. The top three traces show the signal-averaged waveforms derived from the EEG locations along the medial line of the head (Subject 2). Note that the waveforms reveal the occurrence of an alpha wave synchronization in the EEG of Subject 2 that is precisely timed to the R-wave of Subject 1's ECG. Power spectrum analysis of the signal averaged EEG shows that, in this example, the alpha rhythm is synchronized to the other person's heart. This alpha synchronization does not imply that there is increased alpha activity, but it does show that the existing alpha rhythm is able to synchronize to extremely weak external electromagnetic fields such as those produced by another person's heart. Also note that Subject 2 was able to maintain a coherent state and that it was Subject 2's brainwaves that synchronized to the other person's heartbeats. In this example, Subject 1 was not able to maintain coherence, and his/her brainwaves did not synchronize to Subject 2's heartbeats.

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how individual and group interactions can influence and be influenced by coherence, it is possible to improve both therapist to patient interactions as well as group dynamics.

Coherent energetic fields are interrelated and act to amplify and mutually reinforce each other.[72] When an individual increases psychophysiological coherence with the activation of sincere positive emotions, such as appreciation and care, other individuals' coherence also may increase. This helps explain the role of empathy in the therapeutic relationship and how a coherent clinician can influence others to become quieter and more coherent. Client coherence allows for increased patience and resilience and more creative solutions. Similarly, it is possible to increase your ability to create and maintain more coherence in your work, relationships and environment and teach others to do the same.

In group therapy, support groups or classroom settings the creation of a coherent field of social relations can facilitate the generation and maintenance of positive emotions and psychophysiological coherence in its members. The mutual reinforcement toward coherence produces stable, effective collective function, which enhances psychosocial well-being and individual growth and performance. It is important to remember that care and compassion are particularly effective in facilitating this dynamic period.

Discordant emotions and relationships also create a mutually reinforcing cycle. When members of a group are in an incoherent psychophysiological state, activated by stress and negative emotions, this discordance is likely to be carried into the interactions and relationships among them. This produces incoherent relations and conflict within the group. By the same token, without specific education and intervention, the creation of an incoherent field in the group can make it difficult for the individual members (even more so for children and adolescents) to self-activate and sustain a coherent emotional and psychophysiological state. The amplification of incoherence at both the psychophysiological level of the individual and the relational level of the group increases stress and anxiety and reduces task performance and group effectiveness[77] – and it can lead to professional burnout.

Summary

Learning to be sensitive to coherence or incoherence may help the clinician increase empathy and awareness. The clinician's ability to achieve and sustain heart coherence improves the patient's response to the clinician as well as the clinician's response to the patient. A coherent, caring clinician has a greater likelihood of helping the patient achieve coherence and balance.

Chapter 4

HeartMath Interventions and Improved Health Outcomes

Learning outcomes:

- Identify health-related improvements related to improving emotional self-regulation skills

Notes

4.1 Overview

Improving self-regulation and coherence-building skills can help individuals refocus negative emotions toward positive emotions and then restructure maladaptive patterns toward more efficient and productive patterns. HeartMath techniques facilitate improved coherence through emotional refocusing and restructuring.[25] Clients can learn emotional refocusing by changing their negative or maladapted state to one of appreciation, care or other efficient emotions and thereby establish coherent heart rhythms. Through this process they will start to experience powerful and meaningful changes in other bodily systems that can facilitate learning new perceptions and behaviors.

With patience and consistency, clients can achieve emotional restructuring and reset the pattern-identification and matching system in the brain and body to sustain behavioral change.

Chapter 8 contains more details about HeartMath's easy-to-use emotional refocusing skills (the Quick Coherence® and Freeze Frame® Techniques) and emotional restructuring processes (Heart Lock-In® and Attitude Breathing® Techniques).

As used in this course, "HeartMath interventions" refers to the teaching of tools and techniques of the HeartMath System along with measurements of changes in heart rate variability patterns as individuals learn emotional refocusing techniques. Although HeartMath offers validated technology products for assisting with such measurements, the practitioner may use any product which measures the HRV changes adequately.

4.2 Improving Health

Numerous studies have documented the effectiveness of the HeartMath System in helping individuals achieve significant improvements in key markers of both physical and psychological health.[3-5, 44, 48, 71-75]

HeartMath interventions have been shown to promote the maintenance of a highly efficient and regenerative psychophysiological state characterized by improved sympathovagal balance and increased synchronization and harmony in systemwide functioning. It is also conducive to healing and rehabilitation, emotional stability and optimal performance.

At the emotional level, use of the HeartMath system has shown across diverse populations to produce significant reductions in depression, anxiety, anger, hostility, burnout and fatigue and corresponding increases in caring, contentment, gratitude, peacefulness and vitality.[3, 3, 71, 73-75]

Other research has demonstrated that coherence-building techniques produce significant reductions in key health-risk factors (e.g., blood pressure, glucose, cholesterol)[73] and improvements in health status and quality of life in various populations.[4] More specifically, significant blood-pressure reductions have been demonstrated in individuals with hypertension and improved functional capacity and reduced depression in patients with congestive heart failure;[74] improved glycemic regulation and quality of life in patients with diabetes;[63] and improvements in asthma.[76]

Because HeartMath interventions reduce stress-induced autonomic and hormonal activation, improve sympathovagal and neuroendocrine balance and promote increased efficiency and synchronization in the functioning of physiological systems, the HeartMath System

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can be a powerful aid in facilitating healing and rehabilitation. Health professionals have found coherence-building skills to be an effective addition to treatment programs for patients and clients with a wide variety of contexts and conditions that are associated with or exacerbated by emotional stress. (A partial list of reported applications of the HeartMath System is in Chapter 9.)

4.3 Hypertension

HeartMath interventions have been shown to be effective in reducing blood pressure in individuals with hypertension. In a workplace study, hypertensive employees demonstrated a mean adjusted reduction of 10.6 mm Hg in systolic and 6.3 mm Hg in diastolic blood pressure three months after the completion of the intervention. These changes were evident over and above the effects of antihypertensive medication. Several of the participants were also able to reduce their medication usage, with their physician's approval, and one was permitted to discontinue medication usage entirely following completion of the study. Concurrent with these changes, participants also exhibited significant improvements in emotional health, including reductions in stress symptoms, depression and global psychological distress, and increases in peacefulness and positive outlook.[77]

4.4 Congestive Heart Failure

A study conducted at Stanford University tested the efficacy of the HeartMath techniques in a population of elderly patients with congestive heart failure. The treatment group exhibited significant reductions in perceived stress, depression and emotional status relative to an untrained control group. A significant improvement in functional capacity also was achieved. Compliance was excellent, and in post-test interviews, patients expressed singular appreciation for the program, reporting the experience to be both enjoyable and valuable.[74]

4.5 Cardiac Arrhythmia.

HeartMath interventions have been used with great success by patients with cardiac arrhythmias. Many have often reported being able to stop or attenuate arrhythmic episodes. Furthermore, many patients have experienced significant long-term improvements in symptomatology, medication requirements and overall quality of life. The techniques have proven particularly effective in helping individuals with atrial fibrillation, in some cases leading to profound and lasting improvements in symptoms even after a range of invasive procedures and aggressive pharmacological interventions failed.

The Pacemaker Clinic for Kaiser Hospitals in Orange County, California, conducted an internal study on the use of HeartMath interventions in patients suffering with atrial fibrillation. Seventy-five patients were selected randomly to receive a home-study program as an educational aid for learning and practicing the HeartMath tools. The patients were asked to work with the program for three months, during which time they also received training in the use of the techniques by the Pacemaker Clinic coordinator. At the end of the three months, the patients were individually interviewed to assess what benefits they had derived from their practice. Seventy-one of the 75 patients

reported substantial improvements in their physical and emotional health. Fifty-six patients were able to better control their paroxysmal atrial fibrillation and hypertension to the extent that they were able to decrease their anitarrhythmic and antihypertensive medications, with their physician's approval. Fourteen were able to discontinue their antiarrhythmic medications altogether and decrease their antihypertensive medications.

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4.6 Cardiac Risk Reduction

Another promising application of HeartMath interventions is in patient populations at risk of developing heart disease. Individuals suffering from autonomic exhaustion resulting from maladaptation to high stress levels typically manifest abnormally low heart rate variability (HRV. Chronically low HRV connotes reduced flexibility of the cardiovascular system and has been found to be predictive of increased risk of heart disease and premature mortality.[63, 78, 79] The HeartMath interventions have proven highly effective in facilitating the recovery of individuals suffering from stress-induced autonomic exhaustion. Notably, increases in HRV, from low to normal values, have been measured in as little as six weeks in individuals who regularly practiced the techniques.

4.7 Clinical Illustration

Ms. C., an active professional woman who enjoys skiing, scuba diving and skydiving, was diagnosed with a cardiac arrhythmia and mitral valve prolapse in 1989. By 1993, she was experiencing 700 extra heart beats per hour and was told that she was at risk of sudden death. She was prescribed beta-blockers, valium and aspirin, the side effects of which were stomachaches, headaches and hair loss. In July 1994, Ms. C. suffered a near-fatal episode of ventricular tachycardia and underwent radio frequency catheter ablations. Her ventricular tachycardia events continued to recur through the following nine months, during which time she had surgery four times. In April 1995 she was told that another catheter ablation might perforate her heart, causing death. Feeling like an invalid, depressed and afraid to live, Ms. C. was forced to take an extended medical leave from her high-level job at a large computer company. Describing the attitudes and behavior that she felt led her to this state, Ms. C. said, "I was the type of person who was trying to be the perfect mother, the perfect wife, the perfect employee. I used to sleep four hours a night because there was so much to do. I thrived on it. I was so used to that adrenaline rush that I didn't know what it was like not to have it."

In the fall of 1995, Ms. C.'s cardiologist referred her to a seminar, where she learned the HeartMath coherence-building techniques to help her manage her stress and improve her health. When she returned to work after the training, a co-worker remarked that "the difference in her was like night and day." She immediately began practicing the techniques regularly and diligently applied them at work whenever she felt her stress level rising. "After my weekend at HeartMath, whenever that adrenaline would start to rush again, I

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could stop the trigger," she noted. "Now I can pull myself back into balance at will."

The change was impressive to Ms. C's colleagues, who observed that she exhibited far less stress, anxiety and tension and more calmness and ease, even during a particularly hectic work period. Ms. C.'s physicians were similarly impressed with the change in her physical health. With daily practice of the tools, within several weeks after the seminar Ms. C. was taken off valium; within six months, her beta-blocker (Sotalol) dosage was cut in half and later reduced further. A 24-hour ECG recording in the fall of 1996 found not a single irregular heartbeat. Furthermore, 24-hour heart-rate-variability analysis showed marked improvements in autonomic-nervous-system function. Although Ms. C's heart rate variability was abnormally low for her age before she began practicing the HeartMath techniques, it increased to normal values within two months of the time she began using the techniques.

Over four years later, the improvement in her health was sustained, with no further episodes of ventricular tachycardia or surgery. Feeling she had regained her health and her life, Ms. C. declared, "I feel absolutely incredible." Having made no dietary, exercise or other lifestyle changes during this time, Ms. C. attributes her recovery to the HeartMath interventions.

4.8 Breast Cancer

Recreational therapist Diane Groff, Ed.D., and exercise physiologist Claudio Battaglini, Ph.D., both of the University of North Carolina, Chapel Hill, recently completed an exploratory study on the role of recreation therapy in facilitating well-being in survivors of breast cancer using HeartMath's emWave2 device. The two researchers are strong advocates of developing patients' psychological and physical strength, which are needed to combat the debilitating side effects of cancer treatment. Groff and Battaglini reviewed a series of case histories in which 29 survivors within six months of post-treatment for breast cancer participated in the "Get REAL & HEEL program," which consisted of a variety of leisure therapy interventions.

In addition to strength-based physical exercise with a personal trainer, the "Get REAL & HEEL" program offered recreational therapy activities such as cognitive and behavioral interventions for stress management, relaxation training, creative and journal writing, expressive arts, leisure counseling and heart rhythm coherence feedback. Group recreational interventions included dance, expressive arts, group outings and exercise activities with other women in the group. Participants in the study were allowed to choose which primary type of biofeedback intervention they would use. After instruction on HeartMath's Quick Coherence® Technique and the benefits of sustaining heart-rate coherence, the participants all were given the portable emWave device so they could practice at home. They stated that they really liked how easy and convenient they were to use. According to Dr. Groff, the participants expressed a particular preference for the emWave because this type of intervention demonstrated a clear relationship between emotions and physiology. As women

learned these skills in the intervention, they began reflecting on their stress management styles before the onset of their illnesses. Many began to realize that they had been living with a serious deficit of exercise, poor nutrition, excessive stress, ineffective coping mechanisms and little awareness of the impact of chronic stress on their overall health.

Dr. Groff further stated it was especially striking to her and her colleagues that the majority of the participants were able to reach coherence with ease and within the first five minutes of instruction. In the context of managed care and hospital visits, they considered it remarkable to discover an intervention that could be mastered in such a short amount of time. Dr. Groff and her team were especially pleased to witness the participants' feeling of empowerment by learning this new skill for regulating their emotions and physiology.[81]

4.9 Diabetes

A research study was designed to assess changes in psychological status, quality of life and hematologic measures predictive of long-term health and well-being in patients with diabetes who followed a stress-reduction and emotional self-regulation program. Twenty-two patients with Type 1 or Type 2 diabetes mellitus participated in a two-day HeartMath workshop to reduce stress and negative affect, increase positive affect and reduce inappropriate autonomic-nervous-system activation. Self-report measures of stress, psychological status and quality of life were administered before and six months following the intervention. Hemoglobin A1c, cholesterol and triglycerides, and blood pressure also were assessed. Participants experienced significant reductions in psychological symptomatology and negative emotions, including anxiety, depression, anger and distress, following the intervention. There were significant increases in peacefulness, social support and vitality, and corresponding reductions in somatization, sleeplessness and fatigue. Participants showed reduced sensitivity to daily life stressors after the intervention, and their quality of life improved significantly. Regression analysis revealed a significant relationship between self-reported practice of the techniques learned in the program and the change in HbA1c levels in patients with Type 2 diabetes. Increased practice was associated with reductions in HbA1c. Results suggest that the HeartMath emotional self-regulation intervention reduces stress, improves psychological health, enhances quality of life and may help improve glycemic control in individuals with diabetes.[82]

Medication Effects
Improved self-regulation and the resulting increase in coherence may impact a patient's response to medication. Medications should be noted as well as any medical conditions that affect heart rate or the autonomic nervous system. For example, recent asthma medication or caffeine use often will increase heart rate, and antihistamines and beta-blockers may lower heart rate. Research has shown that diabetics who have used HeartMath techniques have improved glycemic regulation and may require less insulin or oral medication.[36] The same is potentially true for some other medications.

We strongly recommend talking to patients and having a disclosure form about the importance of working with their prescribing clinicians before making any changes in their medication. A sample form is included in Chapter 10.

"I recently had a conversation with a mother, whose son has made remarkable improvement with HeartMath tools and emotional regulation, because of using the HeartMath self-regulation techniques. She had come into the office concerned about her son's stimulant medication. He had begun to have symptoms of shaking and anxiousness that corresponded to being overmedicated. I sent them back to the prescribing physician to reevaluate his patient's medication needs and to continue to monitor the effects."

–Myron Thurber

Chapter 5

emWave® Technology

Learning outcomes:

- Identify specific features and functions of the emWave technology.
- Describe how to utilize all emWave products in the clinical setting.
- Explain the relevance of the different emWave features.
- Illustrate how to teach clients and patients how to use the emWave technology.
- Answer common questions asked by emWave users.

Notes

5.1 emWave Technology Overview

The information presented here is intended as an overview only. We recommend you refer to the comprehensive Library included in your emWave product along with the most current user guides, tutorials and other detailed information. Supplemental materials for health professionals are available at www.heartmathhealthprofessional.com

If you are new to the emWave technology you will find the training videos at www.emwavetraining.com to be helpful. The emWave Pro or Pro Plus training videos include segments on emWave2 training. You may also elect to attend one of our free teletrainings offered every week. More information regarding these trainings is available at the previous link.

Clinical application of HRV is discussed in greater detail in Chapter 6.

HeartMath's patented heart rhythm coherence emWave technology objectively monitors heart rhythms by measuring the interval between each heartbeat with either a finger or earlobe pulse sensor and then computes and displays the coherence level. Because this shows how quickly emotions impact physiology in general and changes in HRV in particular the emWave technology is an effective teaching and learning aid that gives the user and clinician a real-time "mirror" of the user's emotional state.

By strengthening the natural-conditioned response between positive emotions, breathing and the coherent state, the user learns a more efficient and automatic response to stress. Hence, during real-time stressful or challenging situations, the simple act of heart-focused breathing will bring about the emotional shift and increased coherence as an unconscious response.

Incorporating visual and audio feedback, the user learns how to quickly create psychophysiological coherence while practicing emotional self-regulation techniques. Additional features and functions enhance the ability to sustain coherence and track progress. Coherence-level audio and visual feedback in the presence of a neutral or positive emotional state helps users develop the ability to achieve and sustain a coherent state when needed.

The importance of this cannot be overstated because it is the key to facilitating the establishment of a new familiar baseline or set point.

5.2 emWave Pro

The emWave Pro includes advanced graphic information and coherence building features making it the preferred product for professional use. Many health professionals find the ability to observe real-time and recorded sessions and track progress outside the clinical setting helpful when assessing a client's current ability to self-regulate, ANS function and level of depletion. The program collects and files data from multiple users, including uploaded recorded sessions from client emWave2 devices and client information received from the HeartCloud™ service where clients upload data from their emWave2 or Inner Balance home trainers who choose to make it available for their practitioner to download to their copy of emWave Pro.

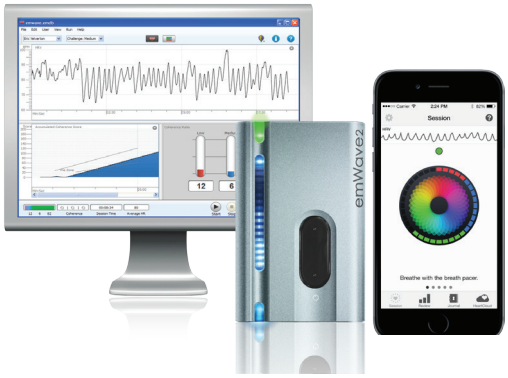


Figure 5.1 emWave Products

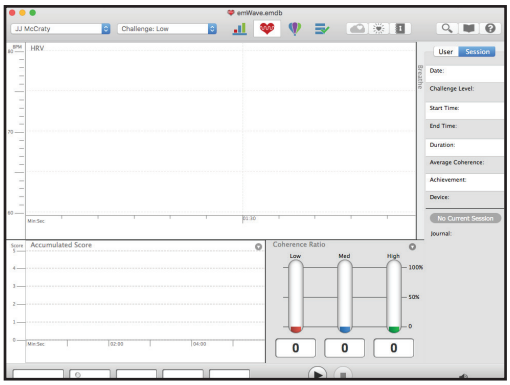


Figure 5.2 emWave Pro and Pro Plus home screen

Figure 5.2 emWave Library

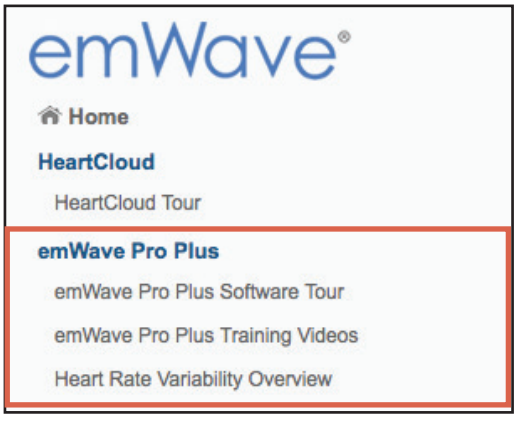


Figure 5.2 emWave Library

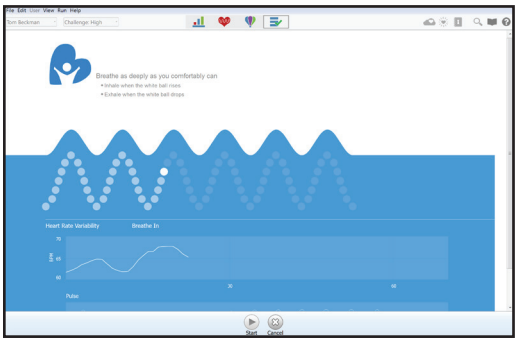


Figure 5.3 – emWave Pro Plus One-Minute Assessment screen

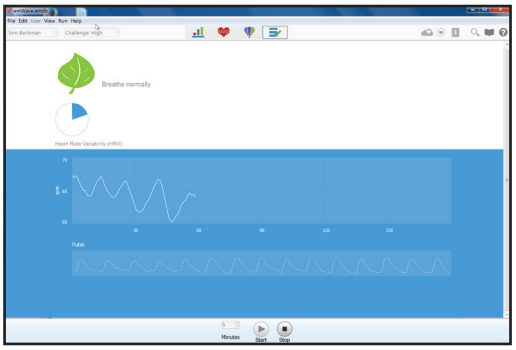


Figure 5.3 – emWave Pro Plus HRV Assessment screen

Additional features:

- Session annotations
- Move sessions between users and databases
- Pulse data and Power spectrum screen with USB module
- Optional racing games for an additional challenge to maintain coherence

5.3 emWave Pro Plus

emWave® Pro Plus combines the features of emWave Pro with two heart rate variability (HRV) assessments: the 1-minute HRV Deep Breathing Assessment, and the HRV Assessment. (Note: An upgrade to emWave Pro Plus from emWave Pro can be purchased from the HeartMath online store.)

Assessments included in emWave Pro Plus:

1-Minute HRV Deep Breathing Assessment

Ideal for assessing overall HRV levels compared to age norms. Challenges the autonomic nervous system via a guided 1-minute deep breathing protocol with a visual breath pacer to determine the maximum amount of vagally mediated (parasympathetic) HRV the client's autonomic nervous system produces. Results are compared to age-related reference ranges and and a report is generated. Correlates well to the gold standard 24-hour HRV assessment.
HRV measures: Mean Heart Rate, Mean Inter Beat Interval (IBI), Mean Heart Rate Range (MHRR), SDNN, RMSSD, Normalized Coherence

HRV Assessment

HRV assessment provides an analysis of heart rate variability with the most common
standardized measures. Session length can be selected between 2-minutes and
99-minutes.

HRV measures:

- Time domain: Mean Heart Rate, Mean Inter Beat Interval (IBI), Mean Heart Rate

Range (MHRR), SDNN, RMSSD

- Frequency domain: Total power, VLF, LF, HF, LF/HF ratio, Normalized Coherence

Features

- 370 Hz sample rate of the pulse wave
- Infrared pulse plethysmograph (ppg) ear sensor or optional finger sensor
- Automatic pulse wave detection and calibration
- Edit interbeat interval data to eliminate ectopic beats or other sources of artifacts prior to HRV calculation and reporting
- Save client session history for review and observing changes across time

To learn more about emWave Pro Plus, you can go to the the HeartMath Library in any current emWave software program (View menu -> HeartMath Library) and click on the available topics.

5.4 emWave2 Handheld

The emWave2 offers users the ability to practice self-regulation skills on the go. Lights and sounds feedback the user's coherence state which can be helpful when preparing for an upcoming event or situation. For example, students can use it to increase attention and focus and reduce performance or test anxiety. In a medical context, a few minutes of coherence can help patients better manage pain and anxiety during an invasive procedure such as chemotherapy or dialysis. The emWave2 is also helpful for systematic desensitization. It's important to remind clients that it is best not to use the device while driving or during tasks that require their full attention.

The emWave2 comes with a USB computer interface. When connected to a computer, the user can run a live session while observing their heart rate variability and coherence levels. The computer interface also saves uploaded sessions from the emWave2 which will store up to 18 hours of session data.

Key features:

- Measures and encourages coherence building with audio and visual feedback.
- Encourages compliance with agreed-to practice plans – practitioners can review client sessions uploaded from client's emWave2 or emailed emWave2 session data base. Can be used to record live sessions on computer, or will retain up to 16 hours of recorded sessions.
- Challenge levels for

Display Interpretation:

- The lights behave differently in the Advanced Mode. If only the coherence indicator lights are on, check to see if you accidentally went to the Advanced Mode. Hold the top of the oval sensor button down for 10 seconds. If you hear 3 high tones and 1 low tone, then you were in the Advanced Mode and returned to the Basic Mode. If you hear 4 low tones and 1 high one, you activated the Advanced Mode and will need to hold down the sensor button until you hear the 3 high tones and 1 low one to get back into Basic Mode.
- The Pulse Indicator, a pulsing blue light when a pulse is detected on the lower end of the emWave2 can sometimes appear to be detecting a pulse when it is not hooked to a person due to an internal feedback loop from the LED and light senor. Both the ear and thumb sensor can be affected by regular, ambient light. As soon as you remove your thumb from the sensor button or open and close the ear sensor, a small red light over the flashing blue pulse sensor can appear for a few seconds. Place your thumb on the sensor or close the ear sensor clip on the ear and the red light will fade away leaving only the blue light blinking to indicate that the unit is now registering your pulse.
- In the Basic Mode, the challenge level will always revert back to low (default setting) when the unit is restarted, along with brightness, sound level, and display settings.
- The emWave2 will retain the challenge level, brightness, sound level and display settings in Advanced modes.

Figure 5.4 emWave2

"In working with university students, we were reluctant at first to recommend the students purchase equipment, but after the students saw the effects of using the emWave DT Stress Relief System and the portable emWave Personal Stress Reliever, they were excited to be able to buy the units because they were so helpful to them." –Myron Thurber

Brightness and Challenge Level cannot be changed once you enter an active session. An active session starts after the pulse sensor has detected 10-20 heartbeats. If you want to change these settings, you need to turn the emWave2 off and then back on, which will return to the Setup Mode. Brightness and Challenge Level can only be changed during Setup Mode.

If the Coherence Indicator goes blank, this means that the device is not able to detect your pulse. Adjust the Ear Sensor or your thumb on the Sensor Button until you see the Pulse Indicator blinking blue and the Coherence Level Indicator turning red, blue, or green.

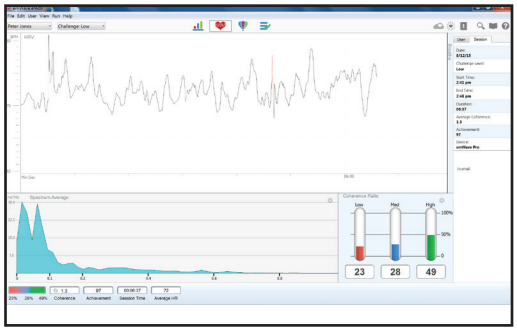


Figure 5.5 – Power Spectrum View

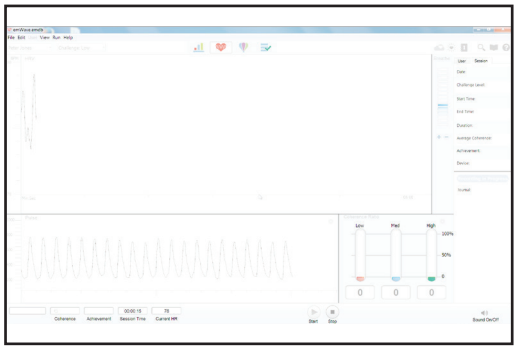


Figure 5.5 Pulse Wave Screen

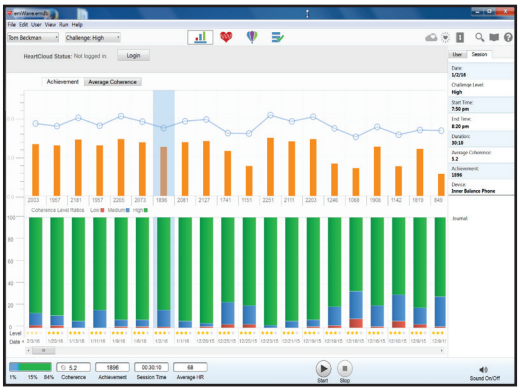


Figure 5.5 – Review Progress Screen

Figure 5.5 – Games and Activities

Battery facts:

- A 2-hour charge is sufficient for 5 to 6 hours of continuous usage. The emWave2 uses a high quality lithium ion rechargeable battery controlled by an onboard battery management microcontroller. With 1 hour of use a day, we expect a lifetime of at least five years, providing it is re-charged at least once a month, whether it has been used or not. Blue bars on the Heart Action Strip indicate the battery is charging. Five bars indicate that the battery is fully charged. A green light will be lit just below that, indicating that the outlet into which the emWave is plugged does in fact have power. The battery is expected to have at least 85% of capacity after 500 full charge cycles.

The following recommendations are true for almost all products with lithium ion batteries.

- All batteries self-discharge after some time, so we recommend running a recharge cycle at least once a month. so that the device does not discharge completely (deep discharge).
- If the system is not used and left unattended for six months or longer, the battery will go into deep discharge on its own. The five LED charging indicator lights at the bottom of the display will remain off when plugged into its charger as the device attempts to recover and recondition the battery.
- To recharge the device, plug in the charger and wait 15 to 20 minute, repeat if necessary. The five charging indicator lights appear when the normal battery charging has begun. Complete the charge cycle in 2 hours.

5.5 emWave Software

The software that comes with both the emWave 2 handheld and emWave Pro includes a comprehensive Library with product instructions and science tutorials, visual and audio options and a variety of interactive games to enhance coherence-building practice, track progress and increase the ability to sustain psycho-physiological coherence. An instructional and practice program called the Coherence Coach® helps users establish and become familiar with a comfortable breathing rate while practicing emotional refocusing and restructuring techniques. Music and animations assist in the coherence and emotional self-regulation training process.

emWave2 software interface:

- Single-user session database; home trainer
- On-screen mandala breathing pacer, coherence over time graph
- 3 games, 4 visualizers
- Coherence Coach, My Inspiration activities
- Upgradable to emWave Pro software
- Connect to HeartCloud to earn awards for reaching goals.

emWave Pro / Pro Plus software interface:

- Multi-user session database for use in practice, and by families
- Multiple databases can be created to segment users, for remote
- storage, or privacy
- Adjustable on-screen breathing pacer
- On-screen mandala breathing pacer, coherence over time graph
- Upload client session data for review from emWave2 or Heart-
- Cloud

- 3 games, 4 visualizers
- Possible to use separate screens for game and session data
- display
- Coherence Coach, My Inspiration activities
- Pulse data and power spectrum screen (with USB module)
- Use emWave2 or USB module as sensors
- Add practitioner contact information to client session printouts
- Move session between users/databases
- Export session data for further analysis by other programs
- Upgradable to emWave Pro Plus if using USB module as sensor

Optional games are available for emWave2 and emWave Pro: Tropical Heat Jet Ski race for Windows and Macintosh, and Dual Drive car race game for Windows. These are a good choice when working with clients who are experienced console game players for whom the built-in games are too simplistic.

5.6 Synching emWave2 Sessions with emWave Pro

Your clients can record sessions with their emWave2 in between visits and sync sessions to both their computer and yours.

- Connect the client's emWave2 to your computer via the USB cable.
- Click on 'File' at the top left, 'Sync emWave2
- Follow the prompts: if you are using the emWave Pro you will have the option to choose the user to save the sessions to. Always verify that you have the correct user selected. If you are using the emWave Pro you will have the option to choose each individual user's folder to save sessions. .
- Click 'Okay' to sync session data, choose to keep or delete session data on the handheld device. (if you are saving the data onto your program and the client also wants to save the data to their computer, make sure the 'Delete handheld session data after import' setting is unchecked.)
- Once the sync has been completed, click okay.
- Click on the Review Progress icon at the top to discuss the client's progress.

Clients can create a HeartCloud account and give you their email address and practitioner read-only password so you can download session data that they've uploaded to the HeartCloud into their emWave Pro user session history on your copy of emWave Pro. See details in section 5.10.

5.7 Tracking Progress

- Click on the Review Progress icon at the top of the screen.
- This will bring you to the Progress View. Move your cursor over the sessions and double-click a saved session. It will open up to the graph of the completed session.
- Click on 'Run' and 'Replay HRV' to see the session data plot on the graph as it happened in real-time.
- Select a session with a lot of green (high coherence) to discuss what is possible with practice.
- In follow up sessions, open up previous sessions to discuss where improvements have been made or where difficulties may have come up.

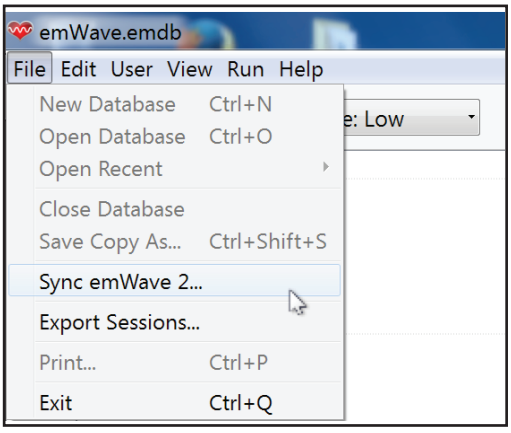


Figure 5.7 Syncing Data

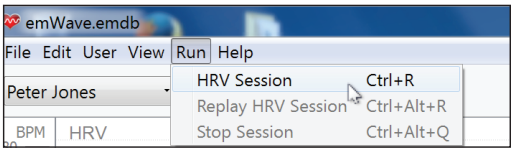


Figure 5.7 – Replay Session

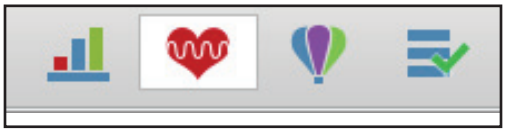


Figure 5.8 Review Data

We suggest you establish a process for the client to practice with the emWave technology outside the therapy session.
Options include:
- *Recommend the client purchase the equipment for personal use.*
- *Make the equipment available in the offic*

Refer to Appendix A for additional client resources.

5.8 Training Tips

How and when you introduce your clients to the emWave devices will depend on the client's needs and the clinical setting.
Which screen and technique you teach will depend upon the client's specific needs. Avoid being too directive unless the client has a specific therapeutic goal such as reducing test or performance anxiety. We suggest you have a saved session on file that reflects a high level of coherence for two or more minutes.

The following sequence is general in nature as a step by step guide for the emWave Pro to illustrate how quickly emotions impact the body in general and heart rate/HRV specifically before the client has learned a self-regulation technique.

1. Before a client's first session, enter the client under the User menu, New item in the program. Note: when opening up a client's file the names of all the clients in the database are viewable. To protect your clients' confidentiality, open up the appropriate client file before the client comes for training or make a habit of assigning initials or a client number for each user.
2. Make sure that the Challenge Level is set to Low.
3. Select Show HRV Full Screen from the View menu to hide the Coherence Ratio and Accumulated Coherence Score windows.
4. Turn off the sound by clicking on the sound icon in the lower-right corner. 

5. Because excessive movement may result in a lot of artifact and produce questionable recordings make sure your client is comfortable to avoid increased muscle tension in the head, neck and shoulders. Place the chair facing away from the screen so the client is not getting any specific visual feedback during the baseline recording.
6. Explain: The sensor picks up the pulse. Then the intervals between all those 'beats' are calculated and plotted to create the HRV pattern.
7. Click the Start button. 

8. Collect one minute of baseline data as you explain what is happening on the screen. (HRV, ANS, etc.). We suggest you do not explain the heart and brain interaction before getting the baseline because this may be a source of worry and stress and the increased stress will affect the baseline.
9. Start with he Heart-Focused Breathing™ Technique.. Then ask the client: This time remember or recall a recent situation that you felt good to you. Optional: Something that put you in the renewal side of the grid.
10. Collect one minute of data.
11. Click Stop.
12. Ask the client: What did you notice about the experiences? Was anything different, mentally, emotionally and physically?
13. Point out the corresponding changes in the HRV trace*. i.e. heart rate, shape of the wave, etc.
14. Open a saved 'high coherence' session to illustrate what's possible with practice.
15. Relate changes to the Depletion Renewal Plan.
16. Discuss benefits and applications of the self-regulation Technique.

* NOTE: Don't expect a lot of high coherence. Point out any slight smoothing out of the wave, reduced heart rate, etc. Your clients are just learning the techniques so any change on the HRV screen is significant. What's important is to illustrate how quickly emotions impact on the body…more specifically, HRV patterns.
We suggest you establish a process for the client to practice with the emWave technology outside the therapy session.

Options include:
- Recommend the client purchase the equipment for personal use.
- Make the equipment available in the office

When using the emWave Pro, you can place annotations on a ses-sion while the session is running or after it's completed. Hold the shift key down and click on the HRV graph where you want to place the note and a box will pop up where you can enter text.

5.9 Inner Balance™ Mobile App

The inner Balance Trainer (IBT) combines HeartMath's coherence assessment technology with mobile iOS and Bluetooth technology. The Inner Balance sensors work with a Lightning ear lobe sensor that connects to the charging connector on the iPhone or iPad or the Bluetooth sensor which works with either an iOS or Android phone to feed the RR interval data into the app.
The IBT App has a variety of features to help users:

- Gain insight into shifting moods
- Learn to shift emotional states
- Receive visual feedback during training sessions on several different screens – two breath pacers, photo and video displays, HRV graph, pulse wave and power spectrum
- Track progress on the session progress screen
- Reward success with award milestones from the HeartCloud
- Journal to record accomplishments
- Pass session data on to a health professional via HeartCloud For more information, visit www.innerbalanceapp.com

5.10 HeartCloud

HeartMath's HeartCloud is an optional service that connects with all of the HeartMath devices including emWave® Pro, emWave2® and Inner Balance™. The new platform helps users build on their training experience, achieve rewards for their success and celebrate their results with others. Client sessions from these devices can be synchronized with HeartCloud once the user creates a HeartCloud account and enters that information in their personal HeartMath device or software settings.

If clients give you their email address and HeartCloud practitioner password, you have read-only access to their session data that they create on their personal devices. (Make sure it's not their main password, as this would allow sessions that you do with them during office visits to migrate to HeartCloud, which would be a HIPAA violation.)

Clients set the practitioner password on their HeartCloud account's Profile screen.

Figure 5.9 Inner Balance app for iPhone and iPad

You can create a free account on HeartCloud™ at www.heartcloud.com

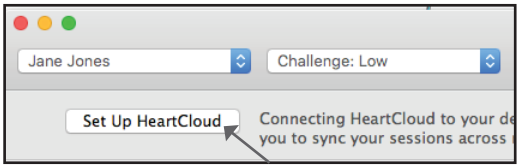


Figure 5.10 In emWave Pro, you can enter the client email address and practitioner password on the client's Review Progress screen, or via the User menu -> Edit

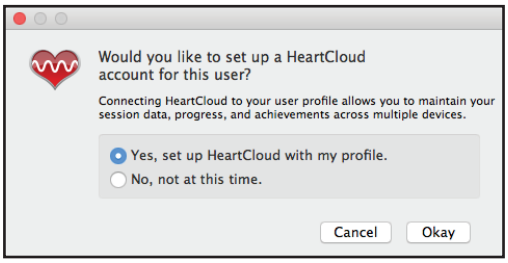


Figure 5.10 Or when you create the user account for the client.

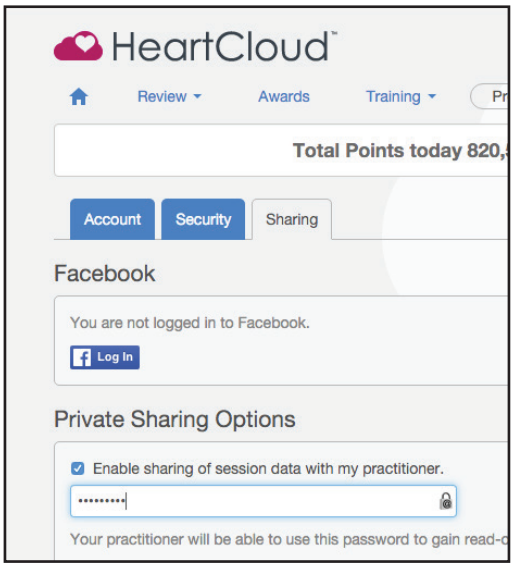


Figure 5.10 Set Practitioner password on HeartCloud.

Notes

Chapter 6

HRV Interpretation and Protocols

Learning outcomes:

- Explain the importance of HRV analysis in establishing improved clinical outcomes.
- State the four primary HRV measurement protocols and what they measure.
- Explain the clinical relevance of measurements obtained in each assessment protocol.

Notes

6.1 Overview

HRV analysis can provide information regarding the dynamics and general status of the client's autonomic nervous system. This information can be useful in helping to determine which HeartMath techniques you will teach them as well as providing a way to monitor progress over time. Being able to show the patient tangible progress is often quite motivating and can be used to facilitate the intervention process.

Heart-rhythm analysis is more than an assessment of heart rate; it is a much deeper assessment of the complex interactions between the brain, the heart and multiple systems in the body. It's important to understand that the heart rhythm can be assessed from two perspectives that offer different levels of information about the client's psychophysiological status.

The most common assessment of HRV involves quantifying the amount of HRV over a given time period. Although the amount of HRV is clearly an important factor to measure, the rhythms and patterns contained in the HRV are more reflective of emotional states. Therefore, when considering HRV, it's possible to assess: 1) how much variability is occurring (the amplitude of the wave) and 2) the pattern of the heart rhythm (coherent or incoherent).

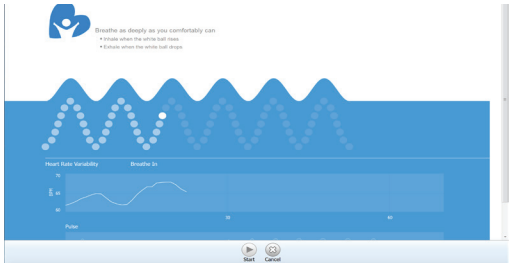
The overall amount of HRV is related to age. Younger individuals have a greater range in the natural beat-to-beat variation than older individuals[83, 84]. Abnormally low HRV, relative to one's age, is a strong and independent predictor of future health problems, including all causes of mortality[85]. In addition, low levels of HRV are considered a psychophysiological marker of impaired emotional regulation and psychological adjustment. Thus, HRV is an important indicator of both physiological resiliency and behavioral flexibility, reflecting the individual's capacity to adapt effectively to stress and environmental demands[86]. The amount of HRV one has, relative to age, is therefore an indicator of overall vitality or system depletion. Overall system depletion does not typically occur over short time periods unless the patient has been exposed to an extreme trauma. Rather, reductions in the amount of overall HRV, in the absence of a clinical disorder such as diabetes, tend to occur over months and years, often because of the cumulative effects of chronic depletion stemming from emotional stress.

If the goal of the HRV measurement is assessment, it is best to assess the overall amount of HRV a client or patient has over a 24-hour period with an ambulatory HRV recording device. The amount of HRV can vary considerably during different times of the day and night because of a wide range of state-specific factors, including the current emotional state, heart rate and mental workload. However, the one-minute deep breathing assessment (also know as the 6-Breaths protocol) can be done as a screening test as it has good correlations to 24-hour assessments for determining how much HRV the client has.

Disclaimer: No specific medical benefits or cures are expressed or implied. None of the feedback or summary data provided by the emWave technology is to be interpreted as medically or psychologically diagnostic, but rather as adjunctive to established medical diagnosis and treatment. Heart rate variability patterns differ widely from one person to another. The coherence scores in the programs and games are intended for tracking one's progress in increasing the ability to maintain a physiologically coherent state. Individuals with heart irregularities such as atrial fibrillation or flutter or intense clusters of premature atrial contractions, and children who are unable to sit still may be unable to use the emWave or Inner Balance technology successfully. They may benefit, however, from learning the emotional refocusing and restructuring tools and techniques.

For an in-depth discussion of measures used to assess the amount of HRV and how to interpret HRV levels in a medical context, please refer to: The Autonomic Assessment Report: Interpretation Guide and Instructions, available at the HeartMath Institute Web site: http://store.heartmath.org/store/e-books/autonomic-assessment. Add: There is also a free HRV course that can be accessed at: www.heartmath.org/HRVBasics

If you are interested in HRV assessment in a clinical context, contact the HeartMath Institute regarding the 24-hour HRV assessment provides physicians with a diagnostic tool to detect abnormalities and imbalances in the autonomic nervous system and predict those at increased risk of developing various pathologies often before the onset of physical symptoms. In addition, the analysis allows the effects of various treatment modalities, which are expected to affect the autonomic nervous system, to be assessed at various stages of recovery. Contact: Jackie Waterman at: jwaterman@heartmath.org



Example of 1-Minute Deep Breathing Assessment screen

Example of Mean Heart Rate Range (MHRR)

The emWave Pro Plus is primarily designed as a heart-rhythm coherence training tool and can be used for clinical short-term assessment of a patient's HRV. The emWave Pro Plus calculates values for several time domain measures including the standard derivation (SDNN) and a measure of HRV coherence. The Mean Heart Rate Range (MHHR) is the most commonly reported measure for the one-minute deep breathing assessment.

While the amount of HRV can and often does co-vary with specific emotional states, we have found that it is the pattern of the heart's rhythm that is primarily reflective of the emotional state. Furthermore, we have found that changes in the heart-rhythm pattern are independent of heart rate: one can have a coherent or incoherent pattern at high or low heart rates. Thus, it is the rhythm, rather than the rate, that is most directly related to emotional dynamics and physiological synchronization.

6.2 HRV Measurements Protocols

There are three analysis protocols of the heart rhythm that we recommend in the context of gaining insight into the clients ANS functioning and regulatory capacity. The number and types of analysis you choose to measure and track will depend on the patient's health status, outcome goals, time availability and the context you are working within. The most important assessment for determining functional capacity is the one-minute deep breathing assessment.

Resting Coherence Ratio Measurement

The first and simplest type of measurement is observing the patient's natural coherence-level ratios while sitting quietly. Resting state coherence can also be qualitatively assessed using the HRV assessment in the emWave Pro Plus by doing a resting state assessment. If you use the HRV Assessment in the emWave Pro it is critical that you record the HRV Assessment for the same length of time in order to do any comparisons.

Resting HRV Measurement

The second measurement is to observe the heart rhythm during the same period. Both of the above assessments should be done over a minimum of two minutes but can be up to five minutes.

One-Minute Deep Breathing Assessment

The 1-Minute HRV Deep Breathing Assessment in the the emWave Pro Plus includes age-related reference ranges for each HRV measure can be used for this assessment. The primary measure for this assessment is the Mean Heart Rate Range (MHRR). The normalized coherence is can also be an informative measure. If you choose to use the HRV Assessment component of the emWave Pro Plus, you must remember to keep the recording length the same in order to be able to compare data and reports for different trials.

6.3 Procedures for HRV Measurements

Client Considerations

The client should be seated in a comfortable chair with a backrest that extends up high enough to provide support for the upper back. The backrest should be tilted at a slight angle (no more than 15°) – just enough to relax the weight of shoulders, but not so much as to encourage drowsiness. The feet should be able to comfortably reach the floor or be supported with a footrest. Ensure that the client cannot see the computer screen during the recording. A private area, exam room or office is suitable for this process. Any location that is relatively quiet and free of distractions will work. Avoid completely closed-off, small, empty areas that can produce a claustrophobic feeling in some individuals.

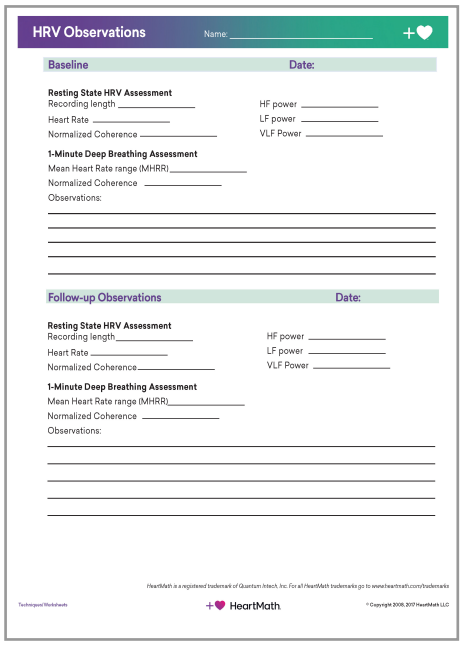
The client should not have engaged in heavy aerobic exercise for at least one hour prior to the recording (climbing a flight of stairs to reach the recording area is not a problem), nor should the client have consumed coffee, tea or other caffeinated beverages within a one-hour period prior to the measurement. No cigarettes should be smoked a minimum of 30 minutes before the recording. It is also best to wait at least 1½ hours after a heavy meal to take the measurement. Any medications the individual is currently taking should be noted.

Resting Coherence and HRV Measurements

Start the recording for the Coherence and HRV Measurements and collect approximately three to five minutes of heart-rhythm data. During the recording is a good time to observe the client's breathing, and the coherence. You may want to consider which techniques or tools will work the best.

6.4 HRV Interpretation

As previously stated, measures of overall amount of HRV indicate one's overall health and fitness status and provide a marker of physiological resilience and behavioral flexibility. The beat-to-beat variability is created through the synergistic action of the two branches of the ANS, mechanical, hormonal and other physiological mechanisms that must act in concert for one to maintain optimal internal self-regulation while responding to changing external and internal conditions. Interpretation of the numerous HRV measures is a complex subject because HRV can be assessed over various time scales through a number of different approaches, all of which have advantages and disadvantages. In this section, the discussion of HRV interpretation is limited to the information that can be gained over a short time period with the protocols outlined above. This type of measurement can help provide significant insight into your client's or patient's current emotional state and relative level of depletion and allow tracking of their progress, which can be motivating for clients. (For a more in-depth discussion of HRV interpretation please see the free course at: www.heartmath.org/HRV).


HRV Observations Name:

Baseline Date:

Resting State HRV Assessment
Recording length
Heart Rate
Normalized Coherence
HF power
LF power
VLF Power

1-Minute Deep Breathing Assessment
Mean Heart Rate range (MHRR)
Normalized Coherence
Observations:

Follow-up Observations Date:

Resting State HRV Assessment
Recording length
Heart Rate
Normalized Coherence
HF power
LF power
VLF Power

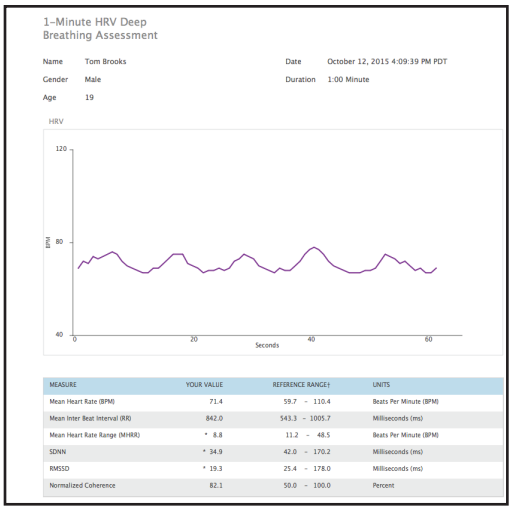
1-Minute Deep Breathing Assessment
Mean Heart Rate range (MHRR)
Normalized Coherence
Observations:

HeartMath

Sample HRV Observations form is in Appendix C.

Excessive movement by the client is likely to result in artifacts which will produce unusable readings. Make sure your client is comfortable, to avoid increased muscle tension in the head, neck and shoulders if using an Ear Sensor or in the arms and hands if using a Finger Sensor.

Explain to your client that you are gathering information about his or her nervous system. Explain that excessive movement may result in artifacts and ask them to sit quietly without talking, falling asleep, crossing legs or making unnecessary movements. The client should not read printed materials or engage in intense mental activity. It is preferable that clients keep their eyes open, and make sure your client is in a comfortable position that helps avoid muscle tension as indicated above.


1-Minute HRV Deep Breathing Assessment

Name Tom Brooks
Gender Male
Age 19
Date October 12, 2015 4:09:39 PM PDT
Duration 1:00 Minute

HRV

MEASURE	YOUR VALUE	REFERENCE RANGE†	UNITS
Mean Heart Rate (BPM)	71.4	59.7 - 110.4	Beats Per Minute (BPM)
Mean Inter Beat Interval (RR)	842.0	543.3 - 1005.7	Milliseconds (ms)
Mean Heart Rate Range (MHRR)	* 8.8	11.2 - 48.5	Beats Per Minute (BPM)
SDNN	* 34.9	42.0 - 170.2	Milliseconds (ms)
RMSSD	* 19.3	25.4 - 178.0	Milliseconds (ms)
Normalized Coherence	82.1	50.0 - 100.0	Percent

Example of 1-Minute Deep Breathing Assessment Report

1-Minute HRV Deep Breathing Assessment

Challenges the autonomic nervous system via a guided 1-minute deep breathing protocol with a visual breath pacer to determine the maximum amount of vagally mediated (parasympathetic) HRV the clients autonomic nervous system produces. Results are compared to age-related reference ranges and prints a report. Correlates well to the gold standard 24-hour HRV assessment.

Understanding how HRV can best be interpreted can be aided by understanding some of the history and basics of autonomic control of the heart.

Background

The clinical use of HRV was first introduced in 1965 when it was found that fetal distress was preceded by alterations in the beat-to-beat intervals before any appreciable changes occurred in the heart rate itself.[91] Stewart Wolf was the first to report the association between low HRV and sudden death in the early 1960s. This finding was derived from a 10-year prospective study designed to identify physiological and behavioral factors that might contribute to sudden death stemming from cardiac arrhythmia in patients who had suffered a myocardial infarction. It was found that neither age, serum cholesterol, LDL/HDL ratios nor treadmill testing results had any significant prognostic power. The only predictive indicator for mortality was diminished HRV as compared to survivors.[92, 93] In the early 1970s, HRV analysis was shown to detect autonomic neuropathy in diabetic patients before the onset of symptoms.[94] Dr. Wolf's initial observations were confirmed in the late 1980s when reduced HRV was shown to be a strong, independent predictor of mortality after an acute infarction.[95, 96] In 1981, power spectral density analysis was introduced as a way to quantitatively evaluate automatic nervous system control of the heart and thus quantify autonomic balance.

Since the 1980s, low HRV and the effects of depletion on the autonomic nervous system (ANS) have been associated with numerous stress-related disorders and medical conditions: including depression,[97] panic disorder,[98] fatigue,[99] hypertension,[100] diabetes mellitus,[101] ischemic heart disease,[102] coronary heart disease,[103] congestive heart failure,[104] hypertension,[105] weight gain[106] and alcoholism.[107] Numerous studies have now clearly demonstrated that decreased heart-rate variability predicts increased risk of sudden death[108-111] and mortality from both coronary heart disease[112] and noncoronary causes, especially cancer and mortality from all causes.[103, 113, 114]

In studies of infants and children, measures of HRV that reflect vagal control of the heart have been demonstrated to reflect a wide range of emotional expressiveness such as temperamental reactivity, empathic responding, social competence, attentional capacity and aggression.[86] In adolescents and adults, low HRV has been linked to hostility, aggression, depression, panic and eating disorders.[86] Thus, measures of HRV include a broad range of psychological adjustment variables, both adaptive and maladaptive, that span developmental stages from infancy to adulthood.

HRV and Self-Regulation

An important finding by Julian Thayer and his colleagues[107] was that the ability to self-regulate, inhibit impulses and persist at difficult tasks is directly related to HRV and increases in HRV are correlated with increased self-regulation. Unintentional failures in self-regulation compromise well-being, while the ability to meet self-regulatory demands such as inhibiting impulses, making decisions, persisting at difficult tasks and controlling emotions contribute to enhanced

well-being and quality of life. For most people, there is no warning of a problem in self-regulation and there is no evidence of an imminent lapse in self-regulatory control.

Measurement Standards

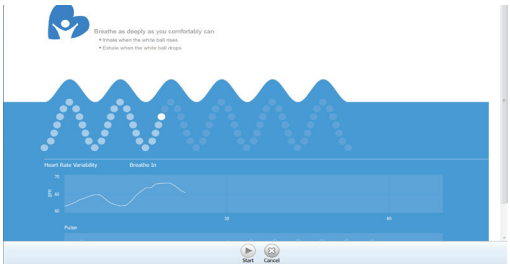
It was recognized as far back as 1979 that nomenclature, analysis methods and definitions of the physiological and pathological correlates of HRV measures required standardization. Therefore, an International Task Force consisting of members from the European Society of Cardiology and the North American Society for Pacing and Electrophysiology was established. The task force published a report to establish standardized nomenclatures and definitions.[115]

Multiple studies, including our own internal studies, have demonstrated that short-term measures of changes in HRV rapidly return to baseline levels after transient perturbations. Studies examining HRV over a 24-hour period demonstrate that measures of HRV are stable in both normal subjects and in post-infarction and ventricular-arrhythmia populations. Because HRV indices appear to be stable and independent of placebo effects, they are ideal variables for assessing therapeutic interventions.

Analysis Methods

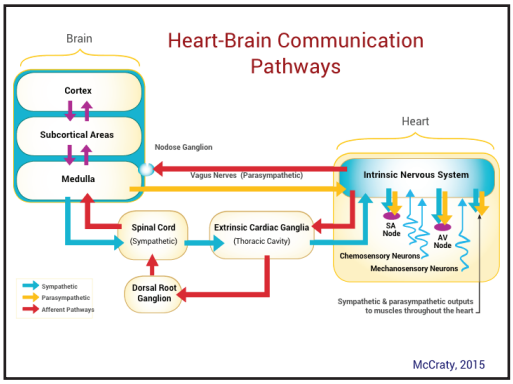
The amount of HRV one has can be assessed in two ways, either as a time-domain analysis or in the frequency domain as a power spectral density (PSD) analysis. Regardless of the analysis method, the time intervals between each successive normal heartbeat are first determined. All abnormal beats not generated by sinus node depolarizations must be eliminated from the record. Time domain measures are the simplest to calculate and include the mean normal-to-normal (NN) intervals during a given recording and statistical measures of the variance between NN intervals.

The SDNN, which is the standard deviation (SD) of all the normal RR intervals in the entire recording, is the most commonly reported time-domain measure. Measured and reported in milliseconds, this measure reflects the ebb and flow of all the factors that contribute to the heart rate variability during the recording and thus is used to quantify the overall amount of HRV that occurred. Because the length of the recording significantly affects this number, the recording length should also always be included. It is not uncommon to see it expressed with the time included such as 5-Min SDNN, or 24H SDNN. In these examples, the first was the SD over a five-minute recording and the latter over a 24-hour recording. A quick and easy time domain test that is reflective of the HRV ranges is the 1-minute deep breathing assessment previously discussed. In this context, rather than reporting the SD, you are reporting the mean heart rate range (MHRR) which is the largest difference between the highest and lowest heart rate (peak and valley in the heart-rhythm wave) during one of the artifact-free cycles over a one-minute period while the patient is breathing as deeply as they comfortably can at a six-breaths-per-minute rhythm. (That's five seconds breathing in and five seconds breathing out, for a total of 10 seconds and doing this six times.)



Example of 1-Minute Deep Breathing Assessment screen

Notes



Heart-Brain Comunications Pathways

Power Spectral Density (PSD) analysis provides additional information beyond what can be gained through time-domain measures by showing how power (which reflects the amount of variance and is directly related to the amplitude of the changes in HRV waveform) is distributed as a function of frequency.

Assessing the patterns in the HRV (heart rhythm) is typically done over shorter time scales than are used for assessing the amount of HRV. This provides information about one's emotional state and the degree of synchronized activity in the ANS and higher brain systems (which affect the brain's ability to process information and thus affect processes such as self-regulation, decision-making, problem-solving, creativity, etc). Rhythm-pattern analysis also includes analysis of heart-rate accelerations or decelerations, these usually are in the context of a known external time-locked event, which are well known methods for quantifying attentional resources that are being devoted to either internal or external events. Visual analysis of changes on very short time scales (single beat-to-beat changes) are also used to provide insight into ANS changes that are related to the onset of a specific symptom or how a specific emotional trigger or physiological or psychological response is reflected in autonomic changes. For example, psychologists who work with patients exhibiting multiple personality disorder have reported that they see distinct heart-rhythm patterns when the patient shifts personalities and can tell which personality is dominant when they see the unique heart-rhythm pattern associated with that personality.

In order to understand how both power spectral analysis and rhythm pattern analysis can be used to distinguish sympathetic from parasympathetic activity, a brief discussion of how the heart responds to changes in the different branches of the ANS can be helpful.

Autonomic Control of the Heart

The intrinsic heart rate (HR) generated by the sinoatrial node in the absence of any neural or hormonal influence is about 100 to 120 BPM[35]. In a healthy individual, the HR estimated at any given time represents the net effect of the parasympathetic (vagus) nerves, which slow HR, and the sympathetic nerves, which accelerate it. At rest, both sympathetic and parasympathetic nerves are active with the vagal effects dominant.[117]

The most obvious effect of vagal stimulation is to slow or even stop the heart. The response time of the sinus node is very short and the effect of a single vagal impulse depends on the phase of the cardiac cycle in which it is applied. Thus an increase in vagal (parasympathetic) outflow from the brain results in an immediate response —within the current cardiac cycle or one or two heartbeats after its onset. After cessation of parasympathetic activation, HR rapidly returns to its previous level. An increase in HR also can be achieved by reduced parasympathetic outflow, and vagal inhibition can cause large increases in HR that occur with one cardiac cycle. Thus, sudden changes in HR that occur within one or two heartbeats, either up or down, are always parasympathetically mediated.[117] A good example of this is the startle reflex, in which the heart rate can jump

20 or 30 beats per minute in the space of a single heartbeat. In this example, there is a large and sudden inhibition of parasympathetic outflow. The opposite occurs in the freezing and or orienting response, in which you see a large decrease in HR within one or two heartbeats.

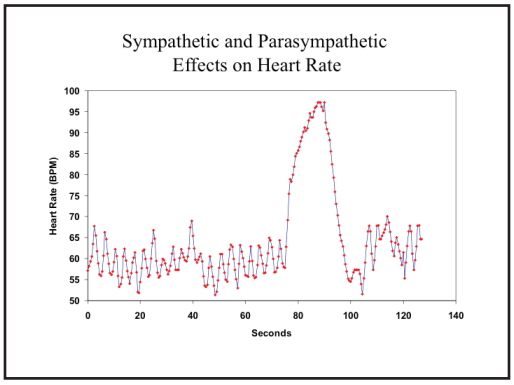
An increase in sympathetic activity is the principal method used to increase HR above the intrinsic level generated by the sinoatrial node (~100 BPM). Following the onset of sympathetic stimulation, there is a delay of up to five seconds before the increased outflow induces a progressive increase in HR, which reaches a steady level in 20 to 30 seconds[117]. The slowness of the response to sympathetic stimulation is in direct contrast to changes in parasympathetic outflow, which is almost instantaneous. Parasympathetic activity predominates when HR is below this intrinsic rate during normal daily activities, and when at rest or sleep. When HR is above about 100 bpm, the relative balance shifts and sympathetic activity predominates. Therefore, heart rate best reflects the relative balance between the sympathetic and parasympathetic systems.

Short-term regulation of blood pressure is accomplished by a complex network of sensory neurons located throughout the heart and in the aortic arch. Because blood-pressure regulation is a central role of the cardiovascular system, the factors that alter blood pressure also will be reflected in fluctuations in the heart rhythm. The afferent impulses (signals traveling to the brain) from these sensory neurons via the glossopharyngeal and vagal nerves travel to the vasomotor centers in the medulla oblongata, where they primarily modulate the sympathetic nervous-system outflow to the heart and the blood vessels, although there is also some modulation of parasympathetic outflow to the heart as well.

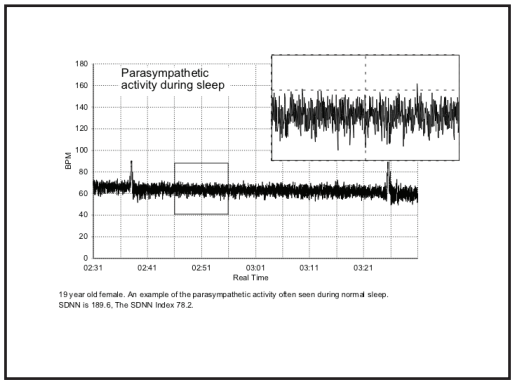
Cycle Length Dependence

When heart rate is either above or below the average daytime range (73 is the national average), the HRV measures are affected. At lower heart rates, there is more time or space within which HR can vary, as opposed to higher heart rates, which allow less time between consecutive beats for variation to occur within. This relationship between the amount of variability and heart rate is called cycle length dependence. As heart rate increases, the HRV range decreases. Conversely, as heart rate decreases, HRV increases. It is important to understand this relationship, as it can affect the interpretation of the HRV data. For example, if an individual has a very high HR, HRV can appear low, although it may be normal. On the other hand, some very athletic individuals may have a low HR and appear to have a higher HRV. A low heart rate accompanied by low HRV is, however, an indicator of depletion.

High HRV is not normally a concern, but if an individual appears to have low HRV, the heart rate should be checked to make sure it is not overly high. If a patient's resting heart rate is above the average range, the possible explanations should be explored with the client. High heart rates can be caused by some medications and beverages containing caffeine that are consumed an hour or less



In this example, there is a large and sudden inhibition of parasympathetic outflo .



HRV during sleep

before the recording. They can also be caused by emotional stress such as worry, anxiety, frustration, etc. Check to see if the patient experiences fatigue, dizziness or headaches. Additionally, high heart rates can result from low parasympathetic function, high arousal and thus overactive sympathetic activity, or the client could have a more serious autonomic problem. We suggest that you recommend that clients contact their doctor for an evaluation when they present with high heart rates.

HRV and Aging

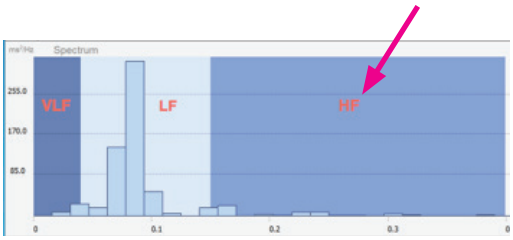
It is well established that lowered HRV is associated with aging,[83, 118] but the various components of HRV change at different rates. The specifics of the age-related decline in heart rate and heart rate variability can be found in HeartMath's Autonomic Assessment Report.[90] The decline in HRV with age is primarily the result of a decline in parasympathetic function.[83] Aging is thus the largest factor that impacts the amount of variability, and most individuals typically lose 3% to 5% every year.

The Frequency Domain

When a power spectrum is obtained from a heart rhythm, typically over a five-minute period, the resulting spectrum is divided into three bands or regions called the high-frequency band (HF), low-frequency band (LF) and very low-frequency band (VLF). In the emWave technology, the power spectrum display reflects these regions with a different color for each band.

High Frequency Band

The high frequency (HF) band is indicated by medium blue (.15 to .4 hertz) on the emWave Pro spectrum display. These rhythms have periods that occur between 2.5 and 7 seconds. This region primarily reflects parasympathetic or vagal activity. The height of the peak in this region is increased during periods of relaxation and during sleep. When the highest peak is in this region, a person may be falling asleep. The peak in this band also corresponds to the HR variations related to the typical respiratory rate, commonly referred to as respiratory sinus arrhythmia (RSA). Heart rate accelerates during inhalation and slows during exhalation. The magnitude of the oscillation is variable, but usually can be increased by deep breathing. The mechanism linking the variability of HR to respiration is complex and involves both central and reflex interactions. A large number of studies have shown that total vagal blockade essentially eliminates the HF oscillations and reduces the power in the LF range. Reduced parasympathetic (high frequency) activity has been found in a number of cardiac pathologies and in patients under mental or emotional stress, suffering from panic, anxiety or worry, and depression. Lowered parasympathetic activity also accounts for much of the reduced HRV in aging.



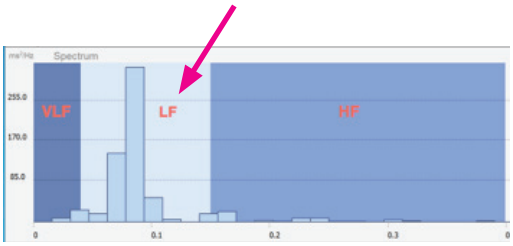
The high frequency (HF) band is indicated by medium blue region (.15 to .4 Hz) on right side of the the power spectrum graph.

Low Frequency Band

The low frequency (LF) component (range from 0.04 to 0.15 hertz indicated by the color light blue) are rhythms or modulations with periods occurring between 7 and 25 seconds can reflect both sympathetic and parasympathetic activity, in long-term recordings. However, the LF band does not represent sympathetic activity in short-term recordings. Parasympathetic influences are particularly present when respiration rates are below seven breaths per minute or when an individual takes a deep breath.

When an individual's HRV pattern and respiration are synchronized or entrained, as can happen spontaneously in states of deep relaxation, sleep or when using techniques to facilitate coherence, the frequency at which the entrainment occurs is often near 0.1 hertz. This falls in the center of the LF band and could be misinterpreted as an increase in sympathetic activity, when in reality it is primarily the result of an increase in parasympathetic activity and vascular resonance.[119] Sophisticated modeling techniques have shown that about 50% of the total power in the LF band is explained by signals impinging on the sinus node that are generated at a central level, and the majority of the remaining power is due to resonance in the arterial-pressure-regulation feedback loop.[38] The sympathetic system does not appear to operate much above frequencies of 0.1 hertz, while the parasympathetic can be observed to operate down to frequencies of 0.05 hertz. Thus in patients who have periods of slow respiration rate, parasympathetic activity can bleed over into the LF band. At the lower end of the LF band and in the VLF range, vasomotor and thermoregulation activity also contribute to the power, in addition to sympathetic activity.[120]

When the highest peak is in the LF band, it indicates the client is in a state of coherence. The area around 0.10 hertz has been described as the resonant frequency of the human cardiovascular system and is highest when a person is in a state of coherence.



The low frequency (LF) component (range from 0.04 to 0.15 Hz indicated by light blue area in the middle of the power spectrum graph)

Resting Heart Rate Ranges

Males		Female	
Age	Heart Rate (BPM)	Age	Heart Rate (BPM)
10 - 19	59 - 95	10 - 19	61 - 97
20 - 29	56 - 93	20 - 29	58 - 94
30 - 39	54 - 90	30 - 39	56 - 92
40 - 49	51 - 88	40 - 49	54 - 89
50 - 59	49 - 85	50 - 59	51 - 87
60 - 69	46 - 83	60 - 69	49 - 85

Table 6.2

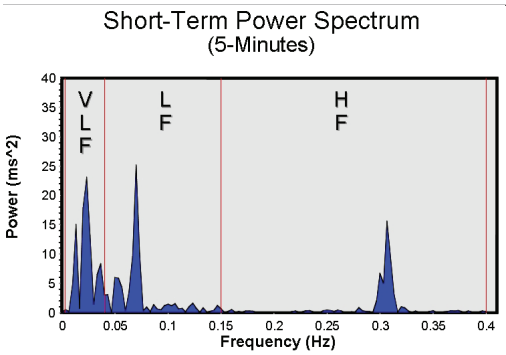


Figure 6.11 Typical HRV power spectrum

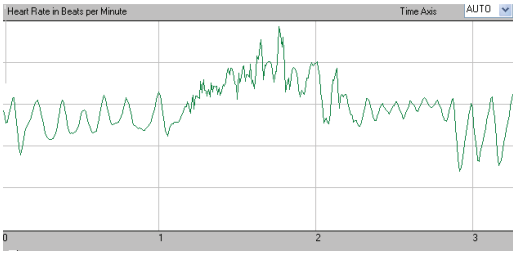


Figure 6.12

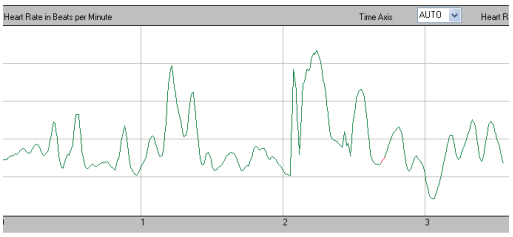


Figure 6.13

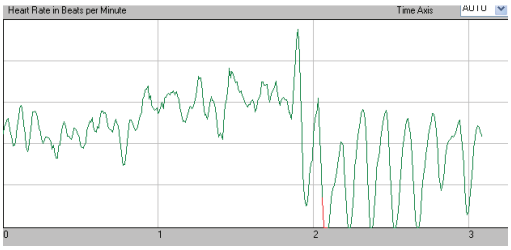


Figure 6.14

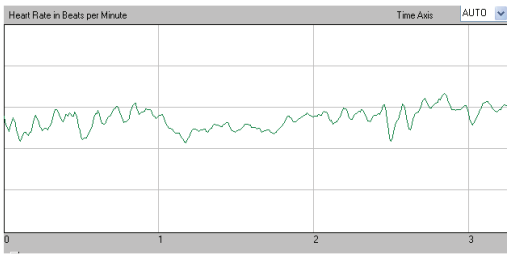


Figure 6.15

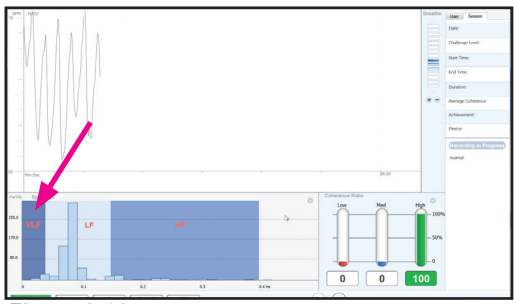


Figure 6.16

Very Low Frequency Band

The very low frequency (VLF) is seen in the dark blue band (0.0033 to 0.04 hertz) which are rhythms or modulations with periods that occur between 25 and 300 seconds. The VLF rhythm is thought to be an intrinsically generated rhythm by the heart's intrinsic nervous system that is modulated by sympathetic activations from, mental, emotional or physical activity. In addition to autonomic influences, other long-term regulation mechanisms are likely reflected in this band, including thermoregulation, the renin-angiotensin system and other hormonal factors.[96] Reduced activity in the VLF band has been shown to have stronger associations with all-cause mortality than the LF and HF bands. [96]

The area to the far right, in white, on the HRV power-spectrum display, is not an indication of normal HRV. When peaks are seen in this area, it typically indicates artifacts, which can be caused by increased muscle tension, atrial arrhythmias or a poor recording quality.

Autonomic Exhaustion

From numerous 24-hour HRV measures in various populations we have observed that long term stress or trauma appears to lead to overall low HRV. As mentioned before, low HRV is associated with a broad range of both physical and psychological disorders and forecasts adverse consequences.

We have come to view the amount of HRV as a measure of one's resilience, vitality, self-regulatory capacity and functional status. Either accumulated physical stress or emotional stress depletes the system, which is reflected in low HRV. In most cases, we have found that individuals with autonomic exhaustion significantly benefit from HeartMath interventions. Figures 6.12-.15 illustrate different types of reactivity to a stress recall exercise. The first three examples are reactors, while the fourth example displays a suppression of emotion or mental focus.

The Power Spectrum During Coherence

During a session with your clients, you may choose to watch the power spectrum screen to see which HRV frequencies are most predominant, although watching the HRV waveform is typically more informative. As explained before, the power spectrum display indicates the three primary frequency bands (the VLF, LF and HF), which are associated with different underlying physiological processes and rhythms. Figure 6.16 gives an example of what the heart-rhythm and power-spectrum screens look like during an active session when one is in a coherent state: The coherent heart-rhythm pattern can be seen in the upper heart-rhythm window. The power spectrum (bottom window) has the highest peak, near 0.10 hertz, (cycles per second) with no other significant peaks. It should be noted that the resonant frequency varies from individual to individual and will not always be at 0.1 hertz. In an active session, the power spectrum updates every five seconds.

Figure 6.17, also shows an example of coherence, but in this example the session has been stopped. Once the session ends the heart-rhythm window automatically rescales and shows all the heart-rhythm data collected during the entire session. The spectrum is recalculated and shows the spectrum of the data for the entire session.

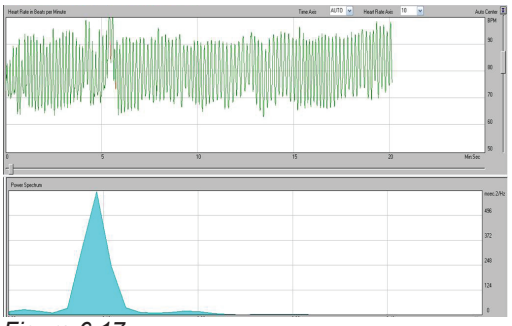


Figure 6.17

Chronic Stress

Figure 6.18 is an example from a client who has been in a chronic state of stress and anxiety. In this example, the average variation in the heart rhythm is only around 5 BPM.

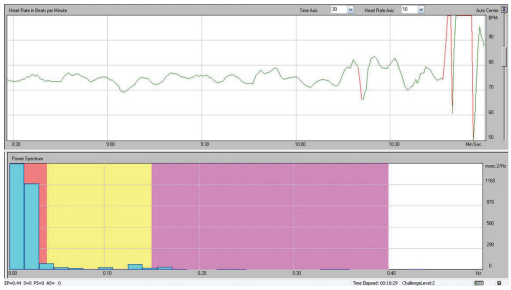


Figure 6.18

It is important to note that when you suspect low HRV, you should insure that the client is not breathing at a very shallow and/or slow rate, because although the client may appear to have low overall HRV, this could merely be state-specific and their HRV may otherwise be normal. This can happen sometimes with individuals who have practiced certain meditation techniques over a long period and have conditioned themselves to breathe at a slower, shallower rate. In such cases, it is not necessarily a sign of pathology, but rather a reflection of a state-dependant pattern associated with low parasympathetic outflow, providing that they have normal HRV outside the meditative state.[116, 122] For cases in which low HRV is suspected, the 1-Minute Deep Breathing assessment should be utilized to help clarify the issue.

Figure 6.19 is an example of a new client attempting to calm herself down. During this period her breathing remained fast (above 14 breaths per minute) and shallow, although she occasionally took some deep breaths. In this example, the client appears to have a relativity reactive autonomic response in the range of her HRV, though the incoherent pattern persists throughout the example. The highest peak in the power spectrum is in the HF range, reflecting the fast, shallow breathing pattern.

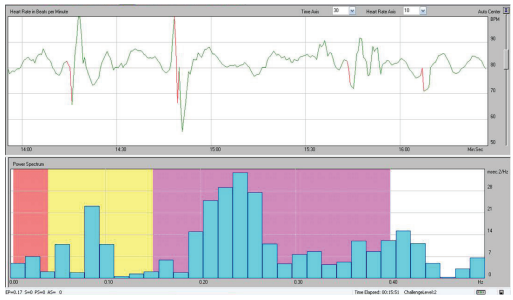


Figure 6.19

Pain

Figure 6.20 shows a client who is experiencing a lot of pain during the recording. This client appears to have healthy autonomic responses, which are reflected in the range of HRV, with a mixture of sympathetic activations, which are reflected by the slower frequency waves (an example is shown in the first minute of data on the display screen) and parasympathetic responses, which are reflected in the faster changes in the waveform.

Figure 6.20

In this example, also notice that there are peaks in the power spectrum that fall outside the HF range (right end of the x axis). These resulted from artifacts in the heart-rhythm wave (the red lines in the heart-rhythm waveform) that likely were created from excessive movement. In this case the artifacts were a result of excessive movement caused by physical discomfort.
Figure 6.21 is another example recorded from a patient with chronic pain. Clients like this can appear to have a good range in the HRV waveform. This is also reflected in the power spectrum, where the

Figure 6.21

Figure 6.22

Figure 6.23

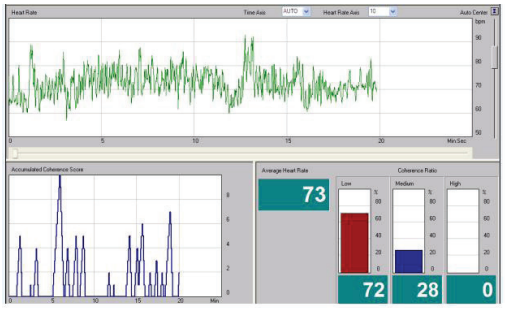


Figure 6.24

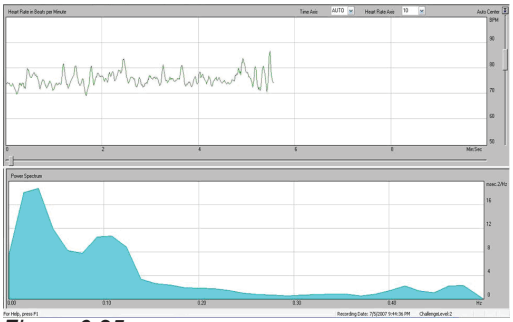


Figure 6.25

power is distributed across all the frequency ranges, with the highest peaks in the VLF and the HF ranges.

Exhausted with Chronic Fatigue

Figure 6.22 is an example of a patient with chronic fatigue who also has low HRV amplitude. Often, this low HRV condition also is observed in clients with high stress. Frequently, they feel exhausted or may be depressed and/or emotionally depleted. As a reminder, when you see a client with indicators of low HRV, it is valuable to perform the 1-Minute Deep Breathing Assessment and insure that the heart rate is not overly high. You should also check to see if they are taking medications and what they are, though the majority of medications do not lower HRV.

Anxiety

Figure 6.23 is from a client with high anxiety. You can see that the heart rhythm has a large number of upwards spikes. These spikes are examples of parasympathetic inhibition (remember any rapid shift occurring within a heartbeat or two is parasympathetically mediated) followed by a sympathetic activation, which sustains the higher heart rate over a few heartbeats. This is a typical pattern seen in anxiety clients who have not yet reached the autonomic exhaustion stage.

Figure 6.24 represents a longer assessment of a chronically anxious client with a childhood diagnosis of attention-deficit, hyperactive disorder (ADHD). This pattern is maintained for 20 minutes.

Depression

Figure 6.25 shows the heart rhythm and power spectrum of a client with depression. In this case, a lower HRV is exhibited than would be expected for the client's age, and there is also an incoherent pattern. The power spectrum screen shows a typical distribution of the frequencies.

Figure 6.26 is an example of chronic depression in a 23-year-old female client.

Arrhythmias and the Pulse Wave

Learning how to understand HRV might not be easy for some. Learning how to understand HRV becomes intuitive, but questions about the tracings will come up in the first few recordings. After a short time, you will become familiar with the HRV tracings and be able to spot any problems with the recordings.

Troubleshooting these situations is best done by viewing the pulse wave or the ECG, depending on what type of equipment you are using. Sometimes there may be a disturbance in heart rhythm that creates an irregular pattern in the pulse-wave. Sorting out what is artifact and what could be a condition that should be referred to a physician can be confusing. Let's start by looking at a normal rhythm with a good connection. (see Figure 6.27)

Figure 6.27 shows a consistent pulse wave in the bottom half of the display. The HRV tracing above reflects the usual pattern you should see when recording a patient or client's HRV.
In Figure 6.28 there is no consistent pattern to the pulse waves on the bottom of the screen. Two prominent peaks are probably pulses, but none of it is regular, so the heart-rhythm pattern above makes no sense.This is likely due to a poor sensor connection which can be corrected by repositioning the sensor.

Sometimes in pulse derived recordings this can be the result of poor circulation to the extremities, which can occur in cold-weather conditions. Often, having the client rub his or her ear lobe will solve the issue.

Another example of a poor connection is seen in Figure 6.29.
The pulse wave on the lower screen is erratic. It also has small bumps in it. Not only are some of the deflections too close together to be pulses, but the space between them is too wide in other parts of the tracing. The sensor is not picking up this person's pulse, and once again, it needs to be repositioned. Switching to the other ear, another finger or from ear to finger are the other options.

Figure 6.30 shows a good connection, but movement artifact is present. Notice in the pulse wave screen on the bottom that some of the deflections look like reasonable pulses, especially the second and third ones, but they are followed by a much different and erratic pattern. Note in the screen above that the red lines are in the middle of some big swings in heart rate. This would suggest that the subject is moving too much, and this tracing is typical of movement artifact. The last three peaks on the lower screen aren't typical either. Simply advising the subject to keep his or her head still probably will solve the problem if an ear sensor is being used. Holding the hand still is advised if a finger sensor is being used.

Now, let's look at some tracings in which the subject's pulse is irregular. Figure 6.31 (pg. 78) demonstrates an unusual pattern in the top panel showing the HRV pattern. Although incoherent patterns can have sudden deflections making sharp points, they don't typically occur in patterns like this. This client likely has a atrial arrhythmia.

In the lower panel, the first two pulses are separated by a pause, and then there are four beats in a row that are evenly spaced. We can't tell from this whether the subject skipped a beat or whether the first beat on the tracing is an extra beat and is followed by a pause. Either way, it represents a real change in heart rhythm. An occasional skip or extra beat is often quite normal and does not indicate a problem. Figure 6.32 (pg. 78) is another example of this. You will notice the same type of pattern here, which is not always the pattern of rhythm disturbances. The lower panel shows three beats that are regular followed by a pause. The HRV panel above shows a similar spike and dip pattern with sharp peaks that interrupt the underlying pattern.

There is no way we can show you all the examples of rhythm problems because of space constraints, but we will mention a very common heart arrhythmia: atrial fibrillation. Roughly 2 million Americans have atrial fib, either constantly or intermittently. It is much more common in the elderly. The hallmark characteristic of this rhythm

Figure 6.26

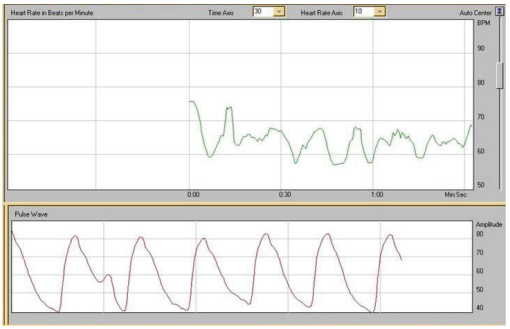
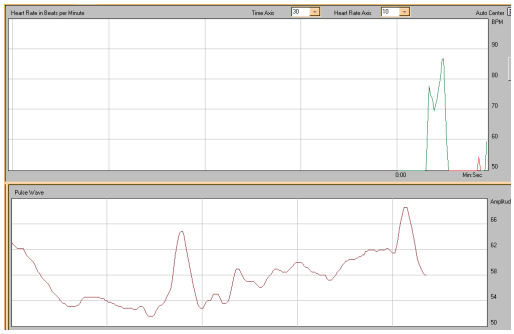


Figure 6.27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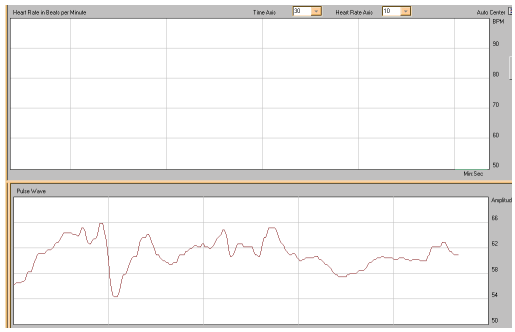


Figure 6.29

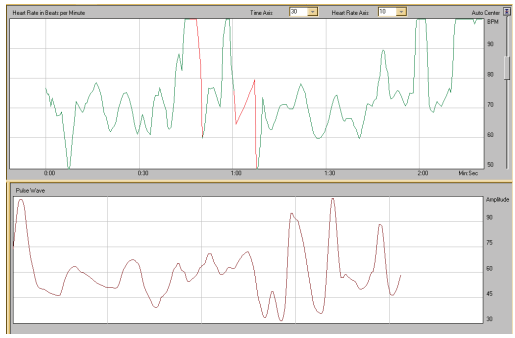


Figure 6.30

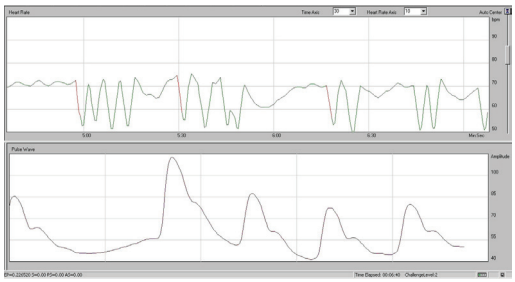


Figure 6.31

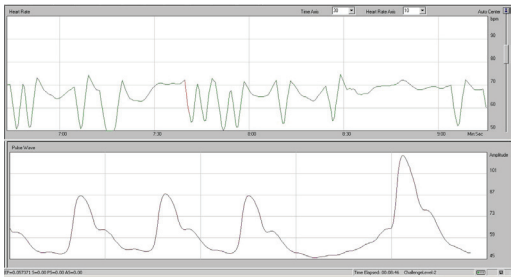


Figure 6.32

"One in four U.S. adults said they suffered a daylong bout of pain in the month prior to being surveyed, according to a 2006 annual report. One in 10 said the pain lasted a year or more."
—National Center for Health Statistics

"Many of the women I see in my practice are involved in "overcare". By the time they get to me, they feel drained. Some are having panic attacks or anxiety, waking up in the middle of the night, "overcaring" about something that they didn't resolve during the day. These women need help before they break down with anxiety or depression. I've been using the Freeze Frame Technique with many of my patients. 40% experience some immediate relief in the first session. If they continue to practice the Freeze Frame Technique, another 30% begin experiencing relief within four sessions. They're able to calm themselves down, regulate their heart rhythms, increase their energy, and they love it because they feel more in control."
—Dr. Anne Berlin, a San Diego psychologist

abnormality is that the rhythm is irregularly irregular, meaning that it is irregular in an irregular pattern. Some arrhythmias are regular such as extra beats every fourth or fifth beat, or skips in similar patterns. Or just one missed or extra beat every now and then. In atrial fibrillation, clusters of irregular beats are interspersed with short pauses. Occasionally the pauses are a little longer. If your subject has atrial fibrillation, the emWave cannot be used unless the rhythm is intermittent and the person is in normal rhythm during the session. Please note that even if a client has a heart arrhythmia and use of the technology will not be useful, they most likely will still benefit from learning the HeartMath techniques and working with the emotional refocusing and restructuring tools for better self-regulation.

Pacemakers

One more condition deserves mention here. Many people, especially older patients who may or may not have other types of heart disease, have a pacemaker. This electronic device is set so the heart rate does not drop below a certain level. It can do lots of things to speed up the heart rate, but a lower limit is set in each person's pacemaker to match his or her needs. The most common setting for the lower rate is 60 beats per minute. If your subject has a pacemaker and spends significant time pacing at the lower rate, there will be no variability in heart rate, so the line will be flat on top, even though the pulses will look normal in the lower panel. That's because the pacemaker triggers the subject's heartbeats, which then cause pulses, exactly as in the normal situation.

You will learn to pick up these irregularities and notice patterns with a little experience. If the client has frequent skips or extra beats, or irregular rhythms of other types, it would be prudent to have this person see his or her physician for further testing, unless this is a chronic condition well known to the patient and the physician. As always, it is wise to err on the side of caution.

In addition, low HRV can indicate a high level of stress that has resulted in autonomic exhaustion or a more serious condition such as hypertension, diabetes or environmental sensitivity. We recommend that patients with low parasympathetic indicators be screened for diabetes. Ask them about feelings they may be experiencing such as excessive fatigue, any major life stressors, worry, anxiety, frustration, etc.

Notes

Chapter 7

Psychophysiological Assessments

Learning outcomes:

- Describe the initial intake process and how to organize the relevant information from the psychophysiological assessment process.
- Relate the baseline assessments to implications for treatment.
- Identify treatment goals/objectives and the appropriate HeartMath intervention.

Notes

7.1 Overview

This chapter focuses on conducting a psychophysiological assessment. The formats of the reports are presented in two styles—one report summarizes the assessment, treatment and outcome in a comprehensive narrative and the other adheres to the traditional Subjective, Objective, Assessment and Plan (S.O.A.P.) guidelines. In these two approaches to planning an intervention and describing outcomes, you will notice that the HRV observations, client's symptoms, sources of stress, and outcome goals are key items to include in the assessment.

7.2 Baseline Assessment

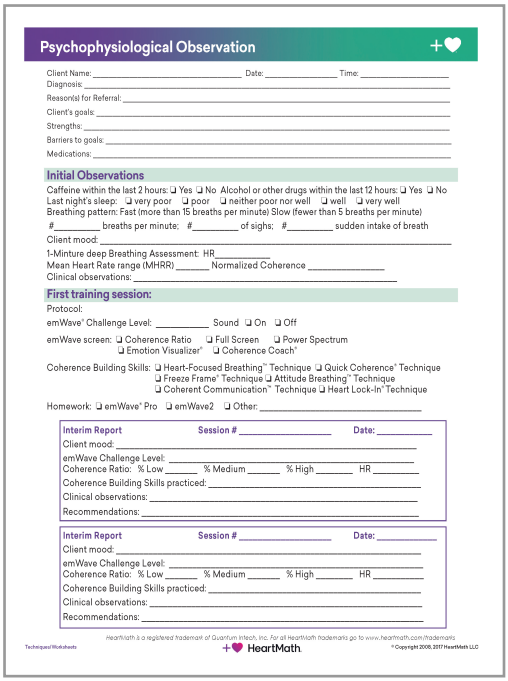
The HRV measurement protocols described in Chapter 6 are intended for settings where objective physiological data can help inform assessment and training. The assessments in this chapter are more relevant to mental health treatment, which focuses on emotional and behavioral management and training. The HRV measurements and the psychophysiological assessment can be used together or separately.

We've included a Psychophysiological Assessment Form (see appendix) to help note and track important information.

Make sure the client sits quietly when taking HRV measurements and refrain from talking. Don't ask questions or make comments that might engage a response from the client. Note any recent medication or medical conditions that could affect heart rate, respiration or autonomic-nervous-system function.

On the Psychophysiological Assessment Form, write down the characteristics of the client's ability to sit, the nature of the breathing pattern – fast or slow, in the chest or abdomen, regular or irregular, sighs, sudden large breaths, etc. These baseline observations along with your observations not only allow you to track the client's progress, but they are also valuable in determining which protocol and techniques to use and identifying objective goals for each client.

This information will also help you decide when to use a higher or lower challenge level and other emWave features. For example, if the client has greater than 80% for a combined medium and high coherence score on Challenge Level low, you may choose to start the client at Challenge Level meduim for training. You may want to use a lower challenge level for a depressed client to show early success and a higher level for an angry client to challenge the individual to recognize his or her need for emotional self-regulation. Once a client can sustain a combined medium and high coherence score above 80% for five minutes, it may be time to increase the challenge level. When a client can achieve a combined medium and high coherence score above 50% you can begin to use one of the games to add another dimension to the client's practice. The Coherence Coach and Emotion Visualizer® can augment initial training, especially for those clients who have trouble with the internal focus.



Psychophysiological Observation

Client Name: _____ Date: _____ Time: _____
Diagnosis: _____
Reason(s) for Referral: _____
Client's goals: _____
Strengths: _____
Barriers to goals: _____
Medications: _____

Initial Observations

Caffeine within the last 2 hours: ❑ Yes ❑ No Alcohol or other drugs within the last 12 hours: ❑ Yes ❑ No
Last night's sleep: ❑ very poor ❑ poor ❑ neither poor nor well ❑ well ❑ very well
Breathing pattern: Fast (more than 15 breaths per minute) Slow (fewer than 5 breaths per minute)
#_____ breaths per minute; #_____ of sighs; #_____ sudden intake of breath
Client mood: _____
1-Minture deep Breathing Assessment: HR_____
Mean Heart Rate range (MHRR) _____ Normalized Coherence _____
Clinical observations: _____

First training session:

Protocol:
emWave® Challenge Level: _____ Sound ❑ On ❑ Off
emWave screen: ❑ Coherence Ratio ❑ Full Screen ❑ Power Spectrum
❑ Emotion Visualizer® ❑ Coherence Coach®
Coherence Building Skills: ❑ Heart-Focused Breathing™ Technique ❑ Quick Coherence® Technique
❑ Freeze Frame® Technique ❑ Attitude Breathing™ Technique
❑ Coherent Communication™ Technique ❑ Heart Lock-In® Technique
Homework: ❑ emWave® Pro ❑ emWave2 ❑ Other: _____

Interim Report Session # _____ Date: _____
Client mood: _____
emWave Challenge Level: _____
Coherence Ratio: % Low _____ % Medium _____ % High _____ HR _____
Coherence Building Skills practiced: _____
Clinical observations: _____
Recommendations: _____

Interim Report Session # _____ Date: _____
Client mood: _____
emWave Challenge Level: _____
Coherence Ratio: % Low _____ % Medium _____ % High _____ HR _____
Coherence Building Skills practiced: _____
Clinical observations: _____
Recommendations: _____

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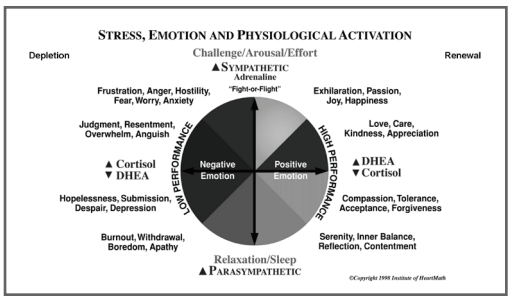
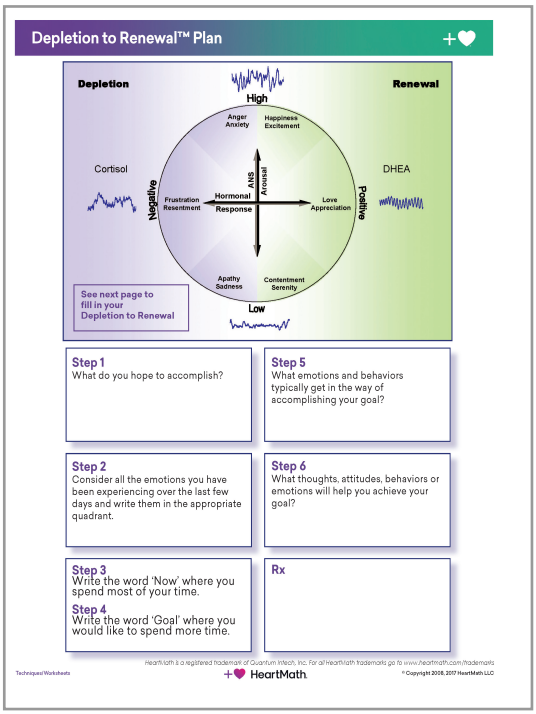
Sample Psychophysiological Observation Form is in Appendix B.



ANS/HPA activation grid.



Sample Depletion to Renewal Plan is in Appendix B.

"When the breakthrough moments come, when the client feels empowered to change his or her life for the better and I have the quieting in my own heart that the client has made a significant discovery, I will often find the courage to express appreciation to my client for allowing me to be present in that 'vulnerable moment.' When I recall these precious feelings I am also renewed and revitalized as a therapist. These are the moments I rejoice in the gift it is to be a therapist." –Myron Thurber

After the first few training sessions we suggest you reassess and fill out an interim progress report. Tracking changes in coherence scores as observed on the Coherence Ratio Screen, will allow clients to see any progress made and, together with you, set new general therapeutic goals specific to their practice of the HeartMath self-regulation techniques.

7.3 Mapping Mental and Emotional States

HeartMath researchers have conceptualized the research-based ANS/HPA response[122, 123] as addressed in Section 2.3 to aid the therapist in identifying the client's emotional arousal state (high arousal verses low arousal) and the emotional valence (negative verses positive) and aid the client is setting an outcome goal.

Many therapists find this model helpful when deciding which HeartMath tool or technique is appropriate to help the client achieve self-regulation and psychophysiological coherence and to facilitate cognitive, emotional and behavioral change for different diagnoses and levels of distress.

ANS Axis

The vertical axis represents the activation level of the autonomic nervous system (ANS), which is related to the intensity of the emotion the subject is experiencing. A comparison between high states of arousal and low states of arousal is a good indicator for many physiological functions. For example, a person in a high state of arousal (emotional intensity) may have a racing heart and fast breathing and probably is not able to get quality sleep. A person who is too low in their arousal may sleep too much, have very low motivation and be unable to be punctual.

HPA Axis

The horizontal, HPA (hypothalamic-pituitary-adrenal) axis is largely driven by the emotional valance. Sustained negative emotions (left) to positive emotions (right) are associated with emotional perception and experience and are associated with shifts in the DHEA (dehydroepiandrosterone) and cortisol ratios. Physiological sampling of cortisol-to-DHEA ratios has been shown to be a good indicator of emotional stress. Examples of this relationship can be seen in the research that has shown that increasing DHEA versus cortisol is associated with decreases in depression and insulin resistance in diabetes, among many other positive effects.[124-127]

Whereas the relative amount of ANS (vertical axis) arousal often is associated with a short-term response, the response of the HPA (horizontal) axis is longer-acting. For example, adrenaline, which is primarily under the control of the sympathetic system is fast acting but has short-term down stream affects. Cortisol on the other hand has long lasting down stream affects on a numerous physiological systems. Consequently, chronic stress, or sustained negative emotion has a longer impact on health and well-being.

Clinical Context

The Depletion to Renewal Plan incorporates the concepts of the ANS/HPA activation grid and is designed to facilitate a discussion about the relationship between emotions and physiology, your client's typical emotional responses and the intensity typically experienced. It can be used when first teaching a tool or any time throughout your sessions to encourage emotional awareness and to track and identify progress.

Charting how even a small or subtle shift in an emotional response on the Depletion to Renewal Plan provides clients a concrete example of how shifting emotions and perceptions can and will impact their physiology. It can help motivate clients to self-regulate and discover they have the power to change their lives, in the moment, for the better.

Figure 7.2 is a simplified version of the ANS/HPA activation grid shown in Figure 7.1 and is an effective teaching aid to help clients identify their current arousal level and dominant emotional states. Once clients understand the relationship between emotions and physiology and are able to plot where on the map they spend most of their waking hours they, along with you, can establish attainable goals and objectives such as: Where are you now? Where do you want to be? How will you get there?

What's important is that the client understands the body responds differently in different emotional states and that they can learn to self-regulate their emotions.

Depression

Figure 7.3 is an example from a client who has episodic acute depression with low energy and low motivation. This person felt overwhelmed at work with multiple projects and was increasingly worried she would fail. The depression was situational and short-term, but the client had a history of a previous major depressive episode and she wanted some help before the depression worsened.

Anxiety

Figure 7.4 is from a client who was experiencing anxiety. He had a difficult time falling asleep at night because he tended to ruminate about problems, sometimes for hours. He also was diagnosed with high blood pressure and tended to anger easily. His goal was to better control his anger, feel less panic in pressure situations and improve his sleep.

Pain

Figure 7.5 shows an example from a 40-year-old female with a closed head injury. She had post-concussive headaches, was frustrated and had difficulty maintaining her normal routine without becoming more frustrated, confused and irritable. Her predominant emotions were directly related to the pain she felt and she often felt frustrated.

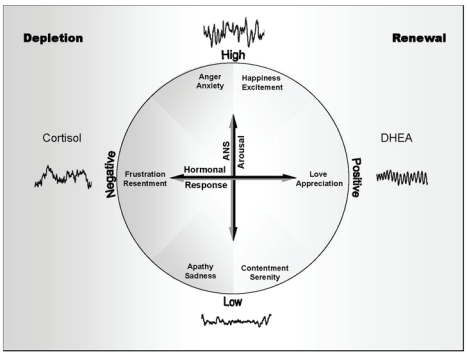


Figure 7.2

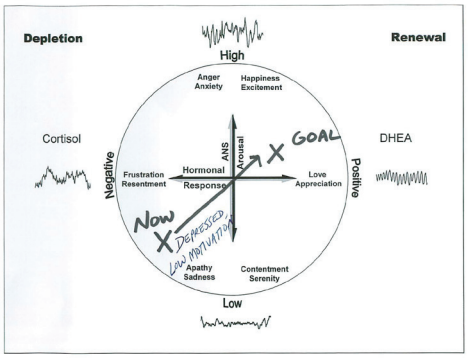


Figure 7.3

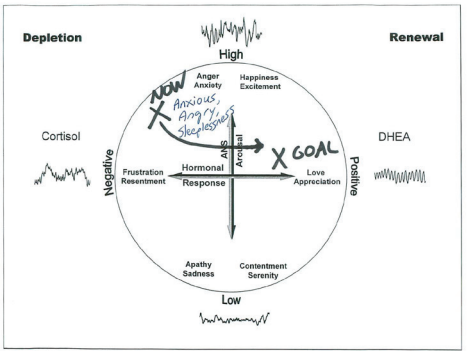


Figure 7.4

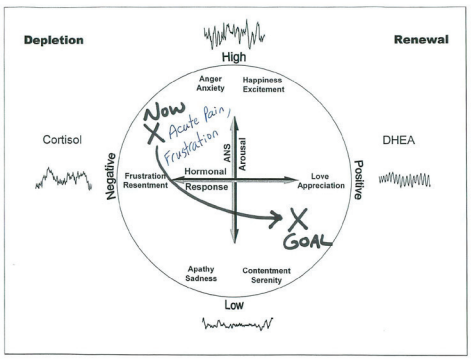


Figure 7.5

Some clients may not be able to discern one emotion from the other. For example, “Am I feeling appreciation or care or compassion?” Some clients may find it easier to plot their responses to different situations rather than name the specific emotion: “During my meeting with my supervisor, I felt negative and my heart was racing.” This would go in the upper left-hand quadrant.

Summary

The Baseline Assessment and Depletion to Renewal Plan, along with the emWave, helps clients increase their awareness of the relationship between their emotions and physiology. Once clients observe how quickly their emotions impact their heart rhythms before and after applying a self-regulation technique, they are better equipped to make choices about their reactions to situational or stressful triggers. Together, the client and therapist can discuss and set goals and track progress. By observing baseline coherence levels and HRV, the therapist can suggest which self-regulation technique is most appropriate for each client.

7.4 Case Studies

A comprehensive psychophysiological assessment should be conducted over several sessions and incorporate data from initial observations, HRV measures, follow-up HRV observations in later sessions, the Depletion to Renewal Plan and treatment objectives that highlight the rationale for choosing the appropriate HeartMath interventions.

Case Study #1

B., a 21-year-old Caucasian woman, presented for out-patient individual therapy because she was concerned her behaviors had become too dramatic, and she suspected she needed anger-management therapy. She came to the counseling center when she became especially concerned about her pattern of escalating anger and irrational paranoia related to her suspicions that her ex-boyfriend was dating other women. She became reactively depressed when this boyfriend broke up with her and she reported that she felt extremely empty inside and lacked an identity without him. When he refused to return her calls, she parked in front of his apartment and monitored his activity. Eventually, late that night, she stood outside of his apartment building while yelling demands that he agree to speak with her again. She also wrote in her personal journal and described intensely depressed thoughts and feelings of self-loathing. B. stated that her ex-boyfriend warned her of the possibility that he would seek a restraining order and now would only communicate with her if she agreed to participate in therapy. In general, client minimized her own responsibility for her anger, tended to externalize the source of her discomfort and blamed the behavior of others as the source of her behavioral outbursts. Still, she was aware of her habitual tendency to react with anger and impulsive verbal outbursts when she perceived rejection or other indicators that her emotional needs would not be met by others. The therapist and the client established a collaborative assessment of the client’s presenting concerns and agreed on particular areas of concern and behavioral goals listed below. She responded well to basic client education on physiology of stress and its effect on the Depletion to Renewal Plan, HRV coherence and behavioral change.

Problematic Behaviors

- Repeated angry outbursts that were out of proportion to the irritating event that precipitated the outburst
- Verbal threats of harm to others
- Failure to accept responsibility for loss of control and frequently blamed others for anger control problems
- Underlying feelings of depression, anxiety or insecurity that contribute to the aggressive behaviors
- Strained interpersonal relationships with peers and romantic partners because of behavioral outbursts
- Excessive and impulsive screaming, cursing and verbally abusive communication when frustrated or stressed

Behavioral Goals

- Demonstrate improvement in listening and responding empathically to thoughts, feelings and needs of others.
- Significantly reduce intensity and frequency of angry verbal outbursts.
- Express anger through more appropriate verbalizations and healthy outlets.
- Markedly improve quality of relationships by increasing frequency of controlled, respectful and direct verbalizations.
- Interact with authority members with more respectful and appropriate communication.
- Identify targets or triggers for angry outbursts and aggressive behavior.
- Increase the number of verbalizations that reflect acceptance of responsibility for angry outbursts and destructive or aggressive behaviors.

Diagnostic Impressions:

Axis I:	309.3	Adjustment Disorder with Disturbance of Conduct
	R/O 314.01	Attention-Deficit/Hyperactive Disorder, Predominantly Hyperactive-Impulsive Type
Axis II:	R/O 301.83	Borderline Personality Disorder

Notes

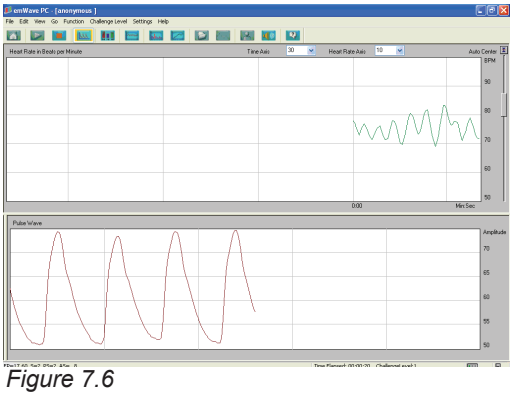


Figure 7.6

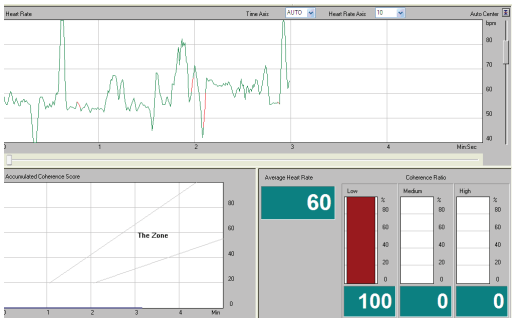


Figure 7.7

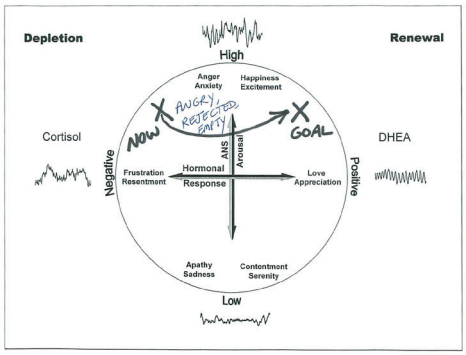


Figure 7.8

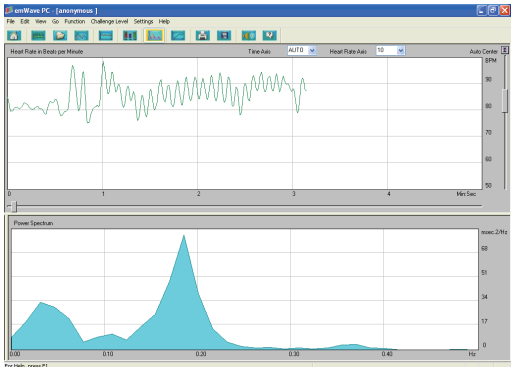


Figure 7.9

In the second half of the first session, the therapist introduced and described the features and functions of the emWave Pro. A baseline of B.'s heart-rate variability was observed and a copy of the first three minutes can be seen in Figures 7.6 and 7.7.

First, therapist confirmed that a good pulse signal was being received and B. appeared to be in a moderately coherent state, but then she seemed to become anxious when attention was focused on a different screen. The client seemed to be self-conscious and uncomfortable with the feedback, so the therapist encouraged client to close her eyes and the sound feedback was turned off. As you can see, B. had an incoherent pattern, with 0% of medium or high coherence in the accumulated coherence score, and no progress above baseline in the zone. There are two artifacts around the second minute of the assessment because the client became restless and she reported that it was difficult for her to sit quietly. Toward the end of the three-minute baseline assessment, B.'s heart rate escalated to approximately 80 BPM. She reported that the experience was difficult for her and she attributed this difficulty to the noisy chatter in her head. B. then reported that she often had trouble sleeping because she experiences this noisy chatter at that time and she often felt frustrated in the morning when she woke up feeling tired and restless. The therapist then facilitated the completion of the Depletion to Renewal Plan. As you can see in Figure 7.8, B. was aware that she tended to experience much anger and anxiety and she existed in a chronic state of emotional depletion (Now), and her goal was to feel more happiness and joy in her life so she could experience a state of renewal (Goal).

In the second session, the therapist introduced the Heart-Focused Breathing and Quick Coherence Techniques. As you can see in the screen cap-ture from the session above, the client initially responded well to the Quick Coherence (Heart-Focused Breathing, along with an emotional shift toward a feeling of appreciation). At first, B. expressed frustra-tion with the downward shift of progress as evidenced in the zone, but then witnessed the powerful effect of going neutral when the ther-apist shifted from the HRV ratio screen to the Coherence Coach and encouraged B. to focus only on Heart-Focused Breathing. She re-ported that she felt more alert, calm and focused during the day, but still had problems with insomnia. For this specific goal, she indicated she would like to feel more calm and less excited before bed, so a second goal was identified in her next Depletion to Renewal Plan.

In this session, the therapist also introduced the power spectrum (see Figure 7.9) and educated the client on the activation of her parasympathetic nervous system. She responded well to praise and therapist's encouragement for her to practice coherence-building tools between sessions. She rented a portable emWave device from the clinic and agreed to practice self-regulation techniques in the moment, when she became aware of an emotional experience on the left side of the Depletion to Renewal Plan (Figure 7.10). The therapist emphasized the importance of frequent short practice sessions instead of one long session per day because client still tended to get frustrated and give up easily when she experienced negative feedback.

In the third session, the therapist reviewed client's Depletion to Renewal Plan, and B.'s progress toward goals demonstrated significant improvement in the ability to listen and respond empathetically to the thoughts, feelings and needs of others. She also reported that her use of the emWave2 served to significantly reduce the intensity and frequency of angry verbal outbursts. Additionally, she believes the quality of her relationships has improved as a result of her ability to interact with others in a more respectful and appropriate manner. Finally, she reports that she has been able to identify targets or triggers for aggressive behavior and has regularly utilized the Heart-Focused Breathing Technique when she notices sympathetic activation. In this third session, therapist and client reassessed B.'s progress on the emWave Pro and she demonstrated a remarkable improvement in her ability to achieve and sustain coherence (Figure 7.11).

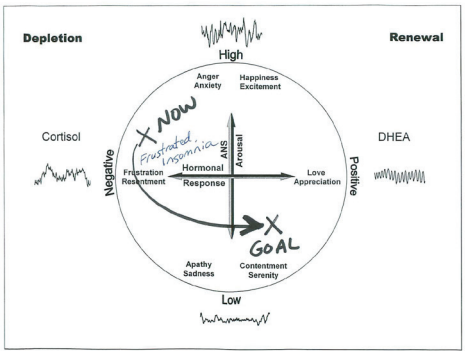


Figure 7.10

*Over the next couple of sessions, B. continued to practice the coherence-building tools and eventually built all emotional refocusing and restructuring tools (the Heart-Focused Breathing, Quick Coherence, Heart Lock-In and Attitude Breathing Techniques) into her daily regimen of coherence practice with the emWave2. She reported that Attitude Breathing and Heart Lock-In Techniques seemed to be hardest to practice, but served to have the longest-lasting effect on her abil-ity to remain in a state of renewal. The client did not express much concern about termination because she had seen evidence that it was possible to sustain coherence over time and she had the tools to maintain her improved ability to freeze the moment and become less impulsive, more neutral and less reactive to stressors. The therapist also learned much from this case, including the ability to recognize personal signals of feeling anxious before and after therapy ses-sions. Many times, this client seemed confrontational in the early sessions, but the therapist practiced coherence and was able to build on empathic and active listening skills. This not only diffused a nega-tive emotional response, but also facilitated more effective communi-cation with the client.

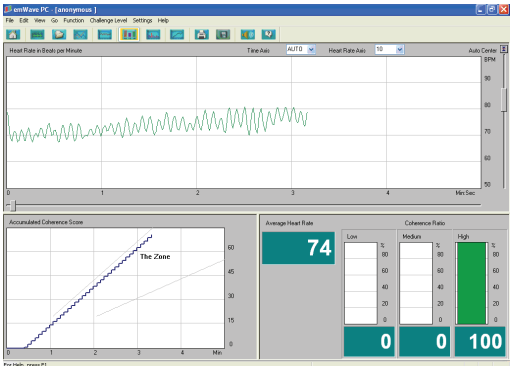


Figure 7.11

Notes

Case Study #2

Name: S. Seen at 11:30 a.m., March 3, 2008
Reason for the referral: The client referred himself to a student counseling center for symptoms of generalized anxiety and poor sleep quality because of worry and inability to quiet his mind.

Medication: He is not currently on any prescribed medication and reports taking, over-the-counter, 10 mg of melatonin to help him sleep at night. He reports drinking about five cups of caffeinated coffee a day and an occasional 12-ounce soda. He reports no caffeine within two hours prior to the assessment.

Goals: The client reports that he would like to be able to control his anxiety so he can do better on tests and bring up his grades, as well as get on a regular sleep schedule so he can feel rested for his morning classes.

Barriers: He reports that he slept about five hours last night and four the night before because his roommate was noisy and he lost track of the time.

Psychophysiological Assessment: The therapist observed the client's HRV for five minutes using the emWave Pro 1.0 with an ear-clip sensor and with no visual or auditory feedback.
Average Heart Rate: 64 beats per minute.

Breathing pattern: approximately 18 breaths per minute, with shallow rapid regular breathing that included three long sighs during the five minutes.

Coherence Score on Level 1: 53% low, 44% medium, 3% high.

Mood: The client reports that he is nervous about coming to the counseling center today and the degree of anxiety he is feeling is about the normal amount he feels all the time.

Impressions: S. shallow breath rate as well as the predominantly low coherence score may indicate that he would be a good candidate for self-regulation training using the HeartMath tools. He may benefit from one or two sessions per week as part of his counseling program. He may also benefit from homework – practicing the tools – to help him improve his sleep habits and decrease symptoms of anxiety.

Depletion to Renewal Plan: (Figure 7.12)

1. *What do you hope to accomplish?* Help with test anxiety, panic when asked to speak in front of class.
2. *Consider all the emotions you have been experiencing over the last few days and write them in the appropriate quadrant*.
3. *Write the word "Now" where you spend most of your time.* Worry, insomnia.
4. *Write the word "Goal" where you would like to spend more time*. Calmer; more appreciative of my accomplishments.
5. *What thoughts, attitudes, behaviors or emotions will help you achieve your goal?* Deadlines, feeling pressured to achieve too much in too short amount of time; I tend to procrastinate and avoid boring tasks.
6. *What thoughts, attitudes, behaviors or emotions will help you achieve your goal?* The Quick Coherence Technique and the Heart-Focused Breathing Technique; establish a weekly schedule; drink less alcohol and fewer cups of coffee; exercise more before bed.

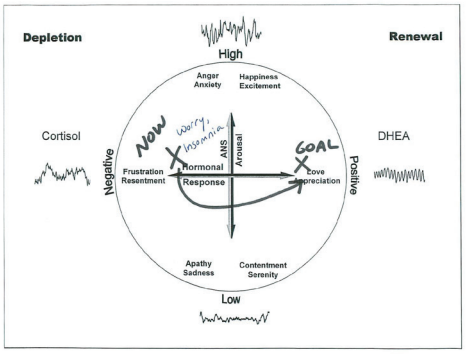


Figure 7.12

The following is a sample S.O.A.P progress note:

Subjective: S. reported that he has been practicing the Quick Coherence Technique at night and is sleeping better. He reports less anxiety when studying for finals, but is still worried about actually taking the test.

Objective: The client used the emWave technology in the therapist's office at Challenge Level 2 for 15 minutes using the Coherence Coach, and practiced the Quick Coherence Technique.

Assessment: The client combined medium and high coherence score was 74% percent, compared to 47% in the initial baseline. This shows a continued increase in self-regulation that corresponds to the subjective improvement he is reporting. (Figure 7.13)

Plan: The client was encouraged to practice the Quick Coherence Technique several times during the day before and after classes and use his handheld emWave on the silent mode during classes to practice staying coherent while in the classroom.

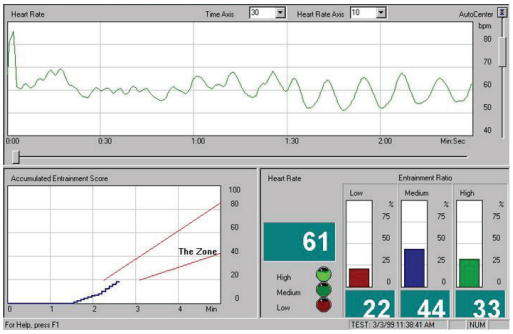


Figure 7.13

Chapter 8

Teaching the HeartMath Coherence-Building Skills for Self-Regulation

Learning outcomes:

- State the steps for the Heart-Focused Breathing Technique, Quick Coherence Technique, Heart Lock-In Technique, Coherent Communication Technique, Attitude Breathing Technique and Freeze Frame Technique .
- Describe the similarities and differences between the refocusing and restructuring techniques.
- State an appropriate clinical application for each HeartMath technique.

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8.1 Overview

Notes

The HeartMath System for self-regulation enhances the efficiency and organization of psychological, physiological and emotional information processing systems. For a noncomplicated client, coherence-building tools often can be learned in one session and then reinforced over approximately five 15- to 20-minute sessions as an adjunctive treatment to other forms of therapy.

HeartMath techniques create a bridge between cognitive, behavioral and experiential forms of treatment by tying them back to the physiological basis and underpinnings of perception and action. Along with the positive emphasis, they can be used as meta-techniques to enhance and facilitate other treatment modalities. The ability to use the techniques along with the emWave HRV coherence monitors adds the advantage of having an objective measure to verify change over time.

HeartMath tools and techniques are not designed to dredge up old ineffective patterns or bring on an a reaction. The act of finding and maintaining a coherent state will encourage a natural resolution of previous psychophysiological inefficient patterns that were brought on and maintained by many forms of trauma and stress. By using the tools and techniques, clients may gain a greater self-regulation, a new perspective and start to look for and find more coherent solutions to past ineffective thoughts, feelings and behaviors.

Some may conclude on first observation that HeartMath's techniques are very similar and that therefore, so are the outcomes. They may refer to them as breathing exercises and miss the benefits of emotional self-regulation. They all start with a slower, slightly deeper breathing rhythm than normal to help the user disengage from an unwanted, depleting negative emotion and to modulate sympathetic and parasympathetic activity to bring a more coherent pattern in the heart's rhythm. Aside from the Heart-Focused Breathing Technique, which is heart focus and rhythmic breathing alone, all the techniques include an intentional shift to a positive emotional state to not only anchor the coherence started with the Heart-Focused Breathing Technique, but also to bring about the longer-lasting benefits that arise from the emotional shift.

Although the differences may not be obvious at first, with practice, each technique offers different and profound short- and long-term changes in perception, self-regulation and emotional balance. Which tool or technique the clinician incorporates into the therapeutic setting will depend upon several variables, including among others, the client's current emotional state, diagnosis and long- and short-term goals.

This section will assist you in deciding which HeartMath techniques best match the client's current physical, emotional and behavioral needs and goals. We recommend that you practice each skill yourself to increase your understanding of how each works and its application to everyday situations.

We've provided basic instructions and generic scripts for each technique. In-depth instructions on how to teach each one and

Notes

how to incorporate emWave instruction within the context of your interventions can be found in the Training Protocols section.

8.2 Heart-Focused Breathing Technique

With a typical anxious or overwhelmed client the Heart-Focused Breathing (HFB) Technique is is the first skill taught. In this regard, it is similar to the first step of each of the other self-regulation techniques. Because HFB is typically easy to learn and use, clients learn that they are able to neutralize their emotions and take out some of the “drama” more quickly and in the moment. The Heart-Focused Breathing Technique is a basic step in teaching clients how to start taking responsibility for their own emotions.

Clinical Context

Using the Heart-Focused Breathing Technique often results in the client experiencing more calm, which is particularly useful when strong emotions such as anxiety and fear drive behavior. It helps clients reduce the drama and take the significance out of highly charged situations and help reduce emotional hyperfocus toward the negative and move the client toward a more effective, objective ready state. Clinically, this technique is particularly useful for anger management, post-traumatic distress syndrome (PTSD), anxiety disorder and acute and chronic pain. When first teaching the Heart-Focused Breathing Technique, read the complete text in the suggested Script to the client. If you decide to incorporate the Depletion to Renewal Plan, review (after the script) how to integrate it into the session.

After you discuss the steps with your client, lead the individual through the steps by simply reading them. Remember to practice the steps yourself as you lead your client. Encourage your clients to practice using the Heart-Focused Breathing Technique on minor issues or irritations at first before tackling a bigger source of stress. Be assertive in reading the step aloud with your clients and practicing the step along with them. At the same time, your tone should be warm and supportive. Read the steps at a relaxed pace and even pace and avoid rushing. For clients, this kind of collaborative effort helps establish a strong therapeutic trust in the process. Be sure to identify any shifts in your own or the client’s experience and offer your observations. This can be very useful with some clients who are less aware of their own emotions.

Script
The Heart-Focused Breathing Technique helps reduce the impact of stress on your mind and body and reduces the energy drain, so you can feel more renewed. Going to a neutral state allows you to step back from your racing mind and your emotionally charged feelings. This gives you a chance to pause your emotions and thoughts long enough to consider the consequences and options.128

Step: 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)

Once you have become familiar with this step, all you need to remember is the quick step to neutralize stress.

Heart-Focused Breathing

When you feel stressed or negative feeling, your body is out of sync. This can feel uncomfortable or uneasy. When you shift your attention away from the mind and focus instead on the area around your heart and feel your breath coming in and going out around the area of the heart you interrupt the body's stress response.

Breathing at a count of 5-6 helps bring order to your nervous system. This may be a slower and deeper way of breathing that may feel awkward at first, but because breathing modulates the rhythm of your heart, this new breathing rhythm changes the heart's rhythm, which in turn has a powerful soothing effect on the brain and the entire body. This is why it's calming to breathe slowly and deeply when you're stressed and helps you self-regulate.

How to Incorporate the Depletion to Renewal Plan

It's helpful to use the Depletion to Renewal Plan (in the appendix and also found on the HMIP Resource Center) when first introducing HFB (or whichever technique you are teaching first). Use the questions on the worksheet to start the discussion and ask your client to write down her responses. Once your client has identified a recent stress-ful situation and her emotional response to that situation, ask her to locate where this stressful emotion is on the Depletion to Renewal Plan. For example, if the client reports that the situation made her angry, anger is a highly aroused, negative emotion and lands in the upper left quadrant. Now lead your client through the Neutral steps and practice them together.

It may take a couple of minutes of breathing for the client to observe any change. Monitor your own feelings and notice how your own body begins to relax, particularly the shoulders, which often will drop. Breathing becomes easier, deeper and more regular. You may begin to feel warmer or find yourself wanting to yawn or swallow. Some experience a softening of the emotion and feel more at ease and calmer with added clarity on what to share with your client.

At this point in the practice ask your client what she notices about her body, emotions and/or thoughts. If she comes up with observations similar to your own, confirm that you noticed the same. If she does not perceive any change, relate your own similar experiences or observations. Go back to the Depletion to Renewal Plan and

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Tip: You and your client may find it helpful to integrate the Depletion to Renewal Plan into the discussion about what they're experiencing before and after practicing the steps for the first time.

"I was attending training at the Institute of HeartMath in Boulder Creek, California, to increase my skill in using the HeartMath tools. As part of a reflective listening exercise, I began to explore the personal difficulty I had at times at accessing the feelings of my heart. I could achieve a degree of coherence through breathing at a resonant frequency and I wasn't uncomfortable, but sometimes I couldn't access heart feelings. My mind reflected on my experience as a young physical therapist at a hospital in Central Washington. I was assigned to the emergency room to clean wounds and burns. For treatment purposes, I learned to numb my emotions in order to accomplish the tasks I needed to perform in the face of patients in excruciating pain. I realized that often, when I tried using the Quick Coherence Technique, I wasn't experiencing a change of emotion, I was going numb instead. The interesting thing about being numb is that I could not tell where I really was impacting my physiology with my emotional state because I had turned off the emotional radar. By learning to access positive emotion, using the Quick Coherence Technique, I began to feel more resilient, connected with others better and was less prone to feeling burned out in my job." —Myron Thurber

discuss the change the client has made relative to the landscape and reinforce how she was able to make the change through her own personal power. Several short examples and practice with the tool will help reinforce the concepts of self-regulation and resilience.

8.3 Quick Coherence® Technique

The Quick Coherence Technique (QC) builds on the Heart-Focused Breathing Technique and helps the student or client begin to shift emotions toward more positive and productive emotions.

Conscious heart focused breathing, as done with the Heart-Focused Breathing Technique, is good in that it tends to produce a calm feeling, and the Quick Coherence Technique is designed to go beyond simple calming by changing the emotional patterns that underlie what is commonly called stress–a process of repatterning and restructuring our emotional responses to life's situations. Practicing the Quick Coherence Technique builds self-regulatory capacity and creates more positive new emotional reference points that can be accessed in stressful situations. The practice is akin to building emotional muscles. More emotional muscle implies that more challenging situations, which would normally result in a negative stressful reaction, can be handled with more ease and effectiveness because of the practice of the Quick Coherence Technique in less challenging situations.

The Quick Coherence steps can be done in seconds anywhere, anytime and is helpful because it empowers the user to self-regulate. The process reinforces the therapeutic concept of changing reactions from an external locus of control to responding from an internal locus of control. Clients learn to identify negative, draining emotions and then how to shift them to positive, replenishing emotions. This addition of activating a positive emotion in stressful or challeng-ing situations adds significant power to the change process already begun with the Heart-Focused Breathing step.

It's important to help clients recognize the difference between numb, neutral and coherence.

The technique is useful to students and clients before and during tests, sporting events, performances or dealing with difficult emotional reactions. Some have found it helpful during counseling sessions to help keep clients in the moment.

Clinical Context

Start by reading and discussing the Quick Coherence steps before practicing them together. If a client is struggling to breathe with heart focus, you may want to use the Coherence Coach to help the client find a regular and steady breathing pattern and reinforce the Quick Coherence steps.

For clients who struggle with activating a positive emotion, it may be helpful to use the Emotion Visualizer® as a focus point while listening

to the music. It can help activate a positive emotion without attaching it to a specific person or place. When clients can identify a positive emotion, they can progress to emotional restructuring techniques like the Heart Lock-In or Attitude Breathing Technique, which builds on the Quick Coherence steps.

Some clients may find recalling a positive emotion difficult. Experiencing a positive emotion may not be a familiar feeling and can be uncomfortable at first. Let them know that it becomes easier with practice. Some may not trust that what they are feeling is real or sustainable. This is not unusual when working with clients with PTSD, long-term abuse, neglect or chronic pain or in a prison population because they are isolated from so many of the people and things that would often be a source of appreciation and care. Reassure them that a positive emotion does not have to a be a big feeling and even a sincere attempt at activating a positive feeling or attitude is sufficient to improve self-regulation.

When teaching the technique for the first time, read the complete text in the Script to the client. If your client already knows other coherence building tools, discuss similarities and differences. After you discuss the steps and practice them individually, read only the full or quick steps to guide the client through the process and then practice it together.

Script

The power of the Quick Coherence Technique comes from positive, renewing self-activating emotions. You will learn how to engage positive feelings anytime, in the moment, when you're feeling a stressful or draining emotion. The technique is easy, but each step is important. All the steps together take less than a minute and work like this:

Step 1. 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 2. Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or something in your life.

Suggestion: Try to re-experience the feeling you have for someone you love, a pet, a special place, an accomplishment, etc., or focus on a feeling of calm or ease.

Once you have become familiar with these three steps, use the quick steps:

Heart-Focused Breathing
Activate a positive or renewing feeling

Heart-Focused Breathing shifts your attention away from the mind so you can tune more into your heart. Breathing shifts your system into increasing coherence, because the rhythm of your breath modulates

Notes

the rhythm of your heart. This is why it's calming to breathe slowly and deeply when you're stressed: a new breathing rhythm changes the heart's rhythm, which in turn has a powerful soothing effect on the brain and the entire body. Breathing at the count of 5-6 in and out helps bring order to your nervous system. Try this.

Activating a positive or renewing feeling helps you sustain the coherence begun with Heart-Focused Breathing without having to remain focused on your breath. Many people find that when they experience positive feelings like care or appreciation while breathing through the heart area, they immediately feel uplifted and regenerated. The reason we call these heart feelings is because they change how your heart is beating and people often refer to such feelings as coming from the heart.

Sometimes, if you're accustomed to feeling more negative than positive, this may feel unfamiliar at first. For now simply make a sincere effort to feel and hold the positive emotions by recalling a positive or fun time in your life and reexperiencing it.

If it's hard for you to recall anything positive right now, let's take some time to remember and write down those times when you felt uplifting feelings. It's helpful to memorize them, so they are easy to recall when you practice the Quick Coherence Technique. Remember, even a sincere attempt at feeling a positive emotion will start reducing the drain and replenishing your system[125].

Practicing makes it easier to sustain coherence for longer periods of time. It will become more natural and familiar to your system, making it much easier to remain calm and balanced in challenging or stressful times and build your self-regulatory capacity and resilience.

It may be beneficial to make a list with your clients of simple experiences or examples that they identify as helping them access the actual feeling of a positive emotion. You may need to remind them that it doesn't have to be a big feeling and it may be a subtle one. Even a sincere attempt at accessing a positive emotion is a good start for some people.

Clinical Context

M. allowed himself to feel only a few emotions, like anger and guilt. His goal was to feel positive emotions again. By his early teens, he had become an alcoholic to numb the pain and personal angst related to family conflict. He talked about losing over 20 years of his life to a stupor of drugs and alcohol and he knew that what he now wanted was to feel again. We used the emWave Pro and started with Heart-Focused Breathing to decrease the sympathetic arousal associated with his anxiety and anger.

Initially, it was difficult for him to identify positive feeling memories that incorporated a range of other emotions. For M., the best anchor was to stay present with the feeling he had when he was running. It allowed him to feel neutral and he experienced relief from emotional pain without feeling numb.

A critical moment for M. that released other emotions was the memory of his greatest emotional pain. He spoke with the voice of a child about his own birthday party with friends at his house. He told how sometime during the party, after he had offended his father, his father took him outside and beat him and then he was allowed to return to

the party. For a few moments, M. allowed himself to recall the past pain as if it were present and an emotional floodgate began to open up. He discovered that he was capable of experiencing pain without becoming numb. This experience of emotional pain in the moment was followed by an open heart and a new perspective.

M. was able to reach his goals in therapy. With the emWave technology, he was able to observe the physiological benefit of shifting his emotions, and consequently his HRV, from chaos to coherence, with either the Heart-Focused Breathing or Quick Coherence Techniques. One after-noon, he related how he had reacted to someone who had parked in his assigned parking spot at work. Instead of his typical angry tirade, he shifted to a neutral state, solved the problem and ended up feeling happy. He was pleased and satisfied with the outcome. His ability to stop unwanted reactions and solve problems more effectively then expanded into his business relationships and eventually helped him find a romantic partner.

8.4 Heart Lock-In® Technique: An Emotional Restructuring Technique for Sustained Behavioral Change

The Heart Lock-In Technique (HLI) is an emotional restructuring tool that is generally taught as a companion to the Quick Coherence Technique. It resets the default emotional valance from depleting negative emo-tions to more restorative positive ones. The Heart Lock-In Technique focuses on building the capacity to sustain heartfelt positive emotions and coherence with their associated benefits for longer periods of time. This technique is generally practiced for five to fifteen minutes at a time, although longer sessions may be used as well. When you sustain coherence for five minutes or more, it makes the state more familiar and accessible to you when you need it to meet challenges of stress. With practice, the coherent state becomes your new refer-ence point, making the experience more automatic. Practice of this technique may also be facilitated with music such as Quiet Joy (by Doc Childre, which was specifically designed to promote emotional balance and augment the favorable psychological and physiological effects of positive affective states.[129]

Sustaining coherence builds resilience, which translates to more stamina, composure and improved decision-making in all areas of life. It helps us accumulate energy, while it reduces anxiety. When positive emotional states are intentionally maintained, coherent heart-rhythm patterns can be sustained for longer periods, which in turn leads to increased synchronization and entrainment between the heart's rhythm and the activity of multiple bodily systems.

Even when stress or emotional instability is subsequently experienced, the familiar, coherent state is more readily accessible, enabling a quicker and more enduring emotional shift. The occurrence of such a repatterning process is supported by both physiological and psychological data. At the electrophysiological level, ambulatory recordings demonstrate a greater frequency of spontaneous periods of coherence (without conscious practice of the tools) in the heart-rhythm patterns of individuals practiced in the HeartMath techniques than in the general population.

Notes

Clinical Context

This technique is useful when a client is ready to spend some time setting goals, pondering how to change behaviors and building more motivation and energy to bring about change. It is an important practice for recovery from depression, loss, grief or PTSD.

If the client's physiological baseline indicates a very low amplitude and power spectrum or the individual reports fatiguing easily or being hypersomnolent, the Heart Lock-In Technique can be used to help build energy and endurance.

Some have observed that clients who begin making therapeutic progress often move from a mostly egocentric life toward wanting to share, communicate and participate with other people. The Heart Lock-In is a supportive way for them to begin expressing their positive desires, not only for themselves but also toward others. Discuss how they have moved away from only being able to focus on their own pain and suffering and now are able to help others. This shift may begin to give more meaning to their own suffering (by increasing their capacity for empathy or compassion) and shows significant therapeutic progress worth reporting.

Some therapists use the Emotion Visualizer, the achievement score and/or the power spectrum screen on the emWave Pro so clients can observe changes in their coherence power as they continue to practice. (These changes are shown by increased amplitude in the yellow field around 0.10 Hertz.) You may want to point out that increasing coherence power has a unique capacity for boosting energy and resilience.

It is possible that both you and your clients will notice physical symptoms associated with this technique such as increased energy in the chest, a feeling of tingling in the hands and feet or a more optimistic mood. Do not be surprised if a client expresses discomfort with the new sensations. Let them know that the feeling of discomfort may be due to the feeling of it being new and doesn't indicate that the new sensations are wrong or bad.

When you first teach the technique, read the completed text in the Script. If your client already knows other coherence-building tools, discuss similarities and differences. After you've discussed the steps with your client, read only the four full or quick steps and practice them together.

Script

The Heart Lock-In Technique helps you sustain coherence for longer periods of time. It helps you instate, or lock in new emotional patterns. Most people find that practicing the Heart Lock-In Technique in a quiet place for five minutes or more a couple times a day helps to accu-mulate energy and recharge their emotional system and cushions the impact of day-to-day stress or anxiety. With practice, the coher-ent state becomes your new reference point, making the experience more automatic, so that when stress or anxiety comes up you can maintain focus, make clearer decisions and dramatically reduce personal energy drain.

The steps:

Step 1. 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.

Step 2. Activate and sustain a regenerative feeling such as appreciation, care or compassion.

Step 3. Radiate that renewing feeling to yourself and others.

When you catch your mind wandering, simply refocus your attention on the heart area and reconnect with feelings of care or appreciation. After you're finished, sincerely sustain your feelings of care and appreciation as long as you can.

Once you are familiar with the steps, you can remember them as

1. Heart-Focused Breathing
2. Activate a regenerative feeling
3. Radiate

As you sustain coherence for five minutes or more during the Heart Lock-In practice, it makes the state more familiar and accessible when you need it to meet the challenges of stress. With practice, the coherent state becomes your new reference point. This makes the process of connecting with it more automatic.

Practicing the Heart Lock-In Technique while listening to background music that lifts your spirit can increase its positive effects[90, 125, 129, 130].

8.5 Coherent Communication Technique

The Coherent Communication Technique (CC) is designed to create greater connection and understanding between the listener and speaker. As we know, heart to heart communication in Healthcare settings helps the patient/client tell their story and feel like they have been heard. Listening carefully helps them open up and disclose more information, especially if they perceive you are attentive and listening nonjudgmentally.

Step 1. Shift into a heart-coherent state before communicating to effectively share and receive information.

Suggestion: Set an intention to be respectful of others' views or situations.

Step 2. Listen for the essence of what is being said without prejudging or getting pulled into drama before the communication is complete.

Suggestion: Remember to re-center in your heart if you start to overreact or lose emotional composure.

Speak from a genuine tone and consider what you are going to say and how it may affect others.

Step 3. During important or sensitive communications it's effective to confirm the essence of what you heard to insure mutual understanding.

Yet, when rushing communications, this is the step most of us forget.

Suggest the patient use the Coherent Communication Technique in a variety of different situations, e.g., with a friend, a family member, a co-worker and a stranger.

Once you are familiar with the steps, you can remember them as:

1. Shift into heart coherence
2. Listen for the essence; Speak with a genuine tone
3. Confirm mutual understanding

8.6 Attitude Breathing™ Technique

The Attitude Breathing Technique (AB) is likely to be one of the most frequently used HeartMath tools. It's easy to adapt this technique to many applications. It combines elements of both emotional refocusing and emotional restructuring. It can be used in conjunction with the Freeze Frame technique to undercover draining, nonproductive attitudes and their replacement attitudes or when a client wants to deepen the process of self-evaluation.

Clinical Context

If your clients are already familiar with the Quick Coherence Technique, relate the steps to what they already can do.

The Attitude Breathing Technique can be adapted to clients or students who can identify their undesired emotional states and want a tool to empower themselves to change self-defeating or draining attitudes.

The technique is useful with adolescents, students and those who struggle with relationships with peers and authority figures, difficult tasks and behaviors, or for people who feel like victims of circumstances or others' power.

This is also a useful tool for clients who lack assertiveness skills and cannot find a voice to speak their truth. Some clinicians feel that personal use of Attitude Breathing Technique helps them better recognize client needs they may be avoiding or missing. It's also helpful to use it when supervising counselors in training.

Start with a Depletion to Renewal Plan to help clients identify – and discuss – the attitude or emotion they want to change and the replacement attitudes and where they are on the Depletion to Renewal Plan. The following list includes examples of stressful attitudes and typical replacement attitudes you can suggest to your clients. It may useful for clients to make their own list of typical stressful or draining feelings and attitudes and the replacement attitudes and feelings they want to use.

Unwanted Feelings & Attitudes	Replacement Feelings & Attitudes
Stressed	Breathe Ease
Anxious	Breathe Calm
Overwhelmed	Breathe Ease and Peace
Bored	Breathe Responsibility
Judgmental	Breathe Tolerance
Fogged/Confused	Breathe Ease for Clarity
Angry/Upset	Breathe Ease to Cool Down
Fatigued	Breathe Increased Energy
Shame/Guilt	Breathe Self Acceptance and Forgiveness
Financial Worries	Breathe Abundance
Isolated/Lonely	Breathe Being Connected and Appreciated
Rebellious	Breathe Respect
Self-pity	Breathe a Feeling of Dignity and Maturity

When first teaching your client, read the complete script. If your client already knows other self-regulation tools, discuss similarities and differences. After you have discussed the steps with your client, read only the steps as both you and your client practice them.

Script

The Attitude Breathing Technique helps you replace draining, negative attitudes with healthier, positive attitudes.

This is how it works.

Step 1. Recognize a feeling or attitude that you want to change and identify a replacement attitude.

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. Breathe the feeling of the new attitude slowly and casually through your heart area.

Quick steps:
1. Identify a replacement attitude
2. Heart-Focused Breathing
3. Breathe in the new attitude

Often the replacement attitude can be obvious, but it takes breathing the feeling of the new attitude to make it real. For example, if you feel angry, you may want to replace it with calmness, but this requires breathing the feeling awhile, until you actually feel calmed. Then you have made the energetic shift.

If you can't identify a replacement attitude, breathe a feeling of neutral to stop the energy drain. If you are not clear on the new replace-

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ment attitude, remember that the neutral attitude works to stop the energy drain and this is particularly important during an emotional storm. Remember to breathe slowly and casually. Do this for awhile to get the full benefits of the tool.

Once you have neutralized the emotional charge, you can use the Freeze Frame Technique to find the new attitude. If that doesn't work, review your attitude replacement list. For some deeply ingrained attitudes, you may need to breathe the new attitude earnestly for a few minutes before you experience a shift. Have a genuine "I mean business" attitude to really move those emotions into a more coherent state and to shift your physiology. Some attitudes are stubborn and recur. When the old feelings return, practice breathing the new attitude. Imagine pulling in and anchoring the new feeling. Even if a bad attitude feels justified, the buildup of negative emotional energy still drains your system.

"When an anesthesiologist told me that he wouldn't give his high-risk patient anesthesia because the patient hadn't been evaluated properly, I almost lost it! This was the second such incident in less than a week. I was ready to blow up. I just about had my finger on the anesthesiologist's chest, when I decided to use the Freeze Frame Technique. Going through the Freeze Frame steps, I froze my anger, started breathing through the area of my heart and reflected on a good memory that was strong enough to evoke feelings of appreciation. As my agitation cleared, I realized that the anesthesiologist was as interested in taking good care of the patient as I was. Keeping that common ground in mind, I was able to bring the anesthesiologist around to my point of view - without exploding. I could have been the typical obnoxious surgeon, but that wouldn't have made for a very collegial relationship."
—Dr. Joseph McCaffrey, General and Vascular Surgeon - Auburn Memorial Hospital, Auburn, New York

8.7 Freeze Frame® Technique: An Emotional Restructuring Tool

The Freeze Frame Technique (FF) is a positive emotional-refocusing ex-ercise that enables individuals to intervene in the moment to greatly reduce or prevent the stress created from inappropriate or unproduc-tive cognitive distortions and behaviors. Freeze Frame combines per-ception, cognition, emotion and behavior in a way that can facilitate self-regulation and decision-making.

It may also be used proactively to gain control before a stress response is triggered. It is a powerful decision-making tool that will be useful for the majority of students and clients who are struggling to make decisions or respond to emotionally charged situations with an internal locus of control.

The technique's name is derived from the concept that conscious perception works in a way that is analogous to watching a movie, in that each moment is perceived as an individual perceptual frame. When a scene becomes stressful, it is possible and helpful to freeze that perceptual frame and isolate it in time so it can be observed from a more detached and objective viewpoint, similar to putting a movie on pause for a moment.

The researchers at HeartMath have found that the process of intentionally de-energizing and temporarily disengaging from distressing thoughts and emotions can be greatly facilitated by shifting one's attention to the physical area around the heart (center of the chest) and self-generating a sincere positive feeling, such as appreciation. This process shifts the physiological state to one of increased coherence, which prevents or interrupts the body's normal stress response and also facilitates higher cognitive faculties that normally are compromised during stress and negative emotional states. This sharpens one's discernment abilities, increases resourcefulness and often facilitates a perceptual shift, which then allows the original stressor to be assessed and addressed from a broader, more emotionally balanced perspective.

The Freeze Frame Technique consists of five simple steps that can be effectively applied in real time amid a stressful situation or day-to-day activities such as driving, sitting in a meeting, interacting with others, etc. The technique can be used effectively in less than one minute.

Clinical Context

The Freeze Frame Technique helps clients decrease emotional hyperfocus and helps them begin to access their ability to make rational and self-efficacious decisions. It also helps the therapist avoid the trap of clients asking the therapist to make decisions for them. This technique has worked well with clients diagnosed with borderline personality and histrionic personality disorders, addictions and clients experiencing acute pain, and it can be used with clients that have acute anxiety issues. We have also used it effectively in peak performance situations such as with executives, performers and athletes.

After reading through the steps and practicing them with a specific stressor or situation in mind, ask the client to talk about the new or changed perception. Sometimes you may have to remind yourself to keep quiet until the client comes up with an answer. If the client is unable to come up with anything, talk about what he was trying to solve and then break it down into smaller steps.

For example a client may say he wants to feel more peace in his life. After going through the steps and not coming up with a solution, ask the client to refocus on feeling more peace at work and then go through the steps again.

If the client is still struggling, refer back to the Depletion to Renewal Plan and ask him to identify more specifically where he is at on the Depletion to Renewal Plan and then work with the Heart-Focused Breathing, the Quick Coherence or Attitude Breathing Techniques before applying the Freeze Frame steps.

When introducing clients to this technique for the first time read the entire script and answer their questions. If your clients already know other self-regulation techniques, discuss similarities and differences. Make sure they can do each step independently before putting them all together. After you have discussed the steps with your clients or anytime you want them to apply the technique, lead them through the exercise using a specific situation and by simply reading through each of the five steps.

Script

As you become more aware of subtle stressful emotions and attitudes, the Freeze Frame steps help you slow down your mental and emotional reactions and make a positive shift to find new solutions to a stressful or challenging problem, situation or issue.

We use the term “Freeze Frame” because it’s a lot like pressing the pause button on your video recorder. You freeze the frame and stop

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“I’ve taught many patients the basic Freeze Frame technique with very good success, especially people with anxiety problems. In one case, an extremely nervous patient I’ve seen for years, who never responded to multiple psychological and pharmacological interventions did so well with Freeze Frame practice that at first she didn’t recognize herself, she was so used to being nervous all the time. She was just delighted. I’ve had wonderful results using the Freeze Frame Technique with anxieties, phobias, and panic. I have not seen an obvious group of people that can’t do it; though persons who have extreme difficulty taking responsibility for their thoughts and feelings can be challenging.”
—Jeffery Stevens, M.D., Psychiatrist, Assistant Medical Director, Psychiatric Unit, Kootenai Medical Center, Idaho

Notes

the movie of your life for a moment so you can edit the frame and create a different outcome. With this technique, you first take a time-out to acknowledge or identify what you're thinking and feeling and how you're reacting. You see where judgments or projections lurk underneath and you take them to the heart.

Then you use the steps to get coherent so your systems are in sync, making it easier to shift emotions and attitudes that may be coloring how you see a situation or your perceptions. From a place of greater awareness, the next step allows you to see a bigger picture and how to proceed. We call this your heart perceptions: They often are subtle and gently suggest effective solutions that would be best for you and all concerned.
Here's how it works:

If your client has difficulty activating a positive feeling, refer back to how heart feeling is taught in Step 2 of the Quick Coherence Technique section.

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).

Option: Ask the client to locate where he or she is on the Depletion to Renewal Plan before and after completing the exercise to anchor the changes.

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

Now that you have added more coherence to your system, you can see the issue from a broader, more balanced perspective.

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

If your client already knows how to do the Heart-Focused Breathing and/or Quick Coherence Techniques, point out how the steps are similar. This will help your clients apply the power of coherence they already know to specific tough or stressful situations to gain a new perspective.

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 have become familiar with these steps, use the quick steps:

1. Acknowledge
2. Heart-Focused Breathing
3. Activate a positive or renewing feeling
4. Ask
5. Observe and Act

We call this your coherent response because your ability to think more clearly and objectively is enhanced by the increased coherence you've created in steps 2 and 3 and you see the issue from a broader, more balanced perspective.

Clinical Example #1

S. tried many self-help techniques to increase his sales ability and yet continues to return to feelings of frustration and anger. S. used the Freeze Frame Technique first to identify that he needed to increase his sense of self-worth and then applied the Attitude Breathing Technique to increase his sense of peace, well-being and wealth. With practice he saw some improvement but continued to struggle with his feelings and attitudes around wealth.

We discussed this barrier and he used the Freeze Frame Technique again to gain more understanding. S. came to realize that since childhood he'd always felt "I'll never get what I want," and as an adult he associated wealth with authority figures he struggled with. He chose to replace this attitude with a feeling of abundance; that there was enough to spare without harming anyone else. He continued to use the Attitude Breathing Technique with a focus on feelings of peace, well-being and abundance. He practiced with his emWave technology during the day and his emWave portable device at home. He began to see a significant decrease in frustration, anger and the hidden feelings of never getting what he wanted. He also saw significant improvement in his coherence scores.

Clinical Example #2

K. is an adolescent who shared her feelings about how her parents were intentionally making her life difficult by putting restrictions on what friends she could hang out with and how late she could stay out. She used the Freeze Frame Technique and discovered that she wanted to feel more respect from her parents. She also identified that when she was out with her friends she would sometimes avoid calling her parents to tell them when she would be home or to ask their permission if there had been a change in plans. When K. practiced replacing this attitude with one of respect and responsibility she decided that she would begin to treat her parents with more respect and ask them if they could work with her so she could feel more respect from them, too. She reported that there was a big change in herself and her parents and she felt more responsible and understanding of her parents as well.

Notes

8.8 emWave Settings

The following table can be used as a quick reference for suggesting initial settings you can use in a variety of clinical settings.

	Sound	Level	CC	HFB	AB	QC	FF	HLI	Screen
Mutli-Session Protocol	Y	2	Y	Y	Y	Y	Y	Y	CR
Depression	Y	1	Y			Y	Y	Y	VFS
Anxious Depression	N	1	Y	Y	Y	Y			VFS
Generalized Anxiety	N	1 or 2		Y	Y				VFS
Panic Disorder	N	1 or 2		Y	Y				VFS
Test Anxiety	Y	1 or 2	Y	Y		Y			CR,VFS
Performance Anxiety	Y	1 or 2	Y			Y	Y	Y	VFS,CS
Anger/Conflict Resolution	Y	1 or 2		Y	Y	Y	Y		VFS,HPS
OCD	N	1		Y	Y	Y			VFS,EV
Loss and Grief	Y	1 or 2	Y	Y		Y	Y		CR
Eating Disorders	N	1 or 2		Y		Y	Y		VFS,CR
Sleeplessness	Y	1 or 2	Y	Y	Y	Y			VFS,CR
Acute Trauma	N	1	Y	Y		Y	Y		VFS,EV
Addictions/Impulse Control	Y	1 or 2	Y	Y	Y	Y	Y		CR,EV,GA
PTSD	?	1 or 2	Y*	Y		Y?			VFS,CR
Essential Hypertension	Y	1 or 2	Y	Y	Y	Y			VFS,PS
Congestive Heart Failure	?	1 or 2	Y	Y		Y			VFS,CR
Chronic Pain	?	1	Y	Y	Y	Y			VFS,CR
Chronic Headaches	?	1	Y	Y		Y			CR,VFS,EV
Fibromyalgia	?	1	Y	Y		Y		Y	CR,VFS,EV
Acute Arthritis	?	1 or 2	Y	Y	Y	Y			CR,VFS,EV
Diabetes (type 2)	Y	1 or 2	Y	Y	Y	Y		Y	VFS,EV,GA
Asthma	Y	1 or 2	Y	Y	Y	Y	Y		VFS,EV,GA
Brain Injury (agitated)	N	1		Y	Y				CR
Abdominal Pain	N	1	Y	Y	Y	Y	?	?	VFS,PS,CR

Y: Yes
N: No
?: Depends upon the client
CC: Coherence Coach (*No sound), or Mandala
HFB: Heart-Focused Breathing
QC: Quick Coherence Technique
AB: Attitude Breathing Technique
FF: Freeze Frame Technique
HLI: Heart Lock-In Technique
VFS: Full Screen
CR: Coherence Ratio Screen
CS: Coherence Score
EV: Emotion Visualizer
GA: Games
PS: HRV Power Spectrum Screen

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Chapter 9

Intervention Protocols

Learning outcomes:

- Describe the differences between the standardized multi-session, brief-intervention, crisis/trauma and group therapy protocols.
- List five conditions and the specific coherence-building tool(s) recommended for that condition.
- State 2 benefits of practicing coherence-building techniques with the emWave portable technology.

Notes

9.1 Overview

Now that we have introduced the physiological basis and research underlying the HeartMath System, we turn to specific protocols that helping professionals can use in a wide range of settings with a variety of external factors. By learning to thoughtfully apply the specific tools, techniques and technologies to the therapeutic encounter, you as a practitioner can facilitate meaningful improvement in a multitude of mental and physical conditions that are exacerbated by stress.

These recommendations are only general guidelines based on clinical experience. The accuracy of clinical diagnoses and ruling out other medical and nonmedical factors such as chronic-versus-acute conditions, severity and intensity are assumed to have been pursued prior to beginning an intervention protocol.

In this chapter, we present a multi-session protocol to be used with the noncomplicated client. We also present a brief protocol to be used for cases in which there will be a limited number of sessions. We later present a protocol that can be used for helping clients in an acute setting who are very anxious. The last protocol is for group therapy in a clinical context, such as anger management, substance abuse programs, etc.

We give you a detailed description of session guidelines and recommended scripts on how to introduce tools and technology to clients. We then introduce a model to help practitioners conceptualize clients with a variety of clinical diagnoses so the practitioner can modify the multi-session protocol to the needs of clients with specific mental health and behavioral issues. Specific modifications for using the multi-session protocol are recommended for sessions with these clients.

Notes

When appropriate, assign a chapter or section from the *Transforming Stress, Transforming Anxiety, Transforming Anger* or *Transforming Depression* books or *The Inside Story* booklet. Sometimes, in a busy clinical setting, there is too little time to introduce homework at the end of a session; therefore, you may want to introduce the information up front so it doesn't get missed at the end of the session.

9.2 Multi-session Protocol

This protocol is designed for those clients who will be meeting with the clinician over several sessions to reduce the stress associated with chronic or acute, situational conditions. In general, we recommend four or five sessions for acute conditions and five to eight sessions for chronic conditions. After an initial 45- to 60-minute session, each subsequent session is 30 to 45 minutes. Sessions can be conducted over a few days or once or twice a week until goals are reached.

Client Learning Outcomes

At the end of this intervention, clients or patients will be able to:

- Identify depleting emotions that impact their health and well-being.
- Neutralize and replace stressful emotions that deplete health and mental and emotional resilience.
- Regain vitality by stopping energy drains.
- Increase the ability to think clearly and find more efficient solutions to problems.
- Understand the difference between a coherent and incoherent HRV trace as observed on the emWave technology.
- Incorporate the emWave technology into personal practice.
- Observe and identify personal and therapeutic benefits gained from applying self-regulation skills.
- Increase the amount of time they're able to sustain coherence.
- Shift the emotional and physiological dynamics that may be exacerbating medical conditions.
- Establish a new psychophysiological baseline.

General Outline

1. As part of your preparation for the session, take a minute or two to create coherence in your own system.
2. Establish short-term goals and set a positive intention for the shifts the client needs to make.
3. Conduct an assessment using the 1-Minute protocol or the HRV Assessment.
4. Introduce the Depletion to Renewal plan to identify goals and to help explain to the client that emotions play a significant role in the development and maintenance of stress, health and well-being.

5. Introduce the emWave Pro and explain basics of HRV and how it will be used in the treatment process. Explain the main features on the screen, including Coherence levels, ratio bars, the zone, achievement score, the HRV trace window and the different tones associated with medium and high coherence.

6. Teach the client how to achieve coherence with the Heart-Focused Breathing and Quick Coherence Techniques utilizing the emWave Pro.

7. Practice and observe progress with the technology.

8. Develop a Depletion to Renewal Plan that includes practicing the Heart-Focused Breathing and Quick Coherence Techniques throughout the day, especially prior to engaging in any situation that is stress-producing or immediately following any situations that trigger a stress reaction.

9. Once the client has success with emotional refocusing (the Heart-Focused Breathing and Quick Coherence Techniques), introduce the restructuring techniques: Freeze Frame, Heart Lock-In and Attitude Breathing in subsequent sessions as a way to continue to make meaningful progress in self-regulation and in making better decisions and choices, especially at stressful times.

10. When the client achieves approximately 50% combined medium and high coherence, introduce the games and the Emotion Visualizer, when appropriate, as a way to explore further growth and facilitate the establishment of positive attitudes and coherence as a new baseline. Encourage them to generalize their practice to different settings and conditions.

11. When the client is able to regularly achieve approximately 80% combined medium and high coherence, increase the challenge level.

Session 1

Objectives

- Identify client's issues or challenges and establish goals for training/treatment.
- Provide basic client education on physiology of stress, role of emotions (Depletion to Renewal Plan), HRV and coherence and its benefits.
- Incorporate the Depletion to Renewal Plan and/or the emWave Pro science tutorial.
- Introduce and describe the features and functions of the emWave technology. Collect baseline HRV assessment.
- Teach the Heart-Focused Breathing or Quick Coherence Techniques.
  (Explore Heart-Focused Breathing along with an emotional shift toward effective feelings such as care or ap-preciation. Use the Coherence Coach or Mandala if needed to help the client learn the steps.)

Notes

Remember the importance of maintaining your own state of coherence as a clinician. This will greatly enhance the efficacy of your intervention.

In your initial discussion of the client's life stressors, it helps to remember the following:
1. Allow the experience and expression of feeling.
2. Reflect what you hear and see.
3. Do not push for catharsis.
4. Focusing on body sensations helps the nervous system to unwind from chronic stress overload.

If the client seems emotionally overwhelmed, lead the person away from intensely painful affect and focus on the instruction of the tools.

We are not suggesting that you have to read the sample script. Please adapt them to meet your client's needs and your style of communication.

The Fun Heart Science videos are an excellent resource for introducing the concepts of heart-brain communication, heart felt emotions and the power of coherence and self-regulation. (found in the emWave Pro library)

- Discuss how to use the Heart-Focused Breathing and the Quick Coherence Techniques in daily activities. Encourage them to use the techniques to prepare before entering into potentially stressful or challenging situations and to use them to quickly recalibrate if they are triggered.
- Assign practice, homework, optional reading and exploration of the www.HeartMath.org Web site for other potential aids and strategies.

Script

Throughout the script practitioner's instructions are in *italics*.

Introduce the protocol to your client.

- Today you're going to learn an easy and effective way to reduce the impact of stress on your body and emotions.
- First, we'll talk a little bit about what stress is and the best way to reduce it.
- Next you'll learn an easy-to-use technique that you can practice throughout the day, especially when stress happens.
- We'll be using a computer program called the emWave® Pro so you can observe and chart your progress.
- Imagine your life if you truly felt calmer and had more energy.

Identify client's issues or challenges and establish goals for training/ treatment.

- What are the stressors in your life? What causes you stress?
- What do you notice – physically, mentally and emotionally?
- Simply put, stress is emotional unease. Emotional unease can be experienced as anxiety, irritation, anger or hopelessness.
- These feelings often result from a deeper feeling or perception that we lack control over the events in our lives.
- The good news is that although we may not be able to control what's going on in the external environment, we can learn to control our feelings and perceptions.
- Often, after the stress response has been triggered and the alarm signals have been sent throughout the body, our habitual patterns of thinking and feeling can take over and make the stress even worse.
- These unconscious reactions eventually accumulate and drain our energy and over the long term, can lead to various health issues and challenges.

- Autonomic exhaustion is a clinical condition that occurs when long-term chronic stress depletes the autonomic nervous system. It is associated with feelings of exhaustion, fatigue, sleep disorders and body aches, as well as with a significantly increased risk of serious health problems.
- Positive emotions lead to energy renewal, resiliency and optimal learning.
- Generating positive emotions has more of a transformative impact than positive thinking.
- Positive emotions have many well-documented benefits, both psychologically and physiologically.
- Research has found that one of the easiest positive emotions to generate is appreciation. For most people, it is an easier emotion to generate than love or care. What many people don't realize is that it is positive feelings or emotions that actually provide the power for beneficial physiological change, not thoughts alone.
- The best way to improve the quality of your life is to change your automatic emotional reactions to external situations.

Describe how to use the Depletion to Renewal Plan. Show an example of a completed chart to client and introduce a blank copy for client's use.

- This chart shows the range of emotions we experience and how these emotions activate the autonomic nervous system and the hormonal system. The vertical line in the middle represents our autonomic nervous system, ranging from high to low arousal. The top of the axis represents high arousal, which means the sympathetic branch is more activated than the parasympathetic. For example, a near-accident or excitement can cause high arousal.
- Emotions drive physiology through two pathways: the autonomic nervous system and the hormonal system.
- Autonomic is another word for automatic. Most of what the autonomic nervous system does is manage over 90% of our body's functions, those things we don't have to think about such as breathing, heart rate, digestion, etc.
- The bottom of this axis is labeled Relaxation because increased parasympathetic activity occurs when we are in a relaxed state. Feelings as different as calmness and boredom also are associated with low arousal. Most stress-management approaches focus on relaxation by trying to decrease arousal, which is one reason most traditional stress-reduction approaches happen outside the workplace; it's impractical to find a hot tub in which to relax in the middle of a tough phone call. If you're feeling anxious, impatient, frustrated or angry, relaxation simply turns down the volume, but it doesn't change the underlying perception of the situ-

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Research tells us there are many adverse consequences of high cortisol/low DHEA:

- Accelerated aging
- Brain-cell death
- Impaired memory and learning
- Decreased bone density; osteoporosis
- Reduced muscle mass
- Reduced skin growth and regeneration
- Impaired immune function
- Increased blood sugar
- Increased fat accumulation around the waist and hips

In contrast, the benefits of positive emotions include the following:

- Increased longevity
- Increased resilience to adversity
- Improved memory
- Effective problem-solving
- Increased cognitive flexibility, creativity and intelligence
- Improved job performance and achievement
- Increased happiness

We recommend you introduce the emWave Pro in the office and the emWave 2 or Inner Balance iOS or Bluetooh devices for practice at home and other settings. Your assessment of clients' readiness for change will determine when they are able and willing to prac-tice these tools at home – after the first or second session, for example.

Ideally, you will be able to lend an emWave2 or encourage them to download and purchase a sensor for the Inner Balance device for cli-ents' use outside the office. Alterna-tively, you may encourage them to purchase their own units. Contact HeartMath about special discounts available to your clients or patients.

You will describe the basic instructions for using the emWave2 or Inner Balance Technology in your therapy sessions.

ation. Just relaxing isn't enough and can actually decrease our performance.

- The horizontal line represents the hormonal system. On one hand, stressful feelings drive the release of the stress hormone cortisol. On the other hand, positive feelings reduce cortisol and increase DHEA, the vitality hormone. The balance between these two hormones contributes significantly to physiological depletion or renewal.
- We move in and out of all four quadrants every day. Together, they make up our emotional landscape.
- Where would you put your emotional experience on this chart?
- What do you do now to cope with negative feelings? Is it working?
- Where do you want to be on this chart?
- A good question to ask yourself now is: "Do I really want to keep draining energy and stressing about this situation?" That question can help stop your stress reaction immediately and prevent further drain on your mind and body.

Introduce the emWave Pro and enter the client as a new user and prepare to do a 1-Minute Deep Breathing assessment.

- We're going to use the emWave Pro so you can see what's happening in your body.

Instruct the client to sit properly and how to position the sensor.

- I'm going to enter your birth date into the computer and then read some instructions to you so we can gather some baseline information.

The explanation for the 1 Minute Deep Breathing Assessment is explained in Ch. 6. Enter the client demographics and then read the instruction to the client. Remind them that the ball will give them practice so they can synchronize their breath and then start recording. They need to continue to breathe deeply until the ball stops after 1 minute. You may decide to review the report with the client or look at the information and review the report with them at a later date. If you choose to wait then let the client know you are going to now show them what their heart patterns look like and click on the heart icon to go to the default setting.

Start the session and check the pulse-wave connection.
(Click the 1 key)

Click to Full Screen HRV view.

Collect two or three minutes worth of baseline data to show the client how quickly the body responds to emotions.

- Remember a recent stressor.
- Now remember a positive or fun time.

Stop the session (Click the Q key) and point out how quickly the body responds to emotions.

Teach the Heart-Focused Breathing Technique

- Now you'll learn one easy step you can use anytime to stop the stress by first changing how you're breathing and then creating a positive emotional state.
- We're going to use the Heart-Focused Breathing Technique. You only need to remember:
  Heart-Focused Breathing
- The first and most basic step entails reducing the emotional charge of a situation or stressor. Think of Heart-Focused Breathing as of form of neutral, a timeout zone where you can step back, neutralize your emotions and see more options with clarity.
- The Heart-Focused Breathing Technique stops the impact of stress on your mind and body and eliminates the energy drain.
- **Step**. 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).*

  Once you have become familiar with this step, all you need to remember is the quick step to neutralize stress.
- Heart-Focused Breathing
- *Practice the Heart-Focused Breathing Technique on the emWave Pro*
- The Heart-Focused Breathing Technique helps you disengage from stressful feelings so that you don't jump headlong into judgments and assump-tions that can turn into irritation, anxiety and frustration. This gives you a chance to pause your emotions and thoughts long enough to consider the consequences and options before you act.
- Let's practice it again:

Start a new emWave session

- Practice Heart-Focused Breathing Technique. *Wait 30 to 60 seconds.*

Stop the session.

Use the Coherence Coach® or Mandala with the Coherence Ratio screen with those clients who need an external point of focus.

Point out the changes on the screen.

- What changes do you notice in your body? What do you feel (more or less stress?)

Explain the ratio bars.

- Red = % of time in low coherence; normal
- Blue = % of time in medium coherence; less stress
- Green = % of time in high coherence; optimal stress-free state
- Your goal is to sustain coherence and increase the green bars, the amount of time in high coherence, which you will do with practice.
- Coherence is a highly efficient mode associated with increased nervous-system harmony, emotional stability and improved cognitive performance. (Another way of saying all this is that our emotions can influence our brain's ability to function either chaotically or coherently.)

Teach the Quick Coherence Technique

Some clients are able to complete the introduction, assessment and learn both the Heart-Focused Breathing and Quick Coherence Techniques in the first setting. Others may not.

- The power of the Quick Coherence Technique comes from positive emotions. When you engage positive feelings, in the moment, you replace depleting emotions with ones that can renew your system. The technique is easy, but each step is important. With practice, the coherence you establish in your system becomes your new reference point and makes the shift easier and more automatic.
- **Step 1**. 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 2**. Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or something in your life.

  Suggestion*: Try to re-experience the feeling you have for someone you love, a pet, a special place, an accomplishment, etc., or focus on a feeling of calm or ease.*

Encourage the client to read the introduction and first chapter of Transforming Stress. Home practice with the emWave can also be encouraged if you have time to provide instruction on its use in the first session.

- Once you have become familiar with these two steps, use the quick steps:
  Heart-Focused Breathing
  Activate a positive or renewing feeling
- Now let's put all the steps together.
- With practice, the coherent state becomes your new refer-

ence point, making the experience more automatic. That's one of the main goals of this technique.

Practice the Quick Coherence Technique on the emWave Pro

- For the coherent state to become a routine part of our lives, we have to find occasions on which to use it.
- Once we find some regular times to practice it, even for a minute, then it can become embedded in our daily experience. We can then turn to this new reference point more easily, especially when facing stress.

Ask client to identify at least two times in the day when he or she can use the Quick Coherence Technique. Typical examples include waking up in the morning, during meetings and commutes to and from work.

Start a new emWave session.

- First practice Heart-Focused Breathing. *Wait 10 to 20 seconds.*
- Now practice by engaging a positive or renewing feeling. Wait 30 to 60 seconds. Ask the client to continue breathing while focusing on the positive feeling.

Stop the session.
Point out the changes on the screen.

- What changes do you notice in your body? Do you feel any stress?

Explain the ratio bars. Remember:

- Red = % of time in low coherence/normal
- Blue = % of time in medium coherence/less stress
- Green = % of time in high coherence/optimal stress free state)
- Your goal is to sustain coherence and increase the green bars, the amount of time in high coherence, which you will do with practice.

Have client continue to practice anchoring the emotional shift. Encourage the person to use the tools any time he or she feels stress or any negative emotions that interfere with self-regulation goals. Save the session in the client's folder (Ctrl +S).

Encourage the client to practice the techniques while using the emWave Pro, Inner Balance or emWave2 several times each day.

Encourage the client to use the technique and the emWave technology in the morning to set the tone for the day and in the afternoon to reset his or her coherence intent.

Clients also should be instructed to use a tool and emWave technology, if available, whenever they feel stressed, overwhelmed or pulled into a negative emotional state.

Option: Ask the client to locate where he or she is on the Depletion to Renewal Plan before and after completing the exercise to anchor the changes.

Notes

If the equipment is not available, ask clients to use the Depletion to Renewal Plan to keep track of how they are doing using the emotional-refocusing tools and techniques and to write down specific goals and results as a means of healthy focus and renewal.

Create an action plan with the client that includes specific situations and times when he or she agrees to use the two learned tools, Heart-Focused Breathing and Quick Coherence Techniques.

Assign homework.

Session 2

Review of homework (Depletion to Renewal Plan) and exploration of any perceived barriers. If you did not review the 1 Minute Deep Breathing Assessment report with them, you may start the session with that review.

Review the concept of coherence, and note that sometimes change will feel strange or odd and may require patience before a new baseline is established.

Practice using the emWave technology and help your client better understand the subtle perceptual, physiological or mental shifts that occur with emotional shifting and changes in heart-rhythm patterns.

- The emWave technology not only allows us to see how our emotions dramatically affect our nervous system, but also helps us objectively measure our levels of stress and coherence.

Instruct the client to sit properly and how to position the sensor. Start the session and check the pulse-wave connection.

Further explore triggers of the stress response and practice the tools and techniques in response to those triggers. Once the client has success with the Heart-Focused Breathing and Quick Coherence Techniques, teach one of the following coherence-building tools in subsequent sessions.

Follow these steps for teaching the Heart Lock-In, Freeze Frame and Attitude Breathing Techniques

Now you'll learn more tools to stop the stress by first changing how you're breathing and then by creating a positive emotional state.

This next tool is the **Heart Lock-In Technique**. This helps you to establish a new baseline of coherence and will lead to an accumulation of energy, recharging your entire system.

Heart Lock-In Technique
Here are the steps:

- **Step 1**. 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.
- **Step 2**. Activate a regenerative feeling such as appreciation, care or compassion.
- **Step 3**. Radiate that renewing feeling to yourself and others.

  This benefits them and especially helps recharge and balance your own system.

  When you catch your mind wandering, simply refocus your attention on the heart area and reconnect with feelings of care or appreciation. After you're finished, sincerely sustain your feelings of care and appreciation as long as you can.

  Once you are familiar with the steps, you can remember them as
  1. Heart-Focused Breathing
  2. Activate a regenerative feeling
  3. Radiate

Notes

The Heart Lock-In Technique also benefits others as you send feelings of love and care to them. Of course, this benefits you and your clients as well and will balance and recharge the nervous system.

Notes

Coherent Communication Technique

The Coherent Communication Technique is designed to create greater connection and understanding between the listener and speaker. As we know, heart to heart communication in Healthcare settings helps the patient/client tell their story and feel like they have been heard. Listening carefully helps them open up and disclose more information, especially if they perceive you are attentive and listening non-judgmentally.

- **Step 1.** Shift into a heart-coherent state before communicating to effectively share and receive information.

  Suggestion: Set an intention to be respectful of others' views or situations.

- **Step 2.** Listen for the essence of what is being said without prejudging or getting pulled into drama before the communication is complete.

  Suggestion: Remember to re-center in your heart if you start to overreact or lose emotional composure.

- Speak from a genuine tone and consider what you are going to say and how it may affect others.

- **Step 3.** During important or sensitive communications it's effective to confirm the essence of what you heard to insure mutual understanding.

Yet, when rushing communications, this is the step most of us forget.

Once you are familiar with the steps, you can remember them as:
1. Shift into heart coherence
2. Listen for the essence; Speak with a genuine tone
3. Confirm mutual understanding

Attitudes, like emotions, either can be depleting or renewing. The Attitude Breathing Technique helps you replace drain-ing, negative attitudes with healthier positive ones. Here are the steps:

- **Step 1**. Recognize a feeling or attitude that you want to change and identify a replacement attitude.
- **Step 2**. Focus your attention in the area of the heart. Imag-ine 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 what-ever rhythm is comfortable).*
- **Step 3.** Breathe the feeling of the new attitude slowly and casually through your heart area.
  - Often the replacement attitude can be obvious, but it takes breathing the feeling of the new attitude to make it real. For example, if you feel angry, you may want to replace it with calmness, but this requires breathing the feeling awhile until you actually feel calmed. Then you have made the energetic shift.

Unwanted Feelings & Attitudes	Replacement Feelings & Attitudes
Stressed	Breathe Ease
Anxious	Breathe Calm
Overwhelmed	Breathe Ease and Peace
Bored	Breathe Responsibility
Judgmental	Breathe Tolerance
Fogged/Confused	Breathe Ease for Clarity
Angry/Upset	Breathe Ease to Cool Down
Fatigued	Breathe Increased Energy
Shame/Guilt	Breathe Self Acceptance and Forgiveness
Financial Worries	Breathe Abundance
Isolated/Lonely	Breathe Being Connected and Appreciated
Rebellious	Breathe Respect
Self-pity	Breathe a Feeling of Dignity and Maturity

  - If you are not clear on the new replacement attitude, remember: A neutral attitude works to stop the energy drain, which is especially important during an emotional storm. Remember to breathe slowly and casually.
  - For some deeply ingrained attitudes, you may need to breathe the new attitude earnestly for a few minutes before you experience a shift. Have a genuine “I mean business” attitude to really move those emotions into a more coherent state and shift your physiology.
  - Some attitudes are stubborn and reoccur. When they come back, practice breathing the new attitude. Imagine pulling in and anchoring the new feeling.
  - Even if a bad attitude feels justified, the buildup of negative emotional energy still drains your system.

Point out the HRV waves to the participant, which should have moved from less coherence at the beginning of the demonstra-tion to more coherence at the end. Point out how the blue and green bars in the lower right-hand part of the screen are showing higher ratios than the red bar, which indicates higher coherence.

Notes

The **Freeze Frame Technique** gives you a chance to find and sort your solutions and increase your options to resolve problems and conflicts. The Freeze Frame Technique gives you a chance to find more efficient options and resolve problems and conflicts that may be depleting your energy.

Your ability to think more clearly and objectively is enhanced by the increased coherence you create in your system using the following steps:

- **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.

  Now that you have added more coherence to your system, you can see the issue from a broader, more balanced perspective, which is called your coherent response.
- **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 have become familiar with these steps, use the quick steps:
1. Acknowledge
2. Heart-Focused Breathing
3. Activate a positive or renewing feeling
4. Ask
5. Observe and act

By now, the client should be familiar with the five applications of cohe - ence:

- *The Heart-Focused Breathing Technique to neutralize the stressful feelings.*
- *The Quick Coherence Technique to add the power of positive emotions.*
- *The Heart-Lock-in Technique to recharge your system and create a new baseline.*
- *The Coherent Communication Technique to create greater connection and understanding .*
- *The Attitude Breathing Technique to transform stressful attitudes.*
- *The Freeze Frame Technique to shift perception and find creative solutions.*

Give assignment for practice, homework and possible readings or encouragement to explore the HeartMath.org Web site.

Session 3

Review of homework (Depletion to Renewal Plan) and exploration of any perceived barriers.

Repeat the instruction on the tools introduced in sessions 1 and 2 as needed. If you weren't able to teach all the tools up to this point you may want to take time at the beginning of this session to do so.

Explain the difference between the emotional-refocusing techniques and the emotional-restructuring techniques and review with clients which ones may be useful specifically for them based on their pe - sonal stress patterns.

Review the trend report or longitudinal pattern of progress and discuss a plan of action for continued progress.

Depending on a client's success (for example, 80% combined medium and high coherence over a 15- to 20-minute period), you may choose to introduce Emotional Visualizer™ and games to the client as he or she practices with the emWave Pro.

From the Main Screen, click on Game button represented by a hot air balloon icon..

The games will play best when the Low Coherence bar (red) is below 49%.

Start with the short Garden Game.

As skill improves, move to longer Rainbow Game and then to the even longer Balloon game.

Increase challenge levels as appropriate.

- When you reach a modest level of coherence with practice on the emWave Pro, you are ready to try out the games.
- The three-minute Garden Game starts with a screen showing a black-and-white picture of a meadow. Color starts to appear in the picture as the level of coherence increases.
- The more coherent you become on the 10-minute Balloon Game, the higher the balloon flies in the air while it moves

Notes

If you don't achieve at least 50% medium to high coherence, the game will not play smoothly and it is easy for the client to become discouraged.

"The HeartMath tools have changed my life. Last spring, before I started practicing the tools, even though my life was good, I was sad, depressed, confused and so many other feelings of defeat. I could not truly enjoy my life, my daughter or my fiancé. I was so beaten down by the hardship I had endured that I could not enjoy the good in life. I felt like it was only a matter of time before everything came crumbling down. Now though, I am no longer a victim! Wow, talk about a miracle. It is like magic. Not like a magic-pill that makes it all better all at once, but like a magic flame inside of me - the more I look at it, the stronger it gets. And the most wonderful thing about it is - it's mine. No one but me truly controls it. The wonderful mother, wife and person that I have always wanted to be, I am! My appreciation of life and my experience grows into a huge flam that surrounds me. I could go on and on about HeartMath tools. They are something every person needs. I am so grateful to be one of the ones who gets to learn it. It is truly the greatest gift of information I have ever received.Thank you! Thank you! Thank you!"

-Love, A

across the landscape. There are many world scenes and obstacles that you have to travel over as you play the game. If you lose your focus, however, the balloon will start dropping to the ground until you get your coherence levels back up. It will take some focused coherence to get the balloon going again.

Review progress on the emWave Technology

From main screen click on the icon on the top of the screen that looks like a bar graph. You may review progress from this screen or choose a specific session to help review progress with the client

As appropriate to your client, you may want to introduce the Zone, Achievement Score or Power Spectrum if you perceive the client will benefit

Give assignment for practice, homework and possible reading or encouragement to explore the HeartMath.org Web site.

Session 4

Review of homework (Depletion to Renewal Plan) and exploration of any perceived barriers.

Repeat the steps in sessions 2 and 3 as needed.
Introduce the difference between the challenge levels.

Review and practice with clients how they are using the different techniques and explore applications in their daily lives.

Develop a personal plan for continued use of new skills.

Explore termination or progress as appropriate.

Sessions 5-10

Repeat the steps of previous session as needed and continue to focus on transferring clients' insights into daily practice.

Review how to utilize the newly learned skills and how to maintain the gain.

Explore termination or progress as appropriate.

Discuss maintenance session and the possible benefits of follow-up sessions.

9.3 Adapting the Multi-session Protocol to Specific Conditions

Please note that the individual presentation of these general conditions may require a different approach than those recommended in the multi-session protocol above. The recommendations by specific conditions are for those with clinical disorders such as depression,

anxiety and trauma related conditions. If the client has a mild or transient situation that would not warrant a clinical diagnosis, then consider using the Multi-session Protocol suggestions. If the client presents as severe, however, you may want to consider the recommendations under the diagnostic category. For example, someone who presents as depressed may be experiencing a normal amount of sadness following a stressful adjustment to divorce and would benefit from the basic protocol suggestions. If the client's sadness persists and interferes with normal function over an extended period of time, you may want to consider the recommendations offered in the depression category. How the client initially presents may change your approach in subsequent sessions. For example, a client who first presents as depressed may eventually present as an anxious perfectionist that is chronically disappointed when he becomes frustrated with less-than-perfect coherence scores on the emWave Pro. Use the Depletion to Renewal Plan to identify where the client spends most of his emotional time when experiencing symptoms he wants to change.

Any client with depression should be assessed for suicidality. It is imperative to assess if the client has significant hopelessness and is thinking about and planning suicide. Because it is important to work within your training and scope of practice, if your client is considering suicide and you are unsure how to more fully assess and respond to a suicidal client, you need to be familiar with your organization's policies or have contact information and be willing to get in touch with your local mental health professionals who are trained in how to respond to these situations.

Depression

With continually rising depression levels now a problem of global proportions, it is imperative, for both individual and societal health, that practical and effective strategies for reducing and transforming depression be made available to all people. Directly addressing the internal emotional source of this distress provides an important key. Heart-based techniques that enable the self-activation of positive emotions show promise as a simple and powerful means to modify engrained emotional patterns that contribute to the experience of depression and its debilitating effects on health and well-being. By virtue of the brain's pattern-matching function, the intentional generation of positive emotions and a new baseline of psychophysiological coherence enable individuals to activate a feed-forward process whereby depressive psychophysiological and behavioral patterns engrained through past experience are progressively replaced by new, healthier patterns of activity. Thus, through the establishment of a new reference pattern, individuals effectively create an internal environment that is conducive to the maintenance of physiological efficiency, mental clarity and emotional stability – an internal environment that is resilient and adaptive as we respond to life's inevitable challenges.

If the client appears to be easily fatigued or overwhelmed, teach energizing tools such as the Heart Lock-In Technique to help them build up energetic resources.

Set clear goals for homework and praise client's progress on any technique that excites or empowers her to move toward her goals.

Encourage the client to read the book Transforming Depression, found at http://store.HeartMath.org

Depressed clients struggle with symptoms related to a chronic state of underarousal. Examples of this low arousal state are a type of mental fog, forgetfulness, social withdrawal and feeling estranged from others. In the beginning of working with depressed clients, keep the session length short – around five minutes – to reinforce initial success and feelings of competency. These clients will need encouragement to maintain engagement and achieve motivation to practice techniques. Also, depressed clients have significant difficulty in accessing positive emotional states, so they may need specific prompts and examples when you introduce the techniques associated with positive emotions.

Notes

It is important to remember that these clients need confirmation that their physiological responses to positive emotions are valid. The use of the Fun Heart Science Videos from the emWave Pro library will build their motivation to practice the techniques. Also, the Coherence Coach and/or Mandala will help them to experience the benefits of this simple step in self-regulating negative affect. Keep the instruction screens and instructions for the techniques simple. Add detail and further explanation as the client progresses. Watch for signs of autonomic exhaustion (e.g., lack of eye contact, minimal responsiveness, yawning), and try to end a session when the client has demonstrated progress and has achieved some mastery over the technique.

It is also recommended that you use variety in your approach to the tools. For example, the use of the Emotion Visualizer and games will engage a withdrawn client. Encourage the client to continue practicing these tools through a frequent visual display of their progress. Finally, energizing techniques such as the Heart Lock-In and Attitude Breathing will help them move from a state of autonomic depletion to one of renewal. Because of clients' feelings of low self-esteem and helplessness, start on the low challenge level and do not focus on results until they have demonstrated improvements toward a more regular HRV pattern. These clients are strong candidates for an HRV assessment, as described in Chapter 6 and 7.

The number of sessions it takes for a depressed client to stabilize and sustain change can vary from a few sessions to more than 20. This variability is because of the depth of the depression, chronicity and emotional availability of the client as well as external factors such as health, social situation, relationships, economic factors, etc.

Clinical Illustration

T first started to experience feelings of depression when she was a young girl. She remembers feeling sad all the time, only wanting to stay in her room and not play with other children. As she went into her teen years, it got worse. She reported that daily bouts of crying were normal for her. On the outside, she appeared to be on top of the world. She was a good student, well liked and a leader. T said putting herself in leadership roles and participating in school activities like cheerleading were only diversions, attempts to compensate for the pain and emptiness she was feeling inside. Her depression continued into her 30s as she struggled to raise a family and manage a successful career. T knew she had a serious problem and she desperately wanted help. She tried everything from religion and prayer to meditation, therapy and anti-depressants to control her depression, but found only random, temporary relief. After years of trying to rid herself of this emotional disease, she finally came to the stark conclusion that she would simply never feel better. All she could experience were feelings of hopelessness.

One day a friend told her about HeartMath. She was tired of chasing a cure for her problem, but finally decided to come to a HeartMath training program. During the weekend she was there, she made a sincere effort to make contact with her heart, and during one exercise, something remarkable happened. She had a breakthrough,

a profound experience of hope and release. For days after the seminar she knew something was different. T had had temporary breakthroughs before, but always returned to feeling depressed. She feared she would go back into the depths of chronic depression, and after so many years it was hard to accept that by going to her heart she could be free of it. T kept practicing what she had learned, using the Heart-Focused Breathing Technique when she felt the need, consciously activating core heart feelings and practicing the Heart Lock-In Technique.

Within a month, the fear of her depression coming back was gone. She truly believed that her emotional problems were behind her. They seemed like they'd been a bad dream. Her health improved dramatically. A joyfulness, lightness and an excitement for life had now replaced her depression. That was several years ago. T now says her life continues to become more fulfilling and enriched every day. Her rather dramatic experience provides a wonderful example of what can happen when our hearts come alive. Emotional problems can be some of the most difficult to deal with, especially if they are long-standing like T's. Perhaps she had looked to her heart for help before, but not knowing what it was supposed to do or exactly how to activate the heart's intelligence with consistency, she continued to suffer for years. Once she made that deeper heart connection, her emotions responded accordingly and T's life took a major turn for the better.

Chronic Low Energy/ Fatigue

Generally, the term fatigue refers to physical exhaustion: It can result from a hard day's work at the construction site or the office, or a strenuous physical workout at school or the gym. Other types such as chronic fatigue and immune dysfunction syndrome require medical attention. Another form of fatigue that is alarmingly commonplace today is the ongoing fatigue and exhaustion resulting from the wear and tear of everyday life. Millions of people today have become adapted to the rapid pace of their lives and the weariness that comes from juggling multiple and demanding lifestyles. Knowingly or not, they suffer from a fatigue that won't subside. Closely related is burnout, which also is marked by long-term exhaustion and is further defined by Webster's New World Dictionary as "a state of emotional exhaustion caused by the stresses of one's work or responsibilities."

Though certain categories of workers – teachers, police officers, doc-tors and nurses, among them – seem to turn up frequently on those listings of high-stress jobs that can lead to fatigue or burnout, many researchers today instead place greater emphasis on the individual, regardless of the line of work. They say what is most important is how each individual responds physically, mentally and emotionally to the unique pressures and working conditions of his or her job. Regardless of the various social, occupational and medical nuances used to define extended fatigue and burnout, it is certain one truth applies: These are very modern maladies. The fast-paced world
in which live seems to constantly accelerate, all the while inflicting an ever-increasing toll as we try to stay stride for stride with those around us, or to reach some mark set by us, our bosses, relatives or others.

Notes

In your work with clients with chronic fatigue, it is especially important to emphasize the depletion-renewal model, reminding the client that we start each day with a certain amount of energy. If that energy is continually spent in stress reactions, there won't be enough left to replenish our reserves or to maintain a healthy immune system. When our energy is drained by stress on a regular basis, we set ourselves on a path toward fatigue and exhaustion. Teach your clients this simple one-day exercise to stop the energy drain of everyday stress: Think of five sources of stressors in each day, things they could change fairly easily if they put their hearts into it. Think of these things as deficits, each one sapping valuable energy. Below, are some possibilities to get started. (Encourage clients to create their own lists, tailoring them to their lifestyles and the things that regularly trigger stressful emotions.)

- Driving in traffic
- Their state of mind before meetings
- Looking at their overbooked schedule
- Communicating with a particular family member
- Thinking about money issues

Encourage clients to reduce the negative, stressful responses to the items on their lists. Explain to them that when they start to tense up during the day, they need to notice how they're feeling and try shifting to more a positive feeling such as ease or appreciation. As clients become more conscious of what they're feeling, they will gradually reduce those energy-draining deficits and accumulate energy assets. It is also important to ask them to evaluate how they feel at the end of the day, using the Depletion to Renewal Plan.

Nearly 38% of U.S. workers complained of "low levels of energy, poor sleep or a feeling of fatigue" in a survey published in January 2007. Almost 66% of those reported health-related lost productive work time (LPT), costing employers $136.4 billion annually. Of workers who did not have fatigue, 26.4% reported lost productive work time, for an annual LPT cost of about $100 billion less than the fatigue group. —Journal of Occupational and Environmental Medicine

Clinical Illustration

After a trip to Mexico in 1994, P returned with a variety of symptoms that resulted in a downward spiral and a collapse a year later. His energy was gone, he was unable to think, unable to get out of bed – waking for about an hour a day, and during that hour sometimes able to only open his eyes. It was four months before he could walk to the mailbox. To this day, there is still no identified cause for chronic fatigue syndrome, so the medical community treated his symptoms. If he couldn't sleep, they gave him something to help him sleep better. If he experienced pain or was depressed, they gave him medications for those problems. His next 10 years were marked by gradual progress to very fragile plateaus, and he was learning to operate in a much reduced way. Yet, it was a delicate balancing act. He had no idea when the next wave of depletion would knock him off his feet. Not knowing if this was ever going to be over was extremely frustrating. During recovery from his last major relapse in the fall of 2004, he recognized something major was missing from his strategy, but he didn't have a clue what that was. In spring 2005, he came upon an article about Institute of HeartMath research. P said, "I began

learning the HeartMath techniques for managing thoughts and emotions and bringing the autonomic nervous system into balance. … I'm using the techniques on a very regular basis, and catching the first signs of the illness and shifting out of it before going down. The changes have been miraculous! Using the HeartMath techniques, I am experiencing the increased energy and the mental function I've needed to really reenter life in a stable way. Now I've gotten to the point where I can ask the question, what do I want to do with the rest of my life? This is a very exciting place to be. For the first time in my life it seems like all my resources are aligning, providing hope and a deeper sense of peace."

Sleeplessness

Clients who report problems with sleeplessness may tend to experience over-active thought patterns such as excessive worry and having trouble with the white noise of ruminative thoughts. They may also report feelings of anger and frustration related to their disrupted sleep patterns. These clients may have tried many different strategies to improve the quality and quantity of sleep, and they may be irritable or negativistic when you teach them a simple technique such as Quick Coherence. Considering this pessimistic attitude, it will be very important to focus on the results of coherence through a display of the power spectrum, which will offer proof that this simple technique can have a powerful impact on their level of arousal. These clients will benefit from accommodations that limit visual stimulus and auditory feedback, given that their sympathetic arousal is likely to be reactive and distracting. Because these clients often are disturbed by thinking too much, the Heart-Focused Breathing Technique can also help reduce the mental chatter and de-emphasize the significance of ruminative thought loops. Help these clients stay focused on learning techniques such as Attitude Breathing to shift emotions away from feeling frustrated with thinking too much toward feelings of calm and quiet serenity. It is also important to focus on the physiological benefits of a shift toward the "here and now" with this client.

Clinical Illustration

M., a 25-year-old graduate student, reported that she was feeling very stressed about completing her master's thesis. The therapist and client discussed her concern about missing classes and some problems with working collaboratively with peers. She was aware of her tendency to stay busy and cope with an avoidant style. M. also reported that her chronically dysphoric mood and her worried thoughts were related to interpersonal conflict with her partner. She was especially upset by a B+ grade in a class last semester, which challenged her commitment to academic excellence. She reported that she felt significantly better when she got more rest, but that that pattern was random and she couldn't predict which nights would be restful and which nights would involve the frustrating experience of tossing and turning and not feeling rested in the morning. As a result, she felt powerless to improve the quality of her sleep. Overall, the client had been high-achieving and quite resilient in dealing with problems, but she suspected that she may have been vulnerable to a relapse into depression if she didn't improve the quality of her sleep

Notes

"A technique I use for sleeplessness is to have the client identify the feeling they have when they have woken on a weekend or on vacation and realized they don't have to get out of bed yet and they have drifted back to sleep. I suggest they try to breath the feeling of drifting back to sleep if they wake in the middle of the night and can't get back to sleep."

Myron Thurber

Notes

and her ability to renew her system. In the initial baseline assessment on the emWave technology, M. was significantly incoherent. Then, when the therapist introduced the HeartMath technique. Inducing task, she was able to observe the powerful changes in her heart rhythm and coherence levels. Finally, after M. learned the Heart-Focused Breathing and the Attitude Breathing Techniques, she realized significant improvements in her ability to achieve and sustain coherence. As a result of this success, M. felt empowered and relieved to discover that she had some mastery of these tools, which had directly observable impacts on her ANS. In a few more sessions, and with regular practice at home, M. reported that her sleep behaviors had improved greatly and this contributed to more focus, alertness and greater cognitive flexibility in her studies.

Emotional Eating

There are dozens of diet plans today. At HeartMath, we believe the very best diet begins with emotional regulation. The success of any diet is most associated with the dieter's ability to control anxiety, anger and other emotions. Researchers at HeartMath have studied what we call the wholeness diet, which entails regulating emotions through heart intelligence and coherence before and after eating. Then the intuitive aspects of the heart will eventually steer you away from overeating and toward foods that are good for you.

There are many factors contributing to the widespread increase in overweight and obesity, but experts say emotional eating is the primary cause in a high percentage of cases. Today's fast-paced and demanding world has given rise to alarming stress levels and people are seeking any way they can find to cope. For many, that means turning to food, especially comfort food, and that largely means precisely the kinds of food that are high in fat and low in nutrition. A Harris Interactive survey reported 46% of Americans are less careful about the food they eat when stressed. And the more stressed you are, the more your body produces the hormone cortisol, which turns fat into energy, unless you regularly overeat: Then cortisol can take all that excess fat and redistribute it around your waist and hips. In your work with clients who report emotional eating and disordered eating patterns, it is helpful for these clients to learn to recognize the association between their responses to stressors and harmful emotional responses like binge-eating and impulsive eating. Encourage clients to use the Heart-Focused Breathing, Quick Coherence and Attitude Breathing Techniques when they feel stressed when they feel stressed or have the urge to eat outside of regular mealtimes.

Clinical Illustration

In summer 2000, J had a wake-up call about her health condition. She was 45 years old, weighed 350 pounds, was always in pain and short of breath, and losing interest in many aspects of life. Trying to maintain a level of professionalism while being physically uncomfortable was very difficult: It took a lot of focused concentration for J to be present and move through everyday activities. She chose to change her life by taking on a very structured food plan and joining a support group. She incorporated daily practices that allowed her to

maintain adherence to the food plan and a new way of life. J often used the emWave technology and the Quick Coherence Technique as a response to stress and many other situations that triggered her eating compulsion. She has lost about 200 pounds in the past 17 months – she went from size 32 to 14 – and recently reported, "I have a new lease on life, regained energy, and move through my day without pain and with confidence."

Generalized Anxiety

Anxiety can be described as any or a combination of feelings that all have their roots in some type of fear, including unease, worry, apprehension, dread, powerlessness or a sense of impending danger – real or imagined. Symptoms can be wide-ranging: the mind goes blank or other cognitive functions are lost, obsessive thoughts, phobias, chronic worry, ongoing unease, sweaty palms, tension headaches, trembling, difficulty breathing, dizziness, panic attacks, increased heart rate and palpitations. Anxiety disorders such as panic attacks may result from certain physiological conditions, most notably heart arrhythmias, and anyone who experiences this should seek immediate advice to make sure the cause of the attacks is not physical. Some anxiety is a normal human response to many of life's uncertainties, among them nervousness over an impending test or a sought-after job, uneasiness in a relationship or concern over the health of a loved one, speaking or performing in public, or worry in the workplace for a variety of reasons, one of the most common being the employee performance review. It is when anxiety becomes exaggerated, when our caring about ourselves, others, social issues, etc., turns into overcare that this otherwise natural human emotion can threaten our well-being.

In your work with anxious clients, it helps to encourage them to use the emWave2 to help regulate their emotions in preparation for events they know will trigger anxiety and to help them recover from stressful episodes. Teach clients that anxiety disorders – chronic worry, panic attacks, obsessive-compulsive disorders and many others – aren't conditions happening to us, but rather are habits we are creating through emotional investment and automatic responses to stressful feelings and thoughts. Encourage them to refocus their anxiety using the Heart-Focused Breathing Technique and then restructure these emotions with the Attitude Breathing Technique. Many of the typical physical symptoms that are commonly reported to impact clients with high anxiety are related to the activation of the sympathetic nervous system. These include shortness of breath, tightened chest region, sweaty palms and a racing heart beat. Each of these symptoms can be impacted and neutralized quickly when utilizing HeartMath intervention tools. These recommendations also apply to clients with other diagnoses – substance abuse and eating disorders among them – in which anxiety is the primary factor driving the manifestation of symptoms that result in ritualized and compulsive behaviors.

With generalized anxiety, we recommend that in the learning phase the clinician use the Full Screen view rather than the Ratio Bars screen. This keeps the client's focus on the HRV trace and can reduce stress over performance. Once the client is more familiar with the tools and techniques and is able to create and sustain a smooth, coherent HRV pattern, the clinician can introduce the concept of ratios, achievement and set goals accordingly.

According to the National Institute of Mental Health, 40 million American adults – that's 18% of the population – have anxiety disorders, which frequently begin in childhood. Social phobia alone, when people become overwhelmingly anxious and excessively self-conscious in everyday social situations, affects 15 million adults, and specific phobias, an intense fear of something that poses little or no actual danger, affects 19.2 million adults in the U.S

"As the turbulence of anxiety churns in the subconscious and plays out in your thoughts and actions … it can cause fatigue, sleep disorders, hormone imbalances, health problems and premature aging." —Transforming Anxiety, Childre and Rozman, 2004.

Clinical Illustration

C, a 45-year-old business executive, had a family history of heart disease, and was feeling extremely stressed, fatigued and generally in poor emotional health. A 24-hour heart-rate-variability analysis revealed abnormally depressed activity in both branches of his autonomic nervous system, suggesting autonomic exhaustion ensuing from maladaptation to high stress levels. His heart-rate variability was far lower then would be expected for his age and was below the clinical cut-off level for significantly increased risk of sudden cardiac death. In addition, C's average heart rate was abnormally high at 102 beats per minute, and his heart rate did not drop at night as it should. Upon reviewing these results, his physician concluded that it was imperative C take measures to reduce his stress. He recommended that C begin practicing a set of emotional restructuring techniques developed by the HeartMath Institute. These positive emotion-fo-cused techniques help individuals learn to self-generate and sustain the beneficial functional state known as psychophysiological coher-ence, characterized by increased emotional stability and synchroni-zation and harmony in the functioning of physiological systems.

Concerned about his deteriorating health, C complied with his physician's recommendation. Each morning during his daily train commute to work, he practiced the Heart Lock-In Technique, and he would use the Freeze Frame Technique for situations in which he felt his stress level rise. At first, C was not aware of the transformation that was occurring. His wife was the first to notice the change and to remark about how differently he was behaving and how much better he looked. Then his co-workers, staff and friends began to comment on how much less stressed he appeared in responding to situations at work and how much more poise and emotional balance he had. A second autonomic-nervous-system assessment, performed six weeks after the initial one, showed that C's average heart rate had decreased to 85 beats per minute and it now lowered at night, as it should. Significant increases also were apparent in his heart-rate variability, which had more than doubled.

These results surprised C's physician because 24-hour heart-rate variability is typically very stable from week to week, and it is generally quite difficult to recover from autonomic-nervous-system depletion, which usually requires much longer than six weeks. In reflecting on his experience, C started to see how profoundly his health and his life had been transformed. He was getting along with his family, colleagues and staff better than he could ever remember, and he felt much more clearheaded and in command of his life. His life seemed more harmonious, and the difficulties that came up at work and in his personal relationships no longer created the same level of distress. He now found himself able to approach them more smoothly and proactively, and often with a broadened perspective.

Test and Performance Anxiety

Most people probably are familiar with some degree of test anxi-ety – uneasiness or feeling unprepared prior to a test, especially an important one. The problem is more serious for a great many others who suffer from a lack of confidence, dread, fear and the inability to concentrate while taking an exam. Some people even draw a blank

when it comes to facts and figures they've studied and otherwise know. Test anxiety can affect not only academic performance, but self-esteem and overall health as well, and it is observed in all age groups. Studies show that many young people with test anxiety are at risk of one day dropping out of school. In today's fast-paced societies and global economy, where future success is measured in large part by how we do on the tests we take in school and in the job market, the pressure to perform starts at an early age. By the time students reach high school, doing poorly on important tests can seriously impact their futures.

As with all forms of anxiety, test anxiety basically is rooted in some type of fear, but the faces of this particular type of fear and its causes are many and varied: fear of failure, lack of self-confidence, fear of blanking out on tests, poor time management or study habits, lack of organization and concern over how test results will impact future plans, among others. These negative emotions can lead test takers to feel overwhelmed. When that happens, anxiety creates a kind of noise or mental static in the brain that blocks our ability to retrieve what's stored in memory, and it also greatly impairs our ability to comprehend and reason.

"A significant majorit , 61%, of high school students suffer from test anxiety and 26% are handicapped by test anxiety often or most of the time." —Findings of the TestEdge National Demonstration Study

Recently, HeartMath researchers focused on 980 10th-graders in a federally funded study. Pre- and post-measures to access the impact of the TestEdge® program, included questionnaires, interviews, observations, student drawings and test scores from the California High School Exit Examination and the California Standards Test. They also used heart-rate-variability measures to determine whether students had learned the TestEdge program techniques of shifting into a state of coherence between the heart and brain prior to taking a stressful test. A secondary related study involved qualitative investigations of the TestEdge program implemented in schools in California, Delaware, Florida, Ohio, Maryland, Texas, Wisconsin and Pennsylvania.

Key findings of the primary study:

- Of those students who suffered test anxiety and received the TestEdge training, 75% had reduced anxiety by the end of the program.
- Students in more than three-quarters (76.2%) of the 21 classes in which the TestEdge program was implemented demonstrated a significant reduction in test anxiety – across the full range of academic ability, lowest-performing to highest-performing classes.
- Reduced test anxiety is associated with increased positive emotions and feelings and usually is associated with a reduction in negative feelings, emotional discord and difficulty in relationships.
- Test anxiety is a significant impediment to the accurate assessment of students' true academic abilities, the consequences of which can profoundly impact their future opportunities and life choices.

- Twice as many girls as boys experienced high levels of test anxiety.
- There was a strong association between test anxiety and academic performance. The greater the level of test anxiety, the lower the test scores. On average, students with high levels of test anxiety scored 15 points lower in both math and English than those with low test anxiety.
- There was an important relationship between students' social and emotional well-being at school and optimism about their futures and academic performance.

The following questions can be used to track your client's emotions and thoughts related to test anxiety:

- Do you have a hard time getting started studying for a test?
- When studying for a test, do you find you get distracted easily or feel like the class or materials are boring?
- Do you expect to do poorly on a test no matter how much you study?
- During tests, do you often experience physical discomfort such as sweaty palms, upset stomach, headache, difficulty breathing or tension in your muscles?
- Is it often difficult for you to understand test directions and questions?
- Do you frequently have mental blocks during tests on material you're sure you've studied and learned?
- After taking tests, do you often discover you completely overlooked one or more test questions?

Clinical Illustration

K teaches students in an adult education program who are preparing for their GED examinations. He utilized HeartMath's TestEdge curriculum to help students overcome their test anxiety. Many students reported great success with the Heart-Focused Breathing Technique when they were study-ing for the pre-GED and they noticed that the reduction in anxiety led to improvements in test scores. "It was time for the test and I was worried and nervous," one student reported. "I focused on my heart and my positive feelings and my breathing. After using the Quick Coherence Technique, I wasn't worried or nervous anymore. I was focused on the test." There is a clear perception among program participants that the HeartMath training, including time on the em-Wave technology, is helping them with test anxiety. It is also clear that they are benefiting from the training in ways that go far beyond the testing environment. Anger management, conflict resolution and general stress management are among the uses being reported by the participants in the program.

Another student said, “Something another student said to me made me very mad. I actually wanted to act out in violence. I went to my counselor to discuss the situation. By this time, I was crying. I closed my eyes and started practicing the Heart-Focused Breathing Technique. I stepped back from the problem and started focusing on how good God has been to me. Then I presented this problem to myself and a still, small voice said, ‘Treat her with kindness, love her, just be still.’ I came out of the office happy and smiling, but I wouldn’t have been able to do that if it hadn’t been for Neutral.”

The next day, beaming after a successful session on the computer using the emWave technology, the same student said, “It’s Heart-Focused Breathing that did that for me. That’s why I didn’t hit that girl yesterday.” One clear area of progress in this adult education program has been the improvement in the passing rates for GED examinations. Those who did not participate in HeartMath training had a 63% pass rate on the GED. Those who practiced the HeartMath tools and techniques had an 89% pass rate on it. Because of these benefits, the program will continue to promote and expand use of the TestEdge program.

Chronic Pain

Pain is the sensation of hurting, an unpleasant or strong discomfort from injury, sickness, disease or functional disorder and is transmitted through the nervous system. More than a physical sensation, pain is our body’s way of defending us from physical harm and further pain by triggering processes that prompt us to seek strategies to protect ourselves and end the experience. Typically, pain is classified as acute or chronic. Acute pain usually is immediate, such as the kind that results from injury, sickness and disease, and then begins subsiding. Chronic pain, described as the disease of pain, serves no apparent biological purpose and can persist for long periods, in some cases years and others indefinitely; frequently it’s resistant to treatment and its cause often is an enigma.

Not too many generations ago many believed we should expect to feel pain at times in our lives and learn to endure it. How much of that way of thinking was practical, philosophical or spiritual can’t be entirely known, but it is certain the inability of medicine and other interventions to alleviate physical suffering must have had some bearing. In modern times, it is widely held that no one should simply learn to endure pain, and there are numerous forms of intervention that offer help. Today there is little in the way of acute pain that can’t be alleviated to some extent, but chronic pain, which only recently gained serious recognition as a type of disease, still perplexes.

Drugs, psychological and physical therapy, diet, yoga, holistic healing and other methods of pain management certainly have had plenty of success, but too often relief is temporary and the source of chronic pain remains undiagnosed. The study of chronic pain is in its infancy and is being pursued by scores of entities – national and international pain research associations, government bodies such as the Centers for Disease Control in Atlanta, universities and many public

After a successful course of treatment, this client reported great satisfaction with the intervention: “HeartMath has changed my life. Last spring, before I started treatment, I was in pain, sad, depressed, confused and I experienced so many other feelings of defeat. I could not truly enjoy my life, my daughter or my fiancé. I was so beaten down by the hardship I had endured that I could not enjoy the good in life. I felt like it was only a matter of time before everything came crumbling down. Now though, I am no longer a victim! Wow, talk about a miracle. It is like magic. Not like a magic pill that makes it all better all at once, but like a magic flame inside of me: The more I look at it, the stronger it gets. And the most wonderful thing about it is, it’s mine. No one but me truly controls it. The wonderful mother, wife and person that I have always wanted to be – I am! My appreciation of life and my experience grows into a huge flame that surrounds me. I could go on and on about HeartMath tools. It is something every person needs. I am so grateful to be one of the ones who gets to learn it. It is truly the greatest gift of information I have ever received.”

"When working in a chronic pain unit, many of the patients were very discouraged and apprehensive in working with their physicians because they felt the physicians were frustrated with or antagonistic toward them. When we taught them to attend their doctors appointment in a more coherent state, they felt that the doctors listened better to their problems and were more willing to help them find creative solutions." –Myron Thurber

and private health, education and research organizations, among them the HMI.

Encourage clients to use the Heart Lock-In Technique, especially first thing in the morning, to increase their endorphin levels and to give the body an energy boost for the day. Also, encourage them to use it before going to sleep at night to reduce the stress and aches and pains of the day so they may enjoy restful sleep. Depression commonly goes hand in hand with those who suffer chronic pain. *Transforming Depression*, the fourth book in HeartMath's Transforming Series, can help clients to understand the feelings they may experience in addition to physical pain, such as hopelessness and disinterest in activities they formerly enjoyed, among others, and then teach them emotional-refocusing tools such as Neutral. It is especially important to teach these clients to use the Heart-Focused Breathing and the Quick Coherence Techniques in response to anticipating pain or unnecessary muscle guarding during rehabilitation exercises. Help them become aware of and reduce anxiety in response to working with medical professionals and in relationships that have been affected because of their chronic pain.

Clinical Illustration

P is a 40-year-old woman who sustained a closed head injury. She had post-concussive headaches and difficulty maintaining her normal routine without increased frustration, confusion and irritability. Her predominant emotion was frustration, which directly impacted her pain levels. P's Depletion to Renewal Plan showed her typical responses as being in the upper, highly aroused, left-hand quadrant. Her goal was to spend more time in the lower, right-hand quadrant. During the five-minute HRV baseline, her HRV pattern was inconsistent and irregular with a low coherence score of 89%. The client was highly irritable and frustrated, so the therapist chose to have P only focus on breathing to decrease her highly aroused state and used the Coherence Coach without additional sounds or the visual enhancement options. P was able to create some high coherence, as indicated by the smoother HRV pattern. After 16 minutes, P reported she was becoming fatigued with the exercise and when her pattern became more irregular, the clinician stopped the session. Sometimes, in the initial learning phases, these clients are only able to practice for shorter periods of time.

Anger/Conflict Resolution

HeartMath techniques have been effectively implemented in a wide range of applications related to anger, conflict and rage. Anger is generally experienced as an escalation process in which emotion and physical symptoms build up and the limbic system becomes activated. Emotional containment is limited and when the maximum level of containment is exceeded a physical manifestation of anger usually results. The physical manifestation of anger can be broken into three categories; verbal aggression, physical aggression and implosion. Verbal aggression is accompanied by an increased volume and the range can include verbal threats and swearing. Physical aggression results in a physical form of contact ranging from a physical push to

physical violence. Implosion is the process of an individual shutting down, taking anger internal and using it against oneself. Implosion often results in shame or degrading of the individual. HeartMath techniques can be effective in each of these manifestations of anger and are easily implemented in the earlier stages of the escalation process.

The emWave Pro is an excellent tool for working with clients resistant to the intervention process. Often clients are not aware of their level of resistance to an intervention or their inner resistance in exploring a sensitive topic. By utilizing emWave Pro, clients can receive visual feedback related to their emotional response to difficult emotional material. When this information is presented to clients they often suddenly connect to the emotion state that may have been repressed or denied. Emotional resistance often is demonstrated on the emWave technology with a dramatic shift away from the client's standard baseline of heart rate variability. This can be witnessed by both dramatic increases in heart rate or by dynamic shifts away from the baseline heart rhythm.

Clinical Illustration

B, a 53-year-old male, requested this HeartMath intervention after a long life filled with violence and emotional separation from others. He had been in recovery from heroin addiction for 16 years and had spent extensive time in state prisons. His early life experience was filled with intensive physical violence, abuse by his father and a street life filled with violence. B was highly active in a 12-step recovery program and had become a member who worked diligently to help others in their recovery process. When he was introduced to a HeartMath intervention, he had not engaged in any form of violence or illegal activity for the span of his imprisonment and recovery, which totaled over 20 years.

B's primary request for help related to his desire to develop an emotional connection to others. He had been frustrated with his inability to connect emotionally to others' life experiences. He described most of his life as "a numb experience." The intervention began with an extensive explanation of the physiology of emotion. B was intrigued by his new understanding and was excited by the potential that there could be a solution to his lifelong dilemma. He was able to relate the science of HeartMath to his own lifelong problems with emotions. He recognized that his previous experiences of being capable of harming others related to his inability to physically and emotionally experience empathy for the victims of his rage, and deep emotional hurt. B wanted to move slowly through the process of learning the techniques, but diligently practiced his newly learned skills two times per day. He began to utilize the Heart-Focused Breathing and the Heart Lock-In Techniques for 10 minutes or more utilizing emWave Pro during each session. His coherence scores quickly began to improve. As time progressed, B began to report stronger emotional awareness and connectedness with those around him. HeartMath restored hope that he could overcome a lifelong issue of not being able to relate to the emotional experiences of others in his life, and this intervention empowered him with a powerful tool set to establish a new baseline of behavioral change.

"The events of the past week have shaken me to my core. After having felt so 'certain' about my beliefs, now I am dealing with my own fear. I have definitely experienced what you refer to as 'survival-level living.' I am so very grateful that I took the HeartMath seminar. I've been using the software almost every day. That helps keep me balanced and able to be there for others."
-Mary Ellen Segraves - Organizational Development consultant

"Just wanted to say THANK YOU! I just read "Transforming Anger" for the 2nd time. It really changed my life and led me to this website where I found other books and products of interest. I have read 5 other Anger books by different authors over the past few months, working hard on transforming the anger that was destroying my life. This book was the only one that helped! Connecting to the heart with these techniques is brilliant!! Because of HeartMath techniques, I can live out the rest of my twenties in peace! THANK YOU!!! I plan to write the authors a letter of thanks also! I will definitely be visiting this site again in the near future!" -Pamela Yachdav

Obsessive-Compulsive Behavior

Obsessive-compulsive disorder (OCD) is recognized by two main characteristics that can be targeted when utilizing HeartMath for intervention. Obsessive thoughts/invasive thoughts and compulsive action are two symptoms that can be targeted by by utilizing the Heart-Focused Breathing, Freeze Frame and Quick Coherence Techniques. The Heart Lock-In Technique is an effective long-term intervention for healing the overall anxiety and shame that often accompanies OCD. Obsessive thought symptomolgy begins to bal-ance and become more manageable when coherence is obtained by using HeartMath techniques. The Heart-Focused Breathing and the Freeze Frame Techniques are the most effective and can be utilized in moments when hypercognition is recognized.

Compulsive action is commonly described as a physical experience within the body and is often termed the urge to act. The physical drive, urge and activation are associated with the limbic system or emotional centers in the brain. As this symptom – urge – surfaces and is recognized, a client can intervene by utilizing the Heart-Focused Breathing, Freeze Frame and Quick Coherence Techniques. This often results in dramatic decreases in compulsive behavior in clients that suffer from OCD.

One of the key elements of effective intervention utilizing these techniques resides in client recognition of symptoms related to OCD. The earlier the intervention occurs during the building of symptoms, the more effective the techniques are in eliminating the hyperstimulation.

Clinical Illustration

N presented with anxiety related to her obsessions and compulsive behaviors as a primary concern, along with a variety of illnesses and chronic conditions, including asthma, headaches, irritable bowel syndrome and high blood pressure. N also had a difficult time falling asleep at night, ruminating for hours. Her primary goal was to feel less compelled to perform rituals – counting, hand-washing – in pressure situations and sleep better. She reported that she spent most of her time in the upper left-hand quadrant and her goal was to spend more time in the middle right-hand quadrant. Her initial baseline pattern was indicative of sudden parasympathetic withdrawal followed by sympathetic activation. When asked, N was able to associate what she saw on the screen with her thoughts and feelings, and she recognized that when her heart rate spiked, her thoughts and emotions shifted to worry. The clinician's main focus was to teach HeartMath's self-regulation tools and techniques as a part of an overall package to optimize her health and well-being. The use of the emWave Pro helped N to get into the optimal zone, regulate her autonomic nervous system and achieve emotional balance so her system could refresh, heal, and restore itself to a more desirable state of wellness and balance. Her successful use of the Heart-Focused Breathing and the Quick Coherence Techniques resulted in an increased sense of efficacy and she felt more in control of her health. The clinician also aimed to help N to identify and address her myriad of stressors, and the Freeze Frame Technique also helped her to develop posi-

tive and effective ways to cope with these stressors. N reported that she especially appreciated the fact that this is a nonpharmacologic option.

Trauma

HeartMath techniques can be effective in treating a client that has suffered severe emotional trauma. Trauma victims often report symptoms that indicate limbic-system overstimulation. HeartMath stress-intervention tools are an excellent therapeutic tool to intervene with these issues. These techniques can be used as a trauma intervention tool by themselves or in support of other techniques.

Using the Heart-Focused Breathing Technique can decrease invasive thoughts associated with traumatic events and the skill sets of the Quick Coherence and Heart Lock-In Techniques help with symptom management, en-couraging the healing process of the brain. These techniques are very empowering for clients who may have had no defensive tools to use against emotionally disturbing processes following traumatic events.

It is important to consider the type of traumatic event a client has suffered before moving forward with an intervention utilizing HeartMath tools. Individuals with trauma experiences involving a strong physical experience such as sexual assault or physical accidents may have difficulty with maintaining a physical body focus without becoming overactivated. HeartMath techniques with a body focus may have to be tested on a client-by-client basis to determine if these techniques can be used without decompensating.

For some trauma victims, intervention with a physical focus may bring forth disturbing invasive thoughts or may even potentially perpetuate a flashback experience. This often can be recognized when an individual demonstrates a dramatic increase in heart rate while performing HeartMath techniques. This may also be a sign that the client needs further trauma intervention before working with the physical body-focused techniques.

HeartMath technology is an excellent tool for teaching trauma survivors about dissociative episodes and is effective for clinicians to identify struggle, with traumatic content being processed. Emotional shifts are customarily represented by corresponding shifts in heart-rate variability. When captured on emWave Pro, these shifts can be used as emotional literacy teaching tools for the clients to increase their physical awareness of the onset of dissociation.

When intervening with victims of trauma, it is important to recognize dissociation as a valuable tool for allowing the client's brain to calm down. If a client is consistently dissociating throughout the implementation of HeartMath tools, it may be a sign that the person is overwhelmed by the intervention. This may need to be followed by slower intervention or a potential limit in the time frame of emotional exposure.

Notes

"I have seen clients struggle with low coherence as they feel anxious or aroused and then as they dissociate the coherence improves. It is good for the clinician to be aware of this possibility so as not to reinforce dissociative states unintentionally."

Myron Thurber

Finally, clients with PTSD diagnoses will require thoughtful evaluation because they may present with high anxiety and hypervigilance and be afraid of emotions or memories that have emotional content. They may also present as depressed/anxious and detached from their emotions. The initial main emphasis will be to help them stay in the present moment and recognize they have the ability to achieve coherence and then, when they are ready, teach them to shift their emotional state.

Clinical Illustration

L. was a traumatized 16-year-old client who was referred to the clinic for anger management after a long history of angry outbursts and acting-out behaviors. She was court-ordered to our program for a stolen-automobile incident that led to a police chase involving sheriffs from six counties and ended in a collision. L. had grown up in a gang lifestyle that had a long-standing family history with ruthless street gangs. As a witness to violence from a very young age, L. was significantly traumatized. She reported the details of her traumatic experience with little affect, and she tended to minimize any effects that seemed to portray her as a victim.

Upon arriving at the treatment program, L. was extremely resistant to attending therapy. She admitted, however, that her anger affected her life severely. She had grown tired of fights with her mother and with the many other young women in the community. She was unhappy with her inability to perform in a public-school setting. She had been expelled because of frequent aggressive behavior with her teachers and she often engaged in fights with other students. After reviewing her developmental history, it was evident L. tended to externalize her symptoms of anxiety and that her default emotion was anger, rather than fear. Nevertheless, she also had clinically significant PTSD symptoms.

L. was taken through the standard intake procedure, including a pre-test with the emWave technology. L. was intrigued by the process of accessing her emotionality with a computer. She asked many questions and her therapist gave her a brief lesson on the impact of the inner brain on her behavior. L. returned to therapy the next week with a new interest and attitude. She was intrigued by tools that were presented to her and continuously asked about having access to the computer at each session. She was taught the Freeze Frame, Heart Lock-In and Quick Coherence Techniques and reported practicing them regularly in the morning before school and at night before going to bed. Each time L. attended therapy, she used emWave technology for 10 minutes, verifying that because of her practice she was dramatically improving on coherence scores. The feeling of gaining greater self-regulation and a feeling of being in control of their emotions and body can be a positive experience for them.

After 10 weeks in treatment, L. had completely stopped acting out in the community and home. L's mother was so inspired by the changes in her daughter that she pursued a HeartMath intervention to help improve her own emotional-management struggles. L. is now successful in a public school, achieving excellent grades and aspires to

attend college. In addition she has not been involved in a physical altercation since she attended therapy and she reports no need for further gang involvement.

Addictions/Impulse Control

Substance abusers often are highly impacted when educated about the HeartMath concepts and hyperarousal in the limbic centers of the brain. This information often gives them an explanation for inner brain-driven decisions that previously were inexplicable to them. The Heart-Focused Breathing, Quick Coherence, Attitude Breathing and Heart Lock-in Techniques are are all effective intervention tools for targeting substance-abuse issues and can be used as supportive techniques for many forms of substance-abuse intervention. The techniques can be utilized in several applications, including urge management, emotional regulation and invasive cognitive regulation.

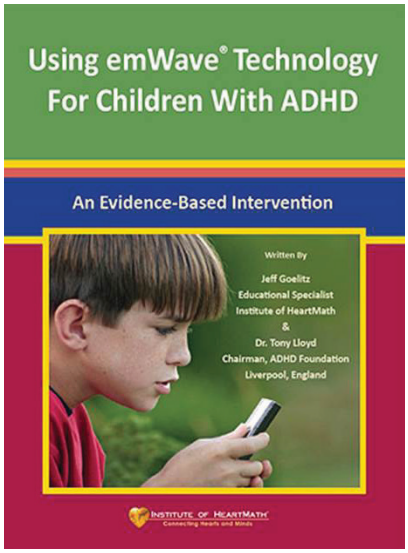
Most 12-step programs have focused a large portion of their interventions on two recognizable traits associated with addictive patterns in behavior and thinking: obsession and compulsion are referenced throughout 12 step programs and are often the target of substance-abuse intervention.

Obsession, or hyperaroused cognitive processing, is a commonly reported experience surrounding relapse-type behavior. It is described by users as an escalating process that builds into compulsion. The use of the Heart-Focused Breathing Technique helps deescalate the aroused cognitive pro-cess by empowering clients to slow down their thinking processes. This allows them to make more effective decisions that support continuing sobriety. This intervention often will stop the switch to compulsive behavior.

Compulsion or physical-body activation is paired with an absence of cognitive process and customarily is reported following a sustained period of obsession. This is most commonly labeled as an urge to use or to act compulsively. The Heart-Focused Breathing, Quick Coherence and Heart Lock-In Techniques have proven extremely effective for urge management by many substance-abuse clinicians.

Clinical Illustration

After several weeks of counseling, T, a man in his 50s who was a recovering alcoholic and drug addict, reported that he began drinking at age 10 to escape an abusive childhood and basically drank and took drugs for over 20 years. He had no meaningful relationships and only felt anger and irritation, but he did not feel any other significant emotions and could not separate the emotions he could feel from his anxiety. He was working on an advanced degree at a local university and was afraid that his anxiety would keep him from completing his degree. He was able to run a business successfully but did not feel connected to anyone and often had explosive anger. He was distressed by the thought that he had not cried in over 15 years. His goals were to complete school, connect with others by going out with them socially and maybe even date a woman. He wanted to feel again. He also wanted to be able to stay clean and sober.



Included are suggested best practices, protocols from two studies and comments from clinicians about how they use the emWave® technolog with young ADHD clients.

Download the compete e-Booklet at:

https://www.heartmath.org/resources/downloads/emwave-for-children-with-adhd/

After T started using the emWave technology he could relate the feeling of the rhythmic breathing with the sensation he got when he ran, which he did on a regular basis. He identified with the relaxed sensation he got when he stayed with that rhythmical activity. He and his therapist worked on breathing for a number of sessions along with cognitive behavioral therapy to help him control his temper.

One day he said he was ready to feel both positive and negative emotions. In the process of connecting with his emotions he identified that his feelings were his father's. When the client was eight his father took him away from his friends at his own birthday party and took him behind the house and beat him with a belt and then ordered him to go back into the party and be a good host. T recalled that after that he decided not to feel again. At that point in the session he began to cry. He cried for a few minutes and then composed himself and reported that now he could feel again.

Within a couple of sessions, T was able to work with the emWave technology to achieve and maintain coherence using positive emotions as well as breathing. He reported incidents when he could resolve conflicts without anger. He was able to achieve all his goals and reported having a flood of different emotions. He also reported being able to taste food better and to experience other physical sensations as if they had just awakened. He then reported he was done with therapy and could manage on his own and through his AA group and discharged himself from further therapy.

9.4 Working with Children who have ADHD, Test Anxiety, Separation Anxiety, etc.

HeartMath tools and techniques have been adapted to help children of all ages with a range of emotional issues, with relations and with a variety of learning disabilities, including ADHD. Young people today experience enormous pressure to do well in school and to fit in. They also have numerous relationship challenges with family, friends and teachers. HeartMath's interventions teach students to manage stress, improve learning and strengthen relationships.

In a recent study, which employed a rigorous positivist research paradigm with a blind placebo control design, researchers demonstrated that HeartMath interventions significantly reduced the severity of ADHD symptoms.[131] The experimental group consisted of 38 children aged 9 to 13 with a diagnosis of ADHD. The primary hypothesis was that training in the HeartMath techniques would improve cognitive function, post-training. Results were measured using the compressive CDR cognitive-functioning testing battery and independently analyzed and validated. Secondary outcome measures included the Revised Connors Teachers Rating Scale Questionnaires and Strengths and Difficulties Questionnaires completed by children and teachers. The placebo control consisted of daily 20-minute 1:1 sessions with a learning assistant for six weeks. Each child was free to build a model of choice from Lego® building bricks. Lego was chosen as the placebo because there is evidence of its efficacy as therapeutic medium. The children in the experimental group were

trained in the HeartMath techniques and on the emWave Pro, using the Rainbow Game. The software was used to measure and train the children to increase their levels of physiological coherence. The musical compilation Quiet Joy, by HeartMath founder Doc Childre, which is designed to facilitate coherence, was used during the training to reinforce learning. Of the children who participated in the experimental group, 37 stated that they enjoyed the sessions and 32 said they continued to practice the HeartMath techniques three months after the training. Findings indicate that the participants in the experimental group had a 24% increase in immediate word recall (short-term memory), 45% improvement in delayed word recall (long-term memory), 28% improvement in word recognition (comprehension), and 9.5% improvement in digital vigilance (attention). In summary, coherence training significantly improved cognitive function (significance $p>0.05$) in the intervention group.

Qualitative assessments also indicate improvements in sleeping patterns, relationships with siblings and self-confidence, along with a reduction in oppositional behavior at home and school. These findings offer a strong case for the integration of coherence-building techniques in multimodal treatments for ADHD. This investigation proves that the HeartMath System has a statistically significant impact on learning.

The three HeartMath tools below are adapted from the language presented earlier in this manual. Here is an example of how these tools and techniques are adapted:

HeartShift™ Steps

1. Notice what you are feeling
   Take a time-out.

2. Shift to your heart
   Focus on the area of your heart.

3. Breathe a feeling of calm
   Breathe slowly and easily. Imagine the air flowing in and out through the heart.

Get in Sync™ Steps

1. Notice what you're feeling
   Take a time-out

2. Shift to the heart
   Focus on the area of your heart.

3. Activate Appreciation/Care (Sunshine)
   Make a sincere effort to activate a feeling of appreciation or care. Build a warm feeling of sunshine in your heart.

4. Breathe the warm feeling
   Breathe slowly and easily as you feel the warmth in your heart grow.

Notes

"HeartMath tools not only help me with my depression, it helps my students as well. One boy in my kindergarten class came to me very distraught over something he had seen. A woman was in her car crying outside the yard where the boy had been playing. He felt for her, and did not know what to do. Images of the woman haunted the boy for weeks, keeping him inside during recess and lunch. Finally, I was able to get the story of what was going on for him. I was surprised by this degree of compassion from such a young child. 'Remember all the things we talked about in your lesson about the heart, and staying connected with your mommy and daddy by sending them love in your heart?' He nodded, eyes wide. 'Well you can connect with that woman who was in the car in the same way, and send her your love wherever she is now, even if you do not know her. I am sure it will still help her.' His whole face lit up as if he just slid into home base for a winning score. He skipped off lighter than a bird, free to play with his friends for the first time in weeks."
-Masha, teacher

For information on how to purchase the TestEdge program, go to these links at the HeartMath.org store: http://store.heartmath.org/Test-Edge-6-8, or http://store.heartmath.org/Test-Edge-9-12

Shift and Shine™ Steps

1. Shift to your heart
   Focus on the area of your heart.

2. Activate Appreciation or Care (Sunshine)
   Make a sincere effort to activate a feeling of care or appreciation. Build a warm feeling of sunshine in your heart.

3. Breathe the warm feeling
   Breathe slowly and easily as you feel the warmth in your heart grow bigger and bigger.

4. Radiate Sunshine
   Send the sunshine from your heart to someone who needs your care.

Program Components Include:

- The Leader's Guide offers a bird's-eye view of the program. This booklet includes a summary of the modules, rubric for skill development and relevant research. Each module contains essential understandings, student objectives, core learning experiences, apply-it activities and assessment strategies for checking student progress.

- Slides for presenting the big ideas in visual form. This series of 20 slides allow educators to present key ideas either through a PowerPoint slide show or using a presentation flip book for table-top display with smaller groups of students.

- Module Booklets for developing knowledge and skills. Each module has a series of four or five core learning experiences with follow-up activities for further practice. Handouts and task cards for follow-up practice are found in the back of each booklet, along with recommended reading and links to Web sites of programs that complement this one in principle and practice.

- Classroom posters for keeping core concepts visible. Three 8-by-24-inch posters are included: The Inner Weather Report, Get in Sync and Shifting Negative Self-Talk.

The **TestEdge®** program helps older children and adolescents overcome test anxiety and learning blocks. This program helps them understand how emotions and attitudes affect their academic work. TestEdge is a scientifically validated supplemental classroom program that focuses on Stress Smarts and Test Smarts, both of which enhance students' ability to perform academically. A controlled study that included a range of high-performing to low-performing students found that 75% had reduced anxiety after taking the TestEdge program. Students experienced less dread about taking tests and increased focus, comprehension and confidence during high-stakes tests. The TestEdge program includes five video lessons with actors and flash animations, interactive sessions and a review of key points.

TestEdge Teacher's Kit includes: Teacher's manual fully scripted lesson plans, 1 Student Activity Book, 3 full-color 11-by-17-inch posters, video of Perception Experiences, overheads and worksheets. a CD-ROM and Heart Zones music CD.

Clinical Illustration

D. was a 9-year-old boy with a diagnosis of separation anxiety. He had worked with several therapists upon being referred to a therapist. He had a long-standing reputation of behavioral problems from the time he was 3, when his father left. He would often act out aggressively during separation from his mother, but later deny any emotion related to perceived abandonment. During his intake process, a psychophysiological assessment was done, including a baseline HRV measurement with the emWave technology. D. was intrigued by the emWave technology and requested further work with the program. After several weeks of intervention, he was taught the HeartMath tools HeartShift, Get in Sync and Shift and Shine. On the fourth week of our intervention, he was set up on the emWave technology in a blind model with the monitor and sound turned off. The therapist and D. had a discussion of the emotional aspects of his separation anxiety in the context of perceived abandonment, and he struggled to describe the feelings associated with the loss of his father.

On several occasions, the therapist and client utilized breathe the warm feeling (Step 3 of Shift and Shine) to stabilize D's emotional state, and then initiated a discussion of his feelings related to separation and loss. At that point in one session, D. became agitated, argumentative and resistant to discussing his emotions any further and eventually shut down. At the conclusion of the session, the therapist stopped the emWave technology and reviewed the session's emotional content. D. was unable to deny the emotional impact and dramatic shifts in his HRV during the time frames in which his father was discussed. Unable to deny the significance of these feelings, D. began to cry for the first time in many years. In later sessions, he continued to overcome the obstacles of this emotional block and was able to move forward into an ongoing discussion of the loss of his father and the associated feelings. His behavior then became less aggressive and impulsive, and he was able to sustain coherence in response to triggers related to his separation anxiety.

Grief and Loss

Interventions for grief and loss require a high level of sensitivity and increased attention to individuality during the implementation of HeartMath techniques. Throughout the grief process, clients report feeling overwhelmed by specific emotions that arise following their loss. These emotional experiences often are explained as changing in intensity and can be managed more efficiently when regularly practicing self-regulation techniques. It is important to note that each one of these emotional experiences may present as overwhelming to the client. These experiences are a common part of the healing process for most situations related to grief and loss.

For information on how to purchase the HeartSmarts program, go to this link at the HeartMath.org store: http://store.heartmath.org/store/HeartSmarts/HeartSmarts-Grades3-5

In the early stages of treatment, clients typically experience intense emotional states. The Heart-Focused Breathing and the Quick Coherence Techniques are are efficient in transforming overwhelming emotions into a more manageable and tolerable experience by stabilizing the emotional response. As a client progresses through each of the grief stages the clinician may utilize the intervention for that emotion. It is important to note that HeartMath interventions are not meant to suppress or prevent any stages in the grief process, but should be viewed as tools to manage emotional states that become overwhelm-ing. Each individual may experience a wide range of emotions, or may report feeling emotionally numb. The grief process varies from individual to individual, and each emotion may or may not need to be experienced for healing to take place. The therapist must be flexible when intervening with a client in the grief process.

Clinical Illustration

E. presented with anxiety as a primary concern, along with a variety of illnesses and chronic pains (asthma, headaches, irritable bowel syndrome, and high blood pressure). E. reported that she had been having a difficult time falling asleep at night and she tended to ruminating for hours. This had been a problem for her since her mother had died three months earlier. Her primary goal was to feel less panicked and sleep better. She reported spending most of her time in the upper left-hand quadrant on the Depletion to Renewal Plan, and her goal was to spend more time in the middle right-hand quadrant. Her initial baseline pattern was indicative of sudden parasympathetic withdrawal followed by sympathetic activation. When asked, E. was able to associate what she saw on the screen with her thoughts and feelings, and she recognized that when her heart rate spiked, her thoughts and emotions shifted to thoughts about her mother and her own mortality. The clinician's main focus was to introduce HeartMath's self-regulation tools as a part of an overall package to teach E. some effective ways of dealing with the normal emotions associated with her grieving process. The use of the emWave technology helped E. get into the optimal zone, regulate her autonomic nervous system, and achieve emotional balance so her system could refresh, heal and restore itself to a more desirable state of wellness and balance. Her successful use of the Quick Coherence and Heart Lock-In Techniques resulted in an increased sense of efficacy and she felt more in control of her health. The clinician also helped E. identify and address the myriad of stressors in her life, and the emotional restructuring techniques helped her to develop positive and effective ways of coping with these stressors. Upon termination, E. reported especially appreciating that this intervention allowed her to experience normal emotions of sadness and fear, in the context of her grieving process, and that the therapist had advocated a nonpharmacologic option.

"Nearly every disease or illness I've seen or treated in two decades of medical practice could have been improved or even cured had my patients or I known how to access the physical power of our heart's intelligence. The HeartMath Solution *is the owner's manual we've been waiting for to help us recognize and use our heart's energy to help heal our bodies and our lives."*
-Christiane Northrup, M.D., author of Women's Bodies, Women's Wisdom*, Clinical assistant professor, Obstetrics and Gynecology, University of Vermont, College of Medicine*

9.5 Brief Intervention Protocol

The multi-session protocol assumes the client is available for assessment and ongoing training. The brief intervention protocol is for those clients not available for more than brief treatment and who will only be seen once or twice, with follow-up limited to electronic or phone

intervention. This protocol can be completed in a 60-minute session. You may want to follow-up with a second session and review homework as described in the multi-session protocol.

Clinical Context

Because HeartMath interventions reduce stress-induced autonomic and hormonal activation, improve sympathovagal and neuroendocrine balance and promote increased efficiency and synchronization in the functioning of physiological systems, the HeartMath System can be a powerful aid in facilitating healing and rehabilitation. Health professionals have found self-regulation tools to be an effective addition to treatment programs for patients and clients with a wide variety of conditions that are associated with or exacerbated by emotional stress. (Refer to the list to the right.)

Client Learning Outcomes

- Shift the emotional and physiological dynamics that may be exacerbating medical conditions.
- Identify depleting emotions that impact health and well-being.
- Neutralize and replace stressful emotions that deplete health and mental and emotional resilience.
- Increase the ability to think clearly and find more efficient solutions to problems.
- Understand the difference between a coherent and incoherent HRV trace as observed on the emWave Pro.
- Observe and identify personal and therapeutic benefits gained from applying self-regulation tools.
- Increase the amount of time able to sustain coherence.
- Establish a new psychophysiological baseline.

General Outline

- Identify client's issues or challenges and establish training goals.
- Describe how to use the Depletion to Renewal Plan.
- Introduce the emWave Pro and portable technologies.
- Gather a 1- Minute Deep Breath Assessment.
- Teach the Quick Coherence or Attitude Breathing Technique.
- Ask client to identify at least two times in the day when the Quick Coherence or Attitude Breathing Technique can be used. Typical examples include waking up in the morning, during meetings and commuting to and from work.
- Encourage client to use the tools before upcoming situations

"I was asked to see an agitated nurse struggling with her mother's death by a social worker at my main clinic. She wanted me to check her blood pressure because it had recently been elevated and the pt was on high blood pressure medication. I took it and it was 180/120. I told her she had to go to her doctor or the ER. She was extremely reluctant, so I suggested I teach her via my emWave technology. When we used the Quick Coherence Technique on my computer, she reached green for 1 minute. I retook her pressure and it had dropped to normal. How efficient!
- Laura Sunn MDSC

You may wish to have a supply of HeartMath publications that you can send with clients as well as emWave equipment for sale, lease or loan.

The client or the trained caregiver needs to understand the basic principles and how to use the equipment.

Clinical Applications

Acute, Chronic and Recurrent Pain
Headaches: tension type and migraine
Recurrent abdominal pain
Burns
Acute procedural pain
Physical therapy and rehabilitation
Emergency room visits

Psychophysiological Conditions
Insomnia
Stress
Cardiovascular rehab
Irritable bowel syndrome
Pre-and post-surgery
Phantom pain and amputation
Somatization/conversion disorders
Tics/Tourette's syndrome
Traumatic brain injury

Learning and Performance Issues
Performance anxiety
Peak performance training
ADHD
Sports

Other Chronic Illness
Arthritis
Asthma
Chronic pain
Chronic fatigue
Environmental sensitivity
Fibromyalgia
Cancer
Atopic dermatitis
Diabetes Type I and Type II
Hypertension
Reflex sympathetic dystrophy (complex regional pain syndrome)
Sickle-cell anemia
Immune-system dysfunction
Inflammatory bowel disease (Crohn's disease and ulcerative colitis)
Muscle spasticity

or challenges that are typically stressful, and to quickly recalibrate any time there is a stress trigger.

- Encourage the client to practice the techniques while using either the emWave Pro or emWave2 several times each day.
- In the next session, if time permits, teach the Heart Lock-In or Freeze Frame Techniques. Introduce the appropriate tools and techniques and explain when they can be used based on the client's stress patterns or goals.
- Establish schedule for practice and follow-up. This may be done with office visits, over the Internet or through phone consultation.

Detailed Script

Introduce and establish the goals of training or treatment.

- Today you're going to learn an easy and effective way to reduce the impact of stress on your body and emotions.
- First, we'll talk a little bit about what stress is and the best way to reduce it.
- Next you'll learn an easy to use technique that you can practice throughout the day, especially when stress happens.
- We'll be using a computer program called the emWave Pro, which lets you observe and chart your progress.
- Imagine your life if you truly felt calmer and had more energy.

Identify client's issues or challenges and establish goals for training

- What are the stressors in your life? What causes you stress?
- What do you notice – physically, mentally and emotionally?
- Simply put, stress is emotional unease. Emotional unease can be experienced as anxiety, irritation, anger or hopelessness.
- The good news is that although we may not be able to control what's going on in the external environment, we can learn to control our feelings and perceptions.
- These unconscious reactions eventually accumulate and drain our energy, and over the long term they can lead to various health issues and challenges.
- Autonomic exhaustion is a condition that occurs when long-term stress depletes the nervous system and can amplify medical conditions. It is associated with feelings of exhaustion, fatigue, sleep disorders and body aches.

- Positive emotions lead to energy renewal, resiliency and better health.
- Generating positive emotions has more of a transformative impact than positive thinking.
- Research has found that one of the easiest positive emotions to generate is appreciation.
- The best way to improve the quality of your life is to learn how to change your automatic emotional reactions to external situations.

Describe how to use the Depletion to Renewal Plan. Show the client an example of a completed chart and introduce a blank copy for the client to use.

- This chart shows the range of emotions we experience and how these emotions activate the autonomic nervous system and the hormonal system. The vertical line in the middle represents our autonomic nervous system, ranging from high to low arousal. The top of the axis represents high arousal, which means the sympathetic branch is more activated than the parasympathetic. For example, a near-accident or excitement can cause high arousal.
- Emotions influence physiology through two pathways: The autonomic nervous system and the hormonal system.
- The bottom of this axis is labeled Relaxation because increased parasympathetic activity occurs when we are in a relaxed state. Feelings as different as calmness and boredom also are associated with low arousal. Most stress-management approaches focus on relaxation by trying to decrease arousal. This is one reason most traditional stress-reduction approaches happen outside of the workplace. It's impractical to find a hot tub in which to relax when you're handling a tough phone call. If you're feeling anxious, impatient, frustrated or angry, relaxation simply turns down the volume, but it doesn't change the underlying perception of the situation.
- The horizontal line represents the hormonal system. On one hand, stressful feelings drive the release of cortisol, the stress hormone. On the other, positive feelings reduce cortisol and increase DHEA, the vitality hormone. The balance between these two hormones contributes significantly to physiological depletion or renewal.
- We move in and out of all four quadrants every day. Together, they make up our emotional landscape.
- Where would you put your emotional experience on this chart?
- What do you do now to cope with negative feelings? Is it working?

Notes

You can use the Coherence Coach and Mandala combined with the Coherence Ratio screen with those clients who need an external point of focus.

Research tells us there are many adverse consequences of high cortisol/low DHEA:

- Accelerated aging
- Brain-cell death
- Impaired memory and learning
- Decreased bone density, osteoporosis
- Reduced muscle mass
- Reduced skin growth and regeneration
- Impaired immune function
- Increased blood sugar
- Increased fat accumulation around the waist and hips
- In contrast, the benefits of positive emotions include:
- Increased longevity
- Increased resilience to adversity
- Improved memory
- Effective problem-solving
- Increased cognitive flexibility, creativity and intelligence
- Improved job performance and achievement
- Increased happiness

- Where do you want to be on this chart?
- A good question to ask yourself now is, “Do I really want to keep draining energy and stressing about this situation?” That question can help stop your stress reaction immediately and prevent further drain on your mind and body.

Introduce the emWave Pro and enter the client as a new user and prepare to do a 1-Minute Deep Breathing assessment

- We’re going to use the emWave Pro so you can see what’s happening in your body.

Instruct the client to sit properly and how to position the sensor.

- I’m going to enter your birth date into the computer and then read you some instructions so we can gather some baseline information.

The explanation for the 1 Minute Deep Breathing Assessment can be found in Ch. 6. Enter the client demographics and then read the instructions to the client. Remind them that the ball will give them a practice so they can synchronize their breath and then start recording. They need to continue to breath deeply until the ball stops after 1 minute. You may decide to review the report with the client or look at the information and review the report with them at later date. If you chose to wait then let the client know you are going to now show them what their heart patterns look like and click on the heart icon to go to the default setting.

Start the session and check the pulse-wave connection. (1)

Collect two to three minutes of baseline data to show the client how quickly the body responds to emotions.

Remember a recent stressor.

Now remember a positive or fun time.

Stop the session and point out how quickly the body responds to emotions.

Teach the the Quick Coherence or Attitude Breathing Technique

Teach the Quick Coherence Technique

- The power of the Quick Coherence Technique comes from positive emotions. When you engage positive feelings, in the moment, you replace depleting emotions with ones that can renew your system. The technique is easy, but each step is important. With practice, the coherence you establish in your system becomes your new reference point and makes the shift easier and more automatic.
- **Step 1**. 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 what-ever rhythm is comfortable).*

- **Step 2**. Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or some-thing in your life.

  ***Suggestion**: Try to re-experience the feeling you have for someone you love, a pet, a special place, an accomplish-ment, etc., or focus on a feeling of calm or ease.*

- Once you have become familiar with these two steps, use the quick steps:
  Heart-Focused Breathing
  Activate a positive or renewing feeling

- Try it now. Don't just think about it: Feel it. Once you have found a positive feeling, sustain this feeling by continuing Heart-Focused Breathing, Activate a positive or renewing feeling

- If you can't feel anything, it's okay. Just try to find a sincere attitude of appreciation or care.

- With practice, the coherent state becomes your new refer-ence point, making the experience more automatic. That's one of the main goals of this technique.

emWave Pro library is an excellent resource for introducing the concepts of heart-brain communication, heart felt emotions and the power of coherence and self-regulation.

Attitude Breathing Technique

- Attitudes, like emotions, either can be depleting or renewing. The **Attitude Breathing Technique** helps you replace drain-ing, negative attitudes with healthier positive ones. Here are the steps:

- **Step 1**. Recognize a feeling or attitude that you want to change and identify a replacement attitude.

- **Step 2**. Focus your attention in the area of the heart. Imag-ine 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 what-ever rhythm is comfortable).*

- **Step 3.** Breathe the feeling of the new attitude slowly and casually through your heart area.

emWave challenge level and sounds may need to be customized, depending on diagnosis (See comments regarding depression and anxiety, etc.).

- Often the replacement attitude can be obvious, but it takes breathing the feeling of the new attitude to make it real. For example, if you feel angry, you may want to replace it with calm-ness, but this requires breathing the feeling awhile until you actu-ally feel calmed. Then you have made the energetic shift.

- If you are not clear on the new replacement attitude, remember that the neutral attitude works to stop the energy drain, which is especially important during an emotional storm. Remember to breathe slow and casually. Here are some suggested replace-ment feelings and attitudes:

Unwanted Feelings & Attitudes	Replacement Feelings & Attitudes
Stressed	Breathe Ease
Anxious	Breathe Calm
Overwhelmed	Breathe Ease and Peace
Bored	Breathe Responsibility
Judgmental	Breathe Tolerance
Fogged/Confused	Breathe Ease for Clarity
Angry/Upset	Breathe Ease to Cool Down
Fatigued	Breathe Increased Energy
Shame/Guilt	Breathe Self Acceptance and Forgiveness
Financial Worries	Breathe Abundance
Isolated/Lonely	Breathe Being Connected and Appreciated
Rebellious	Breathe Respect
Self-pity	Breathe a Feeling of Dignity and Maturity

- For some deeply ingrained attitudes, you may need to breathe the new attitude earnestly for a few minutes before you experience a shift. Have a genuine "I mean business" attitude to really move those emotions into a more coherent state and shift your physiology.

- Some attitudes are stubborn and recur. When they come back, practice breathing the new attitude. Imagine pulling in and anchoring the new feeling.

- Even if a bad attitude feels justified, the buildup of negative emotional energy still drains your system.

- Point out the HRV waves to the participant, which should have moved from less coherence at the beginning of the demonstration to more coherence at the end. Point out how the blue and green bars in the lower right-hand part of the screen are showing higher ratios than the red bar, which indicates higher coherence.

Establish schedule for practice and follow-up. This may be done with office visits, over the Internet or through phone consultation.

Practice the Quick Coherence or Attitude Breathing Technique on the emWave Pro

- We have to find times to use the coherent state for it to become a routine part of our lives.

- Once we find regular times to practice it, even for a minute, then it can become embedded in our daily experience. We can then turn to this new reference point more easily, especially when facing stress.

Ask client to identify at least two times in the day when you can use the technique. Typical examples include waking up in the morning, during meetings and commutes to and from work.
Start a new session.

- First practice Heart-Focused Breathing. *Wait 10 to 20 seconds.*

- Now practice activating a positive or renewing feeling. Wait 30 to 60 seconds. Ask the client to continue breathing while focusing on the positive feeling or attitude replacement.

Point out the changes on the screen.

- What changes do you notice in your body? Do you feel any stress?

Explain the ratio bars. Remember that Red = % of time in low coherence/normal; Blue = % of time in medium coherence/less stress; Green = % of time in high coherence/optimal stress-free state)

- Your goal is to sustain coherence and increase the green bars, the amount of time in high coherence, and you will with practice.

Instruct the clients to practice anchoring the emotional shift. Encourage clients to use the tools anytime they feel stress.

Encourage the client to practice the techniques while using any one of the technologies: emWave Pro, emWave2 or Inner Balance Trainer several times each day. .

Encourage them to use the emWave technology in the morning to set the tone for the day and in the afternoon to reset their coherence intent.

They should also be instructed to use it, if available, whenever they feel stressed, overwhelmed or pulled into a negative emotional state. If the equipment is not available, ask the client to use the Depletion to Renewal Plan to keep track of progress using the emotional-refocusing tools and techniques and to write down specific goals and results as a point of healthy focus and renewal.

Clients or trained caregivers will need to understand how to access a variety of tips in the index and tutorial information for the emWave Pro or emWave2 and how to access HeartMath.org to answer questions. Practice using the basic setting for the emWave Pro or emWave2 and explain the basic concept of coherence and how to see it in the heart-rhythm patterns. Explain that there are different levels of training and show clients how to access information about them. Teach the client how to measure progress in their coherence scores and the trend report.

Second Session

Review how they have been doing since last visit.

Teach Heart Lock-In or Freeze Frame Technique. Introduce the technique and explain when they can be used based on the client's stress patterns or goals.

Heart Lock-In Technique

- Now you'll learn more tools to stop the stress by first changing how you're breathing and then by creating a positive emotional state.
- This next tool is the Heart Lock-In Technique. This helps you to establish a new baseline of coherence and will lead to an accumulation of energy, recharging your entire system.

Here are the steps:

Notes

- **Step 1**. 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.
- **Step 2**. Activate and sustain a regenerative feeling such as appreciation, care or compassion.
- **Step 3**. Radiate that renewing feeling to yourself and others.

  This benefits them and especially helps recharge and balance your own system.

  When you catch your mind wandering, simply refocus your attention on the heart area and reconnect with feelings of care or appreciation. After you're finished, sincerely sustain your feelings of care and appreciation as long as you can.

  Once you are familiar with the steps, you can remember them as
  1. Heart-Focused Breathing
  2. Activate and sustain
  3. Radiate

Freeze Frame Technique

- The Freeze Frame Technique gives you a chance to find and sort your solutions and increase your options to resolve problems and conflicts. The Freeze Frame Technique gives you a chance to find more efficient options and resolve problems and conflicts that may be depleting your energy.
- Your ability to think more clearly and objectively is enhanced by the increased coherence you create in your system using the Freeze Frame Technique.
- *If you decide to also teach the Freeze Frame or Attitude Breathing Techniques use these steps:*
- **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.

  Now that you have added more coherence to your system, you can see the issue from a broader, more balanced perspective, which is called your coherent response.
- **Step 4**.From this more objective place, ask yourself what would be a more efficient or effective attitude, action or solution.

The Heart Lock-In Technique also benefits others as you send feelings of love and care to them. Of course, this benefits you and your clients as well and will balance and recharge the nervous system.

- **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 have become familiar with these steps, use the quick steps:
  1. Acknowledge
  2. Heart-Focused Breathing
  3. Activate a positive or renewing feeling
  4. Ask
  5. Observe and act

9.6 Short-term Crisis/Trauma Protocol (Heal the Moment)

This may be most useful for clients who are in a state of panic or shock from physical or emotional trauma.

Client Learning Outcomes

- Neutralize stressful emotions that deplete health and mental and emotional resilience.
- Increase the ability to think clearly and find more efficient solutions to problems.

General Outline and Script

1. Practice the Quick Coherence Technique to prepare to prepare yourself for action. Access your feelings of care and confidence. Your coherence when working with panicked clients is important.

2. Help clients ground themselves in the present moment. This can be done by making direct eye contact, reaching out and touching them on the back of the arm or shoulder (if it is ethically appropriate).

3. Lower the pitch of your voice and speak slowly and simply in a direct manner.

4. Follow this sample script:

Connect with the client and, if appropriate, touch her arm. Introduce yourself.

- Hello, I am _____

Take a slow and deliberate breath and do a five-second Quick C - herence.

- I will be working with you for the next 10 minutes and we will help you feel calmer. I want you to work with me to slow your breath rate a little to help your body remember to feel calm.

Notes

Introduce the concept that change – as it relates to the established goals for treatment – can feel uncomfortable until new patterns become familiar.

In your initial discussion of the client's life stressors, it helps to remember to:
- Allow the experience and expression of feeling.
- Reflect what you hear and see.
- Do not push for catharsis.
- Focus on body sensations because it helps the nervous system unwind from chronic stress overload.
- Lead the client away from intensely painful affect and focus on instruction of the tools if the person seems emotionally overwhelmed.

"A mere 5 minute session learning HeartMath techniques utterly changed my entire outlook, energy, aura, you name it. No more burnout symptoms. I was more than astounded. For me, it was earth-shattering. Better yet, it was ignorance shattering. The process works. For several days afterwards, I sat in bliss in the Operating Room just breathing through my heart. Since then, I've slacked off the practice since I've felt so good. I have not needed it as much. It worked. I'm very familiar with all the stress literature, but to actually DO it and feel it was a whole other story."
-Dr. Tom Sinclair, Anesthesiology

Watch the client's breath rate and help her focus on breathing out rather than breathing in.

- Breathe out…

Silently count to yourself, two, three, four,

- Breathe in…

Silently count to yourself, two, three, four,

- Let your out-breath be slow and easy…

Silently count to yourself, two, three, four,

- Then in again

Silently count to yourself, two, three, four,

Watch that the client's breaths are not too deep, and look for signs the person is starting to relax – beginning to swallow or the muscles in their face and shoulders are relaxing. If you see signs the client is relaxing, point it out.

- I see your shoulders relaxing and that you are breathing easier. Let's keep doing this for the next couple of minutes.

You may want to solicit her acknowledgement that she is calmer and more relaxed by asking:

- What are you noticing right now?

This type of question helps the client ground in the present moment and experience shifting physical and emotional states.

Prepare the client to address the issue or situation that is causing the stress response by asking

- As we discuss the issues that are unsettling, is it okay for me to help you remain calm?

Asking permission helps the client shift from feeling victimized to feeling empowered.

Reassure the client that you are going to stay with her or him to help and if there are other needs, you will try to meet them.

Depending on the situation, hook the client up to an emWave Pro, emWave2 or Inner Balance Trainer. Explain how to breathe with the device and try to keep the coherence indicator blue or green.

Teach the steps of the Heart-Focused Breathing Technique, explaining the steps as the client practices them.

The Heart-Focused Breathing Technique helps reduce the impact of stress on your mind and body and reduces the energy drain, so you can feel more renewed. Neutralizing the reaction allows you to step back from your racing mind and your emotionally charged feelings. This gives you a chance to pause your emotions and thoughts long enough to consider the consequences and options.[128]

You can use Page 2 of the Depletion to Renewal Plan to walk through the Heart-Focused Breathing Technique step with the client **Step:** 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.

If client has difficulty focusing, suggest: "If you like, you can put your hand over your heart. Close your eyes."

(Optional) Use the Coherence Coach or Mandala on the emWave Pro or Inner Balance Trainer as a point of focus.

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Step 1: Step: 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)

Continue until you have neutralized the emotional charge around the issue.

Once you have become familiar with this step, use the quick step to get neutralize stress:

Heart-Focused Breathing

9.7 Group Protocols

The easy-to-us emWave2 or Inner Balance Trainer is an excellent tool to utilize in a group setting. Coherence in a group setting increases emotional access and openness. Coherence also allows the educational content of a group to be received more efficiently because of the increase in cognitive function. One of the main benefits of the HeartMath tools and technology is the vulnerability that typically is increased in group contexts. Among the most beneficial aspects of coherence in a group setting are the improved self-regulation and individual emotional-management skills that facilitate communication among group members and greatly reduce group disruptions. These self-management skills minimize distractions for all age groups and decrease facilitator intervention related to negative behavior in younger group populations.

HeartMath has been effectively utilized in many different group settings, including anger-management, alcohol and drug abuse and domestic-violence groups. The group protocols, whether implemented in a classroom or a therapists office, allow for instruction of the self-regulation techniques and technologies with any topic and provide flexibility for facilitator creativity and program adjustment.

Client Learning Outcomes

- Identify depleting emotions that impact health and well-being.
- Neutralize and replace stressful emotions that deplete health and mental and emotional resilience.
- Regain vitality by stopping energy drains.
- Increase the ability to think clearly and find more efficient solutions to problems.
- Understand the difference between coherence and incoherence.

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- Incorporate the emWave2 or Inner Balance Trainer into personal practice.
- Observe and identify personal and therapeutic benefits gained from applying self-regulation tools.
- Increase the amount of time spent sustaining coherence.
- Shift the emotional and physiological dynamics that may be exacerbating medical conditions.
- Establish a new psychophysiological baseline.

General Outline

A strong structure in group interventions is crucial for success. The following steps offer a practical group structure which has proven effective in group uses for HeartMath.

- **Check In**

The therapist encourages discussions of emotional concerns and personal problematic issues that may have occurred since the last meeting. In addition, personal goals from the previous meetings should be explored, including checking for progress or shortfalls. This is the most effective time to implement a group practice of the Quick Coherence, Heart Lock-In or Attitude Breathing Techniques, depending on where you are in the process of introducing the techniques while utilizing the emWave2 or Inner Balance Trainer. It is best to start each meeting with a practice of a technique. This practice not only helps familiarize clients with the technique but shifts the group into a more coherent state, which can significantly facilitate coherent thinking and allow for more effective interventions and learning during group exploration.

- **Content**

The facilitator presents self-regulation tools and content related to the topic (anger, substance abuse, health, etc.). In this stage facilitators shift away from emotional expression and group processing to focus on teaching a topic, skill or concept. Participants are permitted to ask questions, but their interpretation and personalization of the material will be processed in the next stage of the group process. This stage is excellent for teaching the tools and relating them to the group's topic.

- **Connection**

Facilitators should encourage group members to discuss material previously presented in the content stage and encourage participants to share personal examples of how they have used a tool since the last meeting. This stage is valuable because participants are encouraged to make a personal life-related connection to the content.

- **Check Out**

Facilitators should encourage group members to develop goals they can maintain during the period leading up to the next meeting. These personal goals are reviewed during the check-in period of the follow-

ing group session. The goals should include specific tools to practice and, if appropriate, specific situations in which the tools should be used. For example, before engaging in activities that typically trigger reactions or if clients actually become triggered, they should use tools to regain their dignity and composure more quickly. If they have the emWave2 or Inner Balance Trainer for home practice, they could be given specific instructions on use (how many times to use them, how much time to spend in Green, etc.). Make sure clients have the appropriate worksheets for the tools they'll be expected to practice.

If group members have processed deep emotional content and are having difficulty transitioning to the closure of the group meeting, it can be helpful to take five minutes and practice the Quick Coherence, Heart Lock-In or Attitude Breathing Techniques to help with the transition.

HeartMath Group Intervention Protocol

The following protocol has proven effective for group implementation of HeartMath methods:

- Pre-test each client in the group during initial intake utilizing emWave Pro.
- Spend one group session educating clients on coherence and its application to the group topic or focus of the group (alcohol relapse, anger management, stress and anxiety reduction, etc.). Provide handouts that have the appropriate techniques and their steps. A progression of the different tools should be introduced in separate meetings. Allow time for practice, exploration and questions.
- Teach the Quick Coherence or Heart Lock-In Techniques in the second session.
- Implement a regime during check-in that includes five minutes of the Quick Coherence or Heart Lock-In Techniques while each group member uses an emWave2 or Inner Balance Trainer.
- Upon group termination perform HRV measures to identify overall improvement in functioning.
- Provide clients with both pre- and post-measurement results, as this encourages ongoing self-change.

Clinical Context

A therapist recently introduced use of the emWave PSR (this was an earlier version of emWave2) into the protocol of an anger-management program for teens. These units were scheduled to arrive while one of the co-facilitators of this group was out of town. A second therapist decided to integrate their use into the group process while the first was away.

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At the time of the handheld emWave implementation, these youths already had been introduced to the emWave technology system and had been fascinated at its ability to read emotions. Clients occasionally were pulled from the group for five to 10 minutes and the therapists instructed them in how to use HeartMath tools and techniques in their daily lives. Therapists were unable, however, to achieve group coherence because of the limitation posed by having one person using the program at a time. Therapists had already utilized some forms of peer mentoring for coaching newer group members on coherence, but the distraction of pulling clients from the group often was counterproductive because of the distractibility of these activated clients.

This particular group was comprised of street-hardened youths that had been immersed in a life filled with gang violence, drug use and criminal activity. They were court-ordered to participate, with their probation officers' knowledge, in group therapy, which they resisted because they were ordered to attend the program. The group had been instructed that they would be utilizing these tools for emotional balance and to achieve coherence. After they achieved coherence, the group would move into the emotional check-in process for the week. This was slightly delayed because they became fascinated, animated and excited when the emWave2 was first introduced. After several minutes of trying to get the group to focus on their emotions, the therapist decided to allow them to play for two minutes and measure their changing emotions as they coaxed each other by making jokes and stirring each other's emotions. The entire group was entranced by a technology that could show emotion shifts. After the first few minutes, the therapist called the group to order and instructed them to begin using the Heart-Focused Breathing Technique. When they started moving closer to coherence, he asked them to switch to the Quick Coherence Technique.

Some group members struggled initially, but the majority began achieving medium and high coherence levels. When one group member achieved high coherence competition pushed others to measure up. For the first time, group members were challenging each other to become healthier.

Initially the content focused on the links between their acting-out behaviors with their emotional experience. For many of the participants, it was a relief to find the source of their persistent life distress, and, more important, to have the HeartMath tools to shift their overstimu-lation. As they became empowered with the Heart-Focused Breathing, Quick Coherence and Heart Lock-In Techniques, several of the group members became passionate about applying HeartMath tools and techniques to their lives.

The immediate impact of group coherence was witnessed following use of the handheld units, when the group moved to the content, or educational portion of the group sessions. This group had a mix of youth, many of which had been labeled as ADHD and bipolar, and the majority of which had been traumatized. For the first time in the therapist's many years of work with this challenging population, there was no longer a challenge to get participants to focus on the group topic during the content section of the sessions.

The youths in this particular group had been expelled from many schools for their lack of involvement and continuous acting-out behavior. As group coherence was achieved each week, the participants began to act out less in the group and outside of the group setting. Parents and school staff began reporting dramatic improvements in student behavior: The successful results of the intervention were being noticed in the community.

The most astounding impact that coherence had on the group process was a shift in the access to emotions that had been repressed for such a long time. As the participants began to discuss their emotional memories, they started to open up emotionally at a level they had never previously demonstrated. They began to share the traumatic life events that had been held secret in previous assessments and interventions.

One group member became vulnerable after having been virtually silent for the previous three weeks prior to introduction of the emWave2. She openly disclosed a sexual-assault event for the first time with the entire group. Her level of vulnerability became contagious, spreading throughout the group and the healing for these damaged youths began to unfold.

The emotional access was so dramatically different that the co-facilitator was shocked when he returned from a three-week vacation. He was astounded to witness the dramatic improvement in the group members' behavior, their levels of compliance, investment and emotional vulnerability. As the participants sustained coherence throughout the next few weeks, the therapists could intervene at a level they hadn't been able to because of resistance and distractions.

Sometimes it was difficult to transition toward finishing up with the group for the week. The openness had reached a level at which closing down left many individuals feeling vulnerable even after substantial processing. After the therapists worked with two groups that utilized this protocol, they decided to have participants use the emWave handheld right before the end of the week when members were struggling with the transition from working to stabilize themselves and reset emotionally to their hectic outside lives. Each group member was encouraged to achieve coherence.

Upon achieving coherence during checkout, each member was required to set a goal for life change. It could be a simple life change, but the goal had to have measurable results. Members had to set their own goals to encourage personal investment and follow-through. Participants were held accountable for their goals each week during check-in by the facilitator and other members of the group. As time progressed, many of the group members' goals focused on practicing HeartMath tools and applying their new skills to specific life stressors outside of the group. They experienced much success in utilizing these tools and techniques and they were able to more effectively self-regulate their emotions and improve their quality of life.

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Chapter 10

Frequently Asked Questions

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What if the client cannot identify a positive feeling or find anything to appreciate?

When a client is unable to clearly identify and recapture a positive feeling, usually it is because the individual is trying to identify a big feeling. Note that feelings such as love often have a bitter and a sweet side to them. Try having the client select very simple things such as a favorite food or the feeling of being able to sleep in for a few extra minutes. Simple activities such as walking on a beach at sunset or playing with a pet may be enough for the client to begin to feel the subtle shift toward appreciation or care. For teenagers, it may be the feeling they have when skateboarding, listening to their favorite music or getting a really good deal at the mall. Remind the client that even a sincere effort to recapture feelings of appreciation and care will begin to influence their systems positively and that this activity, much like exercise, may be difficult at first, but their ability at it will increase, not unlike how a muscle gets stronger through regular use.

Clinicians should looks for subtle shifts in clients such as a spontaneous smile, change in posture and muscle tone, increased swallowing or spontaneous laughter and then bring these to clients' awareness to help them identify when they make positive shifts. Use your own intuition as a guide to help your clients begin seeing their successes.

What if the person has alexithymia?

Alexithymia is defined by:

- Difficulty identifying feelings and distinguishing between feelings and the bodily sensations of emotional arousal.
- Difficulty describing feelings to other people.
- Constricted imaginal processes, as evidenced by a paucity of fantasies.
- A stimulus-bound, externally oriented cognitive style.[132]

Dr. Peter Sifneos and John C. Nemiah of Harvard first described this set of symptoms as a condition of extreme difficulty talking about emotions. The patients they described had stiff postures, over focus on functional details and a barren fantasy life. These patients often could identify that they had depression or anxiety, but they had a limited emotional vocabulary, using words like happy, unhappy, angry or irritated, to describe their feelings.[132]

Bagby and Taylor further identified two kinds of alexithymia, primary alexithymia, which is more of an enduring psychological trait, and secondary alexithymia, a state that is dependent upon and disappears after a stressful situation has changed. This may be present in cases of post-traumatic stress, physical trauma or other illness.[133] Using HeartMath techniques with these individuals requires patience and encouragement. Clients typically have difficulty identifying, describing and working with their feelings. They may find that working on emotions produces symptoms of anxiety or depression and often will be unable to tell that the change in autonomic arousal symptoms is separate from their feelings of stress, even if there are improvements in coherence ratios. These clients also will have dif-

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ficulty understanding the emotions of others. They can still benefit from coherence training, but at first they may only be able to produce coherence through rhythmic breathing.

These challenges commonly are encountered in therapy with children and adults with autistic spectrum disorders such as Asperger's syndrome, nonverbal learning disorder, pervasive developmental disorders and also with clients who have PTSD and traumatic brain injuries.

Clients with secondary alexithymia may limit their use of emotions in a self-protective way to avoid recalling overwhelming emotions. Often those with both primary and secondary alexithymia tend to have difficulty identifying creative or novel solutions to problems involving emotional response, so techniques like Freeze Frame may be frustrating to them.

You can use the following line of questioning, while working with the Attitude Breathing Technique, to help these types of client identify a positive emotion:

- If the emotion or feeling had a color, what color would it be?
- If it had texture, what would it be?
- If it had a size, how big or little would it be?
- If you could feel this emotion, where would you feel it?
- If it had an odor or smell, what would it smell like?
- If it had a temperature, how hot or cold would it be?
- If it tasted like something, what would it taste like?
- If it made a sound, what would it sound like?
- If it had a voice, what would it be saying to you?
- If it belonged to someone, who would it belong to?

After asking such questions, read back their descriptions of the attitudes or emotions they would like to feel or experience, being sure to use the same descriptors letting them make any changes or corrections. Next, have them work on the first stages of the Attitude Breathing Technique with recognizing an attitude you want to change, focus on your heart and breathe. Quietly review the descriptions once again when using the emWave technology on lowest challenge level, without sound. Point out when they begin sustaining coherence and ask them to tell you what they are experiencing. When you see sudden changes in the heart-rhythm patterns, you may ask them to tell you what they were thinking or experiencing. Depending on the clients and their tolerance, work with this exercise for a few minutes only, or you may extend it for an entire session, depending on their goals and how you perceive the tolerance level.

What if the person is uncomfortable breathing slowly?

First, remember that the emotional refocusing and restructuring tools, not simply the breathing rhythm, are the emphasis of the HeartMath System. Breathing practices have been around for thousands of years. Although they're helpful for calming, shifting attitudes and strong emotions it requires more than breathing. Clients will benefit from learning how to identify their depleting attitudes and emotions

and replace them with more renewing ones. HeartMath research on the process teaches them how to increasingly shift the significance out of negative emotions and build replacement attitudes. This is done by learning to engage the power of their heart's intent. Learning to breathe properly, however, is an important part of the process, and it is true that a person often can initially increase coherence through breathing at six breaths per minute, but the power to sustain change is in learning healthy emotional self-regulation. We recommend that in the beginning you work with the client in a comfortable seated position. When a client is used to breathing in an irregular pattern or above 15 breaths per minute, the individual may find it difficult at first to change to a slow rhythmic pattern. Clients may report feeling light-headed or dizzy at first. If this happens, use the Coherence Coach and have the clients select a comfortable breathing rate, and when ready, help them decrease the pace toward an easy five breaths per minute while practicing sustaining a positive heart feeling.

If clients continue to have an irregular breathing pattern, remind them that it's not necessary to take a big breath. The focus is on the breathing pace and to take an easy breath that is usually a little longer. Encourage clients to focus on a slow outbreath and then let the inbreath simply be a rebound to breathing out. It may take several sessions for clients to be comfortable with this slower rhythmic breathing. Remember: Emotional refocusing and restructuring tools are the most important factor, so don't overfocus on breathing or breath rate at the expense of learning to shift the feeling or breathe the new attitude. Remember that the slow breathing may be unfamiliar to clients' present physiological baseline of the cardiovascular system and time may be needed to change and adjust, so encourage them and reinforce any positive changes as you go.

When do you raise the challenge level?

The four challenge levels represent four levels of difficulty in all the emWave technology. There is no specific rule that says when to change a challenge level, but there are some general guidelines that will help the clinician make this decision. One is that on different days there will be variance in the coherence ratio. We suggest that when clients are able to reach a coherence score (by adding the medium and high scores together) of 80% on a consistent basis (for example three or four 20-minute trials), they may be ready to increase to the next challenge level. Most clients will complete their training at the medium or high challenge level. There is no need for all clients to progress to the high or highest levels to make significant lasting changes. If a client continues struggling to maintain higher coherence at the lowest level without medical or medication artifact, then, when possible, the individual should continue learning to sustain coherence. Clients who after consistent prolonged practice cannot reach beyond the lowest level may have significant unresolved emotional or physical issues that require thoughtful evaluation by practitioner and client.

Another way to increase the challenge and improve the generalizability of training is to increase the times and places that clients can maintain a coherent state. This is similar to systematic desensitiza-

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tion to stressful triggers. For example, once clients can maintain coherence in a quiet inner-focused environment, have them try to maintain it while listening to someone speak, perhaps during a telephone conservation, etc., especially with people who push their buttons or in a sports or performance-training context, and while there is appropriate noise or other distractions in the background. There may be some specific distractions or anxiety-producing situations you can think of in the context of what typically triggers people with particular types of conditions.

Another consideration concerning the difference between challenge levels is a common report from clients and practitioners that at the low or medium levels during training many people are able to achieve a coherence score above 80% doing focused breathing only, without paying much attention to making and holding a sincere emotional shift. Likewise, many people at the high or highest challenge level report that they can only maintain a high coherence score by making and maintaining a sincere emotional shift.

What about clients with disabilities or heart conditions who don't respond to using an emWave device?

Clients who have physical limitations in their cardiovascular or nervous systems such as a spinal-cord injury, neurological disorders and asthma, or following heart surgery can still benefit from using the HeartMath emotional refocusing and restructuring tools and techniques, even if their breathing patterns are irregular or their heart-rate patterns limit successful use of the emWave technology.

What if the client only wants to use breathing and resists using the emotional restructuring or refocusing tools?

If you have clients who are resistant to emotional refocusing and restructuring tools initially, begin using the emWave technology and practice with the Coherence Coach or Mandala. Use the Depletion to Renewal Plan and encourage clients to keep track of their observations and perceptions. Make a list of people, events and things they have felt neutral or positive toward and try accessing these while they practice the breathing with the Coherence Coach. Remind them that their ability to feel positive emotions can grow much like a muscle does with exercise and if all they can do is make a sincere effort to find a neutral or positive emotion, that is a good place to start.

How do I improve compliance?

Look for and support even small changes. Encourage regular practice. Suggest that clients ritualize practice so it is something to look forward to rather than a homework-type task. Encourage clients to set up a system for regular use with criteria that include some or all of the following:

- Allow clients to participate in setting goals and subgoals.
- Use the Depletion to Renewal Plan as a way to record symptoms.

- Ask clients to record readily observable and meaningful behaviors.
- Provide adequate instruction as to why and how to self-monitor.
- Reinforce client's accuracy and completeness.
- Take time to review the client's records and make regular reference to the client's goals.
- Determine realistic scheduling, time commitment, transportation.
- Refer appropriate clients for time-management training.
- Pre-book a series of appointments.

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How do I bill insurance companies?

Because reimbursement requirements and standards vary greatly. We recommend you contact the insurer directly and inquire how biofeedback as an adjunctive modality is best covered.

The therapist should report exactly what was performed, including:

- Date of service
- Site of service
- Length of service
- Documentation of therapeutic intervention
- Patient's response to intervention, target symptoms and progress in achieving treatment goals
- Diagnosis
- Legible signature

What if my client will not adhere to my recommendations for treatment, wants to stop taking medications and only wants to practice the HeartMath interventions independently?

Below are sample disclaimer statements some therapists have used to help their clients know the importance of working with their prescribing clinician to make medication changes. It is advisable that you ask your clients to sign this disclaimer because some may decide to make medication changes because of the improvements in their psychosocial functioning, and they need to be reminded of the importance of consulting with their primary therapists and/or physicians when they want to change prescribed medications.

Disclaimer

I _____ agree that I will adhere to recommended treatments for my condition and not to change the dosage or stop taking my prescribed medication(s) without consulting with my therapist and/or physician who is managing the medication(s). Failure to do so may produce undesired side effects that may interfere with my therapy and my health.

The emWave® Pro, emWave2®, Inner Balance™ and the HeartMath® techniques are designed as tools for achieving individual balance, optimal performance, enhanced self-regulation and growth. Although both instruments and these exercises are believed to be safe and have potential benefit, no specific medical benefits or cures are promised or implied. These programs and exercises are not to be

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used as or used in lieu of any course of established medical or psychological treatment.

None of the feedback or summary data provided in the software is to be interpreted as medically or psychologically diagnostic, but rather as adjunctive to established medical diagnoses. Heart rate variability patterns differ widely from one person to another. There are no right or wrong patterns.

The coherence scores in the programs and games are especially useful for comparing one's own progress in increasing the ability to maintain a physiologically coherent state with practice; they should not be compared between individuals. Children who are unable to sit still may be unable to use the emWave Pro or emWave2 successfully, though they may well benefit from learning the emotional refocusing and restructuring tools and techniques.

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Appendix A

- emwave® Technology
  - emWave Pro Plus Checklist
  - emWave2 Quick Start Guide
  - Inner Balance Sheet

emWave® Pro Proficiency Checklist

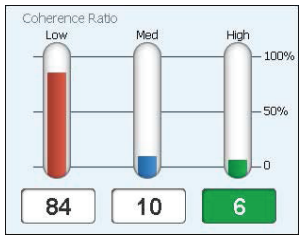
For basic operating instructions, follow this checklist to become familiar with the emWave Pro before training anyone in basic emWave operations.

Starting up the emWave technology, after downloading the software
Plug in your emWave hardware.

❑ Open up the main application window. This tool bar *(as shown below)* contains most of the basic operational choices with the Start and Stop buttons at the bottom.

❑ Start a new session by clicking on the Start icon at the bottom.

❑ Practice the Quick Coherence steps until the red bar (low coherence) falls below 50%. In this case, it is still relatively high at 84%.



❑ Stop session by clicking on the Stop button.

Coherence Coach/Games

❑ From the Home Screen, select the Games button and then select the Coherence Coach.

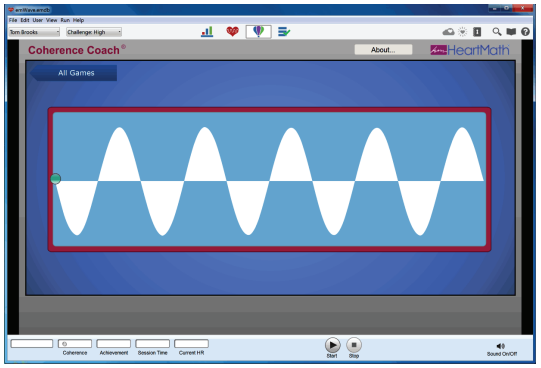
Click on the balloon icon to open up the games menu and then click on the Coherence Coach.

❑ Practice the Quick Coherence steps as you complete the Coherence Coach, adjusting the breathing pacer to the appropriate speed of the user.

❑ Click Exit All Games button, view your coherence ratios and HRV pattern after using the Coherence Coach.

❑ Move onto the following games, beginning with the shorter Garden game, next the Rainbow game, and finally the ten-minute long Balloon game.

❑ After each session, review the scores.



Review Saved Data

❑ From the Home Screen, click on the Review Progress icon at the top of screen.

❑ View accumulated session history.

❑ Select any saved sessions and review them.

Click on the 3 bars to review previous session.

Quick guide: emWave2®

Set up Mode

- ❑ Use your Ear Sensor while learning how to use your emWave2 technology
- ❑ To avoid inadvertently entering Basic Mode or Advanced Mode, do not hold or leave your thumb on the Sensor button
- ❑ Position the Ear Sensor on your earlobe
- ❑ Click the bottom of the Sensor Button to turn the device on
- ❑ Click on the top of Sensor Button to set the challenge level
- ❑ Click on the bottom of the Sensor Button to set the brightness level
- ❑ Locate Pulse Sensor light and observe change from red to blue

Active Session mode

- ❑ Observe the Breath Pacer in the Heart Action Strip
  - ❑ Inhale as lights scroll up
  - ❑ Exhale as lights scroll down
- ❑ Observe Coherence Level lights
  - ❑ Red = low (normal) coherence
  - ❑ Blue = medium coherence
  - ❑ Green = high coherence
- ❑ Practice the Quick Coherence® Quick Steps
  - ❑ Heart-Focused Breathing
  - ❑ Activate a positive or renewing feeling
- ❑ Observe accumulated lights at the bottom of the Heart Action Strip
  - ❑ Each dim bar = 5 seconds of coherence
  - ❑ Each bright bar added for every full Action Strip

Coherence Ratio

- ❑ As you practice the Quick Coherence Quick Steps, click the top of the Sensor Button
- ❑ Observe Coherence Ratio display
- ❑ Calculate Coherence Ratio
  - ❑ Dim light = 10%
  - ❑ Bright light = 20%
  - ❑ Top group = high coherence
  - ❑ Middle group = medium coherence
  - ❑ Bottom group = low coherence
- ❑ Turn the device off by pressing the bottom of the Sensor Button for 2 seconds

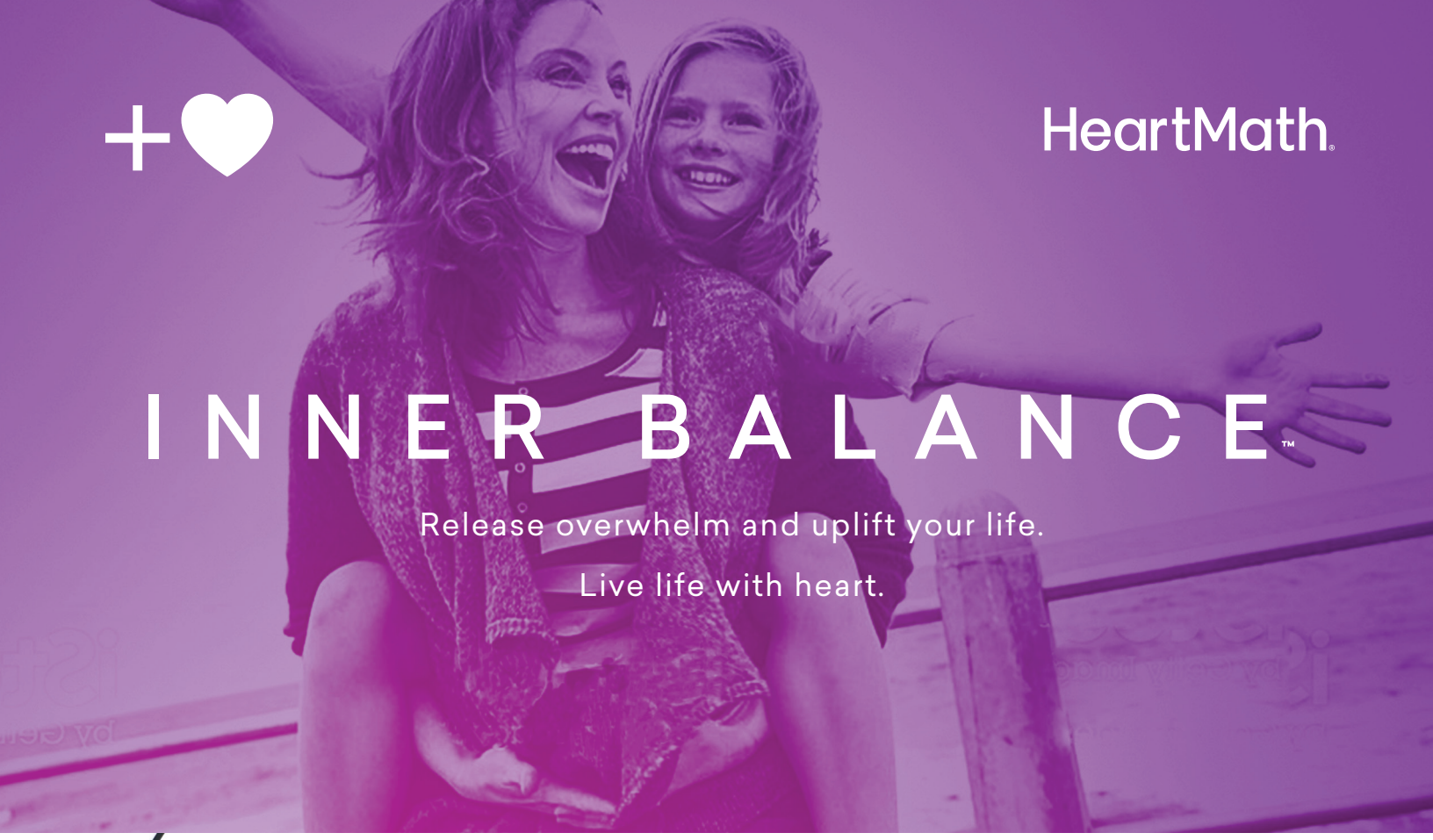
Quick Guide: emWave2®

HRV Mode

- ❑ Click the bottom of the Sensor Button to turn the device on
- ❑ Press down on the top of the Sensor Button for 10 seconds
  - ❑ 5 fast beeps indicate you're in Advanced Mode
- ❑ Observe the Heart Action strip as you practice the Quick Coherence® steps
- ❑ Calculate your HRV range
  - 4 bars = 5 BPM
  - 3 bars = 10 BPM
  - 2 bars = 15 BPM
  - 1 bar = 20 BPM

Stealth Mode

- ❑ Click the bottom of the Sensor Button to turn the device on
- ❑ Press down on the top of the Sensor Button for 10 seconds
- ❑ Press down on the top of the Sensor Button for 2 seconds to enter Breath Pacer mode
- ❑ Press down on the top of the Sensor Button for another 2 seconds to turn off all lights except the Coherence Level Indicator
- ❑ Continue to practice the Quick Coherence steps and observe changes
- ❑ Return to Basic Mode by pressing down on the top of the Sensor Button for 10 seconds
  - ❑ 4 fast beeps indicate you're back to Basic Mode
- ❑ Power off by pressing the bottom of the Sensor Button for 2 seconds



HeartMath

INNER BALANCE™

Release overwhelm and uplift your life.

Live life with heart.

What is Inner Balance?

This biometric wellness technology responds to your emotional state to help you improve overall wellbeing, health and happiness. Our thoughts and emotions influence everything we say and do – they even affect our heart's rhythms. Using the Inner Balance technology trains you to release stress producing thoughts and emotions - and real-time heart rhythm coherence* feedback confirms the positive lift you feel. Instead of waiting for outer circumstances to change, Inner Balance trainer helps you learn to create positive change from the inside out.

EXPERIENCE THE BENEFITS

- Release and prevent overwhelm
- Shift stress-producing emotional states
- Experience Inner Stillness
- Enhance mental clarity.
- Access intuition for making better choices
- Improve performance.
- Increase energy and resilience.
- Sleep better

For more information on any of our products please visit www.heartmath.com.

2+
Decades of HRV coherence research

250
Independent peer-reviewed studies

Recommended by thousands of health professionals

Over 100 countries

Millions of lives transformed

+♥HeartMath

"I use the Inner Balance trainer to create more stress-free states and to make more heart-coherent decisions. Many people don't know how to intentionally create the emotional states they want. This technology is ideal for easily and effortlessly accomplishing this."

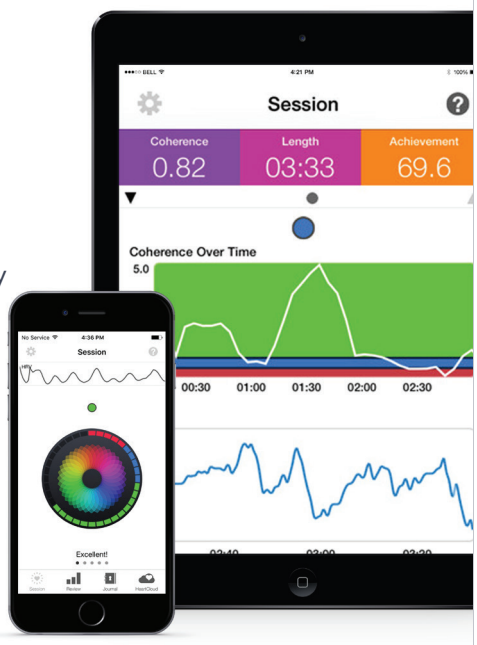
Jack Canfield, Co-creator of the Chicken Soup for the Soul® series, Co-author of The Success Principles™

How the Inner Balance Technology Works

With its specialized sensor, the Inner Balance trainer takes a pulse reading from your earlobe and translates the information from your heart rhythms into graphics on your device. Its on-screen prompts and audio program help to guide you to a balanced and optimal state called heart coherence. Learn to shift your emotional state and watch your heart confirm it!

INNER BALANCE FEATURES

- Onboarding video walks you through how to use the app and its features.
- Audio leads you through a quick and effective stress relief technique called Quick Coherence®.
- Each session displays real-time heart rate variability (HRV) pattern and coherence level.
- Encouraging on-screen prompts guide your practice and help you increase coherence points.
- Track and see progress over time with saved sessions.
- Connect to HeartCloudTM to earn awards, see your cumulative coherence points and gain the support of the global community of Inner Balance users.



About HRV & Coherence

Heart Rhythms are measured by Heart Rate Variability (HRV), a biometric reflective of our emotional states that offers a unique window into the communication between the heart, brain and emotional system. The HeartMath research team discovered that we can intentionally improve heart/brain communication by self-generating a highly beneficial physical and emotional state called "coherence." Simply said, when we are in coherence our heart, brain and nervous system work more efficiently and harmoniously. Coherence is associated with emotional balance and stability, improved mental clarity, and intuitive decision making.

Download the Inner Balance App

Available on the App Store | ANDROID APP ON Google play

For more information on any of our products please visit www.heartmath.com.

TECHNICAL SPECS

SKU
6450

DIMENSIONS
3-1/4 x 2-1/8 x 5/8in
82.55 x 53.9 x 15.87mm

WEIGHT
Weight .9 oz
(25.5g)

PACKAGING
Box Size 5-1/2 x 7 x 1-1/2 inch
(139.7 x 177.8 x 38 mm)
Weight 5.1 oz (144.6g)

SENSOR SPECIFICATIONS
Ear Clip Size
1-5/8 x 3/4 x 5/8 inch
(41.3 x 19 x 15.9 mm)

Cable Length
14 in (35.6cm)

Pod Size
2-5/8 x 1-1/4 inch x 1/2 inch
(66.7 x 31.7 x 12.7 mm)

For specifications on Inner Balance Lightning sensor go to heartmath.com.

14700 West Park Avenue
Boulder Creek, CA 95006
1.800.450.9111
www.heartmath.com

Appendix B

- Handouts
  - HeartMath® Techniques
  - My Depletion to Renewal Plan
  - Client handout: Stress and Coherence lyer

Heart-Focused Breathing™ Technique

The Heart-Focused Breathing (HFB) Technique is an easy-to-use, energy-saving self-regulation strategy designed to reduce the intensity of a stress reaction and to establish a calm, but alert state.

This technique allows you to take a "time-out" where you can step back and neutralize your depleting emotions.

We can gain benefit from conscious breathing if we use it to help us shift into and sustain a more balanced state, understanding that breathing is only the start of what we call the coherence-building process.

Step: 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.

Once you have become familiar with this step, all you need to remember is the quick step to neutralize stress.

• Heart-Focused Breathing

Use the Heart-Focused Breathing Technique anytime you want to:

- Stop the impact of stress on your body.
- Eliminate the energy drain.
- Remove the drama or significance of a situation.
- Helps neutralize emotional reactions in the moment.

List some everyday depleting situations and how you can benefit from applying the HFB Technique.

Situation	Depleting Response	How HFB Can Help

Specific applications:

_____

_____

_____

Heart-Focused Breathing™ Technique Personal Practice Log

Consider any stress triggers or potentially depleting reactions you experienced.
Write down the situation and what happened.

Date	Situation	Response	Observations

Write down any successes you are having with your practice.

Write down any challenges you are having with your practice.

Quick Coherence® Technique

The power of the Quick Coherence Technique comes from positive emotions. When you engage positive feelings, in the moment, you replace depleting emotions with ones that can renew your system. The technique is easy, but each step is important. With practice, the coherence you establish in your system becomes your new reference point making the shift easier and more automatic.

Step 1. 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 2. Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or something in your life.

Suggestion: Try to re-experience the feeling you have for someone you love, a pet, a special place, an accomplishment, etc., or focus on a feeling of calm or ease.

Once you have become familiar with these three steps, use the quick steps:

- **Heart-Focused Breathing**
- **Activate a positive or renewing feeling**

Use the Quick Coherence steps anytime you want to:

- Gain the benefits of positive emotions.
- Have a quick 30 second emotional adjustment.
- Get an extra energy boost.

List some everyday depleting situations and how you can benefit from applying the Quick Coherence Technique.

Situation	Depleting Response	How Quick Coherence Can Help

Specific applications.

Quick Coherence® Personal Practice Log

Consider any stress triggers or potentially depleting reactions you experienced.
Write down the situation and what happened.

Date	Situation	Response	Observations

Write down any successes you are having with your practice.

Write down any challenges you are having with your practice.

Quick Coherence® Technique Basics

The Heart-Focused Breathing™ step shifts your attention away from your depleting thoughts to your heart or chest area increases coherence in your system. Because changing the rhythm of your breathing changes the rhythm in your nervous system, when you breathe deeper and slower, 5 seconds in and 5 seconds out or 6 complete breaths per minute, you bring more order to your nervous system and the rhythm of your heart. Doing this anytime you feel stress has a powerful soothing effect on the entire body and will help you start to feel calmer.

Activate a positive or renewing emotion. Making a sincere attempt to experience a renewing feeling such as appreciation or care for someone or something in your life helps you sustain the coherence started with the Heart-Focused Breathing step, without having to remain focused on your breath. Many people find that when they experience positive feelings like care, love or appreciation while practicing heart-focused breathing through the heart or chest area, they immediately feel uplifted and regenerated. We call these *heart feelings* because they change how your heart is beating and because people often describe these feelings or emotions as *coming from the heart.*

If you are accustomed to having more negative, depleting feelings than positive, renewing feelings, breathing this way may feel uncomfortable at first because it's unfamiliar. For now, simply make a sincere effort to feel and hold the renewing emotions by recalling a positive or fun time in your life and reexperiencing it.

If it's hard for you to recall anything positive, write down some occasions when you felt an uplifting, positive feeling. This will help you remember how to recall one of them when you practice the Quick Coherence Technique. Even a sincere attempt to feel a positive emotion will reduce the drain and replenish your system.

Practice makes it easier to sustain coherence for longer periods of time. Coherence will become more natural and familiar to your system, making it much easier to remain calm and balanced in challenging or stressful times.

Heart Lock-In® Technique

The Heart Lock-In Technique helps you accumulate energy and renew and recharge your emotional system with these steps:

Step 1. **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.

Step 2. **Activate** and sustain a regenerative feeling such as appreciation, care or compassion.

Step 3. **Radiate** Radiate that renewing feeling to yourself and others.

This benefits them and especially helps recharge and balance your own system.

When you catch your mind wandering, simply refocus your attention on the heart area and reconnect with feelings of care or appreciation. After you're finished, sincerely sustain your feelings of care and appreciation as long as you can.

Once you have become familiar with these steps, use the quick steps:

• **Heart-Focused Breathing** • **Activate a regenerative feeling** • **Radiate**

Heart Lock-In Basics

The Heart Lock-In Technique is considered an emotional restructuring technique because it helps you instate or lock in new patterns. With practice, you'll learn how to sustain coherence for longer periods of time, making the coherent state your new reference point. Achieving coherence becomes more automatic and creates a cushion against recurring stress or other depleting emotions.

Most people find that practicing the Heart Lock-In Technique in a quiet place for five minutes or more a couple times a day helps to accumulate energy and recharge their emotional system. This cushions the impact of day-to-day stress or anxiety and other depleting emotions. When stressful feelings come up, many find a lock-in helps them maintain focus, make clearer decisions and dramatically reduce personal energy drain. It helps bring about more balance in your system. Sometimes more balance provides an energy boost and other times it helps slow down your system so that you are calmer and better able to relax

Feelings or attitudes you would like to radiate toward yourself or others

1. _____

2. _____

3. _____

If you are having difficulty feeling and sustaining a positive emotion, use the Quick Coherence® or Freeze Frame® techniques to help you identify perceptions or ideas that will help you increase positive feelings. Some find listening to background music that lifts your spirit can increase the Heart Lock-In's positive effects.

Additional Instructions: _____

Heart Lock-In® Personal Practice Log

Track your Heart Lock-In practice sessions.

Date	Time of Day	Observations before	Length	Observations after	Coherence Ratios (optional)
					L M H
					L M H
					L M H
					L M H
					L M H
					L M H
					L M H
					L M H
					L M H
					L M H

Write down anything you want to remember or other observations from your practice.

What successes are you having with your practice?

What challenges are you having with your practice?

Coherent Communication™ Technique

The Coherent Communication™ Technique is designed to create greater connection and understanding between the listener and speaker. As we know, heart to heart communication in Healthcare settings helps the patient/client tell their story and feel like they have been heard. Listening carefully helps them open up and disclose more information, especially if they perceive you are attentive and listening non-judgmentally.

When the patient/client learns this technique they can find benefits in interactions with family, friends, co-workers as well as other professional interactions they have.

Step 1. Shift into a heart-coherent state before communicating to effectively share and receive information.

Suggestion: Set an intention to be respectful of others' views or situations.

Step 2. Listen for the essence of what is being said without prejudging or getting pulled into drama before the communication is complete.

Suggestion: Remember to re-center in your heart if you start to overreact or lose emotional composure.

Speak from a genuine tone and consider what you are going to say and how it may affect others.

Step 3. During important or sensitive communications it's effective to confirm the essence of what you heard to insure mutual understanding.

Yet, when rushing communications, this is the step most of us forget.

Coherent Communication Quick Steps

1. **Shift into heart coherence**
2. **Listen for the essence;**

Speak with a genuine tone

3. **Confirm mutual understanding**

Practicing coherent communication can shorten meeting times, create more harmonious interactions, align team members, reduce stress, drama, energy drains and foster mutual respect among co-workers and team members.

Ask your patient/client to practice this technique once a week in different scenarios: with family, friends, co-workers or strangers.

Attitude Breathing™ Technique

Attitudes, just like emotions, can either be depleting or renewing. The Attitude Breathing Technique helps you replace draining, negative, attitudes with healthier positive ones.

Step 1. **Recognize** a feeling or attitude that you want to change and identify a replacement attitude.

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. **Breathe** the feeling of the new attitude slowly and casually through your heart area.

Unwanted Feelings & Attitudes	Replacement Feelings & Attitudes
Stressed	Breathe Ease
Anxious	Breathe Calm
Overwhelmed	Breathe Ease and Peace
Bored	Breathe Responsibility
Judgmental	Breathe Tolerance
Fogged/Confused	Breathe Ease for Clarity
Angry/Upset	Breathe Ease to Cool Down
Fatigued	Breathe Increased Energy
Shame/Guilt	Breathe Self Acceptance and Forgiveness
Financial Worries	Breathe Abundance
Isolated/Lonely	Breathe Being Connected and Appreciated
Rebellious	Breathe Respect
Self-pity	Breathe a Feeling of Dignity and Maturity

Attitude Breathing Basics:

- Often the replacement attitude can be obvious, but it takes breathing the feeling of the new attitude to make it real. For example, if you feel angry, you may want to replace it with calmness, but this requires breathing the feeling a while until you actually feel calmed. Then you have made the energetic shift.
- If you are not clear on the new replacement attitude, remember: A neutral attitude works to stop the energy drain, which is especially important during an emotional storm. Remember to breathe slowly and casually. Do this for awhile to get the full benefits of the technique.
- For some deeply ingrained attitudes, you may need to breathe the new attitude earnestly for a few minutes before you experience a shift. Have a genuine '*I mean business*' attitude to really move your emotions into a more coherent state and shift your physiology.
- Some attitudes are stubborn and reoccur. When they come back, practice breathing the new attitude. Imagine pulling in and anchoring the new feeling.
- Even if a bad attitude feels justified, the buildup of negative emotional energy still drains your system.
- If you can't identify a replacement attitude, breathe a feeling of neutral to stop the energy drain.

Attitude Breathing™ Personal Practice Log

Consider any stress triggers or potentially depleting reactions you experienced.
Write down the situation and what happened.

Date	Situation	Depleting Attitude	Replacement Attitude	Observations after Practice

Write down any successes you are having with your practice.

Write down any challenges you are having with your practice.

Freeze Frame® Technique

The Freeze Frame technique gives you a chance to find more efficient options and resolve problems and conflicts that may be depleting your energy. Your ability to think more clearly and objectively is enhanced by the increased coherence you create in your system using the following steps:

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. Now that you have added more coherence to your system, you can see the issue from a broader, more balanced perspective.

Now that you have added more coherence to your system, you can see the issue from a broader, more balanced perspective.

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 have become familiar with these steps, use the quick steps:

1. **Acknowledge**
2. **Heart-Focused Breathing**
3. **Activate a positive or renewing feeling**
4. **Ask**
5. **Observe and Act**

Freeze Frame Basics

The Freeze Frame Technique helps you slow down your mental and emotional reactions so you can become more aware of subtle emotions and attitudes that are depleting your system and find ways to handle or respond to these situations.

We use the term "Freeze Frame" because this process is a lot like pressing pause on a video. The technique helps you stop your "stress movie" for a moment so you can edit the frame and create a different outcome. First take a time-out to identify what you're thinking and feeling and how you're reacting. You can see how judgments or other depleting emotions lurk beneath the surface. Next, you bring more coherence to your system by shifting the emotions and attitudes that may be coloring your perceptions and adding to your stress. Once your system is in sync, you increase your awareness and a new intuitive response emerges. You are better able to see the bigger picture and other options.

Write down depleting situations you would like to change and the changes in perception, impressions or ideas you got after you did the Freeze Frame steps:

Depleting Situation	Change in Perception

Additional instructions: _____

Freeze Frame® WorkSheet

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

Notice whether you feel stressed even as you write this down. Breathe through the heart or chest area with a neutral attitude to help you become more detached from the problem.

Focus your attention in the area of the heart. Imagine your breathe is flowing in and out of your heart or chest area.

Activate a positive or renewing feeling.

Ask yourself what would be a more efficient, effective attitude, action or solution.

Now, quietly **observe** any subtle changes in perceptions, attitudes or feelings and sustain as long as you can. Commit to sustaining beneficial attitude shifts and **acting** on new insights.

Write down your coherent response.

What actions will you take to resolve the issue?

Freeze Frame® Personal Practice Log

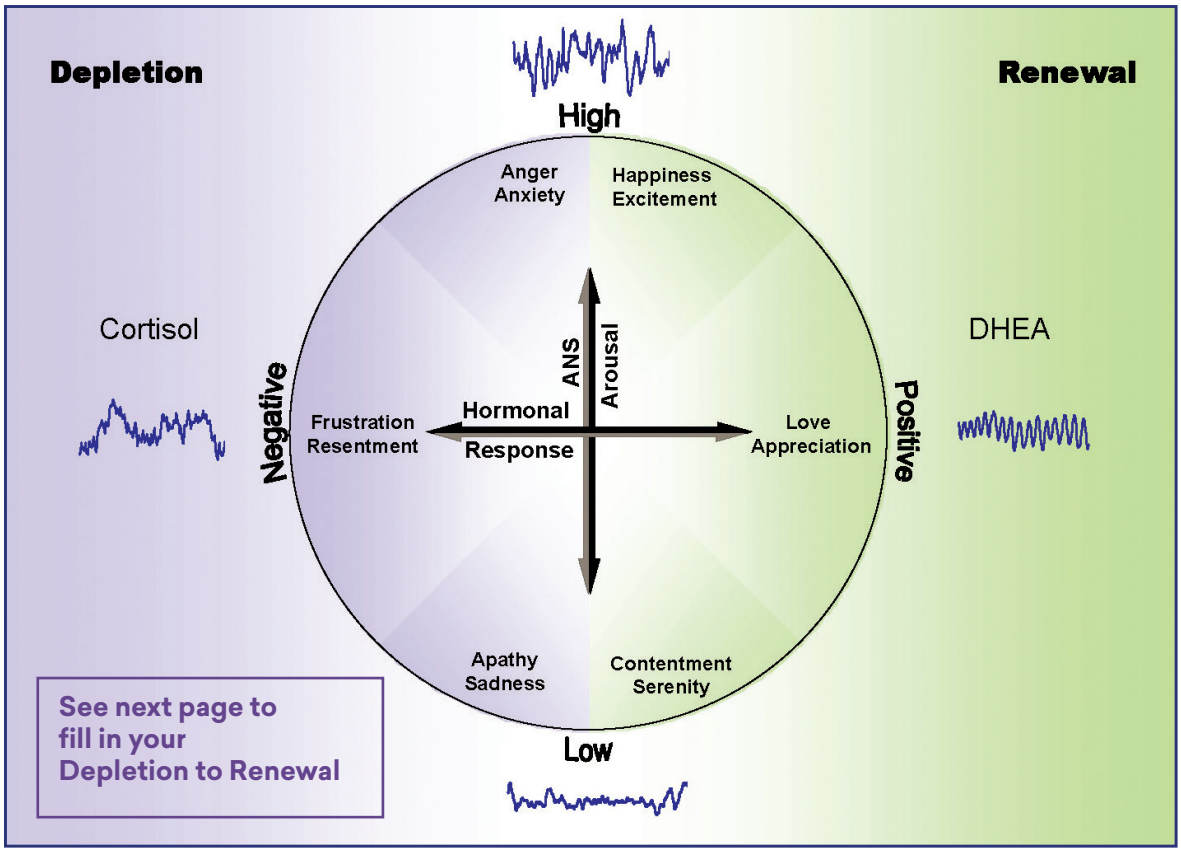
Consider any stress triggers or potentially depleting reactions you experienced.
Write down the situation and what happened.

Date	Situation	Response	Observations

Write down any successes you are having with your practice.

Write down any challenges you are having with your practice.

Depletion to Renewal™ Plan



Step 1
What do you hope to accomplish?

Step 5
What emotions and behaviors typically get in the way of accomplishing your goal?

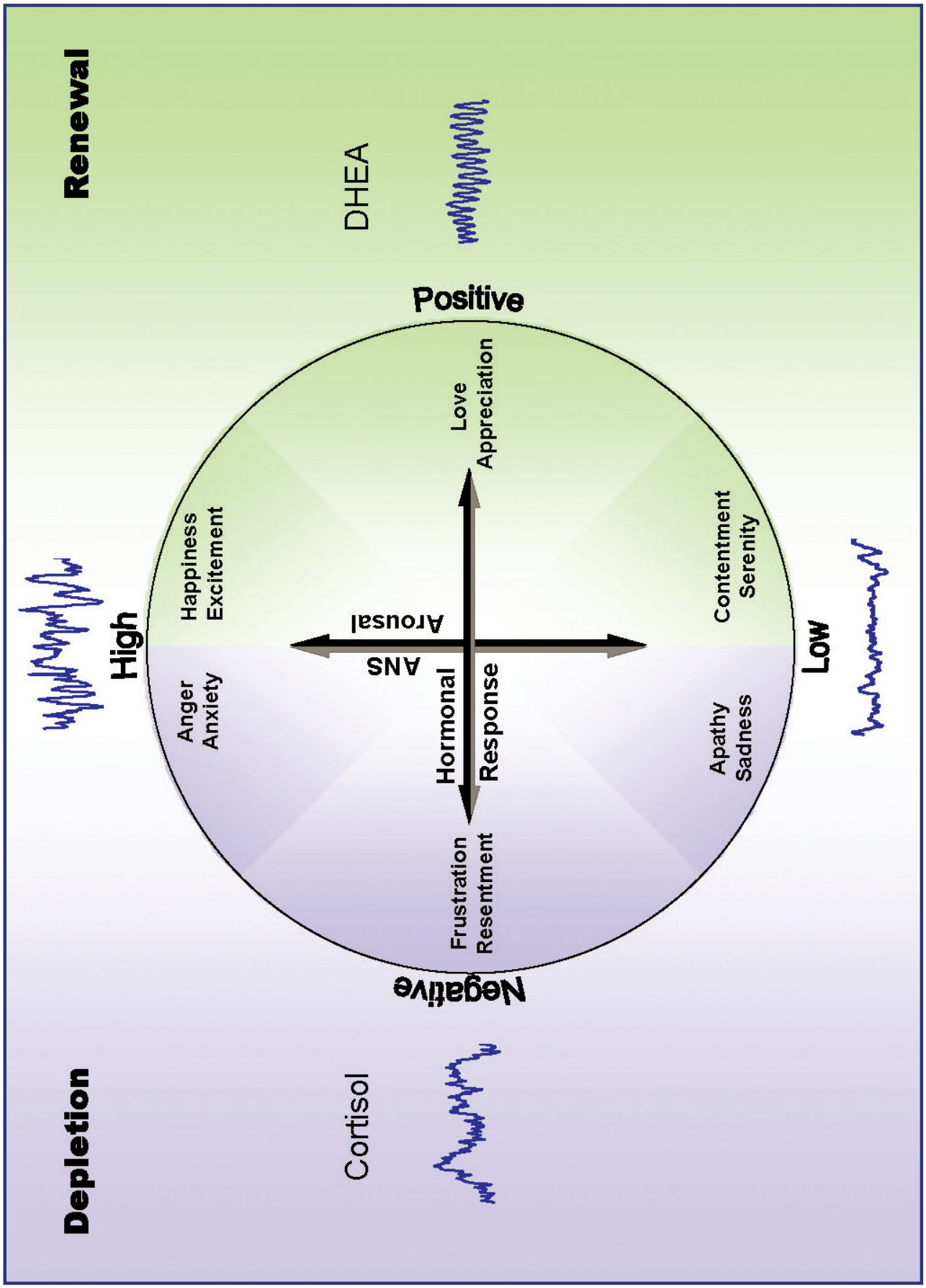
Step 2
Consider all the emotions you have been experiencing over the last few days and write them in the appropriate quadrant.

Step 6
What thoughts, attitudes, behaviors or emotions will help you achieve your goal?

Step 3
Write the word 'Now' where you spend most of your time.

Step 4
Write the word 'Goal' where you would like to spend more time.

Rx



Appendix C

- Forms
  - HRV Measurement forms
  - Baseline form

HRV Observations

Name: _____

Baseline Date:

Resting State HRV Assessment

Recording length _____

Heart Rate _____

Normalized Coherence _____

HF power _____

LF power _____

VLF Power _____

1-Minute Deep Breathing Assessment

Mean Heart Rate range (MHRR) _____

Normalized Coherence _____

Observations:

_____

_____

_____

_____

_____

Follow-up Observations Date:

Resting State HRV Assessment

Recording length _____

Heart Rate _____

Normalized Coherence _____

HF power _____

LF power _____

VLF Power _____

1-Minute Deep Breathing Assessment

Mean Heart Rate range (MHRR) _____

Normalized Coherence _____

Observations:

_____

_____

_____

_____

_____

Psychophysiological Observation

Client Name: _____ Date: _____ Time: _____
Diagnosis: _____
Reason(s) for Referral: _____
Client's goals: _____
Strengths: _____
Barriers to goals: _____
Medications: _____

Initial Observations

Caffeine within the last 2 hours: ❑ Yes ❑ No Alcohol or other drugs within the last 12 hours: ❑ Yes ❑ No
Last night's sleep: ❑ very poor ❑ poor ❑ neither poor nor well ❑ well ❑ very well
Breathing pattern: Fast (more than 15 breaths per minute) Slow (fewer than 5 breaths per minute)
#_____ breaths per minute; #_____ of sighs; #_____ sudden intake of breath
Client mood: _____
1-Minture deep Breathing Assessment: HR_____
Mean Heart Rate range (MHRR) _____ Normalized Coherence _____
Clinical observations: _____

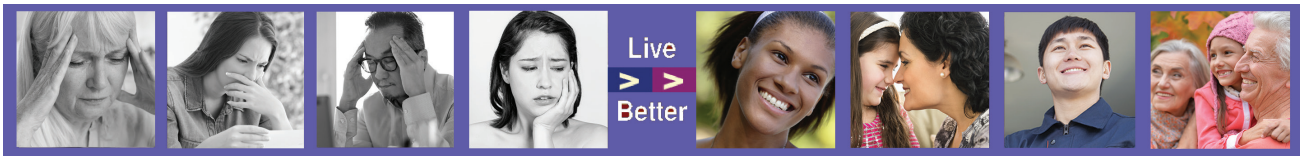
First training session:

Protocol:
emWave® Challenge Level: _____ Sound ❑ On ❑ Off
emWave screen: ❑ Coherence Ratio ❑ Full Screen ❑ Power Spectrum
❑ Emotion Visualizer® ❑ Coherence Coach®
Coherence Building Skills: ❑ Heart-Focused Breathing™ Technique ❑ Quick Coherence® Technique
❑ Freeze Frame® Technique ❑ Attitude Breathing™ Technique
❑ Coherent Communication™ Technique ❑ Heart Lock-In® Technique
Homework: ❑ emWave® Pro ❑ emWave2 ❑ Other: _____

Interim Report **Session #** _____ **Date:** _____
Client mood: _____
emWave Challenge Level: _____
Coherence Ratio: % Low _____ % Medium _____ % High _____ HR _____
Coherence Building Skills practiced: _____
Clinical observations: _____
Recommendations: _____

Interim Report **Session #** _____ **Date:** _____
Client mood: _____
emWave Challenge Level: _____
Coherence Ratio: % Low _____ % Medium _____ % High _____ HR _____
Coherence Building Skills practiced: _____
Clinical observations: _____
Recommendations: _____

The Impact of Stress and the Basics of Heart Coherence



What is stress?

Stress is a term used to describe the wear and tear the body experiences in reaction to everyday tensions and pressures. Change, illness, injury or career and lifestyle changes are common causes of stress. It's how we respond, however, to the emotional pressure and tension we feel from the little everyday hassles–rush-hour traffic, waiting in line and too many e-mails–that do the most damage.

How does stress affect health?

Stress affects people physically, mentally and emotionally. According to the American Institute of Stress, up to 90% of all health problems are related to stress. Too much stress can contribute to and agitate many health problems, including heart disease, high blood pressure, stroke, depression and sleep disorders.

How stressed are you?

Everyone responds to stress differently. Take this quick test to see if you are experiencing stress. The items you check will reveal how much stress is affecting your life.

- ❑ I feel overly tired or fatigued.
- ❑ I often am nervous, anxious or depressed.
- ❑ I have sleep problems.
- ❑ I have repeated headaches or minor aches and pains.
- ❑ I worry about my job, finances, relationships.

What can I do about it?

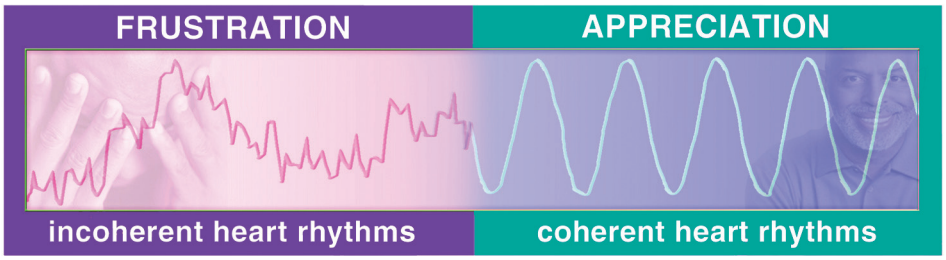
The first step is to understand how stress works. It's not the events or situations that do the harm, but rather how you respond to those events. More precisely, it's how you feel about them that determines whether you are stressed.

Emotions, or feelings have a powerful impact on the human body. Positive emotions like appreciation, care and love not only feel good, they are good for you. They help your body's systems synchronize and work better, as a well-tuned car. Research at the Institute of HeartMath has shown that when you intentionally shift to a positive emotion, heart rhythms immediately change. This shift in heart rhythms creates a favorable cascade of neural, hormonal and biochemical events that benefit the entire body. The effects are both immediate and long lasting.

The Impact of Stress and the Basics of Heart Coherence

How does it work?

When you're stressed, your body is out of sync. Negative/depleting emotions we feel when stressed such as anger, frustration, anxiety and worry lead to increased disorder in heart rhythms and the nervous system. In contrast, positive/renewing emotions like joy, appreciation, care and kindness create harmony in heart rhythms and the nervous system. Other bodily systems sync up to this rhythm, a process scientists call coherence. Because coherence leads to more mental clarity, creativity and better problem-solving abilities, it's easier to find solutions and better ways of handling stressful situations.



How can I create and practice physiological coherence?

The HeartMath® System introduces you to a powerful tool to help you increase physiological coherence. Use the Quick Coherence® Technique in your daily life to reduce the effects of stress and the emWave® technology to enhance your coherence practice.

The Quick Coherence® Technique

The Quick Coherence Technique is an easy way to interrupt the stress response and quickly bring your system into coherence. Practice this tool four or five times a day, every day for a minimum of three weeks. Use it as a quick stress manager prior to or during challenging events or situations. Good times to practice the Quick Coherence steps are first thing in the morning, before going to sleep at night and break time in the middle of the day, but you can use it anytime you want to rebalance or get an energy boost.

The Steps

Step 1. 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 2. Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or something in your life.

Suggestion: Try to re-experience the feeling you have for someone you love, a pet, a special place, an accomplishment, etc., or focus on a feeling of calm or ease.

Once you have become familiar with these two steps, use the quick steps:

1. **Heart-Focused Breathing**
2. **Activate a positive or renewing feeling**

Appendix D

- Certification Option
- Case Study Criteria and Procedures
- Alternative Case Study Guidelines for Publication

Appendix C: Certification Option

Certification is granted to those Candidates who demonstrate competency in and understanding of the information and processes presented in the HeartMath Interventions Course (HMI) by submitting a Clinical Case Study relevant to the Candidate's professional practice within six (6) months of completion of the HMI Classes.

A Certification Panel of at least two members of the HMI faculty will review the Case Study. Candidates who meet the criteria list below will receive a Certificate of Completion and granted status as a Certified HeartMath Practitioner.

Candidates whose Case Study does not meet the criteria will receive recommendations to be considered for a second review. 'Approval pending' candidates will have thirty (30) days to submit an updated report.

The Case Study shall be a descriptive report of the Candidate's assessment, treatment approach or plan and work with a specific client or patient, including, when appropriate, HRV graphs (emWave screen images) and other provided forms to illustrate assessments, progress and treatment approach.

Case Study Criteria:
To be eligible for Certification, this report must be submitted within six (6) months of the last Class. The length of the report should not exceed ten (10) pages, be submitted electronically via email and must meet the following criteria. Refer to CARE Checklist for an alternative Case Study format if considering publication.

- Required consent forms signed and filed.*
- A description of the Client's presenting problems or challenges including any observations that suggest the use of a HeartMath Interventions approach to treatment.
- A description of the Client's baseline assessment based on psycho-physiological or HRV observations that includes comments on what was observed and how these observations guided work with the Client. HMI forms are provided for this purpose.
- The Client's goals/objectives. The Depletion to Renewal (Plan) form is provided for this purpose.
- The rationale for choosing a specific HeartMath Interventions tool(s) or protocol(s) based on observations and goals.
- The Client's homework or practice plan. More specifically how the Client will integrate the coherence-building skills outside of the clinic (or school) setting to establish a new or healthier baseline. This should include how the Candidate will help the Client achieve his or her goals.
- The methodology used to observe, assess and adapt the Client's progress toward the treatment goals.
- A description of how the Client responded holistically to the treatment plan including the impact of HRV coherence on his or her lifestyle.
- Self-evaluation Report: A description or discussion of the Candidate's process. I.e. The personal and professional impact of using the HeartMath skills and/or protocols.

* Procedure for Submission of Case Study Report on next page.

Procedure for Submission of Case Study Report:

- Submit your Case Study Report within 6 months of your last Class.
- Complete and keep on file a signed copy of the Case Study Letter of Informed Consent. A copy of the form follows. Please do not send this form to HeartMath.
- When you are ready to submit your Case Study Report, sign and email a copy of the Confirmation of Informed Consent form to the Program Administrator. Your Report cannot be reviewed without this form. A copy of the form follows.
- Email your Case Study Report as an attachment to the Program Administrator. We cannot accept Faxed or mailed copies of your report.
- HeartMath will acknowledge receipt of your Report via email.
- You will receive email notification of the status of your certification within two weeks of submission.

Tips:

- We recommend you review the collection of Case Studies posted in the Resource Center Library to see how others successfully met the criteria.
- Check the Resource Center Forum for posts that explain how to insert HRV graphs and other emWave screen views into a word document. If you need further assistance, please contact Tech Support (800) 450-9111.
- To comply with Informed Consent, please make sure your Client's full name does not appear as 'User' on any emWave screen view or other forms you include in your report. If you need assistance on how to edit user information on emWave reports, please contact Tech Support (800) 450-9111.

HMI Program Administrator:
hmip.admin@heartmath.com
HeartMath LLC
14700 West Park Avenue
Boulder Creek, CA 95006

CASE STUDY LETTER OF INFORMED CONSENT

Date: _____

I, _____am a client/patient in treatment with_____ ('Practitioner'). In signing this consent form, I agree that my Practitioner can use anonymous information about my treatment in a case study being conducted by my Practitioner.

I understand that the case study relates to the training on HeartMath tools and technologies and this will contribute to my status as a HeartMath® Certified Practitioner. I understand that a summary of my treatment will be presented for evaluation by a panel of experts at HeartMath.

I grant authorization for my Practitioner to summarize my treatment with the full understanding that my anonymity and confidentiality will be preserved at all times. I understand that my full name or other identifying information will never be disclosed or referenced in any way in any written or verbal context.

I understand that my participation is entirely voluntary and that I may withdraw my permission to participate in this treatment at any point up to and including, the last day of _____.

I grant permission to use one of the following:

____ My first name only

____ Only a pseudonym

_____
Signature

_____
Date

CONFIRMATION OF INFORMED CONSENT

By signing this form I declare that

a) The Case Study I am submitting to HeartMath LLC as part of my HeartMath Interventions Certification Assessment Report is based on a real patient or client.

b) The client or patient signed the Letter of Informed Consent form provided by HeartMath.

c) I will keep the signed Letter of Informed Consent on file.

_____
Signature

_____
Name

_____
Title

_____
Professional License: Type, #, State

_____
Date

Email the signed form to hmip.admin@heartmath.com, prior to submitting your Case Study.

Case Study Guidelines for Publication

The HeartMath® Interventions (HMI) certification review panel receives many high quality case studies from those professionals seeking HMI certification status. HeartMath encourages graduates to consider publication of those case studies that address topics that may be of interest to the medical or psychology community.

More than 60,000 health-related articles are published monthly in medical jour-nals. Case reports, written without the benefit of reporting guidelines, are in-sufficiently rigorous to guide clinical practice, inform clinical trial design, or allow outcome comparisons across specialties.

Integrating systematically collected data from the "real-world" practice of healthcare with results from other clinical research will help deliver a more com-plete and higher-quality body of evidence. Guidelines strengthen the link be-tween clinical expertise and external evidence in evidence-based medicine.

In October 2012, the University of Michigan and *Global Advances in Health and Medicine* hosted a consensus meeting to develop health research reporting guidelines for case reports—the CAre REport (CARE) Checklist.

The HMI certification review panel adapted the CARE Checklist to also meet its case study criteria. Therefore, a report that adheres to the CARE guidelines may be submitted, along with a signed copy of the Confirmation of Consent form (refer to HMI Manual, Appendix D), for HMI certification in lieu of the format presented in the HMI course manual.

CAse REport (CARE) Checklist*

HeartMath

The Narrative: A case report tells a story in a professional narrative format that includes the presenting concerns, clinical findings, diagnoses, interventions, outcomes (including adverse events), and follow-up. The narrative should include a discussion of any take away messages and the rationale for any conclusions.

Section	Item	Description
Title	**1**	The words "case report" (or "case study") should be in the title along with phenomenon of greatest interest (e.g. symptom, diagnosis, test, intervention)
Keywords	**2**	Provide 2 - 5 words that identify the key elements of this case
Abstract	**3**	a. Introduction - How was this case unique b. Case Presentation: - The main symptoms of the client - The main clinical findings - The main diagnoses and interventions - The main outcomes c. Conclusion - What were the main "take-away" lessons from this case
Introduction	**4**	A brief summary of the background and context of this case
Presenting Client's Concerns	**5**	a. Demographic information of the client (age, gender, ethnicity, occupation) b. Main symptoms of the client c. Medical, family, and psychosocial history - including lifestyle and genetic information whenever possible. Please including details about relevant co-morbidities and past interventions including results
Clinical Findings	**6**	Physical examination (PE) with relevant findings
Timeline	**7**	A timeline that depicts important dates and times of important events (table or figure)
Diagnostic Focus and Assessment, *where applicable*	**8**	a. Diagnostic methods (e.g. HRV assessments, PE, questionnaires) b. Diagnostic challenges (e.g. financial, availability, language/cultural) c. Diagnostic reasoning including other diagnoses considered
Therapeutic Focus and Assessment, *where applicable*	**9**	a. Types of intervention (e.g. HeartMath techniques, emWave® training, medication, etc.) b. Administration of the intervention - How often, duration, etc. - Changes (with rationale) c. Adherence (how this was assessed)
Outcomes	**10**	a. Practitioner and client assessed outcomes b. Important test results (positive or negative) c. Adverse and unanticipated events
Follow up	**11**	A summary of the clinical course of this case including all follow-up visits
Discussion	**12**	a. The strengths and limitations of the management of this case b. The relevant medical literature that creates the clinical context of this case c. The rationale for conclusions (including potential causal assessments)
Client Perspective	**13**	The Client should share his or her perspective on the case whenever possible

*Adapted with permission from *Global Advances in Health and Medicine*.