



The Science Behind HeartMath®

The research supporting the HeartMath System which is comprised of techniques, tools and technology is based on over 18 years of psychophysiology, neurocardiology and biophysics research, as well as independently conducted clinical, workplace and organizational intervention and treatment outcome studies. Many of these studies have been done in collaboration with universities, research centers and major healthcare system partners. We also collaborate with the Institute of HeartMath, a non-profit research organization who is a recognized global leader in emotional physiology and stress-management research. Their research has significantly advanced the understanding of heart-brain interactions, heart-rate-variability, emotional physiology and the physiology of optimal learning and performance and provides the foundation of the HeartMath System.

Research showing the benefits of the HeartMath system on reducing stress and health risks, reducing PTSD, ADHD symptoms, and improving a broad range of cognitive functions, have been published in many peer reviewed journals including: *The American Journal of Cardiology*, *Harvard Business Review*, *Stress Medicine*, *Preventive Cardiology*, *Journal of Alternative and Complementary Medicine*, *Integrative Physiology and Behavioral Science*, and *the Journal of Advancement in Medicine*. Numerous outcome studies are currently taking place in many institutions such as Mayo Clinic, Arizona State University, Duke University, and VA Palo Alto Health Care System. In addition a study is underway to study the benefits of the HeartMath tools and emWave technology in soldiers deployed to Iraq and Afghanistan. Expected outcomes include, reduced stress symptoms such as sleeplessness, fatigue, and burnout, improved cognitive functioning in challenging situations and reduced incidence of PTSD, and depression.

The Science Behind the emWave® Technology

The emWave technology measures heart rate variability (HRV) in real-time and incorporates patented heart rhythm coherence scoring technology in both the handheld Personal Stress Reliever® and the PC based products. The analysis of HRV is recognized as a powerful, non-invasive measure that reflects heart-brain interactions and autonomic nervous system dynamics, which are particularly

sensitive to changes in stress and emotional state. Coherence is a term used by scientists to describe a highly efficient physiological state in which the nervous system, cardiovascular, hormonal and immune systems are working efficiently and harmoniously. Coherence is a state very similar to what athletes experience when they are in what is called "The Zone". Research shows that when we activate this state, our physical systems function more efficiently, we experience greater emotional stability and we gain increased mental clarity and improved cognitive function. emWave's patented technology monitors the subtle beat-to-beat changes in heart rhythms and determines the level of coherence. It also gives objective feedback on current levels of coherence and includes techniques to help people shift into coherence.



Using emWave Products

emWave products determine the degree of coherence found in your heart rhythm patterns and displays changes in real-time using three colors in the Coherence Level Indicator.

- Red indicates low coherence which would be normal.
- Blue indicates medium coherence which shows good improvement.
- Green indicates high coherence the optimal high performance,

The goal in using the emWave products is to reduce stress by achieving and sustaining High Coherence (green). The Coherence Coach CD (included) provides instruction on how to do the Quick Coherence® Technique to improve your coherence scores.