

## Quick introduction to Biofeedback, meditation and how to rewire your brain to be more calm, happy and healthier

The mind and body are one. Most of us spend our lives in a constant state of Stress. This is where the body is in the Flight or Fight (Sympathetic Nervous System) instead of the more natural Rest and Digest mode (Parasympathetic Nervous System). After some time we don't even notice the Stress, but it's doing damage and exhausting us. It's only when you're deeply in the relaxed state do you feel the weight lifted, and realise what you've been carrying around in the background.

There's a great book called [Why Zebras Don't Get Ulcers](#). Essentially animals get scared and take action but as soon as the threat is over they rapidly revert to a calm Parasympathetic state. Unfortunately due to technology, our urban environment and the way we worry about things, modern humans no longer do this. If you were about to be bitten by a tiger it would be life saving to increase your cortisol, shunt blood away from your digestive system, (because you need energy NOW not in a few hours), stop repairing tissues and instead flood your blood with glucose that your muscles can use immediately, constrict your blood vessels and increase your blood pressure and heart rate. Unfortunately our body activates the exact same mechanisms when we're anxious about missing the bus or other small, non-life threatening events. There's so many stressors these days our body is constantly activating the lifesaving mechanisms inappropriately, which if activated for too long leads to burn out.

Imagine a company is facing financial difficulties. One of the first things it would do is stop hiring new people. The body does the same. In the Sympathetic stress mode the body doesn't do much new building and repair. It only does quick fixes. It creates epigenetic changes that tell the cells they're under threat. After some time of the blood being shunted away from digestion to muscles this can lead to IBS (Irritable Bowel Syndrome), nutrient absorption issues and increased gut permeability (which can cause allergies, Coeliac disease and many other conditions). Multiple studies have shown stress makes autoimmune diseases like MS (Multiple Sclerosis), Crohns and Ulcerative Colitis much worse. The constricting of blood vessels that would help save your life if you were bitten by a tiger (so you don't bleed as much), when activated long term can lead to Hypertension (raised Blood Pressure) and puts extra strain on your heart. "Type A" personalities are at greater risk of a heart attack for a reason. There's even a condition called "Broken Heart Syndrome" which is a temporary heart condition brought on by stressful situations, such as the death of a loved one. The heart physically changes and there's a serious weakening of the muscular portion of the heart. This leads to a dangerous stress-induced cardiomyopathy (Takotsubo cardiomyopathy). Once the severe Stress response subsides, the condition reverses itself.

Chronic stress also rewires your brain so you selectively notice threats rather than opportunities. This selection bias is most exemplified in people with hyper vigilance due to PTSD (Post Traumatic Stress Disorder). In some people "Depression" is really just an exhaustion from their adrenals being pushed to the limit for too long. Some anxiety can motivate us to get a task completed but if it's activated for too long it can become dysfunctional and we become anxious about everything (Generalised Anxiety Disorder).

Your waste clearing pathway in the brain (Glymphatic system) is mostly activated when you sleep. If you have poor quality sleep (which is inevitable if you're even partly in the Stress response) waste products build up in the brain. This can cause brain fog or worse. Chronic stress ages the body prematurely, suppresses the immune system and delays healing.

**The solution is to ACTIVELY switch our body back to the calm state.** Getting [into nature](#) or taking some deep breaths can be profound when done every day. In every culture on earth, practices have developed over the centuries to cultivate this calm state. Once you've done one of these techniques long enough, usually your default state becomes calm and focused. You can always switch to the Stress state but it's only done in extremes. There's a huge range of health benefits to reducing stress hormones and boosting the healing of the body both in terms of mental and physical health. Fortunately, you don't need to enter an Ashram or take a vow of silence, you can find a method that works for you, and it only takes a few minutes a day. **Most people find even just spending 5 minutes twice a day for a month creates profound improvements.** If you can do 30 minutes a day that's even better.

“Meditation” can be anything where you’re in The Zone. If riding your motorcycle stops your thinking, gets you into the present moment and brings you joy, that counts. Even if you can’t ride each day, spend 5 minutes and in vivid detail relive the last ride in your mind, feel the feelings, see the sites and smell the smells. Your brain doesn’t know the difference between a real or imagined experience so it will still help. If you prefer technology and data, then a biofeedback device like HeartMath is ideal. [You can do HeartMath sessions at our Practice using this powerful biofeedback device.](#) After a few sessions you’ll have learnt how to access this powerful focused, calm and happy state whenever you choose, even without the device. HeartMath is one of the more studied modern methods and developed as researchers found a direct connection between your mental state and what your heart is doing. Not just in terms of speed of beating, but electrically, HOW it is beating. This is measured as Coherence and Heart Rate Variability. Different emotions cause a different frequency coherence of the heart. For optimal health you want your heart to be in high Coherence and in sync with your mind. This naturally brings positive emotions and a deep feeling of calm empowerment.

In the rest of this guide you can learn a bit more about this, see some books I recommend and scientific references if you’re interested.

If you’d like to explore mantra based meditation like Transcendental Meditation, that’s fine as well. If you’d prefer to do deep breathing so you can do it anywhere, anytime that’s great too. ([Check out the breathing methods on the 3<sup>rd</sup> last page](#)). And if you really don’t want to DO anything, but are willing to sit while technology lowers your brain waves to a deep meditative state and synchronises your brain hemispheres, then [Holosync](#) might be right for you. **I highly recommend working on this, it will pay dividends for the rest of your life.**

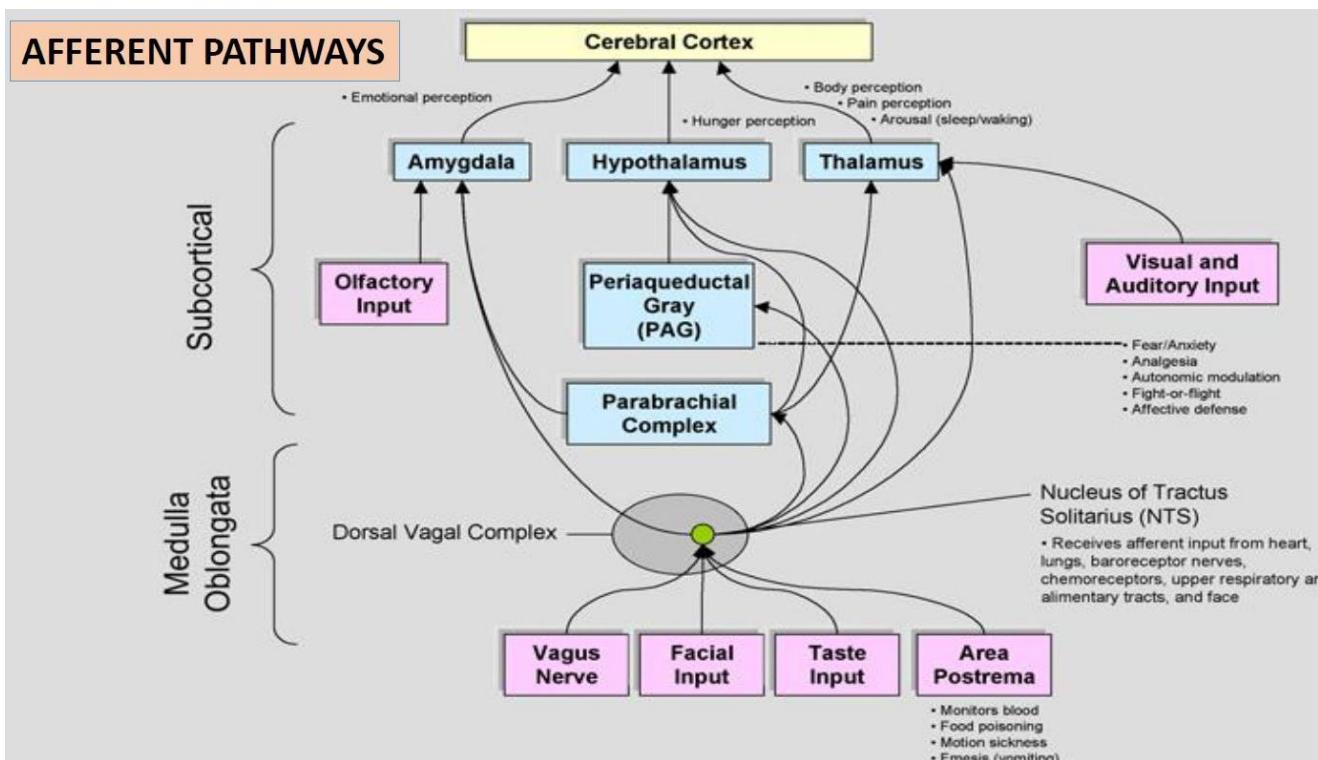
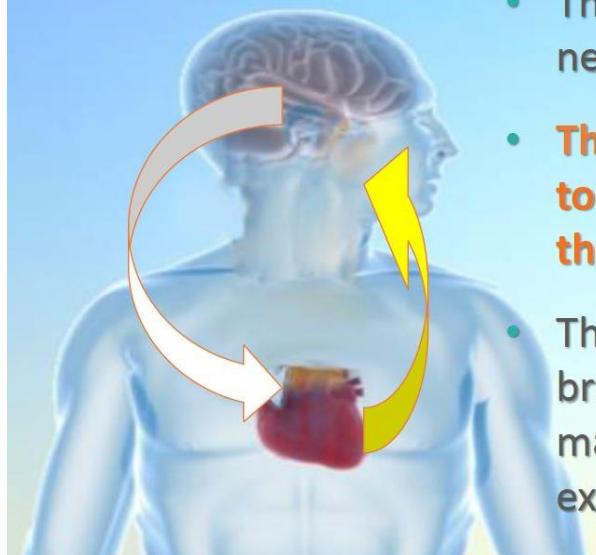
Yours in health,

*Dr Chris Chappell*



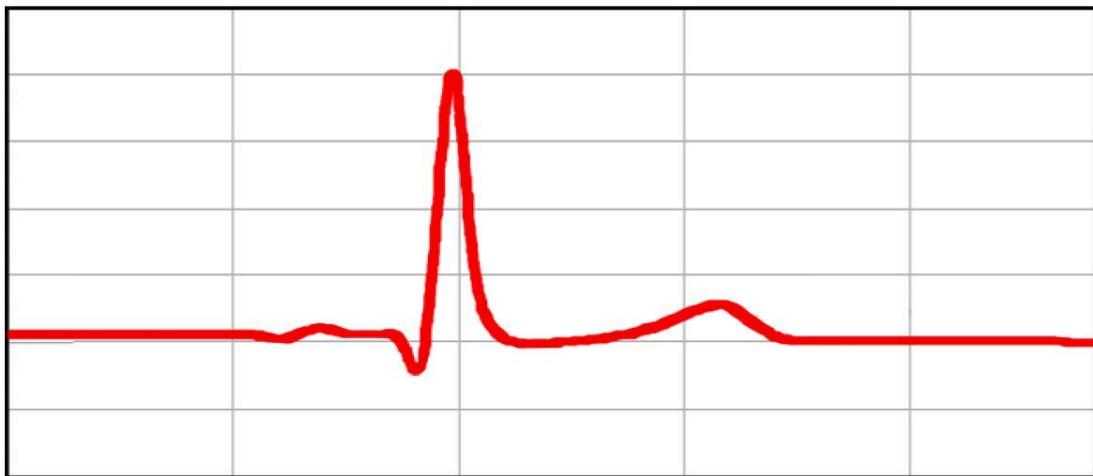
# The Heart Brain Relationship

- The heart has its own complex nervous system – the “Heart Brain”.
- The heart sends far more information to the brain than the brain sends to the heart.
- The heart signals especially affect the brain centers involved in decision making, creativity, and emotional experience.

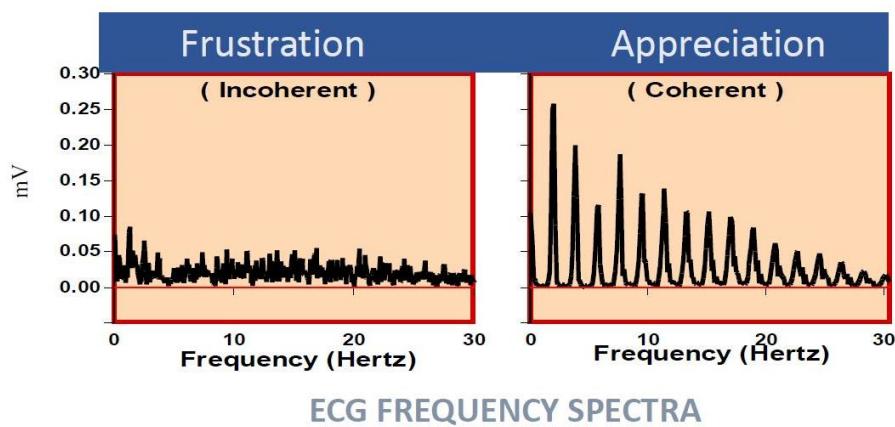


# The Electricity of the Heart

## (ELECTROCARDIOGRAM)



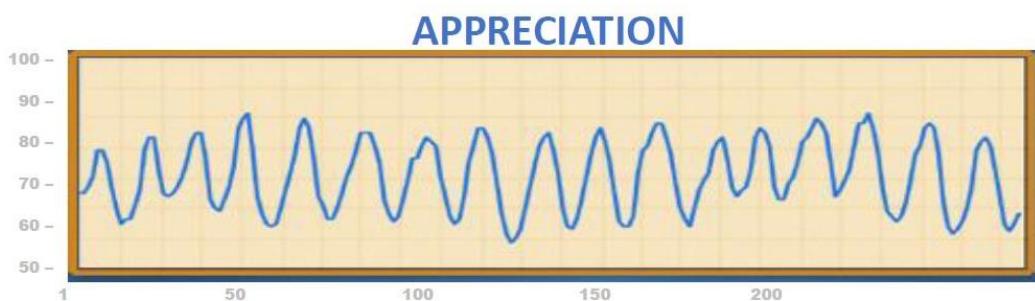
Emotions Produce Different Information Patterns in the Heart's Electromagnetic Field

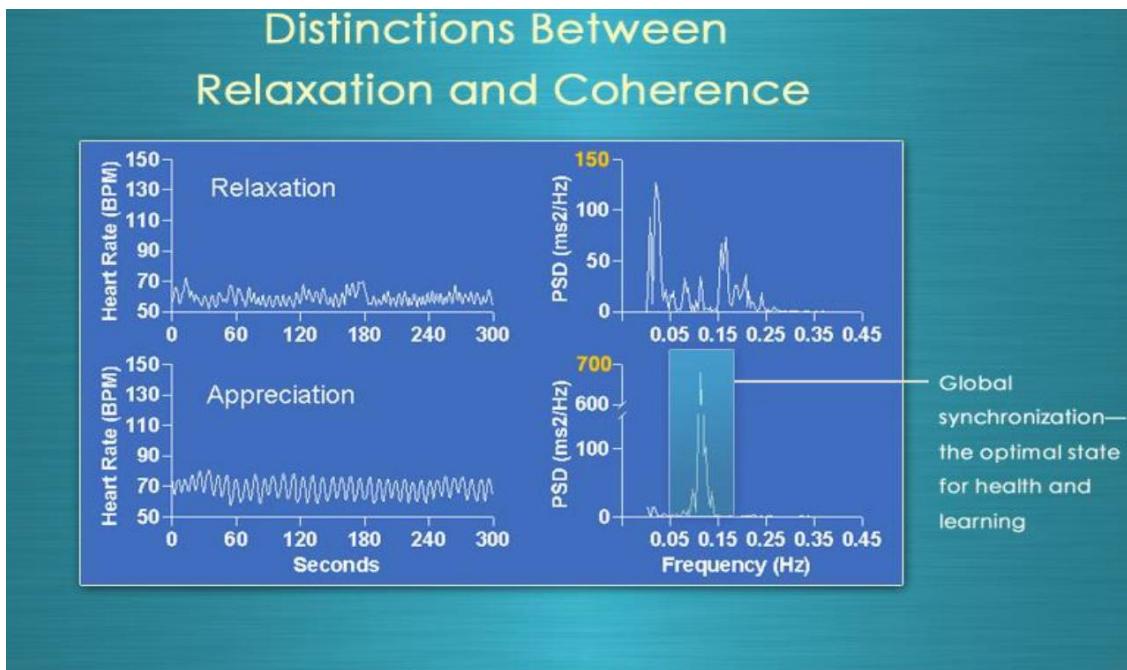
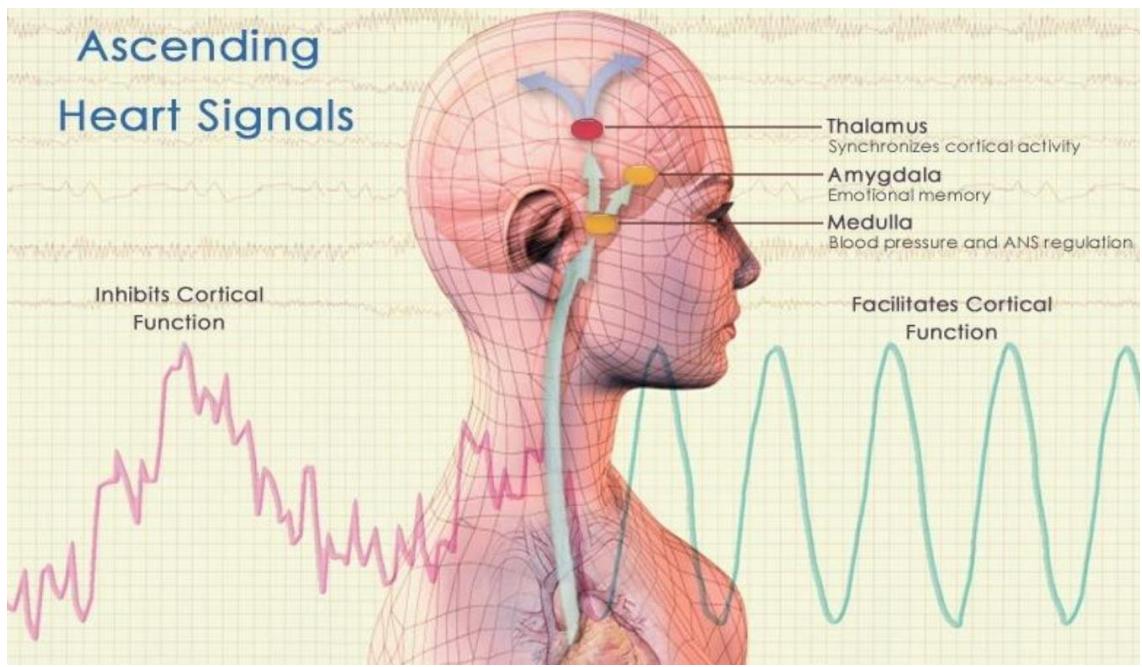


## Heart Rate Variability (HRV)

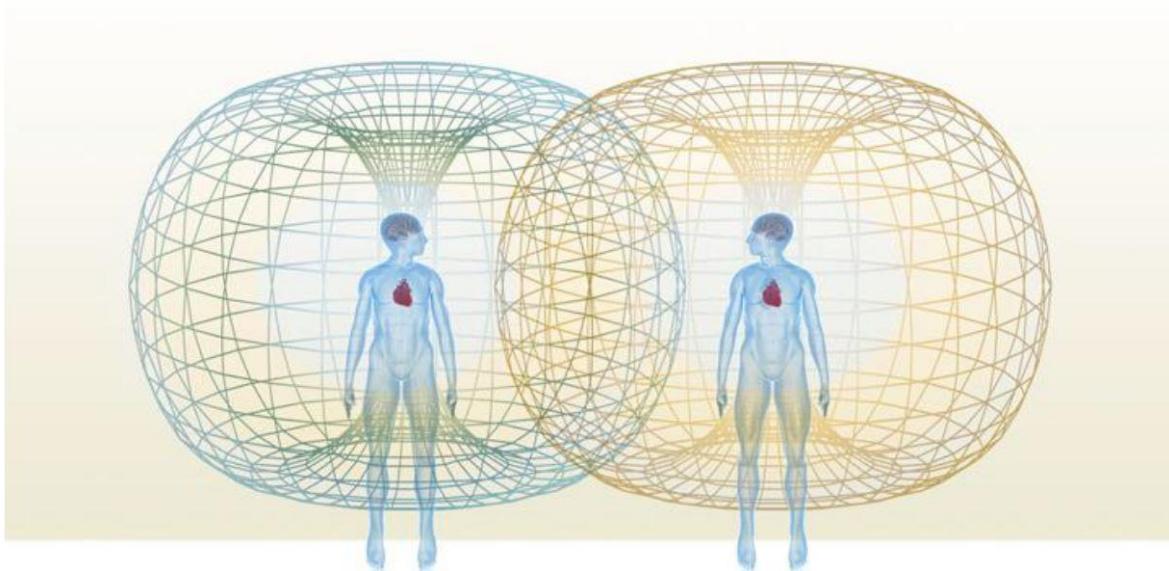


## Heart Rhythms





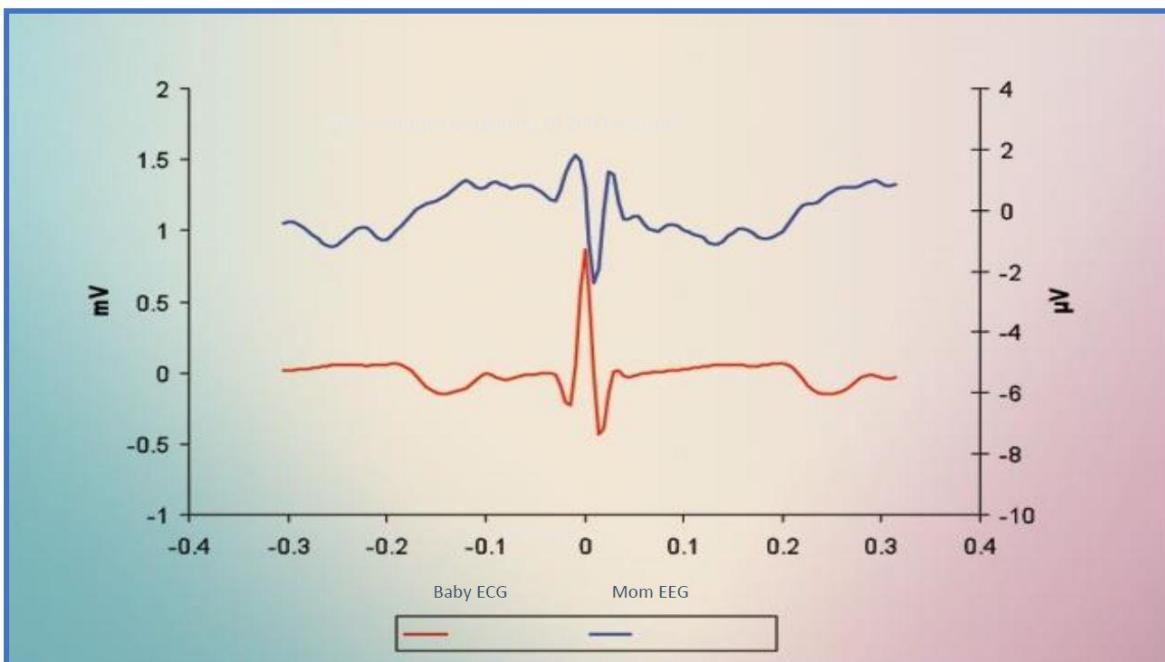
**Our thoughts and emotions affect the heart's magnetic field, which energetically affects those in our environment - whether or not we are conscious of it.**



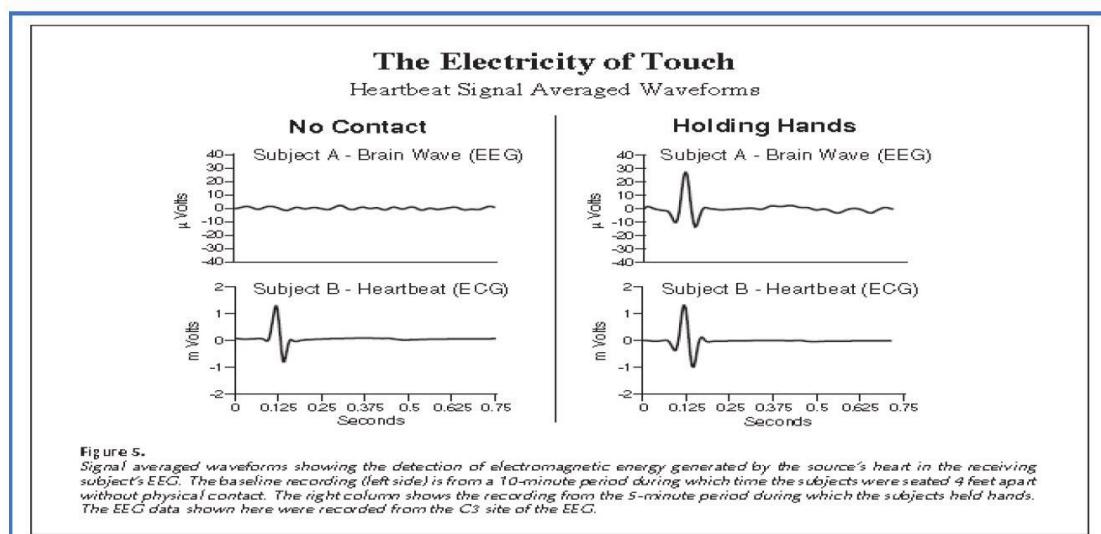
## **Heart-Brain Synchronization**

The *degree of coherence* in an individual's heart rhythms, and the *amount of time* it is maintained determines the *degree of brain and heart synchronization* with another individual at conversational distance.

## Baby's Heartbeat Detected in Mother's Brainwaves



## Alpha Wave Synchronization During Physical Touch



## References - Coherence

Reproduced with permission

1. McCraty Rollin, PH.D., et al, Copyright (2008) "The Coherent Heart: Heart-Brain Interaction, Psychophysiological Coherence, and the Emergence of System Wide Order". Institute of HeartMath, 14700 West Park Ave., Boulder Creek, CA, 95006.
2. McCraty Rollin, PH.D., Copyright (2003) "The Energetic Heart: Bioelectromagnetic Interactions Within and Between People". Institute of HeartMath, 14700 West Park Ave., Boulder Creek, CA, 95006.
3. McCraty Rollin, PH.D., Copyright (2003) "Heart-Brain Neurodynamics". Institute of HeartMath, 14700 West Park Ave., Boulder Creek, CA, 95006.

## Moving From Fear To Choice

*"There is an observing aspect of the brain-mind which notices and is conscious of thoughts, feelings and body sensations but is distinct from those thoughts, feelings and sensations."*

Psychosynthesis. Postgraduate Medical Journal. 1957;33(383):474-474. doi:10.1136/pgmj.33.383.474-a.

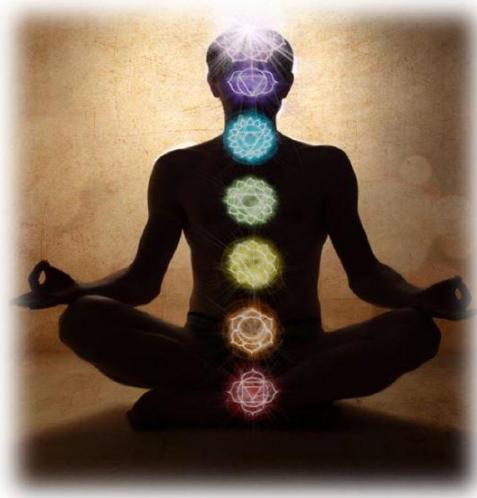
# Overview of Meditation Research and Science:

Creates many changes that include:

- Changes in brain wave activity (in left frontal cortex, limbic system and hypothalamus, among other areas).
- Increased parasympathetic activity and increase in heart rate variability.
- Changes in neurotransmitter levels, including increased serotonin, beta-endorphin, melatonin, and acetylcholine; decreased norepinephrine, and cortisol.
- Increase in gamma wave synchrony in long term meditators during meditation.
- Increases in cortical thickness and in grey matter volume and right hippocampal volume, in long-term meditators.

## “Relaxation Response” Modulates Gene Transcription

*“Relaxation response (RR) practice enhanced expression of genes associated with energy metabolism, mitochondrial function, insulin secretion and telomere maintenance, and reduced expression of genes linked to inflammatory response and stress-related pathways.”*



PLoS One. 2013 May 1;8(5):e62817. doi: 10.1371/journal.pone.0062817. Print 2013.

## “Does Meditation Enhance Cognition and Brain Plasticity”

- Meditation may affect multiple pathways that could play a role in brain aging and mental fitness. It **reduces cortisol secretion and elevates BDNF.**
- It also **lowers oxidative stress** in the body.

Xiong, G. et al. (2009). Longevity, Regeneration, and Optimal Health. *Ann. Acad Sci* 1172:63-69

## Mind of the Meditator

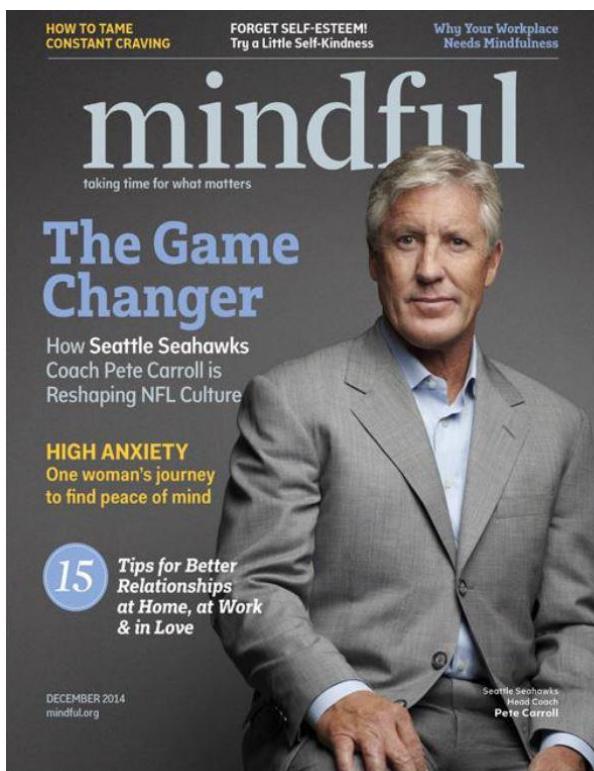


NEUROSCIENCE  
**mind  
of  
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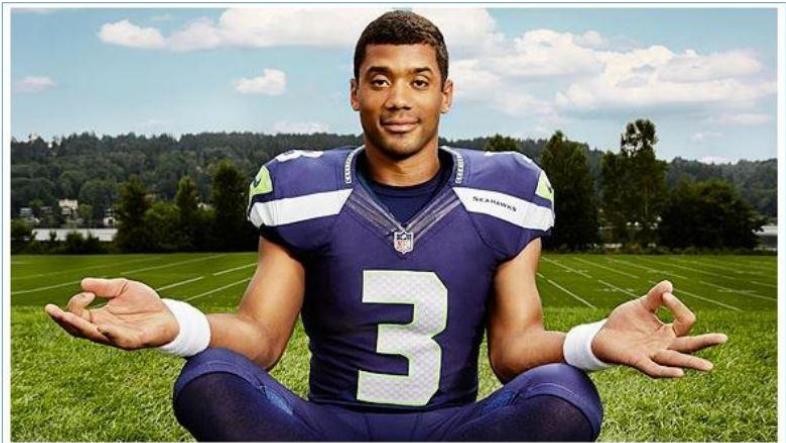
Contemplative practices that extend back thousands of years show a multitude of benefits for both body and mind

By Matthieu Ricard, Antoine Lutz  
and Richard J. Davidson

Matthieu Ricard, Antoine Lutz, Richard J. Davidson. Neuroscience Reveals the Secrets of Meditation's Benefits. *Scientific American*. November 2014. doi:10.1038/scientificamerican1114-38



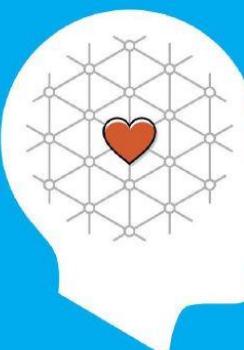
## Mindfulness in the NFL



Peter Yang for ESPN  
Meditation? Yoga? No yelling or swearing? Russell Wilson is on board.

## Hardwiring Happiness

*Hardwiring Happiness*

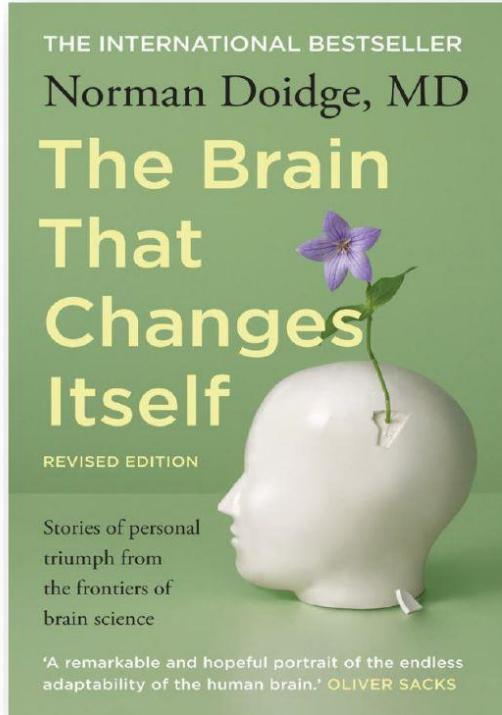


THE  
NEW BRAIN  
SCIENCE OF  
CONTENTMENT,  
CALM, AND  
CONFIDENCE

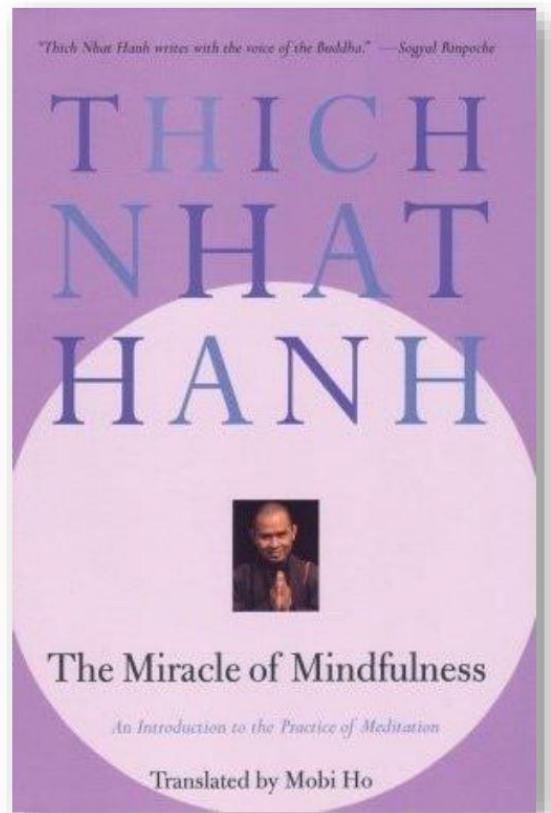
RICK HANSON, Ph.D.

International Bestselling Author of *Buddha's Brain*

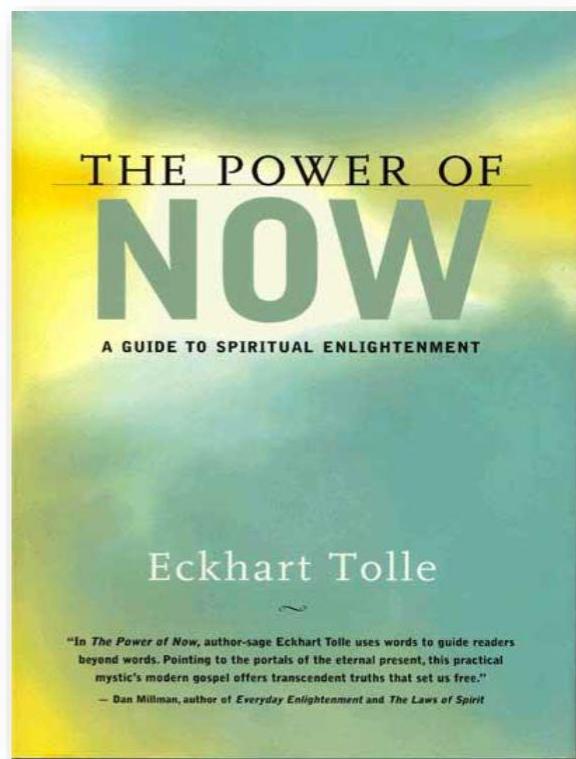
# The Brain That Changes Itself



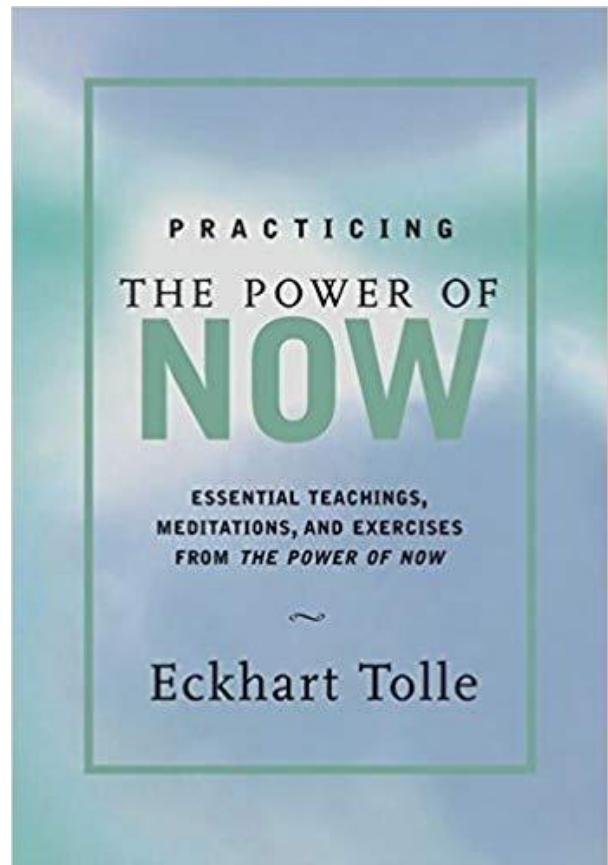
# The Miracle of Mindfulness



# The Power of Now



## Practicing the Power of Now



## Summary of the Research on Breathing

- Lowers Blood Pressure
- Decreases Anxiety
- Improves Asthmatic Symptoms
- Lowers Hgb A1C

## Shallow vs. Deep Breathing

Sympathetic/Stress response includes rapid shallow breathing to increase oxygen supply to heart, brain, large muscles.

This can cause a decrease in CO<sub>2</sub> and induce anxiety and panic. Deep belly diaphragmatic breathing is slow and has a calming effect through stimulation of the vagus nerve, which runs through the diaphragm.

As blood flow is greatest at lung bases, deep breathing increases oxygenation WITHOUT decreasing CO<sub>2</sub> and cannot cause panic.

## **How To Belly Breathe**

*This simple process has been shown in studies to reduce Blood Pressure permanently after just 1 week of daily practice, and enhances parasympathetic modulation (making it easier to get out of Stress and into Calm).*

While lying down or sitting comfortably, place your feet slightly apart. Place one hand on your abdomen near your navel.

Inhale through your nose and exhale through your mouth.

Concentrate on your breathing. Your hand should rise on each in breath and fall with the out breath.

Gently exhale most of the air in your lungs.

Inhale while slowly counting to 4. As you inhale, slightly extend your abdomen, causing it to rise about 1 inch. Make sure that you are not moving your chest or shoulders.

Pause for 2 seconds, then slowly exhale to a count of 4. As you exhale, your abdomen should flatten.

## **Another Technique to change The Nervous System**

Lying down or sitting up...

Exhale fully through the mouth.

Put your tongue on the soft tissue behind your upper front teeth.

Inhale through the nose for a count of 4.

Hold your breath for a count of 7.

Exhale through the mouth for a count of 8 (keeping your tongue on the soft tissue of the upper front teeth).

Do this for 4 cycles.

*Consistency is extremely important, for maximum benefit do this twice daily for 6 weeks.*

## **Further studies**

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## **Want to learn more?**

**An in-depth program will soon be available that brings together a range of different ancient and modern approaches to mindfulness, meditation, resilience, self-empowerment and negative emotion release.**

**This step by step program will help you to live each day free from fear and anxiety. It will also help you release beliefs that limit you, stop self-sabotage, and create the life you want. It will help increase your energy, mental clarity and focus, and cultivate a deep sense of joy with being alive.**

You can find out more about it [here](#)

