"His heart was one of those which most enamour us, - Wax to receive, and marble to retain."

from Lord Byron's Beppo

CHAPTER TWENTY-SIX

MATTERS OF THE HEART

Research in the fairly new field of neurocardiology has direct implications for our Parkinson's research. This chapter will introduce the physiology of the heart-brain relationship and its significance to Parkinson's disease.

The heart is a ball of nerves

Most twentieth century anatomists considered the heart to be a hollow mass of muscle fibers whose job was to pump the blood. It turns out that the heart is actually about sixty percent nerve tissue.[1] I refer to these nerves as heart-nerves. They communicate emotional information to and from the brain.[2]

The heart-nerves are *not* the same as the heart-*muscle* nerves used in operating the heart pump.

The heart-nerves communicate with the brain in two ways. First, the heart connects to the brain through a pair of nerves (one on the left, one on the right) that goes to and from the heart via the spinal cord: up the spine into the brain. Second, the heart connects to the brain through the pair of left and right vagus nerves, which travel to and from the brain stem out through the tissues of the neck, and then down through the torso.[3]

Information from the heart via these heart-nerves tells the brain the manner in which to interpret incoming sensory and thought information: whether ongoing events are good or not, and how much. These interpretive instructions are based on the feelings of the heart, and not on

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[1] "There are at least forty thousand nerve cells in the heart – as many as are found in various subcortical centers in the brain." *The Heartmath Solution*, Childre and Martin, HarperSanFrancisco, 1999, p. 10.

The Heartmath Solution describes some of the work of the Heartmath Institute, a highly respected organization dedicated to sharing information about the heart's physical relationship with emotions and thoughts, and to teaching techniques that harmonize heart and brain electromagnetic patterns. Because *The Heartmath Solution* is found several times in the footnotes of this chapter, the reader might want to know if any "hard science" publications support the findings of the Heartmath Institute. Yes; *The Heartmath Solution* is heavily endnoted in the best scientific tradition with references to highly respected science journals. For example, the above quoted sentence is endnoted to this reference: Armour, J. and Ardell, J., eds. *Neurocardiology*, New York, Oxford University Press, 1984.

[2] In this book, I use the hyphenated term "heart-nerves," to differentiate these brain-connecting heart-nerves from the nerves that regulate the beating of the heart. This hyphenated format is not standardized. Although neurocardiology is a growing field, I have not yet learned of a distinct nomenclature for these nerves that differentiates them from the nerve triggers that regulate the heartbeat.

[3] The lengthy vagus nerve touches more than just the heart. It traverses the torso, touching the stomach, the intestines, and most other innards that are activated in times of mental harmony and somewhat inhibited during times of stress. The vagus nerve plays a large role in the sequences described in this chapter, but I'm not going to discuss it. It would be too much information for someone whose goal is merely understanding Parkinson's disease. Believe it or not, I'm trying to keep the length of this book under control.

brain-based thought patterns. The heart feelings are formed by the heart's electromagnetic resonance with outer and inner experiences.[1] These heart feelings are then communicated to various parts of the brain via the heart-nerves.[2]

An example: the melody line recognition area

For example, one area that receives information from the heart-nerves is located in the brain's frontal lobe. This area is immediately adjacent to the place in the frontal lobe that is activated when one follows a line of melody. It has been proposed by western brain researchers that the intimate proximity of these two areas is the reason that music can quickly evoke a mood or emotion. An old favorite song often evokes the mood and energy level – the heart feeling – that a person had "back in the day," when he first learned the song.[3]

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[1] This idea conforms with Vedic (5,000 year old Hindu philosophy) teachings. In the 20th century, Paramahansa Yogananda, an international authority on the science of yoga and interpretation of the Vedic classics, often used the analogy of radio wave reception and tuning to explain the mechanism by which the heart can tune in and resonate with various wavelengths. (I imagine that explaining the concept of heart wave resonance must have been very difficult during the dark ages, before the days of radio, TV, the Internet and global positioning. In the 21st century, using an electrical system to tune in with invisible waves is a fact of life.)

[2] *The Heartmath Solution* explains that the heart behaves as if it has a "brain" of its own. It also points out that the brain responds to commands sent by the heart, and that, oppositely, very often the brain sends commands to the heart which the heart may or may not comply with. The book endnotes this information to Lacey, J. and Lacey, B. "Some autonomic-central nervous system interrelationships." And Black, P., *Physiological Correlates of Emotion*, New York, Academic Press, 1970:205-227.

Heart instructions are supposed to be dominant over brain commands: brain instructions are supposed to be subordinate and can be overridden by the heart. In PDers, we find that this excellent chain of command system has been over-ruled. Because PDers dissociation from their hearts, the brain is in charge by default. What caused the dissociation? The brain. Essentially, by "getting rid of the heart," the brain that has usurped the leadership role of the heart. This was the condition against which St. Teresa of Avila warns us when she says "Pay no more attention to the brain than you would to the ravings of an idiot."

"The heart produces and releases a major hormone, ANF (atriol neuriatic factor), which profoundly effects every operation in the limbic structure (the emotional brain, also known as the primitive brain, or the "lizard brain"). The limbic area, in addition to regulating non-reason-based responses, also has an effect on memory, learning, and the hormone centers," says heart expert Joseph Pearce.

He continues, "Approximately half of the ANF released by the heart helps to integrate the rest of the body, allowing its parts to perform as a whole."

The other half works with the brain; Joseph Pearce further says "it can carry on a twenty-four-hour-a-day dialogue between the heart and the brain …. The heart is also a very powerful electromagnetic generator. It creates an electromagnetic field that encompasses the whole body and extends out anywhere from eight to twelve feet away from it. It is so powerful that you can take an electrocardiogram reading from as far as three feet away from the body…. this electromagnetic field affects the brain. All indications are that it furnishes the whole radio wave spectrum from which the brain draws its material to create our internal experience of the world. The radio spectrum of the heart is profoundly affected by our emotional response to the world. Our emotional response changes the heart's spectrum, which is what the brain feeds on." (From Chris Mercogliano, Kim Debus, "Does the Heart Have a Brain? An interview with Joseph Chilton Pearce," *Self-Realization*, Summer 2000, pp. 42-44. For more details on the research papers supporting this work, please visit the website of the Heartmath Institute: www.heartmath.org.)

[3] Music, for centuries, has been anecdotally connected with the heart. Research done at Dartmouth College in 2002 actually pinned down the two brain areas that form the connection: one stores emotional information from the heart and the other tracks melody lines. The two areas are adjacent to each other in the brain's frontal lobe. See: Cédric Bihr, "Un air de déjà-entendu…" National Geographic France, août 2003, p. 19.

I want to share a story of a patient of mine (not a PDer) who experienced the connection between heart feeling and music. He had been emotionally shut down since he was three years old, since the traumatic time that he

The processes involved here begin with the feelings that the heart was experiencing at the time a given song was first heard. The heart-nerves send to the brain the information about what the heart is experiencing. An imprint of these feelings, and a note as to the quality and quantity of feeling evoked at the time, is stored in the brain. *And* the feeling information is linked to the melody information!

Years later, if the ears receive the sound of that music, the melody-line tracking area in the frontal lobe recognizes the song. This recognition triggers the link to the stored information about the original heart feeling. The heart then replicates, to some extent, that original feeling.

The heart's role in emotions

Asian medical theory holds that the heart, as it resonates – or not – with the electromagnetic fields of inner and outer experiences, is the initial determinant of feeling and emotion.[1]

In modern times, the general public has been taught that all thoughts and feelings are based in the brain; the body below the neck is merely a machine that transports the head around. But the general public is not up to date. Research in modern neurocardiology is starting to support the idea that the heart is the original source of feeling and emotion, a concept that's been a core precept in nearly every culture, ancient and modern.

When a person listens to a beautiful symphony or beholds a magnificent sunset, he might feel expansion in the chest. This feeling of expansion results from an increase in amplitude of the electromagnetic waves of the heart. This increase in amplitude is due to the heart's resonance with the energy patterns in the music or the sky. These heart-feelings are *not* based on the brain's

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became deaf. In response to treatment, he began to experience heart feelings – and started singing a song that he'd learned in pre-school. When he felt a wave of expansion in his chest for the first time since age three, he was in his living room. I paraphrase his report: "I felt affection for the first time in twenty years. I happened to be staring at the sofa; I felt such affection for that sofa! And when I felt that affection, I suddenly found myself singing 'The Itsy Bitsy Spider.'"

Going off on a tangent, Paramahansa Yogananda, the great 20th century teacher of meditation, used to say that constant inner chanting is as important as meditation in the battle for Self-control of the mind and heart. I forget the exact wording, but it was something along the lines of "Chanting is half the battle." The significance of keeping an inner song running through the head at all times – a spiritually uplifting song – suddenly came home to me with a bang when I understood how the music-association area of the brain can be used to stimulate the nerves that open the door to heart-feelings.

[1] In this sentence, "Asian medical theory" refers to theory based on the Hindu philosophic tradition. In Great Britain, "Asian" usually refers to things Indian. Confusingly, in Pacific Rim countries, including the United States, the word "Asian" usually means Chinese, Japanese, and Korean. In nearly all instances in this book, the term "Asian medicine" is used in the latter sense. That is why I clarify here.

Ultimately, the teachings of both India and the Far East are similar when it comes to discussing the role played by the heart. However, in the United States, there are far more practitioners of Chinese medicine than of Ayurvedic medicine. Therefore, I am explaining most of my arguments along the lines of the well-known Chinese principles.

Even so, although I am an acupuncturist and I shore up my arguments about Parkinson's disease with principles of Chinese medicine, it was through rigorous study and application of ancient Indian philosophy and science that the meanings of the (often poorly translated, even baffling) ancient Chinese teachings came to light for me.

interpretation of the music or the colors in the sky at sunset. These feelings precede any brain involvement.

These feelings are caused by changes in the electromagnetic wave *patterns* of the heart and changes in the *amount* of energy in the electromagnetic signals produced by the heart. Resonance or conflict can increase or decrease the amplitude, the size, of waves. In the heart, this resonance – or lack of – translates into increased or decreased amount of various heart feelings.

Many people are surprised to learn that the electrical activity of the heart creates electromagnetic patterns: heart waves. However, if they recall that the brain's electrical activity creates measurable brain waves, they will understand that the heart's electrical activity creates measurable heart waves.

The heart's electrical field is quite large; it can be detected and charted from several feet away. The heart's electrical signals are holographic (the same in all directions, whether or not they are measured from the front, back, top, or side).[1]

HEART BRAIN ENTRAINMENT

When a person feels content or calm, his brain-wave patterns entrain with his heart-rate-variability patterns.[2] A measurable synchronicity between the heart rate and brain waves occurs. The heart, not the brain, sets the pace.

When a person becomes fearful, this synchronicity is broken off. The heart rate variability patterns become jagged and disordered, but more significantly, the brain wave patterns become unrelated to the heart rate patterns. I repeat, when fearful or under stress, brain waves cease to be entrained with the heart-rate variability patterns.

When the fear is over, the brain's wave patterns can again become entrained with the heart's wave patterns.[3]

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[1] "The heart's electromagnetic field is the most powerful produced by the body; it's approximately five thousand times greater in strength than the field produced by the brain, for example. The heart's field not only permeates every cell in the body but also radiates outside of us; it can be measured up to eight to ten feet away with sensitive detectors called *magnetometers*… Scientists at [various centers] have found that the electrical information patterns generated by the heart are detectable in our brain waves via a test known as an electroencephalogram (EEG)… A series of experiments by Gary Schwartz and his colleagues at the University of Arizona found that the complex patterns of *cardiac* (italics are mine) activity in our brain waves could not be fully explained by neurological or other established communication pathways. Their data provides evidence that there's a direct energetic interaction between the electromagnetic field produced by the heart and that produced by the brain… When we focus attention on our hearts, the synchronization between our hearts and brains increases." From *The Heartmath Solution*, Childre and Martin, HarperSanFrancisco, 1999, p. 33-34.

[2] The term "heart rate variability" might want some explaining. Heart rate variability is defined as the beat-to-beat changes in the heart rate. Heart beats are not regularly spaced. When the doctor measures someone's pulse, he is noting the average heart rate, not a fixed rate. The heart rate changes with every heart beat even when we're sleeping.

As recently as the 1960s, it was assumed that a rock steady heart rate must be a good thing. We now know that a heart that *does* maintain a steady, unvarying rate is a heart at risk, a heart that has lost its ability to respond to outer circumstances. Heart rate variability declines with aging. (Possibly, the reason that beta-blockers and pacemakers can cause emotional emptiness in some people is that they inhibit the full range of heart rate variabilities.)

[3] *Heartmath Solution*, Ibid, uses this example: "Because the heart is the strongest biological oscillator in the human system – the equivalent of the strongest pendulum in a collection of clocks [the principle of entrainment was

Understanding the disruption of heart-brain entrainment

The benefit of disruption of heart-brain entrainment during times of stress or emergency can be easily understood. Consider the example of an injured person running from a hungry lion. At such a time of crisis, a person does not want access to his feelings or information about his own physical and emotional pain: he does not want full access to his heart's ability to resonate or not with inner and outer experiences.

The lion example

A person with a broken leg can run for miles on a broken leg if his life is in imminent peril. When running from the lion, a person does not want to be distracted by the fact that his leg is broken. He does not want to be distracted by the fact that his best friend rejected him two days ago. The perceptions of physical and emotional pain are dangerous distractions when one is running from danger. It may be that this long-recognized ability to detach from one's own feelings of physical and emotional pain during times of stress or fear is due to the non-entrainment of the heart and brain waves at these times.

During times of perceived danger, the brain wave patterns temporarily become independent from the heart wave patterns. It may be that, with brain waves thus disconnected from the heart, going off in their own direction, one's brain cannot fully cognize one's own sensory feelings, including one's own physical and emotional pain: interpretation of sensory nerve activity is primarily guided by the heart. [1]

Other capabilities that may be inhibited during this heart-brain disconnect are the abilities to indulge in positive visualization and mental imagery. Playful imagination or fantasizing positive outcomes during times of emergency might well be dangerous distractions from the job at hand. For that matter, pleasant feelings can also be dangerous distractions; the moment of fleeing a wild lion is *not* the time to think about one's upcoming art project or to marvel at the ecstatic purples and golds of the sunset overhead. Positive sensory feelings and emotions, as well as negative ones, are inhibited during an emergency – when the brain wave patterns are disconnected from the patterns of the heart. [2]

A chemical shift

Heart signals sent to the brain via the vagus nerve activate the brain's dopamine-based mental and motor processes, and stimulate the parasympathetic (feeling contented) nerve system. Heart signals sent to the brain via the heart's spinal nerve activate the brain's adrenaline-based mental and motor processes, and stimulate the sympathetic (feeling fearful) system.

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first realized from studying a collection of pendulum clocks] – the rest of the body's systems can be pulled into entrainment with the heart's rhythms. As an example, when we're in a state of deep love or appreciation, the brain synchronizes – comes into harmony – with the heart's harmonious rhythms."

[1] It appears that the level of non-perception is on a sliding scale: the greater the emergency, the less one is able to perceive his own feelings. In spite of the heart-brain patterns being synchronous or non-synchronous, a seemingly black or white, all-or-nothing condition, we do see a sliding scale of emergency-response emotional shut-out. This sliding scale may be due to the continuous flow of heart-nerve information between the heart and the brain. Even when the heart and brain wave variability patterns become non-synchronous, the heart-nerves continue to send information about the *degree* of problem, and the *extent* to which thoughts become adrenaline-dominant.

[2] Therefore, when people consciously shut off their hearts to prevent awareness of a negative experience, they inadvertently also shut themselves off to positive experiences.

During times of contentment, the heart uses the vagus nerves more and the spinal nerves less. During times of stress or emergency, when the heart and brain waves become non-entrained, the heart uses the spinal nerve more and the vagus nerve less. Both nerves sets are always somewhat in use. Even when a person is feeling primarily contented, a small amount of energy may be flowing in the sympathetic nerves.

The extent to which the brain is informed of heart information via the spinal nerve determines the extent to which the brain use adrenaline-based commands to activate motor and mental function of the sympathetic nervous system. Thus, a nerve and neurotransmitter shift towards adrenaline and the sympathetic nervous system accompanies the electromagnetic change that occurs during heart-brain wave *non*-entrainment.

In an emergency, as adrenaline is increasingly released, the release of dopamine is increasingly inhibited.

When the emergency is over, the heart rate (the average beat rate) slows down, and the heart rate variability patterns become more coherent. Brain wave patterns may again become resonant with heart patterns. Adrenaline levels climb down. Dopamine can be released accordingly.

When the stress or the emergency comes to a close, perceptions of physical and emotional pain, if any, become once again available. These perceptions are accessed via dopamine. An emotionally healthy person resumes, via dopamine, the ability to playfully imagine and visualize, and to anticipate purely happy outcomes. His ability to *feel* physical and emotional input regarding one's own sensory experiences, either negative or positive, a *heart-based ability*, returns.

However, while a person is emotionally inhibited to the extent that he is selectively dissociated from his heart, he will not be able to access dopamine.

Even when *wave* patterns are not in sync, the *nerves* remain connected

During times of fear or stress, the heart-*nerves*, either via the spine or vagus nerves, remain connected to the brain – unlike the heart-brain *wave* entrainment, which disconnects. Whether scared *or* happy, waking or sleeping, these nerve signals continue to tell the brain how the heart is feeling (resonant or not), and how much.

We have not yet discussed the *quantity*, the size, of the heart signals. Briefly, the *amount* of signal getting to the brain from the heart-nerves appears to determine the *degree* to which neurotransmitters are released.

We hypothesize that the size of these heart-nerve signals (the quantity, the "how much") that the heart continues to send to the brain indicates the *level* of emotional energy that is available at the moment.

Whether the brain is using dopamine or adrenaline, whether the brain and heart waves are entrained or not, the amount, the size, the "how much" of the electrical signals that travel from the heart-nerves to the brain seems to determine how *much* of a response the brain can muster: how *much* adrenaline or dopamine can be put into play.

Based on SPECT scans that show the decline in heart-nerve receptor activity in PDers, the ongoing research in neurocardiology, and the perceptible heart changes that occur in people who recover from Parkinson's disease, the rest of this chapter hypothesizes a new understanding

of heart-nerve connectivity and heart-brain non-entrainment that is consistent with the changes that occur during Parkinson's disease and during recovery from Parkinson's disease.[1]

The decision to disconnect the wave patterns is made by the brain: a hypothesis

At a certain level of danger, negative thinking, anxiety – or in the situations that are met with a dissociation response – the brain wave patterns disconnect from their entrainment with the heart wave patterns. Based on our own research, this wave pattern disconnect is a brain-based decision, and not a heart-based phenomenon.[2]

However, with regard to the heart-nerve's sympathetic and vagus nervous system signals, the heart is ever sending electrical signals to the brain.

In an emotionally healthy person, the heart-nerves' signals to the brain are never turned off. The heart cheerfully sends information and energy to the brain, whether the brain is bouncing around in a panic or calmly enjoying the situation. If the heart is *not* electromagnetically resonating with inner and outer experiences, it favors the spinal nerves, the ones that stimulate the sympathetic nervous system. If the heart is resonating with ongoing events, it favors the vagus nerve, the parasympathetic connection.

Notice that I said the *emotionally healthy* heart continues to send nerve information to the brain even when the brain works itself into a dither and disconnects its wave patterns from those of the heart.

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[1] The following articles discuss the discovery that the dopamine receptors in the heart have significantly diminished activity in people with Parkinson's disease: Goldstein et al, "Cardiac Sympathetic Denervation in Parkinson's Disease," *Annals of Internal Medicine*, Vol. 133, No. 5, Sept 5, 2000, pp. 338-347 and Kaufman, Horatio. "Primary Autonomic Failure: Three Clinical Presentations of One Disease?" *Annals of Internal Medicine*, Vol. 133, No. 5, 2000, pp. 382-384.

[2] The researchers at the Heartmath Institute have conjectured that heart-brain entrainment automatically occurs anytime the heart rate variability is somewhat calm and coherent, because they see this in a majority – but not all – of their subjects. Our research on PDers conflicts with this hypothesis.

Most of our PD patients do *not* experience the type of contentment that is associated with heart-brain entrainment even if they have devoted their lives to meditation and inner calm. We have worked with PDers who have, for decades, practiced daily meditation, including breath and heart-rate control. They can create in themselves conditions of extremely slow heart and breathing rate. However, they cannot register the positive feelings associated with heart-brain entrainment. For that matter, most of our partially recovered PDers could not perform, and in many cases could not even comprehend, the very very simple exercises that the Heartmath Institute has developed to induce heart-brain entrainment.

When PDers use *mental* games described later in this book, games in which they *mentally* pretend that their hearts are *extremely* blocked, and utterly *incapable* of *any* sensory feeling, their sensory perceptions seem "normal." When, immediately following, they pretend to remove the extreme blockages from the heart, they often perceive a flood healthy sensory perception. They are usually surprised at the extent to which their PDish idea of "normal" was actually highly inhibited. Even more telling, when they do this experiment, they often feel, instantaneously, a joy and contentment that has been long absent from their lives. The condition of joy is fleeting; it does not last: they have not yet permanently removed the "dissociate from the heart" command from their brains. However, this exercise can be helpful. It demonstrates to the stubborn PDer that, in fact, his "normal" condition is grossly inhibited and joyless, and that it can be changed. Even so, many PDers respond to the discoveries of this exercise with a "So what?" and no determination to change the dissociated status quo.

Therefore, we suspect that decisions made by the *brain*, and not merely a lack of agitation in the heart, can determine whether or not heart-brain entrainment can actually occur. Of course, in emotionally healthy people, the brain is quickly subservient to the heart; the heart's energetic field is much larger than that of the brain. But in people with mental/emotional blockages such as a long-running selective dissociation from the heart, the rogue brain may be operating under its own commands, commands that specifically deny access to the heart.

The emotionally healthy heart is like the loving mother who humors her child with unconditional love and support even when the brilliant child indulges in unnecessary panics over upcoming college-entrance board exams. The heart's love is always sending nerve signals to the brain, humoring the brain, enjoying its little eccentricities. It is the brain, the home of the ego – the source of fear – that disconnects its *wave* properties from the heart *wave* patterns when the going gets tough. The emotionally healthy heart, via *nerve signals*, remains ever true. [1]

Decrease in the **amount** *of heart-nerve signal*

The *amount* of the heart's nerve signals to the brain may begin to diminish at some point. This decline may occur when overall health of the body is decreasing or when the heart has begun to lose interest in life. Sometimes, when the sheer joy of living decreases abruptly, as can happen, for example, when a long-term spouse dies, the signals from the heart may abruptly become significantly diminished. The remaining spouse may soon die.

Based on Asian medical theory, when the *amount* of heart-nerve signals declines, when the joy of living decreases, the *capacity* for life also declines.[2] When the amount of heart nerve

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[1] In a fearless person, one who has utterly surrendered his life over to the Love, Wisdom and Fairness that permeates the cosmos, the heart and brain wave disconnect does not occur.

The saints who play, childlike, with cobras or tigers, or who go graciously, fearlessly to their death, *never* permit their minds to dash off into a condition of adrenaline-dominance. The men and women that have conquered control of the mind are able to remain always in a condition of heart and brain resonance, with the heart guiding the brain. Only those whose minds are still governed by their egos are susceptible to the disconnection with the heart waves that the brain initiates when it imagines itself to be in danger.

The soul is never in danger: as the Vedas put it, "No fire can burn it; no wave can drown it." The soul needs no adrenaline-releasing brain-wave disconnect in order to feel safe. The ego, being a temporary, false construct, is always on the lookout for anything that threatens its position. The ego-led mind may eagerly descend into panic at the first sign of irregularity. When it does, it disconnects from the heart and thus gets to be "in charge" for a while. In PDers, the brain is almost *always* in charge.

Most PDers we've known honestly do not believe that the universe is "Fair." Essentially, because they cannot see all the subtle workings of the laws of cause and effect, they do not believe in cause and effect: Fairness. In this sense, these PDers are the supreme irrationalists. And ironically, so many of them imagine themselves to be more rational than most.

[2] The joy of the *soul* never decreases. However, the joy associated with *living* a particular role in a particular body may wane in response to circumstances, such as aging or emotional loss. According to Asian medical theory, the Heart is the source of joy. According to Asian (Vedic) theory, after subtly vibrating Divine Energy enters the body at the back of the neck (the "Mouth of God"), it goes in two directions: the brain and the heart. Energy is *stored* in the brain, and as much as is needed at any given moment *manifests* physically (converts into the heavier, "denser" waves of electromagnetic energy that becomes the electrical functions of the heart). The *physical* heart is formed by further condensations or "densifications" of the heart's electrical energy as it plays against the DNA of the heart cells. The heart is the first "manifestation" of the extremely subtle waves of Love that energize the body. After energy manifests as heart, the heart then directs the energy throughout the rest of the body based on the vibrations received by the heart. Hence, Heart is the most direct "source" for joy in a living system.

This understanding of living systems is perfectly aligned with the findings of modern physics. When the underlying *philosophies* of Eastern and Western ("modern") medicine are compared, Western medicine, with its emphasis on the crudest results of energy (instead of on the source of energy and the influences that direct that energy), comes across as archaic. To a student of modern physics, the so-called "researchers" of Western medicine, the majority of whom fail to integrate modern chemistry and physics into their work, often resemble the people living in Plato's dark cave.

In Asian medicine, anxiety is the result of Heart insufficiency. When energy levels decline in the heart, the strength of function of other organs, including the kidney and its adjacent adrenal gland (a major source of adrenaline) also declines.

signals decline, the potential levels of release of the two main neurotransmitters, dopamine and adrenaline, diminish. Diminished release of dopamine or adrenaline results in physical and emotional slowness, depression and/or anxiety.

Depression from an insufficient heart-nerve signal

As the *amount* of heart-nerve signals declines, so that the *amount* of dopamine release declines, depression can ensue. In this case, the heart and brain waves *may be* in sync, but because of a diminished amount of heart-nerve signals to the brain, there is not *enough* dopamine release to trigger responses to sensory and thought stimuli. A person in this condition may look at the bright blue sky or the beauty of a rose and have a minimal or not detectable response.

When the heart's electromagnetic field is diminished, the amount of heart-nerve signal going to the brain is diminished, and so the amount of dopamine released by the brain is diminished. The emotional capacity for response is diminished.[1]

Anxiety from an insufficient heart-nerve signal

Even if the *amount* of heart-nerve signals declines, fear-inducing situations *can still* cause a loss of entrainment between the heart and brain wave patterns. However, if the size of the heart-nerve signals is diminished, the brain has a correspondingly diminished capacity for mounting its adrenaline response even though the heart and brain waves patterns become disconnected. If the amount of heart nerve signals decline, then when the brain shifts to sympathetic (fear) mode, the mind may only be able to create an impotent anxiety response because of an insufficient *level* of adrenaline to rally the body to action.

In anxiety, negativity and fear-based thinking dominate the brain; the heart and brain wave patterns are not in sync: the brain is disconnected from heart feelings. But in some cases of anxiety, the *level* of adrenaline release is diminished. This insufficiency of adrenaline may occur if the amount of heart signal is insufficient.

The lowered level of adrenaline release is not large enough to stir the body to action. The fear whirls pointlessly around in the head, but no actions are taken to battle the source of the fear.

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[1] Keep in mind that there are two problematic facets of the mental/emotional blockage of Parkinson's. The first, the dissociation of the heart that dis-entrains the heart and brain, is set in motion at the time of the fear event that precipitates the heart disconnect. This event may snowball in the brain to include increasing numbers of mental arenas from which the heart must be dissociated. The decrease in heart-nerve signals, however, is a slow development. Like the dopamine-producing cells in the brain that become dormant from minimal use, the heart-nerve dormancy most likely also develops slowly, in response to minimal use. This can explain why the personality of Parkinson's might emerge at a very young age: at the time of the initial heart-brain disconnect. But the mood-related symptoms of Parkinson's, the steadily worsening anxiety and depression, and the increasing inability to rouse oneself to adrenaline-based movement, appear slowly, over time, as a result of the gradual decline in numbers of active heart-nerves.

Again, not all PDers have the same level of mental/emotional blockage. Some PDers *do* seem to have the capacity for heart-brain resonance. Some actively cultivate it even though their body is actively inhibiting dopamine because of their injury. Their emotional decline during Parkinson's heads more towards depression than towards anxiety. In our limited experience, these "open-hearted" PDers whose emotions are merely becoming flattened recover more easily that those who are consciously wary and those who want to justify their wariness.

Anxiety is the name of this condition, in which fear dominates the mind *but* the body is not able to mount a big enough response to either challenge the threat or rein in the negative thinking.[1]

The *amount* of heart-nerve signal determines the *quantity* of mental and chemical response that the body can produce. The mind, while able to produce a fear or a happiness campaign by being either disconnected or connected, respectively, to the heart's wave patterns, does not ultimately control the amount of energy available to that campaign. The *amount* of *heart* involvement, sent via the heart nerves, may be the key determinant for how *much* of a response the body can produce.

Dopamine and the heart

The heart is always fine-tuning its dopamine/adrenaline balance. Both adrenaline and dopamine are always in use in the heart. Every microsecond, in response to thoughts and to internal and external sensory perceptions, the heart is moving slightly more towards one nerve set and its neurotransmitter or towards the other. The degree and manner of heart wave resonance with thoughts and with internal and external sensory perception determines the moment-to-moment balance between adrenaline and dopamine. If the heart is more resonant, the neurotransmitter balance shifts more towards dopamine. If the heart is less resonant or emotionally shut down, the neurotransmitter blend shifts more towards adrenaline.

The ratio of adrenaline to dopamine at any given second determines *how* the brain will interpret the incoming sensory information at that moment, and the manner in which the brain will respond.

Up until now, I've only mentioned dopamine as a paired neurotransmitter with adrenaline. In fact, dopamine is not just the "opposite" of adrenaline. Dopamine is the main driver of the heart. If the brain perceives a reason to be fearful, the heart's dopamine triggers adrenaline and a tilt towards the *sympathetic* nervous system's connection to the brain. If the brain is not fearful, the heart's basic dopamine supply triggers more dopamine and a tilt towards the *parasympathetic* nervous system's connection to the brain.[2]

Dopamine is the primary activator of the heart. Dopamine levels in the heart determine the vigor of the neural signals to the brain. Dopamine levels in the heart are determined by the amount of joy and the amount of resonance that the heart is feeling.

The sheer joy of being alive is the energy that allows the heart to resonate and initiate the primary dopamine release for the heart.

Dopamine does not cause joy. Joy causes the release of dopamine. The greater the joy, the greater the level of primary dopamine in the heart. Whether a person is happy or sad, he can always resonate with the sheer joy of being alive. Whether a person is in the midst of battle or in solitude, the sheer joy of living can be present behind his fear or his tranquility. Joy and the heart's ability to resonate are very nearly the same. The former is more purely energetic, the other is the more physical manifestation of the joy energy.

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[1] In Asian medicine, insufficiency of Heart Qi has long been considered the cause of anxiety. It's fun for me to see how modern research is starting to confirm the ancient sciences.

[2] Humans need to always maintain some level of fear: this minimal level of fear is needed to stimulate breathing and a heartbeat. Of course, an advanced soul who is utterly fearless may choose to still his heart and lungs.

Just like light, which has a wave pattern and a photon, human joy has a purely vibratory component and a more tangible component. Just as the astral form of light does not require a photon, the vibratory component of joy exists whether the body exists or not.

For example, light has two components: the light "wave" and the photon. The wave and the photon are considered to be equal and simultaneous, in terms of energy, but the photon is the denser, more tangible, more "crude" half of the combo. Like light's relatively more tangible half, the photon, the electromagnetic wave of the resonating heart is the denser, more crude, more tangible component of joy.

When the heart is resonating with the joy of being alive, it releases dopamine to itself. That dopamine then energizes the other heart responses. This underlying source of dopamine is what powers the heart's balancing act between the dopamine and adrenaline that flows to the brain.

The core dopamine in the heart drives the dopamine and adrenaline systems in the rest of the body. The dopamine stashes in the head, in the substania area and other parts of the brain, are merely satellite supplies of dopamine. They are activated and dopamine is released into various parts of the brain, when the heart instructs the brain to respond to sensory events with joy. The core level of dopamine prepares a person, in body and brain, to be a feeling, sentient being.

The heart and the dissociation response

This core level of heart dopamine is only diminished when a person ceases to feel the sheer joy of being alive or while dissociating from his heart. Also, the core level of dopamine diminishes when a person prepares to die.

The dissociation response shuts down the ability to *feel*. The dissociation response prepares an animal for death. In PDers, heart SPECT scans show that dopamine receptor activity is significantly diminished. PDers have trouble feeling. We might say that some PDers have spent their life fending off death or getting ready to die.[1]

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[1] By thinking about the dissociation response as a preparation for death, a curiosity of recovery suddenly made sense to me. We noticed from the earliest days of the project that, shortly after recovering, many recovered PDers used the unlikely phrase: "So what? It's not like anyone is going to die."

The first time I heard the phrase, a recovered PDer was telling me why she decided to stay at the beach instead of coming to her acupuncture appointment. She had never before chosen to brush off a responsibility. But as she had sat on the beach enjoying the sea gulls, it suddenly occurred to her, for the first time in her life, that she could choose to be irresponsible for once. "So what?" she had asked herself. "It's not like anyone is going to die if I miss the appointment."

Another time, a recently recovered PDer told me that she'd had the astonishing realization that, as director of a show, she need only take responsibility for her own job. If any of the actors, singers or musicians failed to do their personal best, the show might be a little less good, but "So what? It's not like anyone is going to die."

Other PDers also felt the enormous weight of the world sliding off their shoulders as they suddenly saw their life roles in realistic perspectives for the first time. A not uncommon way for recovered PDers to express this new wisdom was "So what? It's not like anyone's going to die!"

It seemed as if these easily-recovered PDers were suddenly able to stop using their mind in a manner that suggested everything they did had a life or death consequence. When their foot injuries healed, they noticed shifts in perceptions and behaviors. To me, the most curious commonality was the vocalized realization: "So what? No one is going to die!" Only after I learned that the dissociation response is a preparation for death did the "No one is going to die!" epiphanies begin to make sense. These PDers, prior to recovery, had dissociated from themselves or parts of themselves. Therefore, beyond all logic, they necessarily had thought patterns and heart-mind separation patterns characteristic of those of a person facing imminent death.