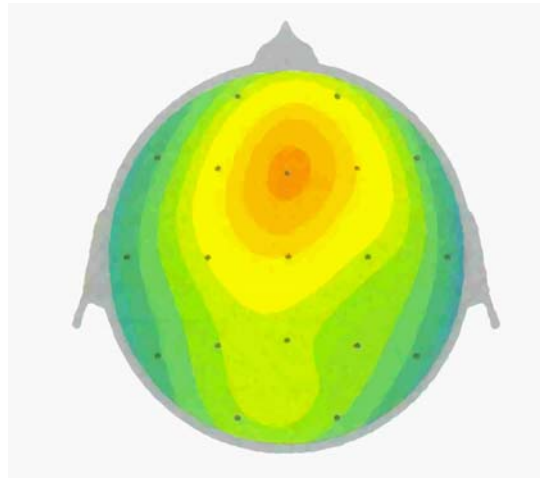


Perform at the top

# The Winner's Circle



for

Peak and Elite Performance

and to remediate specific brain problems...

Learning Disabilities  
Attention Deficit Disorder  
Depression and Anxiety  
Epilepsy  
OCD  
Traumatic Brain Injury  
Stroke

**Dr. Marvin W. Sams**

The Elite Performance Coach™

## **Your future is here...**

Do you have the attention span of a gnat? Is your memory only a faint recollection? Is your life and career limited because of reading difficulties or some other learning problem? Are you in the pits and just can't seem to crawl out? Are you suffering from the devastating effects of a traumatic brain injury or stroke? Or...is it that you want the high focus, emotional resilience, and mental quickness to develop the new process or close the big sale that makes your business the industry leader?

For over a decade, brain performance expert Dr. Marvin Sams dreamed, created, and developed *NeuroMatrix™ Neurofeedback Training*, a neurological training system that teaches *any* brain to function more efficiently and at higher levels of performance. Whether you are struggling in school or on the job because of a learning disability or Attention Deficit Disorder, watching life slip away because of depression or anxiety, find yourself stuck on the middle rungs of the corporate ladder, or, are already soaring at the top of your profession or sport but need to “click it up a notch,” Dr. Sams quickly and efficiently lifts your performance and mood to new heights.

*The Winner's Circle* answers many questions about *NeuroMatrix Neurofeedback Training™*: What it is, how and why it works, and what benefits you (or your child) can expect.

## Comments by Parents and Clients

“You’ve given us our son back!”

Mother of 7 year old with history of ADHD

“My mind just cleared...”

Comment made by a NFL football player during session

“Oh, no, I stopped taking it a long time ago.” (Response when client was asked if she was still taking Prozac.)

Single mother of two, four-year Prozac user

“When I got home, she was sitting out by the pool doing her homework!”

Mother of 15 year old who habitually put off doing homework

“I’m no longer depressed.” “I’m off four of my meds.” “I’m not even taking my lithium anymore.”

Comments of 25-year-old single mother of two as training progressed (history of bipolar depression since childhood)

“She’s taking paramedic training now.”

Report from mother of 17-year-old daughter who was anorexic

“I can remember the play book a lot better”

Professional NFL football player

“I went in and he was washing his own hair in the shower!”

Father of 35-year-old man with multiple injuries from hitting the ground at 60 miles per hour when his parachute fouled

“He just graduated from Jesuit with honors”

Friend of family reporting on an ex-client who just graduated from a nationally known college preparatory high school. Trained 10 years earlier for Attention Deficit Disorder.

“You can’t afford to not do this training.”

Atlanta businessman

“I’m going to go brush my teeth.”

73 year old stroke victim who had previously only been able to say “yes,” “no,” and “OK”

“She looks like a different person.”

Acquaintance of a recently trained person with manic depression

“Thank you for sharing Dr. Sams with me.”

Two NeuroMatrix™ clients talking

“I’m smokin’.”

Veteran NFL Running Back’s response to the Head Coach when asked how he was doing with the Neurofeedback training.

“He is no longer angry.”

Wife

“She made 93 on her algebra test!”

An amazed Mother proudly discussing a daughter with a previous high test score of 60

## **A message from Dr. Marvin Sams, creator of the NeuroMatrix™ Neurofeedback System ...**

What do peak performance, Attention Deficit Disorder, Learning Disabilities, chronic depression and anxiety, Obsessive-compulsive Disorder, oppositional behavior, and epilepsy all have in common? The answer is: **Each is a product of the brain.** Peak performance occurs when the brain is able to do a particular task or project in a highly efficient manner; the rest are symptoms of a brain that is malfunctioning and not performing as it should.

I didn't use to think this way. For over 30 years, I thought of peak performance as "hard work," and brain problems as "diseases" or "disorders." After all, this is what my life and my medical training had taught me. It wasn't until I started searching for answers to some questions I was having that I came to this revelation: *Problems with attention, learning, behavior, and mood are not really "abnormalities" at all; All compromised or restricted performance is simply a reflection, an indicator, that the brain is not functioning as it should.*

My new perception of the brain and human performance evolved from a personal quest. I had worked in the medical neurology field for some 30 years and had seen enough suffering to last a lifetime. I also had a personal motivation: I grew up with major hyperactivity and attention problems, and was profoundly affected by stuttering. My EEG was abnormal, and drugs only made matters worse. I began to ask myself questions: "Was there a way overcome all this suffering and frustration?" "Why can't we create better focus and mood without drugs and those side effects?" "Why are neurological problems so difficult to treat?"

With these thoughts and a strong personal motivation, I began what turned into a decade and a half long research project. The good news is that I answered these questions and then some. With what was learned, we are, in this moment, able to create a new world, one in which problems with attention, learning, behavior, and mood are resolvable...quickly, and without drugs. And, as it turns out, there is a huge bonus. Human performance and potential can rise to new possibilities.

What is this breakthrough, you may be asking? I call it *NeuroMatrix™ Neurofeedback Training*.

What is *NeuroMatrix™ training*? How does it work? What it is good for? This booklet answers these and many other questions for you.

**If I haven't answered your question, please call 972.407.9895.** I am happy to respond. Additional information can also be found on my web site: **[www.thesamscenter.com](http://www.thesamscenter.com)**.

Marvin W. Sams, N.D., R. EEG T, BCIA-EEG

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## Question #1

### **“What is *biofeedback*?”**

We are truly “learning machines.” Our nervous system senses what is going on in the environment – the brain quickly processes and analyzes the new information – nerve cells fire and connect into performance circuits – we function and respond to what is going on in the world. This is “*physiological*” *biofeedback* defined: Information in – process and integrate – respond and interact.

Using the power of *physiological biofeedback*, our brain and nervous system quickly learns highly complex processes:

- When you were just a tiny baby, you began the road to walking by rolling over in your crib. You were soon up on your hands and knees, rocking to and fro. In no time at all, you were crawling around the den, quickly finding the edge of the coffee table, and pulling yourself up. Then, to your parents delight, you tentatively put one foot in front of the other as someone held your hands high in the air. Finally, the big day: You mustered the courage to let go of everything and everybody and took your first step! From that day forward, there was no stopping you. You were all over the house, running from room to room, getting into all kinds of mischief.
- When you got your first bike, one of your parents probably helped by holding the bike upright and running along side as you turned the pedals. You glanced down to see where your hands and feet were, then up to see where you were going, all the while trying to keep the handle bars straight so you wouldn’t crash into something. In spite of having to learn so many unfamiliar and complex tasks all at once, you quickly coordinated everything you needed to do, and off you went on your own. In just a few hours, you had gone from walking to riding. You now whistled merrily along, waving to all your friends as you pedaled by.

Everyone physically and mentally able learns many complex tasks in his or her life. And, instruction manuals are not necessary. Billions of people have learned to walk and millions can ride a bike, for example, yet the local library has no “how-to” books on walking or riding a bike. The reason for this absence is that it isn’t “you” that learns these new tasks: It is your brain. All you needed was the desire to learn it, and the willingness to go through the motions.

Our brain is very smart. It quickly learns what it needs to do for us to live our life. And, whatever our brain learns and practices becomes an integral part of whom and what we are. We walk from room to room with no conscious thought, absent mindedly stick food into our mouth as we read a magazine, and, even if we haven’t ridden for years, we can probably hop on a bike, and, with a few wobbles, be riding as good as before. Unless damaged by drugs, toxins, physical or emotional trauma, or some disease process, our brain never forgets what we need to know: It remembers for a lifetime.

But, as we have all experienced, day-to-day stresses can cause our brain to go into overload, causing various systems to become compromised, even spin out of control. Examples are common: Severe headaches, low back, neck, and shoulder pain from chronic muscle tension, chronic digestive and bowel problems as the brain and body internalize gnawing stress, depression or anxiety can come from an over or under aroused autonomic nervous system (the “fight or flight *versus* relaxation” response), and, if the immune system turns on itself, allergies and autoimmune diseases such as rheumatoid arthritis. When our brain/body rebels from the stresses of our hectic world, we may discover that we have little or no idea of how to alleviate the

discomfort. The reason for this lack of direction is a lack of detection: It was our brain/body that learned how to control and manage these internal functions. “We” (our conscious “self”) probably don’t have the knowledge, the “insider information,” to take conscious control and change what is going on inside our body.

The discovery and development of “*instrumented*” (*computer assisted*) *biofeedback* gives us the power to work with our brain/body so it can re-learn what it learned in years past. When a sensor or electrode is placed on an appropriate location on our body and plugged into an appropriate electronic biofeedback device, we can use the built-in tones, lights, or meter to make us aware of what is going on inside our body. With this information, we can work directly with our physiology to change our internal terrain. By learning to raise our hand temperature with *Temperature Biofeedback Training*, for example, we can learn to calm an over-aroused and out of control nervous system to relieve migraine headaches, lower blood pressure, and better manage stress. *EMG (muscle) Biofeedback*, as another example, allows us to learn to manage tension headaches and calm various stress-related neck and shoulder pains. With the appropriate technology and proper instruction, these changes are remarkably quick and easy for most to learn: Mastery is usually accomplished in just a few sessions.

Once we learn self-regulation with *instrumented biofeedback*, we can normally recreate the experience years later without the biofeedback device. We have better life tools with which to deal with the negative effects of stress-related discomforts.

#### Question #2

#### **“What is Neurofeedback?”**

We are able to go about our day because our brain talks to itself with highly complex waves of energy. These internal dialogues allow us to pay attention and focus on what is going on in our world, to remember what it is we want to know or need to do, to go to and stay asleep, and to color our life with emotional actions and reactions.

Medical professionals have known about these electrical conversations for over 60 years. Using a device called the *electroencephalogram (EEG)*, Neurologists (medical doctors that diagnose and treat diseases of the brain and nervous system) record the brain waves of many of his or her patients, looking for distortions in the brain wave patterning to help diagnose seizures and manage epilepsy, and to help diagnose or rule out a brain tumor, blood clot, or stroke in those with such symptoms as black outs, headaches, or unusual behavior.

A few years ago, computer technology advanced to a point in which a brain wave analysis system could be created to break down the complexity of the brain wave patterning. As research evolved, the *Quantitative EEG* began to reveal that there is much more to brain waves than the detection of brain disease: The technology also helps us determine where and in what way the brain is efficiently doing and not doing its job.

It wasn’t long before biofeedback researchers figured out that when the power of the *Quantitative EEG* is combined with traditional biofeedback technology, the brain could be led to enhance its own performance. Electrodes placed on the scalp pick up the electrical energy the brain is producing; the brain wave signals are sent to the special computer, which amplifies the signals and rapidly divides the complexity of the brain wave frequencies into small groups of energy; The *Neurotherapist* (a therapist specially trained in brain wave training) selects a frequency group known to be important for focus, strategy, or memory, and returns the information back to the

brain as audio tones. As the brain “listens” to the computer-generated audio information, it analyzes the tones, just as it does with all incoming information. Noting the one-to-one relationship between the incoming tones and frequencies it is using to perform the task, the brain begins to experiment by increasing or decreasing the energy of the cells responsible for producing that particular frequency. Finding that increasing the firing of specific cells improves its performance and decreasing it makes it worse (or vice versa), the brain begins to activate (or deactivate) cells to enhance and maintain the new level of performance.

The brain, in other words, uses the computer generated tones to do what it was designed to do by nature: Use information coming in from the outside world to learn or teach itself something. In this instance, the “something” it learns is that increasing (or decreasing) certain frequencies helps it focus better, to understand incoming information more quickly and accurately, and to execute complex tasks in an easier, more efficient way.

There is a fundamental difference between traditional instrumented *biofeedback* and the more recently developed *Neurofeedback*. *Biofeedback* helps us learn to take conscious control of our internal terrain for better management of stress and stress-related health problems. With *Neurofeedback*, however, it is not “us” that learns the new behavior: It is our brain. Just as “we” learned to walk and ride a bike, all “we” need do is go through the motions. (In this case, sit with electrodes on our head and play a video game or watch a video.) Our brain quickly and easily learns what it needs to do to learn and perform complex tasks in a more efficient way.

### Question #3

#### **“What is *NeuroMatrix™ Neurofeedback Training?*”**

After working for almost three decades as a medical professional and clinical researcher in some of America’s most prestigious medical centers, I began a search for ways to remediate attention and learning problems, and enhance human performance without drugs. My research led me to be able to create and develop sophisticated training technologies that literally teach any brain to perform at higher levels of efficiency. I call the completed process, *NeuroMatrix Neurofeedback Training™*.

The *Neuroefficiency Performance Evaluation* consists of a *Continuous Performance Test* and *Quantitative EEG (QEEG)* with *Normative Reference Database report*. The *Continuous Performance Test* evaluates how well the brain and central nervous system are able to focus and pay attention, and how quickly and accurately we are responding to incoming information; the *Quantitative EEG* (computerized brain wave analysis) and *Normative Reference Database report* (a computer library of the brain wave characteristics of normal subjects) defines how well the brain is able to do its job, and guides the *Neurotherapist* in determining what *Neurofeedback* training protocols will most efficiently restore or create enhanced performance circuits.

*NeuroMatrix™* uses two advanced forms of nervous system training: *Remedial Neurofeedback Training™* provides information to the brain on how it producing 11 frequencies keyed to intellectual functioning, focus and attention, and memory; *Heart Link™ (Heart Rate Variability) Neurofeedback Training* teaches our autonomic (“fight or flight” response) nervous system to more efficiently interact with our environment. Our emotional reactivity is balanced and we achieve a sense of well being. The two processes come together synergistically to optimize mental performance and emotional resilience.

When our brain has sufficiently improved its efficiency, our moment-to-moment ability to function at higher levels “just happens;” No additional effort is required on our part. And, just as we jump on a bike years later and our brain “remembers” how to do it, our brain and nervous system doesn’t forget what it learned with Neurofeedback training. Focus, learning, and memory just gets better and better.

#### *Question #4*

#### **“How can NeuroMatrix™ training help so many different kinds of problems?”**

The answer is pretty simple when you understand that *behavior is a product of the brain*. Attention and focus problems (Attention Deficit Disorder), learning difficulties (Learning Disabilities), stuck mood patterns (depression and anxiety), redundant behavior (Obsessive-Compulsive Disorder), and unstable electrical energy (epilepsy) are all examples of a brain executing a specific performance characteristic poorly. The only difference between any of these “brain disorders” is where and in what way the brain is mismanaging its energy.

When the neurological inefficiency is identified from an analysis of the brain wave patterning, and *NeuroMatrix™* training has sufficiently assisted the brain in healing and repairing itself, the symptom(s), whether it be compromised attention, mood, or behavior, is reduced or eliminated all together.

How *NeuroMatrix™* builds peak and elite performance is built on the same foundation. Because performance is a product of the brain, when *your brain* does its job with greater ease and efficiency, *you* do your professional or athletic activity easier, more elegantly, and with greater precision.

#### *Question #5*

#### **“How does NeuroMatrix™ help my brain work better?”**

If we exercise regularly, our muscles grow stronger and we have greater stamina. If we don’t use our muscles, however, atrophy soon sets in and our body begins to waste away. With the brain, it is not physical exercise or lack thereof that builds strength or causes atrophy: It is the experience or inexperience it is having. Feed our brain information in a friendly, non-threatening environment, and we are “learning machines.” But, lock us in a dark, quiet closet for a few weeks, and we quickly lose our ability to function in the world.

Our brain, in other words, is both *self-building* and *self-destroying*: It creates or disconnects performance circuits based on the experiences it is having. Our brain is also *self-healing*: If injured, it uses its day-to-day experiences to rebuild itself. It restores as much function as it can with whatever resources it has left.

A vital feature of our brain’s *self-healing* mechanisms is its ability to lock in the repairs it has made. When the injured brain senses it has done as much as it can with its remaining resources, it locks in the gains. Two things then happen. One, the brain doesn’t lose ground. That’s the good news – we don’t get worse. The second is that our day-to-day performance is also locked in. That’s the bad news – we don’t get much better either. This is why most of the gains in brain injury rehabilitation programs occur in the first six months to a year after an accident or stroke. After that, further improvement comes slowly, if at all.

*NeuroMatrix*<sup>™</sup> training works by returning narrow bands of information back to the brain on how it is performing a complex task. With the isolation and feedback of highly specific performance frequencies, the brain is able to rapidly build new performance circuits. Because the frequencies presented are those produced naturally by the high performance brain, even the most locked-down brain quickly becomes comfortable in unlocking protective mechanisms and re-starting the rebuilding process.

Because our brain is *self-building*, *NeuroMatrix*<sup>™</sup> training works at two levels: One, by providing highly specific information on how it is performing a complex task, the brain is able to rapidly restore and create performance circuit. Second, because the brain builds itself with its day-to-day experiences, it is able to learn and process information more efficiently: Performance and mood continue to improve for months after training is finished.

#### *Question #6*

**“If our brain is able to build new circuits and repair its self, why aren’t we all geniuses, highly successful, and living an effortless life?”**

Neuroscience’s answer to this question is that our brain’s greatest strength is also its greatest weakness. Because our brain is self-building, if chemicals, drugs, or trauma cause damage before or after birth, or our childhood was especially challenging physically or emotionally, our brain will likely begin to create performance circuits that are weak, inefficient, or even inappropriate for what we want or need to do in later life. From a “real world” perspective, this means that what was a rather minor or insignificant physical injury or emotional incident early in life can produce a serious attention, learning, or emotional problem in later life. Everything can seem to be going along quite well for the child who fell off a slide at age two – until she or he starts school and has to sit quietly, or later, needs to learn to read or do math problems. Then, it is discovered that the minor incident or accident was not so minor after all. Brain problems, like compound interest, multiply itself over and over again.

So, while our brain’s strength of building and re-building itself can cause us to become smarter and more adaptable, physical injuries or difficulties in life actually causes our brain to make us less bright, more rigid, confused, and even depressed or anxious.

*NeuroMatrix*<sup>™</sup> was specifically created to identify and correct miswired brain circuits and inappropriate frequency responses. With enhanced function, the brain is better able to maintain itself in an efficient and resilient state. We are able to live in accordance with Nature’s original intent: To become wiser and more intelligent, with a greater memory and a more resilient mood, as we mature and move into our “golden years.”

#### *Question #7*

**“Can *NeuroMatrix*<sup>™</sup> help me make better grades?”**

Why does one student make straight A’s, another makes B’s and C’s, and still another fails miserably? The answer is found in the brain and how well it is doing or not doing its job.

The EEGs of those doing poorly in school, as compared to those doing well, tend to show one or more of the following neurological inefficiencies: Large slow brain waves that overpower faster working frequencies; working frequencies of insufficient power to sufficiently activate cortical

performance areas; “jammed” or inadequate performance circuits; or, the brain being “locked in” and not able to rapidly shift to frequencies needed to process new incoming information.

Having run hundreds of thousands of diagnostic EEGs on struggling students, we EEG professionals have known about these inappropriate brain waves for decades. My greatest reward during my years in the hospital and clinic was helping distressed parents and suffering adults understand that the compromised academic or work performance was not “incompetence” or “just being lazy,” but a neurological problem with their brain. My disappointment, though, was the same as that of the parents and adults: It was extremely frustrating to know that even though the cause of the problem was now understood, not much could be done about it.

After living with this dilemma for many years, it came to me that I could be looking for a way to change this situation. I started asking myself: “Was there something that could be done for those suffering from learning problems?”

I knew from personal experience that drugs were not a good solution. One, there are always side effects: Little or no appetite in growing children, growth retardation, liver and gum disease, and thinking and memory problems. Second, talk to those taking these medicines, especially children and young people, and you will be told that these drugs make you “feel different.” Descriptions like “unreal,” “weird,” and “floaty” are often heard.

I originally thought the answer to better grades and a more fulfilling life might be found in “supercharging” the brain with commercially available “mind/brain” technologies. Electronic devices with tiny lights flashing over closed eyes were supposed to create relaxation and better creativity, cassette tapes with brain altering tones and subliminal messages were being used by those seeking less stress and a more successful life, and beds rotating in magnetic fields allegedly increased the IQ. Unfortunately, these technologies, while admittedly fun to use, ultimately proved disappointing. They just didn’t create what I considered to be real and permanent changes.

A few weeks before I lost heart with the mind/brain technology, I had acquired a *Quantitative EEG* system to research what effects the devices might be having on the brain. What made this particular technology unique, as compared to the other available computerized brain wave systems, is that it could also do *EEG biofeedback* or *Brain Wave Training* (what we now call *Neurofeedback*). I didn’t buy the equipment for that purpose: It just happened to be able to do it. As I began thinking about the possibilities, it started to make sense that, with my almost 30 years experience in clinical and research EEG, *EEG biofeedback* was a “natural.” It had the potential to help me “fix” these “unfixable” problems. I decided to give it a try.

A decade of intense effort later, I had achieved my goals. The final “product,” what I now call *NeuroMatrix™ Neurofeedback Training*, optimizes brain function by synergistically combining two powerful *Neurofeedback* processes:

- *Remedial Neurofeedback Training™* enhances **attention, focus, and memory** by teaching the brain to decrease attention-dampening slow waves and increase the faster working frequencies. **More consistent performance, faster brain processing speed, and improved accuracy** is accomplished by helping the brain correct inappropriate *Coherence* and *Phase* characteristics (measures of how well the brain is sharing and transmitting information from one performance area to another).
- *Heart-Link™ (Heart Rate Variability) Neurofeedback Training* teaches the trainee to consciously de-stress and relax under the pressures of difficult learning and testing situations.

The availability of *NeuroMatrix™ training* means that the dysfunctional or inefficient brain of the child or adult with learning, attention, or mood problems can not only be identified, it can also be taught to overcome the difficulty.

An early formalized *Neurofeedback* study shows an increase in IQ test scores of 15-22 points, and a grade point average increase of 1.5. Many have already gone from failing to passing.

With *NeuroMatrix™*, the disadvantaged becomes advantaged, the average student can become above average, and the above average student has the potential to move into the superior range.

### Question #8

#### **“Can NeuroMatrix™ improve my game?”**

Whether you think about this way or not, your ability to perform on the golf course, athletic playing field, or tennis court *depends on how well your brain is able to do its job*. The exciting news is that, no matter how well or how poorly you are now playing, you can be performing at higher levels, naturally, and with less effort on your part.

The *Continuous Performance Test* measures how well your brain and central nervous system is able to respond and pay attention. The following briefly describes a few of the 38 visual and auditory performance characteristics quantified and reported:

- *Prudence* – How quickly can your brain understand and respond to what is going on in the game?
- *Consistency* – Can your brain/body accurately reproduce what you have practiced, or are you responding a slightly different way each time?
- *Stamina* – Is your brain able to “go the distance,” or does it fade early?
- *Vigilance* – How much (or how little) are you distracted by extraneous movement and sounds?
- *Focus* – How well (or how poorly) is your brain fixing and holding your attention?
- *Speed* – How quickly and accurately is your brain and central nervous system able to respond to game demands?

The *Quantitative EEG* guides the *Neurotherapist* in determining where and in what way your brain needs to be strengthened to optimize performance.

*NeuroMatrix™ training* coaches your brain to more effectively focus on game play, to respond quicker and more accurately, and to not be overly distracted by crowd noise and the movement and activities of other players. For some, *Heart-Link™ (Heart Rate Variability) training* is especially important: It teaches the player how to create a *calm focus* (“*The Zone*”) under the stress of game conditions.

*NeuroMatrix™* assists weekend, amateur, and professional athletes alike in achieving new levels of performance. Professional athletes I trained have set personal, team, and league records, reporting increased endurance, greater adaptability, and improved accuracy under the pressures of

extreme competition. Some have also noted enhanced bilateral strength, coordination, and dexterity.

#### *Question #9*

**“I am expected to be creative and continuously come up with new ideas. Yet, deadlines loom and I get frustrated and distracted. Can NeuroMatrix™ training help?”**

To have a truly new idea and manifest the object of creativity into the physical world, your brain must rapidly go through a six-phase process:

***Phase 1*** A problem or situation is recognized.

To optimize our ability to be creative, our brain must be feeling comfortable in the environment, without undue fear of attack or preoccupations with survival.

***Phase 2*** There must be a desire for solutions or ideas to current problems or situations.

Recognition of potential requires the deeply seated emotional brain to be functioning efficiently and unoccupied with extreme worry and doubt.

***Phase 3*** The brain momentarily suspends logic and survival mechanisms in the left hemisphere.

The left hemisphere’s job is to analyze what is going on in the environment and execute our means of survival. It must be functioning efficiently, sensing a direct, accurate communication with the deep brain survival centers.

***Phase 4*** The “unattached,” “free-floating” right side of the brain is allowed to make abstract associations.

The right side of the brain is our “gathering” brain. It makes no judgment of the incoming information. If malfunctioning, information transferred from the right to left hemisphere will be erroneous, jeopardizing the possibilities of any new and novel ideas.

***Phase 5*** The logic, rational-seeking left hemisphere considers the merits of the new idea.

If the left hemisphere is dysfunctional, the idea will be distorted and probably denied as being possible.

***Phase 6*** If the person elects to manifest the object of creativity into the physical world, the front part of the brain (*frontal lobes*) is brought into play to plan, strategize, and execute the plans needed to create the new idea or product.

Poor attention, focus, or mood, all products of the frontal lobes, will sabotage the manifestations any new ideas.

Creativity, then, from problem-that-needs-a-solution to solution-manifested-into-the-physical world, is a “whole brain” process. If any of the functions are inefficient, an idea or production will only come reluctantly, the potential of possible solutions will not be adequately recognized, or manifestation into the physical world will occur only on a hit or miss basis, if at all.

*NeuroMatrix™ training* helps the brain meet the requirements for the six essential phases. *Bio-Tutorial Neurofeedback Training™* assists the brain in “whole brain” processing by balancing left/right functioning and correcting energetic shortcomings; *Heart-Link™ (Heart Rate Variability) Neurofeedback Training* enhances the heart and the deep brain to communicate release stress so the creative resources of the right hemisphere are fully accessed and the left brain receives and reacts to accurate information.

#### Question #10

#### **“What can NeuroMatrix™ do for my child’s Attention Deficit Disorder?”**

The *Quantitative EEG* (computerized brain wave analysis) typically reveals that those with the symptoms of *Attention Deficit Disorder, with or without hyperactivity (ADD/ADHD)*, decreased ability to focus and pay attention, impulsivity, increased or decreased physical activity, for example, have one of two inefficient brain wave patterns: More *Delta* or *Theta slow waves* than children and adults that attend normally, or excessive *Alpha waves* that do not yield to fast *Beta* frequencies when focus is attempted.

When I first started doing *Neurofeedback* training, I had done medical diagnostic EEG testing on children and adults with attention problems for decades. In the clinic and hospital, we typically record the brain waves as the patient lies quietly with his or her eyes closed. The only stress we use to activate potential abnormalities in the brain is to have the person breath slowly and deeply for a few minutes (hyperventilation) and briefly flash a light over the eyes to see if we could provoke a mini-seizure in the EEG. It didn’t occur to us that if we really wanted to understand if there was a brain problem causing the attention or learning problems, we should record the brain waves as the person to worked on an appropriate and challenging task. In spite of my not having done it before, when I started doing *Neurofeedback training*, it somehow made sense to me that the brain should be both tested and trained under the conditions that caused the “zoning out” behavior, that is, while the person was attempting to focus and work on a complex task.

The first time I handed someone a book to read, then recorded his brain waves, I was shocked. Large slow waves quickly dominated the EEG patterning! The significance of this major brain reaction didn’t escape me. I knew the only other instances in which large slow waves appeared in the EEG was during the deep and prolonged breathing of hyperventilation (because the brain-blood chemistry is being significantly altered), and when someone is unconscious from sleep, coma, or anesthesia. Because these children and adults were awake, not breathing deeply, and actively reading a book, it figured that these large slow waves must mean that those with attention problems must be seriously under aroused. That is, they were half asleep. With this revelation came the thought: For many, *ADD/ADHD* must be a type of sleep disorder.

When normal attending people focus on a particular object or situation, the brain commonly decreases slow waves and increases specific fast wave frequencies. The person then becomes more vigilant (therefore more awake), making concentration and focus easier. In those with the symptoms of *ADD/ADHD*, however, another reaction occurs: When focus is attempted, large slow waves come up. As the child or adult tries harder to focus and understand, the slow waves become larger. This is not unlike what occurs in the EEG patterning as we drift off into sleep.

Based on my under aroused/drowsy brain theory, I believe the difference between those with excessive, uncontrolled physical movement (hyperactivity) and those that sit around looking confused or uninterested in what is going on, is how the individual reacts to the drowsy feeling.

Hyperactivity can be thought of as the child and adult fighting to stay awake, the “couch potato” ADD type as someone who is “giving in” to the feeling of being half asleep.

As I thought about this abnormal brain reaction when attempting to focus and pay attention, it seemed to me that what I needed to do was train the brain to decrease the slow waves and increase the faster “thinking” waves *as the person worked on a challenging task*. This would “wake up the brain” so the child or adult could attend as normal attending people. This technique, of training the brain as the trainee works on a cognitive challenge (usually a strategic video game), has proven itself to be highly effective and efficient. The results are documented in the hundreds of ADHD/ADD children and adults I have successfully trained using this technique.

In some of those with attention problems, the underlying neurological inefficiency is not the high voltage slow waves of a “sleepy” brain, but the *Alpha wave* patterning of an “idling,” at-rest brain.

The brain uses *Alpha waves* (rhythmic 8 to 12 cycles-per-second activity) to rest an area not actively processing information. For example, when we close our eyes, rhythmic *Alpha waves* appear, sometimes quite dramatically, over the visual processing centers in the back of the brain. Open our eyes, re-energizing the visual cortex with scenes and events of the world, and *Alpha waves* instantly drop in voltage. Low voltage, irregular waves of many frequencies then take over to process the information and make us conscious of what is going on in our world.

If some unfortunate child or adult has unyielding *Alpha waves* over the *frontal lobes*, adequate attention and focus will not occur. A diagnosis of Attention Deficit Disorder will likely be made. If other cortical areas are dominated by *Alpha waves*, there will, depending upon the affected brain areas, be such problems as reduced organizational skills, compromised learning abilities, or poor decision-making skills. Learning will be difficult.

The only way to determine the root cause of an attentional deficit or learning problem is to use the *Quantitative EEG* to identify the neurological inefficiency. When the pattern has been identified, the brain can be taught to decrease the attention-dampening *slow waves* or the idling *Alpha wave activity* while working on a task. When training is complete, attention and focus are “automatic,” hyperactivity is reduced or eliminated, and self-esteem restored.

#### Question #11

#### **“I have dyslexia. Can NeuroMatrix™ help me read better?”**

The most studied of specialized brain functions is our ability to read and comprehend the written word. Brain research using special imaging techniques such as the PET, SPECT, and function MRI, reveal that when we focus on printed words, sensors in the back of the eyes are activated – the sensors generate and transmit electrical impulses to the visual centers in the back of the brain – the signals are processed and analyzed by specialized cells in the area – the resulting energy is (mainly) transmitted to activate Wernicke’s area (just behind and above the ear on the left side), where the brain activates specific nerve cells and circuits to “recognize” the words – the impulses are transmitted to Broca’s area (just above and in front of the ear), where the electrical pulses making up the “words” are analyzed for content and meaning – the front part of the brain is activated, making the information conscious and allowing us to “understand” what “we” just “read.”

Our brain does its work by activating and linking nerve cells in different specialized areas of the *cortex* and *deep brain*, and “learns” by strengthening the connections it finds itself making most often. *Learning disabilities* occur when an otherwise normal and healthy brain has a specialized performance area not energetically able to do its job, or there are weak or disrupted pathways not able to link and transmit activated electrical impulses to the next area.

Sometimes these weaknesses occur because of damage from a birth trauma or an early childhood injury. But, often as not, medical tests that detect structural damage in the brain fail to reveal physical damage. The answer is found in evaluating how the brain is able to manage its energy.

The *QEEG* (computerized brain wave analysis) allows faulty brain frequencies and energetically defective areas to be detected and defined; the *Normative Reference Database report* (a statistical comparison of the brain waves to those of normal people) reveals where the brain is not effectively activating, connecting, and moving working energy. *NeuroMatrix™ training* assists the brain in remediating dysfunctional areas, and in creating the networks it needs to efficiently move energy from one performance area to another. Learning becomes fun; life becomes exciting; self-esteem soars.

#### *Question #12*

**“Can NeuroMatrix™ training help depression? My doctor has prescribed several different antidepressant medications, but none have helped.”**

Much has been written about depression being an imbalance or deficiency in the brain’s neurochemistry. There are even TV commercials for psychiatric drugs suggesting this is so. Recent research, however, documents what those of us in the field of EEG have long suspected: The root of chronic depression and anxiety is more about faulty brain circuits and inappropriate brain waves than a “neurochemical imbalance.”

Chronically depressed or anxious people typically show one of three neurological inefficiencies in their *Quantitative EEG* (computerized brain wave analysis) and *Normative Reference Database report* (a computer library of the EEG waveform characteristics of normal people):

- *Coherence* problems over one or both hemispheres (sides) of the brain reflecting a problem in the brain’s circuitry. *Coherence* is a statistical measure of how well the brain is able to share information between different performance areas. Excessive *Coherence* values as compared to the *Coherence* characteristics of people with normal mood patterns) commonly reflect too much “sameness” in the brain’s circuits: The brain is thus “locked in,” not having the resources it needs to shift out of the restricted mood pattern.
- *Alpha waves* over the left frontal region cause the more upbeat left hemisphere to “idle out,” forcing the brain to shift its mood-regulating mechanisms into the more negatively oriented right hemisphere. A pessimistic outlook results. (“She’s always negative.”)
- *Alpha waves* idling the brain’s right hemisphere cause life’s events and circumstances to be misunderstood. (“He just doesn’t get it.”) Unexpected upheaval in relationships, chaotic family situations, and misunderstood social experiences can lead to depression (or anxiety, or anger).

When the *Quantitative EEG* has defined the neurological issue, *NeuroMatrix™ training* addresses the root of the mood problem: *Bio-Tutorial Neurofeedback Training™* helps the brain unlock constricted performance circuits and reduce inappropriate *Alpha waves*; *Heart-Link™*

(*Heart Rate Variability*) *Neurofeedback Training* enhances emotional resilience by teaching the nervous system to more efficiently balance the “flight or fight *versus* relaxation” response. When the brain has the resources with which to do its job more efficiently, day-to-day stresses move from overwhelming to doable. Life’s challenges can be met head on.

### Question #13

**“My daughter has Obsessive-Compulsive Disorder, which has taken over her life and is disrupting the routine of our family. She is refusing to go to school, and has trouble sticking to her home schooling. Will NeuroMatrix™ training help?”**

Those afflicted with the repetitive behaviors of *Obsessive-Compulsive Disorder (OCD)* are forced to lead an almost robot-like existence. He or she is driven to repeatedly wash their hands, perhaps to the point of bleeding; food has to be chewed an exact number of times before swallowing; a light switch is compulsively turned off and on many times a day; or, the same questions are repeated over and over, disrupting the concentration and activities of others. Life is dictated and redundant.

Brain imaging scans show *OCD* behavior to be associated with an inappropriate neural loop between the *caudate* (a structure in the *deep brain*), the front of the brain just above the eyebrows (*orbital frontal cortex*) and the *cingulate cortex* (near the top of frontal lobes). The abnormal firing of the *caudate* triggers the urge to “do something,” the front part of brain says “something is wrong,” and the *cingulate*, that normally allows us to consciously shift our thoughts and focus from one thing to another, inappropriately keeps attention riveted on the feeling of unease.

How does this “neural loop” show up in the EEG? I commonly find one of two neurological inefficiencies: *Coherence* measurements, a statistical analysis of how well the brain is able to share information between performance areas, shows the brain to be locked into a “redundant loop” of restricted performance, or *Frontal Beta Spindles* – brief “flurries” of smooth, fast oscillating waves –in the very front of the brain.

The brain does its work by activating millions of nerve cells, all firing at different rates. Different cortical areas are momentarily joined together, the information shared, then disconnected. Excessive *Coherence* means the brain is having difficulty sharing information between different performance areas. It is either not able to fire enough cells that produce a particular frequency, or there are not enough active connections between cells to get the job done. *Coherence* problems in those suffering from *OCD*’s repetitive behavioral pattern, then, suggest that the *cortex* is not able to adequately respond to signals coming in from the *deep brain*, or, it can’t fire enough of the right kind of cells to shift out of the performance loop.

If the brain is having difficulty shifting out of performance loop, the *Neurofeedback* training objective is to help the brain activate more of the right kind of nerve cells, and to enrich the connections between performance areas. Once done, the *frontal lobe cortex* is better able to receive and act on information coming in from the *deep brain*. Leaving one task (or recurring thought) and shifting to the next becomes, as it is for most of us, effortless and without conscious thought.

When the efficient brain is busy processing incoming information and making us aware of it (such as when we read a book), the EEG pattern is low voltage and irregular – a mixture of many frequencies. If large, oscillating (smooth and rhythmic) brain waves occur when someone is trying to perform a task, we know that particular area of the brain is literally not “getting it.” For

whatever the reason, the brain is not switching from the oscillating idling waves to the “whirry” frequencies needed to process and act on incoming information. That is, sensory and motor data coming in from the *deep brain* or other cortical areas is not adequately received and processed.

A common example of how oscillating *spindle activity* shuts down our “thinking” cortex is seen in the EEG sleep patterns of normal people. Even though our brain is electrically busier during sleep than the waking state, we are not aware of our self, our thoughts, and the physical world. We are unconscious because our brain has deactivated the cortex with oscillating *spindle activity*.

The primary differences between the *Frontal Beta Spindles of OCD* and the *sleep spindles of normal sleep* are their location and the level of conscious awareness. During sleep, *spindles* are seen over the middle part of the brain, the area responsible for sensing the world and moving our body. In *OCD*, the oscillating waves are seen in the very front of the brain (just over the eyes). And, of course, *sleep spindles* occur when we are asleep, unconscious, and physically inactive, while the *spindles of OCD* occur while the person is awake and moving around. Wake or asleep, though, the effects are the same: The cortex cannot process and execute information when and where rhythmic activity is present.

Motor programs for acts learned in the past and practiced to a point of habit (such as washing the hands and turning a light switch off and on) are stored and executed from the *basal ganglia*, a structure in the deep brain. The repetitive behaviors of *OCD* likely occur in those with *frontal spindle activity* because the brain has weak connections between the deep brain structures and the *frontal cortex* (the site of the *spindles*), or, the modulating influences of the *frontal lobes* has been inadvertently “switched off” by the brain and incoming signals are not being efficiently processed. The well rehearsed behavior is thus involuntarily repeated because the *frontal cortex* is not able to send signals to the *deep brain* telling it to turn off the information, or the *frontal cortex* is “weak” and energetically incapable of fully receiving and managing the incoming signals.

Experience has shown that when *NeuroMatrix™* remediates *Coherence* communication problems, or helps the brain activate the *frontal cortex* and improve communication networks between *frontal lobes* and the *deep brain*, redundant behavior is dramatically reduced, or eliminated all together. The person is able, once again, to take charge of his or her own actions and live life to its fullest.

#### Question #14

**“I have panic attacks and haven’t been able to travel for my work. Can *NeuroMatrix™* possibly be of benefit?”**

*Panic attacks* often occur “out of the blue.” There is a sudden feeling of being overwhelmed with fear and anxiety: Sweaty palms, a sense of dissociation, a pounding heart, and racing thoughts occur. Life literally comes to a standstill.

*NeuroMatrix™ training* has shown the ability to pinpoint and remediate the root cause of *panic attacks*. While the QEEG pattern varies from person to person, I usually find the same *Coherence* issues or *frontal Beta spindles* seen in those with the redundant behavior of *OCD*. (See Question #13.)

The behavioral differences in *OCD* and *panic attacks* appear to lie in whether the *basal ganglia* in the *deep brain* is sending information to a *frontal cortex* ill-prepared to manage the data (*OCD*), or the *amygdala* in the *deep survival brain* mistakenly “floods” the *frontal lobes* with emergency

information (*panic attacks*). In either case, “we” (our “conscious self”) are not in control: our *deep brain* has taken over our life.

As with *OCD*, when the QEEG findings are successfully remediated, the panic attacks typically subside, usually disappearing all together.

#### Question #15

**“I have had seizures since I was young. Is there anything that can be done to help me?”**

Our brain does its work by firing billions of zaps of electrical energy every second of every day. Some of these signals stay local to activate a specialized performance area, others are transmitted over distances so one brain area can talk to another. If the brain is not able to contain, channel, or modulate these cellular firings, a sort of neuronal “brush fire” occurs. A *seizure* results if the erratic, uncontrolled electrical impulses “flash over” into sensitive brain areas.

*Seizures* can also be caused by scar tissue on the cortex (from an old injury). An electrical “spark,” a sort of energetic “lightning strike” occurs (known as a *spike discharge* in EEG terms), that can instantaneously create a sort of “electrical explosion” in the brain. Wide areas of the cortex are instantly and dramatically involved, with major control areas being taken over by the uncontrolled energy. The type of *seizure* that occurs depends on the location of the scar tissue and the direction of electrical spread.

The goal of the *Neurotherapist* is to identify the location of the maverick cells or energetically dysfunctional or damaged brain areas with the Quantitative EEG, then teach the brain to bolster and better manage its resources with the appropriate *Neurofeedback* training.

Scientific studies dating back to the late 1960s and early 1970s document *Neurofeedback’s* ability to reduce *seizures*. In spite of my having worked in the field of EEG and neurology for over 40 years, I can’t explain why the neurological community has generally ignored *Neurofeedback* and its ability to help manage seizures. Perhaps it is because Medicine is more oriented toward “drugs for a disease” than “training for regulation.” But, whatever the reason, the “Say no to drugs” campaign and the sometimes-serious side effects of anticonvulsant medication (such as sedation, memory deficits, cognitive (thinking) difficulties, permanent brain dysfunction) are causing parents and those with epilepsy to look for alternatives. *Neurofeedback* already has a long and successful history.

#### Question #16

**“My son had a serious brain injury in a motorcycle accident several months ago. He is doing better now, but still has memory problems, gets confused, and has frequent headaches. Can NeuroMatrix™ help him this long after the accident?”**

*Axons*, thin and threadlike, extend from the brain’s working cells in the cortex to connect with billions of other cells in the deep brain and body. If the head is struck violently, the brain moves rapidly away from the point of impact, and then snaps back. This lightning-fast acceleration and deceleration causes *axonal shearing*, which can have devastating consequences for mental and physical functioning.

The *cortex* (the outer “bark” of the brain) is light and thin, and the *white matter* (the brain’s bulk) dense and heavy. *Axonal shearing* occurs when the head stops abruptly: The violent motion of the brain inside the skull causes the *cortex* to slide over the *white matter*, ripping, clipping, shearing, and bruising *axons*. Because *axons* are responsible for sending and receiving signals to and from the deep brain and body, damage to these vital communication links cause thinking and memory problems. Sometimes, even the brain’s ability to sense, move, and control certain parts of the body are affected. And, because the *cortex* is no longer able to communicate with, and efficiently modulate, the deep brain’s emotional centers, mental difficulties and emotional upheaval can become a way of life.

*NeuroMatrix™ training* is the perfect compliment to Physical, Rehabilitative, and Occupational Therapy. The *Quantitative EEG* and *Normative Reference Database* reveal where and in what way the brain is damaged; *Bio-Tutorial Neurofeedback Training* provides information the brain needs to activate idling neurons and create new communication links. For those physically able to practice special breathing techniques, *Heart-Link™ (Heart Rate Variability) Neurofeedback Training* helps the brain modulate the deep emotional centers.

Because information is being returned to the brain on how it is performing a complex task *in this moment*, brain function, even in those whose accident occurred decades earlier, is always enhanced with *NeuroMatrix™ training*.

#### Question #17

**“My father had a stroke and has difficulty speaking. Will NeuroMatrix™ training help him talk again?”**

The devastating effects of a stroke results from trauma to the brain from inside the skull instead of the outside: A blood vessel swells and bursts – pressure inside the skull causes serious damage to the soft brain tissue. To add insult to injury, the escaped blood, being very toxic to brain cells, produces even more damage and destruction.

While it is true that billions of nerve cells die as a result of a stroke, it is also true that, given the right instruction, neurons in adjacent brain areas can be recruited to help restore lost functions. *NeuroMatrix™ training* assists the brain in activating idling, inactive, and damaged neurons, and in teaching brain cells in adjoining areas to perform a new task.

*NeuroMatrix™ training* greatly enhances and accelerates the therapeutic benefits of traditional Physical, Rehabilitative, Occupational, and Speech Therapy. It assures the greatest possibility of recovering speech and other major brain functions.

#### Question #18

**“Can NeuroMatrix™ help those with Alzheimer’s and Parkinson’s disease?”**

Formalized research has not yet been done to determine how much *NeuroMatrix™ training* would benefit those with these two devastating neurological diseases. However, I have developed two models, based on published neuroscientific research, that suggest *Neurofeedback* might indeed be helpful.

A main reason for the cognitive (thinking) difficulties in *Alzheimer’s disease* is thought to be microscopic *plaques* and *tangles* in the *cortex*. These abnormal growths were first thought to be

solid, creating a speculation that memory problems and confusion were because the path of axons carrying communication signals to other performance areas were being blocked or rerouted. Speculation was that the signals could not reach their intended destination, creating the cognitive problems. More recent research, though, has shown that when the *plaques* are viewed under extremely high-powered magnification, the resemblance is closer to Swiss cheese than a lump of coal. Instead of being blocked, as originally thought, *axons* were found to be threading their way through the holes, increasing their length some 30%. Many of the signals, therefore, *are* reaching their designated target, but the transmission is delayed: The information being conveyed from nerve cells firing arrive too late for receiving cells to effectively process the incoming message. Confusion and dementia occur.

This information about delayed nerve cell communication may be good news. *Phase*, a measurement of the time it takes for signals to travel between brain areas, is routinely calculated, compared to those of normal people, and reported in the *Reference Data Base report*. *Phase* training is easily done, which, hopefully, can help speed up these delayed signals. If effective, cognitive difficulties could be relieved, in whole or in part.

Much of the physical compromise of *Parkinson's disease* (the “pill rolling” tremor, hesitant and shuffling gait, and rigidity) is due to an inadequate production or improper utilization of the neurochemical *dopamine*. This substance is produced and managed in an area of the deep brain called the *basal ganglia*.

The *frontal cortex* and *basal ganglia* have direct, two-way communication. *NeuroMatrix™ training* uses specific frequencies to teach the brain to enhance performance of the *frontal lobes*. Research may show that the process can teach the brain to send corrective signals to the *basal ganglia*, “telling it” to increase production and utilization of *dopamine*.

#### Question #19

**“I snap at my family and people at work. My anger has gotten so bad lately, I lost my temper in traffic and almost caused an accident. Is it possible that NeuroMatrix™ training could help calm me down?”**

In many of those with explosive anger, the *Quantitative EEG* (computerized brain wave analysis) and *SPECT scan* (a brain imaging procedure that reveals how the working brain is managing its energy) show the front and side of the brain (*frontal* and *temporal lobes*) to be over energized. This is thought to occur because the *amygdala*, a pair of independent “mini-brains” located deep within the *temporal lobes*, are over firing and sending inappropriately strong signals to the *frontal lobes*. The *frontal lobes* then become overwhelmed with the energy, and behavior becomes erratic and irrational.

Exaggerated anger can also occur if the *frontal lobes* are themselves damaged or dysfunctional, and not able to efficiently receive and effectively manage the energy coming in from the *amygdala*.

The *amygdala*'s primary role is to constantly monitor the environment for danger. If there is a noise in the middle of the night, for example, we might wake up, heart pounding, with no idea of why we are suddenly awake. This occurs because our *amygdala* “heard” an unfamiliar noise, became alarmed, and sent a strong alerting signal to our *frontal lobes*. Wide-eyed and now fully awake, we get up to search the house to see if we find anything wrong.

If our *amygdala* malfunctions and misinterprets routine events and circumstances as hazardous and a threat to survival, it can send over amplified danger signals to the *cortex*. Extreme, seemingly uncontrolled anger occurs. To observers (and unwilling participants), this is terrifying: The person's reaction is irrational, the outcome unknown.

For a “real world” example: If a strong disagreement occurs over who arrived at a stop sign first, a faulty *amygdala* may feel threatened and “take over” by sending strong alarm signals to the *frontal lobes*. The person is then driven to act in a way the brain believes will ensure its greatest chance of survival. In the worse case scenario, these brain-inspired acts can lead to a physical attack on the person the brain (mistakenly) perceives to be a threat to survival. The brain's intent is honorable – to manage or eliminate the threat – but the most likely outcome is shaken people and perhaps even destroyed lives.

Violent outbursts can also occur if the *frontal lobes* are faulty and not able to accurately process, modulate, or respond to signals coming in from the *deep brain*.

*NeuroMatrix™ training* helps calm anger, apparently by assisting the brain in establishing and maintaining better communication networks between the *amygdala* and *frontal cortex*. It also “tunes” the *frontal lobes* so incoming distress signals are processed with greater speed and precision. *Heart-Link™ (Heart Rate Variability) Training* helps those with anger issues by strengthening the connections between the *heart* and *deep brain* so there is better balance of the autonomic nervous system's fight or flight *versus* relaxation response. Anxiety is calmed, and anger-driven responses reduced or eliminated.

#### Question #20

#### **“How does NeuroMatrix™ training compare to prescription drugs?”**

Psychiatric drugs such as the stimulants Ritalin™ and Adderal™ (attention problems), and mood-altering drugs (for depression, anxiety, and obsessive-compulsive behavior) such as Prozac™ and Zoloft™, may have immediate benefit for the short term. But, taken for an extended period, these powerful drugs can produce many unfortunate difficulties. Side effects can be serious and permanent (such as tics and movement disorders); any positive benefit will probably last only as long as the drug is being taken; and, because the original brain dysfunction has probably not gone away, withdrawal will likely be physically difficult and emotionally overwhelming.

Recent research has shown attention, learning, and mood problems to be more about faulty brain circuitry and an inability to effectively modulate frequency resources than a neurochemical imbalance. The *Quantitative EEG* defines where the brain is not efficiently managing its energy; *NeuroMatrix™ training* helps the brain restore and normalize faulty circuits and create the frequency resources it needs to do its job more effectively.

*NeuroMatrix™ training* has helped many people alleviate their distressing symptoms, avoiding prescription drugs all together, or, under their doctor's guidance, to naturally, safely, and almost effortlessly withdraw from prescription medications.

#### Question #21

#### **“Does Neurofeedback have potential side effects?”**

*Neurofeedback* is not a drug or medical procedure in which something is done to the physical brain. It is closer to personal tutoring, in which the teacher tests the student's present knowledge and understanding, teaches the student what he or she needs to know about the subject, then retests to determine how well the information has been learned. With the neurological tutoring of *NeuroMatrix™*, the *Continuous Performance Test* and *Quantitative EEG* determine where the brain is doing its job well and where it needs help, the brain is taught to better produce critical working frequencies and to re-wire circuits for enhanced performance, the *Continuous Performance Test* and *Quantitative EEG* are repeated to determine how well the brain "learned its lessons," and if more sessions are needed.

Because *NeuroMatrix™* training only sends auditory information to the brain on the frequencies it is using to perform a task, there are no true side effects. A brief period of light headedness or a slight headache, a quickly passing sense of tiredness, or a short period of feeling highly energized, while unusual, can occur in those with a significantly damaged brain that has the resources to rapidly normalize its function.

#### Question #22

##### **"Is Neurofeedback safe?"**

The *Neurofeedback* computer detects the energy the brain is using to perform a task (usually a strategic video game), rapidly divides the complexity of the brain waves into narrow bands of energy, then plays therapist-selected frequencies back to the brain as unique audio tones. Nothing is done to the brain . . . except give it information on how it is performing the task. Because the decision to increase or decrease any performance frequency is *made solely by the brain*, the process is perfectly safe.

#### Question #23

##### **"Why haven't I heard about Neurofeedback?"**

The first scientific study on the benefit of *Neurofeedback* – a 1968 paper documenting the effectiveness of *Neurofeedback* in reducing seizures – was published over 30 years ago. The first study showing enhanced focus and reduced hyperactivity in those with Attention Deficit Disorder was published in the early 1970s. Over the years, dozens of studies documenting the effectiveness of *Neurofeedback* in both these and other neurological issues have been published. Many of these articles have appeared in the *Journal of Neurotherapy*, a scientific journal devoted to studies involving *Neurofeedback*. Three major scientific meetings are held annually to update professionals on the latest research findings, being attended by hundreds of psychologists, medical doctors, and educational and judicial professionals. Three major universities and medical centers have *Neurofeedback* centers, teaching, doing research, and working within the community. Over the past 30 years, tens of thousands of children and adults have been trained with *Neurofeedback*, and are now leading more successful lives. Yet, in spite of this long history, a growing scientific body of research studies, and academic involvement, *Neurofeedback* has received little support in the medical community and minimal coverage in the popular press.

Probably the biggest obstacle to widespread popularity of *Neurofeedback* is tradition. The medical community is trained to prescribe "drugs for a disease," rather than teach "self-regulation for self-mastery," psychological and counseling professionals have been taught to "talk about it," and the insurance industry is structured around "diagnosis and treatment" of a "medical condition" (traditionally, drugs or surgery), or a "mental" diagnosis" and (talk) "therapy."

Medicine and Psychology are being forced to look at its traditions with new eyes. Brain imaging technologies such as the PET, SPECT, functional MRI, and the power of the Quantitative EEG to define the brain's electrical characteristics, are revealing "brain and mental disorders" to be more often energetic in basis than physical in origin, especially in the critical early stages; that psychiatric and neurological drugs have numerous side effects and can create permanent brain damage or dysfunction; and, it is better to prevent than rescue. These findings are slowly creating a new medical orientation toward diet, dietary supplementation, and life style changes. And, yes, a move toward the safe, self-regulatory power of *biofeedback* and *Neurofeedback* training.

Weekly news magazines and TV news programs continue to report that attentional deficits, learning problems, and depression are a major problem, taking a major toll in human resources and costing our society a staggering \$100 billion annually. There are even reports that, for some, prescription drugs have caused more damage than the neurological problem it is suppose to help, and, because of the not yet known long-term side effects of these powerful drugs, the future is uncertain for millions of children and adults. Yet, in spite of the scientific evidence and the tens of thousands of children and adults safely and effectively trained with *Neurofeedback*, the press and TV have done little to inform the public of this safe and highly effective process. Perhaps this is because psychiatric drug companies pay ad agencies, broadcast networks, and print media billions of dollars in advertising revenue every year. But, in fairness, the real reason is unknown.

In summary, if you haven't heard about *Neurofeedback*, it is probably because the concept is outside medical and psychological tradition, the broadcast and print media have barely covered it, and the tens of thousands of children and adults already trained with *Neurofeedback* are busy living a more active and fulfilling life and not necessarily talking to others about their compromised past.

#### *Question #24*

#### **"I have a busy schedule. How long will the training take?"**

Training sessions are about 45 minutes. A minimum of four sessions a week is recommended for the most effective results.

For those coming from out of town and busy people wanting or needing to complete training quickly, two sessions can be done daily. Working five days a week, the first 20 sessions can be completed in just two weeks.

After 20 sessions, a week (or longer) break is typically taken to allow the brain to integrate the training. Testing is then repeated to determine how much has been achieved, and whether additional sessions are necessary to more fully optimize performance and mood.

Most people complete *NeuroMatrix™* training in just 30 sessions or less. However, those suffering from a traumatic brain injury, stroke, and serious birth injury may require more sessions for remediation.

Training does not have to be finished for benefits to kick in. For most, focus, attention, memory, and mood are noticeably improved by session 10.

### Question #25

#### **How much does NeuroMatrix™ training cost?**

Please call our office (972.407.9895 or 800.992.6122, central time zone) for current fees.

### Question #26

#### **“Does health insurance pay for Neurofeedback training?”**

For the past couple of decades, professional therapists and counselors have used *biofeedback* to help their clients better manage stress, reduce or eliminate migraine headaches, calm an irritable bowel, and enhance function in paralyzed limbs; *Neurofeedback* has shown itself to be as effective as stimulant medication for Attention Deficit Disorder, and to alleviate depression and anxiety, quell the automatic behaviors of OCD, reduce seizures in those with epilepsy, and enhance physical and mental abilities in those with brain injury and stroke. In spite of this, many insurance companies reject claims for biofeedback services as “not medically indicated.”

Why this reluctance when the documented benefit is so strong? No one seems to know, but it could be because health insurance companies traditionally cover services for laboratory tests and x-ray procedures for a “medical diagnosis,” and hospital stays, surgery, and prescription drugs when a “disease” is found. *Biofeedback* is much different than any of these procedures. Rather than rendering a diagnosis and administering drugs for a disease, it teaches *self-regulation for self-healing*. Because of this rather dramatic difference, it could be that insurance companies consider *biofeedback* and *Neurofeedback* to be more an educational process than a medical procedure.

Whatever the case, many insurance companies do not presently reimburse for *Neurofeedback* training. There are signs that this is changing, especially for traumatic brain injury, but, for the present, the answer is “maybe, but probably not.”

### Question #27

#### **“What is Dr. Sams’ background and experience?”**

Marvin W. Sams, N.D., R. EEG T., Dipl. QEEG, BCIA-EEG, is a Certified EEG Biofeedback Practitioner (Biofeedback Certification Institute of America), a Registered EEG Technologist (American Board of Registration of Electroencephalographic Technologists) and a Diplomate in Quantitative EEG (American Board of Certification in Quantitative EEG). He is Past President and Past Board Member of the American Society of Electroneurodiagnostic Technologists, Past Board Member of The American Board of Registration of EEG Technologists, and Past President of the American Association of Quantitative EEG Technologists. Dr. Sams is presently Consulting Editor for the *Journal of Neurotherapy*, and Board Member of the American Board of Certification in Quantitative Electroencephalography.

Dr. Sams has over four decades of clinical and research experience in electroneurodiagnostics, psychophysiology, and traditional, Oriental, energy, and natural medicine. His past professional affiliations include: Staff EEG Technologist at Baylor University Medical Center, Dallas, Texas; Research Supervisor of the Section of EEG at the Mayo Clinic, Rochester, Minnesota; and Faculty and Supervisor of the EEG Laboratories at the Ohio State University Hospitals, Columbus, Ohio. He is founder of two medical corporations: Electro-Cap International, a medical

devised used in leading medical centers for research and clinical work, and BioScan, Inc., a nationwide ambulatory EEG monitoring service. For the past 15 years, he has been Director of Quest for Excellence, Inc., and Neurofeedback Centers of America, both dedicated to the research and application of technology that benefits humankind.

Dr. Sams has been allowed several patents for his inventions of innovative, medical-related technology, honored by the International Federation of Societies of Electroencephalography and Clinical Neurophysiology (Best Electrode Design), and awarded the Maureen Berkeley Award by the American Society of ENG Technologists (for outstanding written technical contributions to the field of Electroneurodiagnostics).

Dr. Sams invented the award winning ECI Electro-Cap™, a unique EEG electrode system used in leading medical centers internationally. The advanced technology greatly improves electrode placement accuracy over previous methods, and reduces patient setup time from 30 to five minutes.

Using his unique understanding of the normal, abnormal, and optimally performing brain, Dr. Sams has spent the past decade developing highly specific and effective Neurofeedback training protocols. His clinical research has led to the development of a clinically proven system that optimizes performance and rapidly remediates neurological inefficiencies, including those associated with learning, attention, mood, memory, and the symptoms of head injury and stroke.

Dr. Sams has dedicated his life to the alleviation of human suffering and the enhancement of human potential. His clinical specialty is helping children and adults with Learning Disabilities, ADD/ADHD, depression, closed head injuries, stroke, and stress/anxiety problems lead a more productive and fulfilling life, and in optimizing performance in professional and amateur athletes, entrepreneurs, and sales and business professionals. His current research interests include Alzheimer's and Parkinson's disease.

For more information on *NeuroMatrix Neurofeedback training*™, including a list of selected scientific references and a research paper by Dr. Sams, please visit [www.thesamscenter.com](http://www.thesamscenter.com).

If your question is not answered, you can e-mail Dr. Sams at [drsams@thesamscenter.com](mailto:drsams@thesamscenter.com), or call **972.407.9895** or **800.992.6122** (central time zone).

### **More Comments by Parents and Clients**

"I want Mexican food."

Severely disabled hit and run victim's response to what he wanted to eat as session ended.

"Marvin has changed our lives."

Wife and mother after training family.

"People tell me I'm no longer an average golfer."

Weekend golfer that dropped his score to the mid 80s and 90s (10-12 point improvement).