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What is Neurofeedback?

Neurofeedback is direct training of brain function, by which the brain learns to function more efficiently. We observe the brain in action from moment to moment. We show that information back to the person and we reward the brain for changing its own activity to more appropriate patterns. This is a gradual learning process. It applies to any aspect of brain function that we can measure. Neurofeedback is also called EEG biofeedback, because it is based on electrical brain activity, the electroencephalogram, or EEG. Neurofeedback is training in self-regulation. It is simply biofeedback applied to the brain directly. Self-regulation is a necessary part of good brain function. Self-regulation training allows the system (the central nervous system) to function better.

What is Neurofeedback good for?

Neurofeedback addresses problems of brain disregulation. These happen to be numerous. They include the anxiety-depression spectrum, attention deficits, behavior disorders, various sleep disorders, headaches, migraines, PMS, and emotional disturbances. It is also useful for organic brain conditions such as seizures, the autism spectrum, and cerebral palsy.

The symptoms may go away, so it’s all the same in the end?

Indeed, with neurofeedback the symptoms may be entirely suppressed. A person with diagnosed Attention Deficit Disorder may be able to train the brain to pay attention, so that condition will no longer be diagnosable. A person coming in with migraines may no longer have them. (However, that person may still have a greater "vulnerability" to migraines than the average person on the street.) A person with epilepsy may no longer have seizures. (Although that person still retains a vulnerability to seizures.) A child with severe rages and temper tantrums may not have them again.

How is this done?

We apply electrodes to the scalp to listen in on brainwave activity. We process the signal by computer, and we extract information about certain key brainwave frequencies. (All brainwave frequencies are equal, but some or more equal than others….) We show the ebb and flow of this activity back to the person, who attempts to change the activity level. Some frequencies we wish to promote. Others we wish to diminish. We present this information to the person in the form of a video game. The person is effectively playing the video game with his or her brain. Eventually the brainwave activity is "shaped" toward more desirable, more regulated performance. The frequencies we target, and the specific locations on the scalp where we listen in on the brain, are specific to the conditions we are trying to address, and specific to the individual.

What conditions can be helped?

In our work we are especially concerned with the more "intractable" brain-based problems of childhood whose needs are not currently being met. This includes first of all seizures and febrile convulsions. It includes the severely disruptive behavior disorders, such as conduct disorder and bipolar disorder. It includes the autistic spectrum and pervasive developmental delay. It includes cerebral palsy, acquired brain injury and birth trauma. Many children have sleep problems that can be helped: bedwetting, nightmares and night terrors, sleep walking, and teeth grinding. We can also be helpful with many of the problems of adolescence: drug-taking, suicidal behavior, anxiety and depression. And we can also help to maintain good brain function as people get older. The good news is that almost any brain, regardless of its level of function, can be trained to function better.

EEG Neurofeedback increases concentration and learning. EEG neurofeedback can enhance concentration and reduce impulsivity and hyperactivity. Learning to increase beta and sensorimotor rhythms (SMR) while decreasing theta, has been shown to increase I.Q. scores, attention to learning, and grades at school both in children with attention deficit-hyperactivity disorder, and in normal college students. Its ability to improve memory and alertness also allows business people, artists and athletes to use it to sharpen focus for peak performance.

EEG Neurofeedback can improve mood and energy levels. EEG neurofeedback can enhance mood and energy, and reduce pain. People with head injury, trauma, chronic pain and fatigue show greater mental clarity and interest in daily activities, and less irritability and anger.

EEG Neurofeedback can enhance sleep and reduce anxiety. Practicing increasing SMR during the day has been shown to deepen sleep at night and reduce nighttime awakenings. Relaxation training to reduce muscle tension or enhance alpha and theta brainwave patterns is effective for anxiety, anxiety-related insomnia, and other stress-related disorders.

EEG Neurofeedback can stabilize brain function. One of the best researched applications of EEG biofeedback is its ability to increase resistance to seizures, reducing seizure frequency. Now, it is also being used to help people with migraines, asthma, traumatic brain injury ("mild" head injury), stroke, and neurobehavioral spectrum disorders such as autism, Asperger's and Tourette's syndromes.

EEG Neurofeedback teaches the brain to function better—long term. EEG Neurofeedback is like stretching and strengthening training for the brain, helping change behavior by increasing brain flexibility and stability. Once these skills are learned, the

positive effects can last a lifetime. Depending on symptom severity, medication may often be reduced or discontinued, under qualified medical supervision.

The Research

- In a 1999 study, Thomas Budzynski, Ph.D worked with 8 struggling college students. After undergoing audio-visual brainwave stimulation, the students outperformed a control group and significantly increased their GPA. GPA for the 8 students **continued** to rise even after treatment was discontinued!
- Psychologist Michael Joyce used brainwave entrainment with a group of 30 children. He observed improvements in reading and a half year advancement in grade level as well as substantial improvements in attention, reaction and a reduction in impulsivity and variability.
- Harold Russel Ph.D. and John Carter, Ph.D., of the University of Houston, did several studies in which they used brainwave entrainment to treat ADHD and other learning disorders, testing their IQ before and after treatment. Astonishingly, after treatment the subjects showed a 5 to 7 point increases in IQ score.
- Michael Tansey used a similar protocol to treat dyslexia and other learning disorders, reporting a 19 point average increase in IQ score post-treatment.
- Drs. Siegfried and Susan Othmer found that neurofeedback brainwave training in the 15-18 Hz range can produce significant shifts in IQ score, particularly with people who are suffering from ADD/ADHD and other disorders. In cases where the starting IQ value is less than 100, the average IQ increase was 33 points! They also found significant improvements in memory, reading and arithmetic. In a one year follow-up, trainees showed major improvements in self-esteem, concentration and self-expression.

Conclusion

Intelligence is not set in stone. Disorders like ADD and Dyslexia can have a very negative impact on IQ score. So can Depression, Anxiety and other mood disorders. Limiting beliefs, low self-esteem and a lack of motivation can also have a negative impact. These problems bog down your mental processing, and in some cases even cause the brain to work *less* when you need it most (above), out of frustration and emotion.

Using multiple methods, both psychological and neurological in nature, it is possible to change the brain and have a positive impact on cognitive abilities. This is exactly what the Neuro-Programmer 2 does with over 65 *Brain Training* sessions. NP2 is focused on not only providing a neurological groundwork for increased cognition, but also to rid the subconscious of any mental barriers or perceived limitations.

Neurofeedback Trains Minds To Improve Memory

If you don't want to look at gory pictures as a way to improve your memory there is a less disturbing technique available.

Scientists believe they may have found a way to improve our memory by as much as 10%. Researchers at Imperial College London have used a technique called neurofeedback to train people to remember more clearly. It works by showing people their own brainwaves on a computer screen, and teaching them how to control them.

By Randall Parker at 2003 January 27 10:10 AM Brain Memory

Research & Further Reading

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