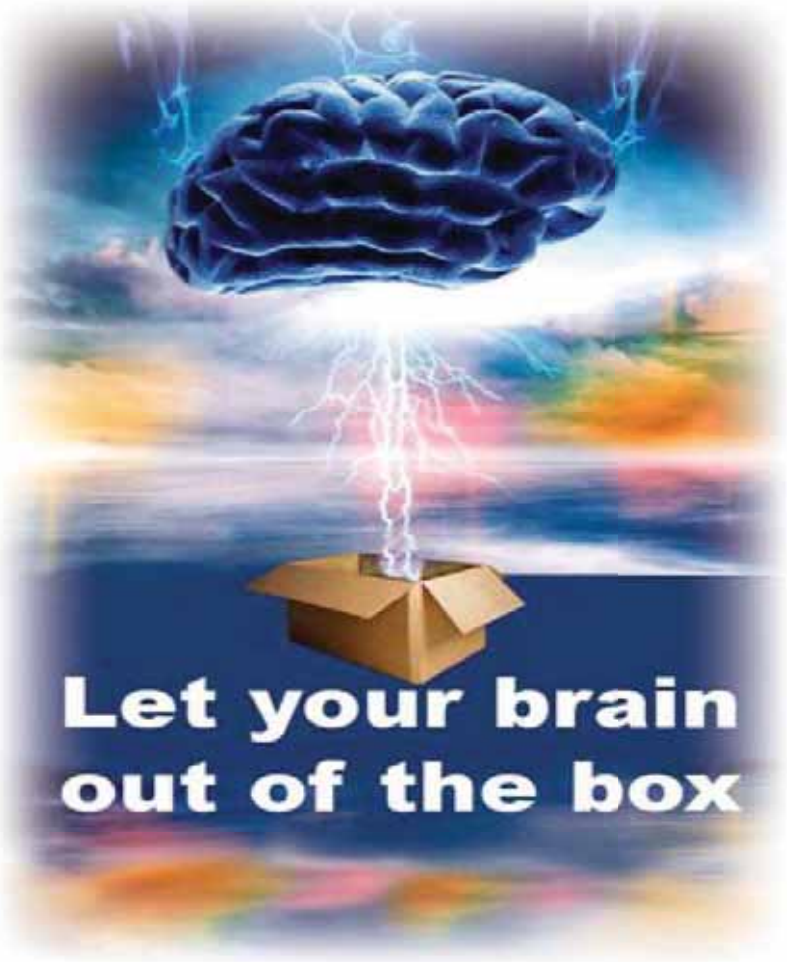

Types of Brainwaves

Brainwave Therapy

Types of Brainwaves

Alpha Waves

Description

"Alpha Brainwaves add images and visuals; you could view this as escape from reality. Too much alpha activity leads to excessive escapes and too many daydreams. Too little makes us human machines:– in motion, but without dreams that direct. “Just right,” adds perfect porridge bowls balanced for healthier lives."

Article 'Brainwaves that Talk Back' by Ellen Weber (PDF, 1.3 MB)

"Alpha ranges between 7-12 hertz and is prominent during relaxation mostly with eyes closed, day dreaming, and upon deep self-introspection."

Brain Activity

"Our brain uses its 8 ¬ 13 cycles per second Alpha waves to idle itself, to rest areas not actively processing and acting on incoming sensory and motor information. While this idling is a normal and favorable phenomenon for the idling brain, if Alpha wave activity becomes 'locked' and inhibited, active participation of vital brain areas cannot occur with efficiency."

Crossroads Institute: QEEG Brain Mapping and Neurometrics

Low Alpha Waves

Low Alpha Waves: Causes: Televison

"Psychophysiologist Thomas Mulholland found that after just 30 seconds of watching television the brain begins to produce alpha waves, which indicates torpid (almost comatose) [slow] rates of activity. Alpha brain waves are associated with unfocused, overly receptive states of consciousness. A high frequency alpha waves [sic] does not occur normally when the eyes are open. In fact, Mulholland's research implies that watching television is neurologically analogous to staring at a blank wall.

I should note that the goal of hypnotists is to induce slow brain wave states. Alpha waves are present during the 'light hypnotic' state used by hypno-therapists for suggestion therapy."

Television: Opiate of the Masses

Telly Addicts

Low Alpha Waves: Causes: Radiant Light

"While watching television, the brain appears to slow to a halt, registering low alpha wave readings on the EEG. This is caused by the radiant light produced by cathode ray technology [CRT, LCDs also?] within the television set [increases serotonin levels?]. Even if you're reading text on a television screen the brain registers low levels of activity. Once again, regardless of the content being presented, television essentially turns off your nervous system."

Television: Opiate of the Masses

Low Alpha Waves: Causes: Positive Ions

- Indoor Air Pollution: Ions: Effects: Effects on the Brain: Brainwaves

Synchronous Alpha

- Research Topics: Open Focus Therapy
- Vision: Bates Method: Palming and Visualization

Theta Brainwaves

What are Theta Brainwaves?

Theta activity is defined by international Federation of Electrophysiology and Clinical Neurophysiology as a frequency band of 4-8 mHz."

Journal of Neurotherapy: Theta: Don't Tread on Me

"Theta Brain waves engage inner and intuitive subconscious. You'll find theta in places where you hold memories, sensations and emotions. Sometimes, we also store secrets there, which we block out in times of pain, to survive what we feel unprepared to fix."

'Brainwaves that Talk Back' by Ellen Weber (PDF, 1.3 MB)

Types

"As is well recognized, however, various subsets exist in all EEG frequency bands; Theta is no exception."
Journal of Neurotherapy: Theta: Don't Tread on Me

Types: Frontal Midline Theta (Fmθ)
"Subset 1: Frontal Midline Theta (Fm Theta) is a specific EEG frequency seen in those subjects actively engaged in cognitive activity, such as solving math problems and playing Tetris®, a Nintendo® game. the peak frequency is between 6.2 and 6.7 Hz and maximally present at Fz [Fz=frontal midline electrode] but with a wide fronto-central distribution."
Journal of Neurotherapy: Theta: Don't Tread on Me

"Fm Theta is associated clinically with the ability to sustain attention over a time, an extroverted personality, low anxiety and low neuroticism."
Journal of Neurotherapy: Theta: Don't Tread on Me

"Of importance, the administration of diazepam (Valium®) and the ingestion of alcohol increases Fm Theta."
Journal of Neurotherapy: Theta: Don't Tread on Me

"In a study of those with marked extroversion, Fm Theta was found, along with lowered platelet MAO activity [Low platelet MAO activity is associated with 'type 2 alcoholism.' MAO activity is also affected by cigarette smoking]."
Journal of Neurotherapy: Theta: Don't Tread on Me

- ## The Brain: Frontal Midline Theta Rhythm (Fmθ) and Blinking

Types: 4 Hz Theta

"Subset 2: According to Cavanaugh (1972), 4 Hz Theta is associated with object naming, an important aspect of memory."
Journal of Neurotherapy: Theta: Don't Tread on Me

Too Much Theta
"People with ADD/ADHD [inattentive ADD/ADHD, as opposed to other types of ADD like overfocused] exhibit too little Beta (thinking) activity and too much Theta (dreaming) activity. This is the classic inattention for ADD.

With ADHD, hyperactivity keeps people from falling asleep. In essence, the person is combatting the high Thetaactivity and keeping themselves aroused (by increasing their Beta activity)."

Biofeedback Training: ADD/ADHD and Biofeedback Alpha-Theta

"Out of all the different types of brain waves there is a very interesting range called the Alpha-Theta border. I've already mentioned that the Alpha was half the story, well the Theta wave is the other half of a state of mind that brings about creativity, intelligence, and a host of other abilities the brain is capable of doing when properly stimulated.

It is a state where the central nervous system reduces input from the peripheral nervous system. The lowering of sensory input serves to normally protect the central nervous system from sensory overload caused by stress or physical damage.

Without these outside functions for the brain to control the brain expands its functioning powers. The normally unused portion of the brain becomes active and performs at maximum capacity. This range is between 7-8 hertz and this is not so surprising when you learn that the resonant frequency of the earth and ionosphere is approximately 7.5 hertz. Our brains evolved within this dynamic field and used it as a standard to function on. The mind experiences the body in a half-in half-out state of sleep or detachment. The feeling is of being conscious of all things around you but the body being in deep relaxation.

Many cultures discovered this and the methods to achieve this state naturally and artificially. Many of the worlds religions were founded on reaching this state and devised strict disciplines to do so. The Alpha-Theta range occurs during reverie, hypnogogic imagery, meditation, and by self-hypnosis."

Brain Activity / Beta Brainwaves Introduction

The mental activity normally associated with Beta waves is the active awareness state that we experience from day to day at work and play. There are many external chemicals that can be induced into the brain to produce this state and they are known generally as stimulants. Some of those stimulants are small amounts of alcohol, the nicotine in cigarettes, caffeine in coffee and tea, diet pills, and amphetamines (which are illegal).

Brain Activity

Too Much Beta

"Beta Brainwaves kick in when we think logically, solve problems, and confront external stimuli. Beta often races and brings panic at times. Used too often, you run the risk of thinking deeply about little, and tiring yourself out about much…Beta has it's place but must be helped to slow down at times and reflect."

Brainwaves That Talk Back (PDF, 1.3 MB)

"However, too much Beta can cause significant problems for the individual by increasing muscle tension, raising blood pressure, and creating a state of anxiety for the individual. While it is possible to teach the highest level cognitive processing and complex artistic expression, attention must also be paid to assist the individual in achieving a degree of physical relaxation."
'EEG Biofeedback-New Interventions' by Dr. Marshall D. Voris

SMR (Sensorimotor Response) or Low Beta Brainwaves
Description of SMR

Some neurotherapists have observed that SMR brain wave frequencies make individuals feel more present, and in the moment. Sensorimotor response is also known as Sensory Motor Response, Sensorimotor rhythem,
and many other terms.
"Low Beta (12-15 Hz), formerly 'SMR':
Distribution: localized by side and by lobe (frontal, occipital, etc)
Subjective feeling states: relaxed [?] yet focused, integrated
Associated tasks & behaviors: low SMR can reflect "ADD", lack of focused attention

Physiological correlates: is inhibited by motion; restraining body may increase SMR
Effects of Training: increasing SMR can produce relaxed focus, improved attentive abilities,"
Brainwaves and the EEG: The Language of the Brain

"What Sterman had done by teaching the cats to produce SMR, he would come to realize, was to strengthen their brain function at the sensory motor strip, the same way a person builds muscle mass by repeatedly lifting weights. (Page 42)"
Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.

Vigilance

"The animal entered a unique state--it remained absolutely still, though extremely alert, waiting for the tone to end. It is the same state a house cat waits in, feigning heavy-lidded indifference, as a bird makes its way near enough to be pounced on.(P. 39)"
Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.

Immobility

SMR is inhibited by motion; restraining body may increase SMR.

"[making a conscious effort to see clearly] is commonly accompanied by some degree of immobility of the eyes and body. The rate of blinking decreases; breathing becomes shallower and may, for a while, even stop. The muscles of the head, neck, shoulders, and perhaps other parts of the body too, may be unnaturally tensed, and all the time the eyes are fixed with increasing intentness on their target. As the eyes become fixed so does the attention, which only encourages the eyes to become yet more fixed, with a resulting impairment of both vision and perception.(P. 59)"

Book: Barnes, Jonathan. Improve Your Eyesight: A Guide to the Bates Method for Better Eyesight without Glasses. Souvenir Press, 1999.

More information about immobility is included in the Mobility section of the Bates Method page.

ADD and Autism

Low SMR may be a symptom of ADD or autism. SMR training is sometimes used by Neurotherapists to treat these conditions. For more information please see the pages Similarities with ADD and Similarities with Autism.

Additional information about SMR neurofeedback is included in the section Brain-wave Therapy: SMR

Other Types of Brain Waves

Delta Brainwaves provide personal radar and feelings at unconscious levels. In healthy doses, these signals cause empathy while too much delta activity can pack on another's baggage. If you read other people's minds, you probably have more delta activity than most. If you find yourself in trouble for stepping on another's toes during typical days, you may engage less."

Article 'Brainwaves that Talk Back' by Ellen Weber

(PDF, 1.3 MB)

Brainwave Therapy

EEG Spectrum's Neurofeedback (Brainwave Therapy) FAQ

EEG Spectrum's Disclaimer

Warning

Persons subject to any form of seizures or epilepsy, using a pacemaker, or suffering from cardiac arrhythmias or other heart disorders, SHOULD NOT use any brainwaves entrainment device without medical supervision.

Alpha Waves

Neurotherapists believe that alpha brainwave training may be helpful in treating people suffering from conditions similar to hypervigilence such as PTSD, and having low alpha. However, frequent exposure to alpha frequencies may cause a release of endorphins.
Open Focus Therapy (Dr. Les Fehmi)

Article: EEG BIOFEEDBACK: (NEUROFEEDBACK)

Alpha Relaxation System (Dr. Jeffrey Thompson)
Note: Don't use this recording when driving:

Alpha-Theta Therapy

Things to Consider

Alpha-theta therapy may stimulate memories in your subconscious mind. Evoking these memories may exacerbate depression. Depression may lead to an even. greater desire to increase SMR and Beta brainwaves by engaging in activities which require vigilence (e.g surfing the Internet).

However, I personally believe that the benefits of meditation and alpha-theta therapy are indispensible. Although it may not be a good idea to listen to an alpha-theta CD (mentioned below) while using a computer.

More information about depression can be found on the Depression/Low Arousal page.

Training

Alpha-theta training may be helpful in both treating hypervigilence and in stabilizing levels of endorphins.

"Since elevations in serum beta-endorphin levels are associated with stress, their elevation in the traditional therapy group may indicate that this group is experiencing the stress associated with abstinence and fear of relapse. It is interesting that the PKBWNT group did not show an increase in this stress hormone after treatment, but instead showed a stabilization (Peniston &
Kulkosky, 1989)."

The Peniston-Kulkosky Brainwave Neurofeedback Therapeutic Protocol

Alpha-Theta CD

Note:

- Don't listen to any of Dr. Thompson's CDs while driving.
- Dr. Jeffrey Thompson believes that using stereo equipment is essential when playing his CDs.
- If you are using headphones place them comfortably with left channel on you left ear and right channel on your right.
- If you are using stereo speakers, make sure they are properly placed to the left and right of where you sit or lie to achieve the proper stereo separation. Place yourself as close as possible to the center and in front of your speakers to achieve the best results.
- Choose a quiet, relaxed, and comfortable environment
- Try to relax all of your muscles

Alpha-Theta CD (Part of Brainwave Suite collection by Dr. Jeffrey Thompson)
Meditation
"The MEDITATION brainwave pattern is a combination of alpha and theta where theta provides the depth and profundity of the meditation experience – the subconscious inner space from which creativity, insight, and healing spring – and alpha provides the bridge, or the link, to the conscious thinking mind so that you can actually remember the contents of your meditation."

The Awakened Mind (Anna Wise)

Avoid Transcendental or Mantra Meditation
It may be wise to avoid transcendental meditation or mantra meditation. I've found articles on the Internet which claim that these forms of meditation can actually cause depersonalization and derealization-among other things.
http://unstress4less.org/default.htm

Brainwave Therapy: SMR
Example of SMR Neurofeedback

"For an eight-year-old named Jake the rest of the world has disappeared as he sits quietly in a darkened room and stares intently at a computer screen with a yellow Pac-Man gobbling dots as it moves across a bright blue background. A soft, steady beeping is the only sound. Jake is not using a joystick or keyboard to control the cartoon character; instead, a single thin wire with a dime-sized, gold-plated cup is fastened to his scalp with conducting paste. The sensor picks up the boy's brain waves-his electroencephalogram (literally, electric head picture), or EEG-and as he changes his brain waves by relaxing or breathing deeply or paying closer attention, he also controls the speed of the Pac-Man. (Page 1)"
Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.

"Jake's brain has places where the electrical activity is not as stable as it should be [Jake is epileptic]. Research shows that the brain's electrical signals are subject to change and that people can be taught how to change them. All neurofeedback does is help guide the client to a specific frequency range and help him or her stay there. The brain does the rest. A technician has set the computer Jake is playing Pac-Man on so that when Jake spends time in those hard-to-reach frequencies [SMR is'hard to reach' for some epileptics], the Pac-Man gobbles dots and beeps like crazy. When he is not in those frequencies, the Pac-Man stops gobbling and turns black. Jake knows nothing about brain waves or his EEG, he simply knows that when the Pac-Man is gobbling and beeping, he is winning, and so he has learned how to adjust his brain waves to make the Pac-Man gobble dots all the time. It was easy: he caught on in just one session. As he spends more time in those frequencies his brain has trouble generating, his brain learns to function there on its own. This exercise makes the brain more stable [Note: SMR increases stability for some epileptics. In other epileptics, SMR may actually induce seizures] (Page 7)."
Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.

Treating ADD with Neurofeedback "Lubar's [Dr. Joel Lubar] hypothesis for what is happening in an ADD brain is that with certain subtypes of attention deficits, there is decreased metabolism and decreased blood flow to the subcallosol cortex. "They're turned off," he says. "That means those areas are not getting enough norepinephrine and other neurotransmitters." As is the case with epilepsy, Lubar believes that when the brain is trained with neurofeedback, blood bathes the cells in the frontal cortex and acts as a kind of fertilizer helping cells overcome malformation, due either to genetics or perhaps from cortisol damage caused by emotional stress. Existing connections are strengthened or reorganized, or perhaps they grow new branches. Whatever the case, they make better, more robust connections with adjoining cells, and so the transfer of current and neurochemicals works much faster and more efficiently. "What we hope we are doing is turning that area on," he says. However, Lubar doesn't think that the Neurofeedback is treating the subcallosol cortex directly, because it's deep in the brain. "We're training the areas in the central and frontal cortex that are involved in the focusing of attention, intent to attend, and the evaluation of appropriate behavior," he says. "By training the area that the subcallosol cortex projects or connects to, it reflects back on how it is operating. That's what we hypothesize.(P. 139)"
Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.

Neurofeedback for ADHD

EEG Biofeedback for Attention Deficit Hyperactivity Disorder (EEG Spectrum)

Neurofeedback: Beta vs. SMR

"For a long time there were two basic approaches to neurofeedback. Generally, those who do beta, or 15-to-18 hertz training on the left side of the brain, feel alert, and those who do 12-to15-hertz SMR training on the right side feel calm. Most hyperactive kids respond better to SMR training; a minority do better with 15-to-18-hertz.(P. 109)"

Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.

Depression

Some people believe that alpha-theta training can be useful in treating depression. The following link contains more information about treating depression with brainwave therapy.

EEG Spectrum International, Inc.

Flexibility: Moving between States

"Schroth points to the military research Barry Sterman conducted. Under an Air Force contract, Sterman did research on B-2 test pilots, monitoring their EEGs as they performed the complicated task of flying a bomber. Those that performed the task best, and with the least amount of stress, were those whose brain waves were the most flexible-that is, those who were able to go into the high-frequency, desynchronized state of beta and, after the task was complete, to move quickly back into synchronous alpha, a relaxed state. Those who didn't experience the alpha reward were more anxious, more stressed. The SMR and beta training, Schroth says, allows people to focus much better and attend to the task at hand; it increases their ability to move between states. In the future, employees involved in complicated, stressful tasks might wear biofeedback equipment all the time so they could 'turn on' the higher-frequency brain waves when they need to and come to a complete rest between tasks to keep burnout low. (Pages 227-228)"

Book: Robbins, Jim. A Symphony in the Brain. Grove Press, 2000.