

Brain imaging studies have revealed that positive and negative emotions are polarized on opposite sides of the brain's prefrontal cortex. The right side governs a physiological loop that produces negative, inhibiting, and avoidance feelings; whereas the left side commands a loop for positive, outward-reaching, "approach" emotions. Research suggests that a person's mood may largely depend on which side of the prefrontal cortex is more active.

EEG BIOFEEDBACK

A PROMISING NEW TREATMENT FOR DEPRESSION AND OTHER BRAIN-BASED DISORDERS

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In his book, *Brain Asymmetry*, Dr. Richard Davidson traces a stream of research and convincingly concludes that depressed mood is associated with an increased amount of Alpha (8-12 Hz) electrical activity (EEG or brain waves) in the left, prefrontal cortex as compared to the right. The Alpha rhythm is the adult brain's idling rhythm and, therefore, *increased* Alpha power at a brain locus means *decreased* activation. Active areas of the brain show more, higher-frequency Beta activity (greater than 12 Hz). Thus, when the left, prefrontal regions of the brain show significantly more Alpha activity than the right, prefrontal regions, the mood will tend to be depressed and negative.

These findings with respect to depression are quite consistent with the more general notion that abnormal activity in the EEG reflects psychopathology and, conversely, normalizing the EEG can improve brain function and reduce psychopathology.

While psychotropic medications have been the most commonly used method of changing brain function, a more recent development in biofeedback technology has focused on the finding that brain waves (EEG) can be recorded from the scalp, rapidly processed by computer and displayed on a video screen and, with appropriate feedback, people can learn to modify their own brain waves.

EEG biofeedback (also called neurofeedback or neurotherapy) is a promising new therapy for persons struggling with mood disorder related to an imbalance in their psychobiological and biochemical processes. For example, the treatment of depression by means of EEG biofeedback generally involves increasing the activation of the left, prefrontal area of the brain relative to the right, prefrontal area. This may be done by *decreasing* left, prefrontal Alpha activity and/or *increasing* left, prefrontal low Beta activity (13-18 Hz) and/or *increasing* right, prefrontal Alpha activity.

Preliminary clinical research reports not only indicate that depressed patients can learn to shift and enhance their Alpha EEG rhythms in the right frontal region, but that the patients' depressed moods subside and are replaced with clearer, more optimistic emotional and thought processes.

This is what EEG biofeedback is all about— improving brain functioning by normalizing the EEG.

There is now good scientific evidence from both controlled research and clinical studies as well as long-term follow-up that EEG biofeedback can be an effective treatment for seizure disorders and attention deficit disorder when compared to common drug treatments and placebo, and that treatment effects are long-lasting. While not yet as solid, there is a growing body of evidence supporting the use of EEG biofeedback in the treatment of such conditions as alcoholism, anxiety disorders, post-traumatic stress disorder, chronic pain, depression, headaches, insomnia, and brain injury.

Currently, there are well over 2000 practitioners in North America offering some form of EEG biofeedback treatment for one or more of the above-listed disorders, and tens of thousands of children and adults have been treated over the last twenty years. A journal devoted to research and opinion on this type of biofeedback and closely related topics (*Journal of Neurotherapy*), a special EEG section of the Association for Applied Psychophysiology and Biofeedback (AAPB), and a professional association (*International Society for the Study of Neuronal Regulation*) have all been established for the dissemination of research and clinical findings concerning neurotherapy-related topics. Certification of properly trained EEG biofeedback practitioners is provided through the *Biofeedback Certification Institute of America* (BCIA).

Myosymmetries Edmonton Inc. in the Meadowlark Health Centre is the only registered psychologist provider of EEG biofeedback and other neurotherapy treatment services in Edmonton. Brief, no-charge, consultations are available upon request.

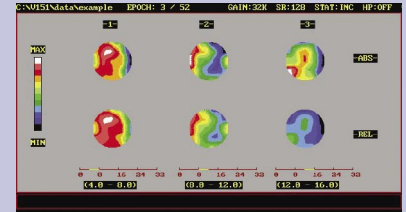
For more information on EEG biofeedback, check out the following internet sites:

www.MyosymmetriesEdmonton.com www.EEGSpectrum.com www.snr-jnt.org www.AAPB.org

Suggested Reading

Davidson, R., Hugdahl, K. (Eds) (1995), *Brain Asymmetry*, Cambridge, MA: MIT Press.
Evans, J., Abarbanel, A. (Eds) (1999), *Introduction to Quantitative EEG and Neurofeedback*, Academic Press: New York, NY.
Robbins, J. (2000), *On the Track of Neurofeedback*, *Newsweek*, June 19, 2000.
Rosenfeld, J.P. (2000), *An EEG biofeedback protocol for affective disorders*, *Clinical Encephalography*, 31(1): 7-12.

Dr. Horst Mueller is a Chartered Psychologist and Clinic Director of the Myosymmetries Edmonton clinic in the Meadowlark Health Centre in Edmonton and specializes in the treatment of persons suffering from chronic pain conditions, mood disorders, anxiety disorders, and stress-related chronic health conditions by means of biofeedback and cognitive-behavioural therapies. He is listed in the Canadian Register of Health Service Providers in Psychology and is certified in EEG neurotherapy by the Biofeedback Institute of America. He is also in the process of completing the training requirements to become a Fellow of the Prescribing Psychologists Register of America.

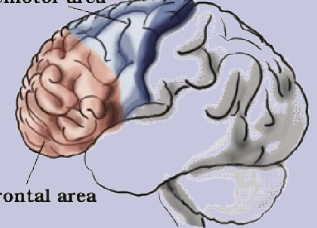


This is a QEEG topograph showing the absolute (upper row) and relative (bottom row) distribution over the cortex of three frequency bands—Theta (4.0-8.0 Hz), Alpha (8.0-12.0 Hz), and Low beta (12.0-16.0 Hz) (going from left to right, respectively). Each circular topo represents the cortex from the viewpoint of someone looking straight down on the top of the head with front of the head facing the top of the figure. For the "absolute" topos, the colours indicate the different amplitudes in micro volts of each frequency band from highest (white) to lowest (black) independently of the others. For the "relative" topos, the colours indicate the different amplitudes in micro volts of each frequency band from highest (white) to lowest (black) relative to the total power of all frequencies from 0-32 Hz.

This topograph is that of a 43 year old female suffering from chronic depression. Note extreme amounts of Theta and Alpha activity appearing in the left hemisphere and especially the left temporo-frontal regions. There is a definite left versus right asymmetry in the distribution of her EEG in Theta and Alpha.

Frontal Lobe:

Premotor area Motor area



Shows a schematic representation of the left side of the brain and indicates the location of the frontal lobe region of the cortex and specific sub-regions of the frontal lobe—the motor area, the pre-motor area, the prefrontal cortex.