

Brainwave Connections

Dedicated to communication and education in the emerging fields of neurofeedback, mental fitness, neuromeditation, and brain modification

VOLUME 1, ISSUE 2 Spring 2005

ON PROFESSIONAL CONNECTIONS

This newsletter is designed to provide connections and communication between and among neurofeedback practitioners, researchers, users, and any interested parties. As much as providing information and interactions, we are also interested in helping people connect with others, in the hope that further education, exchange, and collaboration will follow.

To this end, the existing professional societies and meetings are significant in what they offer to beginners, experienced practitioners, and the general public. One of the most important first steps someone entering this field can do is to look into the key organizations, their publications, web sites, and upcoming meetings. Among the most informative and helpful organizations are:

AAPB—Association for Applied Psychophysiology and Biofeedback

This organization is dedicated to advancing the development, dissemination, and utilization of knowledge, to improve health and quality of life through research, education, and practice. Publications include the journals *Biofeedback*, and *Psychophysiology*. The Neurofeedback Division has over 400 members, and publishes its own newsletter.

See www.aapb.org for further details and information.

ISNR—International Society for Neuronal Regulation

This group was formed in the 1990's, specifically to address the needs of the growing field of neurofeedback and brain modification. It publishes the *Journal of Neurotherapy*, and has an annual meeting, which



will be held in 2005 in Denver.

See www.isnr.org for details.

Professional certification is also important, and can help to maintain minimum standards, and provide credentials.

There are two recognized boards certifying neurofeedback, the BCIA (Biofeedback Certification Institute of America), www.bcia.org, and the NBCB (Neurofeedback and Biofeedback Certification Board), www.nbc.org.

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PLEASE CONNECT WITH US

If you have any experience, interest, or information that you would like to share with the neurofeedback community, please consider contacting us to submit an article, review, or other item.

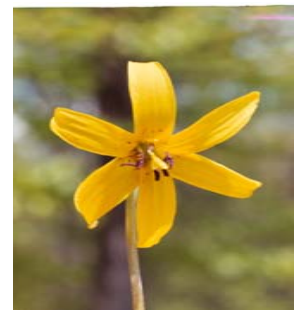
We will be publishing and seeking book reviews, site reviews, workshop reviews,

commentary, opinions, and information from all of our readers, as well as any other interested parties.

One of our purposes is to foster connections between the members of the community, and to foster cooperation and education whenever possible. We will be covering as many

books, workshops, courses, meetings, and other opportunities that we can.

Please consider this an opportunity for you to share that idea, method, approach, or experience that you have found valuable over the years. Let us know what you would like to submit, and see what connects!



THE IMPORTANCE OF 2-CHANNEL TRAINING



TWO-CHANNEL TRAINING IS IMPORTANT WHEN YOU CONSIDER THE COMPLEXITY OF THE BRAIN, AND THE IMPLICATIONS OF TRAINING BOTH HEMISPHERES SIMULTANEOUSLY

The foundations of neuro-feedback have been built on single channel recording and training. From Joe Kamiya and Barry Serman through Margaret Ayers and Joel Lubar, a single EEG lead has provided a wealth of information and material for brain training. What, then is the importance in 2-channel training, and what are the limitations and realities of 1- versus 2-channel neuro-feedback?

1-channel training has the benefit of simplicity and directness. Once the leads are determined, it really does not matter whether or not the active and reference are switched, and the training signal has one datastream to interpret and work with.

Two-channel training is important when you consider the complexity of the brain, and the implications of training, both hemispheres simultaneously.

Richard Davidson of the University of Wisconsin, for example, has discovered that mood is intimately connected to asymmetry in frontal activation. Briefly put, the left frontal lobe needs to be 15% more activated than the right, for a normal individual to have a positive mood. If the right hemisphere becomes more activated, then a negative mood, and depression, can result. It has also been found that immune responses track these changes, and that mood and immunity are therefore also linked. Therefore, it is important in any EEG

training to ensure that the right hemisphere does not become overactivated. (Note that activation in this sense is associated with lower overall EEG amplitudes, and higher EEG frequencies).

It can thus be argued that 1-channel training is potentially problematic for anyone with possible mood or activation issues, since it does not specifically address differential activation of the hemispheres, and could result in an undesired effect if not carefully planned. In such cases, experience and observation, and reacting to subjective or clinical changes would be of value. Otherwise, 1-channel training could offer inadequate control and specificity relative to these dimensions.

When you think about it, single-hemisphere training is a little like learning to ride a bicycle with one hand. While you can certainly get moving, it may be difficult to learn or achieve balance, especially dynamic balance.

Of the 1-channel protocols, the simple "Cz to an ear" Serman/Tansey protocol has been found particularly benign. This is likely due to the fact that it effectively records both hemispheres, since the sensor sits right above the central fissure. Therefore, this protocol effectively trains symmetrically, and avoids abreactions that could be produced by training differentially on one hemisphere.

In contrast, the classic "C3

beta" and "C4 SMR" protocols work well, but can lead to tonic changes in arousal. For example, overarousal of the right hemisphere can lead to negative mood, defiant behavior, and related outcomes. In contrast, underarousal of the left hemisphere can lead to sleepiness or lethargy. When using either of these protocols, it may be necessary to switch between them, to provide balance and facilitate self-regulation.

2-channel bihemispheric training can be achieved by training one protocol on the left and another on the right. For example, training left beta and right SMR simultaneously, can provide the benefits of both types of training. hemispheric balance, along with

Coherence Training also becomes possible only when using a 2-channel protocol. While it is clear that one can perform desynchronization training using one channel and a bipolar hookup, it is not possible to perform true coherence or synchrony training with only one EEG channel. Specifically training for coherence (or synchrony) can provide the benefits of having both hemispheres coordinated, producing a very deep and focused relaxation accompanied by synchronized bilateral thalamocortical activity.

Overall, 2-channel training offers significant benefits, and will likely become an increasingly important neurofeedback tool.

Article by:

Thomas F. Collura,
Ph.D., P.E., BCN

INTERACTIVE BRAINWAVE CAR RACE

My children hit the idea: they found it “boring” to train the brain on their own – at a computer or even with an external train or car as feedback modality – “if you connect this interactive for a competition – we are with you !”

There we are:

Without great effort 2 trainees are able to control each a car on a two-track car race by brainwaves. By specific interfaces with two trainings-entities there is a resolution of braintraining, which is simple to realize and highly motivating.

Material: 2 neurofeedback training systems like BrainMaster, computer/notebook, BrainTrain as BCI (Brain-Controlled Interface) device, 1 car race with two tracks (for example)

The car race may be a simple version – no matter if for battery-use in original. It should be compati-

ble with the electrical requirements of the BCI-device, in case of BrainTrain DC and 6 Volt. The BrainTrain transforms feedback-sounds into electrical impulses. The interfaces of both trainings-systems are connected to the input of the car race in a specific wiring scheme – each to one track.

To be fair, both systems should have the same feedback-percentages. A time-expanded feedback-sound transforms longer electrical impulses – like the “space”-sound in BrainMaster-software. To ensure comparable conditions, both trainees should train with equal training-settings.

The premiere took place during our last basic-workshop in March in Hannover. First patients were Ben and Eric (see photo) – they are proudly demonstrating this interesting training modality.

Meanwhile several patients have trained with this training-setting – children trained with their parents, with their brother or sister, children were motivated through this modality of interactive training to reinforce contact with others. We often observed a remarkable increase of SMR-amplitude – reflecting the result of this highly motivating direct manner of external feedback. More than with computer-animations there exists an intrinsic, plausible connection between task and rewarded brainwaves. And there is a certain fascination to control the motion of the race car without mouse or joy-stick – it’s special fun when a car jumps the rails!

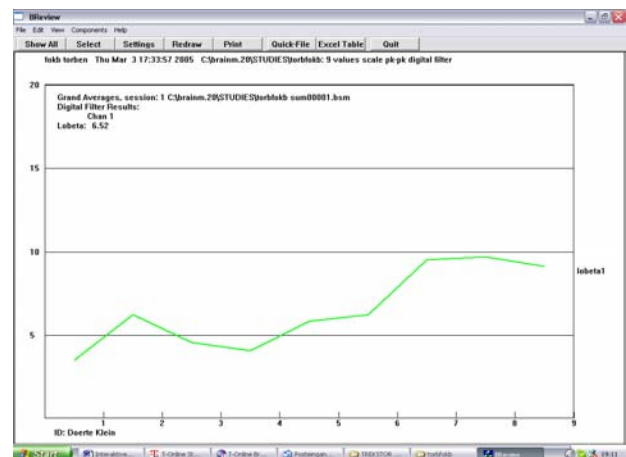
Another training effect could point at the direction of psychotherapeutic benefit: as with given feedback-rate and autothresholding, the cars to not

really drive in competition, the trainees are learning rather an interactive communication. This social aspect should be investigated further. It seems that an interactive use of neurofeedback opens new fields of applications with further tools and comprehensive therapy settings.

Please email for wiring diagram or specific information

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Trainees under the supervision of Dorte Klein, Hannover, Germany, take part in a 2-person simultaneous car race under EEG control.

The SMR amplitude trend for Torbin shows a clear increase with BCI training

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Book Review:

Coping with Mild Traumatic Brain Injury

By Diane Roberts Stoler, EdD and Barbara Albers Hill

Coping with Mild Traumatic Brain Injury calls itself "A guide to living with the problems associated with brain trauma." In its 5 chapters, it covers the physical, mental, and emotional aspects of this often unfamiliar and frightening territory, and answers many questions for survivors and family members.



The book provides an overview of MTBI including mechanisms of injury and diagnostic methods. It then provides additional detailed chapters on physical, mental, and emotional aspects, supported by extensive references. The reader gains a thorough picture of the physiological changes brought about by MTBI, the clinical and life experiences that result, and further changes in mood and behavior. Clinical changes including fatigue, headache, sexual and sensory disturbances, and muscular and motor problems are described. Throughout, the discussion highlights choices and options that are presented, treatment alternatives,

The final chapter on recovering discusses issues regarding rehabilitation, financial issues, and living with someone with MTBI. In addition, there is an extensive list of organizations, professional societies, and agencies that can provide information, referrals, and assistance to professionals as well as the lay public.

Diane Roberts Stoler, EdD and Barbara Albers Hill, (1998) Coping with Mild Traumatic Brain Injury, Garden City Park, New York: Avery Publishing Group, ISBN 0-89529-791-4

WORKSHOP REVIEW—PRINCETON BIOFEEDBACK CENTER, LLC

The Princeton Biofeedback Center is unique, both in its extensive history and contributions to the field, and also in its maintaining up to date principles and practices which continue to move the work forward. Dr. Les Fehmi, and Susan Shor Fehmi, have created a center that combines a broad range of approaches and methods to provide individualized training, workshops, certifications, and mental fitness and treatment programs.

Dr. Fehmi has developed his own approach and methods, including hardware that provides EEG feedback especially tailored for real-time alpha synchrony training, and couples (yes, 2 people on one EEG!) work. We recently had the chance to attend a 3-day workshop on Open Focus. This program combined didactic lecture, group experiential training, individual work, and EEG feedback training. The Open Focus training includes guided visualization and work on personal awareness and mental style. By directing the trainee

to imagine different aspects of the surroundings, internal perceptions, and being aware of perceptual shifts, the Fehmis help to develop a stronger awareness of one's own perceptual and attentional processes. The small class size permits a combination of individual and group work.

The teaching is supplemented by the use of whole-head synchrony training. This approach uses 5 simultaneous monopolar EEG sites, and the simple yet powerful technique of providing feedback when the entire EEG is synchronized in the alpha band. This is achieved by combining the channels so that synchronized (phase-locked) activity is reinforced and fed back. When two people are connected, the reward indicates that each participant is in a synchronized alpha state, plus that the two participants are in synchrony with each other. Those who tried this technique reported a stronger sense of connectedness and harmony after only one afternoon of training, and wanted more time to train!

Overall, it is a rare experience to work with two individuals with this level of experience, compassion, and technical skill. We recommend their work to anyone interested in broadening and deepening their understanding of the brain, neurofeedback, or themselves.

For more information, see:

www.openfocus.com



Dr. Les Fehmi and Susan Shor Fehmi of the Princeton Biofeedback Center, LLC