Tentative Schedule Poland

Neurofeedback Fundamentals
October 22-24, 2009
Catholic University of Lublin,
Aleje Racławickie 14, Collegium Jana Pawła II, Room: C-1037

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BCIA Rubrics to be covered (to cover 24 of the required Hours)**:**

I. Orientation to NFB
II. Neurophysiology and Neuroanatomy
III. Instrumentation and Electronics
IV. Treatment Planning: assessment and intervention

(Rubrics: IV, Research criteria for evaluation of clinical efficacy; V, Psychopharmacological considerations; & VII, Professional Conduct, are not covered because they can be covered by other courses.)

Day 1

The Scientific Basis of Electoencephalographic (EEG) Assessment & EEG Biofeedback or Neurofeedback (NFB).

ADHD will be used as the principle example in Morning
Seizure Disorders will be addressed in the Afternoon

Morning:
Orientation to NFB including **The Science Underlying NFB** (Areas 4 & 5 below may be covered in the afternoon and/or on day two). (Fundamentals09 PP + *advanced BCIA material,)*

1. History of the Field; Basic Terms; Brain Wave Frequencies, 10-20 Montages
2. Learning Theory (use of operant & classical conditioning in NFB training)
3. Physiological Basis of the EEG
4. The EEG Instrument & Programs (filters, encoder, differential amplifier, sampling, optical isolation…)
5. Other terms: EPSP, IPSP, coherence, phase, data-base & z-scores, LORETA, event related potential, long term potentiation (LTP)

Coffee and Snack Break

Correlation of **Mental States with EEG Bandwidths, EEG Assessment**

1. How frequency bands correlate with mental states;
2. Stages of Sleep (brief)
3. Doing the assessment: Single Channel Assessment
4. How do you decide on Electrode placement?
5. How accurate is the single channel EEG assessment? Example: ADHD
6. How do you do a 2-channel assessment & when might you use this?
7. Removing Artifacts from the EEG (Introduction)
8. Examples: ADHD & Learning Difficulties (including 19-channel QEEG findings)

Afternoon:
EEG Assessment Demonstration & Hands-on Experience (ADHD Script)
1. Similarities and Differences with Child vs Adolescent & Adult ADHD
2. Demonstration: Single Channel Assessment

3. Removing artifacts, graphing assessment in 1 Hz bins using Excel
4. Optional Hands-on: Practice in groups: attaching electrodes, checking impedance, doing assessments, setting up a NFB training program using the results of the assessment.
5. Training an ADHD patient and graphing progress using excel.

Results: Efficacy of NFB for ADHD – Meta-analyses, Long-term effects.

Seizure Disorders (May be covered in day 2)
EEG Biofeedback (NFB) Intervention
Efficacy o**f NFB** for seizures

Day 2

Functional Neuroanatomy to Guide QEEG Assessment and Prescription of Intervention

Co-morbidities of ADHD including Asperger's will be used as the principle examples – NFB Hands-on work

Morning:
Neuroanatomy & Neurophysiology – with LORETA and case examples.
Begin to learn how LORETA and the functional neuroanatomy of the cortex using Brodmann Areas and the Systems Theory of Neural Synergy for cortical + subcortical regions, help us to correctly prescribe NFB + BFB intervention for various client presentations.
1. Basic Functional-Neuroanatomy
2. LORETA
3. Brodmann Areas
4. Case examples integrated into 1, 2, & 3 to emphasize how functional neuroanatomy + QEEG & LORETA + Clients presenting symptoms and test results combine to help us define a NFB + BFB intervention
5. Beginning of discussion of neuro-anatomical basis of Executive Functioning

Coffee & Snack Break

Neuroanatomy and LORETA (continued)
With a complex case example: A Doctor who presented with: Anxiety, Panic, Asperger's, ADHD, Busy-Brain, and mild depression. (Stress PP or aspe Lynda's edit wkshopOHx.doc 1-45

Afternoon:
1. **Executive Functioning** (Neuro-anatomical substrate, Tests used, Disorders)
2. Discuss case examples of:
    - ADHD + Learning Disabilities (LD)
    - ADHD + Tourette's
3. Adding metacognitive strategies to NFB + BFB training

Coffee Break:

Begin Autism and Asperger's Syndrome:
1. Neuroanatomical deficits
2. QEEG findings
3. Intervention using NFB + BFB + Metacognitive Strategies

Optional Hands-on: Practice in groups: attaching electrodes, checking impedance, and doing assessments followed by NFB + BFB intervention using the Asperger's script.

Day 3

Morning

Integrating Psychophysiology with Stress Assessment Into a combined NFB + Biofeedback Intervention Program

Stress Disorders with Anxiety / Panic & Depression will be used as the principle examples

Morning:

Stress Assessment & Begin Combined NFB + BFB Intervention (Stress PP)

1. What is being measured: RSA (Respiration & Pulse), EDR, EMG, Temperature.
2. Heart Rate Variability and Polyvagal Theory
3. How to do a stress assessment,
4. Stress: Discuss EEG findings, LORETA, AHPA axis, Limbic System, Anterior Cingulate – hub of affective control;
5. **Stress Management** - Emphasis on Heart Rate Variability (**HRV)**
6. Possible Side effects

Coffee & Snack Break

More detail on Biofeedback Variables or more complex EEG Patterns You May See in your Practice (these may require NFB + BFB)

1. Examples:
    a. Autism & Asperger"s (– demonstrate that LORETA findings support what you see) Cases include high comorbidity of the following:
    b. Seizure Disorders (most often previously not diagnosed)
    c. Anxiety / tension (Stress), panic & Depression; (HR, Resp., EDR, Skin Temp.,EMG)
    d. Movement Disorders (Tourette's)
2. EEGs for complex adult cases. Complex child cases including:
    a. Seizure disorders *(May have been diagnosed as ADHD but some children turn out to have undetected seizures).*
    b. Depression
    c. Substance Abuse (alpha – theta NFB)
3. Medication Effects on QEEG (brief)
4. Lecture on Stages of a Typical Feedback Session (**Asperger's Script** as an example) with reasons underlying each stage. (Asperger's PP)

Afternoon:

More Advanced NFB with BFB assessment & intervention

Concussion (TBI) & Optimizing Athletic and Executive Performance

will be used as the principle examples

Optional: May demonstrate a Full Cap Assessment with Neuroguide analysis & LORETA

EEG and Head Injury

1. Pathophysiology of brain injury

2. Current Research using EEG
3. NFB Treatment approach for Head Injury

Coffee & Snack Break

Optimizing Performance: Training Athletes, Executives, Musicians
Self Regulation using NFB + BFB (**Optimal Performance Script)**
Golf putting demonstration and executive ASSESSMENT sheet for TOPS- Tools for Optimal Performance States (This form is like a "Structured Interview Questionnaire". It gives precise objectives for each stage of optimal performance training and follows these objectives with the NFB + BFB + Metacognitive Training

ASK Questions! GOAL: Respond to the needs of the group)

We wish you all the very best in your future work with NFB & BFB!

Selected Basic References:
Book (Key Reference)

- Thompson, M. & Thompson, L. (2003) *The Neurofeedback Book: An Introduction to Basic Concepts in Applied Psychophysiology*, Wheat Ridge, CO: Association for Applied Psychophysiology.
- Sears, William & Thompson, Lynda (1998) *The A.D.D. Book, New Understandings, New Approaches to Parenting Your Child.* New York: Little, Brown & Co.

Other References (a small number of recent publications by the presenters)
Chapters:

- Thompson, M. & Thompson, L. (2007) Neurofeedback for Stress Management. Chapter in Paul M. Lehrer, Robert L. Woolfolk and Wesley E. Sime (Eds.) Principles and Practice of Stress Management, 3rd Edition. New York: Guilford Publications.
- Thompson, M. & Thompson, L., (2009) Chapter 15: Asperger's Syndrome Intervention: Combining Neurofeedback, Biofeedback and Metacognition in Budzynski, Thomas, Budzynski, Helen Kogan, Evans, James R., Abarbanel, Andrew, (eds.), Introduction to Quantitative EEG and Neurofeedback: Advanced Theory and Applications (second edition), Academic Press, Elsevier, NY, 365-415.

Articles:

- Thompson, L. & Thompson, M. (1998) Neurofeedback Combined with Training in Metacognitive Strategies: Effectiveness in Students with ADD. *Journal of Applied Psychophysiology and Biofeedback,* Vol. 23, No. 4, pp. 243-263.
- Thompson, M. & Thompson, L. (2002) Biofeedback for Movement Disorders (Dystonia with Parkinson's Disease): Theory and Preliminary Results. *Journal of Neurotherapy, 6*(4), 51-70.
- Thompson, M. & Thompson, L. (2006) Improving Attention in Adults and Children: Differing Electroencephalograhy Profiles and Implications for Training. *Biofeedback*, Fall 2006
- Thompson, M. & Thompson, L., (2009) Systems Theory of Neural Synergy: Neuroanatomical Underpinnings of Effective Intervention Using Neurofeedback plus Biofeedback. *Journal of Neurotherapy Vol.13,#1, January-March 72-74*
- Thompson, M. & Thompson, L., (in press) Functional Neuroanatomy and the Rationale for Using EEG Biofeedback for Clients with Asperger's Syndrome. *Journal of Applied Psychophysiology and Biofeedback,*
- Thompson, M. & Thompson, L., (in press) Neurofeedback Outcomes in 150 Clients with Asperger's Syndrome and 9 Clients with Autism. *Journal of Applied Psychophysiology and Biofeedback,*

A small selection of Helpful Publications by other Authors

- Fisch, B.J., (1999) *Fisch and Spehlmann's EEG Primer*. Elsevier NY.

- Baehr, Elsa, Rosenfeld, J.P., Baehr, R., Earnst, C., (1999) Clinical use of an alpha asymmetry neurofeedback protocol in the treatment of mood disorders in, James R. Evans and Andrew Abarbanel, *Quantitative EEG and Neurofeedback,* Academic Press, NY.
- Hirshberg, Laurence M., Chiu, Sufen, Frazier, Jean A., (2005) Emerging Interventions, *Child and Adolescent Psychiatric Clinics of North America,* Saunders, Philadelphia, Vol 14, Number .1
- Devinsky, Orin., Morrell, Martha, Vogt, Brent, (1995). Contributions of Anterior Cingulate Cortex to behaviour, *Brain, 118*, 279-306.
- Chan, Agnes, S., Sze, Sophia, L., and Cheung, Mei-chun, (2007) Quantitative Electroencephalographic Profiles for Children with Autistic Spectrum Disorder. Neuropsychology, Vol 21, No. 1, 74-81
- Gevirtz , R. (2007) . Biofeedback Training to Increase Heart Rate Variability . In *Principles and Practiceof Stress Management* (P. M. Lehrer , R. L. Woolfolk and W. E. Sime , eds) , 3rd edition . New York: Guilford Publications .
- Iacoboni, Marco & Dapretto, Mirella (2006) The mirror neuron system and the consequences of its dysfunction. *Nature Reviews Neuroiscience Vol December 942-951*
- Landers, D.M., Petruzzello, S.J., Salazar, W., Crews, D.J., Kubitz, K.A., Gannon, T.L., Han, M., (1991) The influence of electrocortical biofeedback on performance in pre-elite archers. *Medicine and Science in Sports and Exercise, 23, (1)*, 123-128.
- Kroptov, Juri (2009), Quantitative EEG, Event Related Potentials And Neurotherapy, Academic Press, Elsevier, Sandiego, CA
- Monastra, V. J., Lubar, J. F., Linden, M., VanDeusen, P., Green, G., Wing, W. et al. (1999). Assessing attention deficit hyperactivity disorder via quantitative electroencephalography: An initial validation study, *Neuropsychology, 13* (3), 424-433.
- Sokhadze, Estate, Singh, Shraddh, Stewart, Christopher, Hollifield, Michael, El-Baz, Ayman, Tasman, (2008), Event Related Potential Study of Executive Dysfunctions in a Speeded Reaction Task in cocaine Addiction. Journal of Neurotherapy vol. 12, #4,)
- Sterman, M. B. (2000). Basic concepts and clinical findings in the treatment of seizure disorders with EEG operant conditioning. *Clinical Electroencephalography*, *31*(1), 45-55.
- Yucha, Carolyn & Montgomery, Doil (2008), Evidence-based practice in biofeedback and neurofeedback. Wheat Ridge, Colorado: Association for Applied Psychophysiology