ISNR 2010 Conference
Oral Presentation Abstracts

Please note: Authors are responsible for their submissions. The Student Scholarship abstracts are included in this section.

The category of presentations is indicated by "C" for Clinical Application or Clinical Experience, "R" for Research, and "T" for Theoretical.

The abstracts, learning objective and agenda are presented in order according to the conference schedule. Where possible, the oral presentations have been grouped by theme to facilitate the Continuing Education process. Note the number given to the presentation(s). Full information for obtaining CMEs, American Psychological Association (APA), National Board of Certified Counselors (NBCC), American Social Work Board (ASWB), and California Board of Behavioral Sciences credits and Biofeedback Certification Institute of America (BCIA) recertification credits is in your conference packet.

Thursday, September 30, 2010

Plenary Room 1

STUDENT PRESENTATION

Low-Frequency Repetitive Transcranial Magnetic Stimulation (rTMS) Modulates Evoked-Gamma Frequency Oscillations in Autism Spectrum Disorder (ASD) (R,C)

Joshua M. Baruth, MS, University of Louisville School of Medicine, jmbaru01@louisville.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

It has been reported that individuals with Autism Spectrum Disorder (ASD) have abnormal reactions to the sensory environment and visuo-perceptual abnormalities. Electrophysiological research has provided evidence that gamma band activity (30-80 Hz) is a physiological indicator of the co-activation of cortical cells engaged in processing visual stimuli and integrating different features of a stimulus. A number of studies have found augmented and indiscriminative gamma band power at both early (i.e., evoked gamma) and late (i.e., induced gamma) stages of visual processing in ASD; this may be related to decreased inhibitory processing and an increase in the ratio of cortical excitation to inhibition. Low frequency or 'slow' (=1Hz) repetitive transcranial magnetic stimulation (rTMS) has been shown to increase inhibition of stimulated cortex by the activation of inhibitory circuits. We wanted to test the hypothesis of gamma band abnormalities at early stages of visual processing in ASD by investigating relative evoked (i.e. ~ 100 ms) gamma power in a visual oddball task using Kanizsa illusory figures. Our results indicate that in individuals with ASD evoked gamma activity is not discriminative of stimulus type, whereas in controls early gamma power differences between target and non-target stimuli are highly significant. Following 12 sessions of bilateral 'slow' rTMS treatment to the dorsolateral prefrontal cortex (DLPFC) individuals with ASD showed significant improvement in discriminatory gamma activity between relevant and irrelevant visual stimuli with few, if any side effects reported. We propose that 'slow' rTMS may have increased cortical inhibitory tone and decreased the ratio of cortical excitation to inhibition which improved discriminatory gamma activity at early stages of visual processing. We also found significant improvement in behavioral questionnaires (i.e., irritability, repetitive behavior) as a result of rTMS. Contrary to available pharmacological interventions rTMS has shown significant benefits in treating core symptoms of ASD with few, if any side effects.

References

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Grice, S.J., Spratling, M.W., Karmiloff-Smith, A., Halit, H., Csibra, G., De Haan, M., & Johnson, M.H. (2001). Disordered visual processing and oscillatory brain activity in autism and Williams syndrome. NeuroReport, 12, 2697–2700.
Pascual-Leone, A., Walsh, V., & Rothwell, J. (2000). Transcranial magnetic stimulation in cognitive neuroscience--virtual lesion, chronometry, and functional connectivity. Current Opinion in Neurobiology, 10, 232-7.
Tallon-Baudry, C., Bertrand, O., Delpuech, C., & Pernier, J. (1996). Stimulus specificity of phase-locked and non-phase-locked 40Hz visual responses in human. Journal of Neuroscience, 16, 4240-4249.

Learning Objective

Learn more about visual processing abnormalities in autism as related to evoked gamma frequency oscillations as well as treatment with low-frequency repetitive transcranial magnetic stimulation (rTMS).

Outline

Background on Autism, Gamma, and TMS - 7 mins.
Methodology-Participants, Kanizsa Figures, TMS, Behavioral Questionnaires - 6 mins.
Gamma Power and Behavioral Results / Discussion - 7 mins.

Financial Interest: No financial conflicts.

STUDENT PRESENTATION

The Effects of Neurofeedback in Children with Autism: Results of a Randomized Single Blind Attention Placebo Controlled Study (R,C)

Mirjam Kouijzer, MSc, Radboud University Nijmegen, m.kouijzer@pwo.ru.nl

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
While writing this conference abstract in March 2010, a study investigating the effects of neurofeedback in autism is running in the Netherlands. After accomplishing two smaller studies with promising results (Kouijzer, de Moor, Gerrits, Congedo, & van Schie, 2009; Kouijzer, van Schie, de Moor, Gerrits, & Buitelaar, in press), we now try to prevent our results from attention and expectancy biases. In addition to the EEG-feedback group and the waiting list control group, we included a Skin Conductance (SC)-feedback group. All participants of the present study (n=41) were pre-tested with EEG and executive function tasks and parents and teachers filled out behavior questionnaires. Then, the EEG-and SC-feedback groups had identical sessions of EEG-or SC-feedback without knowing which type of feedback they received. EEG- and SC-feedback sessions were identical with electrodes attached to the scalp (measuring EEG) and to the fingers (measuring SC). After 40 sessions of EEG-or SC-feedback, all participants were re-tested with EEG and executive function tasks and parents and teachers filled out behavior questionnaires again. Data collection ends in July 2010. Hopefully the results of this study can be presented for the first time at the ISNR conference in Denver.

References
Kouijzer, M.E.J., Van Schie, H.T., De Moor, J.M.H., Gerrits, B.J.L., & Buitelaar, J.K. (in press). Neurofeedback treatment in autism. Preliminary findings in behavioral, cognitive, and neurophysiological functioning. Research in Autism Spectrum Disorders, doi:10.1016/j.rasd.2009.10.007.
Kouijzer, M.E.J., De Moor, J.M.H., Gerrits, B.J.L., Buitelaar, J.K., & Van Schie, H.T. (2009). Long-term effects of neurofeedback treatment in autism. Research in Autism Spectrum Disorders, 3, 496-501.
Kouijzer, M.E.J., De Moor, J.M.H., Gerrits, B.J.L., Congedo, M., & Van Schie, H.T. (2009). Neurofeedback improves executive functioning in children with autism spectrum disorders. Research in Autism Spectrum Disorders, 3, 145 -162.

Learning Objective
Understand the results that were found in a Dutch study investigating the effects of neurofeedback in children with autism.

Outline
I plan to discuss the methods and results of a randomized single blind attention placebo controlled study investigating the effects of neurofeedback in Dutch children with autism.

Financial Interest: No conflict of interest.

EEG Connectivity Assessment and Training: A Multichannel Directed Information Flow Perspective (R,C)

David Joffe, BA, EEG Dynamics, dj2242@aol.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Classical coherence analysis methods provide insufficient information to explicitly characterize the direction of information flow between two or more EEG scalp electrode locations, as a function of frequency. In addition, it is impossible to determine the extent to which the coherence measured between any two particular scalp electrode sites may be due to the influence of one or more additional scalp electrode sites, using coherence analysis alone. Additional knowledge in both of these areas may improve a neurotherapist's ability to assess QEEG dynamics more completely, and also improve the efficacy of treatment.

One class of methods which may be employed to address both of these concerns in the context of multichannel QEEG assessment and Neurofeedback training, involves what are known as multivariate autoregressive (MVAR) estimators. However, direct measures of EEG information flow direction and influence based on MVAR methods are not currently utilized in either QEEG assessment or neurofeedback due to the lack of available turnkey research and/or clinical tools, as well as a lack of familiarity regarding the potential clinical efficacy of these tools, on the part of neurotherapists.

Building on his 2008 Journal of Neurotherapy article "Connectivity Assessment and Training: A Partial Directed Coherence Approach", the author will focus on three MVAR derived measures known as Granger Causality, Partial Directed Coherence and the Directed Transfer Function, using intuitive graphical displays to convey the potential power of these methods for both QEEG assessment and neurofeedback training. Also included will be examples based upon multichannel EEG data sets for the purposes of comparing and contrasting the unique perspectives afforded by each of these three methods, as well as highlighting the strengths and weaknesses of the three methods with respect to classical coherence analysis.

References

Joffe, D. (2008). Connectivity Assessment and Training: A Partial Directed Coherence Approach. Journal of Neurotherapy, 12 (2-3), 111-122.

Learning Objective

Identify three major types of directional EEG information flow metrics in the context of multichannel EEG assessment and neurofeedback.

Outline

Overview of EEG connectivity and training using directional measures - 2.5 mins.
Brief discussion of Granger Causality - 5 mins.
Partial Directed Coherence - 5 mins.
The Directed Transfer Function - 5 mins.
Summary and suggestions for further research - 2.5 mins.

Financial Interest: I have no financial interest or relationship with any commercial supporters or manufacturers relating to this presentation material.

INVITED PRESENTATION

Single-Case Experimental Designs: A Valuable Method for Evaluating Neurofeedback in Clinical Practice (R,C)

Matthew Nock, PhD, Harvard University, nock@wjh.harvard.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .83

Abstract

This presentation will introduce single-case experimental designs, distinguish them from case studies, describe the conceptual basis for such designs, outline in detail three different types of single-case designs that are likely to be valuable for use in neurofeedback research, and provide examples of such designs from the literature in order to illustrate their use and value as an approach to testing the causal relations between treatment and outcomes.

Learning Objective

Understand the history of single-case experimental designs and have knowledge of their current uses.
Understand the conceptual and methodological basis for using these designs.
Use single-case experimental designs in his/her own research or practice setting.

Financial Interest: No financial interests to disclose.

INVITED PRESENTATION

Alcohol Addiction: A Clinical Pathophysiological Approach (R,C)

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Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .83

Abstract

It has recently become clear that alcohol addiction might be related to a brain dysfunction, in which a genetic background and environmental factors shape brain mechanisms involved with alcohol consumption. Craving, a major component determining relapses in alcohol abuse has been linked to abnormal activity in the orbitofrontal cortex, dorsal anterior cingulated cortex (dACC) and amygdala.

rTMS targeting the dACC using a double cone coil in an attempt to suppress very severe intractable alcohol craving can be applied. Functional imaging studies consisting of fMRI and resting state EEG can be performed before rTMS, after successful rTMS and after unsuccessful rTMS.

Craving was associated with beta activity and connectivity between the dACC and PCC, which disappeared after successful rTMS. Cue induced worsening of craving activated the vmPFC and PCC on fMRI, as well as the nucleus accumbens area, DMPFC and inferior parietal area, with associated suppression of the VLPFC.

Relapse was associated with recurrence of ACC and PCC activity, but in gamma band and nucleus accumbens and DMPFC activity on fMRI.

Linking functional imaging changes to craving intensity permits to build a pathophysiological model of alcohol craving that can be applied clinically using neuromodulation in the broad sense, whether by neurofeedback, rTMS, tDCS or implants.

References

Degenhardt L, Chiu WT, Sampson N, Kessler RC, Anthony JC, Angermeyer M, et al. (2008): Toward a global view of alcohol, tobacco, cannabis, and cocaine use: findings from the WHO World Mental Health Surveys. PLoS Med. 5:e141.

Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP (2004): The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991-1992 and 20012002. Drug Alcohol Depend. 74:223-234.

Koob GF (2006): The neurobiology of addiction: a neuroadaptational view relevant for diagnosis. Addiction. 101 Suppl 1:23-30.

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Hayward G, Mehta MA, Harmer C, Spinks TJ, Grasby PM, Goodwin GM (2007): Exploring the physiological effects of double-cone coil TMS over the medial frontal cortex on the anterior cingulate cortex: an H2(15)O PET study. Eur J Neurosci. 25:2224-2233.

Learning Objective

Understand the huge societal problem of alcoholism.
Understand the pathophysiology of alcohol craving and addiction.
Know neuromodulatory treatment options.
Develop personalized treatment based on sLORETA EEG or fMRI.

Outline

Epidemiology of alcohol addiction.
Social burden of alcohol addiction.

Pathophysiology of addiction (special emphasis on reward system).
Overview on neuromodulation for addiction (tDCS, TMS, lesioning, electrode implants).
Results of neuroimaging and rTMS study.
Conclusion and take home message.

Financial Interest: I have no financial interest or relationship with the commercial supporter(s) or manufacturer(s) of any commercial product or service that is discussed as part of my presentation.

KEYNOTE PRESENTATION

Multimodal Brain Imaging: Combining Brain Stimulation and Functional Neuroimaging to Understand A Changing Brain (R,C)

Alvaro Pascual-Leone, MD, PhD, Berenson-Allen Center for Noninvasive Brain Stimulation, Harvard Medical School, apleone@bidmc.harvard.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: 1

Abstract
The human brain is intrinsically plastic, changing across the lifespan. Such changes may proof adaptive and lead to functional benefits, or may be the very cause of disease and disability. The challenge is to learn enough about the mechanisms of brain plasticity to guide them, enhancing some and suppressing others, to promote the best functional outcome for a given individual. This requires insights about causal relations between brain activity and behavior.

Functional brain imaging provides correlational information about brain activity and behavior. Establishing causal links requires intervention and brain stimulation techniques enable this, thus offering the potential of adding another dimension to functional brain imaging. Multimodal brain imaging, combining brain imaging and neurophysiologic measuring and noninvasive stimulation methodologies, allows the establishment of a causal relationship and a precise chronometry between regional brain activation and behavior. Application of similar methods in animal models enables true translational mourse-to-human approaches, bridging mechanistic and clinical investigation.

Noninvasive brain stimulation with Transcranial Magnetic Stimulation (TMS) or Transcranial Direct Current Stimulation (tDCS) can interfere with activity in a specific cortical brain region and modulate brain network dynamics. These techniques can both be combined with brain mapping methods. For example, PET or fMRI can identify information about brain areas associated with behavior and TMS can transiently deactivate a region of the brain, thus creating a 'virtual patient' and explore causal relations. EEG, MEG and ERPs can provide further chronometric information. Repetitive TMS or tDCS allows the non-invasive modulation of activity in a specified cortical target in the brain convexity and it's functionally connected cortico-subcortical neural network. MRI and EEG can guide such application of rTMS. Depending on stimulation parameters cortical excitability of the directly targeted brain region can be increased or decreased beyond the duration of the rTMS train. Network effects can result in behavioral benefits through paradoxical functional facilitation, induction of desirable plastic changes, or release of specific neurotransmitters. Such combinations of noninvasive brain stimulation and brain mapping methods can lead to clinically relevant therapeutic effects in neuropsychiatry and neurorehabilitation and provide unique insights into brain plasticity mechanisms in health and disease across the lifespan.

Learning Objective
Learn about mechanisms of local circuit and network plasticity and their modification across the lifespan.
Appreciate the impact of genetic predispositions, environmental factors and disease on plasticity.
Learn about strategies to modulate brain plasticity for a given individual's greatest behavioral benefit.

Outline

The focus of my presentation will be on the mechanisms that control brain plasticity across the lifespan and how increased understanding may enable to prevent age-related cognitive decline, the impact of developmental disorders such as autism, and the risk of dementia. The work combines various brain imaging and brain stimulation methodologies to establish a casual relationship and a precise chronometry between regional brain activation and behavior, and uses noninvasive brain stimulation techniques and behavioral interventions to modulate brain plasticity, suppressing some changes and enhancing others to gain a clinical benefit and functional advantage for each individual.

Financial Interest: No financial interest or products.

Evaluating the Clinical Efficacy of a Multi-Modal Treatment Paradigm Using LENS, NeuroField, and Z-Score Training (C)

Penijean Rutter, MA, CNS Wellness of Tampa Bay, penijean@gmail.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
A brief overview of LENS, NeuroField and Z-score training as individual modalities, and the current clinical applications for each approach. Presentation of before and after QEEG maps and LORETA images from EEG recordings taken from clients who participated in clinical programs using one or more of the three modalities. Comparison of the observed changes in the presented QEEG maps and the LORETA images to the client reports of reduced symptoms and clinical improvement. Discussion of modality integration for the purpose of increasing treatment efficacy.

All z-score training was done on the BrainMaster Atlantis 4x4, with Dr. Tom Collura's PercentZ-OK protocol using Dr. Robert Thatcher's NeuroGuide database as a reference.

All LENS feedback was done using the BrainMaster Atlantis 4x4 with Dr. Len Ochs' software developed by Ochs Labs.

All NeuroField protocols were administered using the NeuroField X1000 unit developed by Dr. Nick Dogris.

References
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Thatcher, R.W., North, D., and Biver, C. EEG inverse solutions and parametric vs. non-parametric statistics of Low Resolution Electromagnetic Tomography (LORETA). Clin. EEG and Neuroscience, Clin. EEG and Neuroscience, 36(1), 1 –9, 2005a.
Thatcher, R.W., North, D., and Biver, C. Development of cortical connectivity as measured by EEG coherence and phase. Human Brain Mapp., Oct. 23, 2007.
Thatcher, R.W., Biver, C. J., and North, D. LORETA current source correlations and cortical connectivity, Clin. EEG and Neuroscience, 38(1): 35 –48, 2007.

Learning Objective
Integrate LENS, NeuroField and Z-score training in a clinical treatment program with efficacy.

Outline
Overview of pre and post QEEG maps and LORETA images from clients who participated in LENS, NeuroField and Z-score training – 10 - 15 mins.
Discussion of integrating modalities to improve treatment efficacy – 5 - 10 mins.

Financial Interest: I currently do not have a financial interest in any of the products or services that I will be speaking about.

Biofeedback Case Studies Using Live Z-Score Training and a Normative Database (C)

Thomas Collura, PhD, BrainMaster Technologies Ltd., tomc1@brainm.com
Joseph Guan, PhD, Brain Enhancement Center, enquiry@bec-eeg.org
Jeffrey Tarrant, PhD, dr.tarrant@hotmail.com
John Bailey, PhD, allinabiofeedback@yahoo.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
This talk will describe clinical approaches and experience using live z-score training in a form evolved over the past 3 years. The method makes it possible for the brain to self-regulate in a number of dimensions including absolute and relative power, coherence, and phase. The method specifically allows the brain to adopt its own learning strategy, and to determine an optimal path to self-regulation. Data clearly show physiological changes and operant conditioning of complex brain states, mediated by the z-score approach. 24 case studies will be presented, in which physiological and clinical changes are documented. The approach is diagnosis-free, and is targeted at normalizing the aberrant brain patterns, regardless of the disorder being addressed. Pre-and post-QEEG and psychometric test results document the improvements. There were 10 locations involved in the 24 reported studies.

We acknowledge the following for their contributions to the case studies in this report:
Doerte Klein, PhD, Penijean Rutter, MA, Nancy Wigton, MA, Harry Kerasidis, MD, Charles R. Stark , MD, and Jonathan Walker, MD.

References
Collura, T., Guan, J., Tarrant, J., Bailey, J., and Starr, F. (2010) Biofeedback Case Studies using Live Z-Score Training and a Normative Database, Journal of Neurotherapy 14(1) 22-46.
Collura , T.F., Thatcher, R.W., Smith, M.L., Lambos, W.A., and Stark, C.A. (2009) EEG biofeedback training using live Z-scores and a normative database, in: Budzynski, T., Budzynski, H., Evans, J., and Abarbanal, A., Introduction to Quantitative EEG and Neurofeedback, 2nd edition, Amsterdam: Elsevier, 103-141.
Collura, T.F. (2009) Neuronal Dynamics in Relation to Normative Electroencephalography Assessment and Training, Biofeedback Volume 36, Issue 4, pp. 134-139.
DuRousseau, D. (2007) Simultaneous Training of Slow Cortical Potentials & Coherence in Children with AD/HD using Realtime Z-Score Neurofeedback: A Preliminary Study, presented at the 2007 Annual Meeting of the ISNR.
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Wigton, N. (2008) Does Z-Score NF work better than non Z-Score NF? Presented at the 16th Annual ISNR Conference, August 28-Sept 1, San Antonio, TX.

Learning Objective
Describe the basic mechanisms of live z-score training.
Describe the changes seen during live z-score training and their interpretation.
Explain some of the clinical outcomes reported using live z-score training.

Outline
Principles of Live z-score training – 5 mins.
Review of case studies – 15 mins.

Financial Interest: Dr. Collura has a financial interest in BrainMaster Technologies, Inc.

Cognitive Improvement Following Z-Score Neurofeedback Therapy of 20 Moderate to Severe Brain Injury Patients: Preliminary Results of a Pilot Study (R,C)

Victor Zelek, PhD, Northeast Center for Special Care, victorzelek@msn.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Although neurofeedback (EEG Biofeedback) has been shown to be an effective treatment modality for a variety of psycho-cognitive disorders, its application for brain injury patients has been slow and mostly limited to mild TBI. Lengthy treatments, poor compliance and inconsistent results have been cited among the reasons. The current prospective pilot study examined Z-score neurofeedback treatment efficacy in improving cognitive functioning of 20 adult patients with a history of moderate to severe brain injury (defined as duration of unconsciousness more than 30 minutes and 24 hours, respectively). All patients were residing at a subacute inpatient brain injury rehabilitation facility (Northeast Center for Special Care). They were 3 months to several years post injury. The etiology of brain injury included TBI, CVA, Infectious Encephalopathy and Anoxic Encephalopathy. Their cognitive abilities were evaluated using Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) before and after Neurofeedback treatment course. All had QEEG analyses done before and after treatment. Neurofeedback was given 2-3 times a week for the total of 20-30 sessions. Cognitive improvement was measured using RBANS. Electrophysiological improvement was reflected by the normalization of Z-score Amplitude and Coherence values that were abnormal at the outset of treatment.

For most patients in the study RBANS Total Scale Score (TSS) improved following the course of neurofeedback, but only a third showed statistically significant cognitive improvement. It is estimated that with a greater number of Neurofeedback sessions the patients are likely to continue making cognitive gains. The cognitive improvement correlated with the normalization of brainwave Amplitude and Coherence, but not always at the injury site. TBI patients showed more improvement and EEG normalization than other diagnostic categories in the study. Brainwave Z-score normalization patterns were examined from session to session as well as within each session. The study also focused and provided recommendations on practical ways to overcome many challenges of using neurofeedback with moderate and severe brain injury patients.

References
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Laibow, R E., Stubblebine, A. N., Sandground, H.,& Bounias, M. (2001). EEG Neurobiofeedback treatment of patients with brain injury: Part 2: Changes in EEG parameters versus rehabilitation. Journal of Neurotherapy, 5(4), 45-71.
Thatcher, R. W. (2000). EEG operant conditioning (biofeedback) and traumatic brain injury. Clinical Electroencephalography, 31(1), 38-44.
Thornton, K. E., & Carmody, D. P. (2008). Efficacy of traumatic brain injury rehabilitation: Interventions of QEEG-guided biofeedback, computers, strategies, and medications. Applied Psychophysiology & Biofeedback, 33(2), 101-124.
Thornton, K. E., & Carmody, D. P. (2005). Electroencephalogram biofeedback for reading disability and traumatic brain injury. Child & Adolescent Psychiatric Clinics of North America, 14(1), 137-162.
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Walker, J. E. (2007). A neurologist's experience with QEEG-guided neurofeedback following brain injury. Chapter in J. R. Evans (Ed.), Handbook of Neurofeedback. Binghampton, NY: Haworth Medical Press, pp. 353-361.

Learning Objective
Understand both the advantages and the challenges of using neurofeedback with brain injury patients.

Outline
Using Neurofeedback with moderate to severe brain injury patients: current state of research and of its clinical application – 4-5mins.
Northeast Center - a 280 bed facility for brain injury rehabilitation overview and clinical populations - 2-3 mins.
A 20-subject pilot study conducted at the Northeast Center: methods, procedures, results – 10 mins.
Conclusions and future direction of our study -plan to have 50 subjects by next year – 2–3 mins.

Financial Interest: I have no financial interest or relationship with the commercial supporter or manufacturer of any commercial product or service that will be discussed as part of my presentation.

Laplacian Z-Score Neurofeedback: A Unique Option in The Realm of Multi-Channel Z-Score Neurofeedback (C)

Nancy Wigton, MA, Applied Neurotherapy Center, nwig@cox.net

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
This presentation will review a newly available Z-Score Neurofeedback technique whereby the real-time Laplacian montage Z-score values are able to be directly trained. Various case studies will be presented, complete with pre and post QEEG data as well as clinical outcome measures when available.

Until 2006 the main Neurofeedback approach was limited to 2-channel amplitude training. In 2006 a new 4channel Neurofeedback technique, called Z-Score Neurofeedback (ZNF), became available that uses real-time Z-scores from an age matched normative database. Since its introduction many clinicians report that the ZNF approach provides for faster clinical outcomes. However until recently, the maximum number of channels that could be trained at one time was 4 and training was limited to the linked-ears normative database.

The use of Multi-Channel ZNF greatly expands the number of scalp locations and measures and includes the ability to train real-time Z-scores using not only linked-ears montage data (as well as coherence and phase measures), but also the Laplacian montage data. In cases where the Laplacian montage data reveals more relevant clinical issues to address, it is now possible to directly train these values. While results are

preliminary, and more study is needed to replicate results, this new approach may turn out to give the clinician a great advantage in more efficiently addressing clinical issues within the realm of Multi-Channel ZNF.

References

Collura, T.F., Guan, J.G., Tarrant, J., Bailey, J., Starr, F. (2010) EEG Biofeedback Case Studies Using Live Z-Score Training and a Normative Database. Journal of Neurotherapy, 14(1), pg. 22-46.
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Learning Objective

Understand how the use of the Laplacian montage with Multi-Channel Z-Score Neurofeedback can be a useful clinical option.

Outline

Introduction - 5 mins.
Presentation of case data - 15 mins.
Summary - 5 mins.

Financial Interest: I am primarily a private practice Board Certified Neurofeedback therapist. However I also provide consultation and education to fellow professionals regarding Neurofeedback and QEEGs, as well as BrainMaster and NeuroGuide hardware and software operation. I am also an authorized distributor for BrainMaster and Applied Neuroscience products.

Thursday, September 30, 2010

Plenary Room 2

What Are We Training When We Train SMR? (R,C)

Michael O'Bannon, PhD, Private Practice, mob@mindspring.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Neurofeedback training of the sensory-motor rhythm (SMR)(12-15 Hz along the sensorimotor strip) has a long and well-established history. It is one of the most commonly-used types of training in clinical practice. Current software and hardware allow wide variation in the actual implementation of SMR training protocols in both clinical practice and the laboratory, however. These variations may produce unintended consequences for outcomes of treatment and research.

This presentation reviews SMR protocol variations that arise from differences in bandpass filter characteristics, choices of feedback signal "inhibit" bands, and use of autothresholding. In addition, it provides an analysis of the vulnerability of traditional SMR protocols to high amplitude out-of-band signals that are often present in the typical EEG records of clients.

First, responses of several commercial software/hardware systems to identical EEG records will be examined and their differences compared. Second, high resolution contingency analyses of several client sessions will be presented to differentiate EEG events that trigger feedback signals over the course of SMR training. These results illustrate some of the unanticipated responses of the EEG to traditional SMR protocols designs. Finally, several recommendations will be offered to assist selection of appropriate protocols in the future.

References
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Biofeedback training of the sensorimotor EEG rhythm in man: Effects on epilepsy. Epilepsia, 15, 395-416.
Vernon, D., Egner, T., Cooper, N., Compton, Neilands, T. C., Sheri, A. and Gruzelier, J. (2003). The effect of training distinct neurofeedback protocols on aspects of cognitive performance. International Journal of Psychophysiology 47 (1): 75–85.

Learning Objective
Understand the potential effects of variations in SMR neurofeedback protocols.

Outline
Filter algorithms currently used in neurofeedback treatment - 10 mins.
Impact of autothresholding on the accuracy on feedback during neurofeedback training - 10 mins.

Financial Interest: No disclosures.

Clinical Red Flags of Undiagnosed Mild Traumatic Brain Injuries (C)

Kay Sheehan, EdD, ADD Center of Colorado, drkms1@gmail.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Introduction:
Many psychotherapists and neurofeedback providers have clients who are unsuspecting of having sustained a mild TBI. Some of these clients, at some point in their lives, may even have gone to an emergency room because an incident occurred in which a mild TBI needed to be ruled out, and were told their MRI was fine and so were they. Other clients, as well as any previous medical and mental health providers, may be completely unsuspecting of a possible mild Traumatic Brain Injury. Uncovering probable mild TBI(s) is important in indicating the need for further assessment, properly diagnosing the client (correcting misdiagnoses when appropriate), and in providing the proper treatment. It is also frequently a relief for the client in understanding the reason for his/her symptoms.

Method:
Over many years of doing psychotherapy, biofeedback and neurofeedback evaluations and treatment, red flags indicating probable mild Traumatic Brain Injuries have become apparent in the initial evaluation of clients with various presenting problems. A brief over view of mild Traumatic Brain Injuries will be presented, the red flags to look for in children/adolescents and adults will be discussed, and cases illustrating the initial red flags and subsequent assessments, will be presented.

Results and Conclusions:
There are some patterns in presenting problems/history of children/adolescents and adults that are red flags of possible mild Traumatic Brain Injuries indicating the need for further assessment.

References
Bounias, M., Laibow, R.E., Stubbelbine, A. N., Sandground, H., and Bonaly, A. (2002). EEG-neurobiofeedback treatment of patients with brain injury Part 4: Duration of treatments as a function of both the initial load of clinical symptoms and the rate of rehabilitation. Journal of Neurotherapy 6:1, pp. 23-38.
Duff, J. (2004) The usefulness of quantitative EEG (QEEG) and neurotherapy in the assessment and treatment of post-concussion syndrome. Clinical EEG & Neuroscience 35:4, pp. 198-209.
Gasquoine, P. G. (1997) Post concussion symptoms. Neuropsychology Review 7:2, pp. 77-85.
Tinius, T. P. and Tinius, K.A. (2000) Changes After EEG Biofeedback and Cognitive Retraining in Adults with Mild Traumatic Brain Injury and Attention Deficit Hyperactivity Disorder. Journal of Neurotherapy 4:2, pp27-44.
Prigatano, G.P. (1992) Personality Disturbances Associated With Traumatic Brain Injury. Journal of Consulting and Clinical Psychology 60:3, pp 360-368.
Reitan, R. M. and Wolfson, D. (1999) Two Faces of Mild Head Injury. Archives of Clinical Neuropsychology 14:2, pp 191-202.
Thatcher, R.W., Walker R.A., Gerson, I. and Geisler, FH. (1989) EEG Discriminant Analysis of Mild Head Trauma. Electroencephalography and Clinical Neurophysiology 73, pp 94-106.

Learning Objective
Identify red flags of probable mild traumatic brain injuries in the initial evaluation of children/adolescents and adults with various presenting problems.

Outline
Brief overview of mild traumatic brain injuries - 5 mins.
Red flags of probable mild TBIs indicating the need for further assessment - 15 mins.

Financial Interest: No financial interests.

Atypical Migraine Aura: Clinical Presentation and Clinical Implications (R,C)

Jeffrey Carmen, PhD, Private Practice, carmen5272@aol.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Introduction
Migraine headaches are very common, with estimates as high as 20% of the normal population. They are sometimes preceded by an aura that is obvious to the migraine sufferer. However, the aura can present itself in uncommon ways that while still important, are more difficult to detect. This oral presentation will cover these less typical aura presentations.

Method
There will be a 15 minute lecture with PowerPoint slides, followed by a 5 minute Q/A period.

Results
Participants will acquire a greater understanding of the subtle variables of migraine brain events.

Conclusion
The migraine aura is a significant part of the migraine mechanism. It is critical to understand the aura variables in order to track migraine frequency and intensity as well as intervention progress. This presentation will provide enough information to allow the participant to pursue further information within the headache literature.

References
International Headache Society Classification System: Downloadable from here:
http://ihs-classification.org/en/
Sacks, O., (1992). Migraine. England: University of California Press.

Learning Objective
Identify at least 3 atypical aura presentations.

Outline
Atypical presentation of migraine aura - 15 mins.
Questions and answers – 5 mins.

Financial Interest: No financial interest connected with this presentation. It is a diagnostic oriented presentation rather than a treatment oriented presentation.

Friday, October 1, 2010

Plenary Room 1

Gorak Video-Game in the Resocialization of Infants in Situations of Social Risk (R,C)

Dirce Maria Navas Perissinotti, DSc, São Paulo Federal University,dircelko@uol.com.br
Yusaku Soussumi, MD

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Introduction:
Present study examines the humanistic video-game, Gorak, created by the Center of Study and Investigation in Neuro-psychoanalysis (CEINP) to Virada Project of Rukha Institute, based on Soussumi's Theory, applied as adjuvant approach to reintegrate children in social risk. Prior studies indicate that the performance in tasks mediated by affective functions increase cognitive tasks. Gorak was created to reflect the affective relations' training in the adjustment of social abilities, socialization and social adjustment, empathy, social assertiveness copping, self-control and better social participation. The game would allow better attentional processing and verbal cognition related to the pre-frontal cortex.

Objective:
To test the effectiveness of the Gorak applied in children under social risk, particularly to exam cognitive activity (WISC-III), social abilities (IHS -Del Prete&Del Prete) and EEG signals (bipolar Fp1-Fp2).

Method:

30 children (6-9 yrs.) were evaluated pre and post playing, in a period of 10 weeks, being applied the instruments cited. Gorak was presented to the children twice weekly by 1h, 20 sessions, in a controlled environment, each one utilizing one computer individually.

Results:
The results showed strong statistical positive correlation and significance for the subtests Picture Completion, Similarities, Picture Arrangement and Comprehension. In the HIS, and also was obtained for items involving negotiation, persuasion and acceptance, not meaning passivity, but better capacity to choose the adequate social copping. Showed up discrete cognitive difficulties related to the attentional processing (. Theta in Fp1-Fp2). Inhibition of the attention was associated to the increase on Theta and electric activity slowed. In the post-test showed up discrete improvement of the standards of Theta.

Discussion:
We conclude that Gorak was enabled the children improve the capacity to establish logical relations and to form verbal concepts; improvement of the capacity to synthesize and integrate knowledge. Improved acknowledgement of social relationship rules and facility of argument was also noticed.

References
Arroyo-Palacio J, Romano DM Towards a Standardization in the Use of Physiological Signals for Affective Recognition Systems. Proceedings of Measuring Behavior 2008 (Maastricht, The Netherlands, August 26-29, (2008) Eds. A.J. Spink, M.R. Ballintijn, N.D. Bogers, F. Grieco, L.W.S. Loijens, L.P.J.J. Noldus, G. Smit, and P.H. Zimmerman.
Beeli G, Casutt G, Baumgartner T, Jäncke L. Modulating presence and impulsiveness by external stimulation of the brain. Behav. Brain Funct. 2008,
http://www.behavioralandbrainfunctions.com/content/4/1/33.
Fonagy P. Guest editorial: Memory and therapeutic action. International Journal of Psycho-Analysis, 1999; 80: 215–223.
Gilleade KM, Dix A, Allanson J. Affective Videogames and Modes of Affective Gaming: Assist Me, Challenge Me, Emote Me. Proceedings of DiGRA 2005 Conference: Changing Views – Worlds in Play.
Soussumi, Y. Tentativa de Integração entre algumas Concepções Básicas da Psicanálise e da Neurociência. Psic. Clin., Rio De Janeiro, 2006; 18(1):63 – 82.
Wickramasekera I. The unconscious, somatization, psychophysiological psychotherapy and threat perception: Footnotes to cartography of the unconscious mind. Biofeedback, 1991: 19(1), 18-23.

Learning Objective
Acquire information about infants in social risk situations and the consequences for childhood development.
Understand neuromodulation techniques as a chance to be offered in violent social context.
Propose estrategy, as affective video-game, as an important instrument to improve affective and cognitive conditions in children.

Outline
Neuromodulation and neuropsychoanalytical concepts and its applications as auxiliary method to improve the quality of life in violent environment – 10 mins.
Application of its principals to build affective video-game who aim better childhood development in Brazilian infants at social risk – 10 mins.

Financial Interest: No financial interests.

Effectiveness of Neurofeedback in Youth with ADHD Problems and Comorbid Disorders (R,C)

Marleen Bink, MSc, Tilburg University, m.bink@ggze.nl
Chijs van Nieuwenhuizen, PhD

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

Background

Youngsters in (forensic) mental health care often display ADHD-problems with inattention and/ or hyperactivity-impulsivity. A majority of them also experience problems on other domains. Co-occurrence of externalizing disorders and/or internalizing disorders is the rule rather than the exception. At this moment, best practices for treatment of ADHD consist of behavioural intervention and medication. But this best practice appears to be less effective for youngsters with comorbid disorders. In the majority of the youngsters with ADHD an underactivity of the frontal and central brain region can be observed. Neurofeedback is a training method which intends to (partially) correct this brain activity by giving direct feedback to the brain.

Methods

The objective is to investigate whether neurofeedback is an effective intervention for youngsters with AD(H)D-problems and comorbid disorders. This will be done by looking at an ongoing study with a randomized controlled design. The aim is to include 100 youngsters in the experimental condition and 50 youngsters in the control condition. In this study, the experimental condition consists of treatment as usual in combination with 40 neurofeedback sessions. These sessions aim to inhibit theta (4-7Hz) activity and reward beta (12-15Hz) activity. The control condition consists of treatment as usual.

Results

Measurements are taken pre-treatment (t1), direct post-treatment (t2), six months post-treatment (t3) and one year post-treatment (t4). At t1 thru t4, EEG-measurements, neuropsychological tests, clinical interviews and/or behavioural questionnaires are administered. In this presentation, preliminary pre-and direct post-measurements of the first inclusion group will be presented.

Conclusion

The hypothesis is that neurofeedback will improve the capability of the brain to process information and will reduce attention, hyperactivity and impulsivity symptoms.

References

Angold, A., Costello, E. J., & Erkanli, A. (1999). Comorbidity. Journal of Child Psychology Psychiatry and Allied Disciplines, 40, 57-87.

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Barkley, R. A. (2006). Comorbid disorders, social and family adjustment, and subtyping. In R. A. Barkley (Ed.), Attention-deficit hyperactivity disorder: a handbook for diagnosis and treatment (pp. 184-218). New York: The Guilford Press.

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Barry, R. J., Clarke, A. R., & Johnstone, S. J. (2003). A review of electrophysiology in attention deficit/ hyperactivity disorder: I. Qualitative and quantitative electroencephalography. Clinical Neurophysiology, 114(2), 171-183.

Clarke, A. R., Barry, R. J., McCarthy, R., & Selikowitz, M. (2001a). EEG-defined subtypes of children with attention-deficit/hyperactivity disorder. Clinical Neurophysiology, 112(11), 2098-2105.

Clarke, A. R., Barry, R. J., McCarthy, R., & Selikowitz, M. (2001b). Excess beta activity in children with attention-deficit/hyperactivity disorder: an atypical electrophysiological group. Psychiatry Research, 103(2-3), 205-218.

Lubar, J. F. (1997). Neocortical dynamics: implications for understanding the role of neurofeedback and related techniques for the enhancement of attention. Applied Psychophysiology and Biofeedback, 22(2), 111-126.

Learning Objective

Obtain increased insight in the potential and effectiveness of Neurofeedback for youngsters with ADHD and comorbid disorders.

Outline
Effectiveness of neurofeedback in youth with ADHD problems and comorbid disorders: a RCT background and preliminary results – 20 mins.

Financial Interest: No financial interest or relationship with one of the commercial supporter.

STUDENT PRESENTATION

Adult ADHD: Physiological Arousal During Resting State and Task Conditions (R,C)

Marie Gonzales, BS, University of Tübingen, mvg03@cox.net
Sarah Wyckoff, MA, Ute Strehl, PD, PhD, MSc

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Objective:
Recent research on Attention-Deficit/Hyperactivity Disorder (ADHD) has focused on central nervous system (CNS) arousal, QEEG Phenotypes, and EEG vigilance models. Distinct and stable patterns of EEG activity have emerged using these models and various sub-types of ADHD identified. However, the assessment and profile of peripheral physiological measures of arousal in ADHD has been less consistent and requires further investigation. Mangina and Beuzeron-Mangina (1992) report children and adolescents with learning disabilities/ADHD have an impaired regulation and asymmetries in electrodermal response during cognitive tasks compared to controls subjects. In a recent study Barry, Clarke, Johnstone, McCarthy, and Selikowitz (2009) reported no significant correlation between theta/beta ratios and skin conductance level (SCL) in an adolescent ADHD population. However, reduced SCL, alpha, and beta power was observed in the ADHD group compared with control subjects. Finally, analysis of EEG Vigilance in a childhood ADHD population indicated that individuals with ADHD have more frequent vigilance state shifts and tend to spend more time in lower vigilance stages (Sander, Arns, Olbrich, & Hegerl, in press). EEG Vigilance and heart rate was accessed in a control population and the average heart rate decreased as participants entered the lower arousal/vigilance stages (Olbrich et al, 2009). Additional research is needed to identify the baseline and task specific physiological response in an adult ADHD population. We hypothesize that adults ADHD will exhibit reduced physiological arousal (reduced heart rate and parasympathetic dominance of HRV and EDR variables) compared to controls during resting state and cognitive/vigilance tasks.

Methods:
Heart rate, heart rate variability (HRV), respiration rate, and electrodermal response (EDR) activity was investigated as a function of CNS arousal/vigilance during resting state, CNV task, and auditory oddball task in two groups of adults (18+ years old), with and without ADHD. Adult ADHD participants met DSM-IV criteria for combined, hyperactive, or attention type ADHD. Participants in both groups reported no additional serious physical, neurological, or psychiatric disorders, had a full scale IQ > 80, and were right hand dominant. Arousal was defined in terms sympathetic and parasympathetic dominance in relation to heart rate, respiration, HRV, and GSR. Analysis of physiological measures was conducted for both groups and conditions.

Results:
This investigation is part of a long-term treatment study currently in progress. The most current results in relation to the pre-treatment physiological measure of clinical and control participants will be presented at the time of the presentation.

Conclusion:
Specific findings will be discussed and implication in the current treatment study and future research will be explored.

References

Barry, R. J., Clarke, A. R., Johnstone, S. J., McCarthy, R., & Selikowitz, M. (2009). Electroencephalogram theta/beta ratio and arousal in attention deficit/hyperactivity disorder: Evidence of independent processes. Biological Psychiatry, 66(4), 398-401.
Mangina, C.A. and Beuzeron-Mangina, J.H. (1992). Psychophysiological treatment for learning disabilities: controlled research and evidence. International Journal of Psychophysiology,12, 243–250.
Olbrich, S., Mulert, C., Karch, S., Trenner, M., Leicht, G., Pogarell, O., & Hegerl, U. (2009). EEG-vigilance and BOLD effect during simultaneous EEG/fMRI measurement. NeuroImage 45(2), 319-32.
Sander, C., Arns, M., Olbrich, S., & Hegerl, U. (in press). EEG-vigilance and response to stimulants in pediatric patients with attention deficit/hyperactivity disorder.

Learning Objective

Understand the sympathetic and parasympathetic physiological profile (Heart Rate, Respiration, HRV, GSR) of arousal during resting state and cognitive tasks in an adult ADHD and control group population.

Outline

Background and description of sympathetic and parasympathetic physiological response during resting state and cognitive tasks for Heart Rate, Respiration, HRV, GSR - 10 mins.
Study population demographics and methods to assess sympathetic and parasympathetic response (Heart Rate, Respiration, HRV, GSR) during resting state and cognitive task - 2 mins.
Review physiological arousal profile/findings (Heart Rate, Respiration, HRV, GSR) in an adult ADHD and control population and discussion of implications in current treatment study - 8 mins.

Financial Interest: I have no financial interest or relationship with any commercial supporters, manufacturers, or products/services.

INVITED PANEL

Current Status of Neurofeedback as an Intervention for ADHD: Current Status, Results From Two Randomized Controlled Studies, and the ISNR Adopted Position Paper on the Use of Neurofeedback in the Treatment of ADHD

Martijn Arns, MSc, BrainClinics Diagnostics, martijn@brainclinics.com
Nicholas Lofthouse, PhD, Ohio State University, Nicholas.Lofthouse@osumc.edu
Marleen Bink, MSc, Tilburg University, m.bink@ggze.nl
Leslie Sherlin PhD (Moderator), NovaTech EEG, lesliesherlin@mac.com

Credits: **CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .75**

Abstract

This invited panel will present the most recent updates in the status of neurofeedback as an intervention for ADHD. A brief historical introduction will be presented along with the most recent findings of neurofeedback in ADHD including the 2009 meta-analysis by Arns, et. al (presented by Martijn Arns). Two randomized controlled studies will be described and results presented. The first study (presented by Marleen Bink) raises the questions of: Is neurofeedback a feasible intervention and is it an effective intervention based on behavioral, cognitive and physiological measures? These questions have

been investigated by conducting a pilot and an ongoing randomized controlled study about effectiveness of neurofeedback in youngsters with ADHD and comorbid disorders. From these studies it was postulated that feasibility depends to a large extent on the commitment and persistence of trainers. In addition, from this pilot study it seems possible to estimate in advance whether a youngster will benefit from neurofeedback training. When a youngster is able to commit to the neurofeedback intervention, then it's hypothesised that neurofeedback will improve the capability of the brain to process information and will reduce attention, hyperactivity and impulsivity symptoms. The second study (presented by Nicholas Lofthouse) is a randomized, double-blind, sham-controlled feasibility pilot trial to test optimal session frequency and duration, blinding technology, and efficacy of neurofeedback vs. sham-control. Current results suggest treatment compliance/completion is acceptable; three times per week as a treatment frequency seems more palatable than twice per week; and blinding appears to work. Therefore, this blinding technology and treatments of three times per week seem appropriate for a large double-blind randomized control trial. Finally, the recent ISNR adopted position paper and recommendations on the use of neurofeedback in the treatment of ADHD will be presented including editorial rebuttals and discussion submitted to the Journal of Neurotherapy (presented by Leslie Sherlin).

References

Arns, M., de Ridder, S., Strehl, U., Breteler, M. & Coenen, A. (2009). Efficacy of Neurofeedback Treatment in ADHD: The effects on Inattention, Impulsivity and Hyperactivity: a Meta-Analysis. *EEG and Clinical Neuroscience; 40*(3), 180-189.

Loo, S.K., and Barkley, R.A. (2005) Clinical utility of EEG in attention deficit hyperactivity disorder. *Applied Neuropsychology, 12* (2), 64-76.

Monastra VJ (2005). Electroencephalographic biofeedback (neurotherapy) as a treatment for ADHD: rationale and empirical foundation. *Child and Adolescent Psychiatric Clinics of North America, 14*, 55-82.

Sherlin, L., Arns, M., Lubar, JF, & Sokhadze, T. (2010). A Position Paper on Neurofeedback for the Treatment of ADHD. *Journal of Neurotherapy,* 14 (2).

Learning Objective

Describe the most recent research of ADHD and neurofeedback including the NIMH-funded pilot study for neurofeedback (NF) treatment (Tx) of ADHD and understand the importance of its double-blind, sham-controlled randomized design.

Discover current study results regarding the feasibility/compliance of 2X vs. 3X Tx's per week Tx frequency and the feasibility of blinding with new NF technology.

Describe the historical and current status and efficacy of utilizing neurofeedback in the treatment plan with ADHD diagnosis.

Outline

Presentation of most recent studies describing efficacy of neurofeedback treating ADHD.

Describe the feasibility of neurofeedback for the treatment of ADHD.

Present the most recent and only randomized, double-blind, sham-controlled feasibility pilot trial and results.

Outline the ISNR adopted position paper on the use of neurofeedback in the treatment of ADHD.

Financial Interest Statement: **No participants have financial interests in this presentation. Leslie Sherlin is CEO for Nova Tech EEG, Inc and is CTO and Director of Clinics for Neurotopia, Inc.**

INVITED PRESENTATION

Theta/Beta and SCP Training in Children with

Attention-Deficit/Hyperactivity Disorder: Behavioral and Neurophysiological Results from a Randomized Controlled Trial (R,C)

Hartmut Heinrich, PhD, University of Erlangen, hheinri@arcor.de

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .83

Abstract
Neurofeedback (NF) could help to improve attentional and self-management capabilities in children with ADHD. In a randomized controlled trial, we evaluated the clinical efficacy of neurofeedback training using an attention skills training as control condition. We also compared slow cortical potential (SCP) training, which addresses phasic regulation of cortical excitability, to theta/beta training both at the behavioral and the neurophysiological level.

94 children with ADHD, aged 8 to 12 years, either completed 36 sessions of NF training (n=59) or a computerized attention skills training (n=35). NF training consisted of one block of theta/beta training and one block of SCP training, each block comprising 18 units of 50 minutes (balanced order).

At the behavioral level, NF was superior to the control training concerning core ADHD symptomatology as well as associated domains. For the primary outcome measure (improvement in the FBB-HKS total score, parent ratings), the effect size was .60. For theta/beta and SCP training, comparable improvements were observed.

At the neurophysiological level (resting EEG, event-related potentials during the attention network test), specific effects for the two NF protocols could be demonstrated. For theta/beta training, e.g., decrease of theta activity in the EEG was associated with a reduction of ADHD symptomatology. SCP training was accompanied e.g. by an increase of the contingent negative variation (CNV) in the attention network test, i.e., children were able to allocate more resources for preparation. EEG-and ERP-based predictors were found.

Future studies should address inter alia how to optimize (individualize) neurofeedback training, i.e., which training protocol (or combination of protocols) should be used for a particular child.

Funded by the German Research Foundation (HE4536/2, MO 726/2, RO 698/4).

References
Gevensleben H, Holl B, Albrecht B, Vogel C, Schlamp D, Kratz O, Studer P, Rothenberger A, Moll GH, Heinrich H (2009) Is neurofeedback an efficacious treatment for ADHD? A randomized controlled clinical trial. J Child Psychol Psychiatry 50:780-789.
Heinrich H, Gevensleben H, Strehl U (2007) Annotation: Neurofeedback – Train your brain to train behaviour. J Child Psychol Psychiatry 48(1): 3-16.

Learning Objective
Differentiate between theta / beta and SCP neurofeedback training and will know more about the design and results of our randomized controlled trial in children with ADHD.

Outline
Introduction to neurofeedback, focus on slow cortical potential (SCP) training -15 mins.
Design and results (behavioural and neurophysiological) of our randomized controlled trial in children with ADHD - 35 mins.

Financial Interest: Hartmut Heinrich receives a research grant from the German Research Foundation (DFG).

KEYNOTE PRESENTATION

The Brain That Changes Itself: The Neuroplasticity Revolution & Film Clips of People Undergoing Plastic Change (R,C,T)

Norman Doidge, MD, Columbia University, normand@uww.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: 1

Abstract
The discovery that the human brain can change its own structure and function with thought, and experience, turning on its own genes to change its circuitry, reorganize itself and change its operation is the most important change in our understanding of the brain in four hundred years. We shall explore how, given that the human brain has been plastic, we have missed this core feature, and how this misunderstanding led scientists to doubt the claims made by the pioneers of neurofeedback. Many new cures for neurological and psychiatric conditions are described. Using film clips of patients from his book, The Brain That Changes Itself, Dr. Doidge will demonstrate some of the key principles of neuroplasticity.

References
The Brain That Changes Itself, by Norman Doidge, Viking/Penguin, 2007.

Learning Objectives and Outline
The participants will define neuroplasticity, review the current understanding of it, and the history of the concept.
The participants will learn the ways in which the human brain is not "hardwired" and the clinical implications of this.
The participants will learn why, if the brain has always been plastic, it wasn't detected, and early manifestations of it were dismissed.
Core innovations, using sensory substitution as an example, will be described, using film clips.
Neuroplastic principles, and a new approach to treatment of neurological and psychiatric problems that reorganizes the brain will be described.
The concept of the plastic paradox will be introduced discussed: to demonstrate how neuroplasticity gives rise to both flexible and rigid behaviors and outcomes. Participants will be able to identify and describe the plastic paradox.

Financial Interest: I have no significant financial interest in the research labs, or companies discussed in my presentation.

Osteopathic Treatment of the Encephalon: A QEEG Study (R,C)

David Bergstein, DO, Stillpoint Therapies, Inc., osteodave@earthlink.net
Debora Elliott, MA, Interactive Brain Analysis, debi@interactivebrain.org

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
The purpose of this study was to explore the objective changes in brainwave activity resulting from direct osteopathic treatment of the encephalon. Quantitative electroencephalography (QEEG) was employed to generate electrocortical "brainmaps" for analysis of these dependent variables: Absolute Power, Coherence, Phase Lag.

A mixed gender group of 20 healthy subjects between 20 and 50 years of age were studied in a crossover experimental design. Each subject underwent a pre-study treatment to clear non-physiologic osteopathic lesions thirty days prior to the control phase of the experiment. First, subjects participated in a sixty minute supine rest period with a QEEG measurement performed prior to and following the intervening rest period (each with an eyes open and eyes closed component). This was the control condition. The experimental condition was identical in all aspects, except that the intervening rest period was replaced with a single session of osteopathic endocranial treatment, exactly seven days following the control session, again with QEEG measurement performed before and after the intervening treatment. A six technique protocol was designed and employed for the experimentation session, with techniques chosen to emphasize the mobilization of the encephalon globally and to re-establish the thalamus as its primary motion fulcrum. We hypothesize that such treatment of the endocranium should lead to systematic and quantifiable changes in the brain's electrocortical activity. The results of all four QEEG measurements were recorded for each subject; the signals were processed and analyzed statistically.

Significant changes in group electrocortical activity resulted from the endocranial treatment protocol. A large increase in Absolute Power in the Alpha frequency band ($p=0.028$), increased Coherence in the Beta frequency band ($p=0.02$), decreased Coherence in the Theta frequency band ($p=0.016$), and decreased Phase Lag in the Beta frequency band ($p=0.012$) were found in the eyes-closed condition for the Treatment group. A small decrease in Absolute Power across the Delta ($p=0.017$) and Theta ($p=0.034$) frequency bands, substantially increased Coherence in the Beta frequency band ($p=0.018$), and increased Phase Lag across the Theta ($p=0.025$) and Alpha ($p=0.024$) frequency bands were found in the eyes-open condition for the Treatment group. In addition to the significant changes in magnitude for these dependent variables, a consistent pattern of non-random, centralized, and orderly activity was found in most of the Pre/Post results for the treatment group. In contrast, although several dependent variables did change as a result of the Rest period, all control measures lacked either statistical significance (Absolute Power) or central organization (Coherence and Phase Lag).

In all, these findings provide strong evidence that electrocortical activity was directly affected by the endocranial treatment protocol. The results of this osteopathic study provide justification for further osteopathic research in the endocranial field.

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Learning Objective

Discuss the application of osteopathic methods to improve electrocortical activity.

Outline

Introduction to the Osteopathic Endocranial Approach - 10 mins.
Discussion of Study Design/EEG as Measurement Tool - 5 mins.
Discussion of study results - 5 mins.

Financial Interest: This study was self-funded.

QEEG-Guided Neurofeedback for Anger Control (R,C)

Jonathan Walker, MD, Neurotherapy Center of Dallas, admin@neurotherapydallas.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Recent changes in QEEG data bases have revealed most anger control problems are associated with excess high frequency beta activity in one or several brain areas. After downtraining such activity, the anger is usually decreased and anger control is improved. QEEG findings and the post treatment findings in 67 patients shows that this approach was significant in reducing anger in all but 8% of patients. None were worse.

References
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Walker, Jonathan E. and Norman, Charles. " The Neurophysiology of Dyslexia: A Selective Review with Implications for Neurofeedback Remediation and Results of Treatment in 12 Consecutive Patients," Journal of Neurotherapy, Vol. 10(1)2006, doi:10.1300/1184v10n01_04.
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Learning Objective
Diagnose and treat anger control problems using QEEG-guided neurofeedback.

Outline
Diagnosis of anger control problems - 5 mins.
QEEG evaluation of anger control problems - 6 mins.
Neurofeedback training to remediate anger control problems - 9 mins.

Financial Interest: No financial interests.

EnListen and Learn: Auditory Processing Training Impacts Neural Substrates of Reading Readiness in Dyslexic Readers (R)

Roger Riss, PhD, Madonna Rehabilitation Hospital, rriss@madonna.org
Paula Ray, PsyD

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Objective:

Convergent neuropsychological, neuroimaging and electrophysiological evidence has implicated a central role for phonological processing dysfunction in dyslexia. In the present pilot study, we examine the impact of an auditory processing intervention on the neural substrates of reading readiness in young dyslexic readers.

Participants and Methods:
As a component of a larger pilot study, we analyzed surface qEEG and low resolution brain electromagnetic tomography (LORETA) activation patterns during reading in 2 children (ages 6 and 8 years old) with documented reading disability. The children received 60 hours of training, consisting of exposure to gated and filtered sound, tailored to each child's specific auditory processing pattern, embedded in a classical musical recording (EnListen method). We identified pre-post training changes in qEEG and voxel-level neuro-electric source localization (LORETA) patterns during reading, and measured the impact of training on psychometric indices of reading readiness.

Results:
We observed increased activation during reading in left temporo-parietal cortex and left inferior frontal regions, similar to patterns observed in normal readers. We noted a shift from right frontal to bilateral frontal activation consistent with patterns reported for well compensated dyslexic readers. Increased regional activation in the anterior cingulate gyrus was interpreted to reflect enhanced activation of an attention circuit during task. While overall reading gains were modest, gains of up to 1 S.D. on measures of phoneme discrimination, working memory and reading fluency, suggested enhanced reading readiness.

Conclusions:
Preliminary findings suggest that auditory processing training may have potential to positively impact neural correlates of reading readiness in dyslexic readers, providing an enhanced foundation for subsequent remedial educational interventions.

References

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Thornton, K. E. and D. P. Carmody (2005). "Electroencephalogram biofeedback for reading disability and traumatic brain injury." Child Adolesc Psychiatr Clin N Am 14(1): 137-62, vii.

Learning Objective
Discuss neuroanatomical and electrophysiological correlates of dyslexia.
Understand research supporting critical role of phonological processing in effective reading.
Discuss converging evidence that auditory processing interventions may directly impact neural substrates of reading readiness in dyslexic readers, reflecting an important new application of self-regulation skills training.

Outline
Review neuroimaging correlates of dyslexia, and describe the important role of phonological processing dysfunction in current models of dyslexia – 5 mins.
Introduce a novel auditory processing intervention (EnListen) based on the work of Alfred Tomatis, MD – 3 mins.
Describe a pilot study exploring impact of EnListen auditory processing training on reading readiness in dyslexic children – 2 mins.
Discuss impact of intervention on pre-post training qEEG and LORETA activation patterns during reading, as well as associated improvement in psychometric measures of reading readiness – 10 mins.

Financial Interest: No financial interests.

The Immediate Effect of NeuroField as Measured by Pre Post QEEG (R,C)

Nicholas Dogris, PhD, NeuroField, Inc., nicholasdogris@verizon.net

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Twenty research subjects participated in an experiment to measure the immediate impact of NeuroField electromagnetic stimulation on the brain. Seven minute QEEG recordings were obtained in an eyes open and eyes closed condition. The NeuroField cap was placed over the QEEG cap and a brief electromagnetic stimulation was administered. Immediately following the NeuroField stimulation the QEEG eyes open and eyes closed condition was repeated. The data was analyzed via the NeuroGuide statistics program using MANOVA and descriptive methods. Significant differences were observed from pre to post test conditions for each test subject. NeuroField appears to lift cortical suppression as evidenced by significant absolute power, asymmetry, coherence and phase changes in the brain. The clinical relevance of NeuroField appears to be in its ability to lift suppression so that other methods of EEG neurofeedback can be used more effectively.

References
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Pridmore S, Belmaker R. Transcranial magnetic stimulation in the treatment of psychiatric disorders. *Psychiatry Clin Neurosci.*1999;53:541-548.

Learning Objective
Develop an introductory understanding of how the NeuroField system immediately affects the human brain along with a theoretical explanation regarding clinical application of NeuroField.

Outline
A brief introduction explaining what NeuroField is and how stimulation is delivered to a person - 5 mins.
Explain the research design in which subjects QEEG was measured, how an immediate NeuroField stimulation was given, and then how an immediate QEEG post test was measured - 3 mins.
Present data showing the pre and post test QEEG's results of 17 subjects. Group statistics will be presented along with NeuroGuide pre and post test summaries for each subject - 12 mins.

Financial Interest: I own NeuroField, Inc.

Friday, October 1, 2010

Plenary Room 2

Marketing the Neurofeedback Practice (C)

Jeffrey Hunter, DBA, Assumption College, hunterjg@cox.net

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
The presentation will involve a brief introduction to a strategic marketing assessment and planning tool which can be used to develop a comprehensive marketing plan for the neurofeedback practice (please see below). The concept of USP, development of a Unique Selling Point for the neurofeedback practice will be discussed.

USP, or unique selling point (and sometimes referred to as unique selling proposition or unique selling position), is a fundamental concept in marketing. It refers to some element of the marketer's offering which makes it more attractive to potential clients or customers than the offering of competitors who are vying for the same clients or customers. To be effective, a USP should provide some type of differentiation that is of value to customers. An example from the automotive world would be an automobile which is unusually efficient and environment friendly, much more so than other competing automobiles. Furthermore, a good USP should be one that is not easily imitated. It should be long-lasting, and should also be able to be communicated effectively to potential clients or customers. The "U" of USP = that which makes the product or service different. The "S" is that which makes it attractive. The "P" represents its ability to make an impression on the mind of a consumer.

In the domain of neurofeedback practice, a potential USP might be "specialization." A practice is the only one in the state of Rhode Island which provides comprehensive therapeutic approaches to ADD/ADHD, including qEEG diagnosis, Z-score neurofeedback training, whole-family counseling, behavior therapy for the patient, and nutritional analysis with dietary recommendations for the child. (This example is intended simply to illustrate the point, not serve as a recommendation).

The neurofeedback practice that develops, maintains, and promotes an effective USP when compared to its competitors will gain and retain market share.

The oral presentation will also make brief reference to the material below which will form the basis of the proposed workshop presentation on marketing the neurofeedback practice.

References
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Health Care Marketing: Tools and Techniques. Fortenberry. Jones & Bartlett, 2009.
Integrated Marketing Communication. Blakeman. Rowman & Littlefield, 2007 .

Learning Objective
Gain familiarity with the concept of "unique selling proposition" and use of a comprehensive marketing checklist for development of a neurofeedback practice.

Outline
A coordinated approach to marketing the health care practice -10 mins.
The concept of Unique Selling Proposition -10 mins.

Financial Interest: No financial interests to disclose.

Neurofeedback: A Critical Treatment Component to Behavioral Modification and Parent Education for Individuals Diagnosed with Fetal Alcohol Syndrome (FAS) (R,C)

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Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Fetal alcohol Syndrome (FAS) is a condition that is very prevalent and extremely difficult to treat. It is on the spectrum of the Fetal Alcohol Spectrum Disorders (FASD). Prevalence of FASD is estimated to be at least 10 per 1000, or 1 percent of all births. FASD is an umbrella term used to describe the range of effects that occur in an individual who is exposed to alcohol prenatally. These effects may include physical, mental, behavioral and/or learning disabilities with lifelong implications. This pilot study describes the development and implementation of treatment protocols that includes pre and post intervention QEEG, neurofeedback training, consultation for behavioral modification and parental education on FAS. It also discusses the variations and complexities of using various neurofeedback treatment protocols and the overall scope of treatment for children diagnosed on the spectrum of FASD.

References
This is a pilot study and on literature review, no other research studies were found in which neurofeedback has been used as an intervention for individuals diagnosed with Fetal Alcohol Syndrome.

Learning Objective
Learn from our pilot study the variations and complexities that are evident in patients diagnosed with Fetal Alcohol Syndrome (FAS).
Assess the results of Neurofeedback treatment from pre and post QEEGs in patients diagnosed with FAS, using various treatment protocols.
Define the overall scope of treatment for patients diagnosed with FAS.

Outline
Define Fetal Alcohol Spectrum Disorders (FASD) - 4 mins.

Assessment
Current treatment options

FAS as seen in QEEG -7 mins.
Non-consistency of abnormalities
Treatment protocols used in the current pilot study
Results of Neurofeedback treatment as shown in post QEEGs

Treatment Planning -7 mins.
Scope of Neurofeedback in meeting treatment goals of patients diagnosed with FAS
Symptom characteristics of FAS in non-diagnosed patients
Treatment plans for patients and families

Patient's satisfactions and treatment outcomes - 2 mins.

Financial Interest: There is no financial relationship or interest with any commercial supporter and or manufacturer of products.

Gamma Induction/Beta Attunement (GI/BA) Intervention Protocol & Neurodegenerative (R,C)

Jaclyn Gisburne, PhD, Rocky Mountain NeuroAdvantage, jaclyn@svquietly.com
Jana Harr, BA, Rocky Mountain NeuroAdvantage, jan.harr@mailcolorado.net

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
The GI/BA protocol is an intervention protocol developed over the past four years. Formerly known as "beta-reset," the GI/BA protocol has shown promise with cognitive, affective, and physical pathologies. Its full potential, limitations, and the understanding of its neurological potentials are still being explored. However, the purpose of this presentation is to look at this and other protocols and their utility as interventions that interrupt and/or reverse the systemic activities associated with chronic and neurodegenerative disorders. We will be discussing how evoking gamma wave potentials, which naturally emanate from the occipital and parietal regions, can facilitate restoration of more normal frequency distribution throughout the brain. We surmise that the gamma-wave potentials are instrumental in the "resetting" of the frequency distributions at these areas and that they have global implications in the remission of symptoms. We will discuss several case studies that reflect the resetting activities as evidenced by the often-instantaneous recovery of the clients. We will also discuss briefly the role of stress/trauma in the development of pathologies and several adjunct modalities that help the clients resolve these entrenched and often encapsulated experiences.

References
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Complete list of references upon request

Learning Objective
Articulate one of the aspects of gamma wave response potentials.

Outline
What constitutes a chronic and/or Neurodegenerative disorder?
What is Beta-reset: Gamma Induction and Beta Attunement Intervention Protocol.
Theoretical discussion on how and why it works on this population.

Financial Interest: No financial interests or relationships with commercial sources.

Saturday, October 2, 2010

Plenary Room 1

Classification of ADHD Patients on the Basis of Independent ERP Components Using a Machine Learning System – Crossvalidation with New Data (R,C)

Andreas Mueller, PhD, Brain and Trauma Foundation, andreas.mueller@psychologie.ch

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Background
In the context of sensory and cognitive-processing deficits in ADHD patients, there is considerable evidence of altered event related potentials (ERP). Most of the studies, however, were done on ADHD children. Using the independent component analysis (ICA) method, ERPs can be decomposed into functionally different components. Using the classification method of support vector machine, this study investigated whether features of independent ERP components can be used for discrimination of ADHD adults from healthy subjects.

Methods
Two groups of age-and sex-matched adults (74 ADHD, 74 controls) performed a visual two stimulus GO/NOGO task. ERP responses were decomposed into independent components by means of ICA. A feature selection algorithm defined a set of independent component features which was entered into a support vector machine.

Results
The feature set consisted of five latency measures in specific time windows, which were collected from four different independent components. The independent components involved were a novelty component, a sensory related and two executive function related components. Using a 10-fold cross-validation approach, classification accuracy was 92%.

Conclusions
A crossvalidation study by means of support vector machine with new data of Norwegian research group to classify ADHD adults which indicates that classification by means of linear and non-linear methods is feasible in the context of clinical groups. Further, independent ERP components have been shown to

provide features that can be used for characterizing clinical populations. The transformation from research into clinical praxis will be shown.

References

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Kropotov JD: Executive system. In Quantitative EEG, Event-Related Potentials and Neurotherapy. Edited by Kropotov JD. Amsterdam: Academic Press; 2008:253-291.

Learning Objective

Understand the research method.
Understand the technology of event related potentials.
Understand that the method of ICA – ERPs is a powerful method for diagnostic purposes.

Outline

Diagnostics of ADHD with ERPs – 15 mins.
Practical considerations – 5 mins.

Financial Interest: CEO of Brain and Trauma Foundation. President of HBImed AG.

Using EEG to Predict Neurotherapy Treatment Outcome in PTSD (R)

Estate Sokhadze, PhD, University of Louisville, tato.sokhadze@louisville.edu
Eric Toolson, PhD, Beth Perry, PhD, Michael Hollifield, MD

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

Introduction:
Posttraumatic stress disorder (PTSD) is a debilitating disease characterized by hyperarousal, avoidance and numbing, and/or re-experiencing aspects of the original trauma. Lifetime prevalence of PTSD in community samples is around 6.8% and as high as 30% among specific populations such as Vietnam veterans and female victims of rape. Treatment efficacy in PTSD ranges from 50-75%, but is highly variable among sufferers, which results in high treatment costs, significant drop-out rates, and low treatment efficiency. Published efforts to quantify biological differences between PTSD and non-PTSD subjects have failed to yield consistent findings (Costa et al., 2002). More importantly for predicting treatment outcomes, there is a paucity of research to identify biomarkers early in treatment that signal an eventual therapeutic response to an intervention. Our long-term goal is to produce an algorithm that allows discrimination of responders from non-responders in the early stages of a therapeutic intervention. To that end, we believe that the best predictors/monitors of response to therapy will be based on appropriate analysis of data from physiological measures that directly reflect activity of the brain regions that have been shown to play an important role in PTSD (Lanius et al., 2006). Of the various available methodologies for differentiating between PTSD and non-PTSD subjects, we have chosen to focus on analysis of EEG data, using an array of theoretical and algorithmic approaches drawn from the recent literature.

Materials and Methods:
Data were obtained from a sample of 10 subjects with co-morbid PTSD and cocaine addiction and 9 control subjects from a larger study on attentional bias to pictorial cues (Sokhadze et al., 2008). The 10 subjects

underwent 12 sessions of neurofeedback as a therapeutic intervention, with the goal of increasing the sensorimotor rhythm with either a decrease or no change in theta waves at C3 (motor strip) referenced to the left mastoid. After preprocessing (60 Hz filtering removal of artifacts), data were characterized by FFT, and the largest Lyapunov exponents (L1), correlation dimensions (D2), and autocorrelation functions (ACF) were computed using proprietary Matlab®-based software, based on a windowed variant (Toolson and Perry, in preparation) of the Rosenstein et al. (1993) algorithm.

Results:
Two measures of the complexity of the EEG tracings – L1 and the rate of decay of the ACF – were significantly lower in PTSD-cocaine addicted patients than in controls. After neurofeedback, the EEG complexity as measured by both L1 and ACF rate of decay were significantly increased, and this correlated with clinical improvement. However, in contrast with results reported by Chae and colleagues (2004), among others, we did not find a statistically significant difference in the correlation dimension (D2) of EEG recordings comparing PTSD-cocaine addicted patients with controls, nor did neurofeedback result in any change in the value of D2.

Conclusions:
L1 and ACF rate of decay complexity in EEG tracings may be markers of improvement with neurofeedback in PTSD-cocaine addicted subjects. Further research is needed to determine if these biomarkers will distinguish between responders and non-responders early in treatment, if this biomarker effect is similar in "pure PTSD" subjects versus co-morbid subjects, and if this biomarker effect is similar or different across types of therapeutic interventions.

References
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Sokhadze E, Singh S, Stewart C, Hollifield M, El-Baz A, Tasman A. Attentional bias to drug-and stress-related pictorial cues in cocaine addiction comorbid with PTSD. 2008. J Neurother. 12(4):205-225.

Learning Objective
Understand different methods for evaluating EEG complexity and its application to neurofeedback in PTSD.

Outline
Introduction to the topic - 5 mins.
Methods - 5 mins.
Results and Discussion - 10 mins.

Financial Interest: No financial interests to disclose.

INVITED PRESENTATION

Nutrient Modifiers of Neuroplasticity and Performance, and the Exploration of Novel QEEG Assessment Metrics (R,C)

Michael Schmidt, PhD, NASA Ames Research Center, wisemedicine@aol.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .83

Abstract
The human brain is nearly 60% lipid and it is structurally dependent upon specific molecular lipid forms. At almost all stages of development and aging, provision of specific lipid molecules in specific ratios shapes neural architecture and function. These molecular demands are amplified in an array of clinical conditions, as well as being vital in efforts to develop elite performers. While lipids shape neural architecture and are at the foundation of neuroplasticity, a range of essential nutrient inputs drive the metabolic networks that define the efficiency of neuron communication. This session will explore the role of specific lipids in shaping neural architecture, function, and neuroplasticity, along with selected essential nutrient inputs that are fundamental to nervous system function and performance. It will also briefly introduce methodologies with the potential for characterizing the impact of subtle variance in metabolic networks by using conventional QEEG assessment metrics, such as coherence, as well as some novel techniques characterizing directional information flow.

References
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Çakır, T, et al. Reconstruction and flux analysis of coupling between metabolic pathways of astrocytes and neurons: application to cerebral hypoxia. Theoretical Biology and Medical Modeling 2007;4:48.
Lukiw, WJ, et al. Docosahexaenoic acid and the aging brain. J. Nutr 2008;138:2510–14.
Secher, NH, et al. Cerebral blood flow and metabolism during exercise: implications for fatigue. J Appl Physiol 2008;104: 306–14.

Learning Objective
Understand the influence of selected molecular inputs derived from the diet on brain structure, function, and performance, with attention to neuroplasticity and novel QEEG methods of assessment.

Outline
Effect of dietary lipids on neural architecture, with further emphasis on dietary precursors and cofactors essential to neurotransmitter networks - 40 mins.
Exploration of methodologies with the potential for characterizing the impact of subtle variance in metabolic networks by using conventional QEEG assessment metrics, such as coherence, as well as some novel techniques characterizing directional information flow -10 mins.

Financial Interest: No commercial products will be discussed. Any mention of molecular forms will be in a generic sense.

KEYNOTE PRESENTATION

Beyond Neurotherapy: The Ethics of National Security Neuroscience (T)

Jonathan Marks, MA, BCL, Harvard University, Jonathan_Marks@hks.harvard.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: 1

Abstract
Neuroscience and associated neuro-technologies have transformed diagnosis and treatment for thousands of patients—from those with severe depression that is not responsive to drugs to those with severely impaired consciousness. Some ethicists and science studies scholars have expressed concerns about the manner in

which therapies have changed as a result of recent neuroscience developments. This lecture will focus on ethical concerns raised by various non-therapeutic applications involving both drugs and medical devices—among them, fMRI, EEG, transcutaneous magnetic stimulation (TMS), and oxytocin—in the national security context. How are such drugs and devices transforming the national security mission? How and why have these drugs and devices been developed? And how have they been received and implemented in the national security world? What are the ethical implications of these translations? Are the implications different depending upon whether the technologies live up to the claims made by their proponents? This lecture will address these questions, and explore the complex interactions between the national security and neuroscience communities—as well as the implications of recent research on public understanding of brain images and neuroscientific explanations.

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Marks J.H. 2007. Interrogational Neuroimaging in Counterterrorism: A 'No-Brainer' or a Human Rights Hazard? American Journal of Law & Medicine. 33: 483-500.

Learning Objective

Identify current and potential applications of neuroscience and neurotechnologies in the national security context.
Understand social and ethical critiques of neuroscience in a national security context.
Recognize and assess practical measures that are responsive to these concerns.

Outline

Overview of recent developments in neuroscience -10 mins.
Current and potential national security applications of these neuroscience developments -15 mins.
The role of commercial actors and government funding agencies in this research and its applications -10 mins.
The ethical implications of these developments -15 mins.
Some proposals to address these ethical concerns -10 mins.

Financial Interest: I have no financial interest with any manufacturer of any commercial product or service that is discussed as part of this presentation.

Saturday, October 2, 2010

Plenary Room 2

Comparing LENS Neurofeedback and Traditional Neurofeedback in the Treatment of Obsessive-Compulsive Disorder (R,C)

D. Corydon Hammond, PhD, University of Utah School of Medicine, D.C.Hammond@utah.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

This paper will compare 3 cases of obsessive-compulsive disorder (OCD) that were consecutively treated using traditional neurofeedback with 3 consecutive cases of OCD that were treated with the Low Energy Neurofeedback System (LENS). All cases were evaluated prior to treatment with the Yale-Brown Obsessive Compulsive Scale (Y-BOCS), as well as following treatment. The mean number of traditional treatment sessions required was 71.7 sessions, while successful treatment in the cases involving LENS was

32.3 sessions. Despite the fact that the patients treated with LENS were found to have a more severe level of symptoms on the Y-BOCS than the patients treated with traditional neurofeedback, they showed more significant improvement. Thus the LENS OCD cases demonstrated 4.1 standard deviations improvement while traditional neurofeedback treated cases improved an average of 3.0 standard deviations. In summary, LENS produced greater improvement in less than half the treatment time.

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Learning Objective
Be able to recognize the potentials of LENS neurofeedback to shorten treatment for obsessive compulsive disorder.

Outline
Introduction - 5 min,
Review of Traditional Neurofeedback Outcomes with OCD - 5 mins.
LENS Treatment Outcomes with OCD – 5 mins.
Discussion and Implications - 5 mins.

Financial Interest: No financial conflict of interest.

An International Study of the BAUD Applications for Emotional and Chronic Pain Issues (R,C)

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Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
The purpose of this study was to determine whether the Bioaccoustical Utilization Device (BAUD) could be effective in alleviating symptoms related to emotional issues, impulsive behavioral issues, and/or chronic pain. Eighty-six patients treated by 19 therapists in the US, Switzerland, Portugal, and Denmark underwent treatment with the BAUD for one or more sessions. A Likert rating of symptomatology was recorded before and after treatment for all patients, and 3 weeks after treatment in a subset of patients. Analysis of immediate post-treatment data using McNemar's test demonstrated clinically and statistically significant improvement in all three symptom groupings. Data recorded 3 weeks post-treatment demonstrated stability of post-treatment results in most patients in the emotional issues and chronic pain categories (insufficient 3 wk post-treatment data were available in the impulsive behavioral issues category for analysis). These data suggest that the BAUD is effective in alleviating symptoms from a variety of psychological sources.

References
Bittman, B., Berk, L. Shannon, M. Sharaf, M. Westerngard, J., Guegler, K. J., et al. (2005), Recreational music-making modulates the human stress response. Med Sci Monit. 11(2), BR31-40.
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Lawlis, Frank (2009) Retraining the Brain, New York: Plume.
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Lutz, A., Greischar, L.l., Rawlings, N. B., Ricard, M., & Davidson, R. J. (2004) Long-term mediators self-induce high-amplitude gamma synchrony during mental practice. Pro Natl Acad Sci USA 101(46) 1636916373.

Learning Objective
Understand how to apply the sonic device to lower anxiety, undesirable behavior and chronic pain.

Outline
Discussion of how sonic stimulation can impact EEG performance - 5 mins.
Methodology of the international study - 3 mins.
Results and implications of the results - 7 mins.

Financial Interest: I am inventor of the device and have financial interest in its sales and utilization as partner in the production company.

Sunday, October 3, 2010

Plenary Room 1

STUDENT PRESENTATION

Pilot Investigation: QEEG Phenotypes and EEG Vigilance of Adult ADHD (R,C)

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Christian Sander
Ute Strehl, University of Tübingen, ute.strehl@uni-tuebingen.de

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Objective:
EEG/QEEG analysis of adults with ADHD compared to healthy controls and/or normative database populations have produced a variety of patterns of activity. Adults with ADHD show the typical increase in Theta/Beta ratios, with varying Theta elevations and Beta reductions (Bresnahan, Anderson, & Barry, 1999; Bresnahan & Barry, 2002; Clarke et al., 2008a). Some exhibit increased absolute Theta and Alpha power without differences in Beta activity (Koehler et al., 2009). Others exhibit increased low-Alpha (8-10 Hz) and/or high-Alpha (10-12 Hz) activity, depending on task condition (Loo et al., 2009; White, 2001: White 2003) while coherence data indicates a reduction in hemispheric differences of Delta and Alpha bands (Clarke et al., 2008b) and increased right-hemisphere alpha dominance is correlated with a greater number of ADHD symptoms (Hale et al, 2009). Distinct EEG and behavior patterns or sub-types in an adult ADHD population have also been observed. Thompson and Thompson (2005) reported elevated Theta/Beta ratios, low Alpha, elevated Hi Beta/SMR, and combined elevated Theta/Beta and Hi Beta/SMR ratios correspond to specific symptom presentation in a clinical adult population. In an attempt to develop theory-driven models for QEEG interpretation, neurofeedback protocol selection, and medication response prediction the EEG Phenotype (Johnstone, Gunkelman, & Lunt, 2005) and EEG Vigilance (Bente, 1964, Hegerl, 2008) models have emerged to explain state and trait differences in clinical populations. These models have been utilized in the evaluation of childhood ADHD and control populations and stimulant medication response in childhood ADHD (Arns, Gunkelman, Breteler, & Spronk, 2008; Sander, Arns,

Olbrich, & Hegerl, in press). Limited research is available on the application of these models in an adult ADHD population for assessment or determination of neurofeedback treatment protocols.

Methods:
Continuous 19-channel EEG was recorded during eye closed and eyes open resting state, CNV task, and auditory oddball task in two groups of adults (18+ years old), with and without ADHD. Adult ADHD participants met DSM-IV criteria for combined, hyperactive, or attention type ADHD. Participants in both groups reported no additional serious physical, neurological, or psychiatric disorders, had a full scale IQ > 80, and were right hand dominant. For each participant, the EOG corrected raw EEG for the EO and EC condition was obtained and a comparison of the individual data to a matched normative database controls was conducted. Participant data was then rated to possess one or more of the following EEG phenotypes outlined by Johnstone, et al. (2005): a) Frontal Slow b) Slowed Alpha Peak Frequency c) Frontal Beta Spindles or d) Paroxysmal EEG. EEG Vigilance clusters and state changes will also be assessed in accordance with the Vigilance Classification Algorithm presented by Hegerl and colleagues (2008).
Results. This investigation is part of a long-term treatment study currently in progress. The most current results related to the distribution of EEG Phenotypes and EEG Vigilance states in the ADHD and control populations will be presented at the time of the presentation.

Conclusion:
Specific findings will be discussed and implications for protocol selection in the current treatment study and future research projects will be explored.

References
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Learning Objective
Understand the principles of the QEEG Phenotype and EEG Vigilance Models for assessment and neurofeedback protocol selection in an adult ADHD population.

Outline
Background and description of QEEG Phenotype and EEG Vigilance Models - 10 mins.
Study population demographics and methods to assess of QEEG Phenotype and EEG Vigilance - 2 mins.
Review QEEG Phenotype and EEG Vigilance findings/distributions. Discussion of protocol selection and current treatment study in progress - 8 mins.

Financial Interest: I have no financial interest or relationship with any commercial supporters, manufacturers, or products/services.

Happiness Specifically Increases a Clarified 40 Hz. EEG Rhythm Used for Neurofeedback (R)

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Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Introduction:
A recently-developed modification of the prefrontal 40 Hz. EEG rhythm, the Neureka! Protocol, clarifies it by eliminating most EMG and selectively enhancing the rhythm from the intralaminar thalamic nuclei. We hypothesize that this intralaminar, diffuse rhythm is part of the brain's system designed to process new learning and encourage more discovery by enhancing positive feelings. Last year, Rubik and Cowan reported the first evidence that variations in Neureka! output are associated with variations in feelings such as happiness, love, satisfaction, gratitude, and peace, even during the user's first session of feedback experience (Experiment 1).

Method:
The Neureka! Protocol from the Peak BrainHappiness Trainer was used to measure the subjects' responses to a variety of spoken words in two experiments. The timing of the spoken words was rigidly controlled so that the resulting EEG could be analyzed. The Protocol's values were recorded for each interval, but no neurofeedback was provided to the subjects.

In Experiment 2, fifteen subjects were asked to "Visualize the experience or feeling associated with the word" and exposed to 10 neutral and 10 positive words for 6 seconds each. The words were selected from the Affective Norms for English Words (ANEW) database (Bradley & Lang, 1999) A subgroup of the positive words were the names of actual emotions—joy, pleasure, delight, happy, love. We used a one minute eyes-open baseline before the neutral words and three minutes of eyes-open baseline after the emotional words. Due to the expected effects of anticipation before the neutral words and continued emotion after the positive words, we used the last 30 seconds as the baseline for analysis.

In Experiment 3, we picked the five best descriptions of positive emotions from Experiment 1 and compared them with five emotionally neutral and five negative words. We used both an eyes-open baseline and a one in which the 9 subjects were occupied by repeating three-digit numbers to themselves. Each word and number was presented for 20 seconds at a time. The instructions for the words were "Whenever you hear a word, it is important to form an image or thought and induce any feeling or state associated with

the word. The image or thought doesn't have to be visual. When you hear a word, please really try to create and enhance the feeling or state associated with the word." Halfway through the 20 seconds, the subjects were asked to "intensify the feeling it creates". To eliminate anticipation effects, there was a longer time at the beginning for the subjects to settle down, followed by some practice numbers and words. Although we used the Neureka! produced by eyes-open baselines at the end of the experiment, we primarily compared the emotional conditions with the pooled final four sets of five repeating numbers each.

Results:
The five names of emotions in Experiment 2 evoked significantly higher Neureka! than the eyes-open baseline, with mean differences ranging from 8.3 (joy) to 4.4 (love). Significance levels were highest for pleasure (P = .005, all double-tailed) and lowest for love (p = .048).

With fewer subjects and an improved baseline, Experiment 3 produced significant differences between the positive emotions (happy, loving, grateful, anticipation of something good, satisfaction) and the repeating number baseline (Mean Difference = 6.6, p = .026), as well as the neutral "emotions" (indifferent, passive, lazy, uninterested, neutral) (Mean Difference = 7.1, p =.018) and the negative ones (bored, disappointed, stressed, angry, unhappy) (Mean Difference = 6.7, p = .026). We also compared two selected emotional names (happy and love) with the 40 seconds of the repeating number condition right before them and found a significant (p = .008) mean differences (11.2) for happy, but not for love (p = .148, mean difference = 8.7). Happy also evoked significantly more Neureka! than unhappy (p = .022, mean difference = 12.6), Unhappy did not differ from the same repeating number condition (p = .764).

Conclusion:
Taken together, these two experiments provide significant backing for the idea that Neureka! is a specific EEG-derived measurement for positive feelings. The finding that only 6 seconds of EEG are required to demonstrate this difference indicates that this is practically, as well as statistically, significant. We believe that this Neureka! protocol can be used to train people to enhance their positive feelings.

References
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Learning Objective
Understand that the brain's 40 Hz. system combines the enhancement of awareness, learning, memory, and positive feelings to process and reward new learning.

Outline
The 40 Hz. brain system - 5 mins.
Clarified 40 Hz. EEG is related to positive emotions like happiness, joy, and love, but not to unhappiness and negative emotions – 15 mins.

Financial Interest: Dr. Cowan has a financial interest as the owner of the company that makes the Peak BrainHappiness Trainer and the Neureka! Protocol. Dr. Sokhadze does not have any financial interest related to this presentation.

Effects of Gamma Neurofeedback Training on Perceived Positive Emotional State and Cognitive Functions (R)

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Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

Introduction:

It has been shown that emotional abnormalities are typical for addicts. Alexithymia, i.e., state of deficiency in understanding, processing, or describing emotions (Fukunishi, 1996), as well as dysphoria, i.e., state of inability to experience positive emotions, mood lability (Cowan et al., 1980), and decreased emotional reactivity to natural positive reinforcers (Gerra et al., 2003) are highly prevalent among substance abusers and in those at risk for development of substance use disorders. Therefore, in addition to well known attentional and cognitive impairment, there are disruptions in processing emotion in individuals with substance dependence and in those predisposed to drug abuse. According to the "allostasis" theory (Koob et al., 2004; Koob & Le Moal, 2001) sensitization to drugs and counter-adaptation are hypothesized to contribute to dysregulation of hedonic homeostasis and to observed brain reward system abnormalities in already addicted individuals. However, in some cases hedonic dysfunctions and lower sensitivity to positive affect might be an inherited trait predisposing afflicted individuals to drug-seeking and drug-taking behaviors that may result in substance abuse and ultimately in drug dependence.

Neurofeedback training-based neurotherapy is one of the potentially efficacious non-pharmacological treatment options for substance use disorders (Sokhadze et al., 2007, 2008, 2009). There have been an increasing number of neurofeedback protocols that report success in treating a variety of addictive behaviors. There are practically no studies on the use of neurofeedback in adolescents and young adults with occasional drug use when individuals have drug use history but did not yet developed substance dependence (Trudeau, 2005). One of the most promising direction of neurofeedback research is development of protocols that might be used to prevent drug abuse through self-regulation training aimed to enhance of EEG measures of positive emotional states. In a previous study it was show an association of prefrontal gamma oscillations with positive emotional states (Cowan & Rubik, 2009). One of the specific aims of this pilot study was to determine the dynamics of self-reported perceived positive emotional state rating before, during and after twelve 25 min long neurofeedback training course in 2 groups of subjects. One group of subjects had documented drug use history (N=6, most of them referred from Louisville Adolescent Network for Substance Abuse Treatment (LANSAT) -a community mental health system of care for adolescents with substance use/abuse issues); and another one was a group of drug-naïve subjects (N=6, recruited mostly from students and residents). Our hypothesis was that the prefrontal high frequency power increase over 12 neurofeedback training sessions is possible and will be accompanied by increased rating scores of positive emotional states. Our prediction was that successful completers of the neurofeedback training in the groups of adolescents and young adults both with and without drug/alcohol abuse history will improve subsequent performance on cognitive tests and will increase positive affect.

Method:

As a preferred neurofeedback protocol, we used enhancement of gamma range (centered around 40 Hz) activity (so called "Neureka!" parameter, Peak Achievement Trainer, PAT) and inhibition/suppression of other frequencies (i.e., "Focus" parameter) at the prefrontal site (FPz). Training of high frequency activity in 40 Hz centered gamma band at the midline prefrontal site after 12 session resulted as it was predicted in better performance on neurocognitive (MicroCog) and attention (IVA+Plus) tasks and improved scores on emotional self-reports (happiness and self-satisfaction, Siahpush et al., 2008) and clinical (Beck Depression Inventory II [BDI-II], Beck et al., 1996) status. This protocol used in the study is based on the PAT application "Brain Happiness and Focus" and is intended to train focus, concentration and emotional state (Cowan, 2008). Individual reports of self-received happiness scores were assessed during each neurofeedback session using Continuous Response Digital Interface dial (CRDI, Geringer et al., 2004) and recorded on per minute basis. The CRDI reading showed significant positive correlation with relative gamma power during individual training sessions and exhibited tendency to increase with the number of conducted neurofeedback sessions.

Conclusion:

Neurofeedback training aimed at enhancement of focus and "Neureka!" measures was accompanied by positively correlated subjective self-reports of positive emotional feelings during self-regulation sessions, and resulted in improved performance on IVA+Plus and MicroCog tests at post 12-session neurofeedback course. Post-training evaluations showed decrease in depression scores and increased happiness and self-satisfaction rating in both groups of subjects in this study. We will discuss potential utility of the Focus and Neureka! protocol for self-regulation of attention and emotional state in individuals predisposed for substance abuse.

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Trudeau, D.L. (2005). Applicability of brain wave biofeedback to substance use disorder in adolescents. Child and Adolescent Clinics of North America, 14, 125-136.

Learning Objective

Understand the development of protocols that can be used to prevent drug abuse through self-regulation training aimed to enhance of EEG measures of positive emotional states.

Outline

Introduction to the issues of emotional disturbances in substance abusers - 5 mins.
Description of our approach to emotion self-regulation using neurofeedback - 2 mins.
Methods used in the study - 3 mins.
Presentation of results - 2 mins.
Discussion of questions related to neurofeedback in addiction treatment and utility of emotional self-regulation in individuals vulnerable to drug abuse - 5 mins.
Answering questions - 5 mins.

Financial Interest: No financial interests to disclose.

Using Neurofeedback to Treat OCD Symptoms in a Low Functioning Down's Syndrome Client (R,C)

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Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

Introduction:

The unique aspects of this case are the extent of the client's low functioning and the severity of his OCD symptoms. This twenty-four year old young adult male's OCD symptoms significantly improved by session twelve. Neurofeedback training was continued to see how further training could improve his overall functioning.

The goal of training was to reduce the severity of the OCD (compulsive type) symptoms to improve his daily life and to see if medications for OCD (Zoloft and supplements) could be reduced or eliminated. The primary OCD symptoms his parents found hampering his daily life were his focus on one thing, for example turning the light switch on and off until he was redirected and constantly sorting mail until redirected, his inability to shift from one task to another, and his inability to do things in a timely manner consistent with his overall functioning, for example, taking two hours to fold a stack of towels. The client's compulsive behavior resulted in his inability to move from task to task in a sheltered workshop and consequent removal from the workshop.

Method:

Training sites were chosen based on QEEG information and symptoms. Using Neurocybernetics EEGer software, the initial sites trained were CZ-A1 and F4-A2. CZ was chosen to impact neural activity associated with OCD. F4 was selected to impact executive functions. During the initial training session, 0-7 hz activity at both sites was two to three times higher in amplitude than SMR. Therefore, it was decided to inhibit 0-7 hz amplitudes and increase SMR (12-15 hz) amplitudes. Additional training sites included C4-A2, FZ-A1, T3-F7 and T3-P3. Every training session consisted of training each of two sites for 15 minutes, respectively. The client was seen for a total of 51 sessions.

Results:

Due to the client's low functioning condition, he was unable to do any pre and post testing, such as the TOVA. His parents' finances precluded a post training QEEG. Therefore, the positive change assessment was based on reports from the parents of the client's behaviors at home, check lists, and in-session observations of the client's behaviors and interactions by the neurofeedback therapist. Additionally, the training data was recorded in a file on the EEGer software enabling within and between session comparisons.

At twelve sessions the parents had seen very positive changes in the client's ability to stop an activity and move on to another activity. He was making eye contact more often and delaying less when asked to do something. Neurofeedback was continued to see if further improvement could be made in these behaviors, to address language issues, and to eliminate medications for OCD.

The parents continued to note improvement in the client's ability to move from task to task as well as to complete tasks more quickly. In addition, the client's Zoloft as well as all supplements were discontinued and the improvements made during the training were maintained.

The therapist who did the neurofeedback training noted increasing eye contact as training progressed to the point of consistent appropriate eye contact toward the end of the neurofeedback training. At the forty-fifth session, for the first time, the client picked a neurofeedback game, which he had not done previously. His

language also improved, for example, at the forty-seventh session, the client began using phrases as opposed to making one-word responses as he had been doing. When asked to pay attention to the screen so he could get more beeps, he always had just said, “sorry.” At this session he said, “sorry about that,” while making eye contact. In the remaining neurofeedback sessions, he progressed from using a one-word response, “sorry,” when asked a question to using a simple sentence, “I don’t know.”

Conclusion:
This case suggests that neurofeedback training can be helpful in treating OCD symptoms in a low functioning Down’s Syndrome client. The positive changes in his behavior helped the client and his parents have a more positive daily routine and may lead to sheltered workshop employment. The client’s parents were so pleased with his progress they decided to continue neurofeedback training, but opted for home training due to finances.

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Learning Objective
Learn how OCD behaviors in a very low functioning Down's Syndrome client were successfully treated with neurofeedback.

Outline
Brief overview of OCD, this client's symptoms and level of functioning - 5 mins.
Description of neurofeedback training, outcome and discussion - 15 mins.

Financial Interest: No financial interests.

INVITED PRESENTATION

Single Cell Memory: How Individual Neurons Route and Store Temporary Information to Maintain Attention (R)

Donald Cooper, PhD, University of Colorado, Boulder, d.cooper@colorado.edu

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .83

Abstract
Our brain's short-term memory system has been likened to the rewritable RAM memory of a computer. To perform normal functions, we need the ability to transiently store, quickly and reliably, large amounts of data, but only a small amount of this needs to be retained in the longer term. Scientists have spent decades working out which parts of the brain are responsible for this memory buffer system, and how neural networks manage this feat. Original theories suggested the memories were retained by multiple cells forming "circuits" around which electrical impulses were fired for the necessary period. More recent ideas

have centered around the concept that even an individual neurons in the cortex could somehow hold information. To test this we probed individual prefrontal neurons from mice using tiny electrodes to measure their function. We found that a particular component of the cells in question tells the cell to start an internal signaling system that holds the "memory" in place. Gene deletion of a protein that initiates this signaling cascade eliminated the single-cell memory buffer. Details and updates can be obtained from the Cooper Laboratory website at http://www.Neurocloud.org.

References

(Available at http://www.Neurocloud.org)
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Sidiropoulou K., Lu, FM ,Fowler M, Xiao, R, Ozkan E, Phillips C, Zhu, M.,White F.J. Cooper DC (2009) Dopamine modulation of prefrontal cortical mGluR5-mediated intrinsic regenerative activity Nat Neurosci. 12(2):287-300.
Switching Signals in the Brain. PLoS Biol 3(6): e210.

Learning Objective

Gain insight into how the brain processes attentional and working memory information at the level of a single neuron.

Outline

Present work from my laboratory showing how individual neurons store transient information in a memory buffer - 30 mins.
How disruptions in the dopamine system can alter this cellular memory buffer leading to pathologies of attention and working memory. In light of this drug addiction and ADHD will be discussed - 20 mins.

Financial Interest: I have no financial interests or relationships with any commercial products. The work presented was funded by Grants from the National Institute of Drug Abuse and the National Alliance for Research on Schizophrenia and Depression (NARSAD)and a Gulf War Syndrome contract from the Dept of Veterans Affairs.

INVITED PRESENTATION

Could Neurofeedback Reconstruct Synchronous Networks Lost Following Traumatic Brain Injury? (R,C)

Paul Rapp, PhD, Department of Military and Emergency Medicine
Uniformed Services University of the Health Sciences, prapp@usuhs.mil

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .83

Abstract

In some instances, individuals receiving mild closed skull head injuries are asymptomatic in the immediate post-injury period but subsequently present significant impairment in cognitive and affective processing. The objective of our research program is to identify individuals at risk of delayed-onset dysfunction and to provide preemptive treatment. The analysis begins with a physiological model of progressive diffuse axonal injury. This model predicts alterations in transient, stimulus-dependent synchronous behavior. Preliminary results are consistent with this prediction. The model suggests that procedures which facilitate the reconstruction of synchronous networks may prevent post-injury deterioration in asymptomatic patients and may provide an effective treatment for patients who present post-injury neuropsychiatric disorders. It is hypothesized that neurofeedback protocols using recently developed time-dependent measures of multivariate CNS synchronous behavior may accomplish this.

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Learning Objective
Learn about developing theories of CNS organization based on transient synchronous networks.
Learn that diffuse axonal injury following traumatic brain injury can be progressive and result in delayed-onset neuropsychiatric disorders.
Learn about recently constructed hypotheses suggesting that appropriately constructed neurofeedback therapy may reconstruct the capability to form synchronous networks following mild traumatic brain injury.

Financial Interest: I do not have a financial interest in the commercial supporter or manufacturer of any commercial product or service that will be discussed as part of my presentation at the 2010 ISNR Conference.

Sunday, October 3, 2010

Plenary Room 2

A Pilot Study: Positive Emotion Monitoring with Hemoencephalography Among a Group of Taiwanese Elders (R)

Huey-Tzy Justina Chen, PhD, Fu Jen Catholic University, 046509@mail.fju.edu.tw
Paul Kwong, DSc, Hong Kong University, pyeekwong@yahoo.com
Meng-Twin Wu, Catholic University
Sai-Hung Tang, Cardinal Tien Hospital

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
The objective of the intervention is to improve the positive emotion by eliciting joy from a protocol of "story-telling". In this 2009 pilot study, seven subjects in Taipei aged ranging 60 to 85 were selected in a snowball sample. Each Subject chatted with Principle investigator for couple of minutes, with Toomim's hemoencephalography (HEG) headband attached, before and after the subject told his (her) stories. The single sessions of about 20 minutes per person were conducted on site, using. Each subject's oxygen levels as measured by HEG signals at fp1 and fp2 were measured before intervention as baseline and during storytelling episode.

The new modality of "neurofeedback" intervention consists of (1) letting the subject learn to observe his or her colorful HEG signals online, (2) encouraging by the activity facilitators to elicit life stories with uplifting episodes, (3) telling the subjects to relate their immanent positive feelings and "somatic markers" to HEG signal as displayed dynamically on a portable screen, (4) intentionally reproducing joyful feelings.

It was found that the signals during the ordinary conversational period, "before" and "after" the storytelling, are lower. There are clear "net gain" of HEG signals in the story-telling period. The results show that when the subjects exhibit joyful and positive narrations, emotional expressions or linguistic affects the HEG

signals are obviously strong and sustained longer. A pilot study result from the new method of using HEG to augment an intervention of an activity program for elderly persons is presented.

Conclusion

Storytelling as augmented by HEG neurofeedback might be an effective modality of intervention to improve the positive emotion of elderly. This dynamically facilitated approach is probably more efficient than a passive approach whereby an elderly subject plays neurofeedback games by himself or herself. Further studies are called for with a sufficient sample size and video recording in order to design an evidence-based intervention protocol.

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Learning Objective
Identify a plausible(feasible) relationship between significant storytelling and positive emotion which could be recorded by HEG.

Outline
How to define a significant storytelling – 10 mins.
How to explain the positive emotion by HEG image – 10 mins.

Financial Interest: There was no any financial support from commercial or manufacturer.

Neuroscience and Depth Psychology: A First Step in Connecting Neurofeedback with Jung's Theory of Complexes (R,C)

David Drapes, PhD, Private Practice, ddrapes@yahoo.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

This will be a sharing, seminar-like offering to examine the effects of brain wave modulation and control beyond symptom reduction toward personality change. Clinical case material will be presented that support the work of C.G. Jung, one of the first clinical professionals to use biofeedback 100 years ago. The question of neurofeedback as a treatment for personality complexes will be addressed from theoretical, neurological and clinical perspectives.

Empirical research based on patient's subjective reports appears to indicate a greater and more pervasive change in outlook toward self and life with neurofeedback assisted depth psychotherapy. This exposes the neurological underpinnings of Jung's ideas about complexes, psychic energy and archetypal patterns, perhaps rhythmic patterns within the collective universe of the patient's mind/brain or neuro-oscillation gone awry.

Happiness, benevolence, resilience and an open embrace of life have been outcomes observed with patients in neurofeedback assisted depth psychotherapy. Neurofeedback training/treatment can evolve beyond techniques to neurofeedback psychology and psychotherapy for those seeking more and professionals wanting to take the field further.

In addition to case vignettes and pilot study research results, discussion, musings, idealizing and a critical eye will be employed to assess the potential of synthesizing the best of the past with the brightest of the present toward a creative neuropsychological hybrid for the future.

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Learning Objective
Recognize a connection of practice of Neurofeedback and C. G. Jung's Depth Psychology, especially his concept of Complex Theory.

Outline
Jung's theory of complexes - 5 mins.

Neurological and clinical underpinnings - 5 mins.
Clinical examples and applications of neurofeedback assisted depth psychotherapy focused on personality change - 10 mins.

Financial Interest: I have no current relationship with any commercial supporter(s) or manufacturer(s) related to my proposed presentation.

Effectiveness of an Advanced Form of Transcranial Electrical Stimulation in Cases of Persistent Anxiety and Depression (C)

Nancy White, PhD, The Enhancement Institute, nancy@enhancementinstitute.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
In an average year in the U.S. some 40 million people suffer from anxiety and another 20 million become clinically depressed. The symptoms of these disorders cause substantial distress for the sufferers and their families and cost society dearly each year in lost time and suboptimal job performance. Moreover, the number of people exhibiting symptoms of depression and anxiety continues to grow and is projected to continue growing until 2020. Research continues to demonstrate that the available pharmaceutical treatments are not much more effective than placebo; in fact, recent articles point out that placebo appears to be as effective as most of the currently popular psychotropics. Persons who cannot find an effective solution to their depression or anxiety tend to get worse and develop bad habits as they seek to compensate, making treatment even more complex. While certain neurofeedback protocols have proven effective for depression and anxiety, they still take months to mediate the symptoms of these disorders. This presentation reviews the results of a pilot study involving anxious and/or depressed patients who were treated in a clinical setting using an advanced Transcranial Electrical Stimulation (TES) system approved by the Food and Drug Administration for the treatment of anxiety, depression and insomnia. In clinical trials this system mediated the symptoms of anxiety, depression and insomnia in a lasting way in most patients within two to four weeks by providing stimulation that appears to affect the hypothalamus and associated brain structures to adapt and alter the levels of neurochemicals critical to maintaining normal mood. The purpose of the pilot study was to confirm the effectiveness of advanced TES in the everyday clinical setting using as measurement standards the quantitative EEG (qEEG) and a multifaceted battery of pre-and post-tests and scans common to the clinical setting. Case studies demonstrate the nature and progress of treatment and the specific outcomes achieved.

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hospital . 7 named after I.P.Pavlov (S. Petersburg centre of neuroses named after I.P.Pavlov), Leningrad Regional Addiction Center, and Psycho-neurological research institute named after of V.M.Bekhterev, Kalaco Scientific, Inc., AZ, USA.
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The World Health Organization. The world health report 2004: Changing history, Annex Table 3: Burden of disease in DALYS by cause, sex, and mortality stratum in WHO regions, estimates for 2002. Geneva, Switzerland: WHO 2004.

Learning Objective
Understand the importance of the hypothalamus in brain-body health and more familiar with the potential of TES to remediate mood disorders, bringing the brain-body system into better balance.

Outline
Role of hypothalamus and its function in brain-body health – 5 mins.
Case studies illustrating the process with pre and post testing, Quantitative EEGs and Scans - 15 mins.

Financial Interest: My financial interest is only that I have one of the machines in my office and offer this treatment.

Turning the Lights Back On: A Musician and Writer Who Lost His Left Hemisphere to a CVA Uses Neurofeedback for "Soul Retrieval" (C)

H. Stephen Larsen, PhD, SUNY, Stone Mountain Center, stephenlarsen@earthlink.net
Victor Zelek, Northeast Center, victorzelek@msn.com

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract

Michael Schacker (patient has given permission to use actual name) is an author, musician and composer who suffered an aortic dissection in 2008. In the emergency repair a clot was thrown that caused a stroke to the left hemisphere. The stroke and bleed occasioned brain swelling that could only be relieved by removing a large flap of skull and most of the left hemisphere of the brain. After physical therapy and rehabilitation he came for special care at a premiere rehabilitation center for TBI, where he continues to be in residence.

Though the skull flap was still missing, during the summer of 2009 a qEEG was performed. In August of 2009, Michael was able to obtain permission to begin outpatient treatments. LENS neurofeedback and HRV training were begun, and continue through the present time. In November of 2009 the cryogenically preserved skull plate was reattached, with only minimum disturbances in Michael's emotions or behavior, making it possible to treat sites (on the 10-20 system) all over the head.

When Michael began treatment at SMC, he could not walk, arriving in a wheelchair. He had only one word, "read." As of this submission (mid-April 2010) he is able to walk from his car into our facility, and has about 60 words. He is able to say phrases and sentences, and has some movement of his previously paralyzed right arm.

This single case study of dramatic recovery from CVA is accompanied by psychometric tests, clinical observations, and before and after qEEG maps as well as LENS maps and treatment records.

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Joel Stein M.D. Stroke and the Family: A New Guide Harvard University Press Family Health Guides (97806740166750.

Learning Objective

Learn how neurofeedback can work with the more extreme cases of TBI and CVA's.
Learn how QEEGs are used, along with LENS maps, to monitor recovery of brain function.

Learn about how the Subjective Symptom Report Scale (Larsen, 2003) can be used to monitor clinical progress.
Observe how topographic brain maps are both similar and different from clinical progress.

Outline
Describe history and neurological severity of case – 5 mins.
Describe evaluation and clinical procedures that were employed – 5 mins.
Auxiliary rehabilitation procedures used in treatment facility, and employed by Barbara Schacker (Stroke Family. org) – 5 mins.
Outcome - 5 mins.

Financial Interest: No interests or relationships.

Practitioner Perspectives of Neurofeedback Therapy (R)

Jonathon Larson, EdD, Illinois Institute of Technology, larsonjon@iit.edu
Catherine Ryan
Mogens Baerentzen, MS

Credits: CME, American Psychological Association, NBCC, ASWB and CA Board of Behavioral Sciences Credits and BCIA recertification credits: .33

Abstract
Introduction:
Research continues to increase empirical support for Neurofeedback Therapy (NFT)efficacy and effectiveness. Hammond (2007) compiled an extensive bibliography of neurofeedback research, and Yucha and Gilbert (2008) published Evidence-Based Practice in Biofeedback and Neurofeedback. Kaiser (2010) reported 5,565 biofeedback and neurofeedback papers indexed within PubMed and Arns (2010) summarized 31 applied neuroscience papers published between August and December of 2009. Despite advances in the quantity and quality of NFT research, a comprehensive literature review found a handful of investigations into practitioner variables related to NFT process and outcome variables. Hammond and Kirk (2008) emphasized the importance of establishing formal NFT practice standards. An investigation reported demographic variables for practitioners from around the world (Rubi, 2006). A staff training program highlighted age as a potential practitioner variable for specific client types (Thompson & Thompson, 2008). Research reported the importance of exploring client and practitioner relationships (Aguilar-Prinsloo & Lyle, 2010). With limited investigation on NFT practitioner variables and recommendations from current research, we proposed to explore practitioner variables through qualitative methods. The goal and research significance of this study were to identify a wide range of NFT themes for utilization in future research on practitioner process and outcome variables.

Methods:
We utilized Community Based Participatory Research (CBPR) to engage practitioners in the process of identifying NFT factors. Through online surveys, we collected demographic variables and perspectives about NFT from 70 consented participants. We utilized SPSS descriptive statistics for our demographic and NFT experience information. We utilized Loftland and Loftland's (1984) systematic filing system and Berg's (2004) themes to concepts to analyze our data set, which allowed us to categorize similar themes into conceptual frameworks.

Results:
Our sample demonstrated various levels of age, education, licensures, certifications, and experience; however, we found an equal gender distribution. For the advantage conceptual framework, we found 84 concepts fitting into 6 categories. The disadvantage framework included 53 concepts within 5 categories. Practitioner characteristics were divided into three separate conceptual frameworks: skills (35 concepts in 3 categories); knowledge (29 concepts in 4 categories); and traits (36 concepts in 5 categories).

Conclusions:
Our results provided 237 themes sorted into 23 categories within 5 conceptual frameworks for future research on NFT practitioner process and outcome variables. The disadvantage framework highlighted utilization and dissemination problems while the advantage framework identified variables possibly impacting NFT. The skill, knowledge, and trait conceptual frameworks offered direction for exploring practitioner variables influencing NFT outcomes. Future factor analysis research may include developing and testing a measurement tool for practitioner variables. We do not offer these findings as a comprehensive list of NFT issues or practitioner factors; rather, we offer this as a potential starting point for investigating practitioner variables related to NFT. In addition, we may have missed additional themes due to our sample size and method of data collection. Overall, we utilized CBPR and systematic filling methods to categorize practitioner perspectives to guide components of future NFT research.

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Learning Objective

Discuss practitioner perspectives on advantages, disadvantages, knowledge, skills, and characteristics related to neurofeedback.

Outline

Discuss the findings of this research study – 5 mins.
Identify a wide range of NFT themes for utilization in future research on practitioner process and outcome variables – 5 mins.
Discuss the rationale, methods, results, directions for future research – 5 mins.
Solicit attendee feedback as a part of our Community Based Participatory Research methodology – 5 mins.

Financial Interest: I have no significant financial interest or relationship you may have with the commercial supporter(s) or manufacturer(s) of any commercial product or service that is discussed as part of your presentation.