ISNR 2013 Annual Conference

Abstracts & Program

Contents

Thursday, 9/19/2013

7:45 AM–8:00 AM

Presidential Address

Randall Lyle, PhD

8:00 AM–8:30 AM

Long-Term Follow-Up of Neurofeedback Outcomes in Clients with Asperger's Syndrome

Tanushree Bhandari

8:30 AM–9:00 AM

Keep Them Coming Back: Interpersonal Techniques and Their Relationship to Client Adherence, Engagement, and Satisfaction

Jonathon Larson, EdD
Thomas Cothran
Christopher Haak
Lindsay Sheehan
Katherine Kereszturi
Bethany Apa
Catherine Ryan
Robert Beedle
Kelly O'Neill

Rigorous empirical research continues to demonstrate the efficacy of Neurofeedback Therapy (NFT) in peak performance training and the treatment of psychiatric and neurological disorders (Hammond, 2007; Yucha & Montgomery, 2008). However, according to NFT practitioners, one of the barriers to successful functional outcomes is client adherence and ambivalence to ongoing treatment (Larson, Ryan, & Baerentzen, 2010). NFT provides an effective intervention for improving self-regulation of brain activity, arousal, and reducing unwanted symptoms. However, the technology does not inherently contain components targeted at facilitating continued client engagement. Human factors play a significant role in client adherence, engagement, and satisfaction with therapy. Research shows that patient engagement and support can be improved significantly using specific interpersonal techniques (Zolnierek & DiMatteo, 2009; Beck, Daughtridge, & Sloane, 2002). Moving beyond simple friendliness, this workshop will survey empirical literature related to professional comportment and rapport, transtheoretical common factors of treatment outcomes, motivational interviewing, and verbal and non-verbal communication. This workshop will fluidly combine dialectic and experiential teaching strategies to elucidate evidence-based strategies for guiding clients from first contact through successful termination of therapy. It is intended to benefit practitioners from a wide range of expertise, from the novice technician to the experienced clinician.

Beck, R.S., Daughtridge, R., & Sloane, P.D. (2002). Physician-patient communication in the primary care office: A systematic review. The Journal of the American Board of Family Practice, 15, 25–38.

Corrigan, P.W., McCracken, S.G., & Holmes, E.P. (2001). Motivational interviews as goal assessment for persons with psychiatric disability.

DiClemente, C.C., & Prochaska, J.O. (1998). Toward a comprehensive, transtheoretical model of change: Stages of change and addictive behaviors. In W.R. Miller & N. Heather (Eds.). Treating Addictive Behaviors (2nd ed.). New York: Plenum Press.

Hammond, D.C. (2007). Comprehensive Neurofeedback Bibliography. Journal of Neurotherapy, 11, 45–60.

Larson, J.E. (2008). User-Friendly Motivational Interviewing and Evidence-Based Supported Employment Tools for Employment Practitioners. Journal of Rehabilitation, 74.

Larson, J.E., Ryan, C.B., & Baerentzen, M.B. (2010). Practitioner Perspectives of Neurofeedback Therapy for Mental Health and Physiological Disorders. Journal of Neurotherapy, 14, 280–290.

Miller, W.R., & Rollnick, S. (2002). MI: Preparing people for change. New York: The Guilford Press.

Miller, W.R., & Rollnick, S. (2002). Change Plan Worksheet. Found at www.motivationalinterveiw.org

Yucha, C., and Montgomery, D. (2008). Evidence-Based Practice in Biofeedback and Neurofeedback. Wheat Ridge, CO: Association for Psychophysiology and Biofeedback.

Zolnierek, K.B. & DiMatteo, M.R. (2009). Physician communication and patient adherence to treatment: A meta-analysis. Medical Care, 47, 826–834.

Zuckoff, A., Swartz, H.A., & Grote, N.K. (2008). Motivational interviewing as a prelude to psychotherapy of depression. In H. Arkowitz, H.A. Westra, W.R. Miller, & S. Rollnick (Eds.). Motivational Interviewing in the Treatment of Psychological Problems. New York: The Guildford Press.

No conflicts of interest.

8:00 AM–9:00 AM

qEEG and Neurofeedback Diagnosis and Treatment for Sports-Acquired Traumatic Brain Injury (TBI)

Michael Linden, PhD ***Jay Gunkelman*** ***Alan Strohmayer, PhD***

The use of Neurofeedback is gaining interest in sport medicine and athletic organizations as training for peak performance and, more recently, for TBI and PCS rehabilitation. In this symposium we will explore the use of qEEG to help identify the deficits resulting from sports acquired TBI. We will review and explore the use of the qEEG and other psychological performance tests to describe the TBI and how they can be used to determine the correct time to return to play (RTP). RTP is currently, a highly controversial topic in sports medicine. We will show the role of qEEG Guided NF protocols in the recovery from TBI and other Post Concussive Syndromes (PCS) especially headache. The presenters will draw upon clinical case studies of TBI successfully treated using these techniques.

Duff, J. (2004). The usefulness of quantitative EEG (QEEG) and neurotherapy in the assessment and treatment of post-concussion syndrome. Clinical EEG and Neuroscience, 35 (4), 198–209

McCrea, M., Prichep, L., Powell, M., Chabot, R. & Barr, W. (2010). Acute effects and recovery after sport-related concussion: A neurocognitive and quantitative brain electrical activity study. Journal of Head Trauma Rehabilitation, 25 (4), 283–292.

Kutcher, J., McCrory, P., Davis, G., Ptito, A., Meeuwisse, W.H., & Broglio, S.P. (2013). What evidence exists for new strategies or technologies in the diagnosis of sports concussion and assessment of recovery? British Journal of Sports Medicine, 47, 299–303.

Dr. Linden and Dr. Strohmayer are in private practices. Mr. Gunkelman is involved in a commercial enterprise which evaluates EEG data from a variety of sources. We intend to present the general methods and findings which are available to everyone and are non-proprietary.

9:10 AM–9:40 AM

An Evaluation of the Psychophysiological Concomitants of Increasing Alpha-Wave Amplitude in Anxiety and Stress Disorders.

Lesley Parkinson
Alan Parkinson

Anxiety and anxiety disorders involve both psychological and physiological conditions. Anxiety covers uneasiness, apprehension, fear and worry in circumstances that do not necessarily warrant it. Accompanying symptoms include those such as heart palpitations, muscle tension, fatigue, headaches, irritability and sweating. Sufferers can also find themselves overwhelmed by accompanying stressful thoughts/cognitions.

Using brainwave oscillations is an important tool for the understanding of cognitive processes. The Alpha Waveband facilitates the integration of brain activity triggered by sensory stimuli and experiential images. It has the best test-retest reliability of all brainwaves and it is an intra-individual stable trait. It facilitates the organization of a brain-stem network that governs Sympathetic Nervous System activity.

The present study investigated the hypothesis that increasing alpha waveband amplitude through Cranial Electrotherapy Stimulation (CES) would lead to a reduction in the physiological and psychological symptoms of anxiety disorders. CES has been shown to induce the cortex to produce an increase in alpha-wave activity.

Methods

Sixteen patients complaining of Stress or Anxiety were recruited. They completed the DASS (Depression, Anxiety and Stress Scale). Baseline CNS Measurement of Brainwave activity occurred at the Central SMS. Patients were put on a one-month waiting list and then re-assessed with the same measures as at baseline. They were provided with an Alpha-Stim CES device to use for 2 months 20 minutes per day. Post-Trial re-assessment then occurred.

Results and Discussion

The measures at each assessment point were analyzed providing means and significant differences. Key measures were for the Alpha Wave amplitudes and the Depression, Anxiety and Stress Scales Scores.

16 patients complaining of Stress or Anxiety were recruited. They completed the DASS (Depression, Anxiety, and Stress Scale). Baseline CNS Measurement of Brainwave activity occurred at the Central SMS. Patients were put on a one-month waiting list and then re-assessed with the same measures as at baseline. They were provided with an Alpha-Stim CES device to use for 2 months 20 minutes per day. Post-Trial re-assessment then occurred.

The measures at each assessment point were analyzed providing means and significant differences. Key measures were for the Alpha Wave amplitudes and the Depression, Anxiety and report measures of anxiety and stress.

The study demonstrated the importance of the alpha wave in reducing the physiological and psychological symptoms of anxiety and stress.

Using CES led to a significant increase in alpha-wave activity and a significant reduction in self-report measures of anxiety and stress.

No conflicts of interest.

9:40 AM–10:10 AM

LORETA Phase Reset of the Human Default Network

Robert Thatcher

Objectives

The purpose of this study was to compare EEG phase shift and lock durations between different Brodmann areas of the human default mode network.

Methods

The electroencephalogram (EEG) was recorded from 19 scalp locations from 70 healthy normal subjects ranging in age from 13 to 20 years. A time series of LORETA current sources were computed from the center voxel of 14 Brodmann areas (BA) comprising the default mode network (DMN). The Hilbert transform of the LORETA time series was used to compute the instantaneous phase differences between all pairs of BAs. Phase lock and shift durations were computed for all combinations of Bas in the delta frequency band (1–4 Hz). Analyses of variance with Bonferroni corrections were computed with main effects of Brodmann areas, hemisphere, and eyes closed vs. open conditions.

Results

Phase shift and lock duration exhibited discrete durations when comparing pairs of Brodmann areas. Phase shift and lock durations while discontinuous and unique for each BA also exhibited exponential changes with distance and were inversely related.

Conclusions

Each Brodmann area is a node in a network that phase locks with other nodes during discrete and specific intervals of time. The results indicate that anatomical nodes behave like a “shutter” that opens and closes at specific durations giving rise to temporal packets of phase locked clusters of neurons across networks.

I am president of Applied Neuroscience, Inc.

9:10 AM–10:10 AM

Neural Connectivity Theory of Epilepsy

Robert Coben, PhD

The prevalence of epilepsy in the general population has been estimated to be at least 7 per 1,000 with rates rising over 4 decades (Hauser, Annegers & Kurland, 1991). In addition, there are subclinical seizure disorders that lead to unwanted symptoms to conditions such as autism. If one considers all form of potential seizures disorders and their manifestations the prevalence and societal challenges that these issues cause are tremendous. While basic neurofeedback (SMR augmentation) has been shown to be effective in reducing seizures (Tan et al., 2009), the duration of treatment is often long (6–12 months) with only an 80% success rate. Recently, the notion of epileptic neuronal networks has been postulated (Stefan & Lopes de Silva, 2013). Utilizing such concepts, one can detect connectivity anomalies that trigger seizure events and measure their resolution as well. Data will be presented to show how this approach may be used to design potentially more effect neurofeedback treatment plans with greater success rates than previously studied approaches.

Hauser, WA, Annegers, JF, & Kurland, LT (1991). Prevalence of epilepsy in Rochester, Minnesota: 1940–1980. Epilepsia, 32 (4), 429–445.

Stefan, H & Lopes da Silva, F (2013). Epileptic neuronal networks: methods of identification and clinical relevance. Frontiers in Neurology, 4(8), 1–15.

Tan, G., Thornby, J., Hammond, D. C., Strehl, U., Canady, B., Arnemann, K., & Kaiser, D. A. (2009). Meta-analysis of EEG biofeedback in treating epilepsy. Clinical EEG and Neuroscience, 40(3), 173–179.

Dr Coben is a cofounder of INS, a consultation service for the field of neurofeedback.

10:20 AM–10:50 AM

Serial Norm-Referenced Quantitative EEG Evaluations during Subacute Recovery from Traumatic Brain Injury: A Validation Study

Fred Ulam, PhD ***Charity Shelton, M.S. CCC-SLP***

Purpose

To assess the usefulness of quantitative EEG (qEEG) in tracking recovery of attention/working memory among patients with traumatic brain injuries (TBI) during subacute neurorehabilitation.

Subjects

Twelve individuals with moderate to severe traumatic brain injuries who were receiving inpatient neurorehabilitation in a university-based hospital and who met inclusion criteria participated. Twelve carefully matched healthy control subjects also participated.

Methods

TBI subjects were administered a battery of neuropsychological tests and a quantitative EEG evaluation every two weeks, from the time of enrollment to the time of discharge. Here, we focus on the Digit Span test from the Wechsler Adult Intelligence Scale-IV, which includes measures of selective attention and auditory working memory. The neuropsychological tests and the EEGs were obtained within two days of one another. Control subjects took the same battery of tests and EEGs on two separate occasions, separated by two weeks.

Analysis

Linear regressions were performed for each digit span subtest and relative power within each of the four traditional EEG frequency bands averaged from four cortical regions—left frontal, right frontal, left posterior and right posterior.

Results

Significant relationships between relative power and digit span were found for patients and controls. For patients, decreases in delta and theta, and increases in alpha accompanied improved performance. Increases in alpha were associated with improvements for controls, while decreases in beta from the left posterior region were associated with improved test scores.

Conclusions

QEEG measures of relative power were meaningfully associated with performance on tests of attention/working memory for patients and controls. Decreases in slow activity and increases in alpha accompanied recovery of attention following TBI. QEEG appears to be a valid marker of

recovery of attentional functions, and may be useful as dependent measure in studies of novel interventions or in guiding neuromodulation treatments.

Ulam, F., Richards, L., Shelton, C., Davis, L., Fregni, F. and Higgins, K. 2012 "Thalamocortical Dysrhythmia in Traumatic Brain Injury: EEG-based Evidence during Subacute Rehabilitation." Under review.

No conflicts of interest.

10:50 AM–11:20 AM

LORETA Z Score Neurofeedback in the Treatment of Veterans with PTSD and TBI

Dale Foster
Katherine Veazey-Morris

War exposes soldiers to multiple traumas, both physiological and psychological. Many veterans return from their tours of duty suffering from both traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD). The complex and idiosyncratic nature of such injuries often results in treatment resistant symptoms. This case series reviews eight cases in which an electroencephalographic normative database functional network symptom checklist match approach to treatment of veterans with both TBI and PTSD was used. Method: 19 channel qEEG data were acquired using Deymed Truscan and analyzed using NeuroGuide and the Thatcher Lifespan Normative database. A symptom checklist match was constructed matching the individual's symptoms with their abnormal functional neural network metrics. Subjects were then trained with LORETA Z Score neurofeedback with the goal of normalizing the EEG power, phase and coherence metrics that were likely responsible for their symptoms based on the neuroimaging literature. Results were remarkable in most cases with symptoms decreasing up to ten percent per session even in cases when the symptoms had been persistent and stable for years. However, in the cases where the most psychotropic medication was involved the results were still positive but slower. This functional network, symptom checklist approach to training appears to offer the best available approach to the treatment of complex cases of TBI and PTSD.

Schneiderman, A. I., Baver, E. R., & Kang, H. K. (2008) Understanding Sequelae of Injury Mechanisms and Mild Traumatic Brain Injury Incurred during the Conflicts in Iraq and Afghanistan: Persistent Postconcussive Symptoms and Posttraumatic Stress Disorder. American Journal of Epidemiology, 167: 1446–1454.

Thatcher, R. W. (2011) Neuropsychiatry and Quantitative Electroencephalography (qEEG) in the 21st Century. Neuropsychiatry, 1 (5):495–514.

Thatcher, R. W. (February 2013) Handbook of Quantitative Electroencephalography and EEG Biofeedback. ANIpublishing Co: eBook Edition v1.0.7

There are no financial or commercial ties between the authors and the products described in this presentation. The authors neither advocate nor promote the acquisition of TBI or PTSD.

10:20 AM–11:20 AM

The Relation between Memory Improvement and QEEG Changes in Three Clinical Groups as a Result of EEG Biofeedback Treatment

Kirtley Thornton, PhD

It is important to understand the relation between changes in the quantitative EEG (QEEG) variables and memory changes as a result of the EEG biofeedback treatment. With this goal in

mind the senior author reviewed his clinical files from the last 5 years and examined the QEEG data addressing relative power and coherence changes and memory (auditory and reading) improvements. The groups involved included 1) normal individuals wanting to improve their cognitive functioning; 2) traumatic brain injured (TBI) subjects; 3) + 4) subjects who can best be classified as having a Specific Learning Disability (SLD). The SLD group was divided between those who are 3) over the age of 14 (adults) and those who are 4) below the age of 14 (children) in order to reference the appropriate age related normative group values.

The analysis revealed significant improvements in auditory and reading memory across all groups as well as changes on the QEEG variables. All of the groups were performing above the normative reference group on measures of auditory and reading memory in terms of percentage differences (24% to 97%) and standard deviations (SD) (+1.28 to 1.85). The average auditory memory SD improvement was +1.52, while the average percentage change was 82% For the reading task the average memory SD improvement was 1.38, while the percentage improvement was 154%. The experimental group was performing 1.66 SD (68%) above the control group on auditory memory and .90 SD (52%) above the control group on reading memory measures.

For the QEEG variables the average raw value of the Spectral Correlation Coefficient (SCC) change for alpha was 6.1 points (2.09 SD), for SCC beta1 (13–32 Hz) 6.53 points (1.81 SD) and for beta2 (32–64 Hz) 7.5 points (1.77 SD). The changes on the relative power measures were less dramatic, albeit significant too many references for the limit of this section a commercial interest is in the process of being formed

11:30 AM–12:20 PM

INVITED SPEAKER

William Cullinan, PhD

12:30 PM–1:30 PM

KEYNOTE SPEAKER

Lorenzo Cohen, PhD

2:00 PM–3:00 PM

SMALL GROUP DISCUSSION

Group discussion on Addictions with Neurofeedback

Richard E. Davis

Managing Neurofeedback and Medications

Michael Cohen

ISNR Research Update

Cindy Kerson

Integrating Neurofeedback into a Psychological Practice

Amber Fasula, PsyD, BCN

3:15 PM–6:30 PM

WORKSHOP 1

Neurofeedback Intermediate—Advanced (BCIA Review Course)

Lynda Thompson
Michael Thompson

This workshop covers areas from the BCIA blueprint of knowledge and skills, information relevant to all neurofeedback practitioners. Basic definitions and descriptions will be discussed. It will cover the highlights concerning the history of neurofeedback, research criteria for determining efficacy, efficacy levels of various disorders treated with NFB, basic neurophysiology & neuroanatomy (very brief) as these apply to assessment for biofeedback interventions, source of the electroencephalogram (EEG), instrumentation, procedures for assessment and intervention. It additionally comments on adjunctive techniques, including biofeedback and relaxation.

Thompson, M. and Thompson, L., (2003), The Neurofeedback Book: An Introduction to Basic Concepts in Applied Psychophysiology, Association for Applied Psychophysiology, Wheat Ridge, Colorado.

Campbell, Neil, Reece, Jane, Mitchell, Lauren, Biology, 5th Edition, Addison Wesley Longman, Inc. 1999, page 971 of Chapter 48 Nervous Systems pp 950–991

Schwarz, Biofeedback: A Practitioner's Guide, 1997

Thompson L., Thompson M., (1998), Neurofeedback Combined with Training in Metacognitive Strategies: Effectiveness in Students with ADD, Applied Psychophysiology and Biofeedback, Vol. 23, No. 4

Fisch, Bruce J., (1999) Fisch and Spehlmann's EEG Primer, Basic Principles of Digital and Analog EEG, third revised and enlarged edition, Elsevier, NY.

Baehr, Elsa, Rosenfeld, J.P., Baehr, R., Earnst, C., (1999) Clinical use of an alpha asymmetry neurofeedback protocol in the treatment of mood disorders in Quantitative EEG and Neurofeedback, James R. Evans and Andrew Abarbanel, Academic Press, NY.)

Lynda Thompson is co-author of THE A.D.D. BOOK

Michael and Lynda Thompson are co-authors of THE NEUROFEEDBACK BOOK

It is likely that these books may be on sale at the meeting. The authors will state their interest in these books at the workshop.

WORKSHOP 2

qEEG and EEG Basics

Michael Cohen

You can never know enough about EEGs and qEEGs.

We are going to review SLOWLY as many EEGs and qEEGs as time allows in the workshop and include discussion of what we see in the raw EEG, in the qEEG and what protocol options mike make sense.

In many workshops, the numbers and logic sometimes flow by quickly. This gives us a chance to discuss and learn what the basics are.

Ed Hamlin
Randy Lyle
Ed Jacobs
Richard Davis

Sometimes I receive referral fees from BrainPaint, BrainMaster, and LENS.

WORKSHOP 3

QEEG, Neurofeedback & Biofeedback Applications with Olympic, Professional & Amateur Athletes and those with Concussions & ADD

Michael Linden, PhD
Lindsay Shaw
Wes Sime
Alan Strohmayer

Interest in the use of QEEG, Neurofeedback & Biofeedback in Sport Psychology is increasing in both professional and Olympic sports. We will explain the various types of Neurofeedback & Biofeedback being used and how to individually integrate these. We will present how QEEG are being used to both diagnose the presence of concussion, and to monitor recovery. We will review the use of Neurofeedback to treat post-concussion symptoms and improve recovery. The use of QEEG to help diagnosis athletes and QEEG Guided Neurofeedback with athletes with ADD & Asperger's will be discussed. We will instruct and demonstrate the use of an integration of neurofeedback & biofeedback for golfers.

Duff, J. (2004). The usefulness of quantitative EEG (qEEG) and neurotherapy in the assessment and treatment of post-concussion syndrome. Clinical EEG and Neuroscience, 35 (4), 198–209.

Arns, M., Kleinnijenhuis, M., Fallahpour, K., & Breteler R. (2008). Golf

performance enhancement and real-life neurofeedback training using personalized event-locked EEG profiles. Journal of Neurotherapy, 11(4), 11–18.

Crews, D. J., & Landers, D. M. (1993). Electroencephalographic measures of attentional patterns prior to the golf putt. Medical Science & Sports Exercise, 25(1), 116–126.

McCrea, M., Prichep, L., Powell, M., Chabot, R. & Barr, W. (2010). Acute effects and recovery after sport-related concussion: A neurocognitive and quantitative brain electrical activity study. Journal of Head Trauma Rehabilitation, 25 (4), 283–292.

Kutcher, J., McCrory, P., Davis, G., Ptito, A., Meeuwisse, W.H., & Broglio, S.P. (2013). What evidence exists for new strategies or technologies in the diagnosis of sports concussion and assessment of recovery? British Journal of Sports Medicine, 47, 299–303.

Sime, W. E., Allen, T. W., & Fazzano, C. (2001). Optimal functioning in sport psychology: Helping athletes find their zone of excellence. Biofeedback, 28(5), 23 25

Strack, B.; Linden, M. & Wilson, S. (2011). Biofeedback and Neurofeedback Applications in Sport Psychology. Association of Applied Psychophysiology & Biofeedback, Wheat Ridge, Co.

Wilson, V. E., Ainsworth, M., & Bird, E. I. (1985). Assessment of attentional abilities in male athletes. International Journal of Sport Psychology, 16, 296–306.

Michael Linden receives a minimal royalty from any of the Sport Psychology books he co-authored.

No other interests.

WORKSHOP 4

NeuroGuide and BrainSurfer Real-Time 3D EEG NeuroImaging for Assessment and Treatment

Robert Thatcher

Standards of EEG recording and analyses will be discussed. Hands on demonstrations of how to obtain artifact free EEG and test re-test reliability greater than 0.9 will be taught. Comparisons to age matched normative data and Z score calculations will be demonstrated. How to minimize medication effects and identify focal brain dysregulation will be demonstrated. How to write a clinic report will be covered. How to link symptoms to dysregulation in neural networks will be presented and how to design neurofeedback protocols based on linking symptoms to dysregulated brain networks will be covered. Real-time 3D neural network dynamics using BrainSurfer will be shown and used for assessment and neurofeedback. Pre vs. post treatment statistics with color topographic maps will also be covered.

I am president of Applied Neuroscience, Inc.

WORKSHOP 5

Swingle ClinicalQ: An Effective Assessment Alternative

Ivette Bledsoe

This hands-on workshop will cover the history rationale, and proper utilization of the Swingle ClinicalQ. The ClinicalQ, developed by Paul Swingle, Ph.D over 20 years ago, is a very efficient intake assessment methodology. It can provide rapid diagnostic data that permits remarkably accurate EEG descriptions of the client's complaints. Participants will learn how to administer a ClinicalQ utilizing a two-channel amplifier. The BrainMaster Atlantis will be used for demonstration purposes, but techniques utilizing other instrumentation platforms will be covered. Resources will also be provided on how to access other platforms.

Donaldson, M., Donaldson, C., C.S., Mueller, H.H. & Sella, G. (2003). QEEG patterns, psychological status and pain reports of fibromyalgia sufferers. American Journal of Pain Management, 13(2), 1–27.

Doppelmayr, M., and Klimesch, W., (2003) EEG and intelligence. Journal of Neurotherapy, 7, 45–46 (Abstract).

Gunkelman, J. (2006) Transcend the DSM using phenotypes. Biofeedback, 34, 95–98. Hammond, D.C. (2006) Quantitative electroencephalography patterns associated with medical conditions. Biofeedback, 34, 87–94.

Henriques, J.B., and Davidson, R.J. (1990) Regional brain electrical asymmetries discriminate between previously depressed and healthy control subjects. Journal of Abnormal Psychology, 99, 22–31.

Kang, D., Davidson, R.J., Coe, L.C., Wheeler, R.E. and Tomarken, A.J. (1991) Frontal brain asymmetry and immune function. Behavioral Neuroscience, 105(6), 860–869.

Lubar, J.F. (1991) Discourse on the development of EEG diagnostics and biofeedback treatment for attention-deficit/hyperactivity disorders. Biofeedback and Self-Regulation, 16, 201–225.

Schwartz, R.B., Komaroff, A.L., Garada, B.M., Gleit, M.,Doolittle, T.H., Bates, D.W., Vasily, R.G., Holman, B.L.(1994) SPECT imaging of the brain: Comparison of findings in patients with chronic fatigue syndrome, AIDS dementia complex, and major unipolar depression, American Journal of Roentgenology, 162, 943–951.

Swingle, P.G. (2001). Parameters associated with the rapid neurotherapeutic treatment of Common ADD

Swingle, P.G. (2008) Biofeedback for the Brain. New Brunswick, N.J., Rutgers University Press.

Yutaka, I., Teicher, M.H., Glod, R.N., & Ackerman, B.S. (1998). Preliminary evidence for aberrant cortical development in abused children. Journal of Neuropsychiatry and Clinical Neurosciences, 10, 298–307.

I have no commercial or financial affiliation with BrainMaster. I am a distributor for Better Physiology CapnoTrainer.

WORKSHOP 6

Oxidative Stress, Excitotoxicity and qEEG: Recognizing and Compensating for Metabolic Limits Compromising Neurofeedback Interventions.

Richard Soutar, PhD
James Hopson

Stress has been clearly documented to have a major impact on cerebral functioning as well as on the entire biological system (Sapolsky, 1999) and contributes to extreme forms of liver, adrenal, thyroid and gastrointestinal dysfunction. The inability of these metabolic systems to self-regulate directly impacts electrophysiological functions (Tops, 2006). Concurrently stressors can also contribute to severe deficiencies in vitamins and minerals that additionally generate pronounced and severe changes in EEG (Niedermeyer & Lopes da Silva, 2005). A wide range of metabolic conditions can also result from stressors such as air pollution (Lundberg, 1996), food packaging pollutants (Kodavanti et al, 2010), food allergies (Brown et al, 2012) and food additives (MacFabe et al, 2011; Serlalini, 2012). In addition to nutritional deficiencies (LaFourcade et al, 2011; Anglin et al 2013) these factors have been documented to be associated with anxiety, depression and deficiencies in cognitive function (Wimalasena, 2004) that are measurable on psychometrics and consequently reflected in contemporary qEEG technologies (Fontani, 2005; Tops et al 2006; Cosford, 2006). Many clinicians have begun to recognize and report qEEG patterns associated with milder forms of metabolic disorder which appear to limit or reduce responsivity to NFB training. Using models of oxidative stress (Lin et al, 2006) and excitotoxicity, mechanisms of action resulting from environmental sources will be outlined as well as potential resulting EEG signatures. Identifying credible and accurate measures to assess these conditions, relating them to qEEG and neurofeedback as well as identifying other health practitioners with viable interventions is a growing challenge in the clinical setting. This workshop will review the research related to these concerns and present effective strategies for dealing with them.

Amodio, P., & Gatta, A. (2005). Neurophysiological investigation of hepatic encephalopathy. Metabolic brain disease, 20(4), 369–379.

Anglin, R. E., Samaan, Z., Walter, S. D., & McDonald, S. D. (2013). Vitamin D deficiency and depression in adults: systematic review and meta-analysis. The British Journal of Psychiatry, 202(2), 100–107.

Brown, A. C. (2012). Gluten sensitivity: problems of an emerging condition separate from celiac disease. Expert Review of Gastroenterology & Hepatology, 6(1), 43–55.

Cosford, R. (2006). ADHD diet and the brain. The general practitioner. Complementary Medicine.62–67.

Fontani, G., Corradeschi, F., Felici, A., Alfatti, F., Migliorini, S., & Lodi, L. (2005). Cognitive and physiological effects of Omega-3 polyunsaturated fatty acid supplementation in healthy subjects. European journal of clinical investigation, 35(11), 691–699.

Kodavanti, Prasada Rao S., Curras-Collazo, Margarita C. (2010). Neuroendocrine actions of organohalogens: Thyroid hormones, arginine vasopressin, and neuroplasticity. Frontiers in Neuroendocrinology, Vol. 31, Issue 4, pp 479–496

Lafourcade, M., Larrieu, T., Mato, S., Duffaud, A., Sepers, M., Matias, I., & Manzoni, O. J. (2011). Nutritional omega-3 deficiency abolishes endocannabinoid-mediated neuronal functions. Nature neuroscience, 14(3), 345–350.

Lundberg, A. (1996). Psychiatric aspects of air pollution. Otolaryngology—Head and Neck Surgery, 114(2), 227–231.

Owner of New Mind Database Analysis System www.newmindmaps.com.

7:00 PM–9:30 PM

Poster Session and Welcome Reception

Friday, 9/20/2013

8:00 AM–8:30 AM

Coherence Training for ASD: Enduring Effects Beyond 3 Years

Robert Coben, PhD

Follow-up studies of neurofeedback outcome after the active phase of treatment has ended are rare. While some studies have examined outcome 3–6 months following treatment (i.e., Gevensleben et al., 2010; Leins, Goth, Hinterberger, Klinger, Rumpf & Strehl, 2007), longer term follow-up periods than this are scant in the literature. Coben, Arns, and Kouijzer (2011) have reported on follow-up periods up to 6 months in ADHD and one year (Kouijzer et al., 2009) for children with ASD. Interestingly, in the work that has been done to date it seems that the benefits of therapy are maintained and may even enhance over time. In this talk, I will present data from children with ASD treated with neurofeedback including a follow-up at 3 years and a single case study with follow-up period at 8 years. These findings further establish the long-term benefits of neurofeedback.

Coben, R., Arns, M. & Kouijzer, M.E.J. (2011). Enduring effects of neurofeedback in children. In Neurofeedback and neuromodulation techniques and applications, pp. 403–423. London: Elsevier.

Gevensleben, H., Holl. B., Albrecht, B., Schlamp, D., Kratz, O., et al. (2010). Neurofeedback training in children with ADHD: 6-month follow-up of a randomized controlled trial. European Child and Adolescent Psychiatry, 19 (9), 715–724.

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.

Leins, U., Goth, G., Hinterberger, T., Klinger, C., Rumpf, N., & Strehl, U. (2007). Neurofeedback for children with ADHD: A comparison of SCP and theta/beta protocols. Applied Psychophysiology and Biofeedback, 32 (2), 73–88.

The presenter is the co-founder of a consulting business providing services to this field.

8:30 AM–9:00 AM

Efficacy of Cranial Electrotherapy Stimulation for Anxiety, PTSD, Insomnia and Depression: Military Service Members and Veterans Self Report

Jeff Marksberry

Cranial electrotherapy stimulation (CES) is prescribed for Service Members and Veterans as a complementary or alternative medicine modality for the treatment of anxiety, PTSD, insomnia and depression. The purpose of this study was to examine Service Members' and Veterans' perceptions of the effectiveness and safety of CES treatment. Service Members and Veterans (N=1,514) who had obtained a CES device through the Department of Defense or Veterans Affairs Medical Center from 2006–2011 were invited to participate in the web based survey via email. One hundred fifty-two participants returned questionnaires. Data were analyzed using descriptive statistics. The majority of participants reported substantial clinical improvement (â?¥ 50%) from using CES: anxiety (66.7%), PTSD (62.5%), insomnia (65.3%) and depression (53.9%). Respondents also perceived CES to be safe (99.0%). Those individuals who were not taking any prescription medication rated CES more effective than the combined CES and prescription medication group. CES provides Service Members and Veterans with a safe, non-invasive, non-drug, easy to use treatment for anxiety, PTSD, insomnia and depression that can be used in the clinical setting or self-directed at home.

I work as the Science and Education director for Electromedical Products, International.

8:00 AM–9:00 AM

Neurofeedback for Early Psychosis: A Theoretical Rationale for Cognitive Rehabilitation

Thomas Cothran ***Lindsay Sheehan*** ***Christopher Haak***
Jonathon Larson, EdD ***Bethany Apa***

Cognitive impairments in schizophrenia are the strongest predictor of functional outcomes, are relatively unaffected by current pharmacological interventions, and are present prior to the first psychotic episode. Deficits in cognitive control appear to be a core characteristic of schizophrenia. Cognitive control refers to processes that allow information processing and behavior to vary adaptively in the moment. The construct encompasses a broad range of mental operations including working memory, contextual processing, and attention allocation. It appears related to a general-purpose, superordinate network with critical nodes in the dorsolateral prefrontal cortex (DLPFC), anterior cingulate cortex (ACC), and mediodorsal nucleus of the thalamus (MDN). Recent evidence suggests that impairments in cognitive control result from disruption in the coordination of activity across brain regions that may stem from deficits in the development of normal brain connectivity. Abnormalities in neural synchrony are present in schizophrenia. Basic research suggests that deficits in neural synchrony underlie the development of deficient connectivity within and between distributed neural networks. During adolescent brain maturation a shift occurs from local to global coordination of brain states. In schizophrenia, nascent connectivity issues during childhood, that may be limited to small-world networks, are then unable to support the shift to higher-order organization; resulting in disability. Precise neural synchronization between neural assemblies appears to promote long-term potentiation and the development of cortical networks. The absence of such

synchronization may produce depression in the connection between neurons. Deficits in synchrony could plausibly explain the specific dysfunction between DLPFC, ACC, and MDN that underlie impairments in cognitive control. This presentation will review neurofeedback studies for schizophrenia and a neurodevelopmental model of the disorder. Finally, a rationale for the use of neurofeedback in treating cognitive impairments in early psychosis within the context of a clinical staging model will be discussed.

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N/A

9:10 AM–9:40 AM

Neuromodulation of EEG LORETA connectivity measures to support abstinence from alcohol and drugs.

Jack Johnstone, PhD
George Fein, PhD

Alcohol dependence is a disorder with an impulsive and compulsive drive towards alcohol consumption and an inability to control or inhibit alcohol consumption. Neuroimaging studies suggest that these behavioral components correspond to an increased involvement of regions that mediate appetitive drive and reduced involvement of regions that mediate executive inhibitory control. We have recently shown using functional connectivity fMRI that, compared to non-substance abusing controls, long-term abstinent alcoholics evidence: (a) decreased synchrony of limbic reward regions (e.g., caudate and thalamus) with both the Anterior

Cingulate Cortex (ACC) and the Nucleus Acumbens (NAcc) and (b) increased synchrony of executive control regions (e.g., dorsolateral prefrontal cortex) with both the NAcc and the subgenual ACC. These results are graded with duration of abstinence and are present both in cross sectional and longitudinal studies. These results are consistent with a compensatory mechanism that develops with abstinence such that at rest decision making networks are primed to be less responsive to appetitive drive stimuli and ready to exhibit inhibitory control. Facilitation of these adaptive changes may show promise as a treatment for individuals pursuing abstinence from alcohol and drugs. Studies to be reported here are extending these findings from fMRI to EEG using LORETA connectivity analysis with the goal of developing a neurofeedback treatment supporting long-term abstinence from alcohol and drugs.

Camchonga, J., Stengerb, V.A, & Fein, G. Resting State Synchrony in Long-Term Abstinent Alcoholics with Versus without Comorbid Drug Dependence. April 2013 Drug and Alcohol Dependence, In Press.

Dr, Johnstone id the president of Q-Metrx, Inc. a small business that provides EEG analysis and interpretation including support for clinical trial s using EEG techniques. Dr. Fein is president of Neurobehavioral Research, Inc. a company that specializes in using EEG, structural MRI and neuropsychological and behavior assessment to study the effects of drugs and diseases on brain structure and function.

9:40 AM–10:10 AM

Continuous Performance Test Results following Neurofeedback and the Efficacy of Frequency Optimization using Bipolar training Montages

John Putman

The existence of Infra low (or Very Slow) frequencies in the brain has been known for many years but their relevance to the EEG has only recently begun to be understood. (Very slow frequencies are defined as those from 0.1–0.01 or lower). Although their origin is not completely clear, evidence suggests that they play a fundamental role in the management of cortical dynamics. These low frequency oscillations also play a role in attention where lower amplitudes of infra-low activity are correlated with attention deficits (Helps, S. et. al., 2007). In addition, shifts in slow cortical potentials seem to precede the onset of seizures (O'Leary and Goldring, 2007).

NA

9:10 AM–10:10 AM

Neurotherapy for Sustainable Addiction Recovery: An Integrated Model

Judith Ann Miller

Three decades of research and development call for a state-of-the-science addiction recovery model. This paper introduces An Integrated Solution for Addiction Recovery.

The purpose of this paper is threefold: 1) To present a historical perspective on the advent of neuroscience adapted for addiction treatment; 2) To present an analytical case series report

that reveals neuro-therapy to be a promising therapy for addiction solutions; and 3) To present an Integrated Model for Sustainable Addiction Recovery.

The research reported in this paper is based on a 2-year progress report (2011 to 2012) N of 100 and (2012–2013) N of 100 addicted clients of an addiction recovery program. Following neurotherapy, 100% of the 200 clients experienced profound relief from the symptoms of addiction (depression, anxiety, insomnia, PTSD, and dual diagnosis) suffered prior to treatment.

A commercial interest is related informationally and educationally to the Alliance for Addiction Solutions and perhaps financially to LENS (Low Energy Neurofeedback Systems).

10:20 AM–10:50 AM

Exercise for Attention: QEEG, ERP and Behavioral Evidence

Lindsay Thornton
Alex Thornton

The link between exercise and cognition has been established (Smith et al. 2010; Chang et al. 2012). Effects tend to be small but significant, and tend to occur in executive function, memory, and attention domains. Although there have been many studies that have examined cognitive function in adults, purely cognitive studies of exercise and cognition in children are rare (Best, 2010). There are many studies of children in the context of academic performance. A review of school studies is contained in a recent CDC white paper (CDC, 2010): exercise in school generally has a positive effect or no effect on academic and cognitive performance. ADHD specific research on exercise is scarce. Archer & Kostrzewa (2012) suggests that ADHD may be improved by exercise, noting that ADHD individuals tend to have deficits in many areas that are improved by exercise (Halperin & Healey 2011). Preliminary evidence suggests that ADHD children may demonstrate improved executive function after a long-term exercise program (Gapin et al. 2011). A recent study (Pontifex et al. 2013) has demonstrated positive effects of a single bout of exercise on task switching and P3 component in ADHD, building on previous work (Pontifex et al. 2011) showing differences in P3 latency and amplitude across high and low fit children. In the present study, students (N=55) were recruited to participate in a month long before school cycling program. 22 unmedicated students had an ADHD diagnosis or had reported attentional difficulties and participated in QEEG and ERPs at pre and post measure. Decreases in theta, mu and alpha were observed at various sites across the cortex. P3b latency and amplitude improved. While the sample size is small, this study provides evidence of neuroeletric changes towards the norm in unmedicated children with attention deficits at baseline, and improved attentional behaviors.

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This project was funded by Specialized Bikes.

10:50 AM–11:20 AM

The Impact of Audio Environment on Attention

Charles Wasserman

This study examined the relationship between audio environment and attention. While background noise has generally been assumed to be distracting, recent research has suggested that the opposite may be true. Twenty-seven participants' attention was assessed using a continuous performance test under three different noise conditions: exposure to ambient noise (the control), pink noise, and an audio track from television. Results: Participant's attention was significantly improved in pink noise as compared to the ambient noise, while no differences were found between ambient and television conditions. These findings suggest that not all noise is created equal when it comes to paying attention.

Charles Wasserman is currently an employee of Thought Technology Ltd. At the time this research was conducted Mr. Wasserman was a student at The University of Hartford, and had no affiliation with Thought Technology Ltd.

10:20 AM–11:20 AM

Using Neurofeedback in a Forward Operating Base: Afghanistan July 2011–July 2012

Michael Villanueva, PhD
Colin Rader

This presentation discusses lessons learned from implementing Neurofeedback within an Afghanistan Forward Operating Base. Four perspectives are addressed: Clinical, Combat Operations, Program, and Medical. Clinically, Neurofeedback proved effective in (a) rapidly relieving operational stress symptoms, (b) facilitating personal management of Axis I and II symptoms and behaviors, including easing signature mTBI symptoms, and (c) reducing recovery time from strenuous Physical Training. Operationally, Neurofeedback delivered both unanticipated and unexpected benefits: Senior Officers used Alpha Theta (AT) sessions to facilitate visualization in mission planning, Intelligence Officers used AT to scaffold perceptual abilities, and patrol leaders used AT and Infra-low Neurofeedback sessions to facilitate

adjustment from long patrol hours noting less distractibility, less irritation, and less fatigue—overall, a rapid return to "baseline" after kinetic patrols. Programmatically, clinic utilization rates of Neurofeedback by Soldiers over the course of the 12 month deployment suggests the NF "training the brain" paradigm to be congruent with Army values in that sessions were viewed as a metric of personal responsibility, a training tool, rather than a behavioral health intervention. This perception may have been key in reducing stigma commonly associated with accessing behavioral health services. Medically, the Battalion Aid Station observed decline in the number of prescriptions issued for sleep and anxiety, increased mood stabilization in Soldiers, and increased cognitive efficiency in key infantry units. Effectiveness of Neurofeedback engendered a closer working relationship with Army and Navy doctors and psychiatrists who monitored psychiatric medications in person or vis a vis telemedicine. Overall, anecdotal evidence from deployment suggests Neurofeedback demonstrates cultural sensitivity to a special population's operational and cultural needs.

Dr. Richard Soutar *Dr. Siegfried Othmer*
Douglas Daily
NA

11:30 AM–12:20 PM

INVITED SPEAKER

Detecting Autism from Spontaneous Brain Activity

Roberto Fernández Galán, PhD[1], Luis García Domínguez, PhD[2], José Luis Pérez Velázquez, PhD[3]*

[1]Case Western Reserve University, School of Medicine, Department of Neurosciences, Cleveland, Ohio, USA
[2]Temerty Centre for Therapeutic Brain Intervention, Centre for Addiction and Mental Health, University of Toronto, Toronto, Ontario, Canada
[3]Neuroscience and Mental Health Programme, Brain and Behaviour Centre, Division of Neurology, Hospital for Sick Children; Institute of Medical Science and Department of Paediatrics, University of Toronto, Toronto, Ontario, Canada
*Corresponding Author and Speaker: rfgalan@case.edu

Abstract
Along with the study of brain activity evoked by external stimuli, an increased interest in the research of background, “noisy” brain activity is fast developing in current neuroscience. It is becoming apparent that this “resting-state” activity is a major factor determining other, more particular, responses to stimuli and hence it can be argued that background activity carries important information used by the nervous systems for adaptive behaviors. In this context, we have investigated spontaneous brain activity recorded with magnetoencephalography (MEG) in children with autism spectrum disorder (ASD) and non-autistic children. Using a dynamical model of brain dynamics, we resolved the interactions between brain regions, i.e. the brain’s functional connectivity, as well as the inputs to the brain in the resting state (background noise); an important component of large-scale neural dynamics that no other method can resolve to date. The analysis reveals significant alterations in both functional brain connectivity and background noise in ASD patients. The dominant connectivity change in ASD relative to control shows enhanced functional excitation from occipital to frontal areas. Background noise in ASD

patients is spatially correlated over wide areas, as opposed to control children, where areas driven by correlated noise form smaller patches. The spatial complexity of the inputs is indeed significantly lower in ASD subjects. Enhanced occipital-frontal excitation may be attributed to changes in white matter density in ASD, as suggested in previous studies, whereas long-range spatial correlations in the background noise may result from less specificity (or more promiscuity) of thalamo-cortical projections. In addition, we also computed the input-output information gain or relative entropy, between the background noise (input) and the brain's ongoing activity (output) in children with Asperger's syndrome compared to controls. The information gain was significantly higher in autistic relative to non-autistic children. This suggests that more information is produced in the brains of subjects with autism at rest. We propose that the excessive production of information in the absence of relevant sensory stimuli or attention to external cues underlies the cognitive differences between individuals with and without autism. We conclude that the information gain in the brain's resting state provides quantitative evidence for perhaps the most typical characteristic in autism: withdrawal into one's inner world. Altogether these results demonstrate the promising potential of our approach as an efficient biomarker for altered brain dynamics associated with autism.

Benefits to the ISNR

The fact that specific patterns of brain activity are characteristic of a given cognitive phenotype should be of major interest for the neurofeedback conference attendees. Indeed, one implicit assumption of neurofeedback as a therapeutic tool is that brain activity does not only depend on the current state of awareness but also on the specific traits of a cognitive phenotype, such as autism, or attention deficit disorders. In my presentation I will show that autism can be detected from patterns of brain activity that are significantly different from those of typically developing brains.

The authors have no conflicts of interest.

12:30 PM–1:30 PM

KEYNOTE SPEAKER

Insights into Nutrition, Genes, and Brain Health

Margaret Joy Dauncey PhD, ScD, FSB

Wolfson College, University of Cambridge, UK
E-mail: mjd4@cam.ac.uk

Abstract

Nutrition affects brain structure and function throughout the life cycle, with profound implications for health and disease. These effects are mediated by changes in expression of multiple genes and associated regulatory networks. Moreover, responses to nutrition are in turn affected by individual variability in target genes, including relatively rare mutations, and relatively common single nucleotide polymorphisms (SNPs) and copy number variants (CNVs). An important layer of regulation is provided by the epigenome; nutrition is one of many epigenetic regulators that modify gene expression without changes in DNA sequence.

Recent advances in genomics and epigenomics are helping to elucidate mechanisms by which nutrition-gene interactions influence mental health and numerous disorders including depression, anxiety, eating disorders, autism, schizophrenia, and dementia. This presentation focuses on integration of knowledge on nutrition, genes, and brain health. First, a short

overview is given on nutrition-gene interactions, including the role of genetic variability in determining responses to nutrition, and the importance of epigenetics in health and disease. The major part of the presentation then provides insights into the importance of energy status to mental health and well-being, and to neurodevelopmental and neurodegenerative disorders. Many nutrients, foods and diets are implicated in brain health and especially important are the effects of energy status i.e. energy intake, physical activity and energy metabolism. Optimal energy intake and physical activity have beneficial effects on cognitive function and reduce the risk of depression and Alzheimer's disease. By contrast, overnutrition and obesity are linked with increased risk of depression and dementia. Effects are related to age and stage of development. For example, prenatal undernutrition increases the risk of brain disorders, including cognitive deficits and schizophrenia, in adult life. The actions of energy status are mediated by multiple signaling molecules, including growth factors such as brain-derived neurotrophic factor (BDNF) that affects neuronal function, synaptic plasticity, and neurogenesis. Epigenetic mechanisms are often involved e.g. DNA methylation and histone modifications. Moreover, variations in multiple target genes including BDNF and apolipoprotein E (ApoE) markedly alter individual responses to nutrition and susceptibility to disease.

Many brain disorders result from a complex network of interactions between numerous genetic and environmental factors, including food intake, physical activity, stress, social interactions, and infections. The personal, social, and economic costs of sub-optimal brain health are immense. Future advances in understanding the complex interactions between nutrition, genes, and the brain should provide new approaches to prevention and treatment of multiple devastating brain disorders, and to optimization of brain health and quality of life.

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Brief summary of the presentation

This presentation provides insights into the critical importance of nutrition-gene interactions in optimal and sub-optimal brain health throughout the life cycle. Many nutrients, foods and diets are implicated in brain health and especially important is the role of energy status i.e. energy intake, physical activity, energy metabolism. Therefore, the major focus of the presentation is on advances in elucidating the mechanisms by which energy status and genes interact to affect brain structure and function. The relevance of current and future advances in nutrition, genes, and brain health to mental well-being, and neuropsychiatric and neurological disorders is discussed.

Justification for the presentation, including anticipated benefits to the ISNR Annual Conference attendees

This presentation will be highly relevant and useful to the ISNR 2013 Conference attendees, including physicians, psychologists, mental health practitioners, researchers, educators, and nurses, all with an interest in applied neurosciences. By providing insights into mechanisms underlying nutrition-gene interactions and brain health, the presentation will:

- Increase understanding of mechanisms underlying immediate and long-term effects of nutrition on mental health and brain disorders.
- Demonstrate the need to account for nutritional status and food intake in studies of brain function e.g. control of energy intake in neurofeedback research on activity and exercise, and in assessment of mental health.
- Highlight potential and future possibilities for optimizing brain health, and preventing and treating disorders such as depression, anxiety, autism, schizophrenia, and dementia.

Commercial Interests

No commercial interests.

2:00 PM–3:00 PM

Small Group Discussion

Training with High Performance Athletes

Leslie Sherlin, PhD

BCIA Certification and Re-Certification

Judy Crawford

Marketing your Practice

Jim Kowal

Neurofeedback and Neuroimaging in Complimentary Medicine

Sarah Prinsloo

Military Co-Morbid PTSD and mTBI

Dave Hagedorn, PhD, BCIA-EEG

3:00 PM–6:00 PM

BCIA Certification Exam—For all preapproved applicants

Questions, please contact Judy Crawford: jcrawford@bcia.org

QEEG Certification Exam

For further information please contact: qeegcb@gmail.com

3:15 PM–6:30 PM

WORKSHOP 7

The Benefits of Incorporating Neuropsychological Measures Into Your Practice: Assessment, Research, and Progress Tracking

Thomas Cothran *Christopher Haak* *Jonathon Larson, EdD.*

Research continues to increase empirical support for Neurofeedback Therapy (NFT) efficacy and effectiveness. However, a disadvantage of NFT reported by neurofeedback practitioners is that it is not well understood among non-NFT clinicians, many of whom do not understand how changes in EEG activity relate to functional outcomes. We propose that incorporating neuropsychological measures into the NFT process may have many benefits in terms of overall treatment tracking and communicating positive results to non-NFT clinicians. We will provide a basic introduction to psychometric theory and specifically classical testing theory. We will then present a variety of measures related to attention, executive functioning, and mood. These cognitive and affective domains will be discussed because deficits in these areas are common across ADHD, anxiety, traumatic brain injury, substance use disorders, and depression. These measures are not only useful in tracking treatment outcomes but are also used by numerous different groups of mental health professionals to gain and communicate information about symptoms. For each measure will discuss the appropriate qualification level of administering the test, test-retest reliability, internal reliability, sensitivity to impairment, evidence of ecological validity, and administration time. We recommend that practicing professionals learn about, become familiar with, and use these measures in their practice. By doing so this will allow them to use measures to that will provide convergent demonstration of treatment gains along with quantitative changes in EEG activity. Moreover, these measures can also be used to help increase clients' awareness about where change is occurring in their life.

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N/A

WORKSHOP 8

QEEG and Neurofeedback for Autistic Spectrum Disorder & ADD

Michael Linden, PhD *Jay Gunkelman* *Jamie Pineda, PhD*

This workshop will review the QEEG subtypes of ADD/ADHD, Asperger's, & Autism identified in recent literature. We will discuss methods to obtain an accurate differential diagnosis of ADD & ASD. We will present QEEG recording and Neurofeedback techniques with ADD & ASD. Each presented will review their own research in these areas, including recent publications about QEEG guided medication with ADD, QEEG guided NF with ASD and DTI/fMRI improvements from Neurofeedback with ASD students.

Jay Gunkelman is an owner in BSI, which provided QEEG reporting services in some of the research.

WORKSHOP 9

The Psychopharmacology of ADHD

Fredric Shaffer, BCB

This workshop is designed for biofeedback/neurofeedback practitioners, psychologists, clinical counselors, clinical social workers, marriage and family therapists, nurses, physicians, other health care providers, and optimal performance professionals who work with clients diagnosed with ADHD and treated with stimulant and non-stimulant medication. This workshop will review current neuroscience findings on ADHD, and the mechanisms, side effects, and efficacy of stimulant and non-stimulant drugs.

The presenter has no commercial interests.

WORKSHOP 10

Developmental Disorders: Integrating Clinical Symptoms, Neurophysiology, and Neuroscience in the Formation of Neurofeedback Treatment Plans

Robert Coben, PhD
Anne W Stevens, PhD

Current estimates suggest that anywhere from 3–9% of school-aged children have been diagnosed with some form of Attention Deficit Hyperactivity Disorder (ADHD). In addition, about 10% of the childhood population has been diagnosed with some type of Learning Disability (LD). Autism spectrum disorder has been estimated to occur at alarming rates (CDC, 2012; 1 in 88 children). Taken together, these major neurodevelopmental disorders impacts approximately one out of every five children (Pastor & Reuben, 2008). The economic costs to society based on

these figures has been estimated at least $42 billion per annum (Pelham, Foster, & Robb, 2007). It has been estimated that about 66% of the children diagnosed with ADHD are treated with medication (CDC, 2005). Considering there are no medications FDA approved for the treatment of learning disabilities, this would suggest that of the 20% impacted by ADHD and LD 13.33 % are treated non-pharmacologically. Neurofeedback has shown promise in the treatment of these neurodevelopmental disorders (Arns, de Ridder, Strehl, Breteler, & Coenen, 2009) as they are neurophysiological in nature.

This workshop will focusing on enhancing knowledge about major neurodevelopmental disorders, treatment options, symptom constellations, and neurophysiological mechanisms so participants will be able to start integrating such information in the formation of neurofeedback protocols and treatment plans. The various forms of ADHD, Learning Disabilities and ASD will be discussed.

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Dr Coben is a co-founder of INS, a company that provides consultation services in the field of QEEG, Neuropsychology, and Neuromodulation.

WORKSHOP 11

Using Paralinguistics and Strategic Language in Voice-Moderated Therapeutic Techniques

Tiff Thompson

A change of pace from the traditional workshops and presentations, this workshop is geared towards the conference's psychotherapist and psychologist neurotherapy practitioners. This workshop will draw from research on linguistics, paralinguistics, music, and strategic rhetoric in the use of voice-moderated therapeutic techniques (such as hypnosis, guided imagery, neural linguistic programming, and led meditation) and demonstrate how these techniques and other quantitative research studies point to noteworthy electroencephalographic and neurophysiological outcomes in the subject. This workshop will draw from a series of methods and approaches (such as the Awakened Mind theory by Anna Wise and the Tomatis Listening Program).

This topic will touch upon spiritual themes and will cover the cultivation, methodology, and specific techniques of using voice in neurotherapeutic practice. The topic will educate and inspire attendees to cultivate their own individual means of using of paralinguistics for the

potential inducement of particular brainwave states, strategically using speech, prosody, volume, tone, dialect, and gait.

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No conflicts of interest.

WORKSHOP 12

Clinical Implications of Neurofeedback Paradigms Using sLORETA Regions of Interest

Penijean Gracefire

Providing real time feedback to the brain based on information generated using sLORETA 3D imaging techniques is a new and exciting capability available to practitioners only within the last few years.

As with any groundbreaking approach, time and data are required to develop training methodologies which yield consistent and comprehensible clinical results in daily practice. This workshop will present pre and post data from clinical cases in which only surface training metrics were used to create feedback, cases in which only sLORETA data from a region of interest was used for feedback criteria, and then cases in which surface readings and sLORETA estimates were used in conjunction to provide training feedback.

A critical examination of these three approaches will be conducted with the intent to clarify the differences between providing feedback based on diffuse global neural activation, feedback targeting a focal region and contingent on a very small number of quantitative metrics, and feedback which incorporates both of these methods simultaneously.

The intent of this workshop is to provide a practical framework for clinicians to make decisions regarding how and when to utilize sLORETA ROI training in a daily setting with more efficacy and understanding. Terminology and basic principles related to the material will be reviewed at the beginning of the presentation, so attendees with no prior experience can follow the discussion and understand key points. Protocol designs used in the acquisition of the presented clinical data will be available to workshop attendees at no charge upon request.

All skill and experience levels are welcome.

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No conflicts of interest.

WORKSHOP 13

Infra-Slow Fluctuation Training for Autism Spectrum Disorders

Mark Smith, LCSW

Infra-slow Fluctuation (ISF) training is an emerging method in neuromodulation. This form of EEG biofeedback addresses the lowest energy the brain produces < .1 hertz. ISF neurofeedback is particularly promising for the treatment of the core symptoms of autism.

Growing evidence suggests that the coordination of large-scale cortical networks play a central role in the psychopathology of Autism Spectrum Disorders (Coben & Padolsky 2007, Dominguez et al 2013, Khan et al 2013, Thatcher et al 2009, Uhlhaas & Singer 2012). Infra-slow oscillations (ISO) on the scale of seconds to several minutes have been directly implicated in the organization of neural networks. Recently, ISO researchers (Palva & Palva 2012) have labeled this low energy the “Ultradian Rhythm” and dubbed it the “superstructure” of the brain whose function is the coordination within and the decoupling between neuronal networks.

ISF neurofeedback training addresses the Ultradian Rhythm and offers a non-invasive method for altering the coordination dynamics of neural networks. QEEG data suggest it modulates neural plasticity within a distributed network promoting positive functional reorganization in the human cortex. Pre/post ISF training behavioral data strongly supports the conclusion that this form of neurofeedback may have therapeutic value in Autism Spectrum Disorders.

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Vanhatalo S, Voipio J, Kaila K. 2005. Full-band EEG (FbEEG): an emerging standard in electroencephalography. Clinical neurophysiology : official journal of the International Federation of Clinical Neurophysiology

6:00 PM–9:00 PM

ISNR Research Foundation Fundraising Dinner with Speaker Joel Lubar

For further information, please contact Cynthia Kerson at executivedirector@isnr-researchfoundation.org

Student Reception—By invitation only: 7:00 PM–9:30 PM

7:00 PM–11:00 PM

BrainMaster Technologies, Inc. Reception

The educational sessions are over for the day but that doesn't mean the learning has to end. Continue the conversation! Join your host, BrainMaster Technologies for a fun evening of food, entertainment and friends. Meet new colleagues and see old friends. Get answers to questions and find out how BrainMaster Technologies has a solution for your clinical needs.

Saturday, 9/21/2013

8:00 AM–8:30 AM

Breathing, Blood Flow, & the Brain—An Evolutionary Understanding

Stephen Elliott

Resonant breathing generates a blood wave in the circulatory system of significant magnitude. This wave rises in the arterial tree during exhalation and rises in the venous tree during inhalation. During exhalation, oxygenated blood exits the lungs, flows through the left heart and into both ascending and descending aortas, the ascending aorta supplying the head and brain. The physiological impetus for the wave is movement of the diaphragm.

This presentation asks, "What is the evolutionary necessity for the wave and for the diaphragmatic action that produces it?" An argument will be presented that the diaphragm is

necessary in order to move blood upward against gravity and evolution of the diaphragm correlates with physical erectness of vertebrate life and of man.

Stephen Elliott is the President and Life Scientist of COHERENCE LLC.

8:30 AM–9:00 AM

Clinical use of Delta Peak Frequency Neurofeedback for Mild Head Trauma

Frank Morganti, D.C.
Richard Genardi, PhD

This talk will present assessment data and clinical results obtained by using the peak frequency of Delta (1–4 Hz) as a key indicator and neurofeedback parameter. This approach made it possible to obtain improvements in clients who did not respond to previous interventions. QEEG's were inspected of patients who had suffered one or more concussions and participated in a hospital based concussion program but failed to remit their symptoms back to normal even after 20 or more hyperbaric oxygen treatments were given after the concussion medical treatment failed we. QEEG were given pre and post hyperbaric treatment and after medical failure, and further inspection of qEEG's results revealed unchanged significantly elevated Delta peak frequency in all or a majority of the 10/20 sites acquired during the pre and post qEEG's in the range of (2.0–2.8 Hz). These patients varied in age from 13–19 years old. In several other older adults who had presenting symptoms of slow processing, depression, and short-term memory symptoms and were medially treated specifically for those symptoms underwent qEEG. They also had elevated delta peak frequency and when questioned remembered having mTBI years before but was undiagnosed. Their symptoms were tracked across multiple brain functional sites by a rating scale linked to fMRI findings to that site. Diffuse axonal injury was evident by involvement of a majority dysfunctioning sites. As a result of this finding, a neurofeedback protocol was developed to reward reduction of Delta peak frequency between 1.7–1.9 Hz. Patients demonstrated within-session changes of 0.5 Hz or more in Delta peak frequency, demonstrating effective operant training to reduce this frequency to enter the normal range.

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Amen, D.G., Newberg, A., Thatcher, R., Jin, Y. Wu, J., Keator, D., & Willeumier, K. (2011) Impact of Playing American Professional Football on Long-Term Brain Function. J Neuropsychiatry Clin Neurosci 23:1.

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The presenters have no commercial interests to declare.

8:00 AM–9:00 AM

Immediate and Follow-up Success of Neurofeedback Treatment for 20 Severely Depressed Clients: Quadrant Brain Theory and Application

Angelo Bolea
Dennis Romig

The application of the Quadrant Brain Theory was previously demonstrated as successful in the neurofeedback treatment of chronic inpatient schizophrenia (Bolea, 2010). The Quadrant Brain Theory and Rationale was since applied with a cohort of 20 suicidal and severely depressed physician referred out patients. The initial treatment success was 95% with only one client dropping out of treatment. The 12-month follow-up had 0% relapse of all clients completing treatment. These results compared to 50% relapse for prescription drug only treatment for depression study groups. The Quadrant Brain Theory and Methodology's utility may extend beyond success in treating depression and schizophrenia. The theory will be presented as well as its application in the treatment of depression.

Bolea, Angelo S., (2010) Neurofeedback of Inpatient Chronic Schizophrenia. Journal of Neurotherapy, Vol. 14(1), pp. 47–54.

Robert Whitaker, Anatomy of an Epidemic, 2010

James Gordon, MD-Unstuck 2008

Dr. David Healy, Let Them Eat Prozac.

No conflicts of interest.

9:10 AM–9:40 AM

Two-Year Pilot Study of Neurotherapy and Audiovisual Entrainment in a Private, Rural K-12 School

Rebecca Ruefer, MS ***Shirley Dyk, MS*** ***Paul Swingle, PhD***

A 2-year study evaluating the feasibility of offering neurotherapy and audiovisual entrainment in a private K-12 school in rural Montana began in August of 2011. Several groups of students were included, comprising both mainstream neurotypical students and resource students, and ranging in age from 6 to 18 years. All students were evaluated using the Clinical Q assessment prior to treatment and again every ten sessions. The Clinical Q reports were e-mailed to a long-distance mentor and the appropriate protocols were e-mailed back to the providers. The providers were a bioengineer and a special-education teacher, both of whom had undergone

training but neither of whom was BCIA-certified. The logistics, feasibility, and results, both behavioral and academic, are presented.

9:40 AM–10:10 AM

Integral Neurofeedback is Superior to Conventional Medicine in a Case of Bipolar Disorder

Dale Foster *Bryan Butler* *Wes Center*

Conventional medicine views bipolar disorder as a biochemical disease with a psychopharmacological treatment but no cure. While this perspective offers some utility, recent advances in neuroscience offer alternative models which are more effective in improving the function and quality of life of those who suffer from this illness. This 20-year case study of a patient diagnosed with bipolar disorder is viewed through the lens of the Integral AQAL model, including linear and nonlinear systems perspectives as well as subjective and inter-subjective factors. The patient's recovery and development is illustrated through surface qEEG, LORETA and SPECT neuroimaging, subjective report, and neuropsychological assessment as he progressed from physical disability to a highly functioning adult via an integral neurofeedback approach. Using multiple modalities of neurofeedback, biofeedback, neuro-modulation, neuro-stimulation, lifestyle management, neurochemistry management, and inter-subjective experiential work, this individual was able to decrease psychotropic medication from six prescriptions to zero, overcome numerous post-traumatic stress symptoms, and improve cognitive function to the point of completing a graduate degree and becoming a licensed health service provider. The typical prognosis of a patient with bipolar disorder treated with conventional medicine is compared with the superior possibilities of an integral neurofeedback approach based on this case study.

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Buckholtz, J. W., Meyer-Lindenberg, A. (2012) Psychopathology and the Human Connectome: Toward a Transdiagnostic Model of Risk For Mental Illness. Neuron 74, 990–1005.

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Wilber, K. (2001) A Theory of Everything: An Integral Vision for Business, Politics, Science and Spirituality. Shambhala, Boston.

Dale Foster is a neurofeedback provider in Cordova, TN, Bryan Butler is a neurofeedback intern in Cordova, TN and Wes Center is a neurofeedback provider in Burleson, TX. Their only commercial interest in this presentation is the general expansion of the use of neurofeedback.

9:10 AM–10:10 AM

Neurofeedback in a Public School Setting: Efficacy as an Intervention for ADHD, Inattentive Subtype to Improve Reading Achievement

Jeffry La Marca, PhD Candidate

Neurofeedback has been used since the 1970s as an intervention to address the symptoms of ADD/ADHD. Studies consistently suggest that neurofeedback training enhances cognitive performance (Vernon et al., 2003), increases IQ scores (Linden, Habib, & Radojevic, 1996), and improves attention (Leins et al., 2007). Furthermore, research indicates that NF is most efficacious for ameliorating symptoms of inattention, which are associated with learning difficulties and academic problems.

Addressing the needs of students with ADD/ADHD is especially critical in schools, as this is where most children are first identified and their impairments become evident (USDE, OSERS, & OSEP, 2008). Research consistently demonstrates that attention deficits have a deleterious effect on academic attainment (Barkley, 2002). Children with ADHD, inattentive subtype have considerably more problems with processing speed than both typically developing peers and students with other subtypes (Ghelani, Sidhu, Jain, & Tannock, 2004). Studies have also found that individuals with the inattentive subtype process visual information slowly and exhibit impairments in allocating attention to information within their visual field (Swanson, Posner, Potkin, & Bonforte, 1991). Reading and math disorders, along with other learning disabilities, appear to be more prevalent in individuals with the inattentive subtype than found in those with the predominately hyperactive-impulsive type (Willcutt & Pennington, 2000).

Although medical and psychological interventions cannot be ignored, especially since these are often implemented with the specific goal of maximizing school success, the responsibility for accommodating students with special needs in school ultimately falls to educators. Neurofeedback may have the potential to be used by highly trained educators to improve school performance. This presentation will discuss the findings of the first study to directly examine the use of neurofeedback as an intervention to improve attention, reading fluency, and reading comprehension in a public school setting.

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This study was funded, in part, by a student grant, awarded September 2012, from the International Society for Neurofeedback and Research. qEEG assessments were provided by Brain Science International. Additional funding was provided by a Special Education Leadership Fellowship from the University of California, Riverside.

10:20 AM–10:50 AM

Modeling EEG-band Neurofeedback: Modulating Internal States without Conditioning of EEG Sources

Leonardo Trejo ***Nayson Fernandes*** ***Eran Zaidel***
Roman Rosipal ***Rasheed Akbarut***

At least three neurofeedback techniques can produce measurable behavioral and neurophysiological changes. These involve modulating slow-cortical potentials (SCP), fMRI BOLD signals, or amplitude (or power) in narrow EEG bands. We think SCP neurofeedback may work indirectly by conditioning task-specific attentional focus, whereas fMRI neurofeedback directly conditions regional brain activity during task performance. However, the object of conditioning in EEG-band training is unclear because there is no overt task to perform and the electrophysiological and behavioral changes can occur rapidly.

In a previous double-blind, placebo controlled experiment, we trained participants to increase EEG amplitude in narrow bands (C3-SMR, C4-SMR, C3-Beta, sham) using auditory rewards and 30-minute training sessions over five consecutive days. We observed widespread changes in ERP/ERSP patterns for reward stimuli during training. However, we did not find significant conditioning of trained bands within or across sessions. We also observed improved performance of a hemispheric attention task in the C3-Beta group after five sessions. To explain these and related results we are developing a four-part model: 1) Introspective tasks such as mind wandering during rest or autobiographical memory, engage a Switching Network which activates an internally-directed Default Mode Network and deactivates externally-directed problem-solving networks. 2) The DMN activates a "self-control" system which links rewards to internal states of arousal, motor activation, attentional focus, or cognitive engagement. 3) The internal states co-vary with synchrony in fundamental EEG "atoms." We separately developed EEG atom metrics, where each atom represents one oscillatory EEG mode in the 1-40 Hz range, with a unique spectral envelope, topographical power distribution, and pattern of connectivity. 4) When the self-control system is engaged, neurofeedback rewards condition internal state modulations or "responses" which cause EEG atom synchrony levels to change accordingly. Thus EEG-band training conditions the self-control system, which can then manage internal states and global network connectivity.

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10:50 AM–11:20 AM

The Influence of Individual Alpha Peak Frequency on Resting State EEG in Adults with Attention-Deficit/Hyperactivity Disorder

Sarah Wyckoff, PhD

Objectives. Adult attention-deficit/hyperactivity disorder (ADHD) has been characterized by deviant patterns of EEG activity during resting state, particularly increased theta and decreased beta to a lesser degree. A recent investigation of childhood ADHD populations indicated that theta/beta activity was mediated by individual differences in alpha peak frequency (iAPF). The present study seeks to investigate whether iAPF influence EEG findings in adults with ADHD, as well as to explore the relation between resting-state brain oscillations, iAPF, and core ADHD behaviors.

Methods. Continuous 21-channel EEG was acquired from 46 adult participants with DSM-IV defined ADHD and 46 healthy controls. For each frequency band (delta, theta, alpha, beta, theta/alpha, and theta/beta power), power analysis (absolute and relative power), and condition (eyes-closed and eyes-open), a mixed ANOVA was used to examine the effects of region and group using fixed frequency and individualized iAPF bands. Partial correlation coefficients were calculated between ADHD behavioral measures and QEEG data.

Results. Using fixed frequency bands, ADHD participants presented with elevated theta, beta, theta/alpha, and attenuated alpha activity. However, several interactions within the theta, beta, and theta/alpha frequency bands were no longer significant after using individualized frequency bands. No consistent relation was found between resting-state brain oscillations and ADHD behaviors, with the exception of a weak positive correlation between iAPF and inattention. The present results suggest that discrepant QEEG findings within adult ADHD research may reflect differences in iAPF. Additionally, EEG activity in adult ADHD appears to be mediated by distinct neurophysiological subgroups such as frontal theta and high alpha peak frequencies.

Conclusion. Future research should investigate the functional role of resting-state brain oscillations by investigating neurophysiological subgroups and controlling for iAPF.

Key words. Adult ADHD, EEG, individual alpha peak frequency, iAPF, QEEG

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No conflicts of interest.

10:20 AM–11:20 AM

The Pause that Reinforces: The Role of Arousal Modulation in EEG Operant Conditioning

M. Barry Sterman, PhD

The field of neuroscience is today driven mainly by genetics, neurochemistry, cell biology, and technology-enabled brain imaging. In an earlier age the field was more focused on neuro-physiology and system organization. This presentation will attempt to integrate these two approaches in proposing a rational model for the processes which enable learning in general and operant conditioning in particular. Specifically it will focus on reward. What system organization produces changes in brain physiology and circuit dynamics as a result of reward? How do these changes produce response reinforcement? What neurofeedback methodologies actually promote and confirm these events?

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11:30 AM–12:20 PM

INVITED SPEAKER

Neurofeedback as an Insurance Reimbursable Service

Meiram Bendat, JD, MFT

While it may seem that scientific research alone is sufficient to steer insurers in the direction of reimbursing credible mental health treatments, including neurofeedback, the reality is that a number of considerations come into play in the battle for insurance coverage. This presentation will focus on impediments to insurance reimbursement of neurofeedback and related mental health treatments, in an effort to educate clinicians and their patients about optimal advocacy strategies.

Specifically, I will address insurer motivations (i.e. economic, prejudice) to reject neurofeedback as a covered service for insured beneficiaries. I will also discuss promising legal developments (such as the Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008 as well as the Patient Protection and Affordable Care Act) to respond to insurer denials and raise areas for collective consideration (i.e. state of relevant research) as clinicians assert the role of neurofeedback in the mental health and insurance fields.

Ideally, attendees will gain awareness of the pivotal time we are in as it relates to "carving their clinical turf."

About the Presenter:

Meiram Bendat is founder of the mental health insurance advocacy service, Psych-Appeal, Inc. and a Los Angeles-based psychotherapist with a background in clinical psychology, marriage and family therapy, psychoanalysis, and the law. His academic achievements earned him accolades at Columbia University, USC Law School, Antioch University, and the New Center for Psychoanalysis in Los Angeles. He maintains clinical faculty appointments at UCLA, Antioch University, and the New Center for Psychoanalysis, where he is currently Chair of Ethics and a member of the Education Committee.

Meiram Bendat is licensed by the California Board of Behavioral Sciences as a marriage and family therapist and is also licensed as an attorney by the State Bar of California. He has broad experience with inpatient, residential, and outpatient mental health care. He has served as a consultant to Pacific Clinics, Bridges to Recovery, Vista Del Mar, Jewish Family Service of Los Angeles, the Wright Institute Los Angeles, and the LA Gay & Lesbian Center. Meiram Bendat frequently speaks at conferences on patient advocacy, access to mental health care, and mental health parity. He is a member of the American Psychoanalytic Association, International Psychoanalytic Association, California Association of Marriage and Family Therapists, and The Access Coalition, a project of Mental Health America.

2:00 PM–3:00 PM

SMALL GROUP DISCUSSION

Loretta Z-score Neurofeedback Discussion of Neuropsychiatric Cases

J Lucas Koberda, MD PhD

Who and Where are We: Are we a Modality or a Profession?

Randall Lyle, PhD

QEEG Patterns that fail Medications

Ron Swatzyna
Jay Gunkelman

Slow Cortical Potential Training

Sarah Wyckoff, PhD

3:15 PM–6:30 PM

WORKSHOP 14

Integrating pIR HEG and EEG Biofeedback to Reduce Allostatic Load

Penijean Gracefire

Allostatic load is the cumulative strain on the body and brain over time, and represents the physiological effects of fluctuating or heightened neural responses that result from repeated or chronic stress. This workshop will approach neurofeedback from the perspective of providing information to an intelligent system for the purpose of encouraging more effective resource management and allocation.

While EEG biofeedback more directly interacts with the electrical system of the brain, effects on metabolic activity have been observed after sessions targeting EEG changes, just as pIR HEG, although prioritizing a metabolic measurement, can affect the availability of electrical resourcing in the brain. Based on the principles of interdependence observed in optimal physiological performance, this workshop will evaluate the practicality and the clinical utility of combining pIR HEG and EEG biofeedback into a simultaneous protocol to provide a platform for increased client capacity to achieve the healthy variability needed to maintain allostasis.

Before and after data from clinical cases studies will be presented and analyzed using the principles of predictive regulation, and the potential benefits of adding HEG into traditional neurofeedback settings will be discussed.

This workshop will review protocol interfaces designed by the presenter for the purpose of simplifying the clinical management of training variables when combining these two modalities for training, and will discuss the practical logistics of sensor placement and threshold manipulation. Reviewed protocol designs will be available to workshop attendees at no charge upon request.

All experience and skill levels welcome.

Sherrill, R. (2004). Effects of hemoencephalographic (HEG) training at three prefrontal locations upon EEG ratios at Cz. Journal of Neurotherapy, 8(3), 63–76.

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Schulkin J; McEwen BS; Gold PW (1994) Allostasis, amygdala, and anticipatory angst. Neurosci Biobehav Rev 18:385–396.

Sterling P; Eyer J (1988) Allostasis: a new paradigm to explain arousal pathology. In: Handbook of Life Stress, Cognition and Health (Fisher S; Reason J, eds), pp 629–649. New York, NY: J. Wiley & Sons

Toomim, H. (2000). A report of preliminary data: QEEG, SPECT, and HEG; Targeted treatment positions for neurofeedback. Applied Psychophysiology and Biofeedback, 25(4), 253–254.

Toomim, H., Mize, W., Kwong, P.C., Toomim, M., Marsh, R., Kozlowski, G.P., Kimball, M. & Raymond, A. (2004). Intentional increase of cerebral blood oxygenation using hemoencephalography (HEG): an efficient brain exercise therapy. Journal of Neurotherapy, 8(3), 5–21.

No conflicts of interest.

WORKSHOP 15

Ethical Standards and Ethical Perspectives in Biofeedback and Neurofeedback

Donald Moss, BCN, BCB

This webinar will review legal and ethical responsibilities of biofeedback and neurofeedback practitioners. The biofeedback/neurofeedback professional is governed in clinical practice by state regulations under the relevant licensing act, professional codes of ethics for his or her home profession, and the Professional Standards and Ethical Principles of Biofeedback (5th rev.) of the Biofeedback Certification International Alliance (BCIA). Violation of such guidelines, even when unintended, invites the risk of lawsuit, criminal prosecution, financial penalties, loss of licensure, and expensive and stressful legal and administrative reviews. The presenter will discuss relevant guidelines governing: entry-level competence; scope of practice; the delivery of experimental or non-documented therapies; the informed consent process; and questions of touch, privacy, and respect. The presenter will place emphasis on the imperative to maintain a positive treatment relationship, eliciting rapport and trust. The therapeutic alliance, along with adherence to professional guidelines, minimizes the risk of misunderstanding and litigation.

The presenter has no relationship with a commercial interest. The presenter serves on the BCIA Board.

WORKSHOP 16

Heart-Brain Connections Neuroanatomy Underlies the Effectiveness of Neurofeedback/Biofeedback Interventions

Lynda Thompson
Michael Thompson

This workshop will begin with a brief literature review which describes how traumatic brain injury (TBI) can directly affect heart rate variability (HRV) measurements and how HRV training can alter the EEG. This will lead to an overview of important components of the neural networks that are influenced by neurofeedback (NFB) combined with biofeedback (BFB) training, particularly central midline structures (CMS) and connections of the Nucleus Solitarius in the medulla of the brain stem. A special focus will be on how heart rate variability (HRV) training has

direct effects on many of the same basic neural structures that are also influenced by EEG biofeedback training, including neural network(s) concerned with emotions (the affect network) and also the executive, salience and default networks and their associated functions. This workshop will use a clinical case example of a woman who suffered a traumatic brain injury (TBI) and had been seen by 40 to 50 top medical specialists without relief from disabling cognitive and affect symptoms. From December 2010 to June 2012 improvements in her cognitive and affect symptoms corresponded to improvements in the QEEG. The psychophysiological stress assessment findings, which showed a failure to recover quickly after a minor stress, dictated the biofeedback interventions, which included the use of temperature biofeedback for Raynaud's and heart rate variability (HRV) training.

The presentation will give an overview of the neuroanatomical and neurophysiological aspects of the normal stress response and compare this to an abnormal (chronic) stress response. Also briefly discussed with respect to depression will be the effects of medication, cognitive behavior therapy, deep brain stimulation and neurofeedback on specific neuro-anatomical areas. The goal is to deepen practitioners' understanding of neuro-anatomical connections so they can plan multi-modal interventions that achieve success with every client.

Baguley, I.J., Heriseanu, R.E., Felmingham, K.L., & Cameron, I.D. (2006). Dysautonomia and heart rate variability following severe traumatic brain injury. Brain Injury, 20(4),437–444.

Gevirtz, Richard (2010). Autonomic Nervous System Markers for Psychophysiological, Anxiety, and Physical Disorders. In Gordon, E. & Stephen H. (Eds.) Integrative +Neuroscience and Personalized Medicine, (pp. 160–180) Oxford Press, New York, NY.

Grippo, AJ., Johnson, AK (2009). Stress, depression, and cardiovascular dysregulation: A review of neurobiological mechanisms and the integration of research from preclinical disease models. Stress, 12(1) 1–21

Helen S. Mayberg, Andres M. Lozano, Valerie Voon, Heather E. McNeely, David Seminowicz, Clement Hamani, Jason M. Schwalb, Sidney H. Kennedy (2005). Deep Brain Stimulation for Treatment-resistant Depression. Neuron, Vol. 45, 651–660

Fred Shaffer & Jon Venner (2013). Heart Rate Variability Anatomy and Physiology. Biofeedback 40(1), 13–25.

Thompson, M. & Thompson, L. (2007). Neurofeedback for Stress Management. Chapter in Paul M. Lehrer, Robert L. Woolfolk and Wesley E. Sime (Eds.) Principles and Practice of Stress Management, 3rd Edition. New York: Guilford Publications.

Thompson, M. & Thompson, L., (2010). Functional Neuroanatomy and the Rationale for Using EEG Biofeedback for Clients with Asperger's Syndrome. Journal of Applied Psychophysiology and Biofeedback, (35)1, 39–61.

Thompson, J. & Hagedorn D., (2012). Multimodal Analysis: New Approaches to the Concussion Conundrum. Journal of Clinical Sport Psychology,6, 22–46.

Lynda Thompson is co-author of *The A.D.D. Book*

Michael and Lynda are co-authors of *Setting Up for Clinical Success*

Michael and Lynda Thompson are co-authors of *The Neurofeedback Book*

WORKSHOP 17

Brodmann Areas of the Brain: Their Neuroanatomy, Neurophysiology , Functional and Neurofeedback Correlates.

Lesley Parkinson

The Workshop will include a definition and description of the Brodmann Areas., including a brief history and overview, their neuroanatomy and the neurophysiological networks involving Brodmann Areas will be explained, including the functional/ symptom characteristics of each area and as far as possible the electrode placements that link to these. The specificities and complexities for each Brodmann Area will be covered.

The Workshop will also present the research base for the functional/symptom characteristics of each Brodmann Area. This will include research findings that have extended the knowledge of the functionalities of each area such as BA6 which is part of the motor cortex but has also been found to have a role in cognition

The Workshop will also include a critical evaluation of the scientific findings surrounding each Brodmann Area in terms of both supporting and challenging the assumptions i.e. validation data. The latest research findings on Brodmann Areas and Clinical Conditions will be presented.

A tabular summation of Brodmann Areas, Key Functions and Networks will be presented, including a flow-chart to aid in neurofeedback protocol design and implementation.

Devinsky O, Morrell M J & Vogt BA (1995) Contributions of anterior cingulate cortex to behaviour Brain118 279–306

Iannetti GD et al (2003) Representation of different trigeminal divisions within the primary and secondary human somatosensory cortex

Neuroimage 19(3)906–912

Kim E Y et al(2009) Triple layer appearance of Brodmann Area 4

Radiology 250(2)515–522

Cavanna & Trimble (2006)The precuneus: a review of its functional anatomy and behavioural

correlates Brain 129(3)564–583

Ramachandran (1995)Anosognosia in Parietal Lobe Syndrome Conscious Cog (4)1 22–51

Cannon Congedo Lubar Hutchens (2009)Differentiating a network of executive attention Int J of

Neuroscience 119(3) 404 –441

Levesque et al (2003)Neural circuitry underlying voluntary suppression of sadness Biol Psychiat

53(6)502–510

Gotman et al (2005)

Critchley et al (2003)Human cingulate cortex and autonomic control

Brain 126(10)2139–2152

Luria AR(1966)Higher Cortical Functions in Man New York BasicBooks

Rosa- Maria Metal Regional structural differences across functionally parcellated Brodmann areas of human primary somatosensory cortex. Neuroimage2013 The above is just a sample of the references. There will be many more

No conflicts of interest.

WORKSHOP 18

The Challenges of Running the "Perfect" EEG: A Hands On Workshop

Marvin Sams *Sarah Benedict* *Farrah Tafacory*

Obtaining a technically satisfactory EEG can present many challenges. The inventor of ECI Electro-Cap, a Registered EEG Technologist (ABRET), presents this workshop with two personally trained Neurotherapy assistants for maximum participation. Emphasis is on the practical with hands on demonstrations of quick and easy cap application, how to obtain low electrode impedances effortlessly, handy patient management techniques for the tense and restless, common perils and pitfalls in EEG recording, and recognizing and reducing artifacts "on the fly."

Personal experience.

No conflicts of interest.

WORKSHOP 19

Assessment and Treatment of the Concussed Athlete

Anne Stevens, PhD
Robert Coben, PhD

It is estimated that 3.8 million concussions occur in the United States each year during a sporting event or practice (Harmon, et. al. 2013). However, while many concussion assessments go no further than the sideline or locker room, statistics of emergency room visits report that as many as 65% of cases involving concussion are for youth between 5–18 years of age (Grady 2010). And, when further evaluation takes place, a CT-scan, orders to rest and a pat-on-the back is often the offered assessment and remedy. With continued legal efforts and media exposure, athletes and parents of athletes are now looking beyond the coaching staff, team trainer or local physician for better assessment and treatment.

Although Standards, such as those set forth by the American Medical Society for Sports Medicine is to rest (Harmon, et. al. 2013), others have questioned this recommendation (Silverberg and Iverson, 2012). Nonetheless, searching for better assessment and treatment strategies, concussed athletes are frequently finding their way into clinics offering QEEG and NFB services. This workshop will address current assessment of concussion in the sport arena. While epidemiology and pathophysiology will also be discussed, extensive time will be dedicated to evaluating the current model of assessment, along with presenting a more integrated, scientifically based approach. Additionally, this information will then be applied to develop optimal treatment strategies. Several case studies as well as original research will be described.

Silverberg, N, Grant I., (2012). Rest after concussion. The best medicine? Recommendations for activity resumption following concussion in athletes, civilians, and military service. Journal of Head Trauma Rehabilitation. 1–10.

Harmon K., Drenzner J., Gammons M., Guskiewicz, K., Halstead M., Herring S., Kutcher J., Pana A., Puukian M., Roberts W., (2013). American Medical Society for Sports Medicine position statement: concussion in sport. British Journal of Sports Medicine. 47,15–26.

ONeil B., Prichep L., Naunheim R., Chabot R., (2012). Quantitative brain electrical activity in the initial screening of mild traumatic brain injuries. Western Journal of Emergency Medicine,13(5), 394–400.

I am cofounder of INS, a consultation service for the NFB/QEEG field.

WORKSHOP20

Medication Failure: EEG/qEEG Outcome Clusters Provide Evidence

Ronald Swatzyna
Vijayan Pillai

Introduction

Unlike other areas of medicine where doctors order biological tests to determine the etiology of an illness, most psychiatrists rely on observations, self-report measures and psychological testing in order to diagnose their patients and develop a treatment plan. However, this methodology may often result in misdiagnosed cases due to the fact that very different conditions, which require very different treatments, manifest themselves through very similar symptoms. With the common practice of polypharmacy being used to target multiple symptoms in an individual, significant negative consequence may emerge, with children and adolescents being especially susceptible to an increased risk of side effects when combining medications. For this reason, EEG/qEEGs is increasingly being utilized to guide medication selection for individuals in clinical settings. The use of qEEG technology provides a window into the functionality or dysfunction of an individual's brain, and provides the physician with objective data to guide prescription choices. The current study seeks to collect EEG and qEEG data in an effort to identify statistically significant commonalities among clinical patients for whom medication has failed.

Methods

The EEG/qEEG data analyzed in this study was collected from June 2009 through August 2013 in a large private practice in Texas. Of the 451 patients referred only 400 were met inclusion criteria: non-clinical cases and repeated EEG/qEEG were excluded. The primary reason for referral was medication and treatment failure. The ages ranged from 5 to 69 with approximately 70 percent being male. The five diagnoses that were studies were ADHD, Autistic Spectrum Disorder, Major Depressive Disorder, Bipolar Disorder and Anxiety Disorders (GAD, PTSD, OCD, Panic Disorder, etc).

Results

Since 2008, we have collected EEG and qEEG data from 400 clinical patients (ages 5-69). In almost every case where two or more medications failed, transient discharges, spindling beta, encephalopathy or focal slowing were identified as the reason for medication failure.

Discussion

Often, medication prescription is a trial and error process. Identifying why a medication has failed has significant implications and can prevent potential harm. Furthermore, having a non-medication intervention option such as neurotherapy and transcranial direct current stimulation decreases the likelihood of harmful side effects and increases potential improvements. Our preliminary findings suggest that EEG and qEEG technology represent a valuable tool for experienced psychiatrists who know how to evaluate and use the electroneurodiagnostic information. The results from our study will be presented and recommendations will be made on how EEG/qEEG objective data can assist in the development of evidence-based medication intervention and treatment protocols in mainstream psychiatry.

No conflicts of interest.

Sunday, 9/22/2013

8:00 AM–8:30 AM

Neurotherapy for the Treatment of Non-Combat Posttraumatic Stress Disorder: A Case Report

Corey Feinberg, MA
Elsa Baehr, PhD

NeuroQuest, Ltd. neuroquest@gmail.com

This is the case report of an adult female diagnosed with PTSD that was not induced by combat or trauma experienced in the line of duty, but rather the posttraumatic psychological distress of having been reared by a mother who was a survivor of the Holocaust. It is the purpose of this report to examine the subject's neurological and behavioral response to neurofeedback training as a treatment intervention for her symptoms of PTSD. Pre-treatment baseline measurements were taken that included an initial intake interview where the subject described the nature and severity of her symptoms, a Quantitative EEG analysis was performed, and self report inventories were administered using Beck short forms for depression (BDI) and anxiety (BAI). A customized neurotherapy treatment strategy was applied using QEEG guided neurofeedback protocols involving posterior, eyes closed combinations of Live Z-Score Training (LZT) for power and coherence as well as traditional amplitude training protocols. Client observations were recorded at various significant points to reflect self reported changes in symptoms and professional observations were gathered about treatment progress from the patient's therapist. In this case, the neurotherapy treatment strategy was able to produce significant changes in the subject's EEG towards a pattern of normalization. These changes in neurology mirrored positive patterns of remediation in the subject's symptoms of PTSD that showed a significant reduction in both severity and frequency of occurrence. The improvements in behavior were observed by the clinician administering treatment, the subject's therapist, and by the patient herself. Post-treatment assessment indicated decreases in anxiety as measured by the BAI, and qualitative improvements in the post QEEG.

8:30 AM–9:00 AM

LORETA Z-score Neurofeedback as a Potential Application in Depression and Anxiety.

J. Lucas Koberda ***Andrew Moses*** ***Paula Koberda***
Andrew Bienkiewicz ***Laura Koberda***

Prior reports have already demonstrated that standard 1-2 electrode NFB is beneficial in the treatment of depression and anxiety (Hammond, 2005, Dias, 2011). Recent development in computer technology and introduction of LORETA NFB enables more precisely targeted therapy. This report contains analysis of 31 patients who were enrolled in LORETA Z-score NFB due to depression and anxiety. Many of the patients were referred for NFB by psychiatrists due to resistance of the symptoms to medications. Patient's work up included EEG, QEEG/LORETA electrical imaging as well as brain imaging. LORETA showed area of frontal lobe or Anterior Cingulate dysregulation as the most frequent finding. The design of this study was to complete a QEEG before beginning NFB in order to conduct QEEG-guided biofeedback treatment. A QEEG was also completed after 10 sessions of NFB therapy to see if any objective improvement in

QEEG/LORETA abnormalities was noted. Patients were also requested to give their subjective feedback on the degree of symptoms improvement. Most of the patients completed at least 10 sessions of NFB and the degree of subjective improvement (if any) was recorded. 24 patients (77%) were found subjective and/or objective improvement. These results are very promising and indicate high potential effectiveness of LORETA Z-score NFB in therapy of anxiety and depression.

References:

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No conflicts of interest.

8:00 AM–9:00 AM

Coherence: Towards Multivariate Analyses and Training

Robert Coben, PhD

Traditionally and historically EEG coherence estimates have arisen from cross correlations between pairs of electrodes (Bendat & Piersol, 1980; Otnes & Enochson, 1972). These concepts have been used and applied commonly. In fact, a search in Google Scholar for "EEG coherence pairs" revealed more than 14,500 citations. Concerns in the literature have emerged about the accuracy of pairwise measures (Barry, Clarke, McCarthy, & Selikowitz, 2005) and research has demonstrated that multivariate methods more accurately reflect the true nature of connectivity (Blinowska, 2011). These findings demonstrate the need for multivariate strategies for assessing coherence. These various methods will be presented and discussed during this talk. Given that multivariate assessment strategies lead to more accurate coherence measures, it only makes sense that multivariate coherence training methods should be explored as well. One such initial approach will also be presented.

Barry, R.J., Clarke, A.R., McCarthy, R., & Selikowitz, M. (2005). Adjusting EEG coherence for inter-electrode distance effects: An exploration in normal children. International Journal of Psychophysiology, 55, 313–321.

Bendat, J.S. & Piersol, A.G. (1980). Engineering applications of correlation and spectral analysis. New York: John Wiley and Sons.

Blinowska, K.J. (2011. Review of the methods of determination of directed connectivity from multichannel data. Med Biol Eng Comput, 49(5), 521–529.

Otnes, R.K. & Enochson, L. (1972). Digital Time Series Analysis. New York: John Wiley and Sons, Inc.

The speaker is the co-founder of a consultation business with services offered to the field.

9:10 AM–9:40 AM

Neurofeedback as an Alternative Treatment for Chronic Primary Insomnia

Olivier Pallanca
Yann Renard
Margaux Perrin

The pathophysiology of Primary Insomnia (PI) remains mostly unclear, but cortical hyperarousal may represent a final common pathway in the development and maintenance of the disorder that might cause the experience of sleep onset insomnia and non-restorative sleep (Riemann 2010; Perlis 1997). Several studies have shown that patients with insomnia exhibit elevated levels of Beta EEG activity (14–35 Hz) at or around sleep onset and during NREM sleep and EEG spectral power in the beta range has been suggested to be an index of cortical arousal. (Buysse 2008; Perlis 2001; Merica 1992; Freedman 1986). Furthermore CBT for insomnia, the first-line treatment for primary insomnia, reduces beta activity insomnia patients (Cervena 2004).A few studies involve neurofeedback as a treatment for primary insomnia, and most of the studies use the SMR techniques and show improvement in sleep and daytime functioning (Hammer 2011, Cortoos 2006) .Methodology and preliminary results: The aim of our study is to better characterize the cortical hyperarousal that exhibit the patient with PI, especially during the wake time and in situation of sleep onset in comparison with a control group.

The 2 groups (15 PI and 15 controls) are constituted after the validation of the PI diagnostic using the International Classification Sleep Disorders 2 criteria.

The EEG recording are made by a nexus 32 (Mindmedia) with 21 EEG cap, with concomitant additional channel for the Heart rate and the skin conductance in order to correlate the emotional and the EEG change. The openvibe qEEG techniques is use to analyse the signal.

In preliminary analyses, the Beta EEG activity seems to be more elevated in some cortical area in the PI group. If the results would be confirmed, we want to develop a special neurofeedback technique in order to decrease the cortical hyperarousal during the wake in patient with PI.

Riemann D, Spiegelhalder K, Feige B, Voderholzer U, Berger M, Perlis M, Nissen C. The hyperarousal model of insomnia: a review of the concept and its evidence. Sleep Med Rev. 2010 Feb;14(1):19–31

Perlis ML, Giles DE, Mendelson WB, Bootzin RR, Wyatt JK. Psychophysiological insomnia: the behavioural model and a neurocognitive perspective. J Sleep Res. 1997 Sep;6(3):179–88.

Buysse DJ, Germain A, Hall ML, Moul DE, Nofzinger EA, Begley A, Ehlers CL, Thompson W, Kupfer DJ. EEG spectral analysis in primary insomnia: NREM period effects and sex differences. Sleep. 2008 Dec; 31(12):1673

Perlis ML, Smith MT, Andrews PJ, Orff H, Giles DE. Beta/Gamma EEG activity in patients with primary and secondary insomnia and good sleeper controls. Sleep. 2001 Feb 1;24(1):110–7.

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Freedman RR.EEG power spectra in sleep-onset insomnia. Electroencephalogr Clin Neurophysiol. 1986 May;63(5):408–13.

Cervena K, Dauvilliers Y, Espa F, Touchon J, Matousek M, Billiard M, Besset A. Effect of cognitive behavioural therapy for insomnia on sleep architecture and sleep EEG power spectra in psychophysiological insomnia. J Sleep Res. 2004 Dec;13(4):385–93.

Hammer BU, Colbert AP, Brown KA, Ilioi EC. Neurofeedback for insomnia: a pilot study of Z-score SMR and individualized protocols. Appl Psychophysiology Biofeedback. 2011 Dec;36(4):251–64.

Cortoos A, Verstraeten E, Cluydts R. Neurophysiological aspects of primary insomnia: implications for its treatment. Sleep Med Rev. 2006 Aug;10(4):255–66. Epub 2006 Jun 27.

No conflicts of interest.

9:40 AM–10:10 AM

Toxicity and Nutrition—Effects on Nervous System Function

Patricia Ryan, M.D.

Practitioners are aware of the benefits of neurofeedback for a variety of disorders including ADHD, Anxiety, Depression, and Insomnia. The purpose of this presentation is to expose the practitioner to the data behind neurotoxicity, nutrition, and brain dysfunction. See how genetically modified foods, and herbicides cause physiologic disruption. Many chemicals including heavy metals, solvents, and aspartame are causing damage to our neurons. In addition, information about food allergies and Candida over-growth and their link to symptoms such as brain fog and irritability, and cognitive dysfunction will be discussed. Some nutritional pearls will be given to the practitioner as well.

No conflicts of interest.

9:10 AM–10:10 AM

Burnout, Interpersonal Commitment, Client Adherence, Continuing Education, and Quality of Work Life among Neurofeedback Practitioners

Jonathon Larson, EdD. ***Katherine Kereszturi*** ***Robert Beedle***
Thomas Cothran ***Bethany Apa*** ***Christopher Haak***
Lindsay Sheehan ***Catherine Ryan*** ***Kelly O'Neill***

This presentation discusses a study of neurofeedback (NFB) practitioner self-perceptions related to quality of work life. Practitioner self-perceptions of common clinician factors related to NFB were identified. To guide this current study, we utilized our previous conceptual framework research on practitioner perspectives of NFB. One hundred forty-eight NFB practitioners completed online surveys gathering demographic information and ratings of practice behaviors and characteristics. Our results indicated that 74% of the variance in quality of work life can be explained by a significant multiple correlation of burnout, interpersonal skills commitment, and client adherence. We found monthly sessions correlated with financial gain or loss (FGL). We also found client adherence separately correlated with monthly sessions, NFB knowledge, NFB learning commitment, and NFB mentorship. For NFB practitioner self-perceptions of common clinician factors, the most frequently endorsed practitioner traits in rank order were (a) ethical, (b) attentive, (c) empathic, (d) calm, (d) observant, (e) sense of humor, (f) analytical and confident (tied), (g) friendly and realistic expectations (tied), (h) optimistic, and (i) careful. NFB practitioner quality of work life appeared to be related to three straightforward components: reducing burnout, increasing commitment to enhancing interpersonal skills, and increasing client adherence. Practitioners providing mentoring, practitioners improving NFB knowledge and skills, and more monthly sessions are separately related to client adherence. Of interest, we found the number of monthly sessions positively correlated with monthly FGL. We found a

variety of perceived NFB common clinician factors adding to the complexity of understanding factors influencing NFB outcomes. Of interest, two (attentive and calm) of the top four practitioner self-perceptions of common clinician factors are also important NFB client outcomes. Finally, a post hoc analysis looking at groups with differing levels of monthly continuing education hours found significantly higher net income among practitioners with higher average hours.

Aguilar-Prinsloo, S., & Lyle, R. (2010). Client perception of the neurofeedback experience: The untold perspective. Journal of Neurotherapy, 14, 55–60.

Berger, H. (1930). On the electroencephalogram of man. Journal fÃ¼r Psychologie und Neurologie, 40, 160–179.

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Hammond, D. C., Bodenhamer-Davis, G., Gluck, G., Stokes, D., Hunt Harper, S., Trudeau, D., . . . Kirk, L. (2011). Standards of practice for neurofeedback and neurotherapy: A position paper of the International Society for Neurofeedback and Research. Journal of Neurotherapy, 15, 54–64.

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Imel, Z., &Wampold, B. (2008). The importance of treatment and the science of common factors in psychotherapy. In S. D. Brown & R. W. Lent (Eds.), Handbook of counseling psychology (4th ed., pp. 249–262). Hoboken, NJ:Wiley.

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Kamiya, J. (2011). The first communications about operant conditioning of the EEG. Journal of Neurotherapy, 15, 65–73.

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Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. Annual Review of Psychology, 52, 398–422.

Mickey, R. M., Dunn, O. J., & Clark, V. (2004). Applied statistics: An analysis of variance

No conflicts of interest.

10:20 AM–10:50 AM

Cumulative Effects of Anodal tDCS on EEG Oscillations and Attention Regulation among Individuals with Traumatic Brain Injury

Fred Ulam, PhD
Ben Hunter, M.A.

Purpose

To explore the effects of tDCS on EEG oscillations and attention regulation among individuals with traumatic brain injuries (TBI) undergoing inpatient neurorehabilitation.

Subjects

Twenty-Six individuals with moderate to severe TBIs participated in a randomized, placebo-controlled, double blind study of tDCS, with 13 in the active and 13 in the sham groups.

Methods

Anodal stimulation to the left dorsolateral prefrontal cortex (F3), with the cathode over the right supraorbital area (Fp2) was provided for 20 minutes at 1 mA over 10 daily sessions. Dependent measures included relative power derived from 6 quantitative EEG studies obtained two days prior to the first tDCS session, immediately before and after the 1st session, immediately before and after the 10th session, and two days following the 10th session. A battery of neuropsychological tests assessing aspects of attention/working memory, inhibitory control and cognitive flexibility were administered before the first and after the tenth tDCS treatment.

Analysis

Repeated measures analysis of variance (ANOVAS) with post hoc t-tests were used to examine EEG and neuropsychological differences.

Results

For the active tDCS group theta decreased immediately following the first session at F3. Decreased delta was seen for the active group between the first qEEG and the last, at Fp2. Increases in alpha were seen for the active group at both F3 and Fp2 between the first qEEG and the final post treatment qEEG. No significant EEG changes were seen for shams. The active group with EEG slowing at the outset showed significant improvement in 7 out of 9 neuropsychological tests, while the active group without slowing improved on only one test. Shams with slowing improved on 3 out of 9 tests, as did shams without slowing.

Conclusions

This preliminary, exploratory study suggests tDCS can safely modulate cortical excitability among victims of TBI with beneficial effects on attention regulation.

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No conflicts of interest.

10:20 AM–11:20 AM

Concussion Hits Hard: Recovery from the Multiple Effects of Concussion: Requires Interventions be based on an Appropriate Multi-Modal Assess

Lynda Thompson
Michael Thompson

Assessment of the patient who has suffered a concussion should be first carried out by a knowledgeable medical specialist. However, MRI, PET, and CAT scans often show no abnormality. In addition, traditional rehabilitation often meets the criteria of conservative do no harm but may do little to remedy the deficiencies caused by minimal to moderate injury. This presentation will suggest a methodology for efficient and accurate assessment that can lead to effective intervention. The EEG and evoked potentials (ERP) can reveal the effects of damage

elicited by stretching and twisting of axons, called diffuse axonal injury (DAI). The evoked potentials are particularly important for reflecting brain speed. Concussion may injure the right and/or left insula. This will impair heart rate variability. Thus concussion assessment should measure QEEG, ERPs, HRV, and, using continuous performance tests, measure attention, impulsivity and variability of response time. This should be combined with neuropsych testing, in particular for short and long term memory, attention span, impulsivity and questionnaires regarding medical health, depression, and anxiety. When available, balance assessment of vestibular function with a "force-plate" can be helpful. Extended biochemical assessment can be added and this can lead to appropriate dietary and supplement interventions.

This presentation will review some of the literature on TBI and the connection to cardiac problems. It will then outline the neuroanatomical underpinnings regarding why, how, and with what effect, LORETA z-score NFB can be used in conjunction with some combination of HRV training, transcranial direct current stimulation (tDCS), passive infra-red feedback (pIR), and metacognitive strategies, in addition to dietary interventions, to bring a client back to high level functioning. The theoretical aspects of this presentation will be supported by case examples: a PhD candidate in artificial intelligence, an author, a graduate student in finance, and an athlete.

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Michael and Lynda Thompson are co-authors of THE NEUROFEEDBACK BOOK

11:30 AM–12:20 PM

INVITED SPEAKER

TMS, EEG and the Network Model of Major Depression

Paul Zarkowski, MD

Clinical Assistant Professor
Department of Psychiatry & Behavioral Sciences Harborview Medical Center University of Washington

Numerous studies have shown Transcranial Magnetic Stimulation (TMS) to be effective in the treatment of a variety of mental disorders, including major depression and schizophrenia. TMS has received a clinical indication from the FDA for use in treatment resistant major depression.

Unlike all pharmacologic treatments for major depression, TMS is unique in its focal nature. Most current treatment protocols apply excitatory magnetic pulse trains to the left dorsal lateral prefrontal cortex. The intensity of the magnetic pulses is crucial and is guided by the resting motor threshold, the intensity necessary to cause a motor twitch in the thumb when stimulating over the appropriate section of the motor strip. Measurement of the motor threshold can be a time consuming process due to variation in the motor response, forcing clinicians to perform multiple trials. Much of this variation can be explained by variation in energy in the alpha and gamma band over the contralateral motor strip before stimulation. Our group has also studied the variation in the motor threshold over a 3-week course of TMS to assess changes in cortical activation. In addition, changes in the hemispheric alpha asymmetry were assessed in subjects receiving TMS. Finally the EEG at baseline and after one week of treatment with TMS was analyzed for the prediction of response after a full 3-week course. The absence of consistent changes in subjects recovering from major depression using fMRI/PET has led many investigators to pursue a network model of major depression. The network model has identified critical cortical areas, including the dorsal lateral prefrontal cortex. Existing evoked potentials show promise to selectively activate these critical cortical areas and verify the hypotheses suggested by the network model on a meaningful time scale.

12:30 PM–1:30 PM

KEYNOTE SPEAKER

Adventures in Neurofeedback: Progress and Pitfalls from fMRI and EEG Studies of Meditation

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Abstract

The field of neurofeedback is quickly growing, in both research and reputation, thanks in part to scientific and technological advancements over the past decades. Yet, it still struggles to gain prominence in the greater scientific and therapeutic communities. Mindfulness meditation has shared a similar coming of age story in the Western hemisphere, but is growing exponentially in scope ranging from research grants to clinical reimbursement. Are there parallels to these stories and lessons that can be learned? My laboratory at Yale University has been studying the clinical utility and neural mechanisms of mindfulness training with a focus on addictions. Beginning with performing some of the first randomized controlled trials for alcohol, cocaine and tobacco dependence, moving to delineating the neural mechanisms of mindfulness using fMRI neuroimaging, and then combining these to develop novel tools to measure cognitive states using fMRI and EEG source estimated neurofeedback, we have learned a great deal about what ingredients are necessary (and which are harmful) for successful recipes to disseminate and augment mindfulness training.

In this presentation, using mindfulness meditation as an example, I will describe hurdles and milestones that may be important for any successful venture aimed at characterizing clinical conditions, and therapeutic treatments targeted therein. Specifically, I will first describe clinical studies of mindfulness for addictions, highlighting psychological mechanistic insights that we gained which helped hone our clinical treatment of smoking cessation and develop novel smartphone-based delivery modalities. I will then outline fMRI neuroimaging studies of expert

meditators that furthered our understanding of the neural underpinnings of meditation. Next, I will describe several fMRI neurofeedback studies that we performed to confirm our findings and at the same time improve current techniques to link 1st person subjective experience with brain activity. Finally, I will discuss the development of a novel adaptation of beam-forming EEG source estimation algorithms for scientific (and eventual commercial) use for neurofeedback augmentation of mindfulness training and validation studies using meditators.

Summary

This presentation will discuss behavioral and neural mechanisms of mindfulness training. It will highlight how fMRI neurofeedback can be used to delineate and confirm neural correlates of behavior and cognitive states which can be of use in basic cognitive neuroscience. It will also describe how source-estimated EEG neurofeedback can be used for assessing cognitive states such as mindfulness neuroscientifically and augmenting them clinically. This presentation will benefit conference attendees in a number of ways, ranging from demonstrating how fMRI neurofeedback is useful scientifically to how EEG neurofeedback is useful commercially.

Financial disclosures

Judson Brewer is the founder of goBlue Labs, a Yale University startup aimed at translating neuroscientific insights into clinical use by pairing mindfulness training with EEG neurofeedback.

2:00 PM–6:00 PM

Vendor Workshops