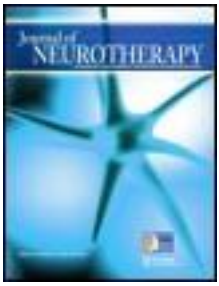

Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience

News from Other Journals and Websites

David Kaiser Editor PhD

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NEWS FROM OTHER JOURNALS AND WEBSITES

David Kaiser, PhD, Editor

Welcome to our journal club, a discussion of the newest papers and resources appearing in other journals or online. This section includes reviews of must-read papers, important EEG research, and findings about specific mental health and neurological conditions that may assist the neurotherapist. A list of the best online resources is also provided.

Authors are encouraged to submit reprints or preprints of recent research for review in this section. Everyone is encouraged to submit reviews of any peer-reviewed papers that may be relevant to the readership of this journal. Website recommendations are also requested. Send this material to David A. Kaiser, PhD at dakaiser@skiltopo.com or P.O. Box 491956, Los Angeles, CA 90049.

RECENT MUST-READ PAPERS

Brenham, S.M., Anderson, J.W., & Barry, R.J. (1999). Age related changes in quantitative EEG in attention-deficit/hyperactivity disorder. *Biological Psychiatry*, *46*, 1690-1697. With all the talk about theta/beta ratios and neurofeedback as a way to regulate high theta/beta ratios–either by beta training, theta suppression, or both–it is refreshing to finally see some meaningful work comparing measure-

ments of amplitude at single sites in ADHD persons vs. normal controls across ages. Bresnahan and colleagues give averages for power in delta, theta, alpha and beta bands at CZ, FZ and PZ for ADHD children, adolescents and adults as compared to controls. While this study lacks the power associated with the use of large standardized databases and cluster analysis of EEG subtypes, its simplicity lends to its usefulness as a reference point for single lead analysis for EEG biofeedback. Easy to read tables of absolute and relative power give us numbers for average bandwidths. The differences for theta/beta ratios comparing ADHD to normals diminish with age. Recommended reading for anyone doing single lead measurements and biofeedback for ADHD. For reprints, contact Robert Barry, Department of Psychology, University of Wollogong, NSW 2522, Australia. (*Reviewed by D. L. Trudeau, MD*)

Clinical Electroencephalography-Official Journal of the EEG and Clinical Neuroscience Society. 2000, *31(1).* This special issue, under Guest Editor Norman Moore, reviews the state of the art today for EEG biofeedback. It also contains the proceedings of the first annual meeting of the EEG and Clinical Neuroscience Society (ECNS). The issue includes seven articles that review EEG biofeedback for clinical applications. These include anxiety disorders, affective disorders, addictive disorders, schizophrenia, ADHD, TBI, and seizure disorder. Frank Duffy, associate editor for neurology for the journal, leads off with an excellent critique of the field of neurotherapy today. In ''The State of EEG Biofeedback Therapy (EEG Operant Conditioning) in 2000: An Editor's Opinion'' Dr. Duffy muses that if the wide spectrum of efficacy associated with EEG Biofeedback Therapy (EBT) were associated with a drug, it would be readily accepted. But it is not accepted in the halls of medicine, more on the basis of persistent biased opinion than on familiarity with its foundation in the literature. ''The more 'magical' and less logical theoretically based EBT appears to others, the more difficult it is for them to embrace the methodology.'' Some of this confusion, Dr. Duffy notes, is because of the existence of two very distinct theoretical models for EBT. The first is the classic alpha-theta model that uses a normally occurring brain rhythm to achieve a special state of mind, such as enhanced meditative states. The second is the conditioning of brain rhythms to achieve a specific medical outcome, as in ADHD or seizure control. Added to this bad

rep, there are factors of cost, labor intensity, and lack of rigorous clinical data on efficacy. There is a whole realm of unanswered questions that Dr. Duffy enumerates, including the types of protocols and montages most useful for a condition, the use of QEEG guided vs. blind protocol guided EBT, the use of EBT in conjunction with other modalities, the number of sessions, the end point criteria used and so forth. His commentary is suggested reading for anyone considering a study, and is a welcomed critique of the state of research today. Request reprints to Frank H. Duffy, MD, Neurology, Children's Hospital, 300 Longwood Avenue, Boston, MA 02115.

A number of excellent reviews appear in this issue.

For "*A review of EEG Biofeedback Treatment of Anxiety Disorders*" reprints contact Norman C. Moore, MD, Brain Research Center, 857 Orange Terrace, Macon, GA 31027.

For "*An EEG Biofeedback Protocol for Affective Disorders*," send reprint requests to J. Peter Rosenfeld, PhD, Department of Psychology, 102 Swift Hall, Northwestern University, Evanston, IL 60208-2710.

For "*The Treatment of Addictive Disorders by Brain Wave Biofeedback: a Review and Suggestions for Further Research*," send reprint requests to David L. Trudeau, MD, 116A4 VAMC, 1 Veterans Drive, Minneapolis, MN 55417.

For "S*elf Regulation of Electrocortical Activity in Schizophrenia and Schizotypy: a Review*," send reprint requests to John Gruzelier, PhD, Cognitive Neuroscience and Behavior, Imperial College of Medicine, St. Dustan's Road, London, UK.

For "*Treatment of Attention Deficit Hyperactivity Disorder with Neurotherapy*," send reprint requests to John K. Nash, PhD, 3300 Edinborough Way, Suite 110, Edina, MN 55434.

For "*EEG Operant Conditioning (Biofeedback) and Traumatic Brain Injury*," send reprint requests to Robert W. Thatcher, PhD, R and D Service-151, VAMC, Bay Pines, FL 33504.

For "*Basic Concepts and Clinical Findings in the Treatment of Seizure Disorders with EEG Operant Conditioning*," contact M. B. Sterman, PhD, Department of Neurobiology, UCLA Medical Center (CHS), 10833 LeConte Ave., Los Angeles, CA 90085-1763. (See review below.)

This entire issue of the journal is a mini-text of EEG biofeedback, and a valuable addition to any library of biofeedback. To obtain a copy of this issue, contact Clinical EEG, 805 W. Liberty Drive, Wheaton, IL

60187. E-mail: *clinicaleeg@aol.com*. Single issues of Clinical EEG may be purchased for $22, annual subscriptions are $66 within the US. You may order by check or credit card (Visa, M/C, AmEx, Discover) by providing full mailing information and expiration date of credit card. For information about ECNS and membership, contact ECNS, Brain Research Laboratories, New York University Medical Center, 550 First Avenue, New York, NY 10016 or e mail *moore_nc@mercer.edu.* (*Reviewed by D. L. Trudeau, MD*)

Sterman, M. B. (2000). Basic concepts and clinical findings in the treatment of seizure disorders with EEG operant conditioning. *Clinical Electroencephalography*, *31(1),* 45-55. In the late 1960s, M. Barry Sterman was investigating the properties of the sensorimotor (SMR) rhythm in cats by means of operant conditioning. He was training alert but motionless cats to increase 11-15 Hz EEG activity when along came the US Air Force who was concerned over the toxicity of hydrazine compounds, compounds widely used in rocket propellant. Sterman designed a study to investigate the convulsive properties of monomethylhydrazine. As was customary in such research, subjects (cats) had already participated in previous work. To his surprise Sterman discovered that cats from his SMR-augmentation study blew the dose-response curve. Prolonged SMR operant conditioning resulted in resistance to the drug-induced seizures–an entirely serendipitous finding and, as he says, a true ''double-blind'' design as neither he (nor the cats) anticipated these results. This incident is described in his recent paper, a review of SMR biofeedback training, particularly in terms of the role it plays in seizure remediation.

Sterman's first paper on SMR training in humans, published in 1972, detailed a single case study of generalized tonic-clonic seizures. Three months of twice-per-week operant conditioning of mid-central 11-15 Hz resulted in seizure cessation. The subject was subsequently withdrawn from medications after continued treatment in an expanded multi-subject study. Also documented in these early SMR training studies was the associated increase in sleep spindle density and decreased awakenings during non-REM sleep. So from the start, SMR biofeedback held a promise as a treatment of specific sleep disturbances. Sterman labors the point, often missed by those recent to the field of neurofeedback, that SMR training produces persistent physiological changes, notably in sleep. In fact, the degree of physiological

change, as reflected by incidence of SMR activity in stage two sleep, negatively correlated with post-training seizure rate.

Sterman lists all published reports of SMR training for epilepsy in peer-reviewed journals since 1972. Any meta-analysis of clinical studies is fraught with heterogeneities, such as subject, medication, and training variance. But in spite of these difficulties, a compilation of this large state-of-the-clinic population is relevant and helpful. A total of 174 epileptic subjects across eighteen studies have appeared in published papers. Of these 174, eighty-two percent demonstrated significant (greater than thirty percent) reduction, with a mean value exceeding fifty percent. Most, if not all, of these subjects sought out SMR training because available seizure medications were ineffective, making any changes beyond and above what current medical treatments could achieve. Two-thirds of subjects also showed EEG changes in response to training (where data were available).

Although training of other frequency bands has been attempted, the vast majority of epileptics respond only with SMR training. ''Training exclusively for the reduction of paroxysmal events, higher frequencies, or EMG activity, or for the enhancement of lower frequencies has been ineffective.'' By higher frequencies, Sterman refers to activity above the normal SMR range in humans (approximately 12-19 Hz). Later descriptions of elevated 4-7 Hz activity in both sleep and waking resulted in an adaptation of standard training protocols to include reduction training of this frequency band. (*Reviewed by David Kaiser, PhD*)

Abstracts of the following papers can be found at *http://www.snr-jnt.org/JournalNT/other.htm*

EEG THEORY AND PRACTICE

Kondacs, A., & Szabo, M. (1999). Long-term intra-individual variability of the background EEG in normals. *Clinical Neurophysiology, 10(10)*, 1708-1716. Long-term intra-individual variability across twenty-five months for most EEG parameters, especially total absolute power and alpha mean frequency, was less than the inter-individual variability in the normal population.

McCormick, D.A. (1999). Are thalamocortical rhythms the Rosetta stone of a subset of neurological disorders? *Nature Medicine, 5(12)*,

1349-1351. ''Dysrhythmias'' of the thalamocortical loop may be behind various types of neurological disorders.

Pfurtscheller, G. & Lopes da Silva, F.H. (1999). Event-related EEG/MEG synchronization and desynchronization: basic principles. *Clinical Neurophysiology*, *110(11)*, 1842-1857. Quantification of ERD/ERS is demonstrated topographically and temporally on various movement experiments.

Cantero, J.L., Atienza, M., Salas, R.M., & Gomez, C.M. (1999). Alpha EEG coherence in different brain states: an electrophysiological index of the arousal level in human subjects. *Neuroscience Letters*, *271(3)*, 167-170. Fronto-frontal and fronto-occipital coherence values in the alpha frequency band are useful indexes of brain arousal states.

Binnie, C.D., & Stefan, H. (1999). Modern electroencephalography: its role in epilepsy management. *Clinical Neurophysiology*, *110(10)*, 1671-1697. EEG assessments are important for answering specific questions that commonly arise in the management of seizure disorders.

Asada, H., Fukuda, Y., Tsunoda, S., Yamaguchi, M., & Tonoike, M. (1999). Frontal midline theta rhythms reflect alternative activation of prefrontal cortex and anterior cingulate cortex in humans. *Neuroscience Letters*, *274(1)*, 29-32. Using magnetoencephalogram (MEG) and EEG, the authors identified that the appearance of Fz theta during consecutive mental tasks may reflect alternative activities of the medial prefrontal cortex and anterior cingulate cortex.

Bremner, J.D. (1999). Alterations in brain structure and function associated with post-traumatic stress disorder. *Seminars in Clinical Neuropsychiatry*, *4(4)*, 249-255. PTSD is associated with reduced volume of the hippocampus and dysfunction of medial and orbital prefrontal cortex, brain areas important in memory and emotional regulation.

Teneback, C.C., Nahas, Z., Speer, A.M., et al. (1999). Changes in prefrontal cortex and paralimbic activity in depression following two weeks of daily left prefrontal TMS. *Journal of Neuropsychiatry and Clinical Neuroscience*, *11(4)*, 426-435. In depressed adults, ten days of prefrontal TMS affects prefrontal and paralimbic activity, which may explain its antidepressant effects.

MENTAL HEALTH AND NEUROLOGICAL DISORDERS

Baving, L., Laucht, M., & Schmidt, M.H. (1999). Atypical frontal brain activation in ADHD: preschool and elementary school boys and girls. *Journal of the American Academy of Child & Adolescent Psychiatry*, *38(11)*, 1363-1371. Compared to normals, ADHD boys exhibit less and ADHD girls more right-lateralization frontally at both four and one-half and eight years of age.

Swanson, J., Gupta, S., Guinta, D., et al. (1999). Acute tolerance to methylphenidate in the treatment of attention deficit hyperactivity disorder in children. *Clinical Pharmacological Therapy*, *66(3)*, 295-305. Acute tolerance to methylphenidate must be considered in treating children with attention deficit hyperactivity disorder.

Rappley, M.D., Mullan, P.B., Alvarez, F.J., Eneli, I.U., Wang, J., & Gardiner, J.C. (1999). Diagnosis of attention-deficit/hyperactivity disorder and use of psychotropic medication in very young children. *Archives of Pediatric & Adolescent Medicine*, *153(10)*, 1039-1045. Children aged 3 years or younger diagnosed with ADHD often exhibited comorbid psychiatric disorders, chronic health conditions, and injuries, calling into question diagnoses and psychotropic medication regimens.

Stein, M.A. (1999). Unraveling sleep problems in treated and untreated children with ADHD. *Journal of Child & Adolescent Psychopharmacology*, *9(3)*, 157-168. Children with ADHD treated with stimulants were three times more likely to exhibit nightly ''severe'' sleep problems than did untreated children with ADHD.

Evenden, J.L. (1999). Varieties of impulsivity. *Psychopharmacology (Berlin)*, *146(4)*, 348-361. Series of psychopharmacological studies, which measured selectively different aspects of impulsivity, suggest that several neurochemical mechanisms can influence impulsivity; impulsive behavior has no unique neurobiological basis.

Cherland, E. & Fitzpatrick, R. (1999). Psychotic side effects of psychostimulants: a 5-year review. *Canadian Journal of Psychiatry*, *44(8)*, 811-813. Of ninety-eight children who received stimulant treatment, six developed psychotic or mood-congruent psychotic symptoms during treatment.

Paradiso, S., Chemerinski, E., Yazici, K.M., Tartaro, A., & Robinson, R.G. (1999). Frontal lobe syndrome reassessed: comparison of patients with lateral or medial frontal brain damage. *Journal of Neurology, Neurosurgery, & Psychiatry, 67(5)*, 664-667. Lateral prefrontal damage disrupts mood regulation and drive whereas medial damage inhibits experience of mood changes.

Chambers, R.A., Bremner, J.D., Moghaddam, B., et al. (1999). Glutamate and post-traumatic stress disorder: toward a psychobiology of dissociation. *Seminars in Clinical of Neuropsychiatry, 4(4)*, 274-81. Glutamate release may be involved in dissociative states. Acute and long-lasting consequences of traumatic stress exposure are associated with hyperglutamatergic states.

Michaels, A.J., Michaels, C.E., Zimmerman, M.A., et al. (1999). Post traumatic stress disorder in injured adults: etiology by path analysis. *Journal of Trauma, 47(5)*, 867-873. PTSD occurred in 42.3% of injured adults six months after trauma and was related to assault, dissociation, female gender, youth, poor mental health, and prior illness.

Benazzi, F. (1999). Bipolar II versus unipolar chronic depression: a 312-case study. *Comprehensive Psychiatry, 40(6)*, 418-421. Chronic unipolar depression may be an intermediate state between bipolar depression and nonchronic unipolar depression.

Hoff, R.A., & Rosenheck, R.A. (1999). The cost of treating substance abuse patients with and without comorbid psychiatric disorders. *Psychiatric Services, 50(10)*, 1309-1315. Having a comorbid psychiatric diagnosis consistently increases the cost and utilization of services among patients with a primary diagnosis of a substance use disorder. The increased cost may reflect greater severity of illness among dually diagnosed patients, or it may indicate fragmented and inefficient service delivery.

Holland, P., & Mushinski, M. (1999). Costs of alcohol and drug abuse in the United States, 1992. Alcohol/Drugs COI Study Team. *Statistical Bulletin of the Metropolitan Insurance Company, 80(4)*, 2-9. Alcohol and drug abuse was $246 billion in 1992, nearly $1K for every American. Alcohol abuse and alcoholism accounted for 60%.

ONLINE RESOURCES

Mental health and neuroscience ''clearinghouses'' are listed below. Information by the pound! But try to avoid the most common error of the Information Age: mistaking information for knowledge.

At Health *http://www.athealth.com/*
Notable for its weekly newsletter (16,000 readers), directory of professionals, and large library of 3,500 links to mental health sites.

Mental health Net *http://mentalhelp.net/*
Perhaps the largest mental health website on the net. A strong online community site including scheduled chats, forums, site reviews, along with the basics.

Internet Mental Health *http://www.mentalhealth.com/*
A well-organized and exhaustive link library that also includes such original content as most-cited research for each disorder.

National Institute of Mental Health *http://www.nimh.nih.gov/*
Information on ongoing clinical trials, health statistics, funding and employment opportunities.

Yahoo *http://dir.yahoo.com/Health/Mental_Health/*
http://dir.yahoo.com/BusinessandEconomy/Companies/Health/Alternative/Biofeedback/
The Internet's largest directory service. Always a good place to start one's search. Links to dedicated sites, net events, and news.

Neurosciences on the Net *http://www.neuroguide.com/*
One-stop knowledge shopping for neurosciences: links to lists, software to societies.

Northern Lights *http://www.northernlight.com/*
The search engine with the greatest coverage (16% of the net). A search of neurofeedback sites reveals 3,400 entries.