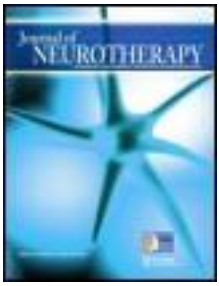

Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience

News from Other Journals and Websites

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Published online: 20 Oct 2008.

To cite this article: David A. Kaiser Editor PhD (2001) NEWS FROM OTHER JOURNALS AND WEBSITES, Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience, 4:4, 49-55, DOI: 10.1300/J184v04n04_08

To link to this article: http://dx.doi.org/10.1300/J184v04n04_08

NEWS FROM OTHER JOURNALS AND WEBSITES

David A. Kaiser, PhD, Editor

Our journal club continues this issue with a review of papers investigating circadian and ultradian rhythms in human EEG, along with a variety of interesting and (hopefully) relevant papers as well as a list of online resources.

Authors are encouraged to submit reprints or preprints of recent research for review in this section. Everyone is encouraged to submit reviews of peer-reviewed papers of interest to JNT's readership. Website recommendations are also requested. Contact David A. Kaiser, PhD at dakaiser@skiltopo.com or P.O. Box 491956, Los Angeles, CA 90049.

RECENT MUST-READ PAPERS

Circadian influences on human EEG were first identified 30 years ago (Scheich, 1969). In 1983, Gertz and Lavie observed significant ultradian rhythmicity in the EEG, at about 200 min per cycle, and they cautioned that, "The observed ultradian and circadian EEG rhythmicities could be spuriously interpreted as learning curves under a biofeedback paradigm." Three recent papers continue the investigation of time-of-day effects in QEEG.

Cummings, L., Dane, A., Rhodes, J., Lynch, P., & Hughes, A.M. (2000). Diurnal variation in the quantitative EEG in healthy adult volunteers. *British Journal of Clinical Pharmacology*, *50*, 21-26.

Cummings et al. (2000) recorded eyes closed and eyes open conditions in 18 subjects across a 24-hour period. Data were recorded every two hours and QEEG activity was summed across 17 recording sites. Prominent circadian effects in theta, lower alpha (7-9.5 Hz), and lower beta (12.75-18.5 Hz) were found, with peaks at mid-day for all three bands. As the circadian effect accounted for 20 to 30% of the change in group means, the authors suggested that any clinical design that does not control for time of day must show effects greater than 20% to be taken seriously. Future pharmaceutical trials using QEEG must be designed to minimize the time-of-day artifact.

Aeschbach, D., Matthews, J.R., Postolache, T.T., Jackson, M.A., Giesen, H.A., & Wehr, T.A. (1999). Two circadian rhythms in the human electroencephalogram during wakefulness. *American Journal of Physiology, 277,* 1771-1779.

Aeschbach et al. (1999) sampled EEG activity for 40 continuous hours from 19 subjects. Data were normalized and analyzed for either C3 or C4 recording sites. They reported two distinct circadian rhythms, and suggested possible mechanisms underlying these rhythms. Theta activity peaked one hour after the onset of melatonin secretion and high alpha activity (10.25-13 Hz) which exhibited a minimum close to the body temperature minimum.

Chapotot, F., Jouny, C., Muzet, A., Buguet, A., & Brandenberger, G. (2000). High frequency waking EEG: Reflection of a slow ultradian rhythm in daytime arousal. *Neuroreport, 11,* 2223-2227.

Chapotot et al. (2000) acquired EEG from four channels (F3, P3, C3, C4) in 12 subjects across the day. As in the two studies above, spectral power estimates were normalized before they were submitted to analysis. (Notably, each study applied different techniques to normalize their data: log transformation, percent from baseline, and z-score transformation, respectively.) To control for external influences, attentional and behavioral demands were set at a constant level by employing an eyes-open fixation task. Ultradian rhythms of 180-240 min were present in almost all frequency bands from 1 to 45 Hz, and faster rhythms, 70 to 120 min in cycle, were found for many of the bands.

Taken together, these studies, along with a growing literature of circadian and ultradian rhythms in QEEG, imply the need for caution in comparing data files acquired at different times of day.

REFERENCES

Scheich H. (1969). Interval histograms and periodic diurnal changes of human alpha rhythms. *Electroencephalography and Clinical Neurophsiology*, *26*, 442.

Gertz, J., & Lavie P. (1983). Biological rhythms in arousal indices: a potential confounding effect in EEG biofeedback. *Psychophysiology*, *20*, 690-5.

EEG AND NEUROIMAGING

Merkel, R.L., Cox, D.J., Kovatchev, B., Morris, J. Jr., Seward, R., Hill, R., & Reeve, R. (2000). The EEG consistency index as a measure of ADHD and responsiveness to medication. *Applied Psychophysiology and Biofeedback, 25,* 133-142.

A possible QEEG marker for ADHD: this index quantifies the transition between two easy cognitive tasks. In this replication study the EEG Consistency Index differentiated ADHD from non-ADHD boys, as well as ADHD boys on and off Ritalin.

Lloyd, D. (2000). Virtual lesions and the not-so-modular brain. *Journal of the International Neuropsychological Society, 6,* 627-635.

Cognitive neuropsychology has generally posited modularity of brain function; however a review of 36 functional neuroimaging studies suggests that functions are distributed over multiple regions, and most brain regions are multifunctional.

Koob, G.F. (2000). Neurobiology of addiction: Toward the development of new therapies. *Annals of New York Academy of Sciences, 909,* 170-185.

Review of drug addiction as a chronic functional dysregulation characterized by neurobiological changes that result in positive reinforcing effects of drugs and a vulnerability to relapse and re-entry into the addiction cycle.

Faraone, S.V., Biederman, J., Spencer, T., Wilens, T., Seidman, L.J., Mick, E., & Doyle, A.E. (2000). Attention-deficit/hyperactivity disorder in adults: an overview. *Biology Psychiatry, 48,* 9-20.

An emerging neuroimaging literature indicates that abnormalities in the same brain regions underlie both child and adult forms of ADHD.

Hale, T.S., Hariri, A.R., & McCracken, J.T. (2000). Attention-deficit/hyperactivity disorder: Perspectives from neuroimaging. *Mental Retardation and Developmental Disabilities Research Reviews, 6,* 214-219.

A recent review of neuroimaging studies indicates that dysfunction in arousal, inhibition, and attention may result from structural abnormalities in frontostriatal regions.

MENTAL HEALTH AND NEUROLOGICAL DISORDERS

Faraone, S.V., Biederman, J., Mick, E., Williamson, S., Wilens, T., Spencer, T., Weber, W., Jetton, J., Kraus, I., Pert, J., and Zallen B. (2000). Family study of girls with attention deficit hyperactivity disorder. *American Journal of Psychiatry, 157,* 1077-1083.

Familial transmission of ADHD is gender-blind. Relatives of ADHD girls show the same propensities for antisocial, mood, anxiety, and substance use disorders as boys.

Rey, J.M., Walter, G., Plapp, J.M., & Denshire, E. (2000). Family environment in attention deficit hyperactivity, oppositional defiant and conduct disorders. *Australian and New Zealand Journal of Psychiatry, 34,* 453-457.

Conduct disorder and oppositional defiant disorder are associated with poorer family environments, although ADHD is not. Improving the quality of family life, particularly in early childhood, may prevent the development of conduct problems.

Seidman, L.J., Biederman, J., Monuteaux, M.C., Weber, W., & Faraone, S.V. (2000). Neuropsychological functioning in nonreferred siblings of children with attention deficit/hyperactivity disorder. *Journal of Abnormal Psychology, 109,* 252-265.

Neuropsychological functioning of nonreferred siblings of children with ADHD is often impaired. Siblings with ADHD were impaired on the Stroop test and on verbal learning and memory.

Aronen, E.T., & Soininen, M. (2000). Childhood depressive symptoms predict psychiatric problems in young adults. *Canadian Journal of Psychiatry, 45,* 465-470.

Childhood depression at age 10 or 11 predicted young adult psychiatric symptoms, especially aggression, poor adaptive functioning, and low self-esteem.

Sherman, E.M., Strauss, E., Slick, D.J., & Spellacy, F. (2000). Effect of depression on neuropsychological functioning in head injury: Measurable but minimal. *Brain Injury, 14,* 621-632.

Regardless of severity, depression results in a small decline in neuropsychological functioning, particularly in visual attention and psychomotor skills.

Pliszka, S.R. (2000). Patterns of psychiatric comorbidity with attention-deficit/hyperactivity disorder. *Child and Adolescent Psychiatric Clinics of North America, 9,* 525-540.

One-fifth or more of children with ADHD also suffer from a learning disorder. Many children with ADHD are also severely emotionally labile, which may result in serious management issues for the clinician.

Bayliss, D.M., & Roodenrys, S. (2000). Executive processing and attention deficit hyperactivity disorder: An application of the supervisory attentional system. *Developmental Neuropsychology, 17,* 161-180.

ADHD individuals are impaired on tasks that require the inhibition of a strongly triggered response compared to learning disabled and normal children.

van Reekum, R., Cohen, T., & Wong, J. (2000). Can traumatic brain injury cause psychiatric disorders? *Journal of Neuropsychiatry and Clinical Neurosciences, 12,* 316-327.

Traumatic brain injury is strongly associated with mood and anxiety disorders, but not substance abuse or schizophrenia.

Beaubrun, G., & Gray, G.E. (2000). A review of herbal medicines for psychiatric disorders. *Psychiatric Services, 51,* 1130-1134.

Translating the results of efficacy studies of herbal medicines into effective treatments for patients is hampered by their chemical complexity, the lack of standardization of most preparations, and little controlled research.

Cohen, H., Benjamin, J., Geva, A.B., Matar, M.A., Kaplan, Z., & Kotler, M. (2000). Autonomic dysregulation in panic disorder and in post-traumatic stress disorder: Application of power spectrum analysis of heart rate variability at rest and in response to recollection of trauma or panic attacks. *Psychiatry Research, 96,* 1-13.

Differences in autonomic regulation, as measured by heart rate variability, are reported for PTSD and panic disorder compared to controls.

Quigg, M. (2000). Circadian rhythms: Interactions with seizures and epilepsy. *Epilepsy Research, 42,* 43-55.

Seizures are susceptible to circadian modulation, and thus experimental research must take into account time-of-day effects on seizure threshold and occurrence. A review.

ONLINE RESOURCES

Compared to most topics, QEEG information is barely present in the data smog we call "the Net." Here are some of the best QEEG articles available:

Introduction and Admissibility of Quantitative EEG
http://www.stark-stark.com/articles/law03.html
Explores the legal and medical controversy of using QEEG as a diagnostic tool.

Dr. Frank Duffy on Abnormal EEG's in CFS Patients
http://www.cfids-me.org/research/duffy.html
An interview from the Australian Broadcasting Corporation.

Mapping the Brain
http://www.epub.org.br/cm/n03/tecnologia/eeg.htm
A graphic-intensive introduction to EEG, its history, the technology.

Quantitative Analysis of EEG Signals: Time-Frequency Methods and Chaos Theory.
http://www.physio.mu-luebeck.de/user/rq/public1.htm
Published papers and a dissertation focusing on wavelet analysis of EEG.

Wavelet Digest
http://www.wavelet.org/wavelet/index.html
Preprint archive.

Psycoloquy
http://journals.ecs.soton.ac.uk/resource/psycoloquy
An online journal with interesting papers on brain rhythms and related topics.

Subtle Energies and Energy Medicine Journal
http://www.issseem.org/journal.html
Abstracts to past issues.

International Journal of Bioelectromagnetism
http://www.ee.tut.fi/rgi/ijbem/
Full text online of journal that investigates bioelectromagnetism; some EEG papers.

Journal of Theoretics
http://www.journaloftheoretics.com/
A peer-reviewed online journal with some interesting papers on EEG, along with more esoteric topics. Remember: "Science without theory, is science without direction."