

Significance of Slow Wave Sleep: Considerations from a Clinical Viewpoint

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Summary: Previous experimental observations, almost exclusively carried out with young healthy subjects, have been interpreted as showing a particular restorative role for human slow wave sleep (SWS). This article considers whether findings from polygraphic sleep studies in patients and elderly subjects lead to similar inferences about the meaning or "function" of SWS. The question was approached in three different ways: (a) by presenting results from a long-term study in elderly subjects whose SWS data were correlated with baseline medical and psychometric findings and with 5-year follow-up results; (b) by correlating nonmanipulated wake-time during days with parameters of SWS on subsequent nights in a group of 30 demented inpatients undergoing 72-h continuous sleep-wake recording; (c) by reviewing and comparing published polygraphic sleep studies for a number of psychiatric conditions. None of these three approaches provided unequivocal evidence for a clinically significant role for SWS. Reasons for the different outcome of SWS studies in young experimental subjects and clinical populations are discussed. **Key Words:** Slow wave sleep—Sleep stages—Sleep and old age—Dementia.

The significance or meaning of polygraphically defined sleep stages in humans has been discussed ever since their description in terms of electroencephalographic patterns (1) and following the discovery of REM sleep (2). Whereas REM sleep was related to dreaming and connections to psychological and psychopathological parameters were soon established, interest in slow wave sleep (SWS) emerged somewhat later. Experiments in young volunteers (3) supported earlier observations (4) that SWS denoted particularly "deep" sleep, as measured by the stimulus intensity needed to awaken a sleeping subject. Other findings, such as the occurrence of SWS in the first few hours of sleep and its increase as a function of previous time awake, e.g., after sleep deprivation, led to the assumption that SWS serves for physical restoration or, put more cautiously, that SWS marks a time in which restorative processes of the organism are taking place.

The discovery that the anabolic growth hormone is excreted mainly during SWS (5) supported the restoration hypothesis of SWS. This was further expanded by Oswald (6) and Adam (7), who adduced biological data to show that the purpose of sleep, and particularly SWS, was for tissue repair and growth. On the other hand, not all studies involving

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Slow Wave Sleep Its Measurement And Functional Significance

Ron Frostig



Slow Wave Sleep Its Measurement And Functional Significance:

Slow Wave Sleep, 1990 *Slow Wave Sleep* Michael H. Chase, Tom Roth, University of California, Los Angeles. Brain Information Service, 1990 **Understanding Sleep and Dreaming** William H. Moorcroft, 2006-09-04 Designed primarily as a text this volume is an up to date and integrated overview of physiological sleep mechanisms brain function psychological ramifications of sleep dimensions of dreaming and clinical disorders associated with sleep It is accessibly written with specially boxed material that enhances the text Authored by a researcher clinician professor with more than 25 years of experience in sleep studies Understanding Sleep and Dreaming provides a solid basis for those who are not expert in this area It offers a good foundation for those who will continue sleep studies while at the same time offering enough information for those who will apply this knowledge in other ways such as clinicians in their individual practices or researchers for whom sleep may be part of a specific study It is an excellent text for courses on sleep at the undergraduate and graduate levels

In Vivo Optical Imaging of Brain Function Ron D. Frostig, 2009-05-06 These are exciting times for the field of optical imaging of brain function Rapid developments in theory and technology continue to considerably advance understanding of brain function Reflecting changes in the field during the past five years the second edition of In Vivo Optical Imaging of Brain Function describes state of the art techniques a Sleep Science: Integrating Basic Research and Clinical Practice W. J. Schwartz, Julien Bogousslavsky, 1997 This book is published at a time when more and more advances are being made to bridge the gap between basic and clinical neuroscience It is primarily intended for scientists and clinicians intent on linking the neurobiology of sleep with its associated disorders Topics were selected that illustrate how contemporary research is being translated into clinical insights and therapies The contributed chapters were written by scientists actively working at the interface between basic and applied sleep science with subjects ranging from the mechanisms of intracellular signal transduction to the effects of ambient geophysical cycles Essays include the physiologic regulation of sleep and its homeostatic collapse the underlying neural and chemical circuitry and the biological basis for new therapies using melatonin and environmental light Sleep, Dreaming & Sleep Disorders William H. Moorcroft, 1993 This is a comprehensive review of sleep dreaming sleep disorders and the functions of sleep and dreams It is designed as a text for undergraduates in psychology biology nursing and related areas The author discusses sleep under the headings of measurement homeostatic rhythmic physiology and sleep in animals Dreaming is examined in the nature of dreams dream theories and dream interpretation In Vivo Optical Imaging of Brain Function Ron Frostig, 2002-05-15 The major advantage of in vivo optical techniques is the ability to study many levels of function of the CNS that are inaccessible by other methods This rapidly expanding field is multidisciplinary in nature and findings have thus far been scattered throughout the literature In Vivo Optical Imaging of Brain Function reviews the wide varie **Comprehensive Human Physiology** Rainer Greger, Uwe Windhorst, 2013-11-11 Comprehensive Human Physiology is a significantly important publication on physiology presenting

state of the art knowledge about both the molecular mechanisms and the integrative regulation of body functions This is the first time that such a broad range of perspectives on physiology have been combined to provide a unified overview of the field This groundbreaking two volume set reveals human physiology to be a highly dynamic science rooted in the ever continuing process of learning more about life Each chapter contains a wealth of original data clear illustrations and extensive references making this a valuable and easy to use reference This is the quintessential reference work in the fields of physiology and pathophysiology essential reading for researchers lecturers and advanced students *Sleep, Neuronal Plasticity and Brain Function* Peter Meerlo, Ruth M. Benca, Ted Abel, 2015-05-18 This book reviews current knowledge on the importance of sleep for brain function from molecular mechanisms to behavioral output with special emphasis on the question of how sleep and sleep loss ultimately affect cognition and mood It provides an extensive overview of the latest insights in the role of sleep in regulating gene expression synaptic plasticity and neurogenesis and how that in turn is linked to learning and memory processes In addition readers will learn about the potential clinical implications of insufficient sleep and discover how chronically restricted or disrupted sleep may contribute to age related cognitive decline and the development of psychiatric disorders such as schizophrenia and depression The book consists of 19 chapters written by experts in basic sleep research and sleep medicine which together cover a wide range of topics on the importance of sleep and consequences of sleep disruption This book will be of interest to students researchers and clinicians with a general interest in brain function or a specific interest in sleep **Current Issues in Developmental Psychology** A.F.

Kalverboer, M.L. Genta, J.B. Hopkins, 2012-12-06 This volume contains a number of contributions which concern basic issues in the field of brain behavioural development in the human especially with regard to the young child They have been written by distinguished scientists active in this field who have all been participating in an Erasmus teachers exchange program entitled Biopsychology of Development ICP NL 3026 14 This volume is the product of this cooperation The book is intended for scientists in this and related fields as well as for graduate students and advanced undergraduates as a means of updating their knowledge about human brain behaviour development It offers a contemporary review methodologically and theoretically of some basic issues in early human brain behaviour development Attention is paid to normal development and also to deviance as exemplified by discussions on child abuse and on early development of preterms and children of deaf mothers For the title of the book we have chosen for the term Developmental Psychology with as a subtitle biopsychological perspectives in order to express our interest in the basic requirements in the organism for an optimal adaptation during ontogeny as well as in the mechanisms underlying maladaptive behaviour The term may indicate that we are not just focusing on higher brain functions which would be suggested by the term Developmental Neuropsychology Further it is meant to express our interest in the integrated study of normal and deviant development without a particular focus on abnormality which would be suggested by the term Developmental Psychopathology **Encyclopedia of Sleep and**

Dreaming Mary A. Carskadon, 1993 Examines all aspects of sleep and dreaming Includes articles on adolescence and sleep aging and sleep all nighters animals dreams apnea bedwetting chemistry of sleep cultural aspects of sleep and dreams dreaming jet lag light and dark cycles psychological theories of dreams REM sleep sleep deprivation temperature effects on sleep and yawning

REM-sleep Homeostasis in the Rat Joel H. Benington, 1992

Medications and Sleep, An Issue of Sleep Medicine Clinics Timothy Roehrs, 2010-12-28 This issue comprises two parts The first part examines pharmacology of drug classes and effects on the sleep wake processes The second part focuses on therapeutics for various sleep disorders In the first part basic neuropharmacology of sleep wake states is discussed Other articles review hypnotics allergy and cardiovascular drugs anti convulsant drugs anti depressant and anti psychotic drugs and stimulants The second part focuses on pharmacology for specific sleep disorders primary insomnia co morbid insomnia sleep related breathing disorders narcolepsy and disorders of daytime sleepiness movement disorders parasomnias and circadian rhythm disorders

Psychophysiological States David S. Shannahoff-Khalsa, 2007-11-08 Our understanding of psychophysiological states are now more broadly defined by the inclusion of the lateralized ultradian rhythms of the autonomic and central nervous systems ANS and CNS that play a key regulatory role in mind body states These neural rhythms are a unique step in the evolution of the nervous system that have mostly been ignored or missed in our understanding of physiology mental activities brain rhythms and in the treatment of psychiatric disorders The multivariate physiological experiments reviewed in this book provide a new big picture for how the body's major systems ANS CNS neuroendocrine cardiovascular fuel regulatory gastrointestinal immune are regulated integrated and coordinated by the ANS via the hypothalamus during both waking and sleep This discovery has implications for psychiatrists psychologists stress physiologists cardiologists sleep researchers neuroscientists neuroendocrinologists cognitive scientists and those interested in performance anxiety depression schizophrenia autism and addictive and impulse control disorders This book includes the translational neuroscience aspect of this discovery including implications for vagal nerve stimulation studies This book is a study in Lateralized rhythms and Ultradian rhythms and their context in the ANS CNS a very new field Implications of these rhythms in Anxiety Depression and Schizophrenia will be explored The book will present theories of possible causes for the assignment of causal mechanisms of these lateralizations The reader will understand the Nasal Cycle the rhythmic alternating side to side fluctuation in nasal airflow which is regulated by the ANS Unilateral Forced Breathing techniques will be discussed Vagal nerve stimulation and its effects will be discussed Yoga breathing techniques are analyzed and theorized scientifically

Encyclopedia of Psychopharmacology Ian Stolerman, 2010-07-31 Here is a broad overview of the central topics and issues in psychopharmacology biological psychiatry and behavioral neurosciences with information about developments in the field including novel drugs and technologies The more than 2000 entries are written by leading experts in pharmacology and psychiatry and comprise in depth essays illustrated with full color figures and are presented in a lucid style **Patty's**

Toxicology, 6 Volume Set Eula Bingham, Barbara Cohrssen, 2012-07-31 Featuring the improved format used in the 5th edition this updated set presents in logical groupings comprehensive toxicological data for industrial compounds including CAS numbers physical and chemical properties exposure limits and biological tolerance values for occupational exposures making it essential for toxicologists and industrial hygienists This edition has about 40% new authors who have brought a new and international perspective to interpreting industrial toxicology and discusses new subjects such as nanotechnology flavorings and the food industry reactive chemical control to comprehensive chemical policy metalworking fluids and pharmaceuticals

Brain Imaging in Freely Behaving Animals David Michael Rector, 1995

Fibromyalgia and Other Central Pain Syndromes Daniel Jeffrey Wallace, Daniel J. Clauw, M.D., 2005 This volume is the first comprehensive text devoted to fibromyalgia and other centrally mediated chronic pain syndromes Leading experts examine the latest research findings on these syndromes and present evidence based reviews of current controversies Chapters discuss the definition epidemiology and pathophysiology of chronic pain and fibromyalgia the clinical presentations of fibromyalgia syndrome and central sensitization syndromes associated with chronic neuromuscular pain The contributors thoroughly examine various approaches to evaluation and management of patients with fibromyalgia and chronic pain Other chapters focus on disability issues prognosis and future research directions A critically reviewed listing of Websites and other resources is included

Neurophysiology and Psychophysiology G. C. Galbraith, M. L. Kietzman, E. Donchin, 2021-09-30 Originally published in 1988 in several respects this book is a tribute to the outstanding career of the late Donald B Lindsley 1907 2003 who over a span of more than 55 years had contributed greatly to the development of research in the fields of neurophysiology psychophysiology and experimental psychology The impetus for the book was a conference held at UCLA to honor Professor Lindsley for his numerous and significant contributions to psychology The chapters of this book have been written by Professor Lindsley's colleagues and co workers and by former students and postdoctoral fellows The introductory chapter written by Lindsley himself tells of 2000 years of pondering The chapter is a discussion of the lengthy history of neurophysiology psychophysiology and behaviour Many of the topics mentioned in this chapter are subsequently presented in the book as reports of ongoing research in the field

International Review of Neurobiology, 1982-07-28 International Review of Neurobiology

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