Novel Approaches to the Assessment of Frontal Damage and Executive Deficits in Traumatic Brain Injury
Brian Levine, Douglas I. Katz, Lauren Dade, and Sandra E. Black

in Principles of Frontal Lobe Function

Published in print: 2002 Published Online: May 2009 Publisher: Oxford University Press DOI: 10.1093/acprof:oso/9780195134971.003.0028

Traumatic brain injury (TBI) is a major cause of frontal brain damage. This chapter describes interrelated streams of research aimed at improving the specificity of behavioral and brain imaging assessment of TBI. It begins with a brief review of TBI neuropathology. It then examines the cognitive and behavioral consequences of traumatic brain injury.

Plasticity in visual development
Janette Atkinson

in The Developing Visual Brain

Published in print: 2002 Published Online: January 2008 Publisher: Oxford University Press DOI: 10.1093/acprof:oso/9780198525998.003.0009

This chapter examines human visual plasticity in relation to enhanced early visual input, early visual deprivation, perinatal brain damage, and congenital brain abnormalities. To answer these questions, the author draws together evidence from Visual Development Unit studies of visual development in: normal children with visual enhancement (through exposure to oblique lines in infancy to attempt to reduce the ‘oblique effect’); children and adults with Williams syndrome; term and very premature infants with perinatal brain damage including focal lesions; children with congenital cataract and strabismus; and children with refractive errors identified in the Cambridge Infant Screening Programmes of 9,000 normal infants. In general, the results fit animal models of visual deprivation with early differing critical periods of plasticity for different aspects of vision, but with the additional finding
that human visuo-cognitive development can also be compromised in a number of these conditions, related to early brain abnormalities and/or visual deprivation.

The assessment and treatment of emotional disorders
Guido Gainotti

in The Handbook of Clinical Neuropsychology

Published in print: 2010 Published Online: 2010 September
DOI: 10.1093/acprof:oso/9780199234110.003.022
Item type: chapter

This chapter begins with a discussion of how emotional disorders differ from other ‘neuropsychological’ disorders such as language, memory, attention, visuospatial exploration, etc. It then discusses taxonomies of emotions and their underlying theoretical models; neurological, psychological, and psychosocial factors causing disorders in brain-damaged patients; the major types of emotional disorders following brain damage; and assessment and treatment of emotional disorders following brain-damage.

VIII Interdisciplinary Approach to Rehabilitation
Klaus R.H. von Wild

in Luria's Legacy in the 21st Century

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DOI: 10.1093/acprof:oso/9780195176704.003.0009
Item type: chapter

This chapter discusses functional (early)-rehabilitation and outcome in neurosurgery since the number of patients with permanent brain damage (TBI) is growing as a result of the increased survival rate. Based on the literature explicatory case histories confirm that essential cognitive impairment and neuropsychological disability will ultimately determine the final degree of handicap and performance capacity following brain damage as classified by the WHO ICDH 2 and its new definition of disability. Early-Neurorehabilitation that respects all aspects of the individual's health related social, economic, and cultural aspects can successfully be performed by means of an inter-/transdisciplinary team approach. By contrast, in emerging countries, these preconditions are still generally lacking. The novel QOLIBRI QoL assessment tool integrates disease specific issues of TBI individuals in the long run, for example cognition, existential aspects etc that are missing in generic
tools. International societies like WFNR, WFNS, AMN, CNM, EMN, and QOLIBRI provide a more scientific understanding in neurorehabilitation and outcome.

Reprogramming the Cerebral Cortex
Stephen Lomber and Jos Eggermont (eds)

The brain has a remarkable ability to adapt in the event of damage — in many cases shifting responsibility for specific cognitive functions to other non-damaged brain regions. This ‘plasticity’ can be crucial in aiding recovery from stroke, trauma, and peripheral damage such as eye or ear damage. Over the past thirty years our view of cortical plasticity has evolved greatly. Early studies suggested that changes to cortical function due to peripheral lesions could only occur during development and that these plastic changes were specific to a particular temporal window or ‘critical period’. Over time, it has been demonstrated that cortical modifications as a consequence of either peripheral or central lesions can induce adaptive, or beneficial, changes in cortical function in an effort to preserve or enhance function. More recently, studies have identified that many of these adaptive changes, once thought only possible in the developing brain, are also possible in the mature or developed brain. At present, many laboratories are defining the beneficial capabilities of cerebral cortex plasticity, upon which many proactive and therapeutic strategies may be developed in order to maximise the ‘reprogramming’ capabilities of the cerebrum. This book describes these exciting studies and examines adaptive cortical plasticity in a variety of systems (visual, auditory, somatomotor, cross-modal, language, and cognition).

Origins and Development of Recollection
Simona Ghetti and Patricia J. Bauer (eds)

The ability to remember unique, personal events is at the core of what we consider to be “memory.” How does the vivid experience of reinstatement of our past emerge? What is the contribution of this experience to our life histories? These questions have intrigued psychologists, neuroscientists, and philosophers for decades, and are the subject of this volume. In recent years, the science of memory has
made extraordinary progress in the conceptualization and assessment of different forms of memory. Instead of thinking of memory as a monolithic construct, memory is now thought of in terms of dissociable classes of constructs. Within declarative memory, the type of memory that one can consciously access, we make distinctions between the constructs of recollection and episodic memory and the constructs of familiarity and semantic memory (respectively). Chapters in this volume discuss new methods to assess these types of memory in studies that refine our understanding of the functions necessary for conscious and vivid recollection. The work has led to substantial increases in our understanding of the building blocks of recollection and its developmental course. The volume also addresses the exciting new research on the neural basis of recollection. Never before has the connection between brain and function been so close. Chapters review neuroimaging studies of the healthy brain and neuropsychological investigations of patients with brain damage that reveal the specific brain structures involved in the ability to recollect. These brain structures undergo important developmental change during childhood and adolescence, leading to questions—and answers—of how the relationship between brain and function unfolds during the course of infancy, childhood, and adolescence.

Effects of Brain Damage on Human Tool Use
Georg Goldenberg

in Tool Use and Causal Cognition

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Item type: chapter

This chapter begins by questioning how the human brain accommodates man’s outstanding capacity for creating and using tools. The review of impaired tool use following brain damage demonstrated that, particularly when naturalistic multi-step actions and the use of technical devices are taken into consideration, lesions in many locations of both hemispheres can interfere with aspects of tool use. The chapter discusses disturbances of single-step actions with single tools and multi-step actions with multiple tools and objects.
Recovery and treatment of sensory perceptual disorders
C. Groh-Bordin and G. Kerkhoff

in The Handbook of Clinical Neuropsychology

This chapter discusses recovery from and treatment techniques for sensory perceptual disorders in the visual, somatosensory, and auditory modalities. There is growing evidence for the efficacy of cognitive rehabilitation in general, and visuoperceptual training in particular, for patients with brain damage. Systematic treatments of somatosensory dysfunctions are just developing, despite their frequency and relevance to the patient. Nevertheless, the techniques discussed provide promising approaches towards significant improvements to patients' disturbances.

The Handbook of Clinical Neuropsychology
John Marshall

The past thirty years have seen the field of clinical neuropsychology grow to become an influential discipline within mainstream clinical psychology and an established component of most professional courses. It remains one of the fastest growing specialities within mainstream clinical psychology, neurology, and the psychiatric disciplines. Updated to take account of these rapid developments, this book contains chapters that demonstrate the contribution that neuropsychological approaches can make to the assessment, diagnosis, and range of treatments for cognitive disorders following brain damage, as well as addressing the special considerations when treating the elderly. The book is divided into ten sections, covering everything from methodological and conceptual issues, functional neuroanatomy, and the historical context. Throughout, the content draws on contemporary neuroscientific techniques, focusing on the methods of functional imaging, cognitive psychology, cognitive neuropsychology, neuropsychiatry, and cognitive rehabilitation. It also provides background information on laboratory and research techniques, as well as covering relevant neurology and psychiatry.
Spatial disorders
Angelo Maravita

in Cognitive Neurology: A clinical textbook

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Item type: chapter

Our daily life is characterized by continuous interactions with the space around us. When we see an object of interest or hear the voice of a friend, we may wish to orient our eyes or head towards that sensory stimulation. Also, many times in the day, we grasp and manipulate objects of interest or tasty foods. In order to accomplish all these tasks we must keep a constantly updated representation of our own body and the external, or extrapersonal space. Such critical functions can be severely affected by brain damage. This chapter describes some of the deficits of spatial cognition that can be observed in clinical practice and relates to current knowledge about the neural substrates of space representation in the human and animal brain. The typical features of deficits of spatial awareness, both visuomotor and topographic, following brain damage are described with reference to the important body of knowledge relative to space representation in the animal and neurologically intact human brain.

Pathology of Visual Depth Perception
Ian P. Howard

in Perceiving in Depth: Volume 3 Other Mechanisms of Depth Perception

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Item type: chapter

Much can be learned about the visual system by studying clinical defects and abnormalities. Damage to the eyes or the visual cortex results in defects confined to a particular region of visual space. Damage to higher centers can produce visual neglect, which is an inability to attend to particular regions of space. Brain damage can also produce stereoanomalies or affect the way in which information is transferred between the eyes. Genetic defects such as albinism can also produce defects of stereoscopic vision. This chapter reviews all these pathologies.
Since the 1980s, MRI scanners have told us much about brain function and played an important role in the clinical diagnosis of a number of conditions — both in the brain and the rest of the body. Their routine use has made the diagnosis of brain tumours and brain damage both quicker and more accurate. However, some neuroscientific advances, in particular those that relate specifically to the mind have provoked excitement and discussion in a number of disciplines. One of the most thought provoking developments in recent neuroscience has been the progress made with ‘mind-reading’. There seems nothing more private than one's thoughts, some of which we might choose to share with others, and some not. Yet, until now, little has been published on the particular issue of privacy in relation to ‘brain’ or ‘mind’ reading. This book presents an interdisciplinary account of the neuroscientific evidence on ‘mind reading’, as well as a thorough analysis of both legal and moral accounts of privacy. The book considers such issues as the use of imaging to detect awareness in those considered to be in a vegetative state. It looks at issues of mental imaging and national security, the neurobiology of violence, and issues regarding diminished responsibility in criminals, and thus reduced punishment. It also considers how the use of neuroimaging can and should be regulated.

Disturbances of visual attention
Claus Bundesen and Thomas Habekost

in Principles of Visual Attention:: Linking Mind and Brain

A powerful way to understand how a system works is to observe what happens if one of its parts is damaged. This is the simple idea underlying research on brain disturbances, one of the main areas of cognitive neuroscience. This chapter begins by explaining the basic methodology of this field, the lesion method (Section 10.1). Visual attention can be disturbed in many ways after damage to different parts of the brain. As described in Section 10.2, these functional deficits can be classified broadly as lateralized (i.e., confined to one side of the visual field)
or non-lateralized (i.e., general). In recent years the classic study of naturally occurring brain damage has been supplemented by transcranial magnetic stimulation (TMS), in which normal brain activity is temporarily disturbed following magnetic stimulation (Section 10.3). Although still a fairly new method, TMS has clear methodological advantages that promise much for future research.

The neuropsychology of acquired calculation disorders
Marinella Cappelletti and Lisa Cipolotti

in The Handbook of Clinical Neuropsychology

Acalculia is an acquired disorder of number processing and calculation skills following cerebral damage. The inability to use numbers can be very incapacitating as it interferes with several everyday activities such as shopping, using bank accounts, and telephones. This chapter presents the basic components of the number and calculation system; discusses cases of selective impairment of number processing and calculation; discusses cases of selective preservation of number processing and calculation; briefly outlines the brain localization of number and calculation disorders; and proposes some guidelines for the assessment and rehabilitation of acalculia in neurological patients.

Steroids
James W. Fawcett, Anne E. Rosser, and Stephen B. Dunnett

in Brain Damage, Brain Repair

The adrenal cortex secretes a wide range of steroids. Nearly all attention has been focused on the role in brain damage of cortisol (or corticosterone, its counterpart in some species). Only recently have the powerful effects on neural function of other adrenal-derived steroids been recognised. The secretion of cortisol is highly labile. There are marked diurnal variations: highest levels coincide with the start of activity, irrespective of when that occurs (e.g. in the early morning in humans, but at the start of the night in rats and other nocturnal species).
In order to understand the Hippocratic revolution in medicine and how it led to the perception of the brain as the ruling member of the body, we must think of ancient Greece at three different but unequal points in time. These epochs can be designated Early Greece, the Golden Age of Greece, and the Hellenistic Era. Hippocrates lived from approximately 460 to 377 B.C., during the middle period or Golden Age of Greece. The three time periods are very different culturally. In each one, not only are there differences in government, religion, and the arts, but they also provide us with distinctly different views of the mind and the brain. This chapter also discusses the myths and legends surrounding the healing powers of Asklepios, son of Apollo and the nymph Coronis; medicine in Homer's epic poems Odyssey and Iliad; the Hippocratic Collection known as Corpus Hippocraticum, which had references to the brain and brain damage; and dissection, the nervous system, and the association between humor and disease.

Spatial extinction and its relation to mechanisms of normal attention

Jason B. Mattingley

This chapter addresses the various clinical manifestations of extinction and relates these to relevant data on attentional limits in normal subjects. It then offers an overview of recent findings from studies of extinction that have focused on cross-modal interactions, the influences of temporally asynchronous stimulation, motor competition, and perceptual grouping, and links these results where possible to relevant behavioral, neurophysiological, and brain imaging data. It concludes by considering the possible sites of brain damage that give rise to extinction, and suggests some fruitful avenues for future research. The studies reviewed show that competitive interactions provide a significant mechanism for the selective processing of sensory inputs in the normal
They also provide evidence that spatial extinction following unilateral brain damage reflects the outcome of biased competition between simultaneous contralesional and ipsilesional stimuli. The use of functional magnetic resonance imaging (fMRI) and event-related potentials has already begun to reveal the brain basis for unconscious processing in extinction.

The unseen and the unknown
Lawrence Weiskrantz

in Consciousness Lost and Found: A Neuropsychological Exploration
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Typically, those types of damages which cause serious loss of mental and physical capacities are what most people associate with brain damage. Surprisingly, in virtually all of the major cognitive categories that are disturbed by brain damage, there can be remarkably preserved functioning – without the patients themselves being aware of this. Examples of this ‘performance without awareness’ is the severe thery disorder known as amnesic syndrome and the phenomenon of blindsight, in which patients can make visual discriminations even though they are ‘blind’ as a result of damage to the visual cortex of the brain. This chapter attempts to give an indication of the type of evidence that exists for residual, so-called implicit, processing. The chapter concentrates on amnesia and blindsight. The chapter focuses on neural pathways and visual attributes on the former and the nature of the psychological disorder and patients’ commentaries on the latter.

Neuropsychological rehabilitation
James W. Fawcett, Anne E. Rosser, and Stephen B. Dunnett

in Brain Damage, Brain Repair
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An alternative approach to the management of patients with brain damage is the rehabilitation of behavioural and psychological skills. Rehabilitative approaches have been developed in particular in the context of treatment and recovery of non-progressive brain damage, as for example occurs in stroke and trauma, rather than
for progressive neurodegenerative disorders. This chapter reviews such approaches. Rehabilitation addresses both the development of behavioural and cognitive strategies that can allow patients to develop alternative strategies to achieve their goals, and the fact that behavioural experience and training can alter the course of the structural reorganisation itself.

**Primary sensory deficits after right brain damage—an attentional disorder by any other name?**

Peter W. Halligan and John C. Marshall

in *The Cognitive and Neural Bases of Spatial Neglect*

Published in print: 2002 Published Online: March 2012

This chapter provides a review of primary sensory deficits after right brain damage. It begins by presenting the historical basis for the conceptual divide between ‘primary’ and ‘high-level’ deficits. A number of converging studies have demonstrated that impairments such as visual field deficits, somatosensory disorders, and motor disorders, traditionally conceived as primary deficits, involve impairments of higher-order cognitive processes. The mere clinical fact that some patients show deficits on one set of tasks whereas others show deficits on other tasks does not in itself provide sufficient reason to justify a qualitative distinction between visual field deficit (VFD) and visual-spatial neglect (VSN).