

Preface

The burgeoning of molecular and genetic studies of neurological and developmental disorders has contributed to the continuing relevance of neuropsychological studies of medical disorders. Neuropsychologists who follow science have updated and expanded the tools of our field to increase understanding of the functional consequences of disease, disease progression, and treatments. Equally important are the theoretical models of neurocognition that have been developed and refined in conjunction with functional imaging and other tissue or neurotransmitter-specific neuroimaging techniques. Contributing to clinical neuroscience, neuropsychiatry, and developmental neuroscience requires a sophisticated understanding of the medical and biological elements and future directions in which progress is being made in order to remain relevant. The purpose of this book is to provide a current and cutting edge understanding of the various diseases and disorders covered within and their neuropsychological effects. The authors are academic clinicians and researchers who bring insight and carefully constructed explanations about their respective fields of research. The neuropsychological findings of the diseases and disorders that comprise this book are given in the context of the disease mechanisms. Rather than taking the route of quick summarization, the chapters are meant to be intently studied, as they are dense with information. These chapters should remain useful for a long time.

Handbook of Medical Neuropsychology: Applications of Cognitive Neuroscience aims to provide understanding of some topics that neuropsychologists confront frequently, such as cerebrovascular disease, dementia, learning disability, normal aging, and traumatic brain injury. These chapters provide incisive reviews of the state of the science, reveal the controversies in diagnosis, and give the current opinions about the most critical factors that characterize these diseases and variations of “normal” brain states (autism, cerebral palsy, and genetic disorders could also be characterized this way). All of the chapters will make the reader who immerses him/herself in the material ready to design a study or understand a clinical evaluation, by helping the reader to be oriented to the key issues, areas that lack clarity, and future directions.

Other diseases covered in this book are confronted less frequently, but are the focus of intense investigation, such as autism, cardiovascular disease, endocrine disease (diabetes), epilepsy, and HIV-AIDS. These chapters are particularly rewarding because of the wealth of information contained in them and the insights that the authors have given us. Those who wish to participate in the cognitive neuroscience of these fields through grant-funded research will find these chapters very valuable. Clinicians will be better able to understand the purposes of treatments and the neuropsychological behaviors of their patients.

Some diseases are included because they are actually relatively common, yet their neuropsychological symptoms and mechanisms are not often examined closely, such as various autoimmune diseases and endocrine disorders, hydrocephalus, migraine, neuro-oncologic disorders, stress disorders, stress/post-traumatic stress disorder, and toxic disorders/encephalopathy. These chapters are reviews that are broadly encompassing yet also focused on the inconsistencies and generalizations that are possible, based on the state of the science.

Today, neuropsychologists must integrate knowledge about neurodevelopmental disorders into their work, whether their focus is adults or children. We are fortunate to have such knowledgeable and elegant chapters about cerebral palsy, pediatric frontal lobe disorders, learning disability, and the language impairments of genetic disorders. These chapters are elucidating and will give the reader new insights.

There are also the chapters on classic, and in some cases not well known, medical diseases that have direct effects on brain functions: autonomic nervous system disorders, hepatic encephalopathy, movement disorders, respiratory disorders, and rheumatologic conditions. Again, these chapters remain true to analyzing their fields through the mechanisms of the disease and how these mechanisms encompass cognitive dysfunction.

There is one other subject of great interest that is still emerging and that is neuropsychologically understudied: mitochondrial disorders. I am grateful to the author, Kevin Antshel, who has taken the proverbial bull by the horns and given us knowledge about the biomedical tools we need to approach the neuropsychological investigation of these diseases.

Last, but most certainly not least, is rehabilitation. This book views this field from two perspectives. One gives the conceptual underpinnings of cognitive rehabilitation as it is carried out in the best brain injury cognitive rehabilitation centers extant. The other approach is the integration of neural brain mechanisms with human perception, to alter the way humans control their movements and balance. The chapter entitled *Sensory Reweighting: A Rehabilitative Mechanism* is included to inspire our present and future generations of neuropsychologists to use neuroscience technologies that integrate sensory information to modify behavior.

Another intent for this book is to provide critiques of the neuropsychological tests that are useful in tracking these diseases. The authors have striven not only to indicate what the tests have shown but also to show that recent research demonstrates that the most informative measures are those with high specificity even in relatively diffuse diseases. The goal was to point to the tests of cognition that are most informative regarding a disease process or disorder.

Finally, we will leave the reader with the insight of a scientist of the past, to remind us that we all can see most clearly if we stand on the shoulders of those who came before us. Neils Bohr, a physicist of the twentieth century whose work was critical for the development of quantum theory, said that the opposite of a truth is a falsity, but the opposite of a deep truth is often another deep truth.



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