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BOOK REVIEWS

The Heart of the [Gray and White] Matter

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Neuropsychology and Cardiovascular Disease. Ronald A. Cohen and John Gunstad (Eds.). (2010). New York: Oxford University Press, 416 pp., $85.00 (HB).

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Epidemiological studies of heart disease as a risk factor for dementia, as well as neuropathological confirmation that cerebral vascular changes are common in patients with Alzheimer's disease, are just a few of the findings over the past two decades that have reinforced the interrelationship between cardiovascular health and brain health. *Neuropsychology and Cardiovascular Disease*, edited by Cohen and Gunstad, provides an important reminder that we need to think outside the box and appreciate this critical balance when we evaluate the neuropsychological status of our patients. The volume fulfills its promise to "provide an integrated review of what is known about how heart and systemic vascular disease affect the brain and to also provide clinicians with insights on how to approach the neuropsychological assessment and treatment of patients with cardiovascular disease." These goals are accomplished via an approach that weaves both basic science and clinical research. The 20 succinct chapters comprising this volume highlight the most salient findings to date, as opposed to monotonously describing one study after another. As a result, the take-home messages are clear. Each chapter is well-referenced, allowing the interested reader to further pursue a particular topic.

In the Introduction to the volume and in Chapter 1, Cohen provides a conceptual framework to explain the link between cardiovascular disease (CVD) and brain dysfunction. The model emphasizes the disruption in cerebral blood flow that occurs due to the effects of heart failure in reducing cardiac output (the heart's "pumping capacity"), and also via systemic vascular factors such as endothelial dysfunction that affect autoregulatory processes necessary for the brain to compensate for inadequate blood supply; "…the impact of heart disease on the brain is ultimately a function of the effect of the integrity of cardiac output over time and the ability of the brain to adjust to changes or disruptions in cerebral blood flow" (p. 27). The remaining chapters in the Overview section cover topics including the epidemiology of CVD and the association between comorbidities such as sleep apnea and cognitive functioning (Chapter 2: Gunstad, Benitez, Yadavalli, & Szabo), and the basic physiology of the heart and the various conditions which result in heart failure (Chapter 4: Fung & Poppas). Chapter 3 (Lane, Maloney, & Paul) on vascular dementia is historically interesting in demonstrating how far the field has advanced from the older model of "Multi-infarct dementia" causing a focal neurobehavioral syndrome and a stepwise deterioration (Hachinski, Lassen, & Marshall, 1974), replaced by the framework of "Vascular Cognitive Impairment" (Bowler & Hachinski, 1995) which incorporates subtle cognitive and personality changes that gradually progress over time. Chapter 5 (Forman & Suaya) describes the evolution of cardiac rehabilitation to a comprehensive risk reduction method that emphasizes physical exercise as well as the importance of a healthy lifestyle and the control of vascular comorbidities. Clinical trials examining a benefit between physical exercise and improved cognitive functioning in cardiac patients are described. In the last chapter of the section, Hughes and Casey highlight the relationship between depression and heart disease, emphasizing that depression is not simply a psychological reaction to illness. The authors describe the interrelationships among reduced vagal control of the heart, chronic inflammation, and depression.

Part II, entitled *Neuropsychological Effects of Cardiovascular Disease* (Chapters 7–11), will be of particular interest to clinicians since each chapter discusses the cognitive and emotional consequences of CVD. Chapter 7 (Cohen, Gunstad, & Benitez) highlights the fact that while CVD typically produces impairments such as slow information processing speed and executive dysfunction, there is no single phenotype that emerges. Rather, the presence and pattern of cognitive impairments reflect a complex interaction among factors such as the type of heart disease, the presence of comorbid vascular risk factors, and a past or current history of strokes. The authors provide a suggested list of neuropsychological measures to evaluate different cognitive domains. In Chapter 8, Gunstad and colleagues present findings on the effects of blood pressure on neurocognitive functioning. Although clinicians typically concentrate on the

adverse impact of high blood pressure on cognition, the authors present research demonstrating that hypotension can also result in dysfunction, most likely the result of reduced cerebral perfusion. The authors present an interesting study demonstrating that increases in blood pressure in patients with chronic hypotension are associated with improvements in cerebral blood flow and cognitive performance (Duschek, Hadjamu, & Schandry, 2007). The remaining chapters in Part II discuss the effects of the metabolic syndrome, cardiac surgery, and heart failure on neuropsychological outcomes. Taylor and MacQueen (Chapter 9) deconstruct the metabolic syndrome into its components in order to understand the mechanisms by which hypertension, obesity, glucose dysregulation, and dyslipidemia each affect cognition. Browndyke and Smith (Chapter 10) review perioperative complications associated with cardiac procedures. The importance of adequate cerebral perfusion during surgery as neuroprotective against neurological insult is highlighted. The final chapter by Hoth concludes with a discussion of the relationship between heart failure and cognitive function, emphasizing the need to develop a comprehensive model that considers the interactive effects of demographic, genetic, comorbid medical conditions, and treatment effects on cognitive outcome.

Although readers may find the information highly technical at times, the chapters in Part III, *Systemic and Cerebrovascular Mechanisms Underlying VCI*, lead to an appreciation of how state-of-the-art advances in cardiac and brain imaging have elucidated not only the effects of cardiovascular disease and systemic vascular factors on brain function, but also the mechanisms that mediate these relationships. Following an overview of the causes and clinical presentation of cardioembolic stroke (Chapter 12: Duffis and Fisher), subsequent chapters describe measures for assessing cardiac performance and cerebral perfusion (Chapter 13: Irani), endothelial integrity (Chapter 14: Miller, Haynes, & Moser), arterial dysfunction (Chapter 16: Hunt), and autonomic nervous system disease (Chapter 17: Allan). Serrador and Milberg (Chapter 15) discuss the mechanisms involved in cerebral blood flow autoregulation, highlighting the importance of chronic hypoperfusion to cerebral white matter damage and both executive dysfunction and fall risk in the elderly. The chapters on structural and functional brain imaging (Chapter 18: Csapo et al.; Chapter 19: Sweet, Haley & Cohen) describe the techniques that have contributed to our understanding of the effects of subtle microvascular disease and loss of connectivity on neurocognitive performance. The final chapter by Lamar and colleagues concludes with a discussion of the relation between subcortical white matter disease and the dysexecutive syndrome, hypothesizing that a disruption of basal ganglia and thalamic gating pathways underlies this relationship. The authors emphasize the communality of such disruptions across a number of neurodegenerative disorders, including Alzheimer's disease.

In summary, *Neuropsychology and Cardiovascular Disease* offers a comprehensive review of all facets of CVD, including its causes, associations with other vascular risk factors, delineation of these effects on brain functioning, and treatment approaches. As a result, the volume will be extremely useful for neuropsychologists interested in understanding the mechanisms by which CVD affects cognitive and emotional functioning.

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Developmental Social Neuroscience Is a Neuropsychological Function, too!

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Handbook of Developmental Social Neuroscience. Michelle DeHaan and Megan Gunnar (Eds.). (2010). New York: The Guilford Press, 558 pp., $85.00 (HB).

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The *Handbook of Developmental Social Neuroscience* is a comprehensive collection of chapters written by leading researchers in the area of the development of social neuroscience summarizing the explosion of research in "the investigation of how social and biological factors interact during development." This book consists of 25 chapters in six sections. It is particularly wide-ranging and most chapters have an important role in the volume, although some overlap in information is present. The first chapter provides a thorough description of the history of social neuroscience and why it is important to study development. The Introduction by de Haan and Gunnar alone is a first-rate summary of both this volume's collection of chapters as well as of the extant research in developmental social neuroscience. Section II,