
BOOK REVIEWS

Brain Imaging Revisited

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Handbook of Functional Neuroimaging of Cognition, Second Edition. 2006. Roberto Cabeza and Alan Kingstone (Eds.), Cambridge, MA, The MIT Press, 480 pp., \$65.00 (HB)

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The first edition of the *Handbook of Functional Neuroimaging of Cognition*, edited by Roberto Cabeza and Alan Kingstone, was a welcome addition to the cognitive neuroscience field when it was published in 2001. There were chapters on the history of neuroimaging and analysis, and all the major cognitive areas that had been studied at the time, written by senior people in their respective areas. That a second edition has appeared so soon after the first is a testament to the rapid growth of the cognitive neuroscience field, which is both gratifying and somewhat daunting to those of us who vainly attempt to keep up with this burgeoning literature. The same authors as in the previous edition write some chapters, but many have been penned by different authors, equally well known in the field, which is also a sign that the field is healthy and growing.

The second edition follows the same approach and format as the earlier edition. The volume is divided into three parts: the first contains chapters on history and methodology; the second covers the major studied cognitive domains, such as attention, language, and various forms of memory; and the final part contains chapters on developmental and clinical applications of functional neuroimaging. Each chapter begins with a general overview that introduces the theories and empirical work that have influenced the topic area. This is followed by a comprehensive review of the imaging literature. Each chapter then ends with a section on currently unresolved issues. These latter sections are particularly useful for students or those who are relatively new to the field, as they serve as “reality checks” on the limitations of the methods and results to date. For example, the chapter on experimental design and analysis covers some of the common pitfalls of functional magnetic resonance imaging (fMRI) studies and encourages the reader to look carefully at how the various pre-processing steps influence the data. This is good advice that the novice needs to hear, and that the expert needs to be reminded of once in a while as well. I also found the introductory chapter on the history of functional neuroimaging quite useful. Today’s user of fMRI should know about the earlier ways of measuring brain blood

flow and function, if for no other reason than to gain a better understanding of what is actually being measured. Another interesting discussion can be found in the chapter on attention, which concludes with the suggestion that future experiments should begin to focus more on “real world” cognitive processes and to study how people behave in complex environments. As this would entail giving up some experimental control, which many might be unwilling to do, this is a thought-provoking suggestion that should generate much discussion in classrooms where this volume is used as a textbook.

There are several improvements over the previous edition. A separate chapter on the principles of fMRI has been added, which will serve as an introduction to the methodology. The editors made a wise choice in selecting the authors of this chapter (Song, Huettel, and McCarthy), and interested readers would be well served by following up with more detailed perusal of the excellent text on fMRI by these authors. In particular, the section on the physiological basis of fMRI is rather brief here, so the reader interested in this important area of research will have to go elsewhere. Another advantage of this edition is that there are new chapters in the section on clinical applications. The previous edition covered cognitive aging and neuropsychologically impaired patients, whereas the new edition also has chapters on childhood development and social cognition. Both of these are welcome additions; in particular, the recent surge of interest in social cognitive neuroscience makes this chapter necessary. Finally, executive functions also get a dedicated chapter, reflecting the continued interest in these processes.

Despite my overall favorable opinion of this new edition of the *Handbook of Functional Neuroimaging of Cognition*, I do have some criticisms. One rather serious oversight is the omission of any discussion of network approaches to image analysis. A chapter on this approach was included in the first edition, and it is not clear why this was not included again. This omission is especially surprising, given that this type of analytic approach, and the theoretical stance that lies behind it, are growing in popularity and influence. It

also would have been nice to have some coverage of analytic techniques such as predictive modeling or multi-voxel pattern analysis, but perhaps these are too new to have been included, given the typical lag times in book publishing. Another limitation is that the Issues sections, which are so valuable, are uneven. As already mentioned, this section in the analysis chapter is quite extensive and thorough; however, in other chapters this is not the case. In the chapter on episodic memory, for example, the Issues section is very brief and not of much use. This is unfortunate, as the literature on episodic memory and functional neuroimaging is quite extensive and this would have been a good opportunity to discuss some of the controversies in this area.

Nevertheless, these criticisms do not detract from the ultimate usefulness of this book. I think the *Handbook of Functional Neuroimaging of Cognition, Second Edition*, will appeal to a wide readership, and will be most helpful to those teaching courses in cognitive neuroscience as well as to researchers in this field who wish to learn about areas outside their own area of expertise. The editors have successfully combined in one volume a broad survey of how functional neuroimaging is accomplished and how neuroscientists have applied it to the study of human cognition. It will certainly be one of the books that I will recommend to new students and postdoctoral fellows, at least until the third edition comes out.

Effects of Alcohol and Nicotine on the Developing Brain: An Authoritative Guide

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Brain Development: Normal Processes and the Effects of Alcohol and Nicotine. Michael W. Miller (Ed.). 2006. New York: Oxford University Press, 424 pp., \$98.50 (HB)

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The process of brain development is an essential yet often overlooked area in the neuropsychological literature. The topic has a natural appeal to those who work with children where developmental disorders predominate. However, it is often more difficult for those who work with adults to appreciate the role of developmental aberrations and their contribution to pathological processes that may seem far removed from the early developmental history of our patients. The tendency for some to deemphasize early developmental influences may stem in part from a lack of clarity about how common toxin exposures, such as alcohol and nicotine, alter normal brain development and contribute to changes in cognitive function. Increasingly, evidence of early developmental influences has emerged in a host of epigenetically-based developmental disorders and neuropathological conditions, such as schizophrenia, and these influences are also implicated in theoretical models, such as cognitive reserve.

Since alcohol and nicotine represent the two most common prenatal toxins it was inevitable that there would eventually be a book devoted to the developmental consequences of these substances, and the authors' decisions to contribute to this book are not misguided. *Brain Development: Normal Processes and Effects of Alcohol and Nicotine*, edited by Michael W. Miller, offers an excellent conceptual basis for normal brain development. This volume describes at length the theoretical and experimental bases for abnormal brain development in response to alcohol and nicotine exposure. There is an underlying theme throughout the book that disruption of normal brain development leads to an array of developmental disorders, outlined through successive chap-

ters in terms of disruption of ontogenetic processes. There is excellent coverage about our current understanding of alcohol and nicotine interference with brain development, albeit primarily at a cellular level, and a valuable context is provided for consideration of developmental resilience. Though these two toxins have very similar effects, their differences are periodically highlighted.

The volume is divided into three sections. A brief editorial introduction is provided first, with mention of how models of neurotoxicity provide insight into normal development (Chapter 1). Section 1, *Normal Development*, highlights normal brain development and the orderly sequence of basic ontogenetic processes—cell proliferation, migration, differentiation, and death. There are 6 chapters, including: Cell Proliferation (Chapter 2), Neuronal Migration (Chapter 3), Neuronal Differentiation: From Axons to Synapses (Chapter 4), Cell Death (Chapter 5), Intracellular Pathways (Chapter 6), and Developmental Disorders and Evolutionary Expectations: Mechanisms of Resilience (Chapter 7). Section 2, *Ethanol Affected Development*, includes 11 chapters and surveys the developmental consequences of alcohol exposure, including: Prenatal Alcohol Exposure and Human Development (Chapter 8), Influence of Alcohol on the Structure of the Developing Human Brain (Chapter 9), Prenatal Ethanol Exposure and Fetal Programming: Implications for Endocrine and Immune Development and Long-Term Health (Chapter 10), Early Exposure to Ethanol Affects the Proliferation of Neuronal Precursors (Chapter 11), Effects of Ethanol on the Regulation of Cell Cycle in Neuronal Stem Cells (Chapter 12), Mechanisms of Ethanol Induced Alter-