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## Imaging the Mind: Neuroimaging Clinics of North America

*AJNR Am J Neuroradiol* 2008, 29 (10) e101-e102

doi: <https://doi.org/10.3174/ajnr.A1053>

<http://www.ajnr.org/content/29/10/e101>

This information is current as  
of August 22, 2025.

## BOOK REVIEW

### Imaging the Mind: Neuroimaging Clinics of North America

C.C. Meltzer and S. Mukherji, eds. Philadelphia: WB Saunders; 2007, 178 pages, 43 figures, 5 tables, \$103.00.

I was a bit taken aback when I first received my review copy of *Imaging of the Mind*, the latest installment of *Neuroimaging Clinics of North America*. The title itself is a marked departure from the relatively bland titles that have graced most previous volumes (*Angioplasty and Stent Placement for Atherosclerotic Cerebrovascular Disease*, *Spinal Imaging*, and *Intracranial Aneurysms*, just to name a few) and provides few clues about the actual content of the volume. That a publication priding itself on presenting practical and state-of-the-art reviews would tackle a topic as ostensibly philosophic and abstract as “the mind” was somewhat perplexing to me, and I was unsure of what I would find lurking within the pages of the book.

A quick perusal of the table of contents reveals an interesting mix of 12 chapters. An insightful and articulate opening chapter entitled “Imaging of the Mind: Yesterday’s Triumphs and Tomorrow’s Challenges” takes the reader on a historical journey through mankind’s attempts, through both science and philosophy, to understand the human mind—from René Descartes’ 17th century theory of mind/body dualism to modern day functional brain imaging (fMRI) and positron-emission tomography (PET). In this chapter, the author is faced with the unenviable task of trying to define the human mind in a framework that allows intelligent discussion in the more unambiguously “scientific” chapters that follow. Questions of how one uses decidedly “physical” imaging techniques to investigate what is essentially an abstract notion are raised and subsequently left for the reader to ponder.

After the introductory chapter, the editors veer away from the philosophic realm and begin to focus on the more “scientific” side of the topic. The remaining chapters composing the first half of the book cover specific structural and functional brain imaging techniques, including diffusion tensor imaging, PET, and fMRI. Chapters covering statistical analysis of functional imaging data, imaging genetics, and mapping of cognitive function and brain connectivity are also included.

Among the highlights from the first half of the volume is the second chapter, entitled “Visualizing White Matter Pathways in the Living Human Brain,” which presents a very accessible review of diffusion MR white matter imaging. The basics of diffusion tensors are reviewed, and more advanced nontensor diffusion imaging techniques, including high angular resolution diffusion imaging and diffusion spectrum imaging, are also covered. The chapter

concludes with an illustrative case study of callosal agenesis, demonstrating how diffusion MR imaging is applied to the study of aberrant white matter connectivity. The chapter is amply illustrated with excellent figures, though the figure legends tend to be a bit verbose.

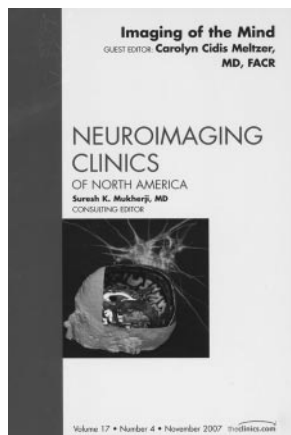
The second half of the volume focuses on several potential clinical applications of these newer imaging techniques, with an emphasis on neuroimaging in neuropsychiatric disorders such as functional pain, autism, mood disorders, posttraumatic stress disorder (PTSD), and substance abuse. These chapters are generally well-written, thorough, and well-referenced and do an excellent job of reviewing how data from modern structural and functional neuroimaging experiments have shaped our understanding of these diseases. Several of these chapters—namely those on autism (no figures), mood disorders (1 figure), and substance abuse (1 figure)—would have benefited from more imaging examples. In addition, there are several instances in which inclusion of contrasting examples of normal finding within figures would have been useful. For example, figure 2 in the chapter on imaging of PTSD, which demonstrates the failure of medial prefrontal activation in a subject with PTSD during exposure to stressful stimuli, would have benefited from side-by-side comparison with a control subject without PTSD to help highlight and contrast the abnormal findings. A number of figures would also have benefited from an occasional arrow or annotation.

The final chapter of the volume is a review of the role that neuroimaging plays in legal affairs in the United States. This chapter discusses how imaging studies are used in criminal and civil trials (eg, to support claims of incompetence by plaintiffs or claims of damage to plaintiffs), standards of admissibility of radiographic studies as evidence, and potential ethical considerations that are raised when imaging is introduced in the courtroom. Although well-written, informative, and imminently readable by those without a legal background, the chapter seems a bit out of place in the context of the preceding chapters and would perhaps have been more appropriate for a book on medical ethics.

The architects of this volume (guest editor Carolyn Cidis Meltzer and consulting editor Suresh Mukherji) certainly did themselves no favors by choosing to tackle such a broad and potentially slippery topic as the human mind. The relative ambiguity of the subject was problematic because it never became clear to me what the true intent of the publication was. Perhaps the editors would have been better served by narrowing the focus of their discussion and selecting a less provocative title (*Neuroimaging in Mental Illness* perhaps?), thus avoiding some of the confounding philosophic issues that may arise when one is examining the human mind.

As stated earlier, this work is a definite departure from previous volumes of *Neuroimaging Clinics*, and it will most likely not appeal to some regular readers. Most of the chapters are generally less practical clinically than past chapters in the series and are, therefore, probably better suited to academicians actively involved in the functional brain imaging or mental illness research than to neuroradiologists working in busy clinical practices.

Ultimately, what is presented between the covers of the book, though certainly thought-provoking, presents only a small piece of what is clearly a much larger and complex puzzle.



zle. In his introductory chapter, R. Nick Bryan writes: “Do current functional neuroimaging techniques even address the neural mechanisms of thought? Certainly not directly, and possibly not at all. . . .” He goes on to write, “What is actually being imaged? Blood flow: yes; glucose metabolism: yes; neurotransmitters: yes; thoughts: no.” Although new neuroimaging techniques demonstrate great promise for expanding our understanding of the workings of the human brain, we are still light years away from being able to unravel the intricate microscopic processes that dictate phenomena such as consciousness, memory, thought, emotion, and spirituality—all

of which play a role in defining our rather messy conceptualization of the human mind. Although this is certainly debatable, I would suggest that any claims that current techniques allow us to actually “image the mind” are very premature. Nonetheless, the chapters presented in this volume of *Neuroimaging Clinics* raise a number of questions that emphasize what a vast unexplored organ the human brain remains and that will certainly fuel further investigation by the scientific community for years to come.

DOI 10.3174/ajnr.A1053