

ground carries far more importance than mere nostalgia for aging aficionados of memory. Indeed, it is the foundation of current psychological constructs of memory that have all too often become reified in the hands of current writers who have no historical perspective and proclaim that pre-2000 Medline or PsychAbstracts publications are dated.

Chapters 6 and 8 are especially compelling. The exposition of chapter 6 provides a lucid unfolding of concepts and results, highlighting through demonstration, the importance of animal models in the ultimate identification of the locus of lesions essential for inducing specific forms of amnesia for declarative information. Following Milner's landmark observation of global amnesia resulting from bilateral resection of medial temporal lobe structures, decades of research ensued in rigorous attempts to create an adequate animal model of global amnesia. The recounting of the unfolding of these lesion studies to test specific hypotheses regarding the single medial temporal lobe structure responsible for the laying down of new memories was as exciting as any novel and captured the experience and contention of the times. Chapter 8 is a careful review of neuron activity related to mnemonic processing. The authors' facility in writing makes it obvious that they have a first-hand understanding of the importance and nuances of elegant manipulations of environment and learning contingencies relevant to animal studies. The evidence presented from behavior and cell recordings conducted in the rodent model was anything but loose associations of studies published by the authors, included here with the sole intention

of inflating the reference section with their own work. Instead, these studies were selected to address particular critical theoretical issues of hippocampal function not amenable to controlled and experimental study in humans.

The organization of the book makes clear the central theme of multiple memory systems both in terms of psychological constructs and neurological substrates. Although this theme is certainly not novel to Eichenbaum and Cohen, their treatment of the nonunitary nature of memory is a serious attempt to define with clarity and evidence memory's distinct components, to identify brain structures supporting each component, and to propose a scheme whereby these disparate processes may cooperate. A strength of this author pair is that each has a fundamental appreciation for complementary lines of evidence, one line from animal research and another from human research, and each has conducted important studies in both domains.

The finale is a highlight. The conclusion is the perspective of the authors, who provide a straightforward, unabashed conceptualization of multiple, dissociable, and discontinuous memory systems. Read this thoughtful book and be challenged to arrive at the same conclusion as proffered by these authors. Perhaps their next volume will propose how these systems are integrated in daily functioning, the conditions under which conflict, interference, or emotion can disrupt or bias their integration, and whether other brain systems can compensate for functionally relevant disruption of critical medial temporal lobe structures.

Beyond the Homunculus

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The Executive Brain: Frontal Lobe and the Civilized Mind, by Elkhonon Goldberg. 2001. New York: Oxford University Press. 251 pp., \$29.95 (HB).

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There is an old saying that one of mankind's biggest challenge will be to fully understand the functioning of the human brain. Some point out the ultimate irony of needing to utilize all 1400 grams of this organ to understand itself. When confronted with the riddle of frontal lobe functions, this argument can be extended further: the part of the brain that is considered to be most responsible for the highest forms of mental activity is likely to be pushed to its own limits in an effort to understand its own functions. While this might seem like an endless loop to some, the good news is that our field has been making serious advances in understanding the executive functions, those abilities we commonly attribute to the frontal lobes. Many of these successes are presented in a clear and engaging manner in this monograph.

This is a book that is intended to appeal to a lay audience while also giving professionals in the large field of neuroscience a rich account of the frontal lobe functions and

other aspects of higher order cerebral activity. The author is a highly regarded, though somewhat enigmatic, neuropsychologist who received the bulk of his training in Moscow, under the tutelage of the great Alexander Romanovich Luria. He begins the book with a personal account of his days as a graduate student and his successful attempt to leave the Soviet Union. The book continues with an outline of a personal approach to neuropsychology that is unlike most others.

Since coming to the United States, Goldberg has been known primarily as a theoretician who has also made contributions to both the clinical and experimental literature. His background in mathematics and topology have left him with a unique perspective on the organization of higher cerebral functions that differs from the mechanistic conceptions filling many of today's textbooks. For reasons that remain unclear, his original articles have lacked the recognition they deserve, with the noted exception of the follow-

ing of a group of loyal students and colleagues. This book provides another chance to those who have not read nor fully grasped his previous work. I recommend those individuals not familiar with Goldberg's body of work to avail themselves of this opportunity.

Throughout the history of psychology, accounts of the mind have assumed a progression from the laboratory outward. Initial studies focused on sensation and perception. Developments in several fields helped our understanding of language. With new technologies, we developed paradigms that enabled us to tackle the problems of attention and memory. While advances in experimental psychology have had a clear impact on the development of clinical neuropsychology they have left largely unexplained many of our most important psychological capacities, including insight, judgment, and problem solving. For many functions commonly attributed to the frontal lobes, the path of development has been reversed. Many of the modern day conceptions of these executive functions originated in clinical descriptions of individuals who had undergone neurologic damage to the frontal lobes, with the case of Phineas Gage as the most salient example. Goldberg, who is also a seasoned clinician, uses this approach to its fullest, incorporating his experiences with a variety of patients, including those with schizophrenia, Tourette's syndrome, and traumatic brain injury, to add vitality to his systematic account of the executive skills and how they relate to the larger scope of brain functions.

In one of the earlier chapters, Goldberg points out that many popular books now cover the topic of memory and its disorder. Until now, no similar book had been written on the frontal lobes. In the case of memory, we now can say that it has something to do with encoding, storing, and retaining information. Goldberg notes that the functions of the frontal lobes do not fit so neatly into any such soundbite. Many neuropsychologists have had the experience of trying to explain the concept of executive functions to laypersons only to see their eyes gloss over when encountered with the terms organization, planning, and sequencing. Some practicing neuropsychologists have become quite lazy in this regard, by simply equating their discussion of frontal lobe functions with performances on various tests such as

the Wisconsin Card Sorting Test, Stroop Test, and Trailmaking Test. Goldberg takes a longer route in his discussion of the frontal lobes, thereby providing a more enriched and practical language to use in describing the functions of this fascinating part of the brain.

In this book, Goldberg goes beyond a discussion of the frontal lobes to other important topics including hemispheric differences and clinical testing procedures. His theoretical account of left and right hemisphere functioning is one of few that escapes the teleological dichotomy of verbal and non-verbal functioning. While his discussion of left hemisphere capacity in terms of descriptive systems may, at first glance, be consistent with most other accounts, it is actually quite different. His depiction of the right hemisphere as mediating responses to novelty also provides a more rich and dynamic account of this oft-neglected part of the brain. He also argues for the need to move from a horizontal focus on left and right hemispheric differences in favor of more vertically and longitudinally oriented conceptions of the brain and its key connections. His description of the differences between adaptive decision-making *versus* veridical decision-making should appeal to those concerned about the limitations and ecological validity of many neuropsychological tests. Goldberg offers a novel means for testing individual styles rather than abilities that, if accepted more widely, could have a significant impact on the field.

By having in mind an audience that is larger than the field of professionals, Goldberg manages to make this book informative, while being highly readable and entertaining. The book progresses with arguments on how an understanding of frontal lobe functions has the potential to enhance understanding of social issues and even some aspects of political organization. He also provides a unique perspective on mental illness in general. Negative points include some repetition. Some might consider the review of the literature to be highly partisan. However, these are minor points that do not detract from the overall quality of the book. Neuropsychologists at all levels of training will benefit from reading this book. Its success in describing very complex issues in simple terms will make this a book that many will recommend to friends and professional colleagues alike.

An Introduction to Human Neuropsychology

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Principles of Neuropsychology, by E.A. Zillmer and M.V. Spiers. 2001. Belmont, CA: Wadsworth/Thomson Learning. 606 pp., \$86.95 (HB).

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Education and training in neuropsychology has been primarily directed to pre- and postdoctoral students with numerous excellent books available for these target audiences. However, as indicated by Eric Zillmer in the preface to

Principles of Neuropsychology, this book is geared toward undergraduates and beginning-level graduate students, a group that in this reviewer's opinion, has received considerably less attention from the field. According to Dr. Zill-