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Book review

Fundamentals receives a facelift but stays true to self

Fundamentals of Human Neuropsychology, Sixth Edition. Bryan Kolb & Ian Q. Whishaw. 2009. New York, NY: Worth Publishers. Pp. 818. ISBN 978–0716795865. $115.95.

Most students of neuropsychology or the neurosciences have undoubtedly encountered at least one version of Bryan Kolb and Ian Q. Whishaw's *Fundamentals of Human Neuropsychology* in their professional lives. Between these two authors, we have four editions of this seminal text on our shelves. Consistent with the title of the series, previous editions aimed to provide students at either the advanced undergraduate or graduate level with a comprehensive introduction to neuropsychology that was easily understandable yet provided appropriate depth. Although the overall organization has stayed fairly consistent, the scope of each edition has progressed over the years, shifting from covering topics at a somewhat deeper level by the third edition—seemingly to provide for greater use with graduate studies—to offering slightly less detail on an even broader range of topics in later editions. These shifts reflected both the vast changes that occurred in the field of neuropsychology and neurosciences over that time, the need to pare down the material, and, presumably, the scientific interests of the authors themselves.

Even with these changes (along with recurrent updates with the latest findings in the field), the text of each edition has been highly readable and cogent, the chapters have been logically organized, and the illustrations have been clear and expertly drawn, all of which has helped facilitate an understanding of the often complex topics presented in the textbook. These aspects have not changed in the Sixth Edition of *Fundamentals of Human Neuropsychology*, and it is clear that the authors went to great lengths to attempt to improve on earlier editions. The breadth of coverage remains impressive, and the details contained in several chapters rival those in other, more focused textbooks. In particular, the integration of the latest research findings from a staggeringly broad range of fields is to be commended. However, the greatest improvement in this edition, as noted by the authors in the preface, is the inclusion of numerous full-color, high-resolution illustrations, which truly do complement the text in a remarkable manner. In addition, the text provides a more reader-friendly format, with expanded summaries at the end of each chapter, case studies to begin each chapter, and "Snapshots" that offer quick summaries of recent research findings relevant to each chapter topic.

The core of this edition (Chapters 1–7) still predominantly focuses on providing extensive background in the areas of neuroscience and neuroanatomy. Consistent with previous editions, it is in these chapters that the authors seem most comfortable in laying out information that is clear enough for an undergraduate population and provides a refreshing review for the more experienced professional. As an apt introduction to the text, Chapters 1 and 2 provide a quick-read background on neuropsychology's history and the evolution of the brain and brain–behavior relationships. Chapters 3–6 provide excellent fundamentals on brain organization and basic neuroscience, and it is in these chapters that the reader will likely begin to realize the didactic clarity that the high-resolution figures can provide. However, one begins to wonder whether chapters 4 and 5 could have been combined and condensed, especially given that most students interested in cellular and systems neuroscience will likely read more in-depth texts (e.g., Kandel, Schwartz, & Jessell, *Principles of Neural Science,* 2000) through other courses. Chapter 6 presents an excellent overview of different neuroimaging techniques, their potential utility, and welcome sections on the strengths and weaknesses of each approach. This chapter is especially useful given the extensive updates regarding recent imaging research throughout the text. Chapter 7 may have benefited from expanding sections addressing addiction and the effects of narcotic substances on the brain, especially given the resurgent interest in these topics in recent years.

In Chapters 8–17, the authors delve more deeply into functional neuroanatomy and models of cortical organization with seemingly minor changes from previous editions, barring a few updated findings and the "Snapshots" in each chapter. This consistency is not necessarily a shortcoming, because many of these principles have changed little since the last edition. Chapters 8–10 expertly cover the organization of the sensory and motor systems and the structure of the cortex, and the authors effectively integrate findings from behavioral neuroscience and complex models from cognitive science. Chapters 11 and 12 focus on cerebral asymmetry and lateralization of functioning and take some advantage of the recent increase in sex differences and functional neuroimaging research examining this fascinating topic to update a number of findings. As with past editions, these

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two chapters have a elegant narrative form and are a treat to read among the surrounding chapters, which have much more of a "textbook" feel. The authors are to be commended for the intelligibility of their writing in Chapters 13–16, which focus on the organization of the cortex lobe by lobe, as the text follows a similar format in each chapter (i.e., anatomy, theories of functioning, and disorders and symptoms) and is evenly written.

Consistent with previous editions, the next section (Chapters 18–22) provides a strong foundation on the neural substrates and divisions that underlie higher cognitive functions. Chapter 19, examining language, is particularly strong, with rich, scholarly discussions regarding localization of function and recent progress in developing models of the underlying organization of language in the cortex. In each of these chapters, the authors skillfully elucidate the several different components (e.g., implicit, explicit, and emotional memory) of each neurocognitive function (e.g., learning and memory), weaving in classic cases from neurology and neuropsychology to illustrate the separate components and systems involved. Considering the likely reader, an appropriate amount of detail is provided regarding the brain regions and neural systems that subserve such processes. With such a comprehensive book comes the inherent danger of repeating earlier material when examining a topic from a slightly different perspective. In this context, however, the repetition that occurs feels more like reiteration, and readers will likely find that this approach helps to facilitate learning and comprehension of the complex topics.

Chapters 23–24 examine development and developmental disorders, with a focus on plasticity and reorganization after injury. While the chapters are informative, complement each other remarkably well, and fit in with the theme of plasticity in this section, the reader may wonder why they were not encountered earlier in the text, as they might have provided a relevant framework for many other sections. Chapters 25–27 continue by discussing injury and plasticity in the adult brain. Although these chapters provide general background on these topics and touch on a surprising number of disorders, it was our impression that they lacked the enthusiasm contained in other chapters, perhaps because aspects of many disorders were already discussed in previous chapters. This is not necessarily a drawback, as the chapters are clearly written and will likely provide supplementary information regarding the various disorders that will help enhance the reader's learning.

Despite the many strengths of the text, we noted two relatively minor weaknesses relevant to readers who are aspiring clinical neuropsychologists: the increasing focus on nonhuman animal research and the sections devoted to human assessment. For students and researchers less familiar with behavioral neuroscience, the focus on animal literature provides an effective and illuminating integration of these at times separate fields. Nonetheless, it may be a drawback for the aspiring clinical neuropsychologist, as the functional implications of many of these findings for humans are not entirely obvious or directly translational. This statement is not intended to malign the significant contributions of comparative studies, but the text does not discuss many of the limitations of such studies, which may be a problematic omission for novice readers. For example, there are numerous challenges associated with using animal models to study human disease, including not only anatomic, metabolic, and cellular differences between species, but also differences in how data (e.g., behavior) is collected and measured. Consider the recent findings of Alle and colleagues (2009), who showed that a decades-old, widely used model of the energy efficiency of action potentials derived from the analysis of squid giant axons was probably underestimating the energy efficiency of the mammalian brain, which may have profound implications for future studies of the human brain. The limitations in nonhuman research do not diminish the potential utility of the information in the text, but they would be important for trainees to encounter in reading such sections.

Furthermore, the increased attention on animal research may have limited the authors' focus on other clinical research topics that may be important for the trainee in this field, including assessment approaches and techniques. To this end, the sections that focus more closely on assessment (Chapter 28, but also throughout the text) seem to be receiving less focus with each update. While the authors provide a sound historical perspective on human assessment, there are multiple areas that would have benefited from updating, including advances in certain assessment tools. There is some updated information regarding certain sections of the material (e.g., discussing symptom validity testing), and, admittedly, some assessments have had immense staying power over many years, such as tests to detect aphasia and language disorders. However, widely used tests such as the California Verbal Learning Test–Second Edition (CVLT/CVLT–II; Delis, Kramer, Kaplan, & Ober, 2000; Delis, Kramer, Kaplan, Ober, & Fridlund, 1987) barely receive a mention in the text, despite the fact that the measure has become the first-line memory measure for many clinicians and researchers (Rabin, Barr, & Burton, 2005) and takes a novel quantitative process approach to profile memory impairment. Perhaps the authors assume that most students of neuropsychology will encounter Lezak and colleagues' (2004) *Neuropsychological Assessment* or Strauss, Sherman, and Spreen's (2006) *A Compendium of Neuropsychological Tests* in their studies, but thorough updates regarding the clinical relevance of tests and recent innovative assessments seem warranted. In addition, there seems to be a missed opportunity to educate the reader on other developments in the field, including advances in medical neuropsychology and cultural neuropsychology.

To even raise such criticisms seems blasphemous, given how important this work is to our field and how much work must have been required to update the text six times. It is only natural that the text has shifted in recent editions in conjunction with the authors' research interests, which have increasingly focused on how behavioral neuroscience research in animals can inform an understanding of the neural basis of behavior in humans. Ultimately, Kolb and Whishaw offer a lucid and understandable guide to the fundamentals of neuroscience and neuropsychology, and with the sixth edition's facelift, they now have didactic

assistance from vivid, full-color figures. Thus, despite a few minor weaknesses, this text still belongs on the shelf of every neuropsychology student and is appropriate for a wide range of audiences, including seasoned professionals.

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