Considering the major themes in perception and cognition, the foreword to this handbook states that it “is designed to bring together the essential aspects of this very large, diverse, and scattered literature, and to give a précis of the state of knowledge in every area of perception and cognition”. This is a bold statement to make and an ambitious goal to set oneself. However, on first inspection of the book two things are immediately apparent. First, it is a large book, some 487 pages split into fourteen chapters. However, second, and of much more relevance, it is notable that the book has brought together the writings of some of the most influential and highly regarded people in their respective areas. It is at this stage that the opening statement starts to look like a much more plausible proposition.

The book is divided into two parts. Part 1 comprises the first three chapters and considers the early history and philosophical context of current day issues in perception and cognition. Hochberg, in chapter 1, traces the historical roots, surveys the major issues of the first half of the century, and considers the main premises upon which it was based. The major psychological movements are covered along with the resulting changes in what were considered acceptable topics for research at the time. Rollins, in chapter 2, considers the role that philosophy has played in the last half of the century and the two-way interactions that have emerged between philosophy and cognitive science. A thorough treatment is provided, covering methodology, computation, representation, and content. Mandler, in chapter 3, is concerned with how philosophy has tackled specifically the problems of mind and consciousness since the decline of behaviourism. The main philosophical positions are covered in a clear and easy to follow manner and a comparison is made between the different methods and approaches that psychologists and philosophers have taken to study the issues. The chapter concludes with a description of Mandler’s own proposal about the functions of consciousness and its effects on actions and thought.

Part 2A (chapters 4–10) is mostly concerned with stimulus processing: how stimuli are processed, the resultant perceptions and representations of objects, and events and historical developments in theory and methodology for measuring and understanding such processes.

Cutting, in chapter 4, considers the concept of information, how it developed, and its roles in the area of perception and cognition, with particular regard to the perception of objects, spatial relations, and events. Three major frameworks of perception (personal experience, mathematics and natural law, and biological expediency) are clearly presented and evaluated. The chapter closes by considering what is represented in the information we receive, and how multiple sources of information can be treated in terms of their selection, interaction and disambiguation.

In chapter 5, Gillam reviews and considers past and current explanations of visual illusions, with particular emphasis on the Müller–Lyer, Zöllner, Poggendorff, and Ponzo illusions. The usefulness of illusions is considered in relation to the development and evaluation of theories of perceptual representation. Both physiological and functional theories of illusions are described and evaluated. This very detailed chapter is nonetheless still accessible and many clearly presented examples of the discussed illusions are provided.

Cutting and Massironi, in chapter 6, examine the roles of pictures in perceptual investigation. The chapter starts by noting the history and special status of pictorial representation with reference to ancient cave paintings. In particular, the chapter concentrates on the functions of basic primitive picture elements—lines, their junctions, and bordering regions. Amongst other issues, the main questions addressed are: how the different aspects of the world can be represented pictorially, why pictures are so effective at communicating ideas about features of the world, and why minimal representations can be so effective. This treatment includes: the analysis of how pictures represent and communicate information, relationships between the richness of a pictorial representation and the extent to which perception is then direct (bottom–up) or indirect (requiring inference and cognition), and the form of basic primitive elements. The chapter closes with a proposal of a
grammar for lines and regions. The approach is intentionally broad and interdisciplinary and in being so provides a very effective and entertaining treatment of the topic.

In chapter 7, Profitt and Kaiser consider internalised constraints that the visual system may apply in the processing of visual stimuli. They note that many perceptual problems cannot be solved without the use of such constraints. The purpose of constraints is therefore to turn ill-posed perceptual problems into well-posed solvable problems. Four distinct types of internal perceptual processing constraints are identified and surveyed on the basis of statistical regularities, geometric optics, universal laws of organisation, and group concepts. The authors consider, with a number of clear examples, when and why such constraints are necessary and how they have been incorporated into both past and present perceptual theories.

The topic of chapter 8, by Duscher and Sperling, is the development of theories, methodologies, and analytic techniques in the 20th century. Following a consideration of the achievements of the 19th century, the reader is taken through developments in the fields of motion processing, visual attention, and memory. Common to the areas considered is the rapid development of theory and methodology during the second half of the century. New methodologies and tools were developed and refined in order to measure and characterise human performance. New theoretical processing architectures and analysis techniques were developed. The chapter illustrates how relatively vague ideas or objective descriptions have changed into highly complex process models with boxes representing processes and arrows information flow, each box or process then being subdivided as further details of the process become available. This large and fascinating chapter elegantly demonstrates the significant advances in understanding and theory that have been made over the course of the 20th century.

In chapter 9, Hochberg deals with Gestalt theory. He first considers issues relevant to the development of, describes, and evaluates the Gestalt approach to perception. Numerous illustrative examples are presented and discussed with particular reference to the areas of vision, attention, and memory. In the remainder of the chapter, Gestalt phenomena are reconsidered in light of present thinking about brain structure, attention, and the roles of mental representation. This, like the previous chapter, is relatively large and necessarily covers a lot of ground. However, despite this, the chapter presents a coherent view of the main issues and remains entertaining and approachable.

Nakayama, in chapter 10, considers how the brain allows us to perceive the world and what the major breakthrough might be that will revolutionise our understanding in this area. The chapter surveys some of the major historical events and achievements including: early developments in vision, physiological findings, the discovery of the extent of visual processing areas, the role of psychophysics, and Marr’s framework. The chapter closes with a consideration of the current position. Again, this chapter illustrates elegantly and clearly the enormity of progress and development that has occurred over the last 100 years even if, as suggested, our understanding is still highly limited.

The emphasis in part 2B is more with cognitive rather than perceptual issues, in particular individual abilities and cognitive development.

Spelke, in chapter 11, surveys the progress made in the study of cognitive development in both animals and human infants in the last 50 years or so. The chapter presents, with many clear examples from the literature, a fascinating look at the abilities of young infants and animals, how they develop and how they are studied. Three main areas of development are covered: space perception, object perception and representation, and the development of number representation. Each section describes theoretical and methodological developments, concludes with the current state of the area, and outlines remaining questions. The chapter concludes with a consideration of the directions in which this multidisciplinary research topic is moving.

In chapter 12, Wright and Landau describe some of the essential aspects of language and action that require explanation, and in doing so compare the focus of study of each area. Some of the topics covered include: levels and types of representation, mapping between different levels, fluency of movements, sequencing behaviour, generalisation, and symbolic versus connectionist modelling. The chapter provides a clearly written coverage of the past and current central problems and how their study has changed and developed over the years.

Chapter 13, by Medin and Coley, covers the topic of concepts and categorisation over the last 50 years. The first part of the chapter is devoted to the functions of concepts and their empirical study. A review of relevant research is presented with the reader being gently guided
through theoretical developments within the field including the classical view, prototype views, and exemplar views. This provides a clear history and evaluation of theoretical and methodological advancements in this field. The chapter closes with a discussion of recent work and remaining future research questions.

In the final chapter, Johnson-Laird reviews research on imagery, visualisation, and reasoning. The chapter starts with the traditional views of visual imagery and then deals with the roles of formal rules and propositional representations, and theory and evidence for mental models. The chapter closes by considering the relations between mental models and images and the virtues and limitations of image representations. Again this chapter presents a very clear and entertaining treatment of the topic and guides the reader through the area with many appropriate examples and demonstrations of relevant findings.

On reflection, it is quite difficult to review a book like this because each chapter could, itself, justify its own unique review. However, I will try to convey my overall impression and highlight a few important issues. The volume as a whole provides a remarkably integrated and complete coverage of the area of perception and cognition, as it has developed, how it now stands, and where it is likely to go in the future. However, at the same time, each chapter also stands on its own perfectly adequately, can be read in isolation without loss of clarity, and there is little redundancy. Every chapter is both accessible and of consistently high quality, being both engaging and enjoyable to read. The volume provides a broad coverage of the field and contains extensive references to research both for covered material and for material that through necessity could not be included in detail. Owing to its broad coverage and accessibility, this book will be of interest to a wide audience, and will doubtless serve as a valuable source and reference work. In these respects, the volume is highly successful. Naturally, in a book of this nature, there are probably areas that some would argue could have had greater coverage. However, as mentioned earlier, often in these cases the reader is referred to key papers and research in the field for further details. This review started by quoting the ambitious statement of aims given in the foreword of this volume. Has the book lived up to its claim? I think that, at least for myself, the answer has to be yes.

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Findings and current opinion in cognitive neuroscience edited by L R Squire, S M Kosslyn; MIT Press, Cambridge, MA, 1998, 381 pages, $47.50 paper (£29.50) ISBN 0 262 69204 X

This book comprises forty-six articles that appeared in Current Opinion in Neurobiology between 1994 and 1996. These articles have been selected to give a sampling of five popular domains of cognitive neuroscience: perception and action, neuronal plasticity and memory, cognition, the organization of action, and development and structure. In principle, this volume has great potential for use as a class text for advanced undergraduates and introductory graduate students. There is much to admire about this text. The articles have been written by some of the most influential contemporary neuroscientists writing on the topics of their expertise. In a sense, the book is a summary of the ‘greatest hits’ in neuroscience. The articles are generally very accessible, with clear diagrams and excellent illustrations. The range of articles demonstrates how a broad range of convergent tools (including single-cell record, ERPs, functional imaging, behavioural tests, neuropsychology, drug studies, and genetic research) can be used to tackle research questions. The breadth of questions and techniques will give students an excellent feel for the diversity found in cognitive neuroscience.

The articles demonstrate how contemporary techniques can be used to achieve closure on important topics, and readers get a sense that neuroscience can make rapid progress investigating interesting and important questions. These articles will encourage students to view neuroscience as a dynamic field. This style leaves the reader feeling enthusiastic about research. It is unfortunate that so few articles outline future directions for research. The authors attempt to conclusively answer most of the questions that are introduced, although there is little speculation. I think students would benefit from a more comprehensive introduction to which questions remain outstanding.

One of the major strengths of the journal Current Opinion in Neurobiology is the authors’ emphasis on recent research, rather than comprehensive literature reviews of the topics, providing an excellent means for neuroscientists to learn about the latest breakthroughs and trends occurring
in their field. This recipe makes for a refreshing journal, but the focus on new research does
mean that the articles quickly gain a dated feel. This weakness is especially evident in this
collection of articles, which already seem out of date with the latest research. In particular, the
book seems overly concerned with research from the first half of the 1990s, while much of the
classic earlier research is ignored. Clearly, what makes an excellent contemporary journal does
not necessarily make a good book. Thus, this book is a victim of the rapid progress of contem-
porary neuroscience—review articles published only a few years ago already feel dated. Students
reading this text will not be introduced to the origin of the topics, while research scientists will
find the articles out of date. Another flaw in this book (which it shares with most other edited
volumes) is the lack of integration between chapters. Again, this reflects the chapters’ heritage
as independent articles in a journal. Each article can stand alone and can be read in isolation
from the other chapters. Consequently, when taken as a whole there is considerable redundancy
across chapters. Furthermore, there is no attempt to connect common topics between the chapters.
A more carefully integrated approach would have helped students understand how the different
popular research techniques can combine to resolve neuroscientific issues.

This book attempts to fill a useful niche—giving students a broad overview of neuroscience,
and presenting a number of contemporary techniques and tractable research questions. It may
help students decide which domain of cognitive neuroscience is most suitable to their interests
and skills. In addition, it is certain to develop enthusiasm and a sense that neuroscience can
resolve a number of difficult questions. The style of the chapters—introducing the logic and
results of significant studies in a palatable summary form—makes a nice introduction to reading
research articles. Furthermore, this book develops critical thinking by describing competing models
and presenting experiments that attempt to test these models. Unfortunately, its reliance on
unmodified articles from a scientific journal detracts from its suitability as a class text. The lack
of integration between chapters and the focus on research conducted during a brief period of time
makes the volume seem somewhat unsuitable as a key text for either research scientists or neuro-
science students.

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All books for review should be sent to the publishers marked for the attention of the reviews editor.
Inclusion in the list of books received does not preclude a full review.