Cognitive science is an interdisciplinary attempt to understand how the mind works. When the term was first coined in the 1970s, six disciplines were officially included in this ambitious project: anthropology; computer science; linguistics; neuroscience; philosophy; and psychology. Given this daunting breadth of research that cognitive scientists were, and still are, expected to draw upon, the production of high-level introductions like The Cambridge Handbook of Cognitive Science (CHCS) is vital. Young researchers from different disciplines must become well-versed in relevant, but distinct, fields of study if they are to make useful contributions beyond their specific discipline, and reap the benefits of participation in an interdisciplinary venture. With this in mind, CHCS provides fifteen useful, original, and up-to-date survey articles.
that serve as broad introductions to foundational, theoretical, and empirical issues in
cognitive science. All are written by leading researchers across the range of sub-
disciplines listed above. However, the specific interest of the editors, Keith Frankish
and William Ramsey, is in work at the intersection between philosophy and the
empirical study of mind, and this is reflected in their choice of authors. This is a book
for philosophers, interested in learning how empirical cognitive science might
constrain their theorizing, or a book for practicing scientists, interested in adding
clarity and philosophical sophistication to their work.

CHCS is split into three parts, introducing foundational issues in cognitive science,
work on specific aspects of cognition, and some influential research programs. Part
one is certainly the most straightforward of these. After a gentle introduction written
by the book’s editors, Adele Abrahamsen and William Bechtel provide readers with a
brief, but detailed, history of cognitive science. Despite introducing more advanced
topics, like cognitivism and the computational theory of mind, this chapter manages
to be clear and easy to read. Similar clarity is achieved in chapter two, where Barbara
Von Eckardt guides her readers through the basic features of the representational
theory of mind, with a special emphasis on the nature of representation. While it is
obvious where Von Eckardt’s allegiances lie—offering a stark warning to any would be
anti-representationalists—her discussion is generally even handed, and she provides a
useful list of further reading that should give skeptical readers a place to get started.

In chapter 3, Paul Thagard does a nice job of introducing some basic controversies
concerning cognitive architecture, focusing on disputes between connectionist and
rule-based approaches. This is difficult and technical terrain but Thagard presents
things in an admirably jargon-free way. That said, his personal view—that we need to
combine certain aspects of rule-based approaches with certain aspects of connectionist
approaches—is pressed quite hard. While I have some sympathy with this standpoint,
there are respects in which it is controversial (see Chalmers, 1990, and Fodor &
Pylyshyn, 1988 for a contrasting point of view). But novice readers may find
themselves struggling to understand why, or even how, there could be any room for
doubting Thagard’s position.

I found part 2 of the book to be more problematic. Each of its eight individual
chapters introduces research on a distinct aspect of cognition. Unfortunately, some
chapters are significantly more challenging than others (for instance, Ray Jackendoff’s
piece on language), and some of them fail to present important controversies in
sufficient detail. For instance, towards the end of Elisabeth Pacherie’s chapter on
action, there is a discussion of the possibility that the psychological causes of action
can be directly perceived by others. While this is a view that is gaining popularity,
providing researchers with an alternative to highly intellectualist accounts in which
agents must infer others’ thoughts and intentions, it would be fair to say that this
remains a minority position. But Pacherie presents the empirical data as though it has
established that we regularly directly perceive others’ intentions. She cites a number of
empirical studies, demonstrating that humans’ specific intentions are made manifest
in their movement patterns and, moreover, that humans show some sensitivity to
these. But this fails to establish that these intentions are literally perceived, for it is
open to the critic to say that they are inferred on the basis of this perceivable behavior. Unfortunately, Pacherie’s discussion of this is much too quick, leaving the mistaken impression of established fact where there is much debate. In a book that aims to introduce novice readers to work at the intersection between philosophy and empirical cognitive science, this is a pity. Controversy often arises in cognitive science because different groups of researchers focus on different findings, and offer different interpretations of these findings. One of the key jobs for philosophers of cognitive science is to find ways of adjudicating such interpretations. But, simply stating contested experimental findings as though they uncontroversially support one particular view or another is at best, misleading, and at worst, undermines the philosophical project of the book.

In this regard, Gregory Murphy and Aaron Hoffman’s chapter on concepts is perhaps even more questionable. The authors explore two distinct approaches to the study of concepts, emphasizing formal models of category learning and content respectively. For Murphy and Hoffman, progress in this area requires a synthesis of both approaches. Unfortunately, one gets the feeling that setting things out in this way suits the authors’ purposes better than the readers’. For a start, it is never made clear how any of this intersects with traditional philosophical approaches. This leaves the chapter feeling distinctly out of character with the rest of the book. Furthermore, important, relevant, and contemporary scientific works, such as Carey’s *The origin of concepts* (2009), make it onto the further reading list, but they are not mentioned once during the entire chapter. As such, readers will struggle to situate even key scientific thinkers, such as Carey, and key positions, such as Carey’s, within the debates that the chapter ostensibly introduces.

On a more positive note, several of the chapters from this section are excellent. William Lycan has only 15 pages to introduce the topic of consciousness, but he manages to provide a broad overview of the important empirical and theoretical issues in a balanced and easy-to-understand way. When discussions must be cut short due to limitations of space, Lycan carefully signposts this fact, and provides relevant references for interested readers to follow up on. Similarly useful are Jesse Prinz’s chapter on the emotions, and Casey O’Callaghan’s paper on perception. Both of these lay out important and useful distinctions between the ways in which theorists, both past and present, have thought about these topics. They then provide a judicious introduction to the ways in which modern empirical work is constraining theorizing in these areas, without drawing any premature conclusions. As such, any of these three chapters would provide an ideal introduction to the relevant debates, for interested senior undergraduates onwards.

Part three of CHCS introduces a number of important and influential contemporary research programs in cognitive science. Each chapter is written by a leading proponent of the program that is being discussed. Consequently, it is unsurprising, but important to note, that all are keen to convey the value of the approach they hold so dear, even when it is contentious. For instance, H. Clark Barrett’s chapter on evolutionary psychology functions as a nice introduction to the field, but given that this is an approach that has come under heavy fire in recent years,
more time should have been spent considering specific challenges charged against it. As it is, Barrett merely acknowledges that concerns have been raised, states that he thinks these are unfair, and moves on. This is unfortunate as debates over the extent to which cognitive science should appeal to evolutionary theory would seem to be of particular relevance to the book’s intended audience.

Dominic Standage and Thomas Trappenberg’s chapter on cognitive neuroscience is quite technical at times, and the uninitiated will do a fair amount of Googling to keep track of the jargon. However, for those willing to put in the effort, the chapter is ultimately rewarding. The authors focus their discussion on three particular cognitive phenomena: namely, episodic memory, decision-making, and category learning. Collectively, these serve to introduce a range of challenges met, and methods used, by cognitive neuroscientists, that will be illuminating for both philosophers and scientists interested in applying neuroscientific findings to functional theories of the mind and brain.

Similarly, Andy Clark’s chapter on embodied, embedded, and extended cognition ought to be of particular interest to philosophically minded cognitive scientists. This broad research program offers, perhaps, the most revolutionary approach to cognitive science that is considered in the book, proposing that non-trivial problems become more computationally tractable and energy efficient when the cognitive load is spread between brain, body, and world. The chapter covers a range of issues like causal spread and cognitive extension, and it considers some challenges to this broad outlook on the metaphysics of mind. Clark’s chapter is adapted from material in his neo-classic *Supersizing the mind: Embodiment, action, and cognitive extension* (2008). For this reason alone, it is probably worth reading. However, the further reading list seems out of date. Several important and useful books have been published since *Supersizing the mind* that will be of interest to readers who are new to this approach, but which fail to be acknowledged by Clark; for example, Lawrence Shapiro’s well-received textbook, *Embodied cognition* (2011) and Richard Menary’s collection, *The extended mind* (2010).

The final chapter of CHCS, written by Sara J. Shettleworth, discusses animal cognition. When, taken together with Clark’s chapter on embodied, embedded, and extended cognition, and Barrett’s essay on evolutionary psychology, this provides a fitting end to the collection. The book began by discussing the history of cognitive science, before focusing on the current state of its art. In many ways, these final chapters represent a future for cognitive research that is increasingly interdisciplinary, all integrating subjects that were not originally thought of as relevant to cognitive science (particularly the biological sciences). This is in keeping with the spirit of the whole collection, and highlights how ambitious a volume it is. Compiling a handbook for a well-established and tightly delineated discipline must be difficult enough. But, Frankish and Ramsey have gone well beyond this in compiling a handbook that aims to guide readers into an emerging, and quite frankly messy, world of interdisciplinary exploration. For this, their efforts should be commended. Despite several concerns that have been raised throughout this review, the book, as a whole, comes highly recommended. Many of the papers will serve as ideal introductions to their given
domains and, taken collectively, readers will be given a broad grounding in this fascinating area of study.

References


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