Having read other volumes of the Attention and Performance series, with their enormous influence on their fields, I wondered whether it was worth writing a book review for *Functional Neuroimaging of Visual Cognition* (2004), edited by Kanwisher and Duncan. Books from this series do not appear to need reviews: the tradition from which they come speaks for itself. And this one is no exception, following the high standards set by its predecessors. I would be very surprised if this book did not become as well cited as the ones before.

But for very good reasons not everybody, especially those who think of themselves as psycho-physicists, would automatically look into an ‘imaging’ book—despite its prestigious origins. The reason for this might be that, after a few years of experience with imaging, one might wonder how much modern techniques of functional brain imaging—whether they address vision or not—can really contribute to our understanding of the human brain. Publications using functional brain imaging often enough leave us with the impression to be nothing else but a (not very satisfactory) mapping of the human brain; in other words, imaging seems to be restricted to localisation of cognitive function or modern phrenology. So, why bother reading a book about imaging then? If, instead of just being able to investigate *where* something happens in the human brain, imaging could also inform us about *how* it happens, our sophisticated theoretical models about perception could be tested. The message at the core of the book is that imaging can indeed give new insights into how the brain works—and to me this message didn’t sound like an empty promise.

The book is the outcome of the twentieth meeting of the International Association for the Study of Attention and Performance in Sicily in 2002, concentrating primarily on the neural basis of vision. But it is far more than a summary of a conference about vision. It is an excellent guide to a new way of thinking about future research directions, merging brain imaging and human behaviour. Whether you are interested in visual, auditory or tactile perception, whether you use basic psychophysics or modelling, whether you are a student, lecturer, or researcher, if you are interested in perception you should consider a close look at this book.

The volume consists of 25 chapters, the middle 23 chapters organised into four major sections. The first section asks whether or not the brain is organised in terms of distinct neural modules related to separate cognitive functions (the visual system serves as an example). In the second section, we learn what imaging techniques can tell us about human object recognition and its implementation in the occipito-temporal lobe. In the third and fourth sections, visual attention and sensorimotor integration are addressed, showing how our understanding of human vision-related behaviour has already been furthered by imaging data gained from fMRI, MEG, EEG, or PET (just to mention a few of the imaging techniques discussed—this book is in no way restricted to fMRI, as one might have suspected). Two special chapters frame the main core: In Chapter 1, Rizzolatti introduces the world of functional imaging by showing how we might use imaging to get new insights into “understanding the world of others” in humans; imaging findings on ‘mirror neurons’ in human prefrontal cortex are embedded into a framework obtained with classic neuroscientific techniques, such as single-cell recordings in monkey prefrontal cortex. The last chapter of the book (Chapter 25), written by Posner, synthesises the issues brought forward in earlier chapters, adding at the same time in a very measured way his personal view about what brain imaging has achieved so far and what it might achieve in the future.

Even though the book clearly focuses on visual cognition, every chapter addresses issues which go far beyond being of interest to vision scientists only. Haxby (Chapter 4), for example, uses the ventral visual stream and object representation to demonstrate how the choice of analysis used in functional magnetic resonance imaging (fMRI) can lead to two orthogonal interpretations of the same data—one supporting high modularity (here in the form of object-specific cortical
regions), the other distributed representations. The chapter is a wonderful example for students, showing how difficult it sometimes is to interpret scientific evidence. Spelke (Chapter 2) discusses the coexistence of domain-specific, task-specific, and encapsulated ‘core knowledge systems’ in children by using a developmental approach in order to find out why the design of the mature human cognitive system looks sometimes modular, sometimes non-modular. Other chapters use functional imaging techniques to address questions such as how directed cortical interactions can be studied—overcoming the common view of fMRI as a pure localisation technique (Goebel et al, Chapter 22), how time might serve as a coding space in the cerebral cortex (Singer, Chapter 5), whether the human brain differs fundamentally from that of other mammals (Krubitzer and Kahn, Chapter 3), or how plastic the human brain might be (Johnson, Chapter 13).

Throughout the book it is obvious that everybody agrees that imaging is fascinating and tempting, and that it opens up amazing new possibilities to study the link between brain functioning and human behaviour. It seems that literally every day new ways of applying different techniques evolve. The times in which fMRI was nothing but a ‘localisation’ tool and event-related potentials could indicate temporal processing only are long gone. To cite Posner’s concluding sentence: “Imaging is not just a new tool for studying the human brain, it is an appropriate tool for understanding how our brains control our behaviour” (Chapter 25, page 524). But the book doesn’t praise ‘imaging, imaging, imaging’ over any other technique. Every single author makes sure that we are not blinded by these new possibilities: as with any other approach, brain imaging is not perfect; every technique has its pitfalls and limitations (including analysis issues). Over and over again we are reminded that we need converging evidence from different approaches to understand how the brain works, and that the more classic neuroscientific techniques haven’t lost any of their importance. Thus, alongside the clear enthusiasm for modern imaging techniques and their capacities to open new ways for investigating the brain, all the authors agree that modern imaging does not make classic methodologies obsolete.

And psychophysics? Without clever and well-controlled behavioural procedures and without the theoretical concepts and models deriving from purely behavioural studies, the best functional brain imaging technique cannot tell us how perception works. In a time in which grant funding seems to be strongly biased towards imaging and away from purely behavioural studies, this cannot be pointed out often enough.

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Book received
Action in perception by A Noë; MIT Press, Cambridge, MA, 2004, 277 pages, $38.00 (£24.95)
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