
Reviews

Visual reflections: A perceptual deficit and its implications by M McCloskey; Oxford University Press, Oxford, 2009, 320 pages, £34.99 (US \$59.95) ISBN 978 0 19 516869 3

One of the more fascinating aspects of vision research is the way the human visual system reacts and adapts in conditions where everything goes a bit wrong. I remember being captivated as an undergraduate by how deficits such as akinetopsia and cerebral colour blindness not only provide us with insight into how normally functioning brains work, but also how they force us to rethink our ideas about how we perceive the world. The rather unassuming and general title of McCloskey's book belies this fact. Through a somewhat serendipitous series of events, McCloskey had the good fortune to come into contact with AH, a student who presented a rather peculiar visual deficit—she was unable to accurately perceive the orientations and locations of visual stimuli. For example, when asked to draw a giraffe facing rightwards, she would draw it facing leftwards. Similar deficits occurred in her spelling, but what McCloskey claims makes her deficit all the more intriguing is the fact that AH remained largely unaware that anything was wrong.

Visual Reflections is split into two parts. The first part contains a collection of previously published and unpublished studies, and presents an exhaustive list of tests that AH undertook over a four-year period. Whilst the results of these tests are initially interesting, after chapter after chapter on specific aspects of AH's deficit the reader starts to feel as though the story is a little repetitive. Moreover, one can't help but feel a little cheated out of some of the allure of this case come chapter 8, wherein the author attempts to resolve the paradox of how, given the quite obvious problems she encountered in spelling and drawing, AH was "entirely unaware of her perceptual deficit" (as previously noted on page 5). It transpires during the chapter that this statement is perhaps not entirely accurate—"AH, her parents, and her teachers did recognise that she had significant problems in a variety of domains, although they failed to identify the underlying cause of the problems" (page 83). Whilst this is perhaps a minor point, after reading this I couldn't help but feel a little disheartened that some of the magic of this case had been lost.

The second part of the book concentrates on the potential theoretical interpretations of AH's deficit—specifically in regard to how the human visual system deals with spatial representation and frames of reference. McCloskey begins with an outline of the frame-of-reference problem, arguing that there are two key questions about the representation of locations. These concern what locations are defined in relation to (the 'definition' question), and in what form locations are represented (the 'format' question). McCloskey goes on to argue that these two questions are distinct from one another, and that this distinction is not readily apparent from the cognitive and neuroscientific literature on the subject. Whether or not you agree with this assertion, McCloskey does an admirable job of outlining why it is necessary to think of the two questions as separate, and makes reasonable attempts to answer them using the results of AH's experiments.

Ultimately, McCloskey's goal in the latter part of the book is to outline a framework for a new theory of multiple visual subsystems, which is then pitched against two prominent theories, Ungerleider and Mishkin's "what–where" hypothesis (Ungerleider and Mishkin 1982) and Milner and Goodale's "vision-for-perception/vision-for-action" hypothesis (Milner and Goodale 1995). McCloskey argues instead for transient and sustained visual subsystems that are in some ways analogous to (and argued to draw on information from) early magnocellular and parvocellular pathways. Where the results from the extensive testing of AH fit well with this new hypothesis, McCloskey argues that they pose challenges for the what–where and perception–action viewpoints.

McCloskey should be commended for his attempts to generate a new way of thinking about visual subsystems. He proposes an intriguing model that provides a neat framework for a large body of future work. However, one caveat to remember is that, as McCloskey admits himself, it is a model based heavily on data from a single-case study. AH's deficit is a developmental one, not acquired, and as such it seems reasonable to raise the question of how generalisable her results are to normal populations. To his credit, McCloskey does not attempt to sidestep this

issue; instead, hitting it head-on in the concluding chapter. Indeed, it is quite clear from the latter half of the book that such counters to the author's claims have been well-considered, and are dealt with in a refreshingly constructive manner.

Overall, then, *Visual Reflections* provides an extremely comprehensive account of a uniquely intriguing single-case study and is quite an enjoyable read, particularly in the second half of the book. For anyone interested in the oddities of the human visual system, and what we can learn from developmental case studies, this book would certainly be a welcome addition to the vision bookshelf.

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Theory of mind: how children understand others' thoughts and feelings by M J Doherty; Psychology Press, Hove, East Sussex, 2009, 264 pages, £39.95 cloth, £17.50 paper (US \$64.76, \$28.76)
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A 'Theory of Mind' is an understanding of the mind–world distinction and appreciation that behaviour can be driven by beliefs, which may differ from observable reality (Bartsch and Wellman 1989; Lewis and Mitchell 1994; Wellman and Bartsch 1988). Having a theory of mind enables individuals to understand their own and others' behaviour, to predict how people will act in given circumstances, to manipulate the behaviour of others, and function in a social environment. This capacity is fundamental to our ability to act as social beings and consequently has attracted a bewildering flood of empirical research, theory, and counter-theory over the last 20 odd years. Martin Doherty's review of the field from the perspective of developmental psychology is a timely, coherent, and concise overview of the types of research that have been conducted to date. He presents the evidence for Perner's 'Representational Understanding of Mind' model (RUM) (Perner 1991; 1995) in a manner that sets out the nuances of this elegant but complex argument in clear detail and illuminates those areas where contention remains. In keeping with the remit of its publisher, Psychology Press, the book is pitched well for an undergraduate audience, covering the basics as well as offering insights that will be of interest to all those working in the field at any level. In the course of delineating the evidence for RUM, Doherty describes the variety of ways that the question of when and how Theory of Mind (ToM) develops has been tackled, and rigorously questions many of the assumptions that have slipped into the literature. Specifically, and of note for readers of *Perception*, he suggests that sophisticated perceptual processes may be sufficient to produce many of the seemingly complex social behaviours observed in very young children and non-human primates that have lead other researchers in the field to attribute advanced cognitive reasoning.

Doherty begins by setting his constraint of evidence for ToM as success on the standard false-belief test in which a child shows evidence of understanding that other characters can hold false beliefs that differ from reality yet none-the-less guide their behaviour. This point of view is not without its critics (eg Bloom and German 2000), but at least limits the field to be addressed to just those studies showing evidence of this sort. He then goes on to outline the three main competing theories within the field—Theory Theory, Simulation Theory, and Modular Theory. My only real disappointment with the book arose in this section as it seems a little understated. Theory Theory is given extensive explanation, with pages of supporting empirical evidence why it is the favoured theoretical framework. By comparison, the alternative Simulation Theory and Modular Theory are given relatively little space and discussed in light only of counter-evidence (much of which is outdated). Doherty concludes, weakly, that all three may play a role in ToM expression, but persists for the rest of the book to pay them only lip service. Given the strength of his argument and the evidence he presents for Theory Theory, I think the alternative theories could have been given a fairer review at this stage while still maintaining Theory Theory's.

The remainder of the book is, for the most part, a description of all the evidence to support Theory Theory, and specifically Perner's model of it, in a variety of associated research areas. Chapters 4 and 5 look at developing skill in understanding other mental states and negotiating

non-mental representations, chapters 6 and 7 look at pretence and gaze following as precursors to ToM (ultimately discounting them), chapters 8 and 9 look at the interaction of executive function and language development with ToM, and chapter 10 outlines alternative theories of the role of a ToM deficit in autism. The strength of Doherty's book is its excellent and comprehensive coverage of the evidence supporting RUM, and his descriptions of lower-level explanations to argue against of the counter-evidence. In a literature that is becoming increasingly biologically deterministic (as described by Carpendale and Lewis 2006), Doherty's book clearly points out a number of assumptions that are frequently left unchallenged and under-addressed. While many previous summaries of the literature assume such things as joint attention as a precursor to ToM and a deficit of ToM as an explanation for autism, Doherty points out how inconclusive the evidence for these sorts of assumptions may be and posits alternative explanations.

There is a strong tendency in both comparative and developmental psychology to interpret complex behaviour in terms of high-level cognitive abilities, but Doherty throughout the book curbs this movement by highlighting how the same capabilities could be brought about through perceptual and statistical processing of the external information available. In this regard, the book provides an ideal model of the theoretical cut and thrust involved in describing the development of any cognitive ability on the basis of overt behaviour in psychological tests. For this reason alone the book stands as an important addition to students of the field and, in comparison to many other similar reviews on the market, will be of particular interest to readers of *Perception*.

Doherty delineates his area of interest well—evidence in support of Theory Theory on false-belief tasks and associated burgeoning capabilities. The areas he covers do not differ significantly from those covered in reviews of the field 20 years ago (eg Astington et al 1988) suggesting that, while techniques have improved, the primary questions remain unanswered. However, by looking in depth at this section of the literature, he illuminates the crux of many of the conflicts within it. As he points out, many of the controversies rest on how researchers define evidence for implicit and explicit Theory of Mind capabilities. What does it mean to have an implicit ToM? If it is not accessible then does it count? If implicit ToM exists, how does that reflect on our theories of the development of explicit ToM? Once answers to these questions are agreed, as in many areas within developmental psychology, the field will be better able to assess how the variety of evidence fits with the range of theories.

The development of Theory of Mind has attracted so much empirical debate and contradictory research that it is necessary at regular intervals to have someone provide an overview of where we have got to. Doherty simplifies this process by taking a single theoretical standpoint and presenting the research to-date from that perspective. This is a valuable contribution in offering a straightforward outline of Perner's point of view, one of the dominant theories in the field, and highlights many of the assumptions driving the field forward that need to be addressed. As such, I would be delighted to recommend this book to my students with the caveat that they also become acquainted with one of the many other reviews of the field that outline the alternative theories in greater detail.

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