



Preface

Vision and the brain, part II



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Identifying, manipulating and navigating around objects depends acutely upon what we perceive and is vital to our existence. Vision provides us with more information than any other sensory system to meet these needs and has been a topic of contemplation for much of human history. Yet, an empirical and theoretical basis for understanding the underpinnings of vision is much younger, and many findings that guide our understanding of the cerebral substrates of normal and disordered vision are just decades old. As for abnormal vision, many neurologists routinely encounter patients whose visual experience has been drastically altered in fascinating and, sometimes, bizarre ways. For instance, patients may no longer recognize their own images in mirrors, experience color hues, attend to visual objects in one half of space, or see more than one object at a time.

These cerebral visual disorders have been studied for over a century, with conflicting views on their validity, pathogenesis, and implications for understanding the visual system. Theories and hypotheses on the cerebral organization of vision evolved rapidly over the past few decades, reflecting the intense, diverse research being focused on this key sensory system. Many important discoveries have depended on observations in patients with visual dysfunction caused by brain lesions.

Vision and the Brain summarizes the current understanding of cerebral visual dysfunction from theoretical and pragmatic perspectives. Visual sensory impairment cannot be characterized just by measurements of visual fields and visual acuity: introductory articles in *Vision and the Brain, Part I* (May 2003), address methods of evaluating visual sensation including the use of psychophysics and electrophysiology. Higher-level visual functions can be objectively measured using standardized cognitive tests, often administered by a neuropsychologist. Functional anatomy of human vision can be visualized in neurologically normal and brain-damaged individuals using new techniques in radiology and physics. Symptoms of retinal disease and optic neuropathy may accompany and confound interpretation of cerebral visual dysfunction in cerebral disorders and must also be assessed.

The next section in *Part I* contains articles devoted to disorders associated with damage to the medial occipitotemporal cortices. This includes an article on achromatopsia, and three articles that address cerebral disorders of object recognition (visual agnosia, prosopagnosia, and alexia) often associated with lesions in the occipitotemporal cortices. Each article reviews clinical features, underlying theory, and points of debate.

Vision and the Brain, Part II (August 2003), begins with two articles that address visuospatial and motion processing deficits, which are more often attributed to occipitoparietal and lateral occipitotemporal lesions. Additional articles address disorders of visual imagery and consciousness (including “blindsight”) that are broadly relevant to many neurological patients. Articles on the developmental and neurodegenerative diseases address visual impairments of the young and old. The final article reviews therapy and rehabilitation of cerebral visual disorders based on best available scientific evidence. These volumes provide an overview and starting point for an education on how brain damage affects visual experience. Vision science is a rapidly moving multidisciplinary field, and its researchers are adept at exploiting the capabilities of new technologies to push the boundaries of our knowledge. We hope the scholarly reviews of the authors provide a framework that prepares the readers for understanding new developments that are bound to follow.

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