Brain And Visual Perception The Story Of A 25 Year

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Visual Perception Oxford University Press, USA
In The Space Between our Ears Michael Morgan explains how our brain interprets what we see. Using a wealth of sources from over the centuries including philosophical writings, scientific thinking, experiments, passages from poems and novels, and scenes from films, Morgan reveals thedifficulty in working out exactly how we make and receive our visual perceptions. To illustrate various points the book includes optical drawings as well as simple experiments that the reader can perform to test the different components of sight and our reactions to it. The book describes and criticises recent attempts to locate the 'neural correlates of consciousness' in specific parts of the brain. Against what he calls the 'secretion theory of consciousness' Morgan controversially argues that visual perception is most likely to be a function of the whole visualpathway, not just a small part of it. This intelligent, engaging book provides a revelatory overview of what we know about how the brain works regarding visual space, giving a unique insight into one of our most vital yet least understood senses.

The Neuropsychology of Vision Elsevier
Since the publication of the first edition in 1966, Eye and Brain has established itself worldwide as an essential introduction to the basic phenomena of visual perception. In this book, Richard L. Gregory offers clear explanations of how we see brightness, movement, color, and objects, and he explores the phenomena of visual illusions to establish principles about how perception normally works and why it sometimes fails. Although successive editions have incorporated new discoveries and ideas, Gregory completely revised and updated the book for this publication, adding more than thirty new illustrations. The phenomena of illusion continue to be a major theme in the book, in which the author makes a new attempt to provide a comprehensive classification system. There are also new sections on what babies see and how they learn to see, on motion perception, and tantalizing glimpses of the relationship between vision and consciousness and of the impact of new brain imaging techniques. In addition, the presentation of the text and illustrations has been improved by the larger format and new page design. The thousands of readers of the previous editions of Eye and Brain will find this new revised edition even more attractive and enthralling.

Perceptual Learning GRIN Verlag
A comprehensive review of contemporary research in the vision sciences, reflecting the rapid advances of recent years. Visual science is the model system for neuroscience, its findings relevant to all other areas. This essential reference to contemporary visual neuroscience covers the extraordinary range of the field today, from molecules and cell assemblies to systems and therapies. It provides a state-of-the art

companion to the earlier book The Visual Neurosciences (MIT Press, 2003). This volume covers the dramatic advances made in the last decade, offering new topics, new authors, and new chapters. The New Visual Neurosciences assembles groundbreaking research, written by international authorities. Many of the 112 chapters treat seminal topics not included in the earlier book. These new topics include retinal feature detection; cortical connectomics; new approaches to mid-level vision and spatiotemporal perception; the latest understanding of how multimodal integration contributes to visual perception; new theoretical work on the role of neural oscillations in information processing; and new molecular and genetic techniques for understanding visual system development. An entirely new section covers invertebrate vision, reflecting the importance of this research in understanding fundamental principles of visual processing. Another new section treats translational visual neuroscience, covering recent progress in novel treatment modalities for optic nerve disorders, macular degeneration, and retinal cell replacement. The New Visual Neurosciences is an indispensable reference for students, teachers, researchers, clinicians, and anyone interested in contemporary neuroscience. Associate Editors Marie Burns, Joy Geng, Mark Goldman, James Handa, Andrew Ishida, George R. Mangun, Kimberley McAllister, Bruno Olshausen, Gregg Recanzone, Mandyam Srinivasan, W.Martin Usrey, Michael Webster, David Whitney Sections Retinal Mechanisms and Processes Organization of Visual Pathways Subcortical Processing Processing in Primary Visual Cortex Brightness and Color Pattern, Surface, and Shape Objects and Scenes Time, Motion, and Depth Eye Movements Cortical Mechanisms of Attention, Cognition, and Multimodal Integration Invertebrate Vision Theoretical Perspectives Molecular and Developmental Processes Translational Visual Neuroscience

Neuromathematics of Vision MIT Press

Seminar paper from the year 2015 in the subject Biology - Evolution, grade: 1,3, Karlsruhe Institute of Technology (KIT) (ZAK | Zentrum für Angewandte Kulturwissenschaft), course: Visual Communication and Culture, language: English, abstract: Today, in our fast moving, computer-driven lives we are exposed to a myriad of sensations every second and not only from the environment or nature around us but also from ceaseless attacks through our modern media, that is mostly based on visual stimulation. So the topic of perception is, although it has been dealt with throughout the centuries from the stoic philosophy of the Greeks to modern neurologists, a highly current one that affects us all and every day in an unprecedented way. Not least as a popular American crime drama television series with the title “Perception”, where an eccentric neuropsychiatrist uses his unique perception abilities to solve complex criminal cases and a modern theatre play “Molly Sweeney” by Brian Friel, on stage at the moment at Theater Lindenhof in Melchingen, Germany, where the protagonist, a young woman, regained her eyesight through an operation and could not cope with the

overwhelming sensations, show the current fascination of the topic. In the following chapters I will draw attention to the basic principles of perception, especially visual perception as well as the evolution, concept and the functioning of our eyes to come to a better understanding of how we see things and the way our visual perception works.

Vision: From Neurons to Cognition MIT Press

The Neuropsychology of Vision describes a range of new approaches to neuropsychological investigation and provides a broad overview of visual neuropsychology. The book starts by presenting the results from new research employing single-unit recordings, on the neuronal basis of perception demonstrating that the visual system relies strongly on feedback from higher to lower levels of information processing, and that neuronal plasticity exists in the primary sensory cortices of adults, areas previously considered to be hard-wired. The book also describes other new and adapted techniques to measure brain activity, including multi-unit sum potential recording, functional magnetic resonance imaging and employing transcranial magnetic stimulation to induce temporary, circumscribed functional lesions in the cortices of normal subjects to mimic disorders. The coverage then moves on to review the experience of patients suffering from disturbances of visual perception. The disorders covered include agnosia, neglect, blindsight and achromatopsia. The final chapter is devoted to recovery and rehabilitation from cerebral visual disorder. Professors Fahle and Greenlee have brought together some of the leading international specialists in the field to provide this comprehensive and up-to-date review.

Vision, Brain, and Behavior in Birds Elsevier

The philosophy of perception is a microcosm of the metaphysics of mind. Its central problems—What is perception? What is the nature of perceptual consciousness? How can one fit an account of perceptual experience into a broader account of the nature of the mind and the world?—are at the heart of metaphysics. Rather than try to cover all of the many strands in the philosophy of perception, this book focuses on a particular orthodoxy about the nature of visual perception. The central problem for visual science has been to explain how the brain bridges the gap between what is given to the visual system and what is actually experienced by the perceiver. The orthodox view of perception is that it is a process whereby the brain, or a dedicated subsystem of the brain, builds up representations of relevant figures of the environment on the basis of information encoded by the sensory receptors. Most adherents of the orthodox view also believe that for every conscious perceptual state of the subject, there is a particular set of neurons whose activities are sufficient for the occurrence of that state. Some of the essays in this book defend the orthodoxy; most criticize it; and some propose alternatives to it. Many of the essays are classics. Contributors G.E.M. Anscombe, Dana Ballard, Daniel Dennett, Fred Dretske, Jerry Fodor, H.P. Grice, David Marr, Maurice Merleau-Ponty, Zenon Pylyshyn, Paul Snowdon, and P.F.

Strawson
Discovering the Brain MIT Press
In The Vision Revolution: How the Latest Research Overturns Everything We Thought We Knew About Human Vision, Mark Changizi, prominent neuroscientist and vision expert, addresses four areas of human vision and provides explanations for why we have those particular abilities, complete with a number of full-color illustrations to demonstrate his conclusions and to engage the reader. Written for both the casual reader and the science buff hungry for new information, The Vision Revolution is a resource that dispels commonly believed perceptions about sight and offers answers drawn from the field's most recent research. Changizi focuses on four “why" questions: 1. Why do we see in color? 2. Why do our eyes face forward? 3. Why do we see illusions? 4. Why does reading come so naturally to us? Why Do We See in Color? It was commonly believed that color vision evolved to help our primitive ancestors identify ripe fruit. Changizi says we should look closer to home: ourselves. Human color vision evolved to give us greater insights into the mental states and health of other people. People who can see color changes in skin have an advantage over their color-blind counterparts; they can see when people are blushing with embarrassment, purple-faced with exertion or the reddening of rashes. Changizi's research reveals that the cones in our eyes that allow us to see color are exquisitely designed exactly for seeing color changes in the skin. And it's no coincidence that the primates with color vision are the ones with bare spots on their faces and other body parts; Changizi shows that the development of color vision in higher primates closely parallels the loss of facial hair, culminating in the near hairlessness and highly developed color vision of humans. Why Do Our Eyes Face Forward? Forward-facing eyes set us apart from most mammals, and there is much dispute as to why we have them. While some speculate that we evolved this feature to give us depth perception available through stereo vision, this type of vision only allows us to see short distances, and we already have other mechanisms that help us to estimate distance. Changizi's research shows that with two forward-facing eyes, primates and humans have an x-ray ability. Specifically, we're able to see through the cluttered leaves of the forest environment in which we evolved. This feature helps primates see their targets in a crowded, encroached environment. To see how this works, hold a finger in front of your eyes. You'll find that you're able to look “through" it, at what is beyond your finger. One of the most amazing feats of two forward-facing eyes? Our views aren't blocked by our noses, beaks, etc. Why Do We See Illusions? We evolved to see moving objects, not where they are, but where they are going to be. Without this ability, we couldn't catch a ball because the brain's ability to process visual information isn't fast enough to allow us to put our hands in the right place to intersect for a rapidly approaching baseball. “If our brains simply created a perception of the way the world was at the time light hit the eye, then by the time that perception was elicited—which takes

about a tenth of a second for the brain to do—time would have marched on, and the perception would be of the recent past," Changizi explains. Simply put, illusions occur when our brain is tricked into thinking that a stationary two-dimensional picture has an element that is moving. Our brains project the “moving" element into the future and, as a result, we don't see what's on the page, but what our brain thinks will be the case a fraction of a second into the future. Why Does Reading Come So Naturally to Us? We can read faster than we can hear, which is odd, considering that reading is relatively recent,

Eye and Brain Cambridge University Press

This book provides the first comprehensive and current review of considerable progress made over the past decade in analyzing neural and behavioral mechanisms mediating visually guided behavior in birds.The visual capacities of birds rival even those of primates, and their visual system probably reflects the operation of a ground plan common to all vertebrates. This book provides the first comprehensive and current review of considerable progress made over the past decade in analyzing neural and behavioral mechanisms mediating visually guided behavior in birds.The book's five major sections deal with the visual world of birds, the organization of avian visual systems, the development and plasticity of visual structure and function, visuomotor control mechanisms, and cognitive processes. The introduction to each section discusses the nature and significance of the problem areas, providing a context for the chapters to follow, which review the current status of research on a specific problem. The contributors are an international assemblage of researchers, representing a wide variety of disciplines, ranging from ornithology to neurophysiology and including ethology, experimental psychology, anatomy, and developmental neurobiology. For the ethologist, avian behavior is the source of a wide variety of species-typical fixed action patterns; for the experimental psychologist, birds are the subject of choice for studies of conditioning, learning, and cognitive processes; for the neurobiologist they provide model systems for studying developmental processes, sensory mechanisms, orientation, and motor control. For these reasons, research on the avian brain and behavior occupies an increasingly important place in contemporary behavioral biology.

Vision and Brain Oxford University Press

A comprehensive and integrated introduction to the phenomena and theories of perceptual learning, focusing on the visual domain. Practice or training in perceptual tasks improves the quality of perceptual performance, often by a substantial amount. This improvement is called perceptual learning (in contrast to learning in the cognitive or motor domains), and it has become an active area of research of both theoretical and practical significance. This book offers a comprehensive introduction to the phenomena and theories of perceptual learning, focusing on the visual domain.

The Psychology of Visual Art MIT Press

A radically integrative

account of visual perception, grounded in neuroscience but drawing on insights from philosophy and psychology. How do we gain access to things as they are? Although we routinely take our self-made pictures to be veridical representations of reality, in actuality we choose (albeit unwittingly) or construct what we see. By movements of the eyes, the direction of our gaze, we create meaning. In Brain and the Gaze, Jan Lauwereyns offers a novel reformulation of perception and its neural underpinnings, focusing on the active nature of perception. In his investigation of active perception and its brain mechanisms, Lauwereyns offers the gaze as the principal paradigm for perception. In a radically integrative account, grounded in neuroscience but drawing on insights from philosophy and psychology, he discusses the dynamic and constrained nature of perception; the complex information processing at the level of the retina; the active nature of vision; the intensive nature of representations; the gaze of others as visual stimulus; and the intentionality of vision and consciousness. An engaging point of entry to the cognitive neuroscience of perception, written for neuroscientists but illuminated by insights from thinkers ranging from William James to Slavoj Žižek, Brain and the Gaze will give new impetus to research and theory in the field.

The Vision Revolution Springer Science & Business Media

This book considers computer vision to be an integral part of the artificial intelligence system. The core of the book is an analysis of possible approaches to the creation of artificial vision systems, which simulate human visual perception. Much attention is paid to the latest achievements in visual psychology and physiology, the description of the functional and structural organization of the human perception mechanism, the peculiarities of artistic perception and the expression of reality. Computer vision models based on these data are investigated. They include the processes of external data analysis, internal environmental model synthesis, and the generating of behavioristic responses based on external and internal models comparison. Computer vision system evolution resulting from environmental effects is also considered. A unique feature of this book is the authors' use of black and white, and colour prints of traditional and contemporary Russian art to illustrate their principal theses. In doing so, they introduce the reader to a particularly Russian view of the world.

Eye, Brain, and Vision MIT Press

The present volume covers the physiology of the visual system beyond the optic nerve. It is a continuation of the two preceding parts on the photochemistry and the physiology of the eye, and forms a bridge from them to the fourth part on visual psychophysics. These fields have all developed as independent speciali ties and need integrating with each other. The processing of visual information in the brain cannot be understood without some knowledge of the preceding mechanisms in the photoreceptor organs. There are two fundamental reasons, ontogenetic and functional, why this is so:

1) the retina of the vertebrate eye has developed from a specialized part of the brain; 2) in processing their data the eyes follow physiological principles similar to the visual brain centres. Peripheral and central functions should also be discussed in context with their final synthesis in subjective experience, i. e. visual perception.
Microphysiology and ultramicroscopy have brought new insights into the neuronal basis of vision. These investigations began in the periphery: HARTLINE'S pioneering experiments on single visual elements of Limulus in 1932 started a successful period of neuronal recordings which ascended from the retina to the highest centres in the visual brain. In the last two decades modern electron microscopic techniques and photochemical investigations of single photoreceptors further contributed to vision research.
Vision Wiley-Blackwell
For over thirty years, Nobel Prize winner David H. Hubel has been at the forefront of research on questions of vision. In Eye, Brain, and Vision, he brings you to the edge of current knowledge about vision, and explores the tasks scientists face in deciphering the many remaining mysteries of vision and the workings of the human brain.
Visual Perception Oxford University Press
An engaging introduction to the science of vision that offers a coherent account of vision based on general information processing principles In this accessible and engaging introduction to modern vision science, James Stone uses visual illusions to explore how the brain sees the world. Understanding vision, Stone argues, is not simply a question of knowing which neurons respond to particular visual features, but also requires a computational theory of vision. Stone draws together results from David Marr's computational framework, Barlow's efficient coding hypothesis, Bayesian inference, Shannon's information theory, and signal processing to construct a coherent account of vision that explains not only how the brain is fooled by particular visual illusions, but also why any biological or computer vision system should also be fooled by these illusions. This short text includes chapters on the eye and its evolution, how and why visual neurons from different species encode the retinal image in the same way, how information theory explains color aftereffects, how different visual cues provide depth information, how the imperfect visual information received by the eye and brain can be rescued by Bayesian inference, how different brain regions process visual information, and the bizarre perceptual consequences that result from damage to these brain regions. The tutorial style emphasizes key conceptual insights, rather than mathematical details, making the book accessible to the nonscientist and suitable for undergraduate or postgraduate study.
A Vision of the Brain Oxford University Press, USA
* Authored by one of the world's foremost authorities on the biology of the brain. * Illustrated in two colours throughout. * Contains a section of full-colour graphics. * A benchmark text for students and researchers alike. .
The New Visual Neurosciences Routledge

Cerebral visual impairment (also known as cortical visual impairment, or CVI) has become the most common cause of visual impairment in children in the United States and the developed world. Vision and the Brain is a unique and comprehensive sourcebook geared especially to professionals in the field of visual impairment, educators, and families who need to know more about the causes and types of CVI and the best practices for working with affected children. Expert contributors from many countries represent education, occupational therapy, orientation and mobility, ophthalmology, optometry, neuropsychology, psychology, and vision science, and include parents of children with CVI. The book provides an in-depth guide to current knowledge about brain-related vision loss in an accessible form to enable readers to recognize, understand, and assess the behavioral manifestations of damage to the visual brain and develop effective interventions based on identification of the spectrum of individual needs. Chapters are designed to help those working with children with CVI ascertain the nature and degree of visual impairment in each child, so that they can "see" and appreciate the world through the child's eyes and ensure that every child is served appropriately.

Neuropsychology of Visual Perception Taylor & Francis

"Image and Brain attempts what is rarely seen in cognitive neuroscience: The Big Picture. To be sure, it is Kosslyn's Big Picture, but that is probably the best there is." -- Irving Biederman, William M. Keck Professor of Cognitive Neuroscience, University of Southern California. This long-awaited work by prominent Harvard psychologist Stephen Kosslyn integrates a twenty-year research program on the nature of high-level vision and mental imagery. Image and Brain marshals insights and empirical results from computer vision, neuroscience, and cognitive science to develop a general theory of visual mental imagery, its relation to visual perception, and its implementation in the human brain. It offers a definitive resolution to the long-standing debate about the nature of the internal representation of visual mental imagery. Kosslyn reviews evidence that perception and representation are inextricably linked, and goes on to show how "quasi-pictorial" events in the brain are generated, interpreted, and used in cognition. The theory is tested with brain-scanning techniques that provide stronger evidence than has been possible in the past. Known for his work in high-level vision, one of the most empirically successful areas of experimental psychology, Kosslyn uses a highly interdisciplinary approach. He reviews and integrates an extensive amount of literature in a coherent presentation, and reports a wide range of new findings using a host of techniques. A Bradford Book

Image And Brain AFB Press

This long-awaited work by prominent Harvard psychologist Stephen Kosslyn integrates a twenty-year research program on the nature of high-level vision and mental imagery. Image and Brain marshals insights and empirical results from computer

vision, neuroscience, and cognitive science to develop a general theory of visual mental imagery, its relation to visual perception, and its implementation in the human brain. It offers a definitive resolution to the long-standing debate about the nature of the internal representation of visual mental imagery. Kosslyn reviews evidence that perception and representation are inextricably linked, and goes on to show how "quasi-pictorial" events in the brain are generated, interpreted, and used in cognition. The theory is tested with brain-scanning techniques that provide stronger evidence than has been possible in the past. Known for his work in high-level vision, one of the most empirically successful areas of experimental psychology, Kosslyn uses a highly interdisciplinary approach. He reviews and integrates an extensive amount of literature in a coherent presentation, and reports a wide range of new findings using a host of techniques. A Bradford Book

Visual Perception Part 2 MIT Press

A contemporary and interdisciplinary perspective on the study of art, connecting and integrating ideas from across the humanities and sciences.

From Humans to Computers World Scientific

The brain ... There is no other part of the human anatomy that is so intriguing. How does it develop and function and why does it sometimes, tragically, degenerate? The answers are complex. In Discovering the Brain, science writer Sandra Ackerman cuts through the complexity to bring this vital topic to the public. The 1990s were declared the "Decade of the Brain" by former President Bush, and the neuroscience community responded with a host of new investigations and conferences. Discovering the Brain is based on the Institute of Medicine conference, Decade of the Brain: Frontiers in Neuroscience and Brain Research. Discovering the Brain is a "field guide" to the brainâ€"an easy-to-read discussion of the brain's physical structure and where functions such as language and music appreciation lie. Ackerman examines: How electrical and chemical signals are conveyed in the brain. The mechanisms by which we see, hear, think, and pay attentionâ€"and how a "gut feeling" actually originates in the brain. Learning and memory retention, including parallels to computer memory and what they might tell us about our own mental capacity. Development of the brain throughout the life span, with a look at the aging brain. Ackerman provides an enlightening chapter on the connection between the brain's physical condition and various mental disorders and notes what progress can realistically be made toward the prevention and treatment of stroke and other ailments. Finally, she explores the potential for major advances during the "Decade of the Brain," with a look at medical imaging techniquesâ€"what various technologies can and cannot tell usâ€"and how the public and private sectors can contribute to continued advances in neuroscience. This highly readable volume will provide the public and policymakersâ€"and many scientists as wellâ€"with a helpful guide to understanding the many discoveries that are sure to be announced

throughout the "Decade of the Brain."