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Eye and brain the psychology of seeing - fifth edition

Since the first edition was published in 1966, Eye and Brain has established itself worldwide as an important introduction to the underlying phenomena of visual perception. Richard 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 usually works and why it sometimes fails. The illusion continues to be the main theme in the book, which provides a comprehensive classification system. There are also sections on what children see and how they learn to see, on perception of movement, the link between vision and consciousness, and the impact of new brain imaging techniques. Memuat Since the first edition was published in 1966, Eye and Brain has established itself worldwide as an important introduction to the underlying phenomena of visual perception. 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We should only open our eyes, and spread in front of us lies a banquet of colors and shapes, shadows and textures: pageant rewarding and threatening objects, miraculously captured vision. All this, from two tiny distorted inverted patterns of light in the eyes. Seeing so familiar, apparently so easily, it takes a leap of imagination to appreciate that the eyes are setting extremely difficult problems for the brain to solve to see to be possible. How does it work? How are ghostly images transformed into the look of solid objects lying in the outer world of space and time? Since the beginning of the recorded interrogation, there have been several approaches to how we see it. They are very different from current views. An important problem was how distant objects reached the eyes and brain while staying there in space. Two and a half millennia ago, Greek philosophers thought light was shooting from the eyes to touch objects like sensing fingers. Another notion at the time was that objects have shell expansion ripples of stone fell on the pool, but keeping the shape of the object over long distances. Until recently, philosophers called the meaning of data, they had to be intermediaries - no question, no mind- between objects and perception. Both of these ideas were serious candidates before it was clear that there were images of light optically projected from the outside world to retinal screens in their eyes. Optical images were unknown before the twentieth century, and not until the beginning of the seventeenth were detected in the eyes of the image. Finally it became clear that the light was not coming in and out of the brain, locked privilegedly in his bone box. The whole brain receives minute electrochemical pulses of different frequencies as signals from the senses. Signals must be read by rules and knowledge to make sense. But what we see, and what we know or believe, can be very different. As science progresses, the differences between perceived performances and accepted realities are getting bigger. It is far beyond the overall account that the eye is a camera; but this is essentially true, although far from the whole story. These are the unpretentious features of the eyes and brains that interest us most here. What strikes is the sheer amount of brain contributing to vision, giving enormous added value to eye images. Where does this extra wealth come from for vision? To some authorities it's just objected to-they see perception as passive acceptance of what's out there as a window facing the world. But that doesn't begin to explain how we see objects from sketchy eye images, even from sparse lines and rough dots of seemingly inadequate pictures. In ideal conditions, the perception of the object is much richer than any possible image in the eyes. Added value must come from dynamic brain processes, using knowledge stored from the past to see the present and predict the near future. Prediction has tremendous survival value. Not only does this make fast games possible, despite physiological delays in signal from the ane to the brain, and brain to hand. Anticipation of danger and potential rewards is essential for survival–it is made possible by buying time from seeing objects distant in space. This introduces a certain way of thinking about perception. This is essentially a look at a 19th-century German polymath—a physiologist, physicist, psychologist—Hermann von Helmholtz (1821–1894), who described perceptions as unconscious conclusions from sensory data to what might be there. This is a school of thought adopted here, but there are others. Psychology is unusual among the sciences, in that it has doubts about its most underdone assumptions, with very different alternatives held by different authorities. Active and passive accounts are extremely different ways of describing and explaining visual phenomena. Few such divisions in their basic ideas. There were equally divided paradigms (as the American philosopher of science Thomas Kuhn calls them) during Darwin's time over whether species evolution was through natural selection or special creation of each species, but this is now being addressed, by an almost universal acceptance of evolution. However, while active, in fact Helmholzian, perception accounts now dominate, it wasn't until a few years ago and they are not u.S. held every day. The paradigms of perceptionSou may outline some recent explanations:Behaviour was founded by John Broads Watson (1878–1958) with his 1913 manifesto: Psychology as Behaviour Examines It. This stemmed from a consciousness denial, at least as a ploy to make psychology scientifically respectable. Behavior was hugely influential in America until the 1980s, especially with B. F. Skinner's experiments and ideas. It is based on the previous work of Russian physiologist Ivan Pavlov (1849-1936) with his experiments on conditional (or conditional) reflexes. Pavlov showed that, starting with an innate (inherited) reflex such as saliva to the sight or smell of meat, dogs would come to saliva to any stimulus (such as a bell) presented at the same time or just before eating. It turned out that it was possible to build up chains of conditional reflexes. For behavioral, it seemed that the air conditioning chains explain all the behavior learned, even the language. They listed the congenital reflexes seen in infants and measured the strengths of reward drives. As such, they developed a scientifically respectable atomism to describe complex behaviors from simple components. Solving problems, at least for animals such as cats, was to be by trial and error - without understanding the nature of the problem. Perception and behavior had to be controlled quite directly by incentives, with modifications from the internal states of drives such as hunger, so that with sufficient psychology knowledge should become an absolutely prognostic science. It didn't work. Watson's rejection of consciousness makes psychology even more like physics; but for most of us today, he threw out a baby with bath water. Gestalt psychology was a completely different competing school. Founded by a group of German scientists in the 1920s, the focus was on dynamics and holism. Many gestalt psychologists (completely different from the recent gestalt therapy) fled Nazi Germany under Hitler's leadership to settle in an America where they had a major influence. Gestalt was grouping elements in a way that is generally greater than the sum of its parts. Analysis of susceptible components should not have been possible. An important concept was pregnance, roughly speaking, pregnant with meaning. Solving problems had to be through understanding. a well-known example is the chimpanzee Sultan Wolfgang Kohler; presented with a banana out of reach and a number of short sticks, it was described as looking at sticks for a few minutes and then suddenly joining the two together to descend the banana. Throughout, there is an emphasis on sudden decisions, with sudden understanding. Gestalt psychologists described visual perception as more than the sum of irritants organized under different laws. They mostly come from subjective reports on how the location of points is treated as patterns: which dots belong together, form lines and so on, or are separate. This may seem vague, hardly scientific; but the gestalt laws of the organization were important for the perception of vision and sound. They were adopted by the AI (AI) community, especially for programming computers to recognize patterns and objects. Laws include: (1) closure- a propensity for approximately circular patterns of dots to be treated as belonging and formation of an object;(2) a common destiny-parts moving together like tree leaves are treated as an object;(3) admixing functions connected side by side; and the advantage of smooth curves. The laws of the organization were to be inherited, but because they correspond to the common features of virtually all objects, training can be involved to give all of us many of the same visual organizations. Gestalt concepts of brain physiology (electric fields and so on) have been abandoned. Cognitive psychology, in its various forms, denies that perception and behavior are controlled by irritants, emphasizing the importance of general background knowledge and more or less logical thought processes. The extent to which these actions relate to perception is controversial. Typically, visual perception was considered quite separate from cognitive problem solving, but this can be questioned. Nevertheless, Herman von Helmholtz thought of visual perception as unconscious conclusions, and so did the perception of thinking. Cambridge psychologist Kenneth Craik (1914–1945) put forward the notion that the brain works with physiologically existing functional internal models of perceived and imaginary objects and situations. Now this is usually changed to a more symbolic narrative; but the notion of brain representation is being used as central to cognitive approaches. The clever eye that philosophy, or paradigm, largely comes from Helmholtz. It's that visual and other perception is smart decision-making, from limited sensory evidence. An important point is that sensor signals are not adequate for direct or certain perception; so clever guesses are needed to view objects. The view taken here is that perceptions are prognostication, never quite certain, hypotheses of what might be there. It was perhaps the active intelligence of perception that was an evolutionary beginning problem solving. When, a generation before Freud, Helmholtz called the perception of unconscious conclusions strongly criticized—for how one can blame or praise unconscious perceptions and actions? We are still baffled by these issues. There are many traps in the way of studying the eyes and brain. It is important to avoid the temptation of thinking that the eyes produce photos in the brain that are perceptions of objects. Images in the brain of the concept suggest an inner eye to see them. But it will take even more eyes to see his picture-another picture, another eye-and-so on forever, nowhere to go. At the beginning of this century, Gestalt psychologists gushed that perceptions were snapshots inside the brain: it was assumed that the brain's electrical fields copy the shapes of objects. So, a circular object will produce a circular field of the brain. Presumably the house will have a home shaped like an electrical picture of the brain, although it is far less plausible. The green object having a green brain-trail is ridiculous. This concept, known as isomorphism, has led to speculation that the properties of brain fields produce visual distortions (e.g., bubbles, usually spherical ones), visual phenomena explained by their supposed mechanical or electrical properties. There is no evidence of isomorphic traces of the brain. Now we think of the brain as a representation, and as symbols of language represent the characteristics of things, although the shapes and sounds of speech are quite different from what is presented. The language requires rules of grammar (syntax) and character values (semantics). Both seem necessary for vision processes; although its syntax and semantics are ineitive to be discovered by the experiment. Some vision puzzles disappear with little thought. There is no particular problem that eye images are inverted and optically right-left reverses- because they are not treated like images, in the inner eye. Since the image is not an object of perception, it does not matter that it is inverted. The brain's task is not to see the retinal image, but to link signals from the eyes to the objects of the outside world, as it is essentially known to the touch. Reconnaissance touch is very important for vision. It is important that the relationship with sensory vision remains the same. When changed experimentally (with optically rear prisms, or lenses or mirrors) then a problem is established, and special training is required. No special training is required for a child to see the world the right way up. Gestalt psychologists have made some great suggestions, realizing that the visual system is reaching to solve some very complex problems that arise right at the start. How does retinal stimulation mosaic give perception to individual objects? (This also applies to hearing, especially languages. Visual divisions are not given simply by the boundaries of light on the retina. Division into objects is given according to different rules, and knowledge. Sharp curbs are quite rare, except for linear drawings that are not characteristic and present their own problems. The tendency to group elements into goals was examined by Gestalt psychologists, with patterns of points. Their experiments suggested different rules for organizing the creation of objects. It was a much more useful idea than isomophism, and it proved important for programming visual computers, although this development is in its infancy. We see something dynamically grouping in an array of dots (see Figure 1.1). Dots are equally parted, but there is a tendency to arrange them in columns and rows. We see active attempts to organize visual data into objects. With more complexity, grouping, and regrouping can become more dramatic (Figure 1.2). If the brain hadn't tried data organizations all the time, it would be difficult for a cartoonist to search for objects like faces. In fact all he or she has to do is present some well-chosen lines and we see the face, complete with expression. This important visual process can, however, go through the top to make us see faces on fire, galleons in the clouds, or Man on the Moon. Vision, of course, is not infallible. This is largely because knowledge and assumptions add so much that vision is not directly related to or confined to eye images - so quite often it produces fiction. This can be useful because the images are inherently inadequate, but visual fictions and other illusions bother philosophers looking for confidence out of sight. How have such complex processes begun to represent things? What is their evolutionary benefit? For simple organisms, eye signals initiate behavior quite directly. Thus, tropeisms up to or away from the light can serve to seek protection or food in typical settings, without a creature able to make decisions between alternative courses of action. We can say that primitive organisms are almost completely controlled - tyrannized - trophisms and reflexes. Many reflexes still protect us (e.g., flashing for fluffy air on the eye, or to sudden loud sound) and reflexes are essential to maintaining body functions such as breathing and digestion. But gradually, through evolution, direct control by external objects is largely replaced by increasingly indirect representations of objects and situations. This has the huge advantage that behaviour may be appropriate for properties of objects that are not and often cannot be signalled by feelings. Thus, we pick up a glass to drink not just from irritants, but from the knowledge of glasses, and what they may contain. By contrast, a frog surrounded by dead flies will starve to death because although they eddy he does not see them, as they do not move. These representations of the brain are much more than photos. They include information about what different kinds of objects can do, or be used for. In order for behavior to be appropriate in a wide variety of situations, you need a lot of knowledge about the world. Knowledge must be selected and accessed within a fraction of a second to be useful for perception, or the moment for action (or survival) will pass. Thus, the intelligence of vision works much faster than other problem solving. This may be because perceptions are quite surprisingly separate from generally abstract concepts, and may disagree. Thus, a person feels the illusion, although a person knows that it is an illusion and even what causes it. Illusions tell us a ---, as I will show, more than we would like to know! (Continues...) An excerpt from Richard L. Gregory's an ocses and brain. Author © 1997 by Richard L. Gregory. Excerpted with permission from Princeton University PRESS. All rights reserved. No part of this passage can be reproduced or reprinted without the permission of the publisher. Excerpts are provided by Dial-A-Book Inc. solely for personal use by visitors to this website. Site.

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