Visual perception art definition

The ability to interpret the surrounding environment using light in the visible spectrum of Sight and Eyesight redirected here. For more information on use, see Sight (disambiguation) and Eyesight (song). This article needs additional citations for validation. Help improve this article by adding citations to reliable sources. Unsourced material can be attacked and removed. Find sources: Visual perception - news · newspaper · books · scholar · JSTOR (March 2014) (Learn how and when to delete this message template) Part of the series onPsychology Outline History Subfields Basic Types Abnormal Behavioral Genetics Biological Cognitive/ Cognition Comparative Intercultural Cultural Differential Developmental Evolutionary Experimental Mathematical Neuropsychology Personality Quantitative Social Applied Psychology Applied Behavioral Analysis Clinical BehaviorAl Analysis Clinical BehaviorAl Analysis Community Consumer Advice Critical Educational Environmental Ergonomics Forensic Health Humanistic Industrial and Organizational Legal Medical Military Music Working Health Political Religion School Sport Traffic Lists Disciplines Organization Psychotherapies Publications Research Methods Timeline Theory Topics Psychology Portalvte Visual Perception is the ability to interpret the surrounding environment using light in the visible spectrum reflects objects in the environment. This differs from visual acuity, which refers to how clearly a person sees (for example, 20/20 vision). A person may have problems with visual percussion processing, even if they have 20/20 vision. The resulting perception is also known as visual perception, sight, vision, or vision (adjective form: visual, optical or eye). The various physiological components involved in vision are referred to together as the visual system, and are the subject of many researches in linguistics, psychology, cognitive science, neuroscience, and molecular biology, collectively referred to as vision science. Visual system Main link: Visual system In humans and a number of other mammals, light enters the eye through the cornea and is directed through the lens to the retina, a light-sensitive membrane at the back of the eye. The retina serves as a sensor for converting light into neuronal signals. This transduction is achieved by specialized photoreceptive retina cells, also known as rods and cones, which detect photons of light and react to produce nerve impulses. These signals are transmitted by the optic nerve, from the retina upstream to the central ganglia in the brain. Lateral geniculate nucleus, which transmits information to the visual cortex. Signals from the retina also travel directly from the retina to the higher coloscle. The lateral geniculate nucleus sends signals to the primary visual cortex, also called the striate cortex. Extrasteal bark, also Visual association cortex is a set of cortical structures that receive information from the cortex as well as each other. [1] Recent descriptions of the visual association cortex describe the division into two functional pathways, the vetral and dorsal pathways. This assumption is known as the two-current hypothesis. The human visual system is generally believed to be sensitive to visible light in the wavelength range between 370 and 730 nanometers (0.00000037 to 0.00000073 meters) of the electromagnetic spectrum. [2] However, some research suggests that people may perceive light at wavelengths of up to 340 nanometers (UV-A), especially in young people. [3] Study See also: Two-factor hypothesis The main problem in visual perception is that what people see is not just the translation of retina stimuli (i.e. the image on the retina). So people interested in perception have long tried to explain what visual processing does to create what is actually seen. Early studies Visual dorsal current (green) and vetral current (purple) are shown. A large part of the human cerebral cortex is involved in vision. There were two great ancient Greek schools that provided a primitive explanation of how vision works. The first was the theory of vision emissions, which insisted that vision occurs when rays come out of the eyes and are captured by visual objects. If the object was seen directly, it was using rays that came out of the eyes and fell on the object again. However, the fractured image was also seen by rays coming out of the eyes, passing through the air, and falling after the fracture onto a visible object that had been seen as a result of the movement of the rays from the eye. This theory was promoted by scholars who were followers of Eucles optics and Ptolemy optics. The second school advocated a so-called intromiss approach that sees vision as coming from something that enters the eyes of a representative of the object. With its main promoters, Aristotle (De Sensu),[4] Galen (De Usu Partium Corporis Humani) and their followers,[4] this theory seems to have some contact with modern theories about what vision really is, but it remains only speculation that lacked experimental foundations. (In eighteenth-century England, Isaac Newton, John Locke, and others, carried out an intromiss theory of vision forward by insisting that the vision involved a process in which rays-composed of real matter-emitted from seeing objects and entered the oracle's mind/sensorium through the eye of the aperture.) [5] Both schools of thought relied on the principle that similar is known only as, and thus on the idea that the eye was composed of some inner fire that interacted with the outer fire of visible light and allowed vision. Plato makes this claim in his dialogue Timaeus (45b and 46b), as well as Empedocles (as well as by Aristotle in his De Sensu, DK frag. B17). [4] Leonardo da Vinci: The eye has a central line, and everything that reaches the eye across this central line is clearly visible. Alhazen (965 –1040) conducted many researches and experiments on visual perception, expanded Ptolemy's work to binocular vision, and commented on Galen's anatomical works. [6] [7] He was the first person to explain that vision occurs when light is reflected on an object and then directed into the eyes. [8] Leonardo da Vinci (1452–1519) is considered the first to recognize the special optical properties of the eye. Written by: Features of the human eye ... was described by a large number of authors in a certain way. But I find it's completely different. His main experimental finding was that there was only a clear and clear vision in the field of view – an optical line that ends at the fovea. Although he did not use these words literally, he is actually the father of modern distinction between foal and peripheral vision. [9] Issac Newton (1642–1726/27) was the first experimentation to find out by isolating the individual colors of the spectrum of light passing through the prism, that the visually perceived color of objects appeared due to the nature of the light that reflected the objects, and that these split colors could not be changed to a different color, contrary to the scientific expectations of the day. [2] Unwitting conclusion The main article: Hermann von Helmholtz's unconscious conclusion is often attributed to the first modern study of visual perception. Helmholtz examined the human eye and concluded that he was unable to create a high-quality image. The lack of information seemed to make vision impossible. He therefore concluded that the vision could only be the result of some form of unconscious conclusion that the term created in 1867. He suggested that the brain makes assumptions and conclusions from incomplete data, based on previous experience. [10] Inference requires previous world experience. Examples of well-known assumptions, based on visual experience, are: light comes from the above objects are usually not seen from below faces are seen (and recognized) upright. [11] Closer objects may block the view of more distant objects, but not, on the contrary, characters (i.e. foreground objects) tend to have convex boundaries Study of visual illusions (cases when the derivation process goes wrong) have brought many insights into what assumptions the visual system creates. Another type of unconscious conclusion hypothesis (based on probabilities) has recently been revived in so-called Bayesian studies of visual perception. [12] Proponents of this approach believe that the visual system performs some form of Bayes inference to derive perception from sensory data. However, it is not clear how in principle, the relevant probabilities required by the Bayesian equation. Models based on this idea have been used to describe various visual perception functions, such as motion perception, depth perception, and terrain perception. [13] [14] Completely empirical theory of perception is a related and more recent approach that rationalizes visual perception without explicitly mentioning Bayesian formalisms. Gestalt Theory Main Article: Gestalt Psychology Gestalt psychologists working primarily in the 1930s and 1940s raised many research questions that are being studied by vision scientists today. [15] The Gestalt Laws of Organization was guided by a study of how people perceive visual components as organized patterns or units, instead of many different parts. Gestalt is a German word that is partially translated as a configuration or pattern along with an entire or emerging structure. According to this theory, there are eight main factors that determine how the visual system automatically groups elements into patterns: Proximity, Similarity, Closure, Symmetry, Common Destiny (i.e. common movement), Continuity and good gestalt (a pattern that is regular, simple and orderly) and past experiences. Eye Motion Analysis See also: Eye Movement The first 2 seconds (Yarbus, 1967) During the

1960s, technical developments enabled continuous registration of eye movement during reading,[16] while watching an image,[17] and later, in visual problem solving,[18] and when cameras with a headset were available, also while driving. [19] The image on the right shows what can happen in the first two seconds of visual inspection. While the background is out of focus, representing peripheral vision, the first eye movement goes into a person's shoes (just because they are very close to the initial fixation and have a reasonable contrast). The following fixation jump from face to face. They might even allow comparisons between faces. It can be concluded that the face icon is a very attractive search icon within the peripheral field of vision. Foveal vision adds detailed information to the peripheral first impression. It can also be noted that there are different types of eye movements: fixing eye movements (microsaccades, eye drift and tremor), vergence movements, saccadic movements and persecution movements. Fixations are comparably static points where the eye rests. However, the eye is never completely at rest, but the view position will drift. These drifts, in turn, are corrected microsawhen, very small fixation movements of the eyes. Vergence movements involve the cooperation of both eyes to allow the image to fall on the same area of both retinas. The result is one focused image. Saccadic movements are a type of eye movement that makes jumps from one position to another and is used to quickly scan a specific Finally, the movement of persecution is a smooth movement of the eyes and is used to track objects in motion. [20] Facial and object recognition There is considerable evidence that facial and object recognition is performed by different systems. For example, prosopagnostic patients show deficits in the face, but not object processing, while object agnosic patients (most notably, patient CK) show deficits in the processing of objects with saved facial processing. [21] Behaviorally, it has been shown that faces, but not objects, are exposed to inverse effects, leading to claims that faces are special. [21] [22] Furthermore, the processing of the face and object recruits different nervous systems. [23] In particular, some argue that the apparent specialisation of the human brain in facial processing does not reflect the actual specificity of the domain, but rather the more general process of discrimination at the level of experts within a given class of stimuli,[24], although this claim is the subject of substantial debate. Using fMRI and electrophysiology, Doris Tsao and colleagues described brain regions and facial recognition mechanisms in macaques. [25] The non-comrotemporal cortex plays a key role in the task of recognizing and differentiating different objects. The MIT study shows that subsets of the IT cortex are in charge of various objects. [26] By selectively shutting down the neural activity of many small areas of the cortex, the animal is alternately unable to distinguish between certain specific pairs of objects. This shows that the IT cortex is divided into areas that respond to different and specific visual functions. In a similar way, some specific patches and areas of the cortex are more involved in facial recognition than in recognizing other objects. Some studies tend to show that rather than a unified global image, some specific features and areas of interest to objects are key elements when the brain needs to recognize an object in an image. [27] [28] In this way, human vision is susceptible to small specific changes in the image, such as distortion of the edges of an object, texture adjustment, or any small change in the key area of the image. [29] Studies of people whose vision has been restored after long blindness show that they cannot necessarily recognize objects and faces (as opposed to color, movement, and simple geometric shapes). Some assume that being blind in childhood prevents some parts of the visual system necessary for these higher level tasks from developing properly. [30] The general belief that a critical period lasts until the age of 5 or 6 years was challenged by a 2007 study that found that older patients can improve these abilities with years of exposure. [31] Cognitive and computational approaches In the 1970s, David Marr developed a multi-level vision theory that analyzed the process of vision at different levels of abstraction. In to focus on understanding specific problems in vision, he identified three levels of analysis: computational, algorithmic, and implementation levels. Many see-through scientists, including Tomasa Poggia, have adopted these levels of analysis and used them to further characterize the vision from a computational point of view. [32] The computational level solves high-level abstraction problems that the visual system must overcome. The algorithmic level attempts to identify a strategy that can be used to resolve these issues. Finally, the level of implementation will try to explain how the solutions to these problems are realized in the neural circuits. Marr suggested that it is possible to examine vision at any of these levels independently. Marr described the vision as advancing from a two-dimensional visual field (on the retina) into a three-dimensional description of the world as an output. Its vision phases include: 2D or initial sketch of a scene, based on the extraction of elements of the basic components of the scene, including edges, areas, etc. Note the similarity in concept with pencil sketch drawn quickly by the artist as an impression. 2 1/2 D sketch scenes where textures are recognized, etc. Note the similarity in concept with the stage when drawing, where the artist highlights or overshadows areas of the scene to provide depth. A 3D model where a scene is visualized in a continuous, three-dimensional map. [33] Marr's 2 1/2D sketch assumes that a depth map is created and that this map is the basis of 3D shape perception. However, both stereoscopic and visual perception, as well as monocular viewing, clearly show that the perception of a 3D shape precedes and does not rely on the perception of the depth of points. It is not clear how the preliminary in-depth map could be created in principle, nor how this would address the issue of organisation or grouping. The role of perceptual organizational constraints, overlooked by Marr, in the production of 3D shaped perceptuals from binocularly viewed 3D objects has been demonstrated empirically in the case of 3D wired objects, e.g.[34][full citation needed] For a more detailed discussion, see Pizlo (2008). [35] A newer, alternative framework suggests that the vision should consist instead of the following three phases: coding, selection, and decoding. [36] Coding is to sample and represent visual inputs (e.g. to represent visual inputs as neural activity in the retina). The selection, or attention selection, is to select a small fraction of the input information for further processing , e.g. Decoding is intended to derive or recognize selected input signals, such as recognizing an object in the center of a view as someone's face. Within this framework,[37] begins on the primary visual cortex along the visual pathway, and attention restrictions impose a dichotomia between the central and peripheral field of vision for visual recognition or decoding. Transduction Main article: Visual phototransduction Of Transduction is the process through which energy from environmental stimuli is converted into neural activity. The retina contains three different cell layers: the photoreceptor layer, the bipolar cell layer and the ganglia cell layer. The layer of the photoreceptor where the transduction takes place is furthest from the lens. Contains photoreceptors with different sensitivity called rods and cones . Cones are responsible for the perception of colors and are of three different types marked red, green and blue. Rods are responsible for the perception of objects in low light. Photoreceptors contain a special chemical called photopigment, which is embedded in the membrane of the slats; one human rod contains approximately 10 million of them. Photopigment molecules consist of two parts: opsin (protein) and retina (lipid). [39] There are 3 specific photopigments (each with their own wavelength sensitivity) that respond across the visible light spectrum. When the respective wavelengths (the ones that a particular photopigment is sensitive to) hit the photoreceptor, the photopigment is divided into two, which sends a signal to the bipolar cell layer, which in turn sends a signal to the ganglia cells, axons that form the optic nerve and transmit information to the brain. If a certain type of cone is absent or abnormal, due to a genetic anomaly, there is a lack of color vision , sometimes called color blindness. [40] The transduction process involves chemical messages sent from photoreceptors to bipolar cells to ganglia cells. Several photoreceptors can send their information to a single ganglia cell. There are two types of ganglia cells: red/green and yellow/blue. These neurons constantly fire-even when not stimulated. The brain interprets different colors (and with lots of image information) when the rate of fire from these neurons changes. Red light stimulates the red cone, which stimulates the red-green ganglion cell. Similarly, green light stimulates a green cone that stimulates the green-red ganglion cell, and blue light stimulates the blue cone, which stimulates the blue-yellow ganglion cell. The rate of ganglia cell firing increases when it is signaled by one cone and reduced (inhibited) when signaled by a second cone. The first color in the name of a ganglia cell is the color that excites it, and the second is the color that inhibits it. ie: A red cone would excite red-green ganglion cells and a green cone would inhibit red-green ganglion cells. This is the opponent's process. If the burning speed is red-green the cell is increasing, the brain would know that the light was red, if the speed was reduced, the brain would know that the color of the light is green. [40] Artificial visual perception Theory and observation of visual perception were the main sources of inspiration for computer vision (also called machine vision, or computational vision). Special hardware structures and software algorithms provide machines with the ability to interpret images from a camera or sensor. See also Color Vision Computer Vision Perception Depth Perception Entoptic Phenomenon Gestalt Psychology Lateral Masking With The Naked Eye Machine Vision Motion Perception Multisensory Integration Interpretation (Philosophy) Spatial Frequency Visual Illusion Visual Processing Visual System Vision Deficiencies or Disturbances Achromatopsia Akinetopsia Apperceptive Agnosia Associative Visual Agnosia Color Blindness Hallucinogen Persistent Impaired Perception Illusory Palinopsia Prosopagnosia Refractive Error Recovery from Blindness Syndrome Scottish Sensitivity Visual Agnosia Visual Snow Related Disciplines Cognitive Science Ophthalmology Eye Optometry Psychophysics Reference ^ Carlson, Neil R. (2013). 6. Physiology of behavior (11. ed.). Upper Saddle River, New Jersey, U.S.: Pearson Education Inc. s. p. 187-189. ISBN 978-0-205-23939-9. ↑ a b Margaret, Livingstone (2008). Vision and art : biology of vision. Hubel, David H. New York: Abrams. ISBN 978-0-8109-9554-3. 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