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# VISUAL PERCEPTION

**1.**

Light from specific objects in the surroundings is directed onto the photoreceptors of the retina during the complicated phenomena of vision that was caught by the eye. Before reaching the visual cortex, this vision is mainly experienced, where electrical signals coming from those cells traverse a number of "retinal cell types and the central nervous system (CNS)". On this fundamental topic, there are numerous species variants, each of which enables the animal to take advantage of a certain ecological niche. The "comparative ophthalmologist" can treat a wide variety of ocular disorders in a vast array of species with confidence because of the fundamental commonalities among all vertebrate eyes and how they react to an injury.

The complex process of "seeing" depends on several factors, including (1) light entering the eye from the outside world; (2) the eye effectively transmits and focuses towards objects on the retina through the images of these; (3) the retina then detect rays of these light; (4) then information transmission to the brain through the pathways of visuals; and (5) then the brain process the information for making it useful. Every object can be considered to be "seen" by an animal "if it differs from its surroundings" in at least one of the following five categories: "luminance (brightness), motion, texture, binocular disparity (depth), and color". The most important feature of vision is the ability to distinguish between objects (such as a predator from its surroundings), and making this distinction is necessary for survival. In general, separations of objects based on color are more difficult to make than those based on motion, texture, depth, and brightness.

**2.**

Vimal Information Processing is the term for the perception, thought, and other mental functions that enable us to quickly "feel" and deduce the meaning and significance of what we are seeing (Pearson, 2018). Quick Automatic Naming is essential for processing visual information because our eyes only stay on an object for a fraction of a second before moving on to the next one. Bringing the eyes back to the target again will help one understand if they did not grasp the concept the first time. Other vision problems, such as binocular instability or challenges with eye tracking, may contribute to poor visual information processing. Consequently, before beginning

a treatment program for vision information processing alone, it is crucial to detect and treat these additional neurological conditions, if they are present.

**Visual information processing**

Consider the visual system to be similar to the hand and arm. If you were to only use one hand to investigate, you would have to first grab something or stretch out to touch it. You can only feel a thing after that in order to learn more about it. This is how vision is. When we want to grab something, we first position our body and eyes such that they are pointed precisely in the direction of the object. Using this as a visual grab After we have the object in our visual grasp, we can "visually feel" it to learn more about it. They are mental functions like cognition and visual perception. The "visual feel" stage typically takes place in a fraction of a second since we frequently jump rapidly to the following point with our eyes. Vaal information processing must therefore go very quickly, frequently in a fraction of a second. It is required to look again and again in order to understand if one does not receive the necessary visual information input due to a poor visual capture and the eyes dart onward.

The capacity to quickly identify a sign and translate that recognition into a spoken name is known as rapid automatic naming. Imagine trying to call out a string of random characters or numbers as quickly as you can, for instance. To complete this assignment, you must squint your eyes at each letter or number, then inhale the information, then send the information to the language centers of your brain so that you may verbally convey the correct symbol. It is necessary to quickly translate the symbols and words on the page into the meaning and understanding required for effective comprehension even though, when reading text fluently, the same rapid processing occurs for whole words. In real life, we typically read aloud, so we are not constrained by the speed of erhal processing.

**3.**

Normally everyone has some sense organs like the eye, nose, and car that mainly allow us to gather information from the surroundings. Every function of the sense organ refers to the component of a sensory system that accepts and delivers sensory data to the brain through sensory inputs (McLeod, 2018). There is significant theoretical disagreement among psychologists over the perception that is directly dependent on the present information about the

environment. Some contend that perceptions are influenced by the expectations of the perceiver and prior knowledge in addition to the information present in the stimulus.

This discussion is compared to Gibson in the year 1966, as he proposed a theory of vision, which is a "bottom-up" theory, and Gregory in the year 1970, as he proposed a "constructivist (indirect) theory of perception", that is a "top-down" theory. Two categories of perceptual processes are distinguished by psychologists. processing from the top-down and the processing bottom-up is frequently referred to as the process data-driven because perception starts with stimulus. "Top-down processing" in pattern recognition is the usage of information that is contextual, where the context provided by the meaning of the words around it can help to understand.

**4.**

In the year 1970, "psychologist Richard Gregory" asserted that "perception is a useful process that relies on top-down processing. We need higher cognitive information, either from earlier experiences or stored knowledge, to draw judgments" about what we view because our environment typically presents confusing inputs. Helmholtz referred to it as the "probability principle." He sees perception as the hypothesis that is based on knowledge, and in this way, our environment and prior knowledge help us actively construct the reality we perceive.

Gregory estimates that although a lot of information is transmitted from the eye to the brain, about 90% of it is lost. The brain is forced to infer what a person experiences based on prior information a result. The reality we see is what we actively construct. According to Richard Gregory, perception involves a large degree of testing hypotheses for making sense of the data sent to the sense organs. Our worldviews are speculations based on our prior knowledge and experiences. Sensory receptors collect information from the environment around us and combine it with the knowledge we already have regarding the experience of the result as a world. Perception errors will emerge from incorrect hypotheses (eg, visual illusions like the Necker cube).

James Gibson in the year 1966, also argues perception is immediate and not amenable to hypothesis testing, in contrast to Gregory's theory. We have access to enough information around us to understand the world right now. His idea is also referred to as the "Ecological Theory" since it holds that perception could be entirely explained in relation to the environment.

**Features of Gibson's Theory**

Gibson argues that vision determines sensation: what we see is what we get. Interpretation or processing is not mandatory because the data that is mainly received by us regarding "the size, shape, distance, etc., is sufficiently precise for us to engage" directly with the world. According to Gibson's (1972) theory, perception is mainly a process of bottom-up, meaning that sensory data is also analyzed from the simplest level of "analysis of the raw sensory data" towards the most complicated level of analysis by the system of visual.

The optic array

Gibson's Theory is mainly based on the notion that all of the visual information is mainly needed for perception and they are contained in an optic array, or the light pattern that enters the eye. The arrangement of items in space is made clear by this optic array. Light beams concentrate towards the cornea of your eye after reflecting off of surfaces. Perception entails 'picking up' the wealth of information immediately from the optic array with little to no processing. It is the "ever-changing source of sensory data" due to mobility and various light intensities shining in various directions. As a result, as you walk, the optic array's structure changes. Gibson contends that because humans possess the mechanisms for understanding this erratic sensory information, we have a steady and meaningful perception of reality. "The optic array's flow" changes reveal crucial details regarding the movement type that is occurring. "The optic array" will either flow away towards or from the specific spot. You are flowing in its direction if its flow comes from this point, and then you are moving away from the spot if the optic array is moving in that direction.

**Figure 1: Sensory information through the environment**

(Source: https://lcpscollege-my.sharepoint.com/:w:/g/personal/academic-support_lcps_org_uk/EfelHLMsm4pAiqlDaURFKawBcZ5kF9tdIVdgOCa9_hg9Yw?rtime=u3EytIpE20g)

**5.**

The experiment of Visual Cliff

"Eleanor Gibson and Richard Walk" studied the way newborn animals could sense depth in the year 1960, and Russell discovered that human infants could sense depth in the year 2020. "Eleanor Gibson and Richard Walk" made an experiment for determining if the children would crawl over to an apparent cliff; if they did, it was made a condition that the depth of inborn perception was not there. If they didn't, it would be evidence in favor of the nativist theory that perceptual skills are innate. Their system included a robust glass platform that served as a "bridge" on each side. It featured a checkered design on one side (the "shallow side") directly beneath the glass. The cliff was situated on the opposite side of the bridge, and the checkerboard design was located below a steep drop.

**Experiment 1**

36 infants with ages ranging from six to fourteen months are sampled. Their mother took part in the study as well. Whether the baby's mother called it from the shallow side or the cliff side was the independent variable (IV). The child's ability to crawl to its mother was the dependent variable (DV).

**Experiment 2**

Gibson and Walk evaluated young chickens, lambs, and kids (young goats) using the same equipment. All of the animals were under the age of 24 hours. Studies involving different species are akin to experiments. The animal species, such as chick, rat, kitten, or lamb, was the natural source independent variable (IV). The animal's preference for the shallow or "deeper side of a visual cliff apparatus was the dependent variable" (DV). As a result, they could watch the animal's reaction and determine whether it had absorbed the lesson of not "going downwards." Rats (who were additionally tested using an elevated bridge) and kittens, which had to be at least a few weeks old, were among the other species that were put to the test. Following their dark-raised upbringing, some kittens were evaluated. The checkered pattern was removed from the equipment and replaced with a surface that was uniformly gray to test the rats' ability to perceive depth with fewer visual cues.

**6.**

Visual constancy is the propensity to view an item as remaining constant and unchanging regardless of any adjustments made to the retinal image. It has brightness constancy, shape constancy, and size constancy (Anon., n.d.). Knowing that the real size of the object doesn't change despite the dimensions that it projects onto the retina (size constancy). Example: Photographing a person from various angles.

**Limitations of infant studies**

A low-salience event is one that is unlikely to be remembered if it is not unique or significant. The inability of a child to understand a situation. The uniqueness of an event—if the event in issue is just one among many such events, it can be difficult to recall its specifics. Whether the incident occurred in person vs something a child heard or watched on TV.

**How recently has the event occurred?**

Children changing their accounts is not a given despite these circumstances. Nonetheless, a lot of psychologists convince judges that they would, according to Lamb. Both cross-cultural and cultural studies have benefits and drawbacks. It's interesting to note that both cultural similarities and differences can teach scholars a lot because they both call for cross-cultural comparisons. For instance, Diener and Oishi (2000) were eager to investigate the relationship between contentment and wealth, and they are particularly interested in how people from different cultures differed in life happiness.

They used global polls that asked participants the same question, such as "How pleased are you overhaul your life as a whole these days?" to investigate this issue. and requested responses on a standard scale, in this case, one that called for responses on a scale from 1 to 10. Also, they gathered information on average levels of income in each country. The Diener research team (2000) found that there was a propensity for money to be connected with greater life satisfaction across more than 40 countries. Comparatively high levels of satisfaction were reported by citizens of affluent nations like Denmark, Switzerland, and Canada, while lower levels were reported by citizens of poorer nations like India and Belarus. Yet, there were a few fascinating exceptions. Individuals from the affluent nation of Japan expressed less contentment than those from similar-wealth countries. Brazilians, who are from poorer countries, also got scores that were extremely high when compared to persons from higher-income countries. The researchers

attempted to explain these differences, and one theory that was put up was that of culture. Another type of cross-cultural study is cross-cultural (method) validation, which determines whether assessments (such as questionnaires, tests, and standard scales) are reliable and valid when applied across cultures. Studies on cross-cultural validation assess whether psychological measures are equivalent across cultures. Instruments should be the same in all cultures. The comparability of conceptual meaning and empirical methodology across cultures is referred to as measurement equivalence. On the other hand, bias describes distinctions that vary in meaning both within and between cultures.

**7.**

According to the constructivist theory of vision, in addition to our perceptions, our expectations and prior knowledge also play a role in how we interpret what we see. The way we view the world is shaped by experience and learning. Gibson offered a competing view that contends perception is innate rather than learned. Humans have evolved to develop reliable conclusions simply from the sensory data we get. Gibson noted that humans acquire detailed information about distance and depth as we move, without having to make any assumptions about the necessary visual cues.

There are two major approaches to understanding perception in psychology. The direct theory of perception, put forth by Gibson in 1966, contends that what we see is a direct depiction of the environment in which we live. Additionally, the information environment offers enough to directly influence perception. According to Gregory's constructivist theory of perception, sense only offers hazy and insufficient information about the surroundings. Interpretation is therefore required in order to construct a mental picture of the environment. According to the constructivist theory, humans do not directly see the world. What we observe is our interpretation, which is influenced by our current circumstances, assumptions, hopes, and feelings. Sensation describes how our senses pick up sensory information. As an illustration, our auditory system recognizes sound waves and transforms them into nerve impulses. Constructivists define perception as the conscious experience of a sensation (such as the experience of hearing), which requires interpretation and inference.

3

**Gibson's theory of direct perception**

An overview of the key components of Gibson's theory of perception will be given first. The process of perception is direct and bottom-up. It is not necessary to employ prior information or interpret sensory input in order to perceive. Rich and complex sensory input is enough to allow for accurate environmental judgments. It was suggested that direct perception is innate rather than learned. It most likely resulted from evolution. Direct perception helps animals respond to hazards in the environment swiftly and effectively, which is advantageous for their survival. So, the creatures with the capacity to assimilate information from the environment quickly had a higher chance of surviving. perception theory from the bottom up. According to Gibson's view, perception is a bottom-up process. Bottom-up processing is driven by data and entirely dependent on sensory data. The retina receives environmental sensory data (light), which is converted into electrical impulses and then processed in the visual brain as a subjective experience of seeing. Making correct assessments about the environment via this approach does not involve the use of prior experiences or interpretations because it is direct and information only flows in one direction. The top-down theory of perception, on the other hand, asserts that our expectations and prior experiences have a significant impact on how we perceive the world. We form assumptions and interpret our experiences using prior knowledge.

**Figure 2: Example of Gibson's direct perception**

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**Limitations of the direct theory of perception**

Gibson's theory has a drawback in that it fails to explain visual illusions, which show that occasionally sensory data is insufficient to produce a reliable representation of what we perceive. Certain inputs, like distorted sights or sounds, are meaningless to us on their own. Nevertheless, after being stimulated with a different stimulus, we can immediately understand them (e.g., hidden Dalmatian dog optical illusion). You may recall the well-known illusion involving the blue and white outfit that went viral in 2015. This is outside the reach of Gibson's idea.

According to Gibson, illusions are manufactured and frequently taken out of context, which is why our experience of them is unreliable. Our ability to perceive complex sensory stimuli enmeshed in complex situations has evolved. This claim is constrained by natural illusions. Despite their complex context, natural illusions nonetheless happen in the natural world. The waterfall illusion is an illustration of a natural illusion. After spending some time watching the water flow down a waterfall, if we turn our attention to the rocks close by, we will see that they are rising upward, in the opposite direction of the water flow we had been watching. Also, it is unclear how affordances function. Some people contend that learning, not natural knowledge, produces the majority of affordances. It is challenging to overlook situations where we do not directly observe everything in our environment. We have the ability to selectively ignore some inputs while concentrating on others, especially in hectic surroundings. When we fail to see anything unexpected in our visual area because our attention was elsewhere, this phenomenon is known as inattentional blindness.

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