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Top-Down VS Bottom-Up Processing

Sarah Mae Sincero 197.3K reads

Generally speaking, there are two approaches to understanding the process of perception. These are the top-down processing and the bottom-up processing. What differentiates one from the other? Let's find out.

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Top-Down Processing

Top-down processing is defined as the development of pattern recognition through the use of contextual information. For instance, you are presented with a paragraph written with difficult handwriting. It is easier to understand what the writer wants to convey if you read the whole paragraph rather than reading the words in separate terms. The brain may be able to perceive and understand the gist of the paragraph due to the context supplied by the surrounding words.

Gregory's Theory

In 1970, psychologist Richard Gregory stated that perception is a constructive process that depends on top-down processing. He explained that past experience and prior knowledge related to a stimulus help us make inferences. For Gregory, perception is all about making the best guess or a hypothesis about what we see. In terms of visual perception, Gregory argues that about 90% of visual information is lost by the time it arrives in the brain for processing. This event leads to the creation of a perceptual hypothesis about the stimulus, based on his

memory and past experience that may be related to it. When it comes to visual illusions, such as the Necker tube, Gregory believed that the brain may create incorrect hypotheses, leading to several errors of perception.

Bottom-Up Processing

In the bottom-up processing approach, perception starts at the sensory input, the stimulus. Thus, perception can be described as data-driven. For example, there is a flower at the center of a person's field. The sight of the flower and all the information about the stimulus are carried from the retina to the visual cortex in the brain. The signal travels in one direction.

Gibson's Theory

Psychologist E.J Gibson criticized the explanation of Gregory regarding visual illusions as they are merely artificial examples, not images that can be found in a person's normal visual environment. Being a strong support of the bottom up processing approach, Gibson argued that perception is not subject to hypotheses; rather, perception is a direct, "What you see is what you get" phenomenon. He explained that our environment can sufficiently supply details related to the stimulus (e.g. size, shape, distance, etc.), so perception of the stimulus may not depend on prior knowledge or past experience. Motion parallax supports this argument. When we travel on a fast moving train, we perceive that objects closer to us pass by faster, while farther objects pass us slowly. Thus, we are able to perceive the distance between us and the object that pass us by based on the speed at which they pass.

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