

# Perception, sensation



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“ Perception is more than just a sensation” Introduction Sensation is the passive process of bringing information from the outside world into the body and brain. Perception is the active process of selecting, organising and interpreting the information brought to the brain by the senses. Sensation and perception are two distinct processes, which collaborate to help us make sense of our environment. Perception requires physiological mechanisms and psychological components, these combine to help us understand.

Perception is the process of how we acquire and understand information, sophisticated perceptual mechanisms go to work in order for us to gain knowledge. Our perception of the world is “ direct, immediate and effortless” (Mather, 2006). Understanding how perception works is extremely complex and people differ in how they perceive, humans are quick to perceive as Biederman (1990) showed people can recognise and interpret complex novel scenes in as little as 1/10th of a second.

The differences between sensation and perception are based around the fact that sensation is a physiological process stemming from one of the five senses, sight, hearing, smell, taste and touch. These senses enable us to detect stimuli in the environment. Perception on the other hand involves an understanding of this sensory information, drawing from the stimuli detected from the senses, our minds must process that information and create a mental representation of the senses. How our mind perceives this depends upon our background knowledge.

For example if we smell sour milk, our nose picks up the smell which is the sensation, then perception plays its part by telling us that the milk has passed its use by date. Sensory organs absorb energy from physical stimuli

in the environment which pass to sensory receptors these detect stimulus energies and convert them into mental impulses which are sent to the brain. Now perception begins, upon receiving the impulses the brain organises the input and translates it into something meaningful. However perceptions are not always accurate.

The picture below is called the Muller- Lynn illusion. People are asked which line is bigger and people immediately answer with the bottom line, when in fact they are even. This shows that perceptions can be deceived quite easily. What we 'see' is not the same as what is 'there'. Perception and reality differ. Numerous illusions show that the human mind can misinterpret information and inaccurately perceive senses, these include the Poggendorf illusion and the Penrose staircase. Muller-Lynn Illusion.

## **Perception**

People perceive through sight, which is one of the senses. The physical stimulus for visual perception is light. (Wavelength > colour and Intensity > brightness. ) Light interacts with objects. (e. g refraction, bending of light. ) This forms the basis of how we perceive visually. Colour is the most important component of our visual experience, some of the earliest theories of perception were developed from how we perceive colours. In order to explain colour perception one has to be familiar with,

1. Hue – variations in wavelength, difference between colours.
2. Brightness- the intensity of energy, black v white
3. Saturation – purity of colour, difference between pink and red (how much black/white added to the colour)

The human can identify approximately 200 hues, 500 intensity steps and 20 saturations, combining to nearly two million colours. Does colour exist? People just assume that because we see colours, they actually exist in the world. Meaning, that when they see the colour red, that red is a real, physical, tangible, "thing".

But is it, or is colour just a matter of our perception? If we had different types of nervous systems, we would see things differently (literally) and so wouldn't we think those other things we saw were the real "things"? The Trichromatic theory Thomas Young, a 19th century English scientist suggested that it takes just three colours for us to see all the colours of the spectrum. He demonstrated this through experiments where he showed that people could match any colour by making a combination of just three colours (wavelengths) of light.

Similar to a colour wheel explanation of vision taking just three colours and blending them to make any colour. Seventy years before we knew that humans have three retina cones- red, green and blue. Opponent-process theory Hering (1870) suggested cone photoreceptors are linked together to form three opposing colour pairs, red/green, blue/yellow, light/dark. The two stage theory was output of three cone types recoded by another layer of neural mechanisms into 6 psychologically primary colours. (Hurvich & Jameson, 1957)

## **Perceptual Constancies**

Size constancy means objects maintain the same size, despite changes in proximal stimulus, people that are further away do not seem smaller than people that are close. This is exhibited in the Ponzo illusion. The Ponzo

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illusion. In the Ponzo illusion, two identically-sized lines appear to be different sizes when placed over parallel lines that seem to converge as they recede into the distance. How Does the Ponzo Illusion Work? The Ponzo illusion was first demonstrated in 1913 by an Italian psychologist named Mario Ponzo.

The reason the top horizontal line looks longer is because we interpret the scene using linear perspective. Since the vertical parallel lines seem to grow closer as they move further away, we interpret the top line as being further off in the distance. An object in the distance would need to be longer in order for it to appear the same size as a near object, so the top "far" line is seen as being longer than the bottom "near" line, even though they are the same size. Depth perception Images projected to our retina are 2D but we interpret this as 3D dynamic scene.

In order to perceive depth we use a number of visual cues both monocular and binocular. Gibson & Walk (1960) 'visual cliff' experiment suggests depth perception is not present at birth. 'Visual cliff' Gestalt psychology Gestalt psychology was founded by German psychologists Max Wertheimer, Wolfgang Kohler and Kurt Koffka and focused on how people interpret the world. The Gestalt perspective formed partially as a response to the structuralism of Wilhelm Wundt, who focused on breaking down mental events and experiences to the smallest elements. "The whole is greater than the sum of its parts" (Wertheimer, 1923).

We perceive a visual array in a way that most simply organises the disparate elements into a coherent form. The Gestalt theory puts forward a number of laws.

1. Law of Pragnanz - things are perceived as simply as possible.
2. Law of proximity – Objects near each other will be seen as a unit.
3. Law of similarity – objects similar to each other will be seen as a unit.
4. Law of continuity – we perceive smoothly flowing or continuous forms rather than disrupted or discontinuous forms.
5. Law of closure – we create illusory contours to perceive incomplete objects.

Perception has much to do with processing and we use two methods of processing these are, bottom up processing, and top down processing. Bottom up processing is also known as data driven perception. Sensory receptors register a physical stimulus which in turn sends the information to the brain, sensation starts the process but perception takes over and places the parts together when recognition occurs. This is the most basic form of processing. Top down processing is more concerned with higher level mental processes, such as memory and expectation.

The information travels down from our brain to influence what we perceive, this is also known as hypotheses driven processing. This is an example of top down processing, this shows how context helps us recognise the letters in the alphabet. Top down processing speeds up the analysis of the retinal image when familiar scenes and objects are encountered and can complete details missing in the optic array. Perception beyond vision Auditory perception plays a key role in perception, along with the chemical senses- taste and smell.

Auditory perception comes from sound, the physical definition being pressure changes in the air or other medium. Sound waves vary in

amplitude- loudness, frequency- pitch, timbre- quality of tone. Chemical senses help in our everyday lives by helping us to taste and smell stimuli. Humans are microsmatic meaning smell is not crucial for survival, we typically have ten million olfactory receptors in our noses whereas dogs have one billion which shows how dogs have such keen senses of smell. Taste and smell are seen as the gatekeepers of the body they can induce good or bad responses.

Tastes and smells involve a different physiology than vision and sound, this is because the latter two are nerve ends tingling, however when chemical senses are induced the person actually inhales some molecules of the smell inducing substance. At any one time there are hundreds of odour molecules in the air, people have the capability to make sense and distinguish between them. This demonstrates perceptual organisation. We can identify approximately 100, 000 odours but cannot label all accurately, this is due to our memory not sensitivity.

Gender differences can affect ones ability in identifying odours as women are normally better. (Cain, 1982). Due to the fact that memory plays a part in this top down processing is used.

## **Conclusion**

Sensation is the process by which our senses gather information and send it to the brain. Once the signal is received the brain processes it and allows us to make sense of it. A large amount of information is being sensed at any one time such as room temperature, brightness of the lights, someone talking, an engine sound, or the smell of aftershave.

With all this information coming into our senses, most of our world never gets noticed. We can't notice radio waves, x-rays, or the microscopic parasites crawling on our skin. We don't sense all the odours around us or taste every individual spice in our gourmet dinner. We only sense those things we are able to since we don't have the sense of smell like a bloodhound or the sense of sight like a hawk, our thresholds are different from these animals and often even from each other.

Perception has all the previous components working at the same time so that we can function and make sense of things. How we perceive things can depend upon many factors but without perception nothing would make sense. Sensation differs from perception, but the two go hand in hand to help us gain a greater understanding of the world around us. Perception forms such a large part in our day to day lives and many don't grasp how important it is to us and how lost we would be without our perceptions.