



GENERAL PSYCHOLOGY

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COURSE INTRODUCTION

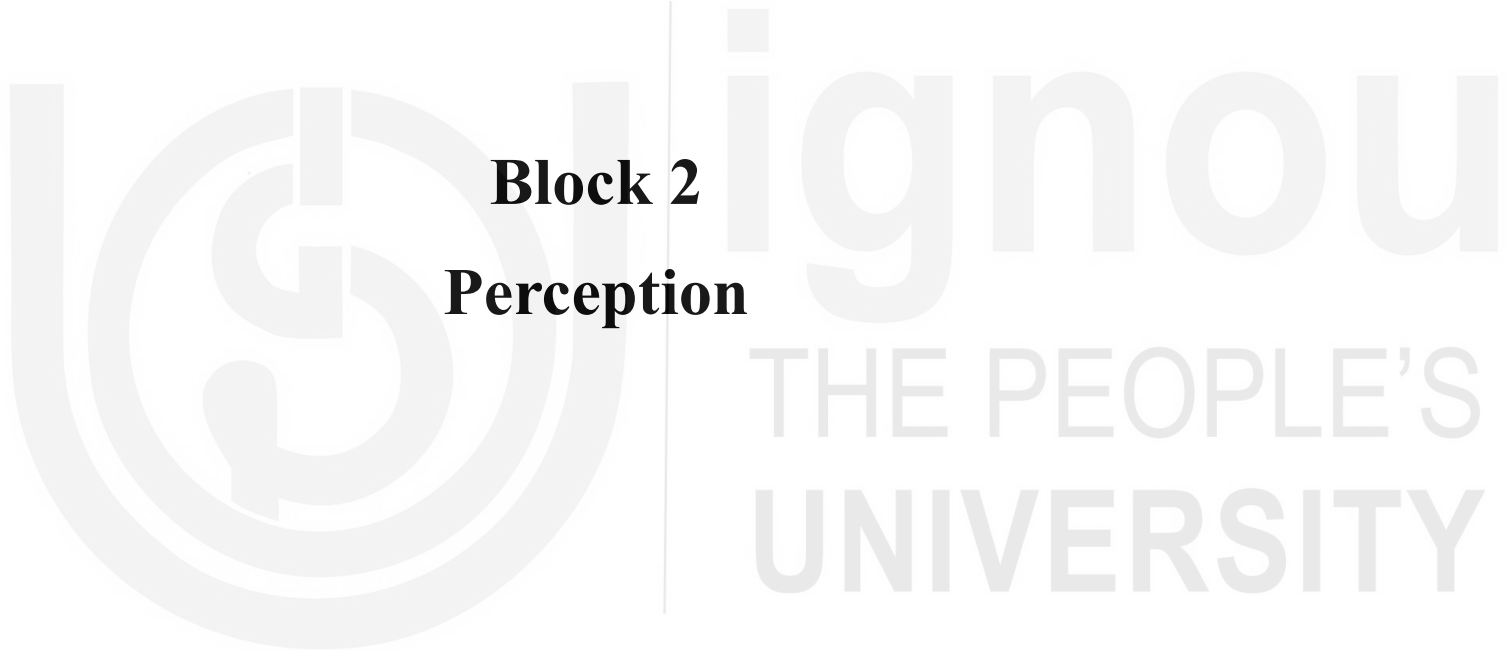
The Course of Introduction to Psychology is one of the courses of First Semester of BA (Honours) Psychology. The attempt of this course is to explain you the meaning and concept of psychology. It also explains the human behavior and their cognitive processes; biological processes and affective processes that make them behave differently.

The first block of this course is **Introduction to psychology** which discusses the origin of the field of psychology and the emergence of psychology as an independent Discipline in the world including India. The second block of this course is- **Perception** which explains the steps and process of perception. It also explains how our perception is influenced by other factors.

The third block of this course is- **Thinking and language** which deals with the process of thinking and concept of creativity. The fourth block of this course is- **Learning and Memory** which will deal with the definition, process, stages and theories of learning and memory. In the last block of **Motivation and Emotion**, you will be introduced with the concept and theories related to motivation and emotion.



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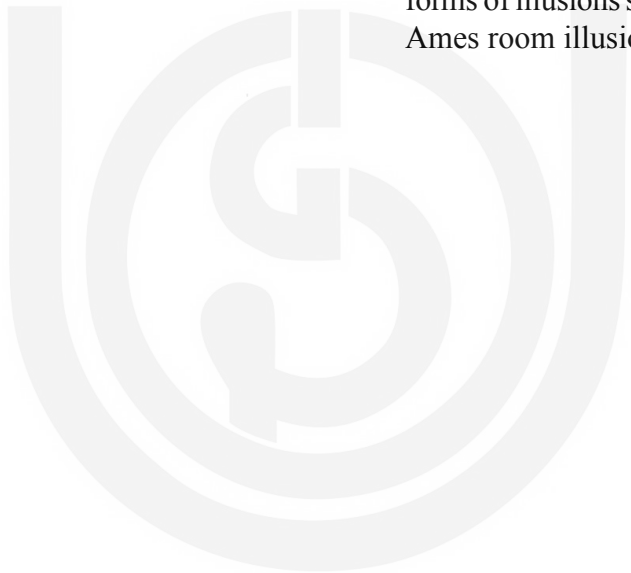
Block 2
Perception

BLOCK 2 PERCEPTION

Introduction

This block comprises of two units. The *first unit* deals with the concept of perception, the laws of perception, perceptual constancies and also the factors affecting perception. In this unit, all relevant topics related to perception will be dealt. The unit starts with an explanation to the process of perception followed by an introduction on sensation. Further, the role of attention in perception will also be explained to you. The various perceptual constancies (size, shape, colour, distance) followed by various factors affecting the perceptual process will also be discussed. With reference to the Gestalt philosophy, the different principles of organising stimuli will also be explained to you.

The second unit deals with the other aspects of perception that is, the different types and errors of perception. In this unit, the various types of perception will be introduced to you. The factors responsible for depth, distance, movement, and size perception will also be discussed. Lastly, the different types of errors involved in the process of perception will be explained to you. Further, the various forms of illusions such as Muller-lyre illusion, Ponzo illusion, Ebbinghaus illusion, Ames room illusion, and moon illusion will be discussed accordingly.



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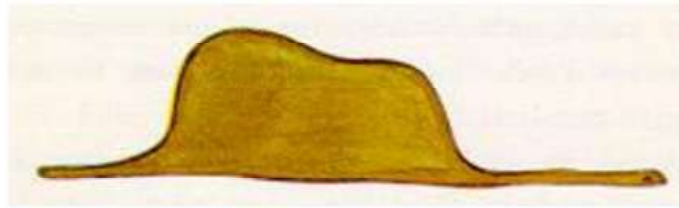
UNIT 3 PERCEPTION: MEANING, LAWS, PERCEPTUAL CONSTANCIES AND FACTORS AFFECTING PERCEPTION*

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3.0 INTRODUCTION

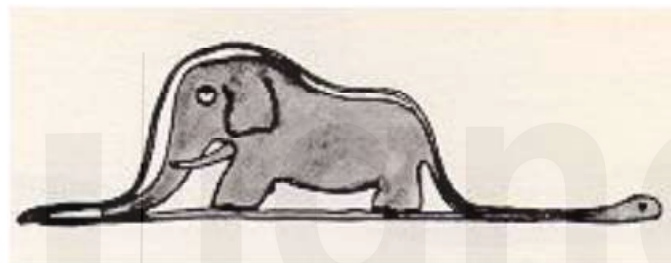
I pondered deeply, then, over the adventures of the jungle. And after some work with a colored pencil I succeeded in making my first drawing. My Drawing Number One. It looked like this:



I showed my masterpiece to the grown-ups, and asked them whether the drawing frightened them.

But they answered: “Frighten? Why should any one be frightened by a hat?”

My drawing was not a picture of a hat. It was a picture of a boa constrictor digesting an elephant. But since the grown-ups were not able to understand it, I made another drawing: I drew the inside of a boa constrictor, so that the grown-ups could see it clearly. They always need to have things explained. My Drawing Number Two looked like this:



The above excerpt is from the book, “*The Little Prince*” (1943), by Antoine de Saint Exupery. As illustrated above, it is not necessary that our understanding of a stimulus will be shared by others also. The world around us is complicated and so is the process of knowing it. The psychological process responsible for our interpretation of the world is known as **perception**. In this unit, those psychological processes which we use to understand our world will be discussed. Specifically, this unit will discuss the process of perception, sensation, role of attention in the perceptual process, and factors affecting perception.

3.1 OBJECTIVES

After studying this Unit, you will be able to:

- Explain the process of perception;
- Have an understanding of the factors affecting perception;
- Describe the concept of sensation;
- Explain the types of perceptual consistencies;
- Outline the basic principles of organization using Gestalt theory; and
- Understand the basis of perceptual illusion.

3.2 PERCEPTION: WAY TO UNDERSTAND THE WORLD

Perception is a set of process, which helps us in understanding the world around us. Every second we encounter numerous stimuli. Take a look around the room in which you are sitting right now. What can you see? Walls, the colour of the

walls, fan, light, the sound of the fan, books kept in the racks and many more things. Your awareness about all those stimuli is the result of a higher mental process called “perception”. Perception helps us in interpreting our world and thus helps us in making an appropriate decision, from what dress to wear to how to cross the road. Therefore, perception is a process of selecting, organising and interpreting the sensory information based on previous experiences, other’s experiences, need or expectation.

Now, close your eyes and try to visualize your kitchen. What do you remember about the kitchen of your house? Not everything. Right? Why is it so that you are not able to visualise your kitchen with 100 per cent accuracy? Since, our brain is not capable of attending every single detail of the world; it selectively attends only some stimuli. Let us take another example. How do you cross a busy road? You selectively pay attention to some stimuli (traffic signal, the speed of the vehicle or people on the road) and then cross the road. While crossing the road, you have very less awareness about the buildings or number of trees around the road. Why? Because it is not necessary for the action, you need to perform at that time, i.e., while crossing the road safely. The act of crossing a road safely can be explained using the process of perception. First, you select the stimuli (traffic signal, moving vehicles, and people) you need to pay attention to and block other stimuli (parked vehicles, trees, conversation with your fellow pedestrian etc.). In this way, your brain tries to focus on the task. Then, your brain organises the scene, and lastly, it figures out when it will be appropriate to cross the road safely. Any mistake during these steps can cause an accident. So broadly speaking, the process of perception involves three steps when it encounters stimuli viz. (i) selection, (ii) organization and, (iii) interpretation. These stages of the process of perception have been discussed in detail in the following section.

3.2.1 Stages of Perception

This section will explain in details the stages involved in perception as well as the factors affecting these stages.

Stage I: Selection

The first stage of perception is “selection”. Since our brain has limited capacity, therefore, it cannot attend to all stimuli. We unconsciously or consciously select some stimuli and ignore others. The selected stimulus becomes the “attended stimulus”. Now, look at the following two figures. What do you see?



Fig. 3.1: Rabbit or Duck?



Fig.3.2: Vase or Human Faces?

Source: (Figure 3.1) <http://mathworld.wolfram.com/Rabbit-DuckIllusion.html>

Fig. 3.2: <https://pxhere.com/en/photo/1283860>

Your interpretation of these two figures depends on your organisation of the information, and organisation of the information, in turn, depends on your attention. Take for example, the second figure. Some people give more attention to the white portion and thus see two human faces, while some focus their attention on black part and perceive it as a vase. These differences in answer suggest that individual differences also occur in the process of perception.

Stage II: Organization

In this stage, stimuli are arranged mentally in a meaningful pattern. This process occurs unconsciously. Many principles have been proposed to explain the process of organisation. Section 2.4 discusses the Gestalt principles of organisation. It will help you understand how humans naturally organize stimuli to make a meaningful pattern and thus interpretation.

Stage III: Interpretation

In this last stage, meaning is assigned to the organized stimuli. Interpretation of the stimuli is based on one’s experiences, expectations, needs, beliefs and other factors. Thus, this stage is subjective in nature and the same stimuli can be interpreted differently by different individuals.

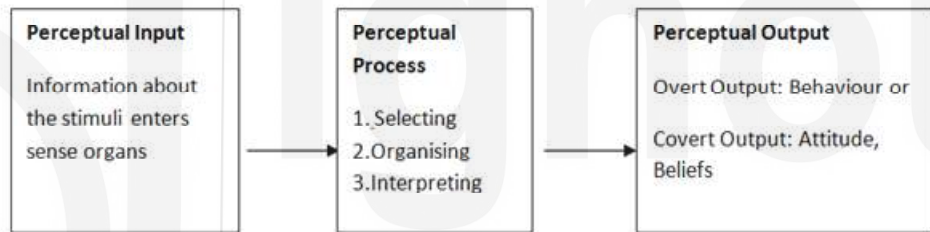


Fig. 3.3: Process of Perception

3.2.2 Theoretical Approaches to Perception

Two separate theoretical approaches have been proposed by psychologists to explain the process of perception. One is known as “**Top-down processing approach**” and, other is known as “**Bottom-up processing approach**”.

Table 3.1: Theoretical approaches to perception

Bottom-up processing	Top-down processing
Process of perception is direct.	Process of perception is indirect.
Perception is a data driven process i.e., stimuli carries sufficient information to be interpreted meaningfully and we don’t need to rely on our experiences.	Perception is an experience driven process i.e., stimuli don’t have sufficient information to be interpreted meaningfully and therefore, we need to rely on our experiences.
J. J. Gibson was one of the strongest advocate of this view.	Richard Gregory was the strongest advocate of this view.

3.3 SENSATION

A closely related term to perception is “sensation”. Sensation is the first contact we establish with our physical environment. “It focuses on describing the relationship between various forms of sensory stimulation (including electromagnetic, sound waves, pressure) and how these inputs are registered by our sense organs (the eyes, ears, nose, tongue, and skin)” (Baron, 2001, pp. 85). Therefore, the sensation can be understood as the process of gathering information about the environment using our senses and then transmitting it to the brain for further process, i.e., perception. The process of perception, which occurs unconsciously, will interpret this sensory information to make a sense of our world.

3.3.1 Process of Sensation

The process of sensation consists of three steps. The first step is *reception* – the process of receiving information in the form of light, heat or other physical energy by our sense organ using specialised sensory receptors cells. The next step is known as *transduction* – the process of converting received physical energy into electric impulse or energy which refers to the language which can be interpreted by our brain and nervous system. In the last step, with the help of nerve fibres *these converted electric impulse travels to our nervous system for interpretation.*

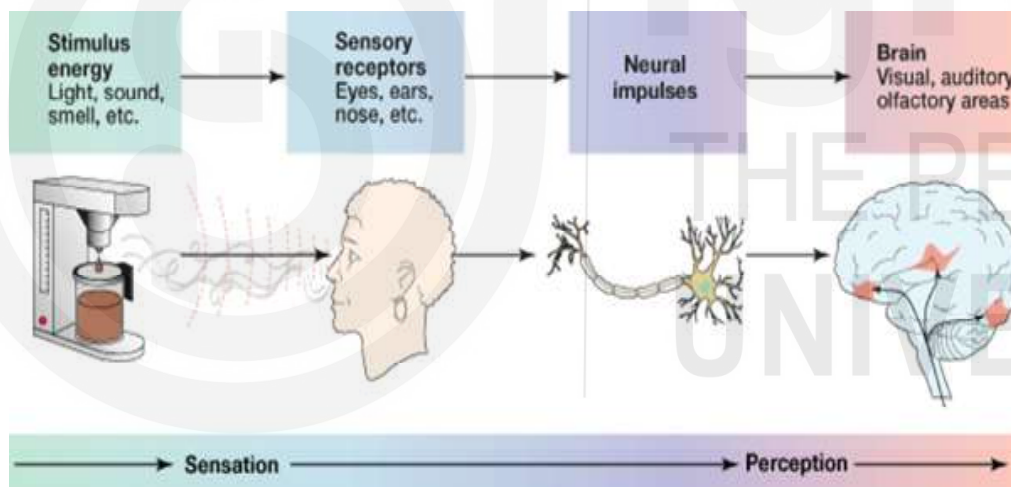


Fig. 3.4: Process of sensation

Retrieved from <https://www.tes.com>

3.4 ROLE OF ATTENTION IN PERCEPTION

The dish antenna we use in our home receives all available signals from the satellite but the tuner of the television-set selects signal according to our wishes. Similarly, our senses can register numerous stimuli at a given time but attentional processes help us in selecting relevant stimuli responsible for perception. Following are some important functions of attention in context of perception:

- **Selective attention:** The most important function of attention is *selectivity*. It refers to a process by which attention is focused on stimulus of ongoing interest, while ignoring other irrelevant stimuli. Selective attention acts as a filter.

- **Sustained attention:** It is the ability to attend to a stimulus for a longer period of time without being distracted. Job of looking at a radar screen requires sustained attention. Our attentional process helps us in doing this kind of monotonous jobs.

Self Assessment Questions (SAQ-I)

- State whether the following are ‘True’ or ‘False’
- 1) Interpretation of the stimuli is based on one’s experiences, expectations, needs, beliefs and other factors.
- 2) The Bottom up processing approach says that the process of perception is indirect.....
- 3) Broadly speaking, the process of perception involves two steps.
- 4) Our senses can register numerous stimuli at a given time.
- 5) In the stage of organization the stimuli are arranged mentally in a meaningful pattern.....

3.5 LAWS OF ORGANIZATION: GESTALT PRINCIPLES

In the early 20th century, three German psychologists Max Wertheimer, Wolfgang Köhler and Kurt Koffka proposed new principles for explaining perception called as *Gestalt principle*. According to these psychologists, the process of perception does not involve perceiving an array of stimuli as an object but it involves our tendency to seek a form or pattern in it. The literal meaning of the word *Gestalt* is form or configuration. The basic premise of Gestalt psychology is that ‘whole is different from the sum of its part’. Based on this basic premise, Gestalt psychologists proposed a number of principles or laws to explain the process of perceptual organisation i.e., how we perceive smaller units of stimuli as a whole, having a particular pattern. In the following section, let us discuss some important Gestalt laws of perceptual organisation but before doing so, can you find thirteen faces in the following picture?



Fig.3.5: The Forest Has Eyes by Bev Doolittle (1984)

Source: <http://www.greenwichworkshop.com>

- **Figure-ground Relationship**



Fig.3.6: An example of figure-ground relationship

Source: <https://www.tes.com>

This principle states that we have a tendency to segregate our world in the form of figure and ground. Figure is that part of stimuli which has our focus of the visual field, whereas the ground is background. Figure has a definite shape and is better remembered whereas; background is shapeless and has no limits. Now look at the Figure 6, what do you see? Two people or two pieces of chess (two queens and one bishop)? When you focus on people, chess pieces disappear in the background and when you focus on the chess pieces, people become the background.

3.5.1 Law of Proximity

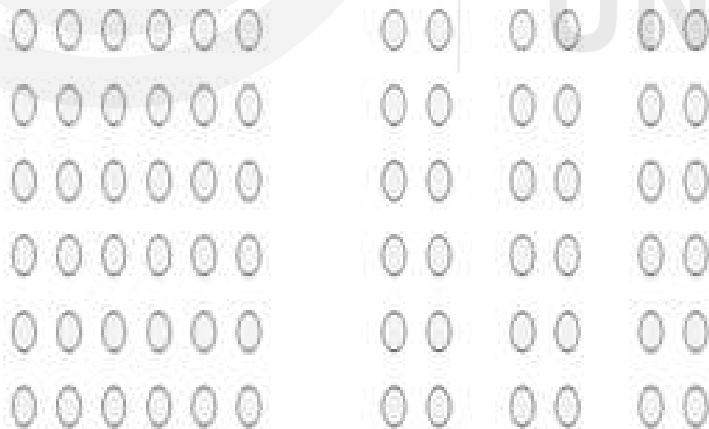


Fig.3.7: The Gestalt principle of proximity

Source: <https://courses.lumenlearning.com>

In order to perceive stimuli meaningful, stimuli which are closer to each other are perceived by us belonging to one group. Due to this reason, people tend to see following circles as cluster or group rather than individual circles. Our brain tends to group large elements as one to make us interpret more easily.

3.5.2 Law of Similarity

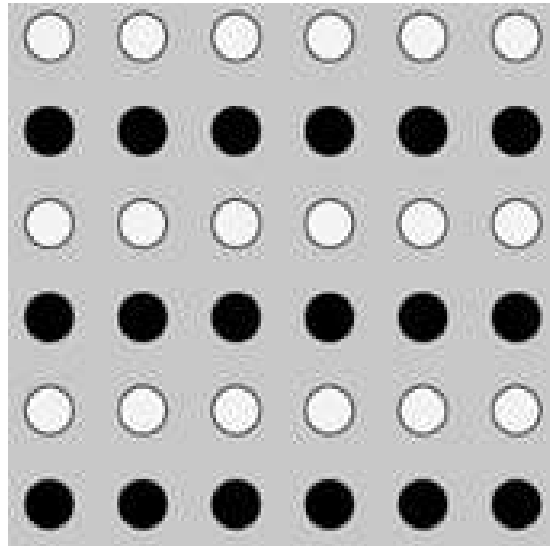


Fig.3.8: The Gestalt Principle of Similarity

Source: <https://www.verywellmind.com>

This principle states that stimuli similar to each other are grouped together. For instance, in the Figure 8, we tend to group circles based on its colours. In real life also, we use this principle extensively. For example, during a cricket match, we tend to group players based on the colour of their jersey.

3.5.3 Law of Continuity or Good Continuation

It refers to our tendency to perceive figures in continuation rather than in parts. This principle is exhibited more in the perception of line. Figure 9 is generally perceived by us as a line instead of separate circles.



Fig.3.9: The Gestalt Principle of Continuity

Source: <http://art.nmu.edu>

3.5.4 Law of Closure

Following its name, this law should not be confused with the law of proximity. This law states that we have a tendency to perceive stimuli as closed shapes even with some missing parts.



Fig.3.10: The Gestalt Principle of Closure

Source: <https://www.logodesignlove.com>

3.5.5 Law of Common Region/Common Fate

Perception: Meaning, Laws, Perceptual Constancies and Factors Affecting Perception



Fig.3.11: The Gestalt Principle of Common Fate

Source: <http://cdn.zmescience.com>

This principle states that stimuli moving in similar directions are perceived as belonging to same group, as shown in Figure 3.11.

3.5.6 Law of Good Form/Pragnaz



Fig. 3.12: The Gestalt Principle of Pragnaz

Source: <https://www.interaction-design.org>

The word Pragnaz is a German in origin, meaning “good figure”. This principle is also called as “law of good figure”. According to this principle, out of all possible ways of grouping stimuli, we tend to group stimuli in the simplest and stable shape. Thus, we can say that simpler forms are more perceived by us. For example, instead of perceiving Figure 12, as consisting of five circles, we tend to perceive it as a symbol of Olympics.

3.6 PERCEPTUAL CONSTANCY

Perceptual constancy is a remarkable feat of our perceptual ability to perceive familiar stimuli as constant (with reference to size, shape, colour and brightness), irrespective of the change in the environment, location and characteristics of the stimuli. There are basically three types of perceptual constancies; size, shape and colour. In the following section each type of constancy will be discussed in brief.

3.6.1 Size Constancy



Fig.3.13: An example of size constancy

Source: <https://www.flickr.com>

Our retinal image of the people standing in this picture is very small but all thanks to the phenomenon of the size constancy, our brain perceives them as people of normal size.

3.6.2 Shape Constancy

As the door swings towards us, its shape changes and so does our retinal image of the door, but still we perceive the shape of the door as same due to shape constancy. See Figure 3.14.



Fig. 3.14: An example of shape constancy

Source: Atkinson & Hilgard (2009)

3.6.3 Colour or Brightness Constancy



Fig. 3.15: An example of colour constancy

Source: <https://www.flickr.com>

It is our ability to perceive the colour and brightness of stimuli constant even with the change in the wavelength of the light at our retina. For instance, in Figure 15, we perceive the colour and brightness of the rose constant.

3.7 FACTORS AFFECTING PERCEPTION

3.7.1 Effect of Motivation or Need

Motivation always plays a vital role in various psychological processes including perception. You must have observed that when you feel hungry, the smell of the food catches your attention more easily than when you are full. Many experimental studies have also reported the same effect. In a classic experiment, Stanford (1936) reported that hungry participants perceived ambiguous stimuli more as food-related stimuli than non-hungry participants. Similarly, in a recent study, Changizi and Hall (2001) demonstrated that your need for thirst could also affect perception.

3.7.2 Effect of Expectation or Perceptual Expectancy

Perceptual expectancy is a person's readiness or a predisposition to perceive things in a particular way.

In a classic experiment, Bruner & Minturn (1955) illustrated the role of expectation in our perception. In one condition he showed his participants, an ambiguous figure of '13' in the context of numbers like this;



Fig. 3.16

In the second condition he showed the same ambiguous figure of '13' in the context of alphabets like this;



Fig. 3.17:

In the first condition, participants perceived the ambiguous stimulus as 13 while in the second it was perceived as B. The ambiguous stimulus in both conditions was same but interpreted differently due to participants' expectation.

In another classical study, Bugelski and Alampay (1961) used an ambiguous picture of the 'rat-man', as shown in figure 18. This picture was presented in two conditions. In one condition, participants were first exposed to animal picture and then to the ambiguous 'rat-man' picture. Whereas, in another condition participants were first exposed to neutral pictures followed by the picture of 'rat-man'. Experimental condition in which participants were exposed to animal picture perceived more this ambiguous picture as a rat than in the later condition.

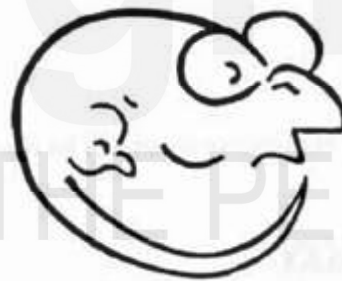


Fig. 3.18: Rat-man stimulus used in experiment

Source: <https://www.simplypsychology.org>

3.7.3 Effect of Emotions

What do you think can emotions affect your perceptual ability? Suppose, if you are a fan of a particular IPL team and during a match, the umpire made a call against your favourite team. Then it's more likely that you will perceive that umpire as partial. Why? Because you believe that your team is perfect and it cannot make any mistake. This example shows that your emotion for your favourite team is distorting your perception of the reality. Emotions do not hamper your perception always. Many studies have demonstrated the relationship between emotion and perception. An important point which needs to be mentioned here is that emotion does not always hamper your perception. Sometimes it facilitates also. Studies have suggested that when perception task is irrelevant to emotions it hampers your performance. Whereas, when your perception task is relevant to emotions, it facilitates the performance (Dodd, Vogt, Turkileri, & Notebaert, 2016; Compton et al., 2003). However, in a recent study, it was reported that emotions not only affect one's perception but also influence the working memory (Hur, Jordan, Dolcos & Berenbaum, 2017).

3.7.4 Effect of Stimulus Characteristic

You may have noticed that the horns used by heavy trucks usually have high frequency, high pitch and high volume. Why? Just to grab your attention. Studies have shown that those stimuli which sound, taste, look or feel different, grabs our attention more than other stimuli and thus affect our perception. According to the evolutionary psychologist, this property has a survival purpose. It has helped humans in identifying danger.

3.7.5 Effect of Experience



Fig. 3.19: A Flamingo shaped pen

Source: <https://www.amazon.in>

Prior experience plays an important role in the way we interpret stimuli; it shapes your perception. For example, if you mistakenly perceive a rope as a snake in the dark, then your previous experience is guiding your perceptual process. What do you see in the above picture? A Flamingo shaped pen, right? Even though this is not a typical pen, but you perceive it as a pen because of your previous exposure.

3.7.6 Effect of the Culture

Culture provides structure, guidelines, expectations, and rules to help people understand and interpret behaviors. Ethnographic studies suggest there are cultural differences in social understanding, interpretation, and response to behavior and emotion. Cultural scripts dictate how positive and negative stimuli should be interpreted. Now look at the following hand gesture and interpret it. What does it mean?



Fig. 3.20: A hand gesture referring to perfect

Source: <http://westsidetoastmasters.com>

In India, the illustrated hand gesture refers to beautiful or perfect. But in Mediterranean countries, it refers to sexual insult whereas, in Japan, this gesture

relates to money. This example suggests that interpretation of a stimulus changes with the change in the culture.

Self Assessment Questions (SAQ-II)

Fill in the following blanks:

- 1) provides structure, guidelines, expectations, and rules to help people understand and interpret behaviours.
- 2) plays an important role in the way we interpret stimuli.
- 3)always plays a vital role in various psychological processes including perception.
- 4) As the door swings towards us, its shape changes and so does image of the door.
- 5) The.....principle states that stimuli similar to each other are grouped together.

3.8 LET US SUM UP

In this unit, all relevant topics related to perception were covered. The unit started with an explanation to the process of perception followed by an introduction on sensation. Further, the role of attention in perception was also explained. The various perceptual constancies (size, shape, colour, distance) followed by various factors affecting the perceptual process were discussed accordingly. In the context of Gestalt philosophy, the different principles of organising stimuli were also discussed at the end.

3.9 UNIT END QUESTIONS

- 1) What do you understand by perception? Define it and describe the stages of the perceptual process.
- 2) Differentiate between perception and sensation
- 3) Describe the role of attention in perception.
- 4) What do you understand by perceptual constancy and describe any two types of constancies?
- 5) What is Gestalt theory of perception? Describe any five Gestalt principles of organization.
- 6) Explain perceptual expectancy and describe how it can affect one's perception.

3.10 GLOSSARY

- Perception** : It is a process of selecting, organising and interpreting the sensory information based on previous experiences, other's experiences, need or expectation.
- Sensation** : The process of receiving information from the environment using your five senses and sending it

to brain for further interpretation, is known as sensation.

- Perceptual Constancy** : It is our ability to perceive the shape, size and colour of the stimuli as constant even though in reality the stimuli change with reference to these characteristics.
- Selective Attention** : It refers to a process by which attention is focused on stimulus of ongoing interest, while ignoring other irrelevant stimuli. Selective attention acts as a filter.
- Sustained Attention** : It is the ability to attend to a stimulus for a longer period of time without being distracted.
- Gestalt Principle** : The literal meaning of the word *Gestalt* is form or configuration. This principle states that ‘whole is different from the sum of its part’.
- Law of Pregnaz** : According to this principle, out of all possible ways of grouping stimuli, we tend to group stimuli in the simplest and stable shape. Thus, we can say that simpler forms are more perceived by us.

3.11 ANSWERS TO SELF ASSESSMENT QUESTIONS (SAQ)

SAQ-I

- 1) True
- 2) False
- 3) False
- 4) True
- 5) True

SAQ-II

- 1) Culture
- 2) Prior experience
- 3) Motivation
- 4) our retinal
- 5) law of similarity

3.12 REFERENCES AND SUGGESTED READINGS

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UNIT 4 PERCEPTION: TYPES AND ERRORS OF PERCEPTION*

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- 4.1 Objectives
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4.0 INTRODUCTION

In the previous unit, we studied the meaning, nature, and laws of perception. In this unit also we will continue with the topic of perception. Since, vision seems an effortless process, we often take this process for granted. However, in reality, the process of perceiving colour, shape, form, movement is not simple. In this unit, we will make an attempt to solve the mystery of perceiving various types of perception such as depth, distance, movement, and size. Further, we will see how various types of illusions affect our process of perception.

4.1 OBJECTIVES

After studying this Unit, you will be able to:

- Describe the nature of depth and distance perception;

- Articulate the role of monocular and binocular cues on depth and distance perception;
- Explain the nature of movement and size perception;
- Discuss the basis of perceptual illusion; and
- Describe the different types of illusions.

4.2 PERCEPTION OF DEPTH AND DISTANCE

Depth perception refers to one's visual ability to perceive the world in three dimensions and thus enabling us to judge the distance of an object. Whereas, the process by which we determine the distance of an object is known as distance perception. Our brain uses both monocular and binocular cues to judge depth and distance.

4.2.1 Monocular Cues



Fig. 4.1: A one-eyed minion

Source: <https://wallpaperscraft.ru>

These are those information or cues that our brain receives from one eye only. These cues are weaker than binocular cues (information that our brain receives from both eyes) in strength. Following are some of the common monocular cues:

4.2.1.1 Relative Size



Fig. 4.2: Hot air balloons flying in the air

Source: <http://www.freestockphotos.biz>

This cue gives us information about the distance of an object based on its relative size with a similar object. This cue works on both two-dimensional and three-dimensional images. The basic premise is that if two objects are of the approximately similar size, then the object which is closer is perceived as larger.

4.2.1.2 Texture Gradient



Fig. 4.3: Flower meadows

Source: <https://commons.wikimedia.org>

This cue is based on our perception of the change in the gradient or degree of texture. The texture of the objects which are nearer to our eyes are rough or distinct, but as you move further away from it, the texture of the object will become less distinct or smooth and thus suggesting the perception of more distance. For example, if you look at your wall of the room from 30 feet, it seems smoother, but if you look at the same wall from one foot, you can notice the details on the wall. This change in the texture correlates with the distance.

4.2.1.3 Arial Perspective or Haze



Fig. 4.4: Near Salt Lake City by Albert Bierstadt

Source: <https://psych.hanover.edu>

Objects are perceived at a distance if there is a presence of haze in the environment. Haze is the result of atmospheric dust particles, fog or water vapours. Sometimes perception of distance based on haze can be deceptive. The same mountain can be perceived as nearer or at distance depending on the presence of haze.

4.2.1.4 Linear Perspective



Fig. 4.5: An example of monocular cue-linear perspective

Source: <http://acddpsych.blogspot.in>

This cue is based on the convergence of straight lines at a point on the horizon. An appropriate example of this cue could be the perception of convergence of rail tracks at a distance. This cue suggests that closure the lines are; the greater will be the distance.

4.2.1.5 Interposition/Occlusion

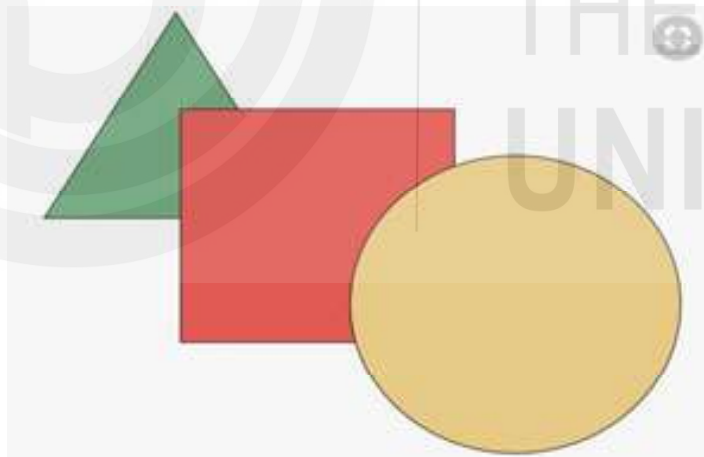


Fig. 4.6: An example of monocular cue-occlusion

Source: Retrieved from <https://in.pinterest.com/pin/93731235972658147/>

When two objects are overlapped, then the object which has been overlapped or obscured will be perceived as farther away than the overlapping object.

4.2.1.6 Accommodation

Even though this cue occurs with both eyes, it is still considered as a monocular cue. It is known as accommodation because the size of our lenses accommodates themselves based on the distance. Our lenses become thicker when an object lies closer to eyes while it becomes thinner when an object lies at a distance.

4.2.2 Binocular Cues



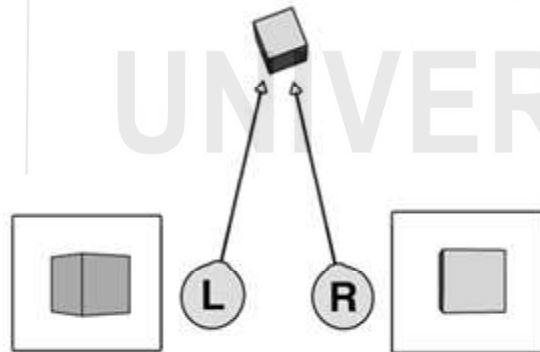
Fig. 4.7: A two-eyed minion

Source: <http://amostpeculiarlademoiselle.blogspot.in/2013/12/a-minion-for-little-b.html>

The cues that we receive from both eyes are known as binocular cues. These cues are more powerful than monocular cues. The process of gaining binocular cues to assess depth is known as stereopsis.

Following are two types of binocular cues:

4.2.2.1 Retinal Disparity



L= Left eye

R=Right eye

Fig. 4.8: Formation of different retinal image by left and right eyes

Source: <http://artnet.nmu.edu>

We humans have two eyes, separated by the distance of average 6.3 cm. Therefore, the retinal image of the same object differs slightly from each other. The closer an object is to eyes; greater will be the difference in its retinal image. Our brain analyses the degree of disparity between these two separate retinal images and produces a single image of the object to judge information on depth, height and width.

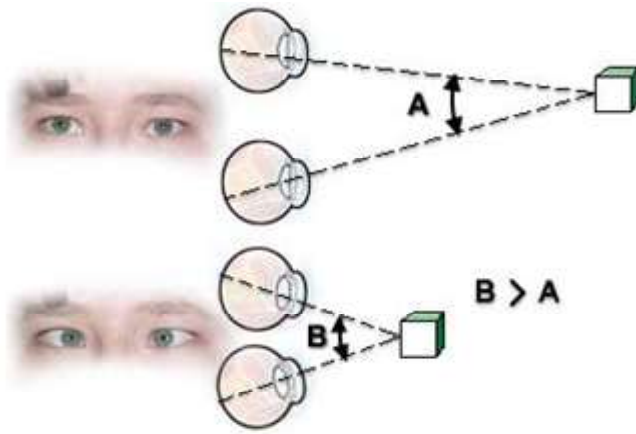


Fig.4.9: Two convergence angles formed by our eyes.

Source: <https://psychlopedia.wikispaces.com>

Our eyes make an angle while focusing on an object, known as convergence angle. Convergence angle for distant and near-by objects are different. When an object is at a distance, our eyes make smaller convergence angle, but when an object is closer to our eyes, our eyeballs rotate inwards and form large convergence angle. This change in convergence gives a clue about distance and depth to the perceiver.

Self Assessment Questions (SAQ-I)

Fill in the blanks:

- 1) The retinal image of the same objectfrom each other.
- 2) The cues that we receive from both eyes are known as
- 3) Objects are perceived atif there is a presence of haze in the environment.
- 4) Depth perception refers to one'sability to perceive the world in three dimensions.
- 5) The texture of the objects which are nearer to our eyes are,but as you further move away from it, the texture of the object will become.....

4.3 MOVEMENT PERCEPTION

How do we know that if a car is coming towards us or moving away from us? Movement perception is our ability to judge the direction and speed of a moving object. Psychologists have tried to answer the questions on movement perception using following four factors:

Retinal motion: When an object moves its image on retina also moves. This motion of the retinal image is detected by special visual neurons which are sensitive to change in motion and direction. In this way we perceive movement.

Motion after-effect (MAE): If you fixate your gaze on a moving object for some time (few seconds to minutes) and then move your gaze to a stationary object. Then the stationary object will be perceived as moving in opposite direction to the original moving object. This phenomenon is known as MAE and occurs due to motion adaptation.

Induced movement: When a smaller stationary body is surrounded by larger moving body then smaller body is perceived to move in the direction opposite to the larger body. Due to this phenomenon, we perceive moon as moving when it is surrounded by slowly moving clouds.



Fig. 4.10: Moon behind clouds

Source: <http://courses.washington.edu>

Apparent movement/Stroboscopic motion: First given by Gestalt theorist Wertheimer (1912). In this phenomenon, when stationary stimuli are presented in succession, it is perceived in a motion. This phenomenon is used to explain the movement perception in videos.

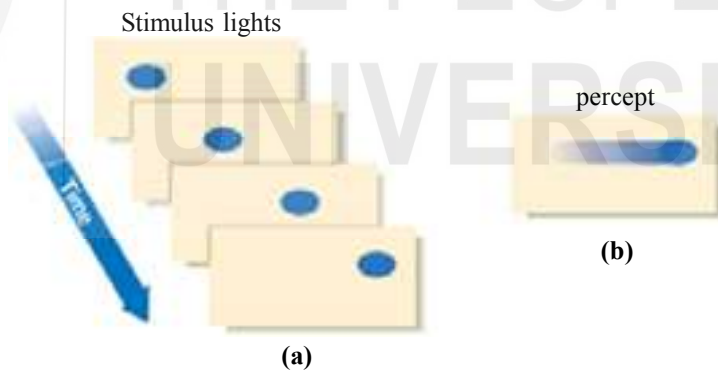


Fig.4.11: The sequence of still frames in (a) shown at the appropriate intervals, results in the percept shown in (b). The illusion of continuous motion resulting from successively viewed still pictures is the basis of motion in movies, video, and television.

Source: Atkinson and Hilgard (2009), pp. 163

4.4 SIZE PERCEPTION

In this section, we will discuss those mechanisms that are involved in judging the size of the stimuli. Our ability to judge the size of the stimuli correctly even with the change in the distance has been explained using three hypotheses: *the size-distance invariance hypothesis, familiar size hypothesis and the direct perception hypothesis.*

- 1) **Size-distance invariance hypothesis (SDIH):** The basic premise of this hypothesis is that the perceived size of a stimulus is proportional to the perceived distance (Kilpatrick and Ittelson, 1953). It further states that if information about the distance is available then size of the stimuli is interpreted based on retinal image. However, if the information about the distance is not available then size of the stimuli is judged based on the visual angle alone. The mathematical expression of this relationship is as follows:

$$S'/D' = f(\text{theta sign})$$

Where,

S' = perceived size

D' = perceived distance

Theta = visual angle

Here, before proceeding further, it is important to explain the term “visual angle” first. It is the angle made by our eyes after looking at the object.

- 2) **Familiar Size Theory/Cue:** This cue is used to judge not only size but also the distance and depth of the stimuli. We know the visual angle for a stimulus decreases with the decrease in the distance. Our brain uses this information (visual angle) along with our previous information of the size of the targeted stimulus and determines its actual size, distance and depth. Thus, according to this theory familiar size influences our size perception, which in turn influences our distance perception (Ittelson, 1960). However, later two psychologists (Gogel & Da Silva, 1987) proposed that the theory of familiar size is valid in all conditions. When the condition of viewing is improvised then we use egocentric reference distance to determine the size of the familiar object.
- 3) **Theory of Direct Perception:** Gibson in 1979 proposed the theory of direct perception. His ideas regarding size perception were summarised by Epstein (1982) as: “(i) there is no perceptual representation of size correlated with the retinal size of the object, (ii) perceived size and perceived distance are independent functions of information in stimulation, and (iii) perceived size and perceived distance are not causally linked, nor is the perception of size mediated by operations combining information about retinal size and perceived distance. The correlation between perceived size and perceived distance is attributed to the correlation between the specific variables of stimulation which governs these precepts in the particular situations” (p.78).

4.5 ERRORS IN PERCEPTION

As discussed in previous unit, perception is the process of analysing and understanding a stimulus as it is. But it may not be always possible to perceive the stimuli as they are. Knowingly or unknowingly, we mistake the stimulus and perceive it wrongly.

It may be due to defect in our sense organs or defective functioning of the brain. Many times the prejudices in the individual, time of perception, unfavourable background, lack of clarity of stimulus, confusion, conflict in mind and such other factors are responsible for errors in perception. There are two kinds of errors:

a) **Illusion**

Illusion is a false perception. Here, an individual perceives a stimulus incorrectly. For example, in the dark, a rope is mistaken as a snake or vice versa. The voice of an unknown person is mistaken as a friend’s voice. A person standing at a distance who is not known may be perceived as a known person.

Most of our illusions are visual and auditory. But illusions pertaining to other senses are also possible.

b) **Hallucination**

Sometimes we come across instances where the individual perceives some stimulus, even when it is not present. This phenomenon is known as hallucination. The person may see an object, person, etc. or s/he may listen to some voice though there are no objects and sounds in reality.

Hallucinations pertain to all the sensations that appear to people, but visual and auditory hallucinations are more common. Usually individuals with unsound mind, emotionally disturbed, alcoholics and those who are in confused states may experience hallucinations. However, among abnormal and intoxicated people, hallucinations are very common.

In addition to these errors, abnormalities in our sense perceptions may also occur and known as anaesthesia (no sensation), hyperesthesia (excessive sensitivity) and paraesthesia (distorted or wrongly localised sensation). In these cases the tactile (skin) sensation is wrongly perceived.

4.6 TYPES OF ILLUSION

Is perception reality? Not always. The process of perception is not always foolproof. Knowingly or unknowingly, we tend to make mistakes and misperceive stimuli. When we ‘misinterpret’ the sensory information then it is known as an illusion. It has also been defined as “a discrepancy between one’s awareness and some stimulus” (Reynolds, 2008). Some typical examples of illusions include perceiving tree branches as ghosts or perceive rope as a snake at night. In this section, we will talk about some common forms of illusion.

- **Types of illusion:**

4.6.1 Muller-lyre Illusion

Which of the following lines appear longest?

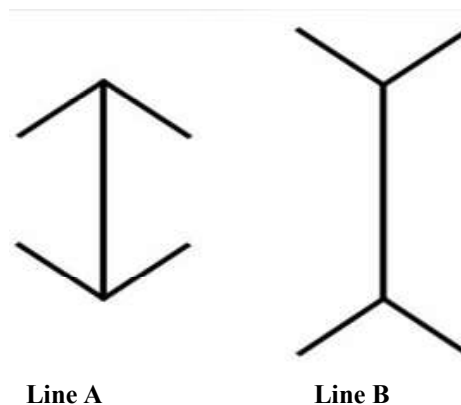


Fig. 4.12: Muller-lyre illusion

Source: <https://isle.hanover.edu>

If your answer is line A, then you are wrong. And if your answer is line B, then again you have given an incorrect answer, because both lines are of equal length. The illusion you have just seen is a geometrical-optical illusion known as Muller-Lyer illusion. In this illusion, two straight lines of the same length appeared to be of different length. Lines with inward pointing arrow seem shorter than the outward-pointing line.

4.6.2 Ponzo Illusion

It is also an optical illusion, in which two converging straight lines distort our perception of the size of two identical lines drawn across it. The upper yellow line appears to be longer than the lower yellow line, when in fact both are of the same length. The incorrect judgment of the size of yellow lines happens because we use linear perspective cue to judge its size.

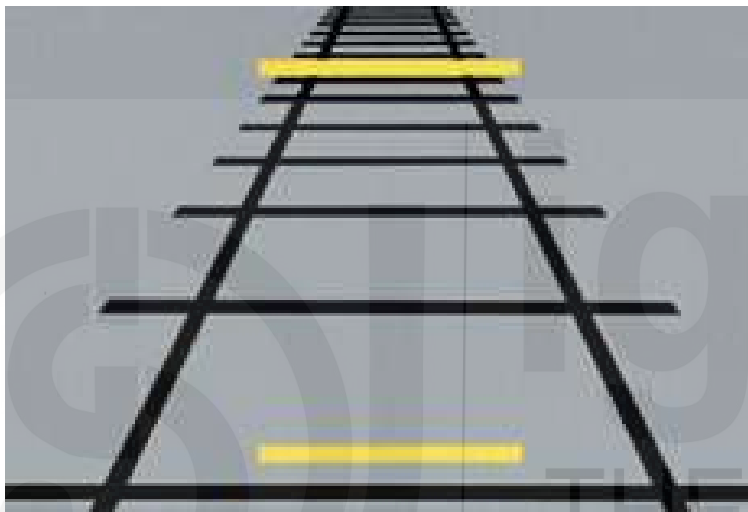


Fig. 4.13: The ponzo illusion

Source: <http://www.illusionsindex.org>

4.6.3 Ebbinghaus Illusion

It is an optical illusion of relative size perception. Discovered by Hermann Ebbinghaus but popularised by Edward B. Titchener, this illusion is also known as Titchener circles. Now, answer this. Which of the following orange circle is smaller?

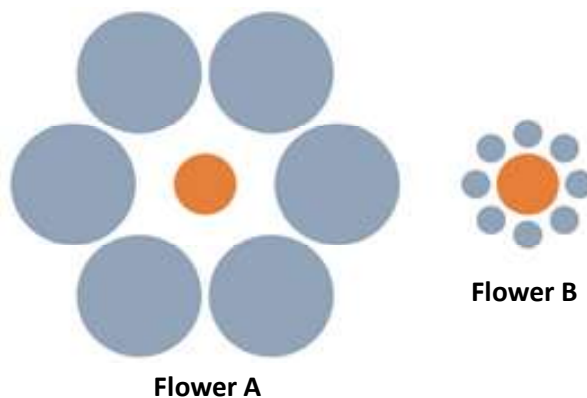


Fig. 4.14: The Ebbinghaus illusion

Source: <http://www.illusionsindex.org>

Irrespective of your answer, both orange circles are of the same size. This is known as Ebbinghaus illusion. The perception of the size of orange circle depends on the relative sizes of grey circles.

4.6.4 The Ames Room Illusion

Named after its creator, American ophthalmologist Adelbert Ames, Jr., this optical illusion leads to the distortion of perception of relative size. To an observer, a person standing in one corner of the room is perceived as significantly larger than the person standing in another corner.

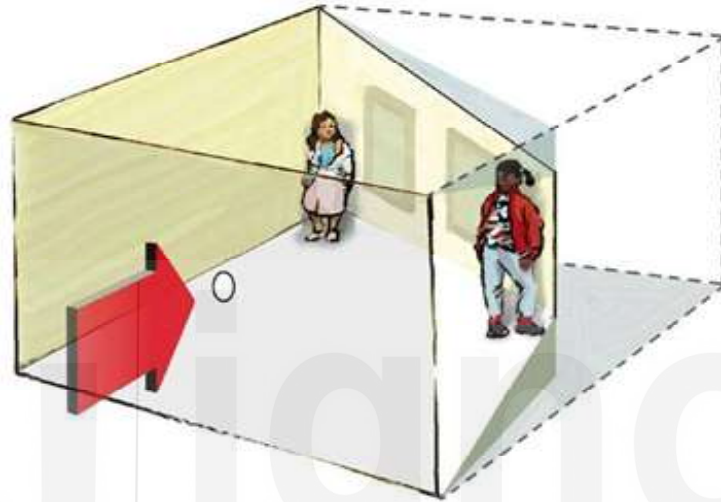


Fig. 4.15: The Ames room illusion

Source: <http://conwaypsychology.webs.com>

4.6.5 The Moon Illusion

Have you ever noticed that the size of the moon when it is coming over the horizon? If yes, then you must have noticed that it looks bigger on the horizon than when it comes overhead. However, in reality, there are no differences in the size of the moon. Our perception of the moon having different sizes at horizon and zenith is known as moon illusion. This illusion occurs because of our perception of the sky as a flattened dome and thus forcing our brain to reduce the size of the moon at zenith.

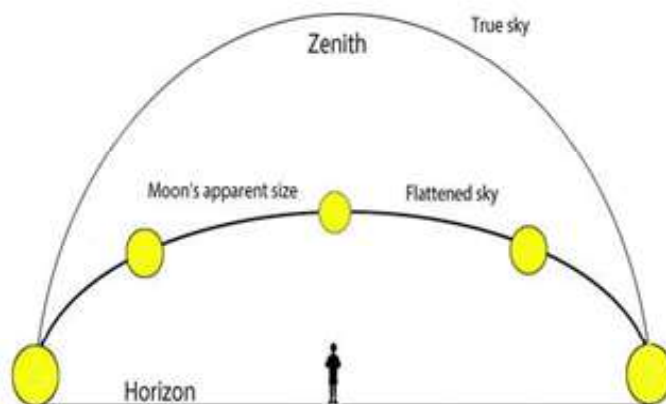


Fig. 4.16: The moon illusion

Source: <http://www.skyandtelescope.com>

Self Assessment Questions (SAQ II)

State whether the following are ‘True’ or ‘False’:

- 1) The process of perception is always foolproof.
- 2) Some typical examples of illusions include perceiving tree branches as ghosts or perceive rope as a snake at night
- 3) Gibson in 1979 proposed the theory of Familiar Size.....
- 4) Sometimes we come across instances where the individual perceives some stimulus, even when it is not present.
- 5) When an object moves its image on retina also moves.

4.7 LET US SUM UP

In this unit, the types of perception were introduced to you. Specifically, the factors responsible for depth, distance, movement, and size perception were discussed. Lastly, the different types of errors involved in the process of perception were also discussed. To explain these errors in more detail, the various forms of illusions such as Muller-lyre illusion, Ponzo illusion, Ebbinghaus illusion, Ames room illusion, and moon illusion were discussed accordingly.

4.8 UNIT END QUESTIONS

- 1) Differentiate between monocular and binocular cues of perception.
- 2) Explain the factors responsible for movement perception.
- 3) Explain the size-distance invariance hypothesis, familiar size hypothesis and the direct perception hypothesis with reference to the process of size perception.
- 4) Is perception always correct? Support your view with some appropriate examples of illusions.
- 5) Differentiate between illusion and hallucination.

4.9 GLOSSARY

Perception	: It is a process of selecting, organising and interpreting the sensory information.
Monocular Cues	: Perceptual cues obtained from one eye only.
Binocular Cues	: Perceptual cues obtained from both eyes.
Illusion	: It is a process of perceptual distortion, leading to misinterpretation of the stimulus.
Relative Size	: This cue gives us information about the distance of an object based on its relative size with a similar object. The basic premise is that if two objects are of the approximately similar size, then the object which is perceived as larger is closer.
Linear Perspective	: This cue is based on the convergence of straight lines at a point on the horizon. This cue suggests

that closure the lines are; the greater will be the distance.

- Convergence angle** : Our eyes make an angle while focusing on an object, known as convergence angle. Convergence angle for distant and near-by objects are different.
- Movement perception** : It is our ability to judge the direction and speed of a moving object.
- Stroboscopic motion or phenomenon** : In this phenomenon, when stationary stimuli are presented in succession, it is perceived in a motion. This phenomenon is used to explain the movement perception in videos.

4.10 ANSWERS TO SELF ASSESSMENT QUESTIONS (SAQ)

SAQ-I

- 1) differs slightly
- 2) binocular cues
- 3) a distance
- 4) visual
- 5) rough or distinct; less distinct or smooth

SAQ-II

- 1) False
- 2) True
- 3) False
- 4) True
- 5) True

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