

$$a^0 = 1 [a0]$$

$$\arcsin(z)$$

# PERCEPTION

PROFESSOR AYE AYE OO

RECTOR

$$x_{n+1} =$$

**WHAT DO YOU SEE HERE?**





# PERCEPTION



WE DON'T SEE THINGS AS THEY ARE,  
WE SEE THINGS AS WE ARE.

## Definitions

- Sensation: absorbing raw energy (e.g., light waves, sound waves) through our sensory organs
- Transduction: conversion of this energy to neural signals
- Attention: concentration of mental energy to process incoming information
- Perception: selecting, organizing, and interpreting these signals



## Overview: Sensation and Perception

- Energy contains information about the world (usually incomplete, full of noise, and distorted)
- Accessory structure modifies energy
- Receptor transduces energy into a neural response
- Sensory nerve transmits the coded activity to the central nervous system
- Thalamus processes and relays the neural response
- Relayed to specialized areas of the cortex
- Perception of the world is created

# What is Perception?

- ❑ **A process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment.**
- ❑ **People's behavior is based on their perception of what reality is, not on reality itself.**





# PERCEPTION

“Perception is a process by which people regard, analyze, retrieve and react to any kind of information from the environment.”

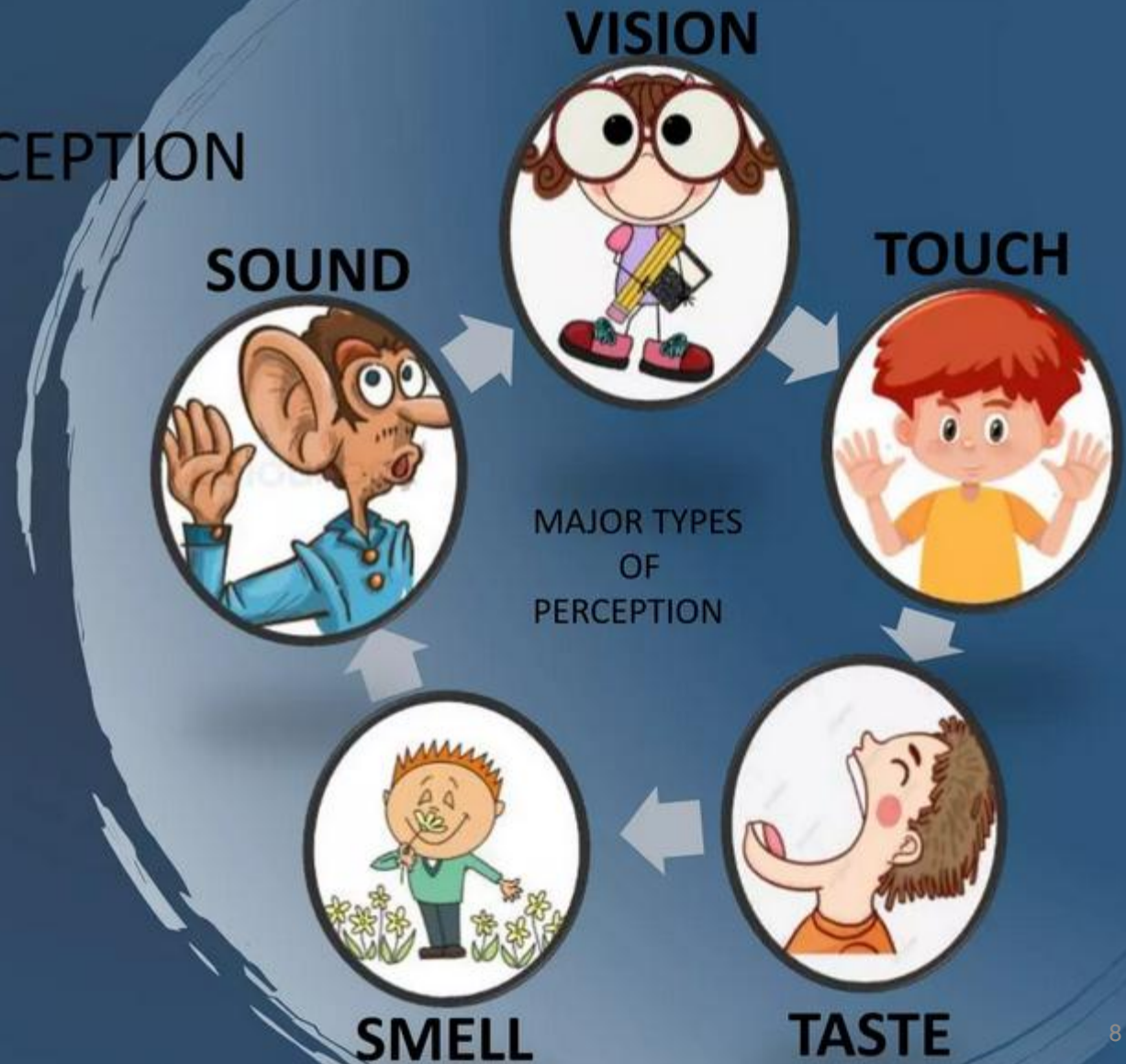
“Perception may be defined as a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment.”

S.P. ROBBINS

In simple words we can say that perception is the act of seeing what is there to be seen. But what is seen is influenced by the perceiver, the object and its environment

# CHARACTERISTICS OF PERCEPTION

- It is both subjective and objective.
- It is shifting, not permanent.
- It is selective.
- It is a result of past experiences.
- It is driven by motivations and interests.

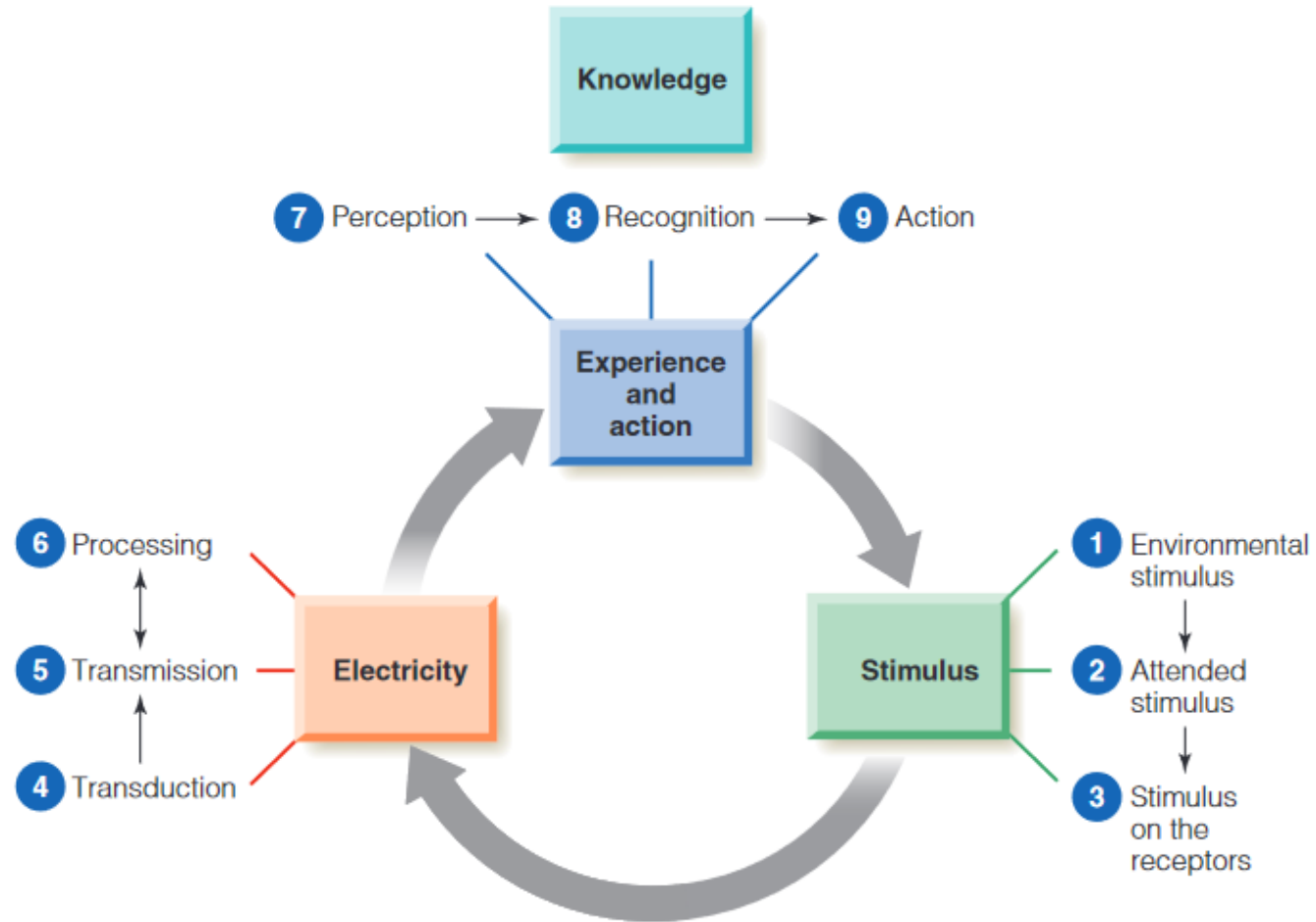






## FACTORS THAT AFFECT 'PERCEPTION'

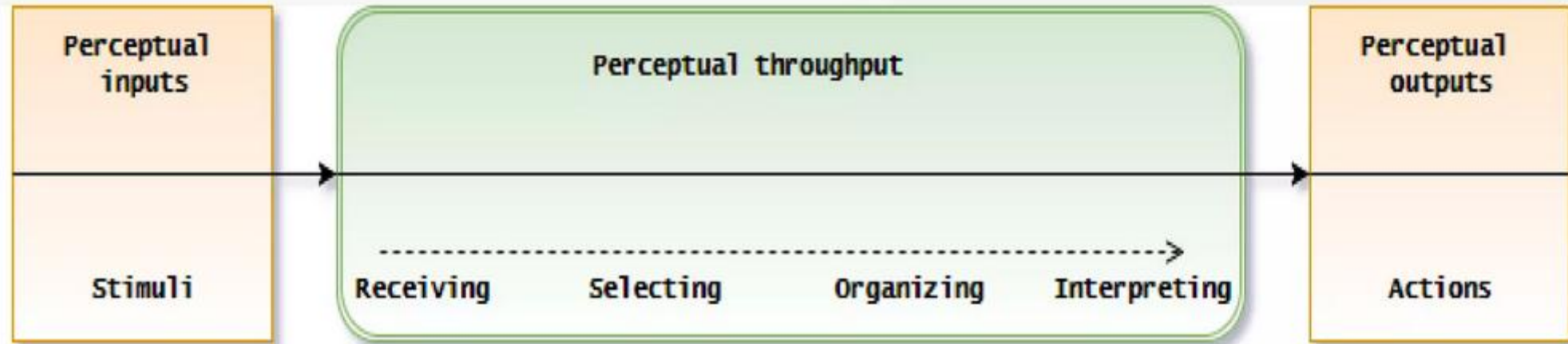




**Figure 1.1** ■ The perceptual process. The steps in this process are arranged in a circle to emphasize that the process is dynamic and continually changing. See text for descriptions of each step in the process.



# PROCESS OF PERCEPTION

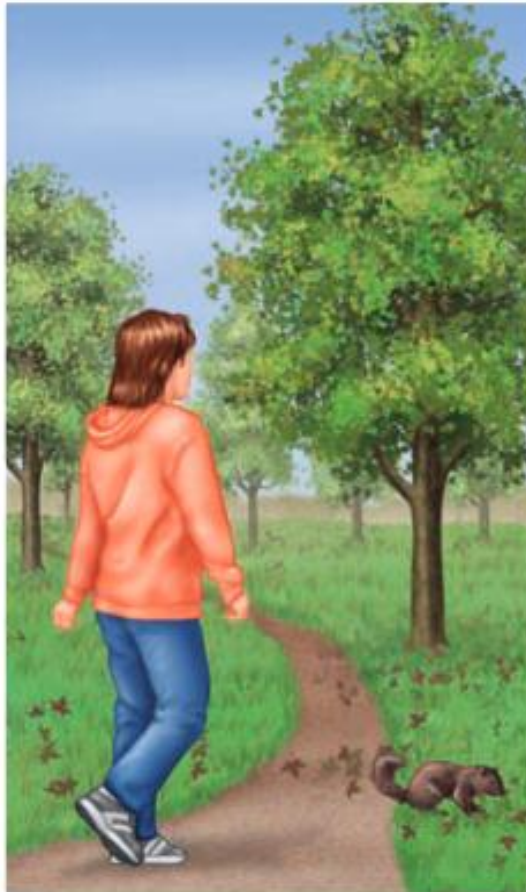


**Perceptual Inputs :** . Stimuli may be in the form of objects, events, or people. Thus everything in the setting where events occur, or which contributes to the occurrence of events, can be termed as perceptual input

**Perceptual Mechanism:** Perceptual mechanism involves three elements- selection of stimuli, organization of stimuli, and interpretation of stimuli.

# Stimuli – Environmental stimuli, Attended Stimuli

1. Environmental stimulus



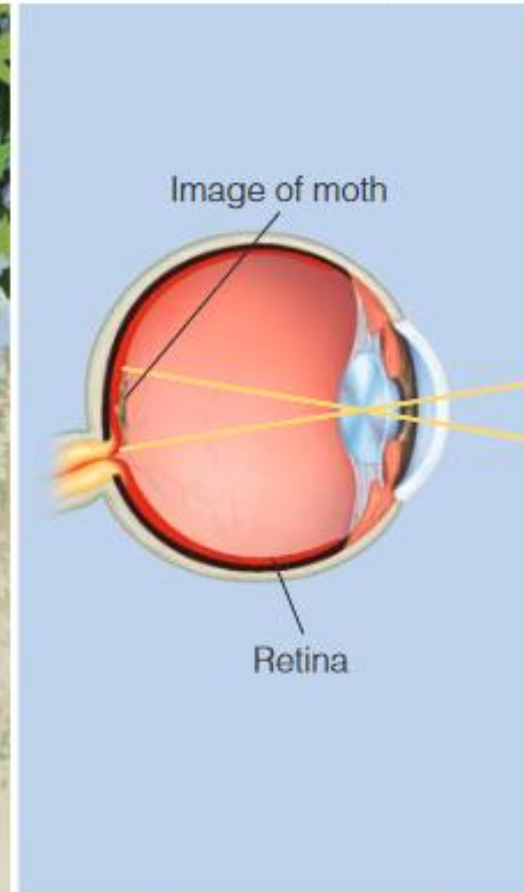
(a) The woods

2. Attended stimulus



(b) Moth on tree

3. Stimulus on the receptors

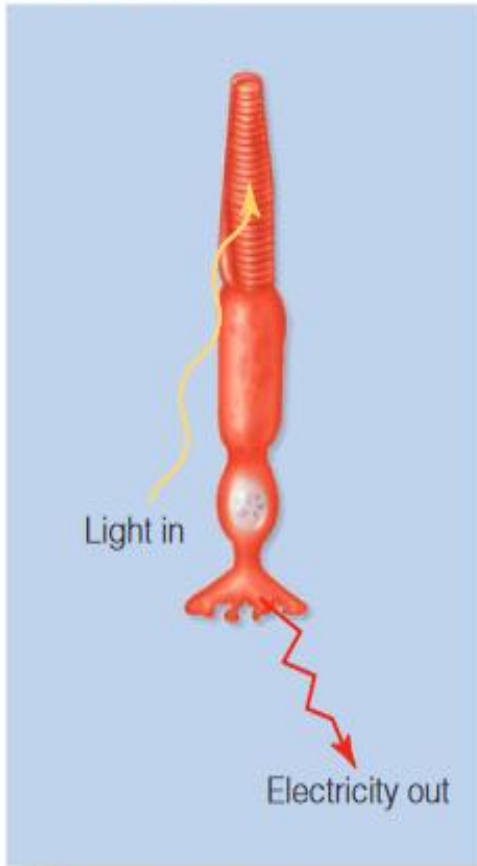


(c) Image on Ellen's retina

**Figure 1.2** ■ (a) We take the woods as the starting point for our description of the perceptual process. Everything in the woods is the environmental stimulus. (b) Ellen focuses on the moth, which becomes the attended stimulus. (c) An image of the moth is formed on Ellen's retina.

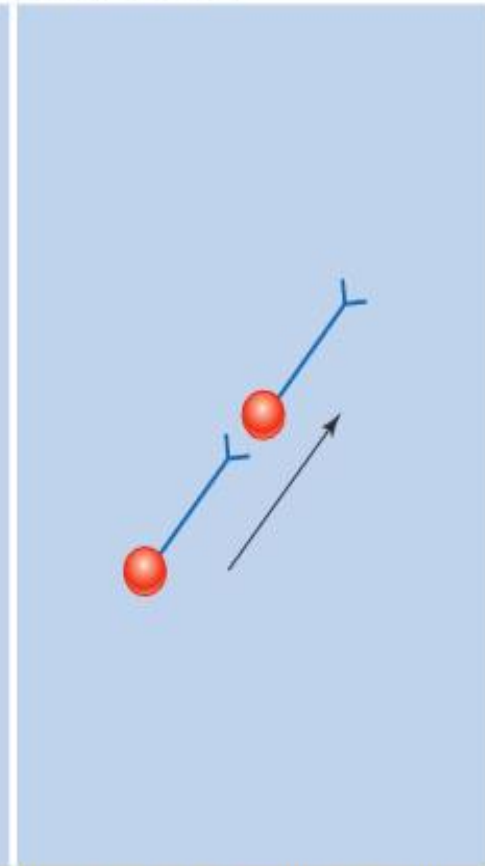


#### 4. Transduction



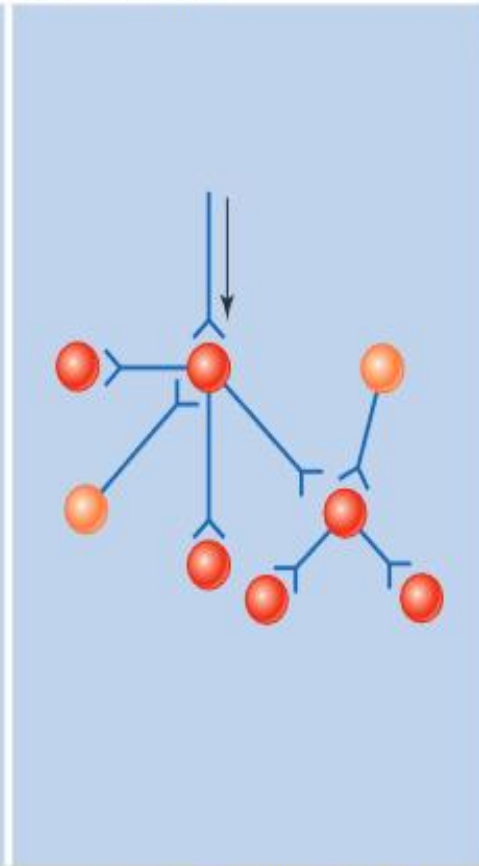
(a) Electricity created

#### 5. Transmission



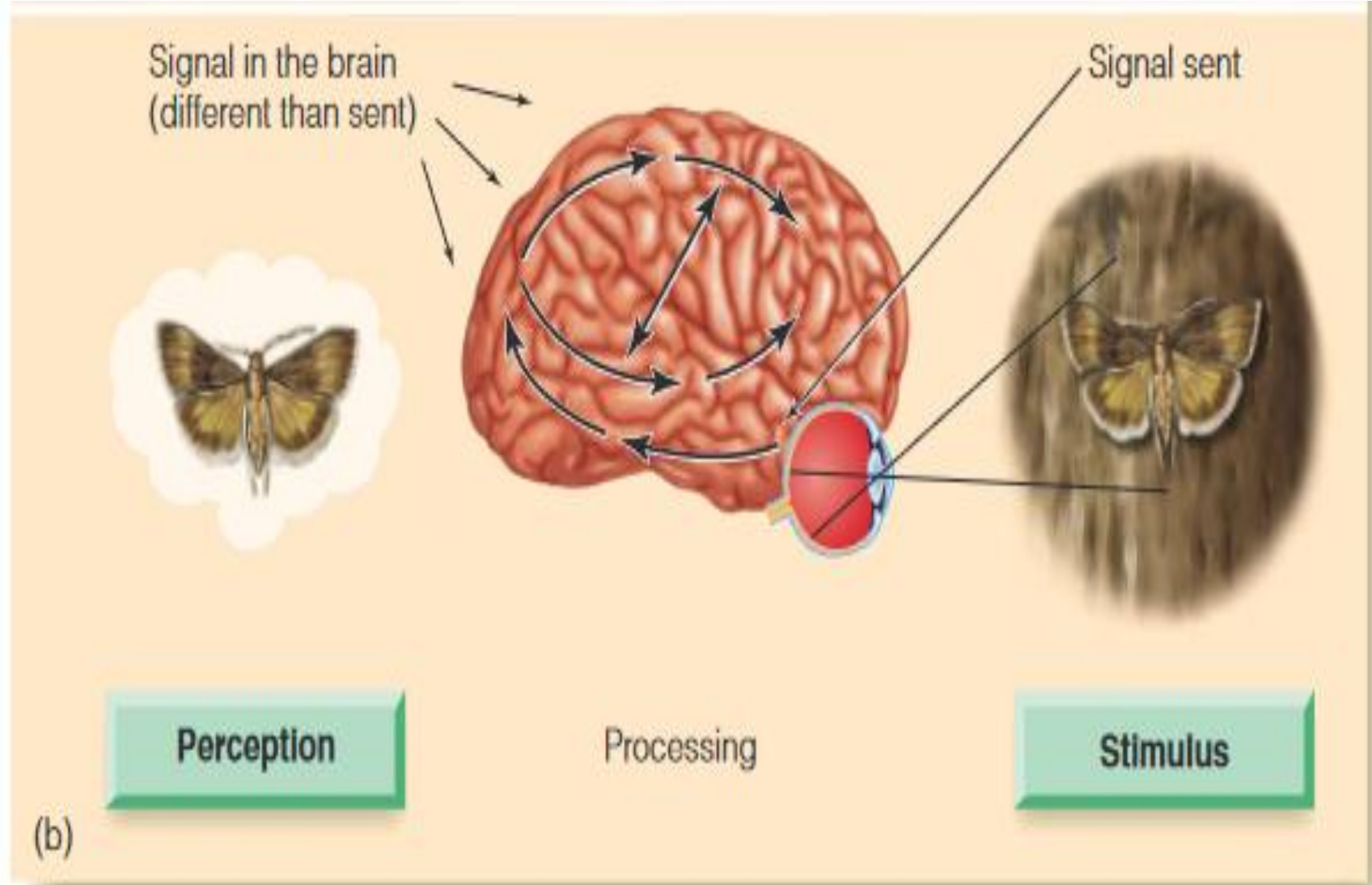
(b) One neuron activates another

#### 6. Processing



(c) Interactions between neurons

**Figure 1.3** ■ (a) *Transduction* occurs when the receptors create electrical energy in response to light. (b) *Transmission* occurs as one neuron activates the next one. (c) This electrical energy is *processed* through networks of neurons.



signal sent. (b) The nervous system sends electrical signals that stand for the moth. The nervous system processes these electrical signals, so the signal responsible for perceiving the moth is different from the original signal sent from the eye.

### 7. Perception



(a) Ellen perceives something on the tree.

### 8. Recognition



(b) Ellen realizes it is a moth.

### 9. Action



(c) Ellen walks toward the moth.

**Figure 1.5** ■ (a) Ellen has conscious perception of the moth. (b) She recognizes the moth. (c) She takes action by walking toward the tree to get a better view.



## The Complexity of Perception

- Bottom-up processing
  - Perception may start with the senses
  - Incoming raw data
  - Energy registering on receptors
- Top-down processing
  - Perception may start with the brain
  - Person's knowledge, experience, expectations

## Perception Is...

- The process of recognizing, organizing, and interpreting information from senses
- Not an exact copy of “the world”
- Based on our past experience and expectations

## Conditions of perception

- Intensity
- Novelty
- Repetition
- Intention
- motivation



## Prerequisites of perception

- Things felt by the senses
- Things relating to prior knowledge and past experiences
- Functioning of the brain
- Response of the individual

# THREE APPROACHES TO PERCEPTION

- Computational approach – holds that perception is the result of nervous system activity that modifies and processes raw sensations into reality.

Example: To identify an object as a red ball, the neurons in our visual cortex each respond to one aspect, such as the color, curved edges, or texture, and other neurons join the information to create our perception.



2. **Constructivist** approach to perception holds that we construct reality by putting together raw bits of sensory information. Our expectations of reality influence our perceptions.

*Example:* Many children's books contain connect-the-dot tasks. On the page are a series of dots and some features, such as eyes, ears, or a mouth. As constructivists would say, we can make good guesses as to what the picture is going to be by putting together all the bits of information from the dots and the features. Since eyes and ears go with a face, the completed drawing will probably have a person in it.







3. **Ecological approach** to perception argues that the environment holds many affordances that **does not allow us to perceive our surroundings**.

*Example:* As Mengie walks across the street she only needs to look **downward** to perceive the visual and auditory cues that traffic is coming.

## Perceptual Organization

- “Old” view – structuralism
  - Perception involves adding up sensations
- “New” view – Gestalt psychologists
  - The mind groups patterns according to laws of perceptual organization



# PERCEPTUAL ORGANIZATION

Perceptual organization: processes that group smaller units of the perceptual world into larger units





“Gestalt” is a German word that roughly translates to “organized structure.” Gestalt stresses on the concept of organization of the whole that is orderly, rule-governed, and not random. Gestalt psychology proposes that the “properties of the whole are the result of summation of those parts”. Thus, a part has properties that depend on the whole in which it is included. The dependence of parts on the whole can have a wide-ranging nature. Complete dependence of parts upon each other is also being proposed.

# FIGURE GROUND DISCRIMINATION

When you emphasize the white vase, the two black profiles become background.

If you organize the faces as the figure, what has been a vase now becomes background.



## FIGURE AND GROUND: “WHAT STANDS OUT?”

- We tend to see things in a figure and ground
  - FIGURE: refers to the object being perceived
  - GROUND: refers to the background

# GESTALT ORGANIZATIONAL PRINCIPLES

**Figure-Ground:**  
The ground is always seen as farther than the figure



**Proximity:**  
Objects that are physically close together are grouped together



**Continuity:**  
Objects that continue a pattern are grouped together

When you see this



do you see this?



plus this?



or this?



**Closure:**  
The tendency to see a finished unit



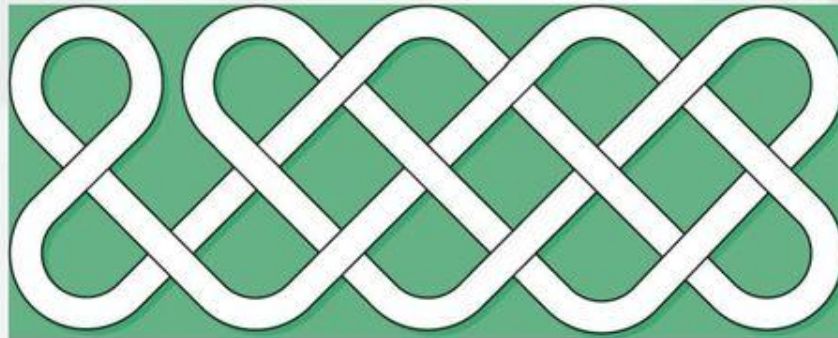
**Similarity:**  
Similar objects are grouped together





# Gestalt Laws of Perceptual Organization

- Law of good continuation
  - Lines tend to be seen as following the smoothest path

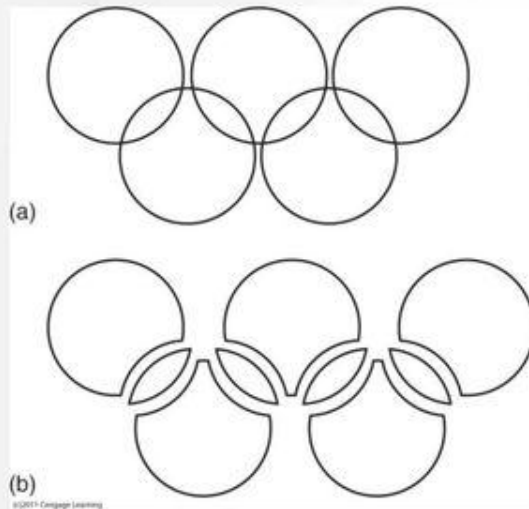


(c)2011 Cengage Learning

Caption: We perceive this pattern as continuous interwoven strands because of good continuation.

## Gestalt Laws of Perceptual Organization

- Law of good figure (simplicity or prägnanz)
  - Every stimulus pattern is seen so the resulting structure is as simple as possible



Caption: Law of simplicity. We see five circles, as in (a), not the more complex array of nine objects, as in (b).

## Gestalt Laws of Perceptual Organization

- Law of familiarity
  - Things are more likely to form groups if the groups appear familiar or meaningful



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Caption: *The Forest Has Eyes* by Bev Doolittle (1985). Can you find 13 faces in this picture? (Source: "The Forest Has Eyes" 1984 Bev Doolittle, courtesy of The Greenwich Workshop, Inc.)



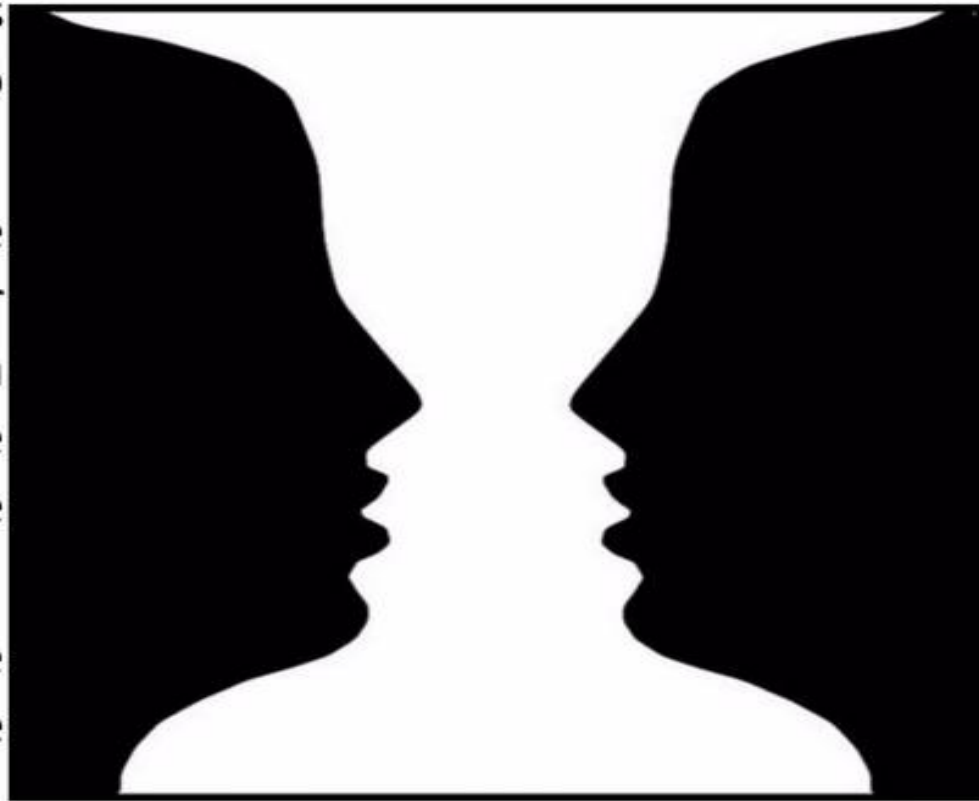
## **Principles of perception**

- 1. The principle of figure –ground relationship.**
- 2. Principle of closure**
- 3. Principle of grouping.**
- 4. Principle of simplicity**
- 5. Law of Pragnanz.**
- 6. Principle of contour.**
- 7. Principle of Context.**
- 8. Principle contrast.**
- 9. Principle of distance and depth.**
- 10. Principle of motion.**



## The principle of figure –ground relationship.

- A figure is always perceived in relationship to its background.
- We experience a figure against a background or background against a figure based upon the characteristics of the perceiver.
- The given pattern may be perceived either as a vase or as two faces.





## The principle of closure

- While confronting an incomplete pattern one tends to complete the pattern or sensory gaps and perceive it as meaningful whole.
- This is helpful in interpreting various incomplete objects or patterns in the environment.
- Though the Panda is not complete still we recognize it as a Panda.



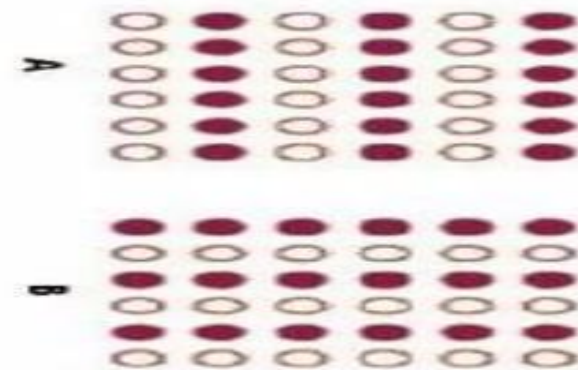
## The principle of grouping

- It is a tendency to perceive a stimuli in organised meaningful patterns. It may be based on
  1. Similarity: objects look alike are grouped together. (group of dots)
  2. Proximity: objects that appear close are grouped together. (8 lines)
  3. Continuity: Grouped based on the continuation.

Proximity



Similarity



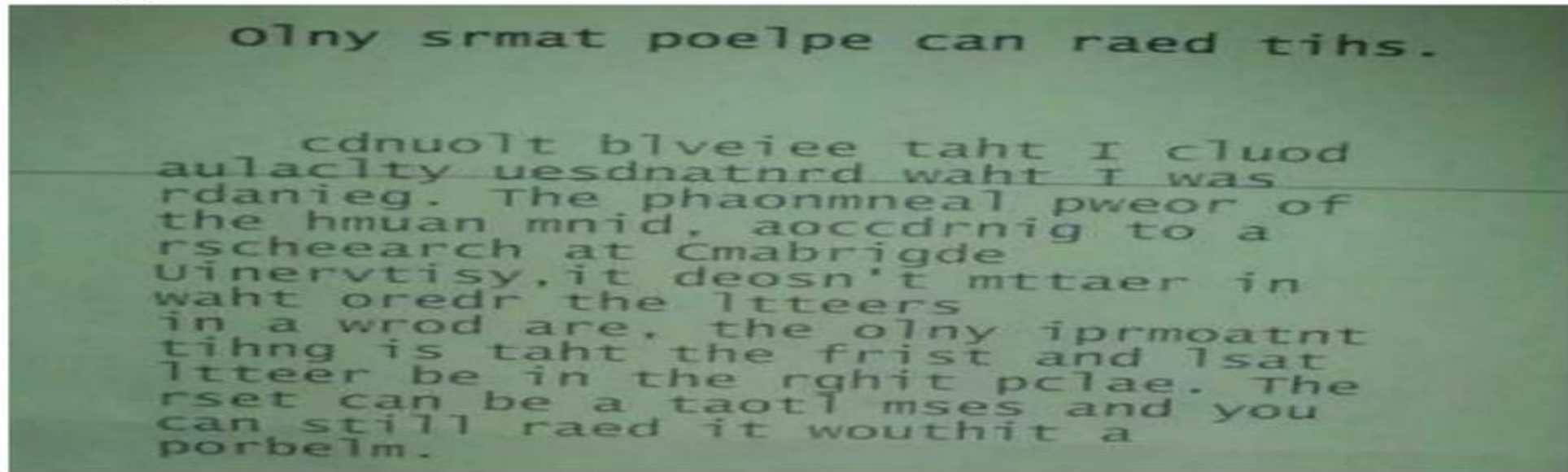
Continuity





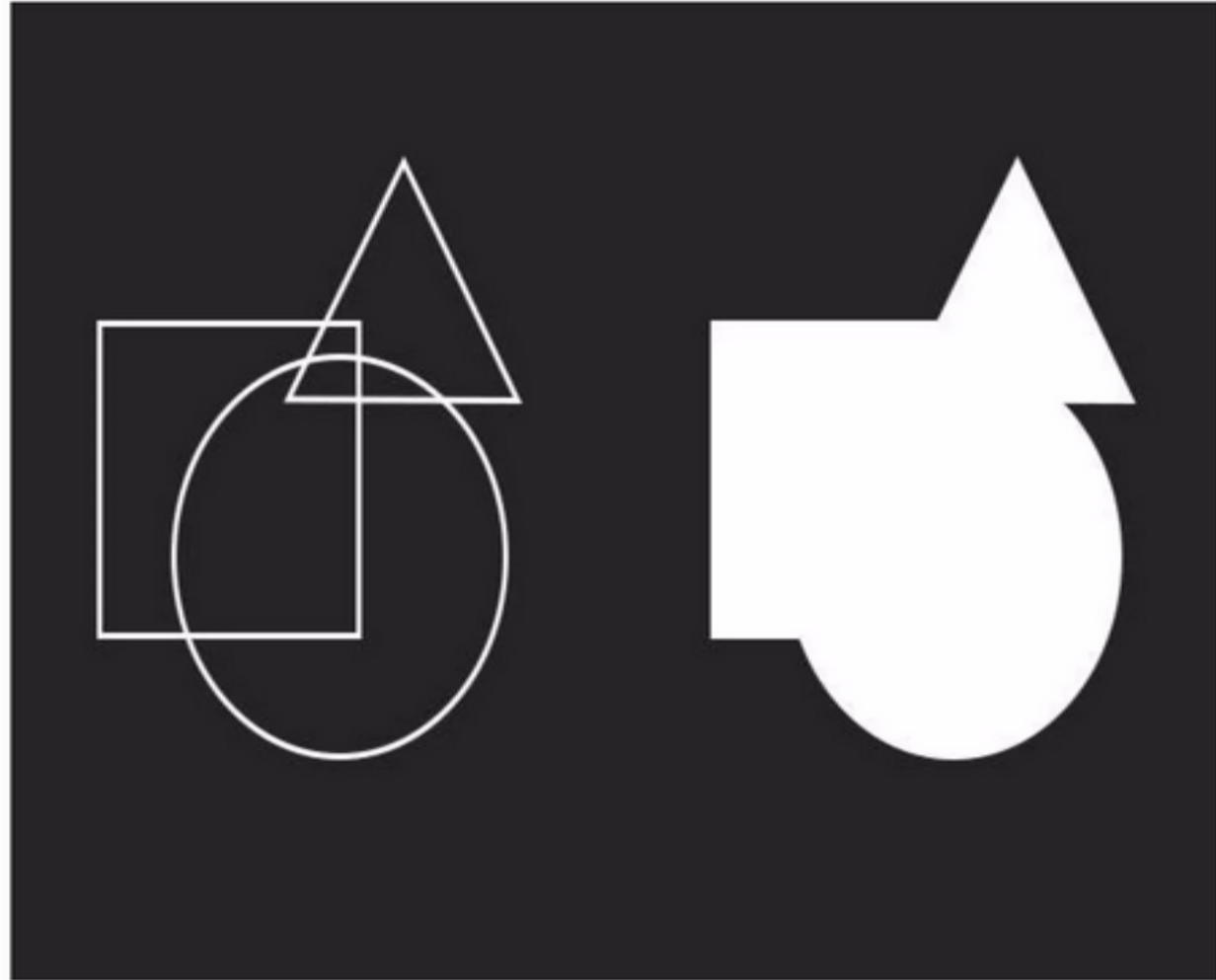
## The principle of simplicity

- We tend to perceive a stimulus in such a way that in the simplest possible pattern.
- The characteristics like symmetry, unbroken lines and compact areas and the perceivers familiarity with the figure contribute to its simplicity.



## The law of Pragnanz

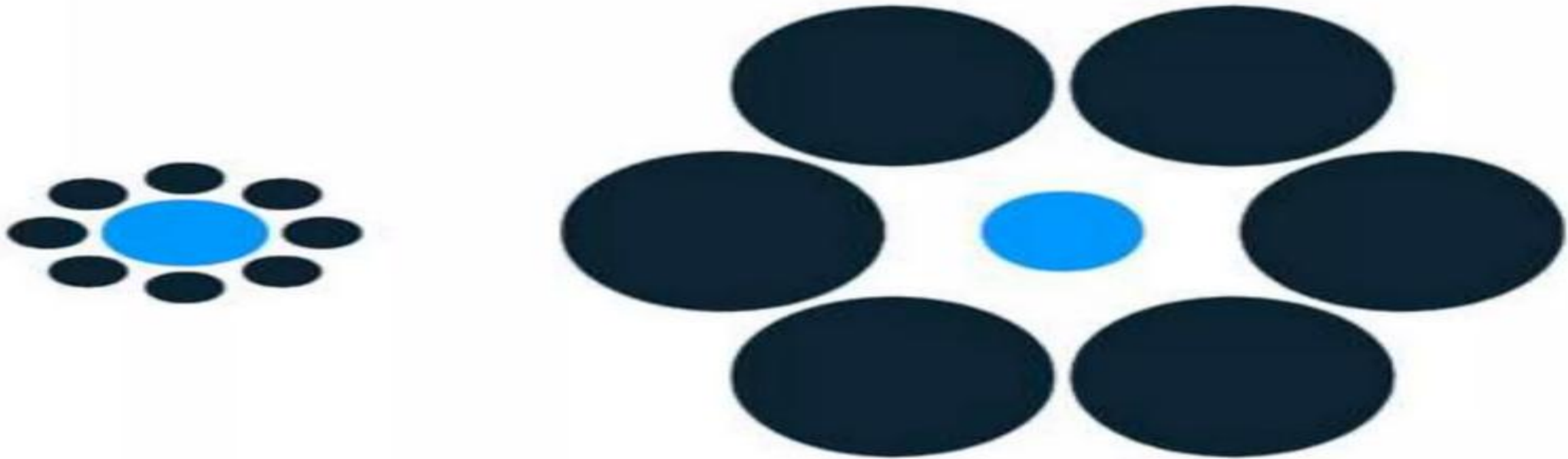
- We perceive a figure in its good and proper form instead of the incomplete, imperfect, ugly or broken ones.
- It is also similar to principle of simplicity.
- The given figure appears as overlapping square, triangle and circle.



- **Principle of contour** We perceive a figure in its contour and it is the boundary between a figure and background. We can perceive different figures and sketches with their appearance, sizes and colours only when they have been marked separate. In the given we cannot separate the margin of colours as they lack contour.



- **Principle of Contrast:** We perceive a figure larger or brighter in relation to its background. In the given picture the the blue dot is brighter compare to the background. In the first picture the blue dot appears larger to background and vice versa in second picture.





- **Principle of context:** a rain may be perceived by farmer as blessing and hell for a tourist.
- **Principle of distance and depth:** Through this principle we are able to see the distance of an object based on its size. Also we can measure the depth of something based on the perception. Even an infant has this ability.
- **Principle of Motion.** There is movement around all of us. Motion perception is based on change of position and comparison against background.

Eg. Hills don't move but nearby trees move during a travel.

# Errors in Perception

**Errors on account  
of defects in  
perceptual organs.**

**Illusion**

**Errors on account of  
defects mindset and  
time of perception.**

**Hallucination**

# Perceptual errors

- 1. Illusion: these are faulty perceptions. Eg. Looking horizon as the meeting place of sky and earth.**
- 2. Hallucination: perception of stimulus in the absence of the stimuli. It may a sound, smell, vision, taste, touch. This is one of the marking feature of psychosis.**

## Perception and Action: *What* and *Where*

- What stream: identifying an object
- Where stream: identifying the object's location



Thank  
You!

