General Psychology



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Chapter Two
Sensation and Perception

Contents or Topics

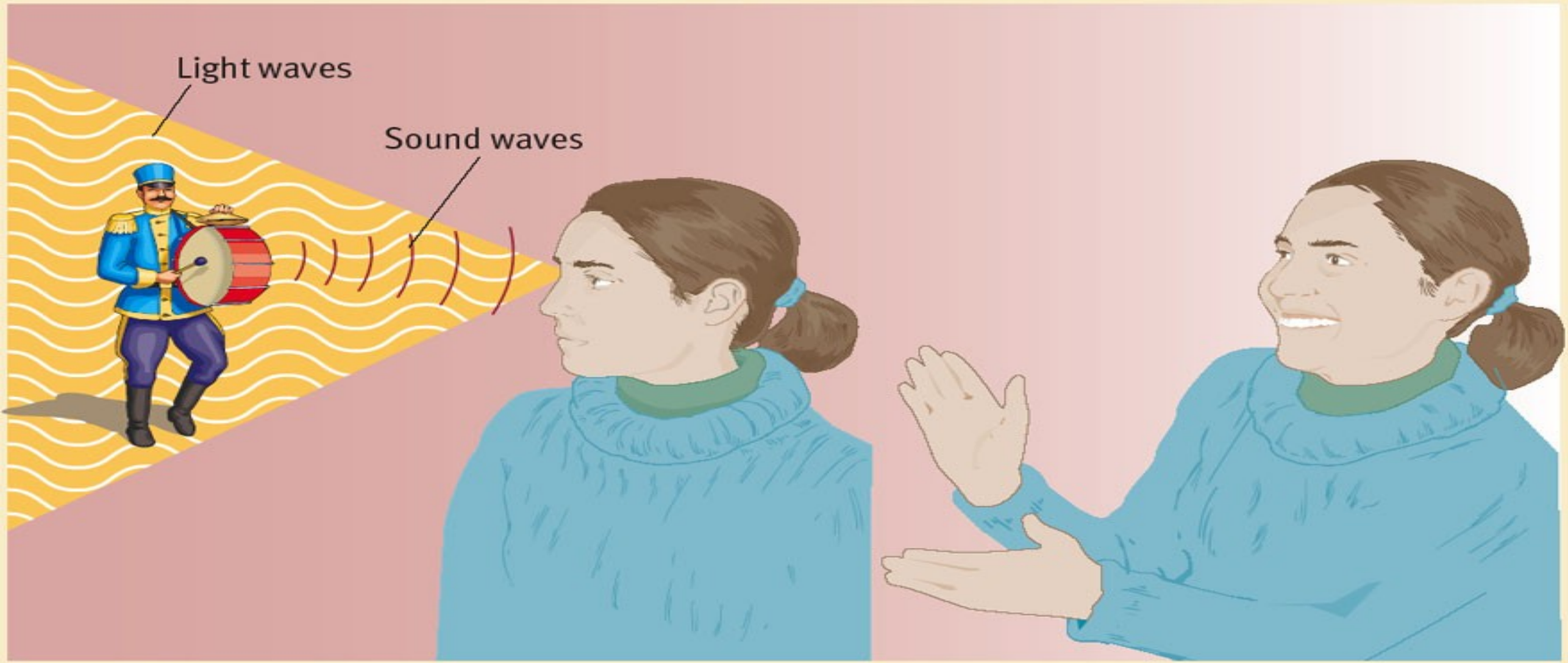
- *Sensation and the senses*
- *Meaning of perception*
- *perceptual organization*
- *Depth and Distance perception*
- *Perceptual Constancy and Illusions*
- *Extrasensory perception*

Sensation

- Process by which sense organs ***respond to a stimulus***
- **receiving**, **converting,** and **transmitting** a **stimulus** from the environment to the brain

  - **Stimulus -** any change in outside energy that arouses a **sense organ** and its **receptors.**
    - ✓ *The energy could be sound waves, light waves, etc.*

- **Sensory receptors**
  - ✓ Specialized cells in the sense organs that detect and respond to sensory stimuli—light, sound, odors
  - ✓ transducer (convert) the stimuli into neural impulses



Sensation

Sensory organs absorb energy from physical stimuli in the environment.

Sensory receptors detect stimulus energies and convert them into neural impulses, which are sent to the brain.

Perception

The brain organizes this input and translates it into something meaningful.

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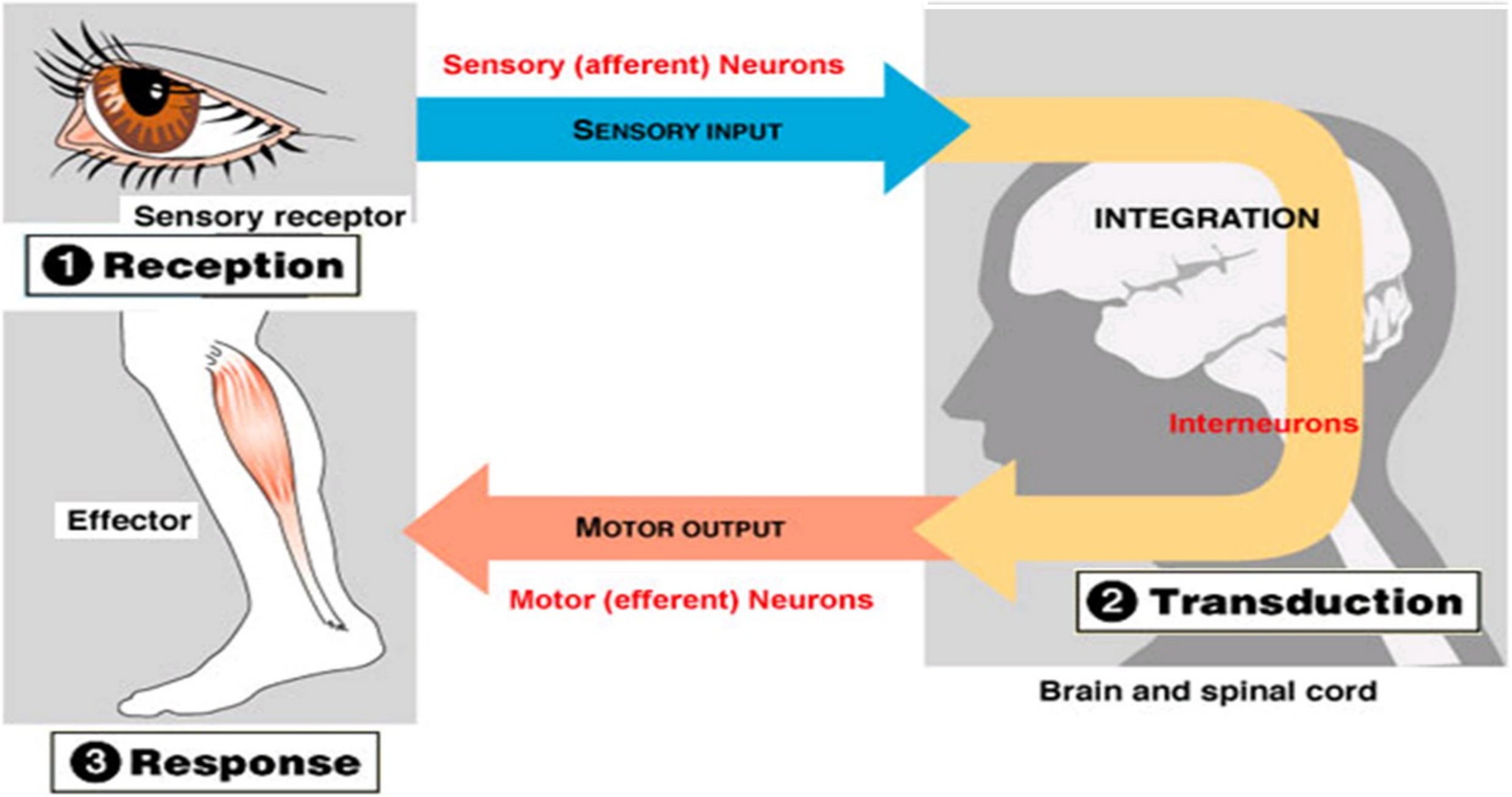
Transduction:



1. Sensory receptors --> 2. signal transduction --> 3. Physiological response

Process of Sensation

Sensory adaptation - tendency of sensory receptor cells to become less responsive to a stimulus that is unchanging.

- *some experimental psychologists say that the sense of pain does not experience this phenomenon.*

Sensory overload: happens when you're getting more input from your five senses

- your brain can't sort through and process

Absolute Threshold

- **Smallest amount** of energy needed for a person to consciously detect a stimulus 50 % of the time.
- **Level necessary** for a stimulus to be detected.
- Anything less than this goes **unnoticed**.

E.g. *What is the softest sound you can hear?*

What is the dimmest light you can see?

Sense	Absolute Threshold
Vision	A candle flame seen at 30 miles on a dark clear night
Hearing	The tick of a watch under quiet conditions at 20 feet
Taste	One teaspoon of sugar in two gallons of water
Smell	One drop of perfume diffused into entire volume of a six-room apartment
Touch	The wing of a fly falling on your cheek from a distance of 1 centimeter



Difference Threshold

- **Just-Noticeable Difference (JND)-**

- The smallest amount of change needed
  - ✓ to detect in a stimulus before we detect a change.



Weber’s Law



Ernst Weber : Computes the Just Noticeable Difference.

The change needed is proportional to the original intensity of the stimulus.

The more intense the stimulus the more change is needed to notice the difference.

- light intensity- 8%
- weight- 2%
- tone frequency- 0.3%

Subliminal Perception

- when stimuli are below one's absolute threshold for conscious awareness
- Just strong enough to activate the sensory receptors
  - but not strong enough for people to be consciously aware of them.
- Subliminal advertising

Summarize

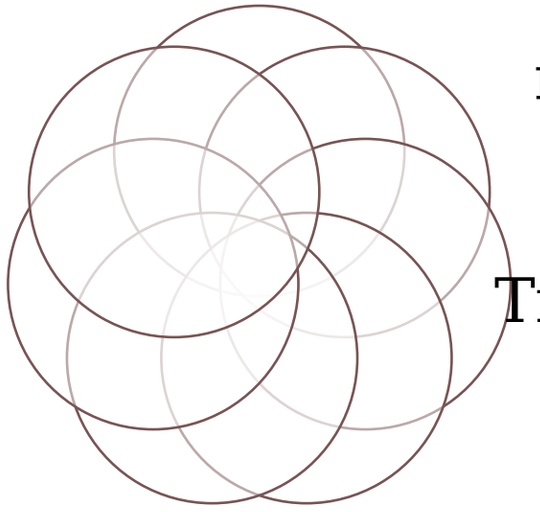
What best have you learned ?

Sensation

Weber’s Law

Sensory receptors

Sensory thresholds



Transduction

Sensory overload

Sensory adaptation



From sensation to perception

Bottom-up: progression from individual elements to the whole (e.g. sensory input recognition.)

- *Moves from **part** to **whole**.*
- *called **data-driven processing.***

Top-down: perceptual representation is affected by progression from the whole to the elements.

- *Moves from **whole** to **part.***
- *called **conceptually driven processing**.*

Recognize stimulus

Combine specific features into more complex forms

Detect specific features of stimulus

Bottom-up processing

Top-down processing

Formulate perceptual hypothesis about the nature of the stimulus as a whole

Select and examine features to check hypothesis

Recognize stimulus

Perception

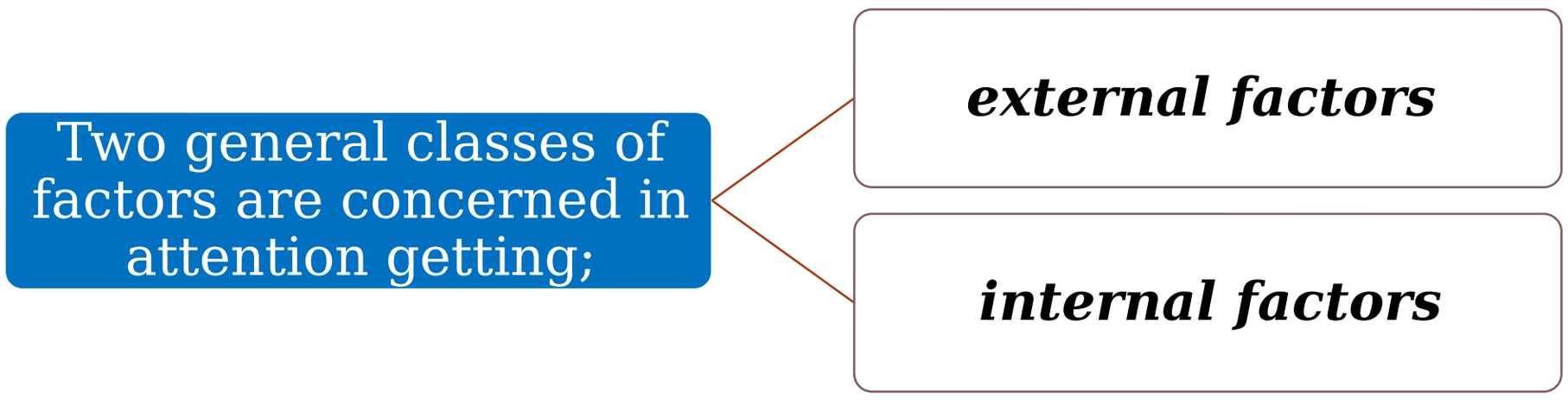
Selection, organization, and **interpretation** of sensory input

- Characterized by ***Selectivity, Organization*** *and* ***Constancy,***



Selectivity in perception

- Of the various events around us, we **attend to only a few**.
- **Attention** is a basic factor in perception
- Attention divides our perception in to **focus** and **margin**.
  - ✓ *The events perceived clearly are in the **focus** of experience*
  - ✓ *other items in the **margin** are dimly perceived -we are aware of their presence, but only vaguely so.*
- **Attention constantly shifts**.



External Factors

Intensity and size:

- *the louder a sound,*
- *The brighter a light*

Contrast:.

- *What contrasts with surrounding*

Repetition:

- *repetition of a stimulus is important to gain attention.*
  - *A misspelled word is more likely to be noticed it occurs twice*

Movement

- *Our eyes are involuntary attracted to movemen*

Novelty (Newness)

- *called **curiosity drive**.*
- *objects or situation tends to diminish after some time has been spent with it.*

Internal Factors in Attention

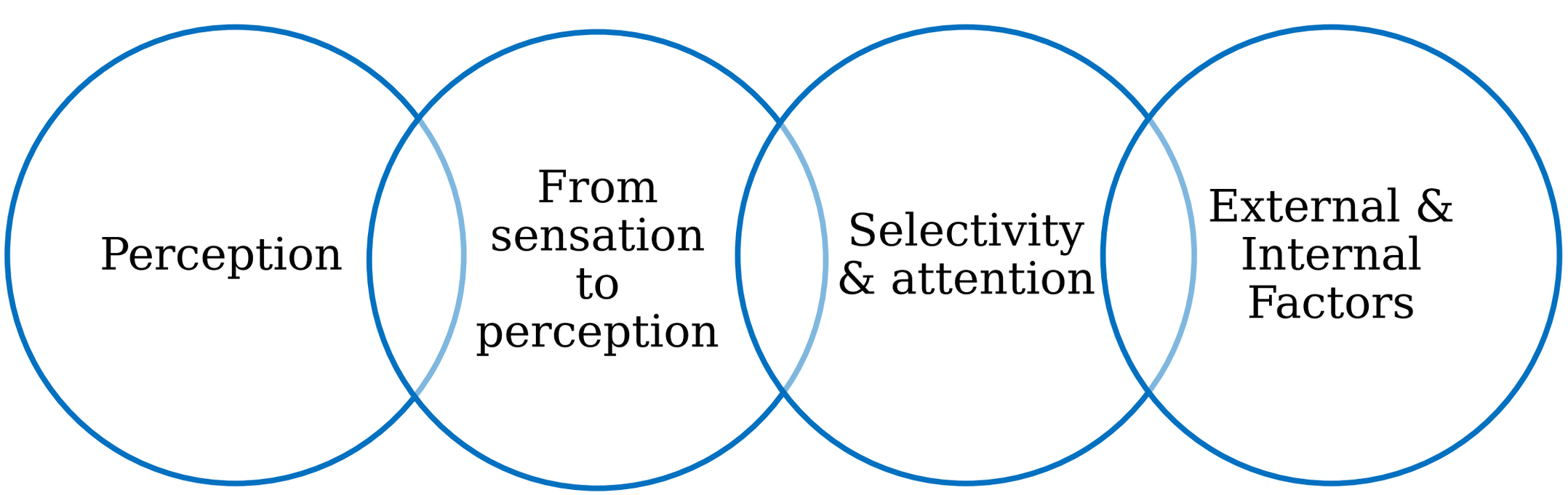
- **Motives**:
  - our needs and interests govern what will attract our attention
    - *Even the sleepiest student in the class can be made attentive if the instructor talk about sex*
- **Set or expectancy**:
  - *If we expect to see, hear, etc., we tend to see, here, etc,*

- **Context**
- How we experience an event and react to it depends upon the context in which the event appears



Summarize

What best have you learned ?



Organization in Perception

The whole is different from the sum of its parts

Here we perceive an assembly of several hundred people as an airplane.



Organization in Perception

Gestalt Principles of Perception

Gestalt *German word* translated as **"overall pattern or configuration."**

- Rejected the idea that a perception can be broken down into its component parts
- *perception is an active creation, not just the adding up of pieces*

The sense organs and the nervous system *naturally and from experience (learning)*

- *tend to* ***organize or modify*** *our perceptions into simple* ***patterns or objects***

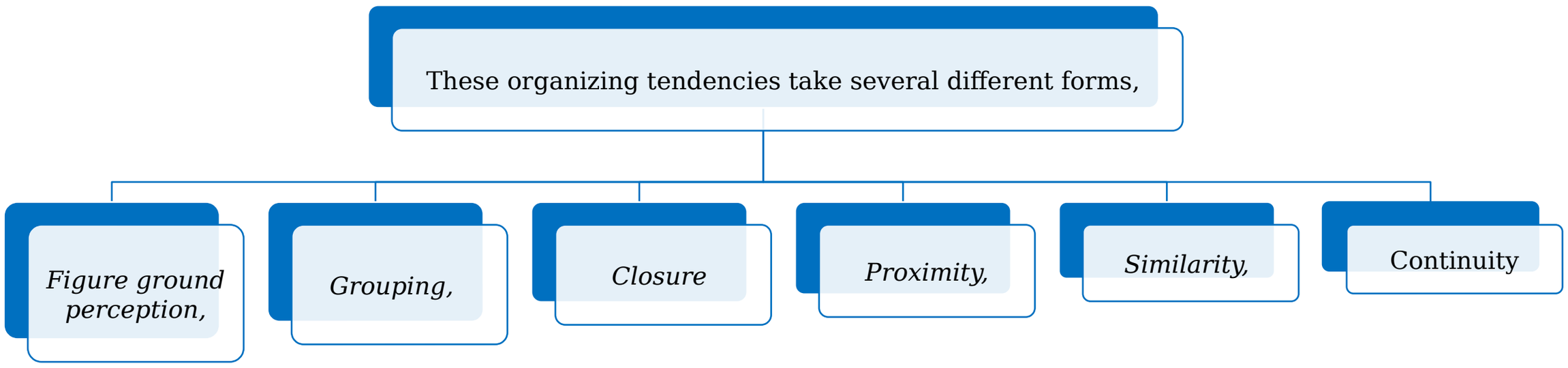


Figure and ground perception

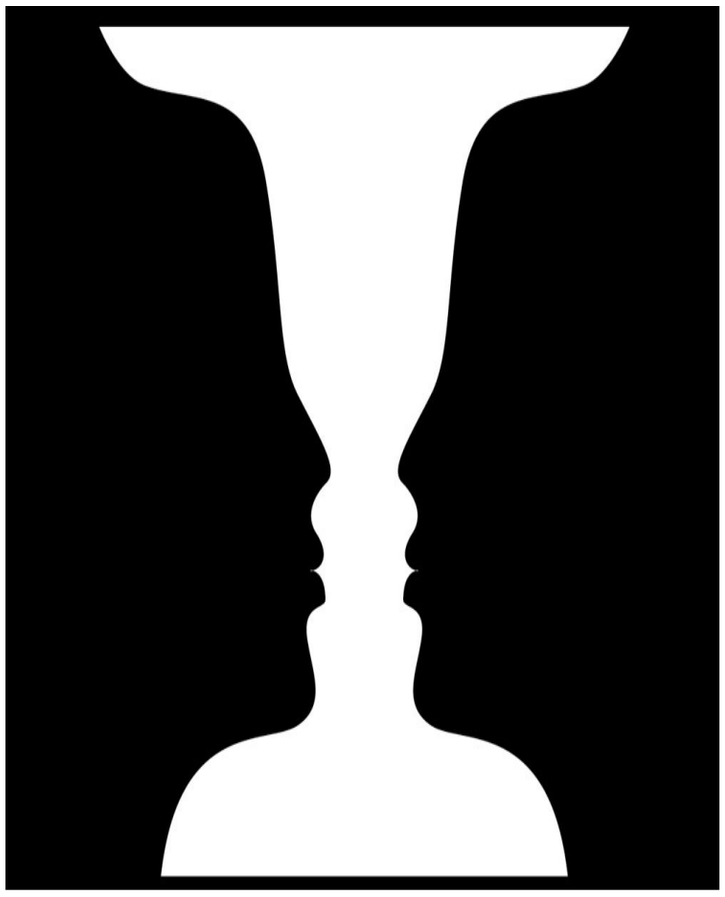
- Organization of a scene in to its: Figure—the object of interest VS

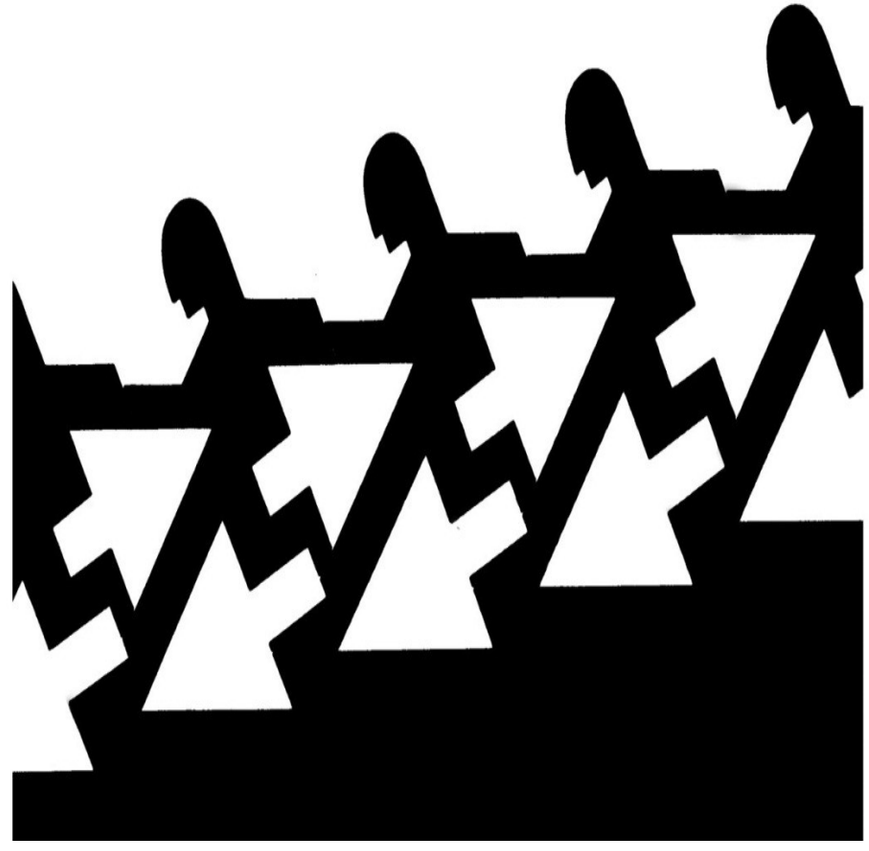
  Ground —the background

  ✓ is also found in senses other than in vision.

- **From the first picture find a young lady and an old woman?**







Similarity

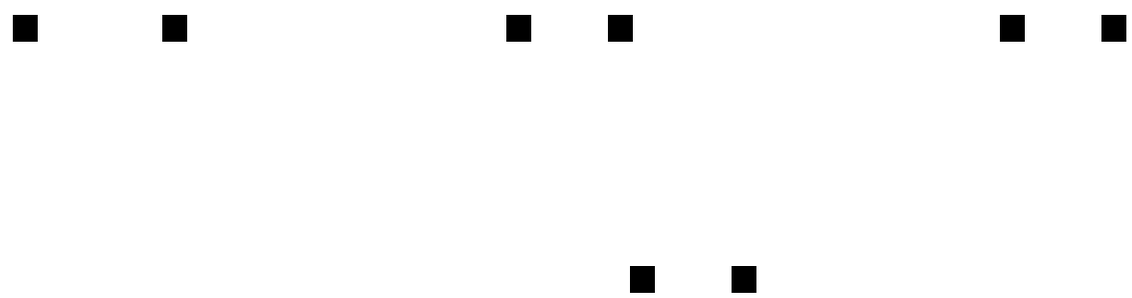
- When the elements of a stimulus or pattern have similar features (size, shape, colour)
- We tend to group them together

Eg: 0 0 0 0 0 0 0
+ + + + + + +
0 0 0 0 0 0 0



Proximity

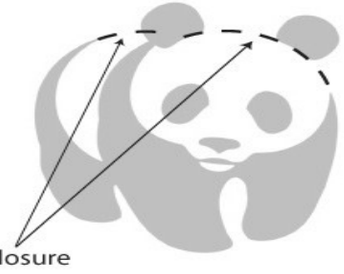
- Elements that are closer together are grouped together.
- we tend to see pairs of dots rather than a row of single dots in the following:

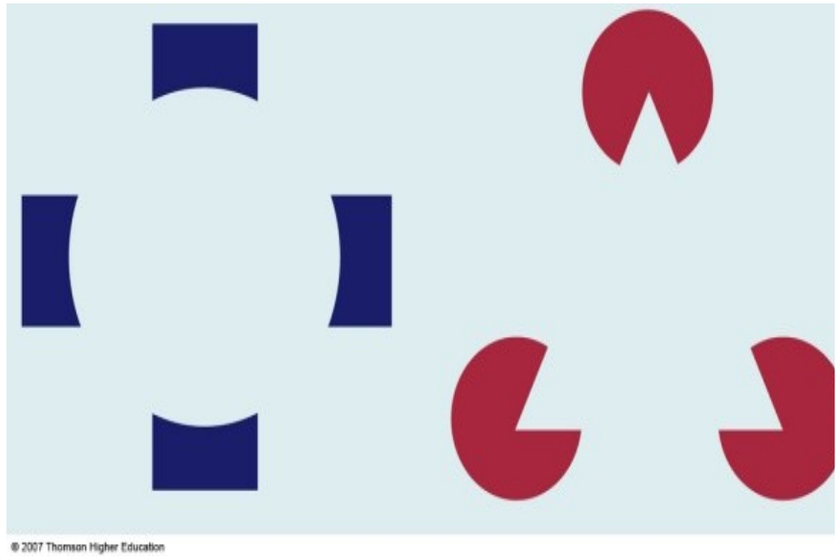


Closure

- filling in gaps in stimulation so that we receive a whole object and not disjointed parts.
- We perceive an object as a whole, despite it being actually incomplete.
- E.g.

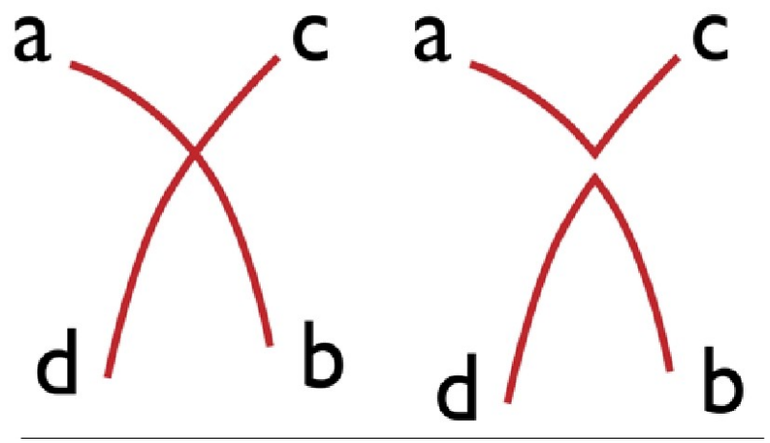






Continuity

- We prefer to see contours based on smooth continuity instead of abrupt changes of direction.

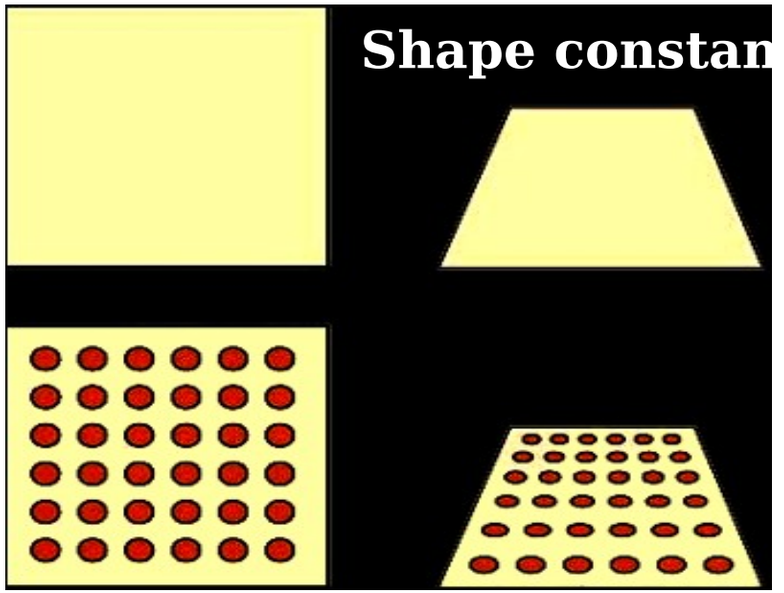


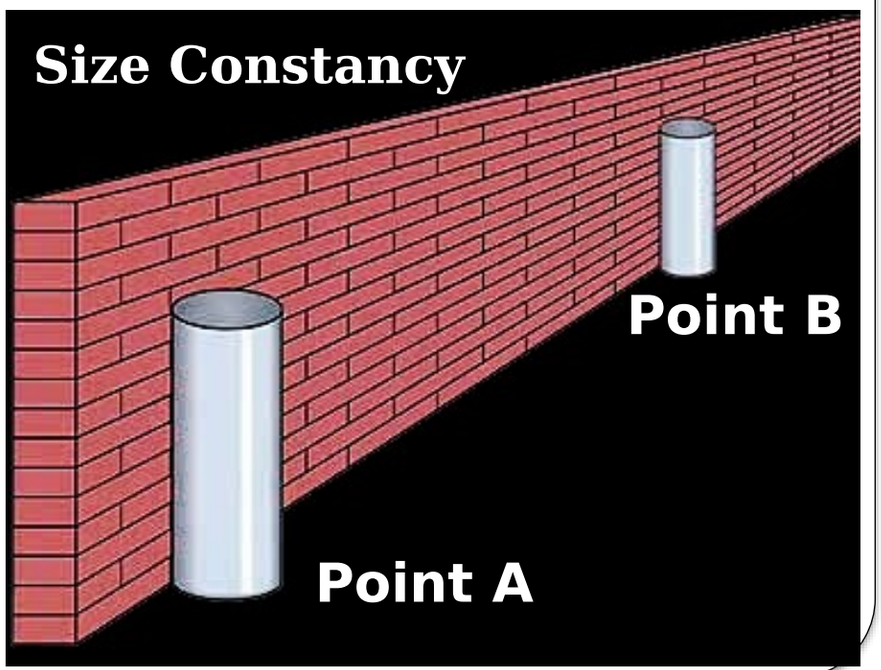
Constancy in Perception

- Tendency to perceive objects ***as stable*** despite changing sensory information

- When ***viewing conditions*** change, the ***retinal image changes*** even if the objects being viewed remain constant
  - ✓ E.g. as a person walks away from you, their retinal image decreases in size

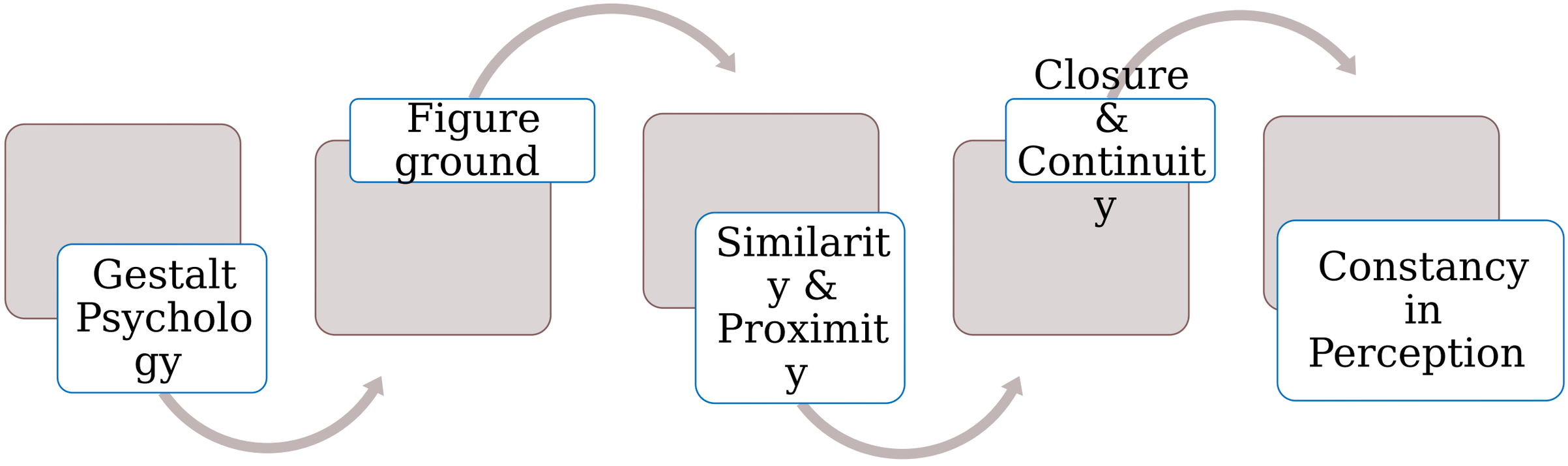
- Includes:- Size, Shape, Brightness etc





Summarize

What best have you learned ?





Visual Cliff Experiment

Eleanor Gibson.

human infants (crawling age) have depth perception.

Even newborn animals show depth perception.

Perceiving Depth/Distance

Ability to recognize distances and three dimensionality

Involves interpretation of visual cues that indicate how near or far away objects are.

To make judgments of distance, people rely on a variety of cues,

Binocular cues – clues from both eyes together

Monocular cues – clues from a single eye

Monocular Cues

- You really only need one eye to use these cues
- used in art classes to show depth

Linear Perspective: Parallel lines appear to converge in the distance.

Relative size- Larger objects are perceived as being closer to the viewer, and smaller objects as being farther away

Interposition: When one object partly blocks your view of another, you perceive the partially blocked object as farther away

Shadowing: make light and shadow useful in judging distance

Height in plane: distant objects appear higher in a picture

Texture Gradient: Closer objects tend to have a courser texture than to far way objects

Monocular Cues- Examples

- Linear Perspectiv
- Interposition
- Relative size
- Texture gradient
- Shadowing







Linear perspective

Parallel lines that run away from the viewer seem to get closer together.



Texture gradient

As distance increases, a texture gradually becomes denser and less distinct.



Interposition

The shapes of near objects overlap or mask those of more distant ones.



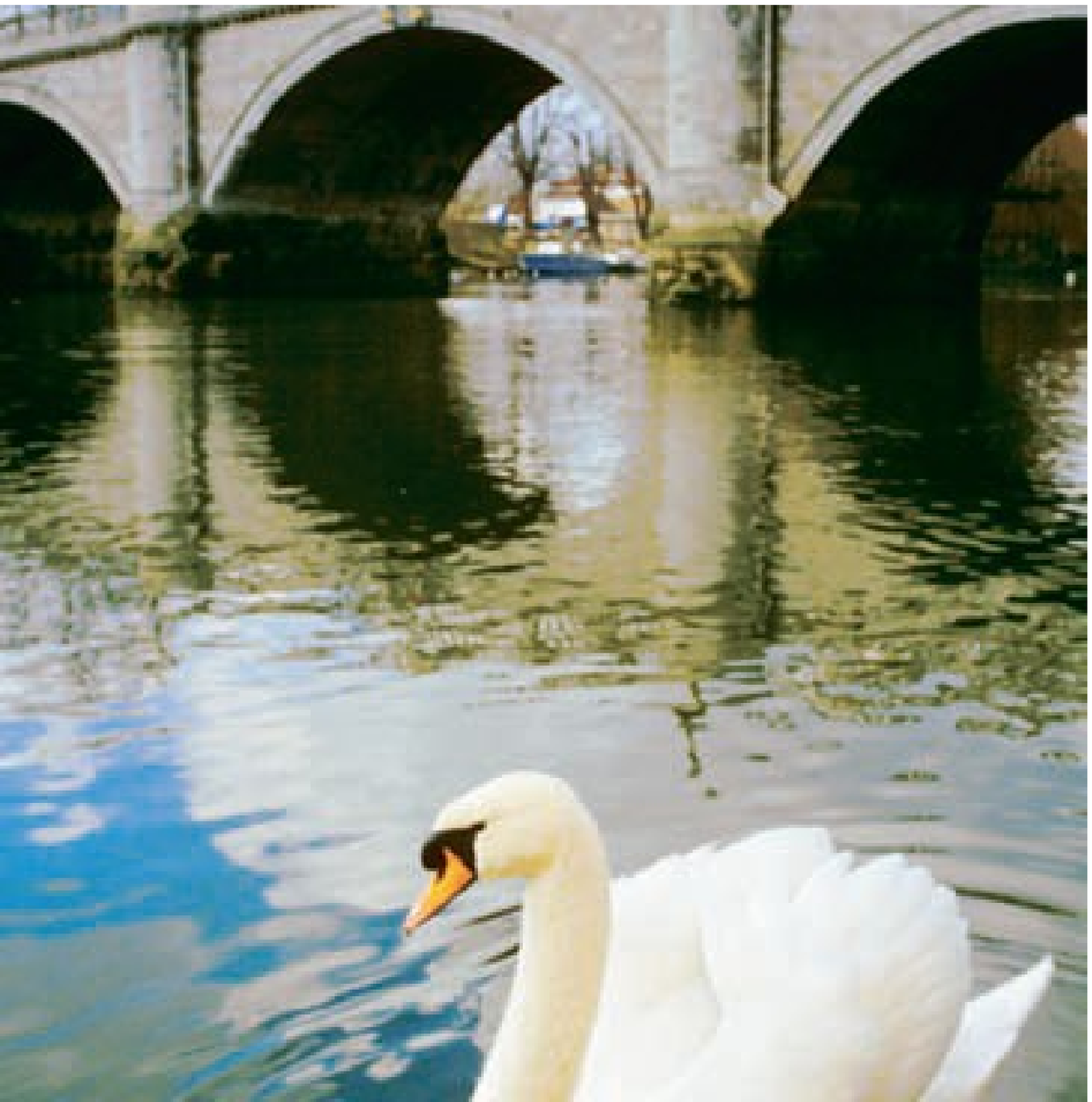
Relative size

If separate objects are expected to be of the same size, the larger ones are seen as closer.



Height in plane

Near objects are low in the visual field; more distant ones are higher up.



Light and shadow

Patterns of light and dark suggest shadows that can create an impression of three dimensional forms.



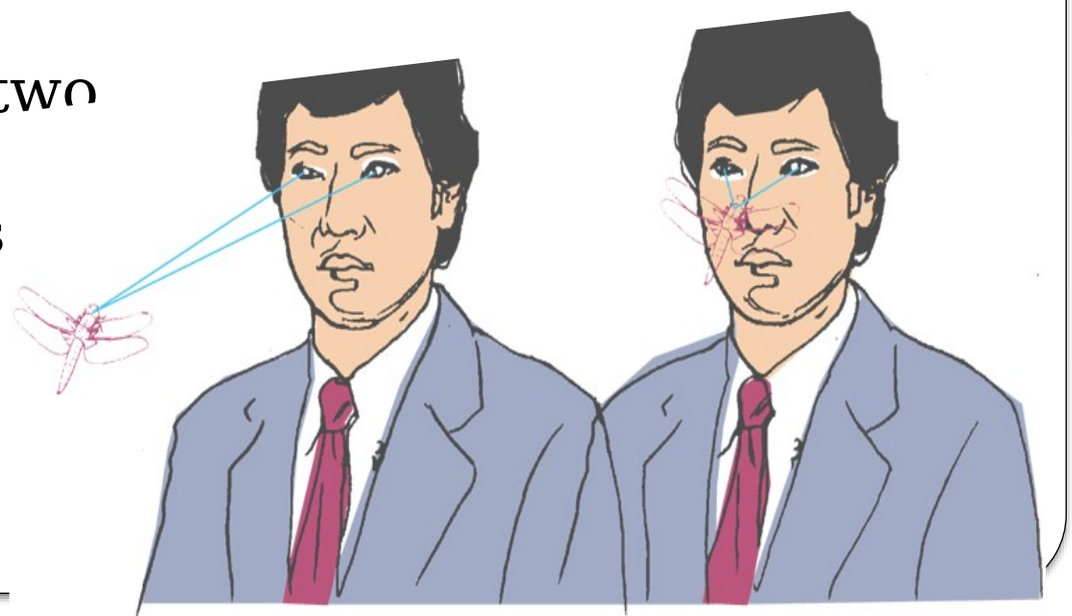
Binocular Cues

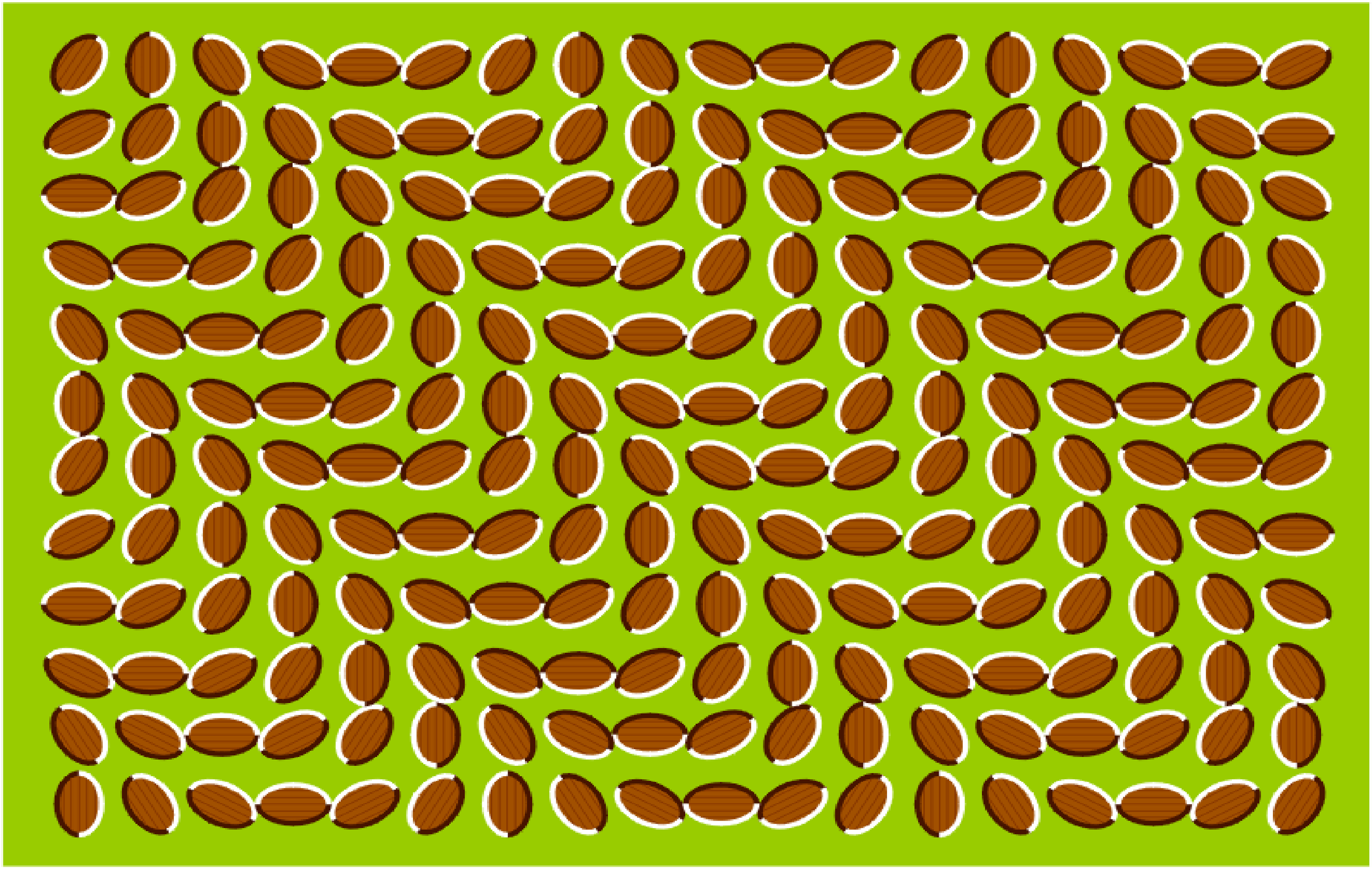
Clues about distance based on the differing views of the two eyes.



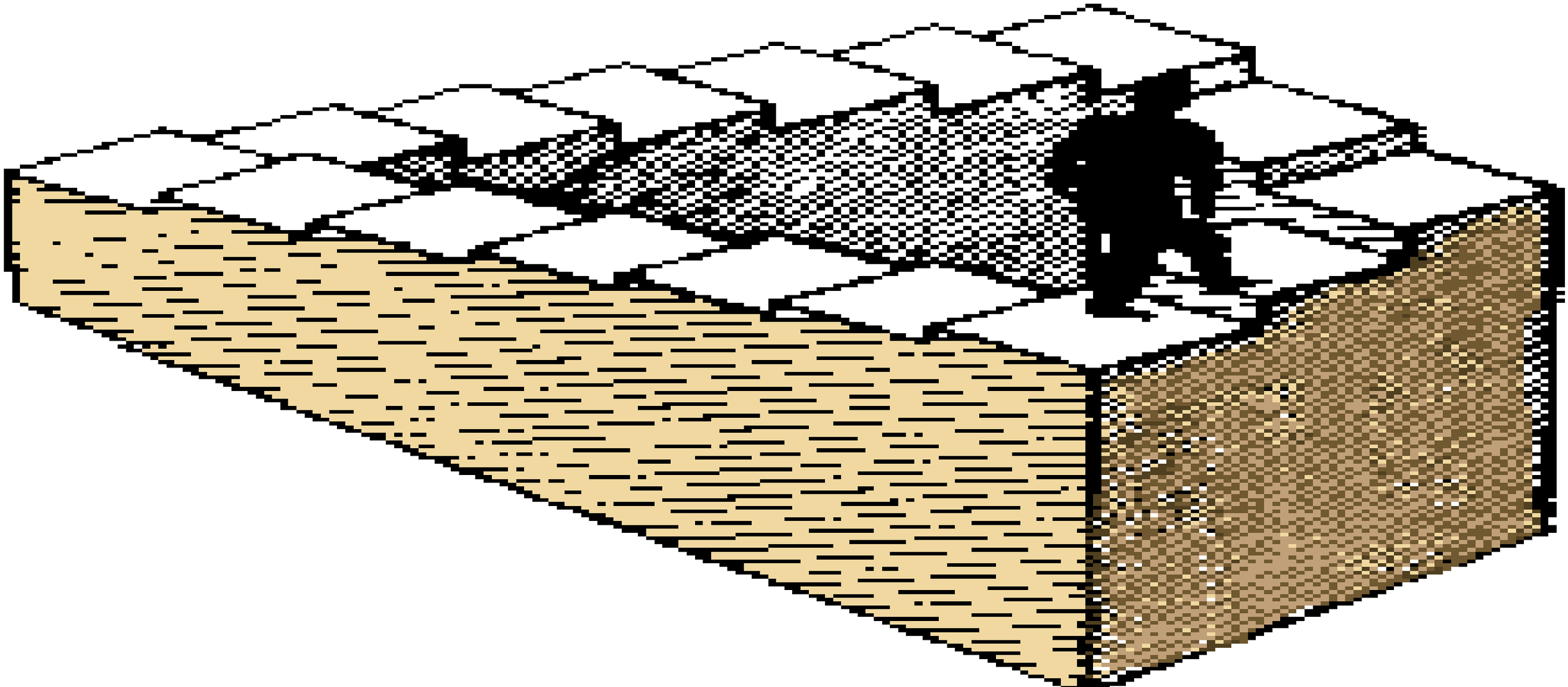
- **Retinal Disparity:** The closer an object gets, the greater the disparity between the images seen by each eye.
  - Retinal disparity increases as objects come closer,

- **Convergence:** Neuromuscular cue, when two eyes move:
  - inward (towards the nose) to see near objects and
  - outward (away from the nose) to see faraway objects.





How can the man **go up** all the time? Can such a staircase be built as a real object?

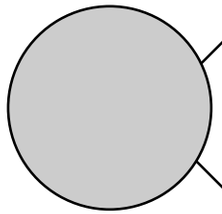




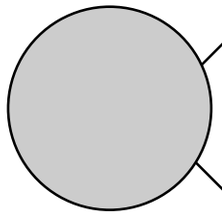
Perceptual Illusions

- inexplicable discrepancy between the ***appearance of a visual stimulus*** and its **physical reality.**
- when perception yields false interpretation about the physical reality.
- incorrect perceptions.
- created when perceptual cues are distorted so that our brains cannot correctly interpret space, size, and depth cues.

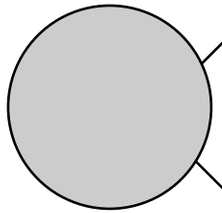
Types



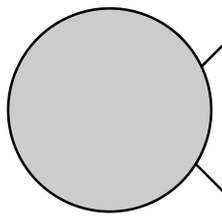
Ponzo: The horizontal lines are the same length.



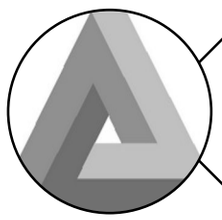
Poggendorff: The two diagonal segments lie on the same straight line.



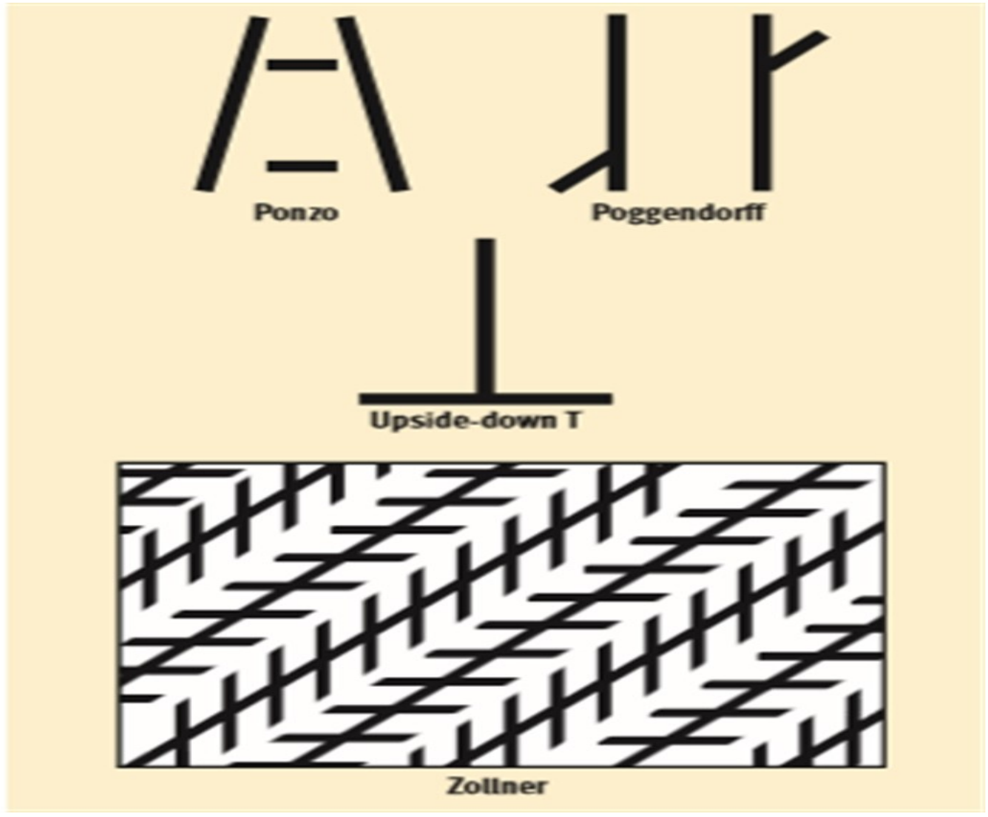
Upside-down T: The vertical and horizontal lines are the same length.



Zollner: The long diagonals are all parallel

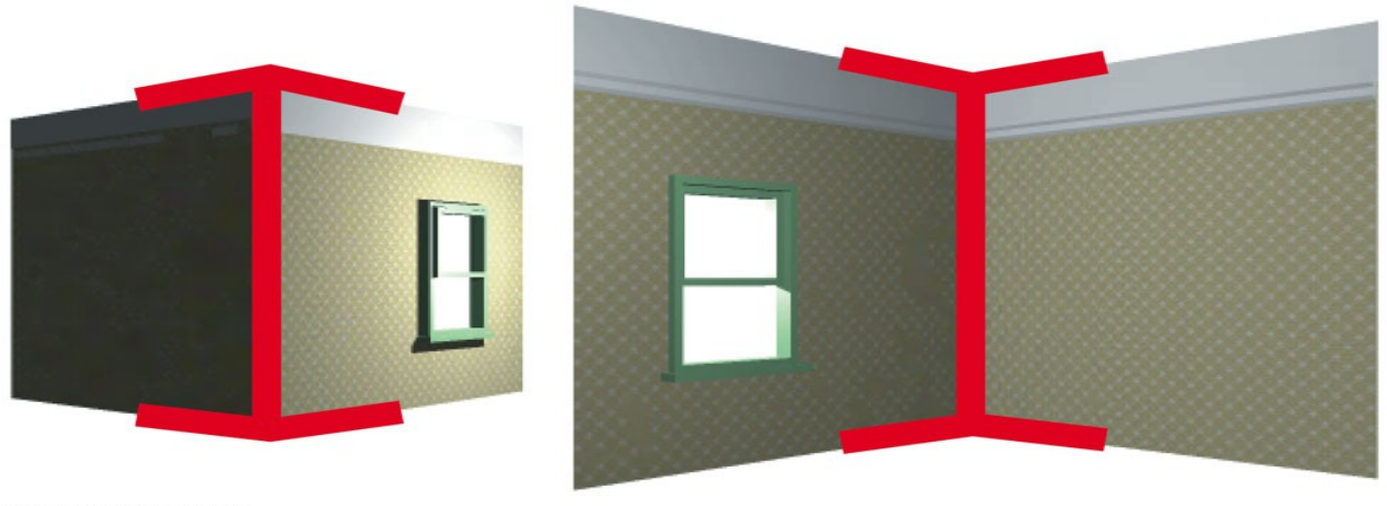


Impossible triangle. This triangle cannot be built as a real object.



Perceptual Illusions examples





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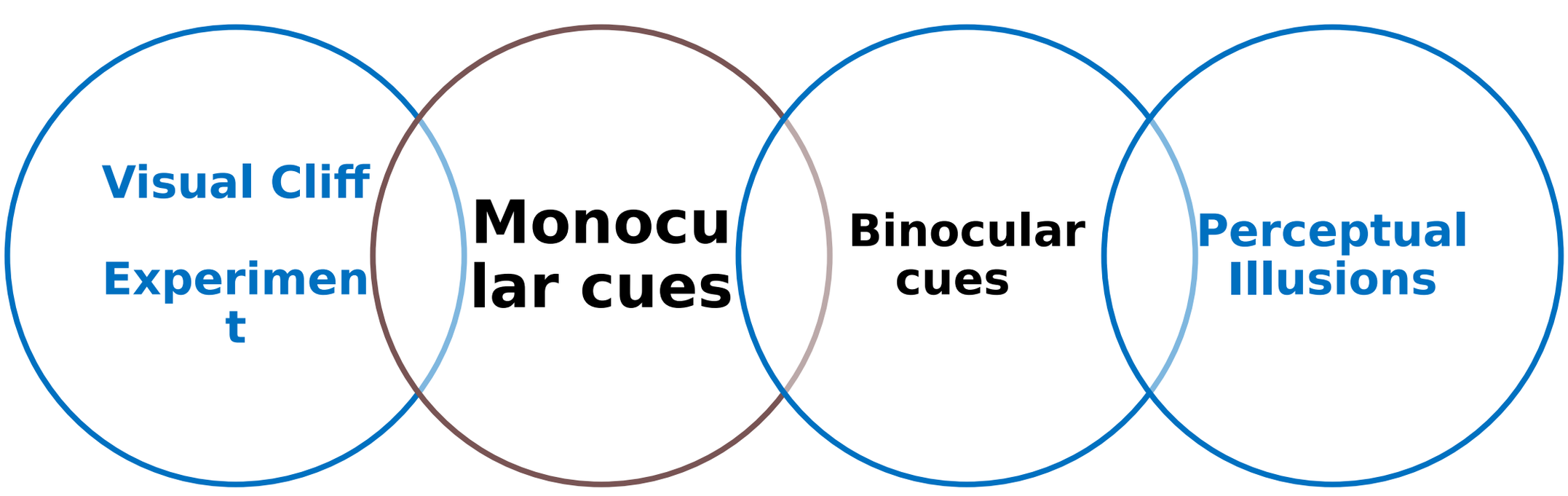
Summarize

What best have you learned ?



Extrasensory Perception

perception that occurs without a basis in sensory input.

Para psychologists - study Para normal events - things that are out of the normal experience or knowledge.

Examples of paranormal or extrasensory manifestations:

- ***Precognition****:- ability to foretell future events.*
- ***Clairvoyance****:- ability to perceive hidden objects*
- **Telepathy(**mind readers):- direct transmission of thoughts from one person to the other without using any of the known senses.
- **Psychokinesis**:- unique ability to affect the physical world purely through thoughts.
  - *Eg., can bend a spoon, or a key without touching (without applying any physical force).*

There is no strong research evidence presented to support the claim



What best have you learned from this chapter ?

Thank You!