#03

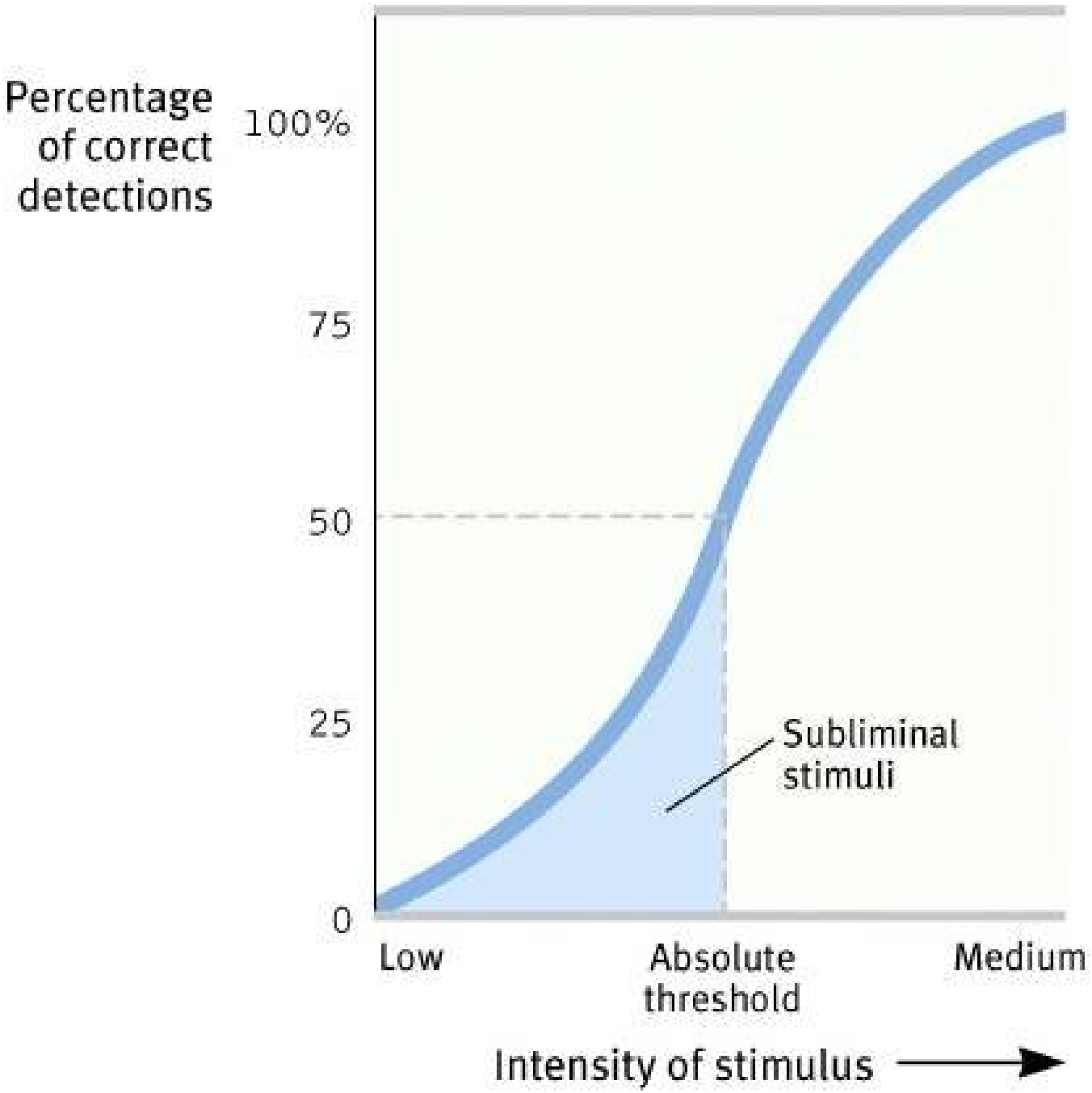
perception

WHAT WE SEE IS NOT ALWAYS WHAT EXISTS.

SENSATION

- Sensation
  - Stimulation of sensory organs by physical environment
  - Sight, hearing, touch, smell, taste, balance

- Absolute threshold
  - The smallest level of a stimulus that a person can correctly detect 50% of the time (e.g., for taste, 1 teaspoon of sugar in 2 gallons of water)


Percentage of correct detections
100%
75
50
25
0
Subliminal stimuli
Low
Absolute threshold
Medium
Intensity of stimulus

- Sensory adaptation
  - Diminished sensitivity as a consequence of constant stimulation (due to response fatigue in neurons)
  - Our sensation is highly alert to novelty; when bored, it frees us for more important information

PERCEPTION

- Perception
  - Organization and interpretation of sensory input, enabling us to recognize meanings
  - An active, constructive process, not always a mirror reflection of reality

- Gestalt laws
  - Gestalt (literally, form or shape) psychologists identified a number of important principles underlying how our brain organize bits and pieces of visual information into meaningful wholes



"The whole is different from the sum of its parts"

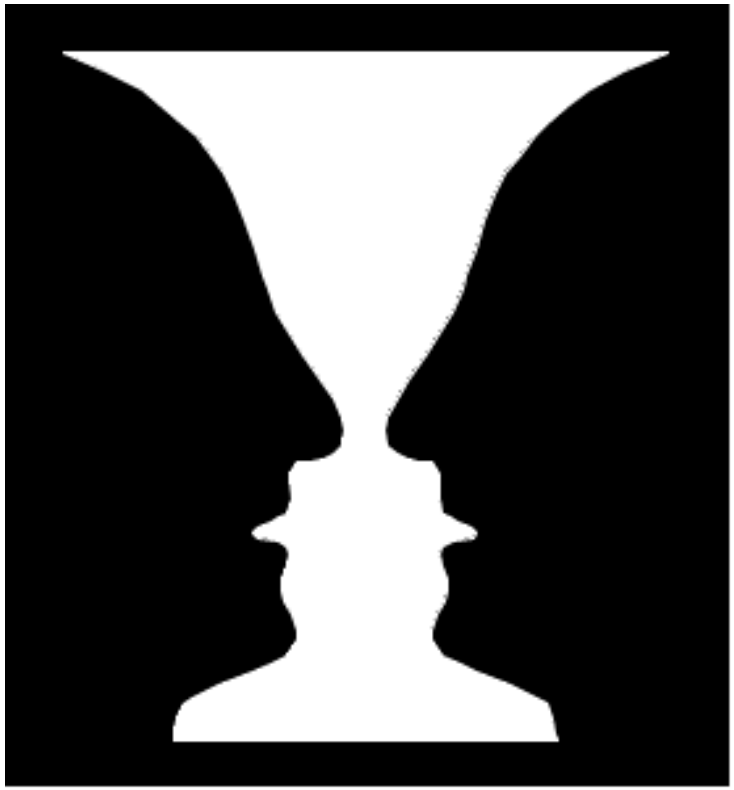
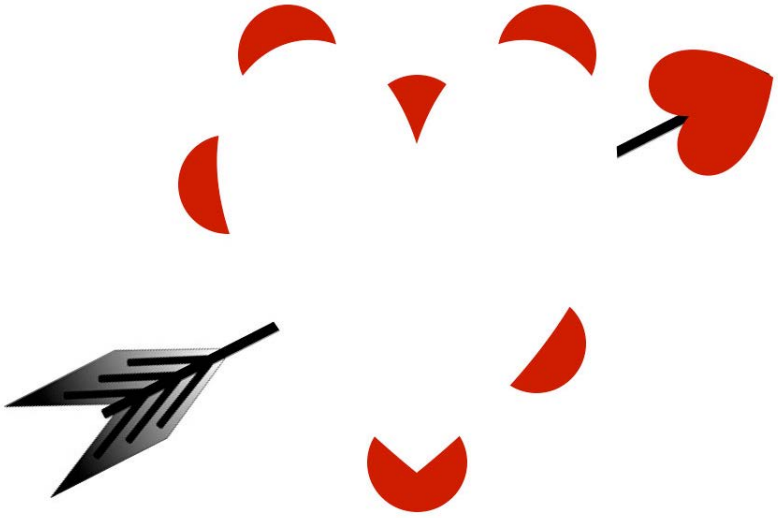


Figure and ground

Our brain tends to divide elements into figure and ground

Closure

Our brain tends to supply the missing elements to close or complete a figure

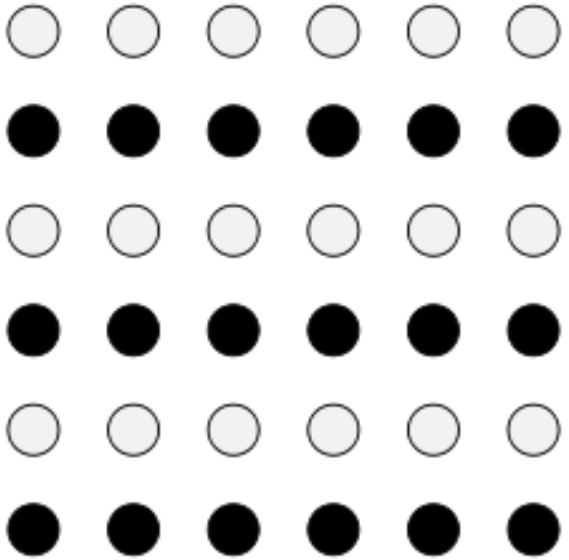


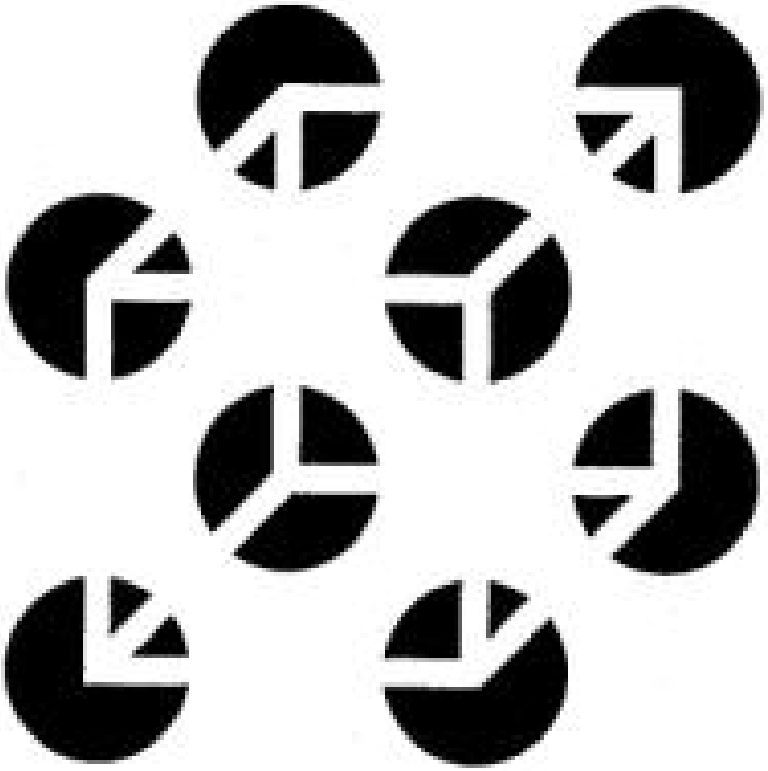
Proximity

Our brain tends to group elements that are close to each other together

Similarity

Our brain tends to group elements that are similar to each other together



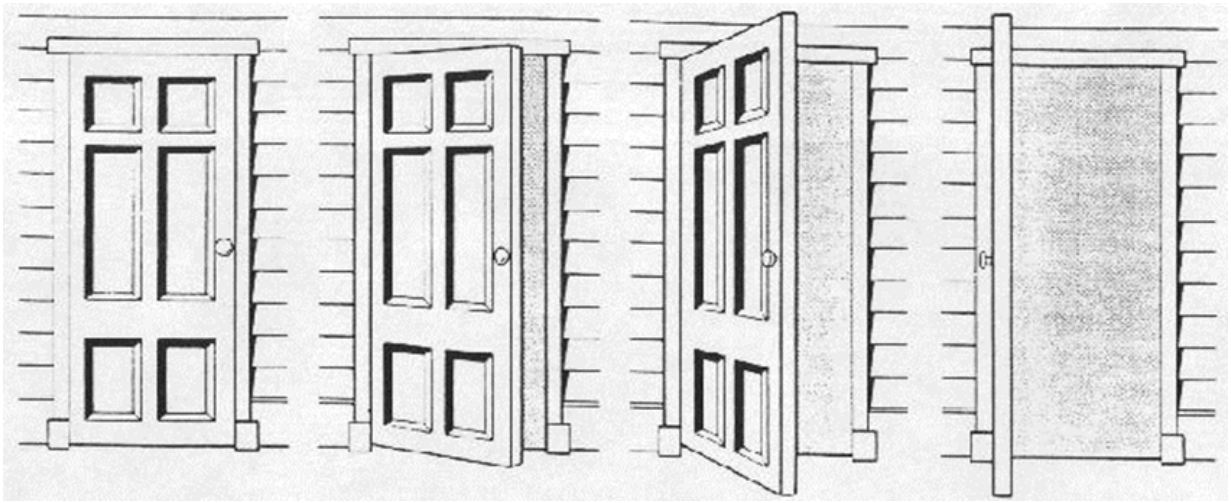


Simplicity

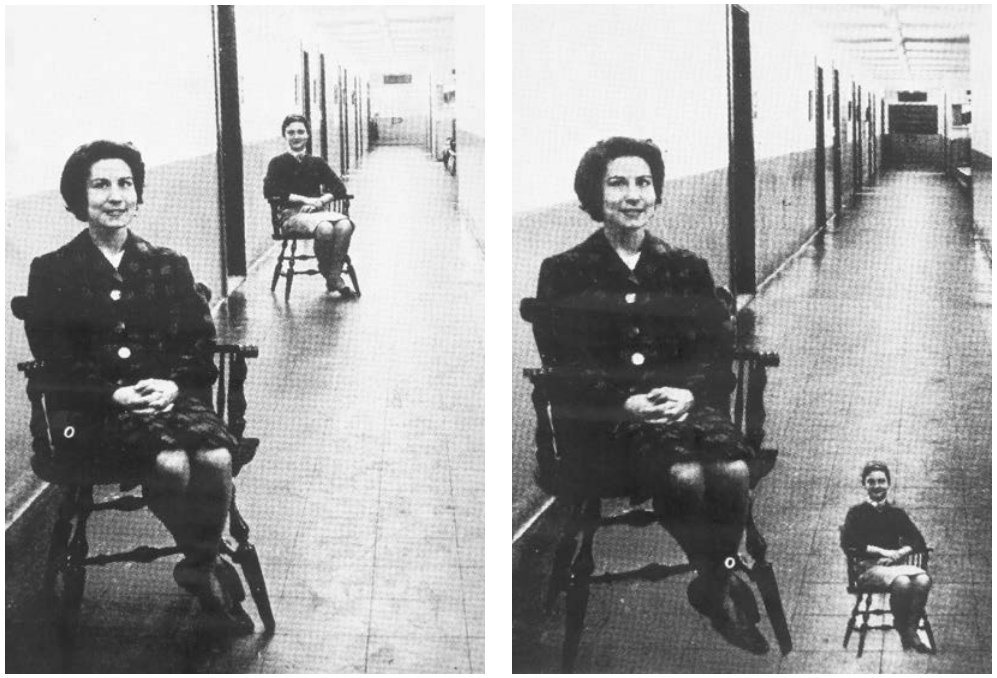
Our brain tends to organize elements in the simplest way possible

- Top-down processing
  - Perception is guided by higher-level knowledge, experience, expectations, contextual information, and motivations
  - vs. bottom-up processing (recognizing and processing information from individual components of a stimuli and moving to the perception of the whole)

- Perceptual constancy
  - Perception of an object as constant (having unchanging shapes, sizes, brightness, and color) even as illumination and retinal images change



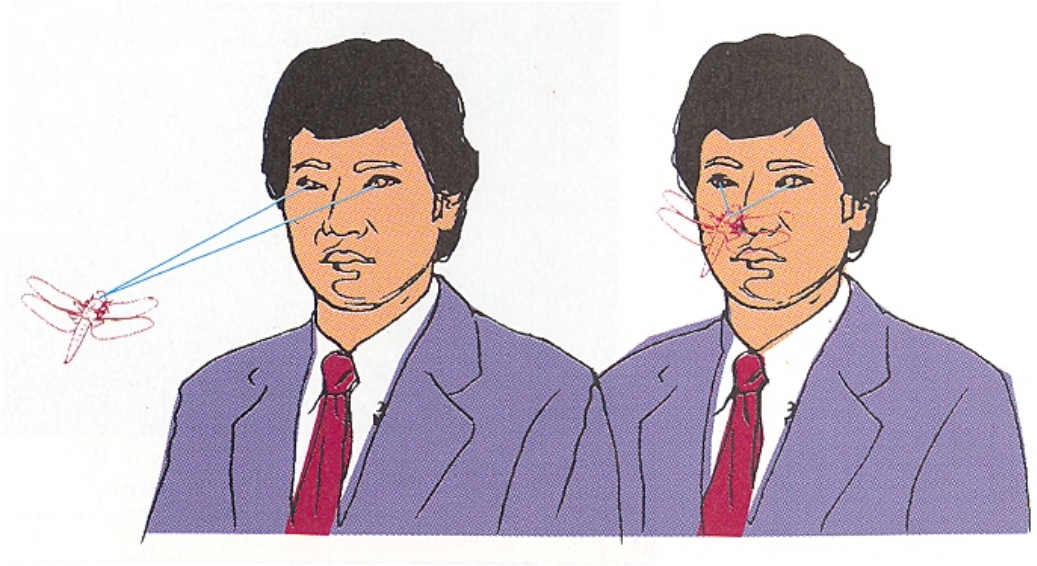
Shape constancy

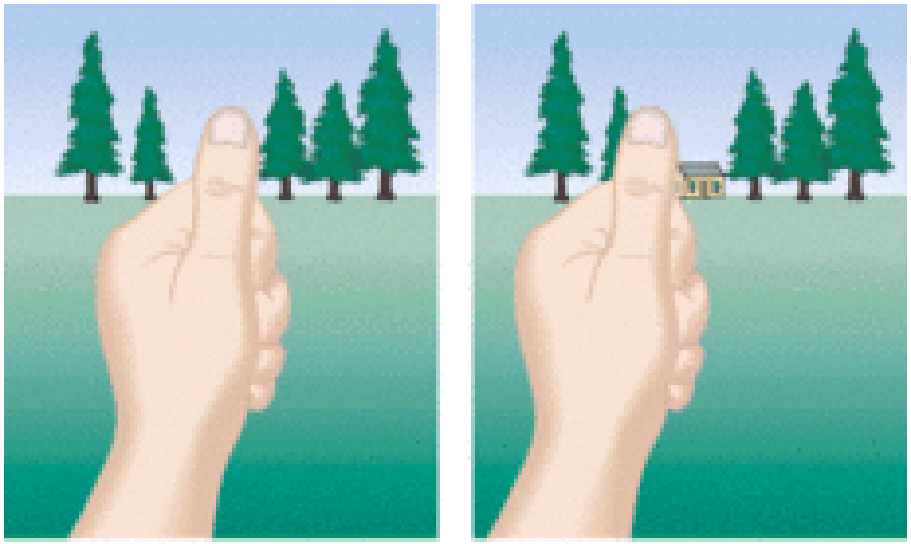


Size constancy

- Depth perception
  - Viewing the world in three dimensions and perceiving distance
  - Binocular cues: clues about distance based on differing views of the two eyes
  - Monocular cues: clues about distance based on image in either eye alone (also known as pictorial depth cues)

Convergence
sensing the eyes converging toward each other as they focus on closer objects

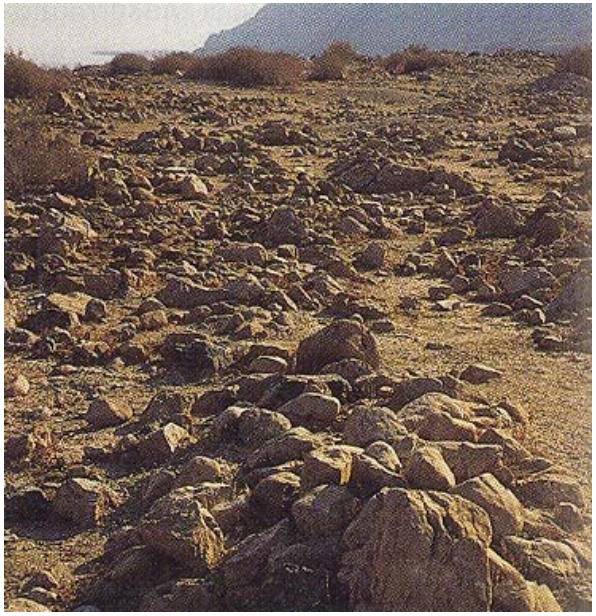




Retinal disparity
comparing images from the retinas in the two eyes, thereby computing distance—the greater the disparity, the closer the object

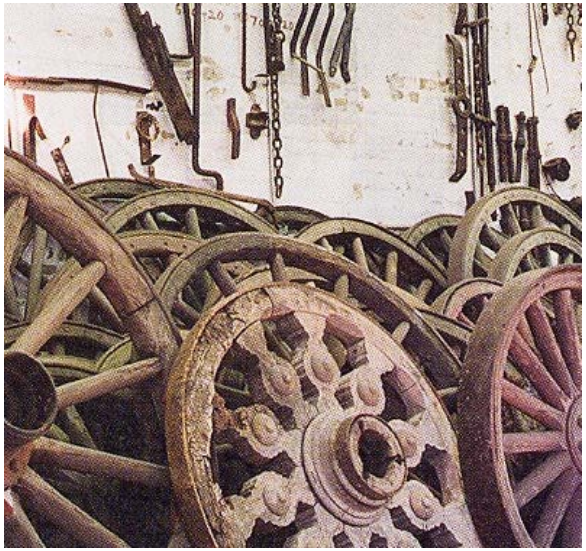
Linear perspective

Parallel lines running away from the viewer seem to converge



Texture gradient

A texture is coarser in nearer areas than in farther areas



Interposition

The shapes of nearer objects masks those of more distant ones

Relative size

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

Height in plane

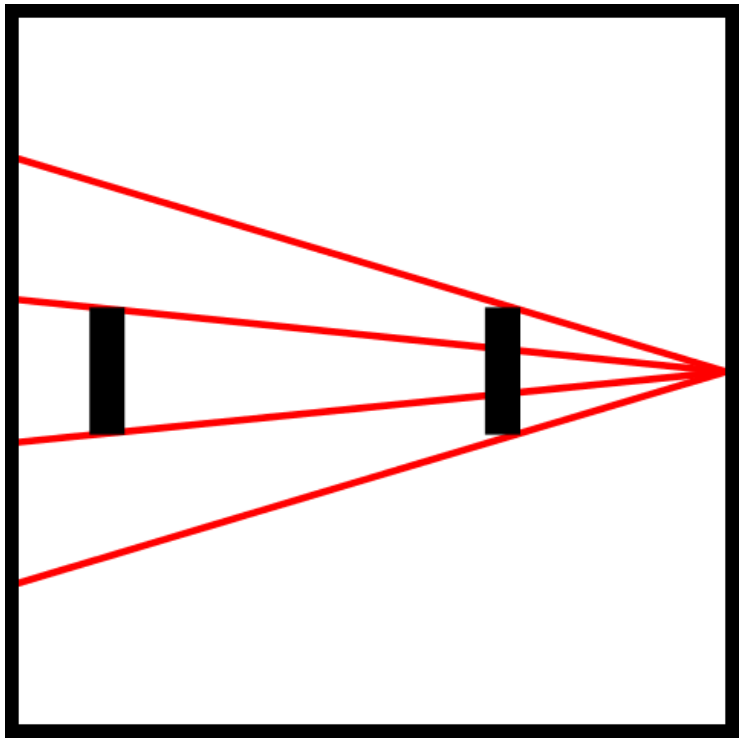
Nearer objects are lower in the visual field

Light and dark

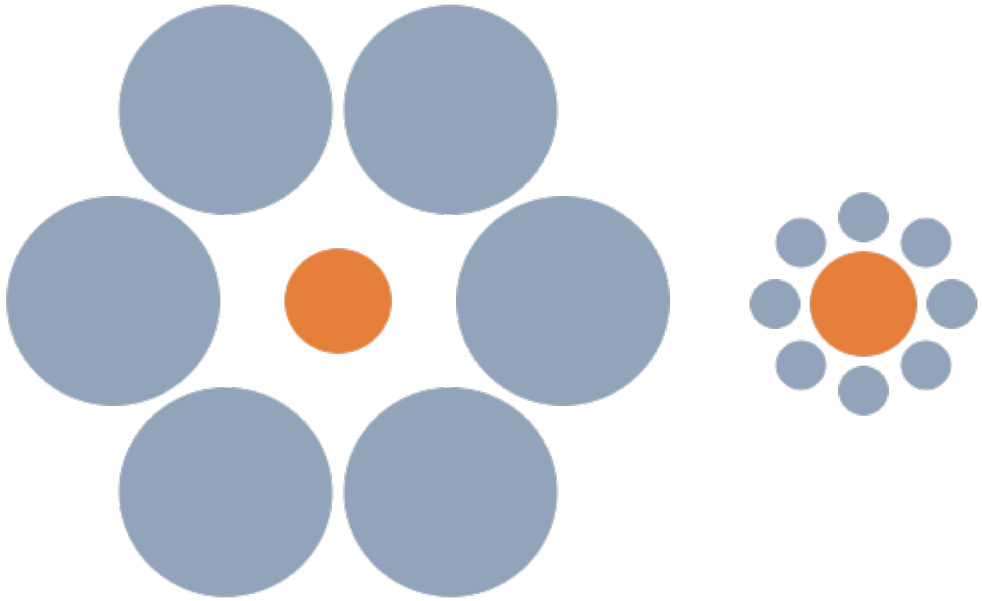
Patterns of light and dark suggest shadows

ILLUSION

- Illusion
  - The perception principles discussed help us perceive the world accurately and efficiently (e.g., perceptual constancy, depth perception)
  - But sometime these principles give rise to an apparently inexplicable discrepancy between perception and physical reality



Ponzo illusion



Ebbinghaus illusion

Ames room

TWO MORE ISSUES

- Sensory interaction
  - The integration of sensory processes when performing a task (e.g., maintaining balance using both vision and proprioception)
  - In interpreting the world, our brain blends various sensory inputs

- Perceptual adaptation
  - Even when sensory input is disrupted, our brain can adjust to the situation and correct for the disruptions