

Sensation and Perception

Chapter 3

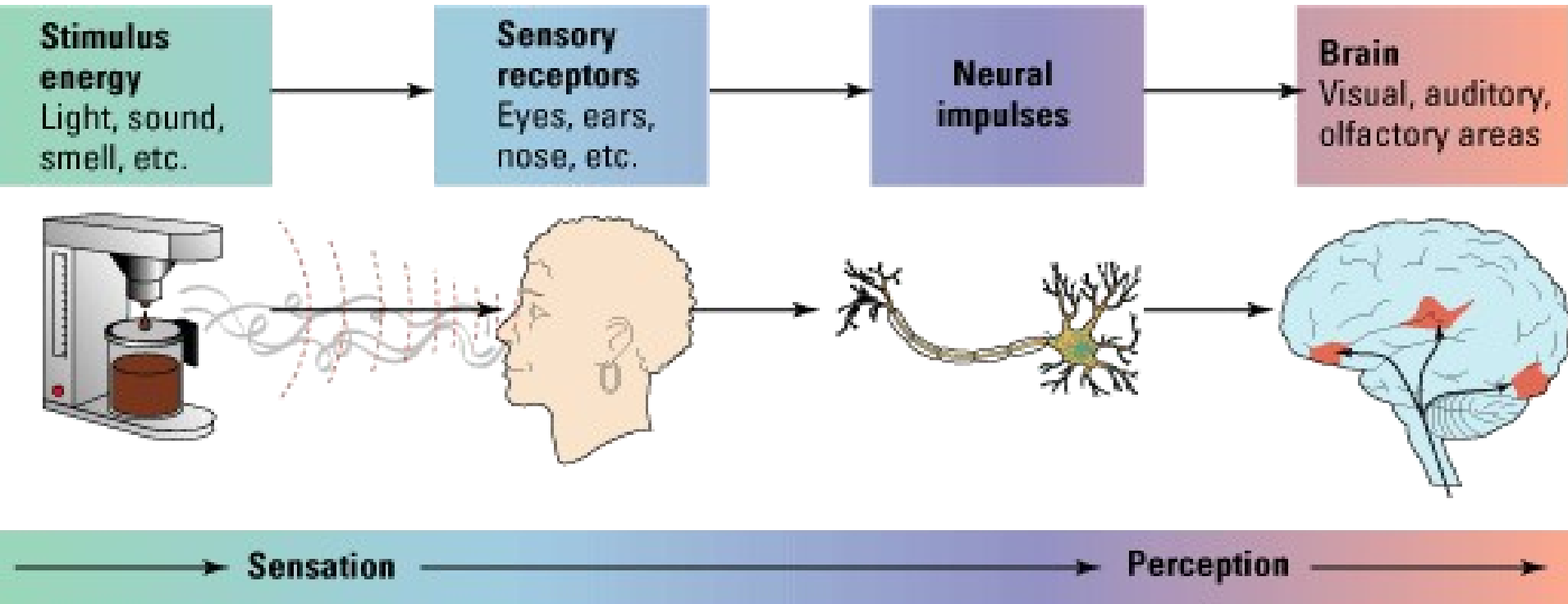


Sensation

- Sensation - the activation of receptors in the various sense organs or a process by which an organism's sense organs respond to a stimulus.
- Sensory receptors specialized forms of neurons.
- Sense organs:
 - eyes
 - ears
 - nose
 - skin
 - taste buds



LO 3.1 Sensation and the central nervous system



Sensory Thresholds

- Just noticeable difference (jnd or difference threshold) - the smallest difference between two stimuli that is detectable 50 percent of the time.
- Absolute threshold - the smallest amount of energy needed for a person to consciously detect a stimulus 50 percent of

TABLE 3.1 EXAMPLES OF ABSOLUTE THRESHOLDS

Sense	Threshold
Sight	A candle flame at 30 miles on a clear, dark night
Hearing	The tick of a watch 20 feet away in a quiet room
Smell	One drop of perfume diffused throughout a three-room apartment
Taste	1 teaspoon of sugar in 2 gallons of water
Touch	A bee's wing falling on the cheek from 1 centimeter above

Habituation and Sensory Adaptation

- Habituation - tendency of the brain to stop attending to constant, unchanging information.
- Sensory adaptation - tendency of sensory receptor cells to become less responsive to a stimulus that is unchanging.
- Saccades - constant movement of the eyes, tiny little vibrations, that people do not notice consciously; prevents sensory adaptation to visual stimuli.

Perception

- Perception is a constructive process by which we select, organize and interpret sensory input to achieve a grasp of our surrounding
- A. Selection
- Attention is a basic factor in perception. It is determined by external factors in the environment and internal factors such as motives, expectancy

External Factors in Attention

- **Intensity** - the louder a sound, the more likely a person is attending to it. The brighter a light, the more it tends to capture our attention
- **Size** -. The larger or bigger a stimulus, the more it will attract our attention.
- **Contrast** - as human beings , we tend to adapt or become used to the stimulation around us. Any change in the stimulation to which we have become used immediately captures our attention. What contrasts with surrounding environment attracts attention easily.
- **Repetition** - the repetition of a stimulus is attention getting.
- A misspelled word is more likely to be noticed if it occurs twice in the same paragraph than if it occurs once.
- **Movement** - we are sensitive to objects that move within our field of vision.
- **Novelty** - new things in our surrounding get our attention
- **Context and expectation** -

Internal Factors in attention

- Of equal importance, like the above ones, are internal factors, such as **culture, personality, motivation, emotion, motives, interests, and other states** within the person.

Perception and Constancies

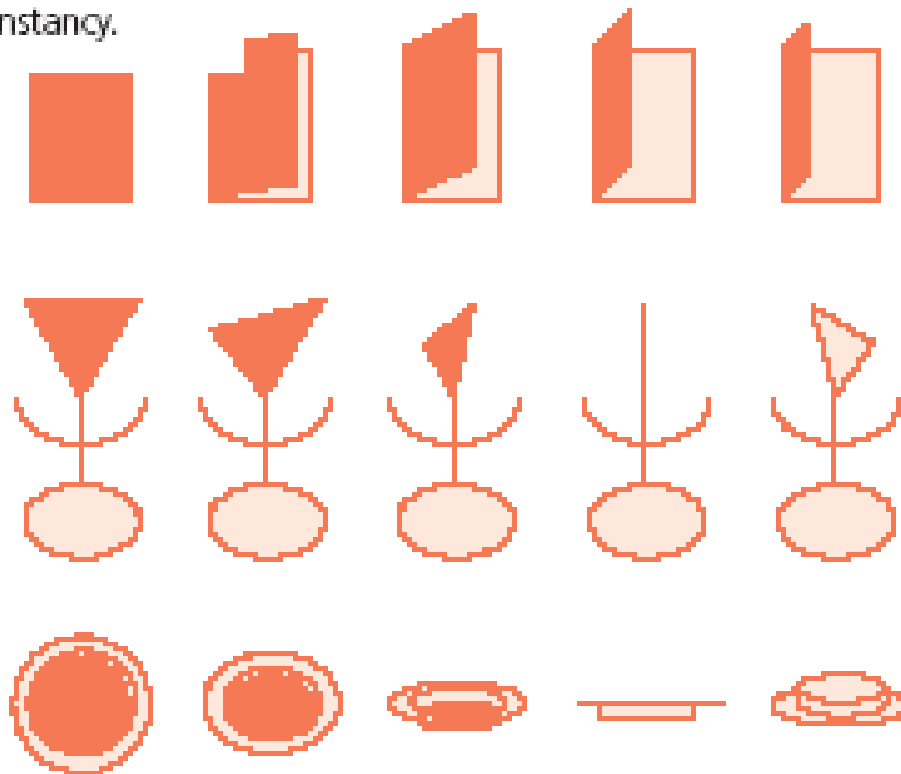
- Perception - the method by which the sensations experienced at any given moment are interpreted and organized in some meaningful fashion.
- **Perceptual Constancy** - the capacity to perceive visual objects as constant in terms of their properties, despite changing stimulations of the same visual objects.
- Perceptual constancy is a phenomenon in which physical objects are perceived as unvarying and consistent despite changes in their appearance or in the physical environment.
- Size constancy - the tendency to interpret an object as always being the same actual size, regardless of its distance. For example, a large building may appear small when one looks them from distance but still they perceive it large.

Cont.

- Shape constancy - the tendency to interpret the shape of an object as being constant, even when its shape changes on the retina.
- Brightness constancy - the tendency to perceive the apparent brightness of an object as the same even when the light conditions change.
- Color constancy - the tendency to perceive an object as having the same color although the object has different color in different conditions.
- For example, colored camera makes our photograph red face, black-and-white camera makes our photograph black and white. But in both cases we perceive the color of face as being constant

FIGURE 3.14 Shape Constancy

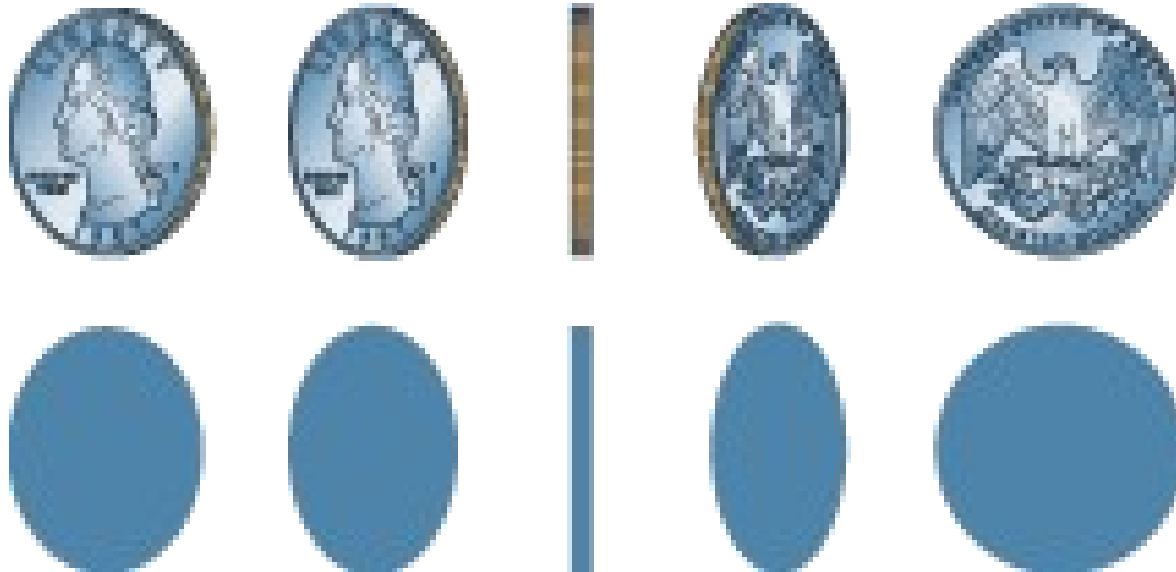
Three examples of shape constancy are shown here. The opening door is actually many different shapes, yet we still see it as basically a rectangular door. We do the same thing with a triangle and a circle—although when we look at them from different angles they cast quite differently shaped images on our retina, we experience them as a triangle and a circle because of shape constancy.



13 Perception and perceptual constancies

LO 3.13 Perception and perceptual constancies

Shape constancy



Gestalt Principles

- Figure-ground - the tendency to perceive objects, or figures, as existing on a background.
- We shift back and forth between the two interpretations i.e. figure and ground
- Reversible figures - visual illusions in which the figure and ground can be reversed.

FIGURE 3.16 Figure-Ground Illusion

What do you see when you look at this picture? Is it a wine goblet? Or two faces looking at each other? This is an example in which the figure and the ground seem to “switch” each time you look at the picture.

LO 3.14 Gestalt principles of perception

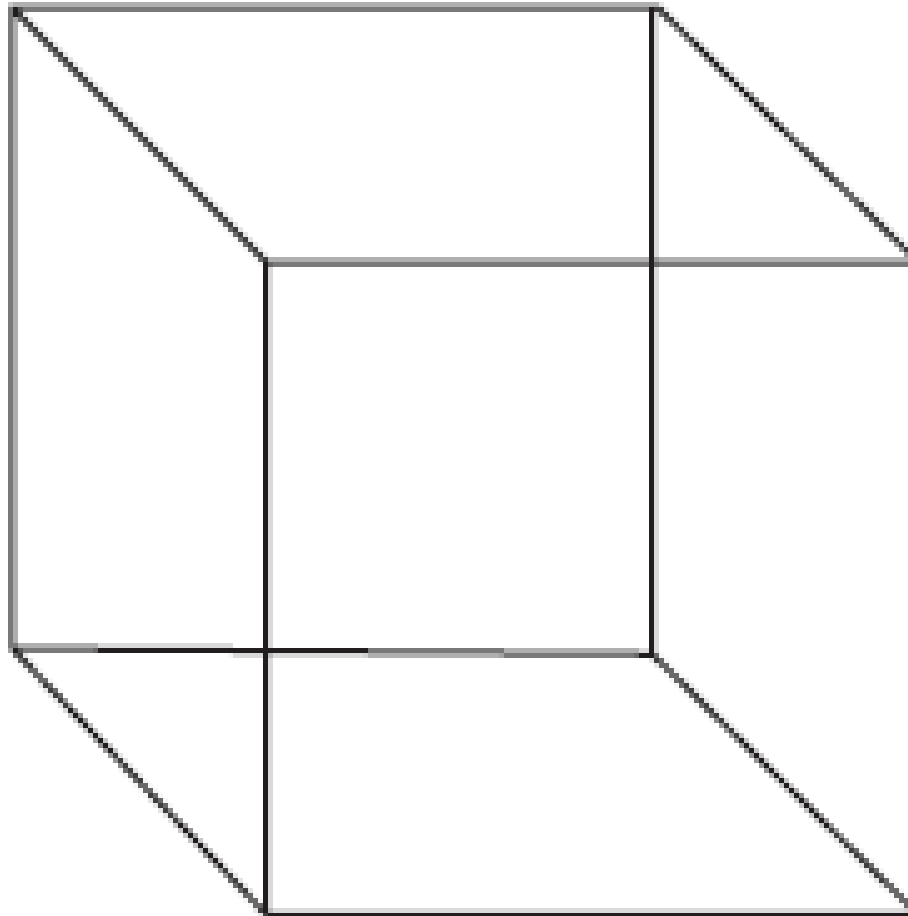


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FIGURE 3.15 The Necker Cube

This is an example of a reversible figure. It can also be described as an ambiguous figure, since it is not clear which pattern should predominate.

LO 3.14 Gestalt principles of perception



LO 3.14 Gestalt principles of perception

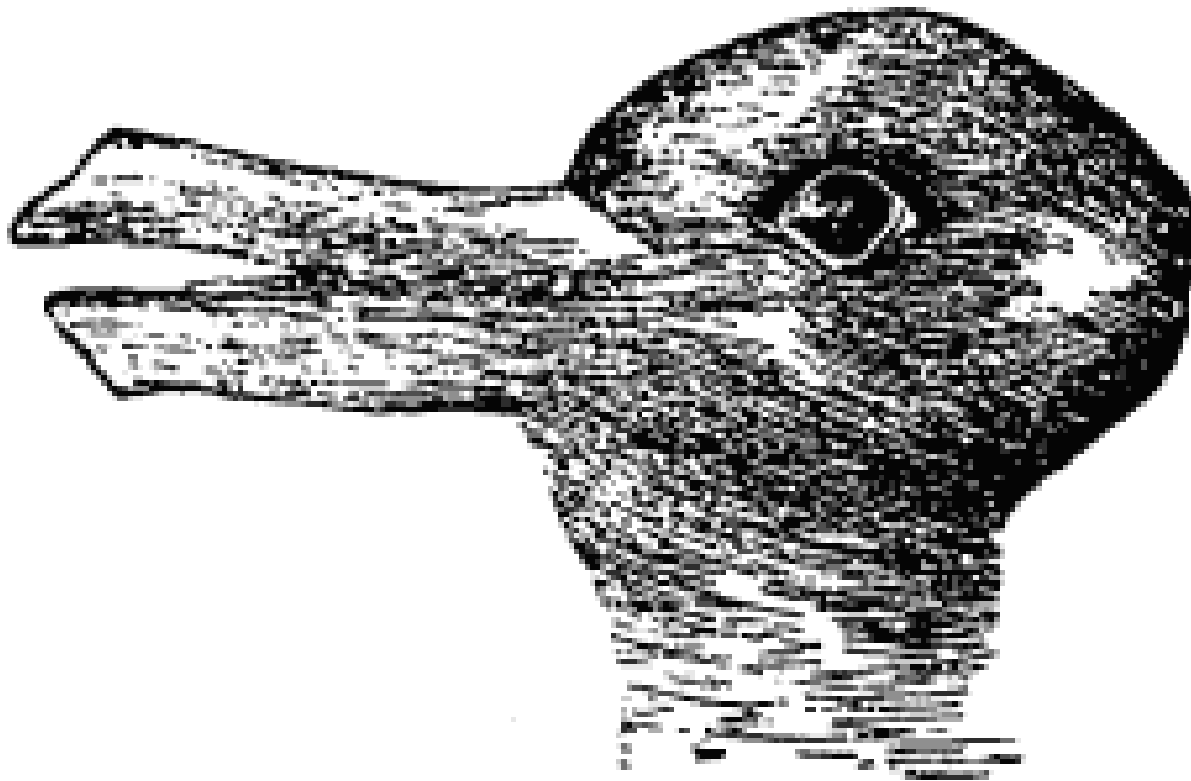
Do you see
an old lady
or a young
lady?



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LO 3.14 Gestalt principles of perception

Do you see
a rabbit or
a duck?



The white and black stripes on these zebras can be reversed – both can serve as either figure or ground.

LO 3.14 Gestalt principles of perception



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Gestalt Principles

- Similarity - the tendency to perceive things that look similar to each other as being part of the same group.
- Proximity - the tendency to perceive objects that are close to each other as part of the same grouping.
- Closure - the tendency to complete figures that are incomplete.
- Continuity - the tendency to perceive things as a continuous pattern rather than with a complex, broken-up pattern.
- Contiguity - the tendency to perceive two things that happen close together in time as being related.

FIGURE 3.17 Gestalt Principles of Grouping The Gestalt principles of grouping are shown here. These are the human tendency to organize isolated stimuli into groups on the basis of five characteristics: proximity, similarity, closure, continuity, and common region.

Proximity: The dots on the left can be seen as horizontal or vertical rows—neither organization dominates. But just by changing the proximity of certain dots, as in the other two examples, we experience the dots as vertical columns (middle) or horizontal rows (right).

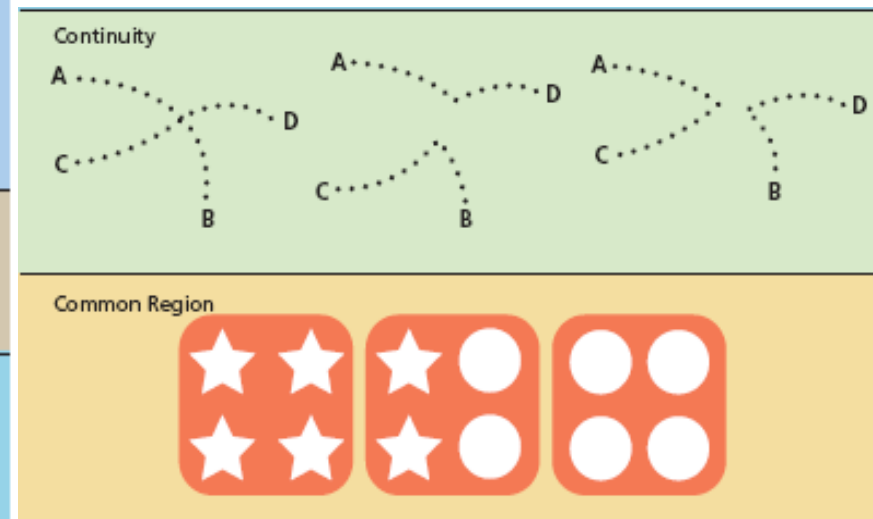
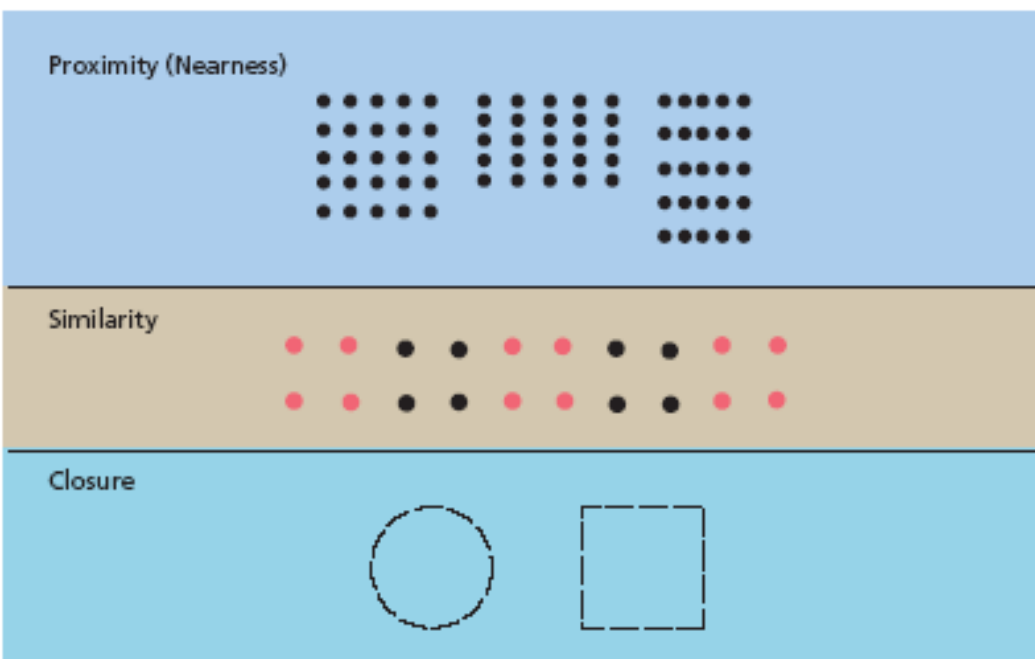
Similarity: The similarity of color here makes you perceive these dots as forming black squares and color squares rather than two rows of black and colored dots.

Closure: Even though the lines are broken, we still see these figures as a circle and a square—an example of how we tend to “dose” or “fill in” missing parts from what we know of the whole.

Continuity: Because of continuity, we are much more likely to see the figure on the left as being made up of two lines, A to B and C to D, than we are to see it as a figure made up of lines A to D and C to B or A to C and B to D.

Common Region: Similarity would suggest that people see two groups, stars and circles. But the colored backgrounds define a visible common region, and the tendency is to perceive three different groups.

LO 3.14 Gestalt principles of perception



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Depth Perception

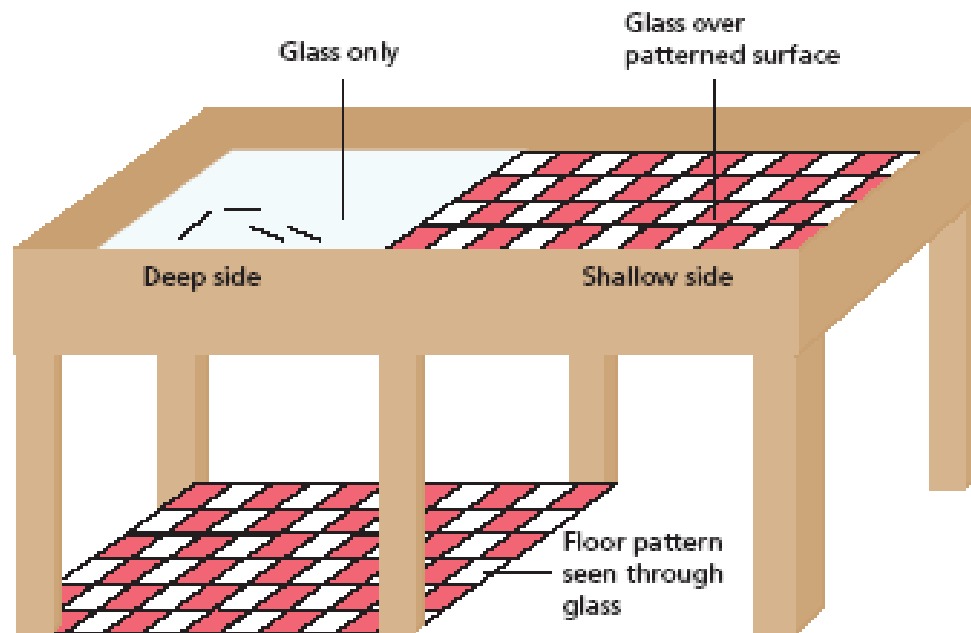
- Depth perception - the ability to view the world in three dimensions and to perceive distance—a skill known as **depth perception**—is due largely to the fact that we have two eyes.
- It is simply the ability to perceive the world in three dimensions.
- The difference in the images seen by the left eye and the right eye is known as binocular disparity.

- To determine distance, our brain uses discrepancy between the images in the two eyes, which varies according to the distance of objects that we view.
- Studies of depth perception
 - Visual cliff experiment

FIGURE 3.18 The Visual Cliff Experiment

Experiment In the visual cliff experiment, the table has both a shallow and a "deep" side, with glass covering the entire table. When an infant looks down at the deep-appearing side, the squares in the design on the floor look smaller than the ones on the shallow side, forming a visual cue for depth. Notice that this little girl seems to be very reluctant to cross over the deep-appearing side of the table, gesturing to be picked up instead.

LO 3.15 Perceiving the world in three dimensions



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Monocular Cues

- Monocular cues (pictorial depth cues) – cues for perceiving depth based on one eye only.
 1. Linear perspective – the tendency for parallel lines to appear to converge on each other.
 2. Relative size - perception that occurs when objects of a certain size appear to be small and are, therefore, assumed to be much farther away.
 3. Interposition (overlap) - the assumption that an object that appears to be blocking part of another object is in front of the second object and closer to the viewer.

Monocular Cues

4. Aerial perspective - the haziness that surrounds objects that are farther away from the viewer causes the distance to be perceived as greater.
5. Texture gradient - the tendency for textured surfaces to appear to become smaller and finer as distance from the viewer increases.
6. Motion parallax - the perception of motion of objects in which close objects appear to move more quickly than objects that are farther away.
7. Accommodation - as a monocular clue, the brain's use of information about the changing thickness of the lens of the eye in response to objects that are close or far away.

FIGURE 3.19 Examples of Pictorial Depth Cues (a) Both the lines of the trees and the sides of the road appear to come together in the distance. This is an example of linear perspective. (b) Notice how the larger pebbles in the foreground seem to give way to smaller and smaller pebbles near the middle of the picture. Texture gradient causes the viewer to assume that as the texture of the pebbles gets finer, the pebbles are getting farther away. (c) In aerial perspective, the farther away something is the hazier it appears because of fine particles in the air between the viewer and the object. Notice that the road and farmhouse in the foreground are in sharp focus while the mountain ranges are hazy and indistinct. (d) The depth clue of relative size appears in this photograph. Notice that the flowers in the distance appear much smaller than those in the foreground. Relative size causes smaller objects to be perceived as farther away from the viewer.

LO 3.15 Perceiving the world in three dimensions



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LO 3.15 Perceiving the world in three dimensions

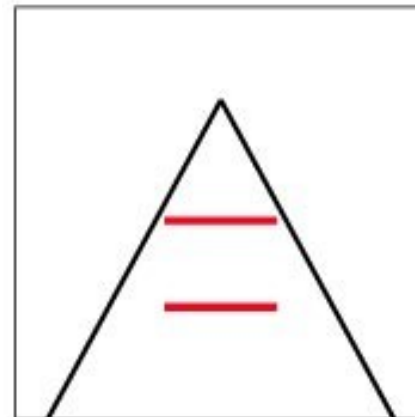
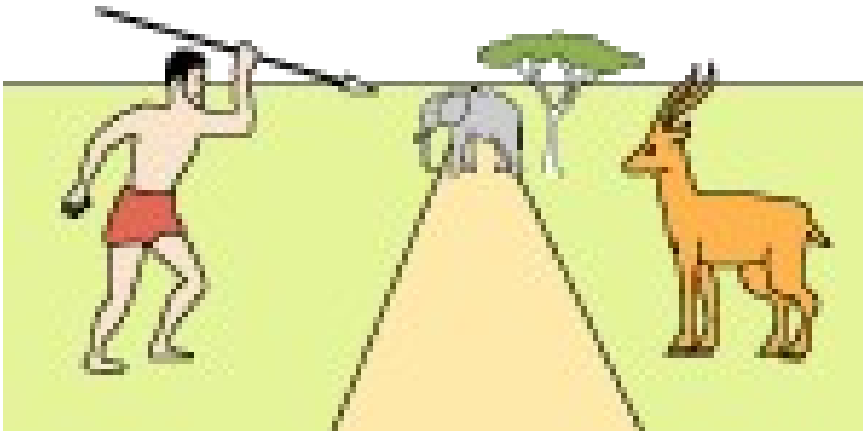
Pictorial depth cues



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LO 3.15 Perceiving the world in three dimensions

Linear Perspective



Binocular Cues

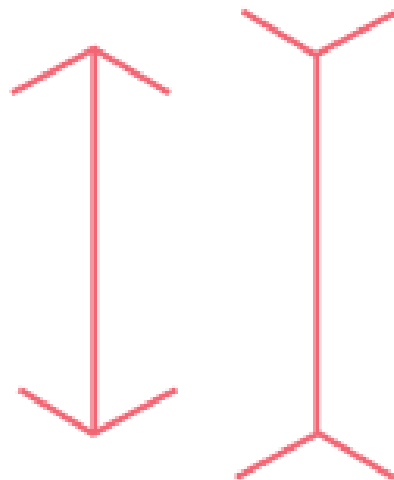
- Binocular cues - cues for perceiving depth based on both eyes.
 1. Convergence - the rotation of the two eyes in their sockets to focus on a single object, resulting in greater convergence for closer objects and lesser convergence if objects are distant.
 2. Binocular disparity - the difference in images between the two eyes, which is greater for objects that are close and smaller for distant objects.

Perceptual Illusions

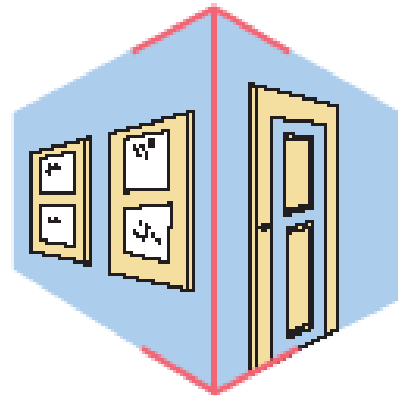
- Müller-Lyer illusion - illusion of line length that is distorted by inward-turning or outward-turning corners on the ends of the lines, causing lines of equal length to appear to be different.
- Moon illusion - the moon on the horizon appears to be larger than the moon in the sky.
 - Apparent distance hypothesis
- Illusions of Motion:
 - autokinetic effect - a small, stationary light in a darkened room will appear to move or drift because there are no surrounding cues to indicate that the light is *not* moving.
 - stroboscopic motion - seen in motion pictures, in which a rapid series of still pictures will appear to be in motion.
 - phi phenomenon - lights turned on in a sequence appear to move.

LO 3.16 Visual illusions

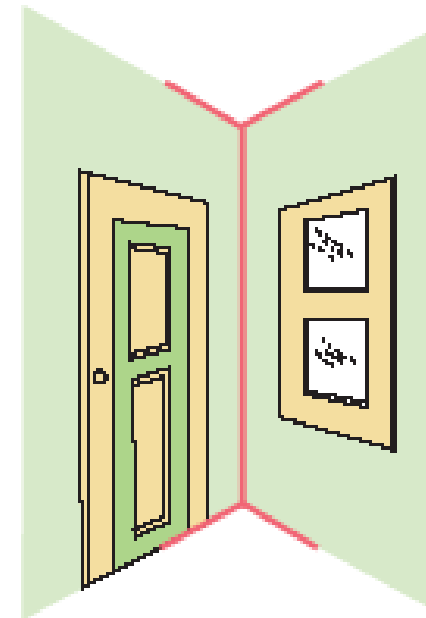
FIGURE 3.20 The Müller-Lyer Illusion (a) Which line is longer? In industrialized Western countries, people generally see the lines in part (a) in situations such as in part (b). According to one theory, they have become so accustomed to seeing right angles in their environment and assume that the short, slanted lines are forming a right angle to the vertical line. They make that assumption because they are accustomed to seeing corners, such as the ones shown in the figure on the right. Consequently, in the figure on the left, they tend to perceive the line on the right as slightly longer than the line on the left.



a.



b.



The moon illusion. When this moon is high in the night sky it will still be the same size to the eye as it is now. Nevertheless, it is perceived to be much larger when on the horizon. In the sky, there are no objects for comparison, but on the horizon, objects such as this tree are seen as being in front of a very large moon.

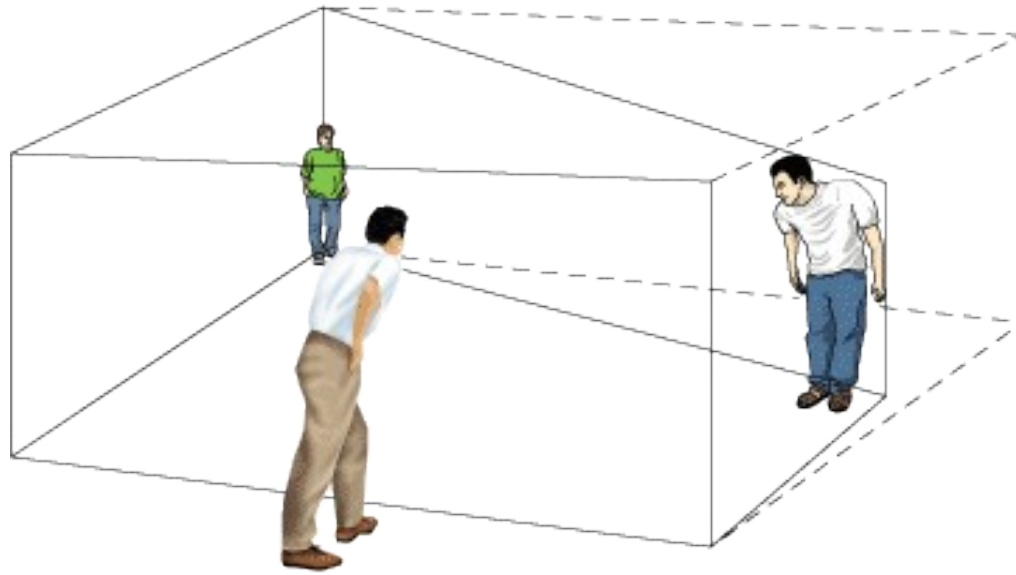


LO 3.16 Visual illusions

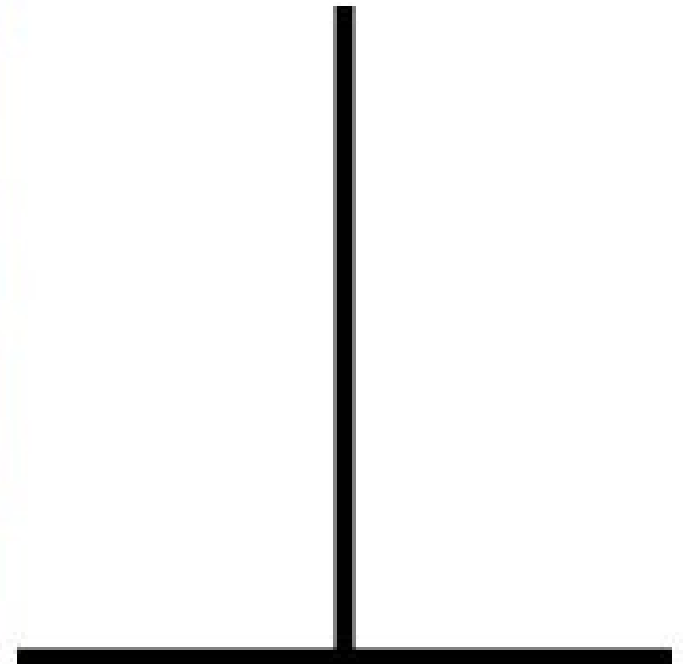


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Ame's room illusion



LO 3.16 Visual illusions



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Factors that Influence Perception

- Perceptual set (perceptual expectancy) - the tendency to perceive things a certain way because previous experiences or expectations influence those perceptions.
- Top-down processing - the use of preexisting knowledge to organize individual features into a unified whole.
- Bottom-up processing - the analysis of the smaller features to build up a complete perception.

FIGURE 3.21 **Perceptual Set** Look at the drawing in the middle. What do you see? Now look at the drawings on each end. Would you have interpreted the middle drawing differently if you had looked at the drawing of the man or the kneeling woman first?

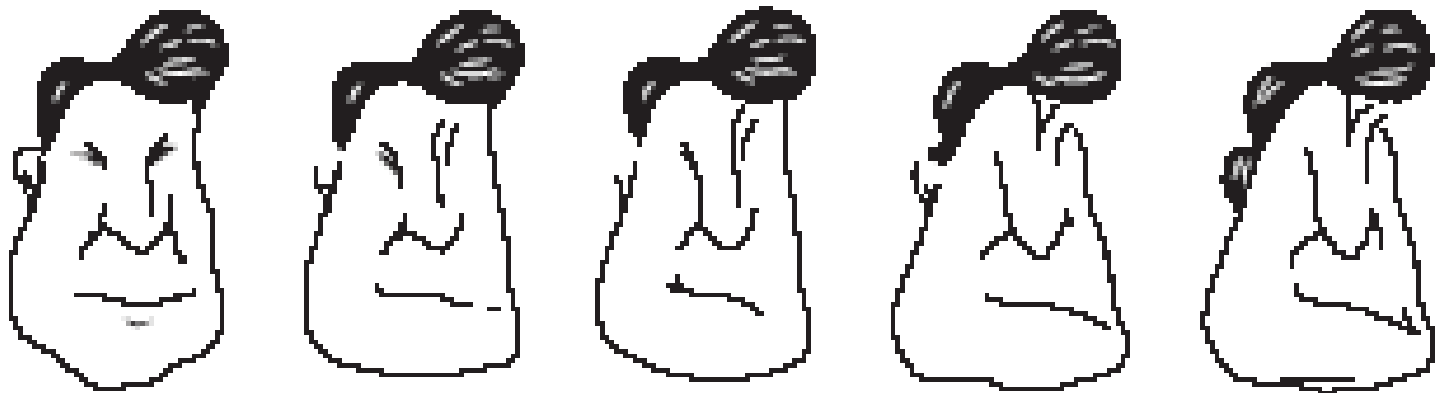
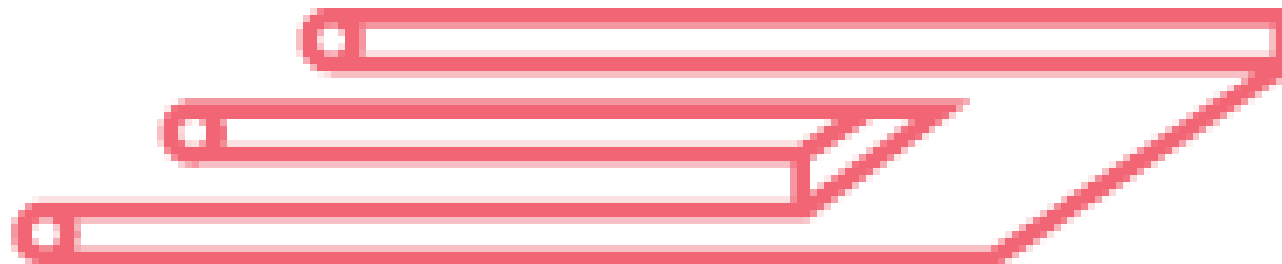


FIGURE 3.22 The Devil's Trident

At first glance, this seems to be an ordinary three-pronged figure. But a closer look reveals that the three prongs cannot be real as drawn. Follow the lines of the top prong to see what goes wrong.



LO 3.17 Factors that influence perception

Applying Psychology

- Extrasensory Perception (ESP) - claim of perception that occurs without the use of normal sensory channels such as sight, hearing, touch, taste, or smell.
 - Telepathy - claimed ability to read another person's thoughts, or mind reading.
 - Clairvoyance - supposed ability to "see" things that are not actually present.
 - Precognition - supposed ability to know something in advance of its occurrence or to predict a future event.
- Parapsychology - the study of ESP, ghosts, and other subjects that do not normally fall into the realm of ordinary psychology.

LO 3.17 Factors that influence perception

FIGURE 3.23 Zener Cards These five shapes, star, circle, cross, wavy lines, and square are used in a test for telepathy, a form of extrasensory perception. One person (the sender) looks at each card after pulling it from a randomly shuffled deck of these five cards and thinks about the image on the card. The person being tested for telepathy, who cannot see the card, is supposed to guess what the shape is. An accuracy rate greater than chance is taken as an indication of telepathic ability.

