

# Chapter 4

## Sensation and Perception

PSY 100

Dr. Rick Grieve

Western Kentucky University

# Sensation and Perception

## ■ Sensation

- The process of stimulating the sense organ receptor cells and relaying that information to higher brain centers for further processing

## ■ Perception

- The brain's process of organizing and interpreting sensory information to give it meaning

**Figure 4.1**

**The distinction between sensation and perception.**

Sensation involves the stimulation of sensory organs, whereas perception involves the interpretation of sensory input. The two processes merge at the point where sensory receptors convert physical energy 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.

# Thresholds

- **Absolute threshold**
- **Noise**
- **Difference threshold (JND)**
- **Weber's law**

# The Visual System

- **Light**

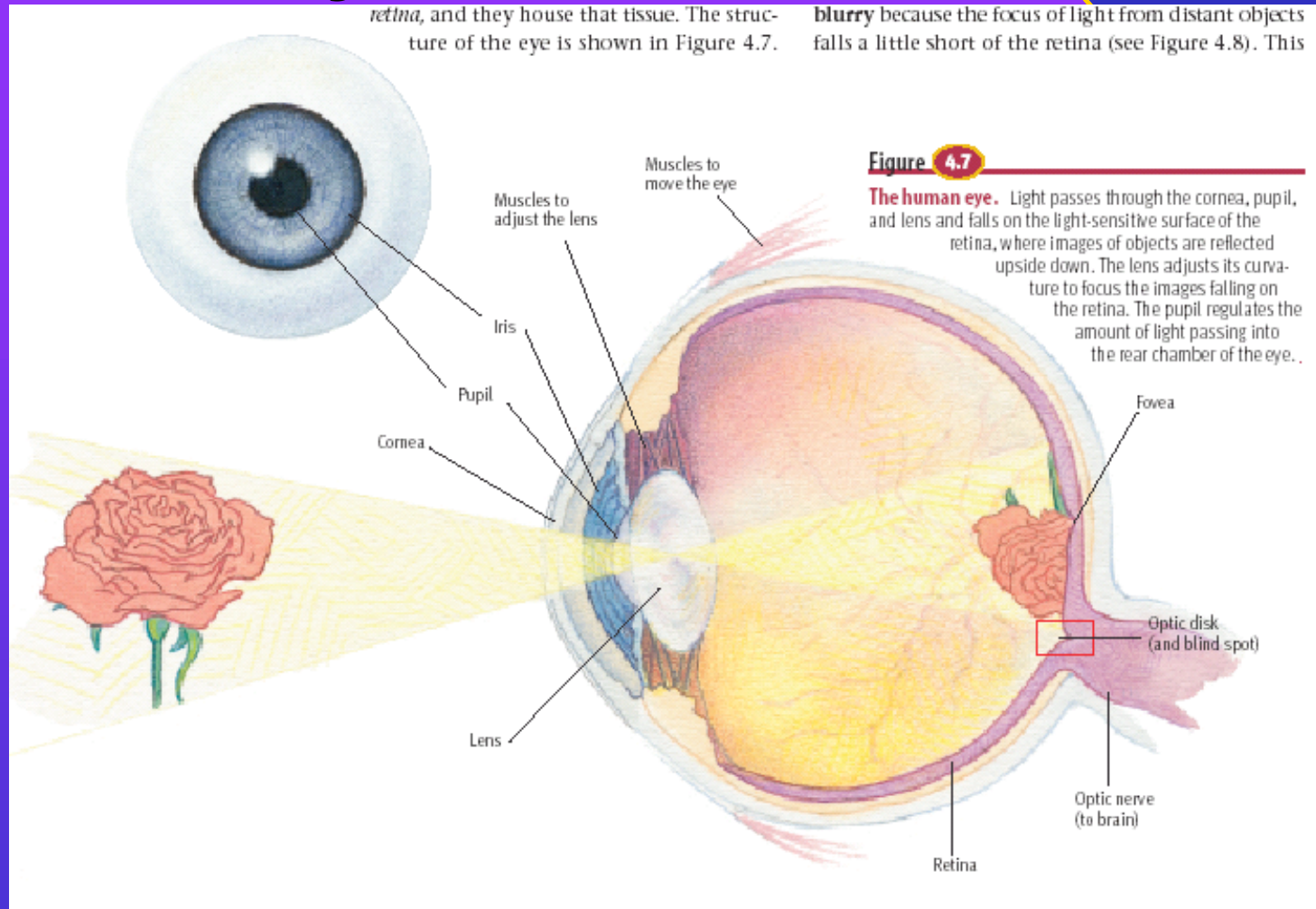
- **A form of electromagnetic energy that can be described in terms of wavelengths**

- **Wavelength**

- **The distance from the peak of one wave to the peak of the next**

# The Visual System

- Sclera
- Iris
- Pupil
- Cornea
- Lens
- Retina

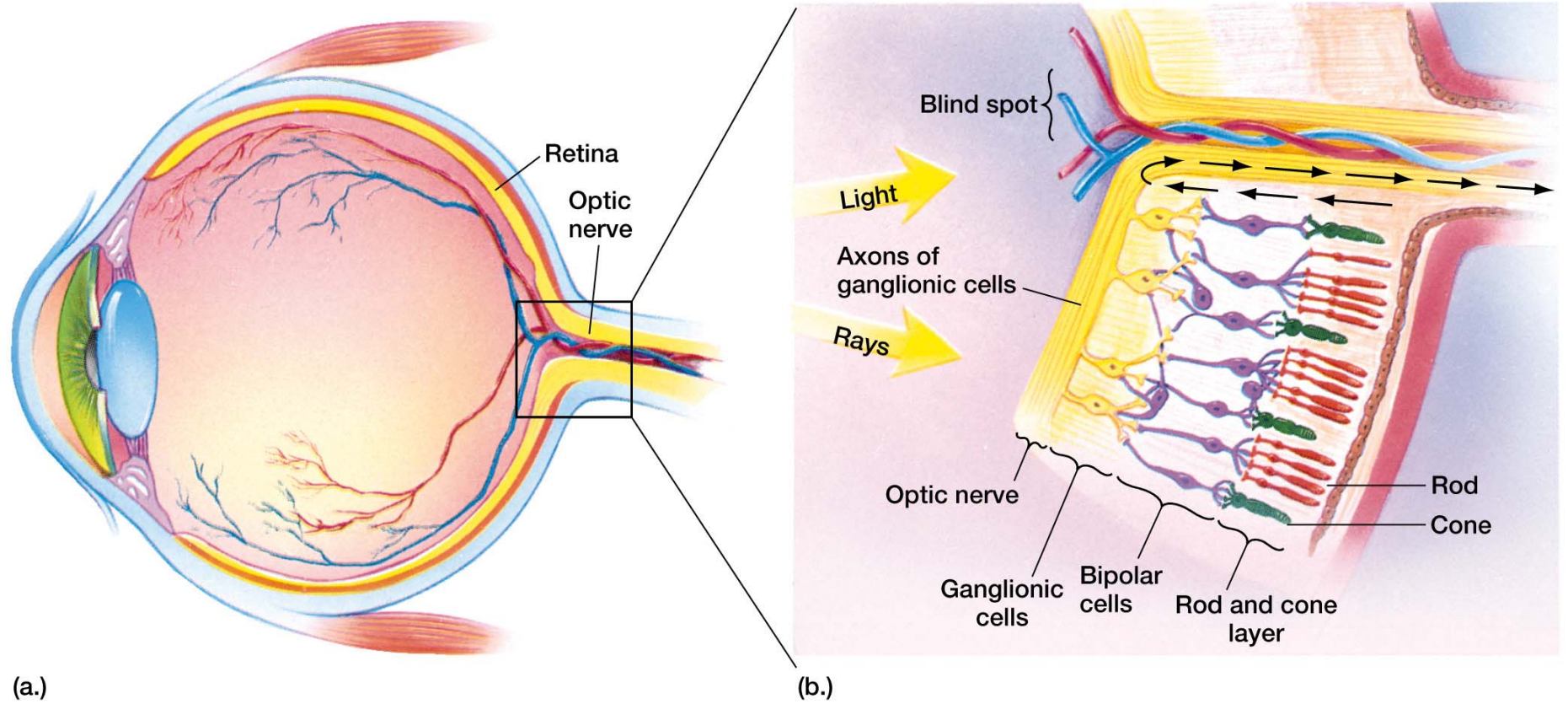


**blurry** because the focus of light from distant objects falls a little short of the retina (see Figure 4.8). This

# The Visual System

- **Rods**
  - The receptors in the retina that are exquisitely sensitive to light but are not very useful for color vision
- **Cones**
  - Receptors in the retina for color perception
- **Duplicity Theory**
- **Visual Acuity**
- **Dark Adaptation**

# The Visual System



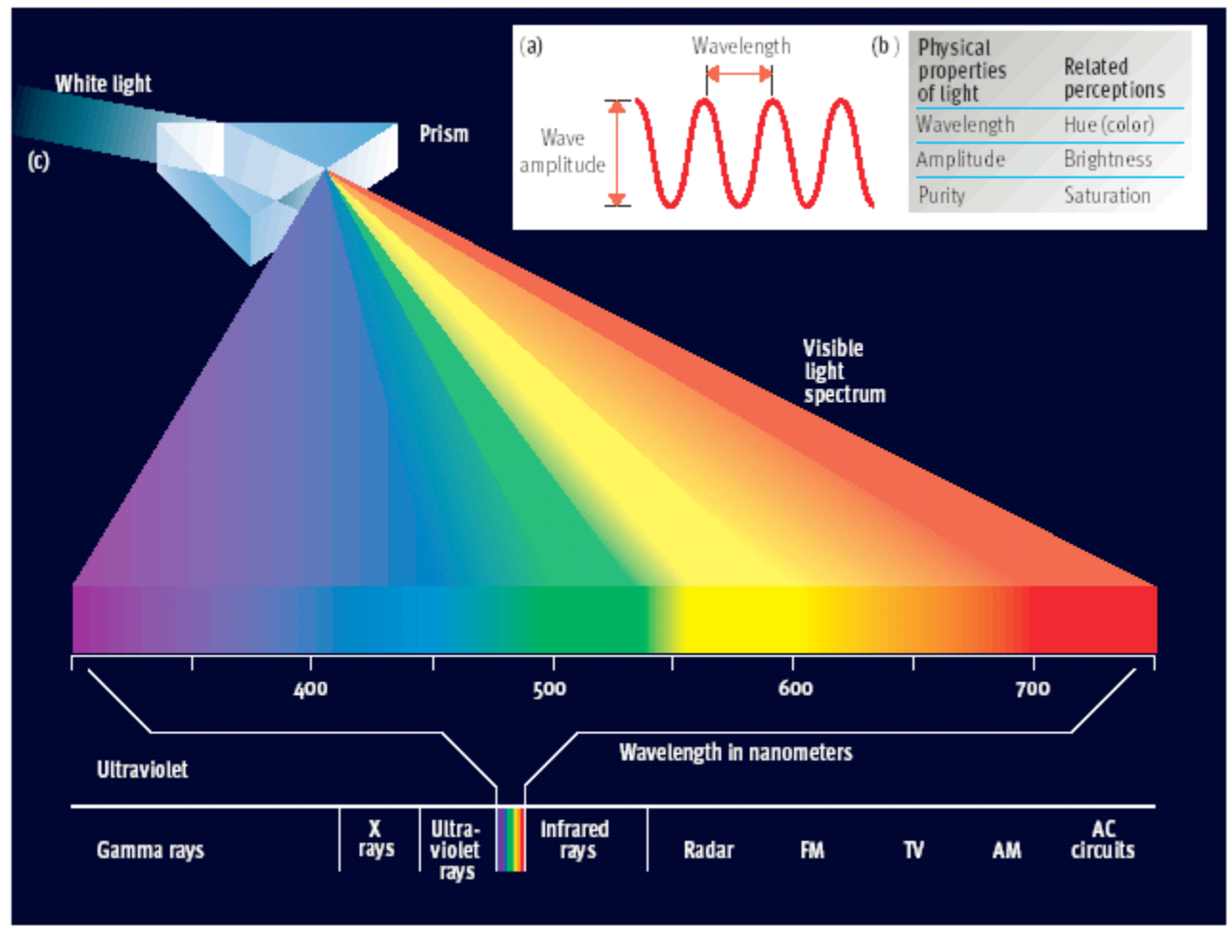


# The Visual System

- **Feature detectors**
  - **Neurons in the brain's visual system that respond to particular lines or other features of a stimulus**
- **Sensory adaptation**
  - **A change in the responsiveness of the sensory system based on the average level of surrounding stimulation**

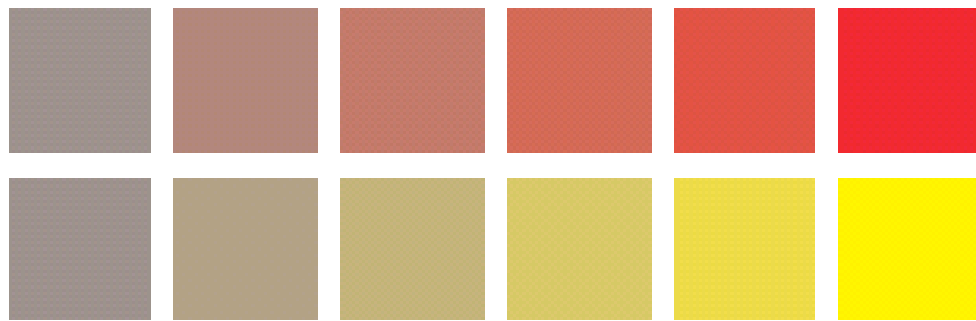
# Color Vision

- Hue
- Saturation
- Brightness



**Figure 4.5**

**Light, the physical stimulus for vision.** (a) Light waves vary in amplitude and wavelength. (b) Within the spectrum of visible light, amplitude (corresponding to physical intensity) affects mainly the experience of brightness. Wavelength affects mainly the experience of color, and purity is the key determinant of saturation. (c) If white light (such as sunlight) passes through a prism, the prism separates the light into its component wavelengths, creating a rainbow of colors. However, visible light is only the narrow band of wavelengths to which human eyes happen to be sensitive.



Saturation

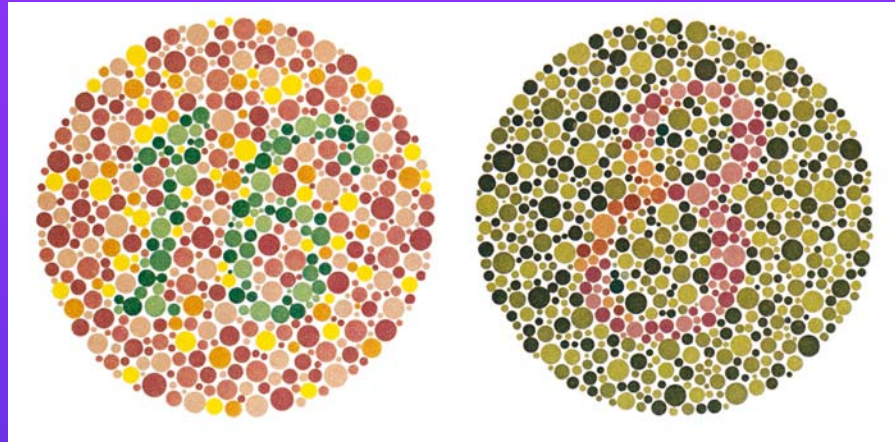


**Figure 4.6**

**Saturation.** Variations in saturation are difficult to describe, but you can see examples for two colors here.

# Theories of Color Vision

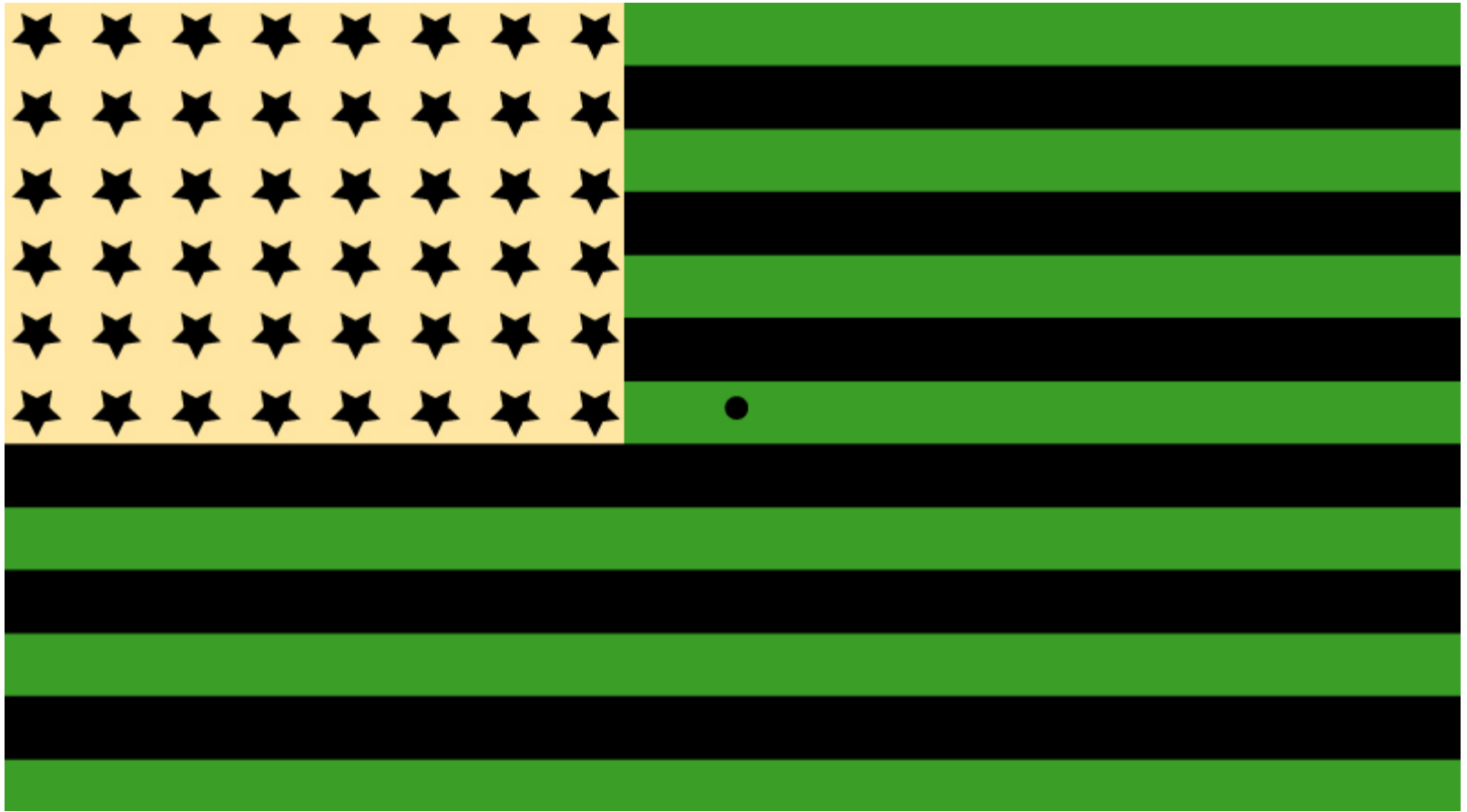
- Trichromatic theory



- Opponent-process theory

# Theories of Color Vision

In the following slide, fix your eyes on the dot in the center of the flag







# Perception: The Stroop Effect

In the following slide, name the color of each rectangle

# Perception: The Stroop Effect



# Perception: The Stroop Effect

Once again, name the color of each rectangle in the following slide

# Perception: The Stroop Effect

**RED**

**YELLOW**

**BROWN**

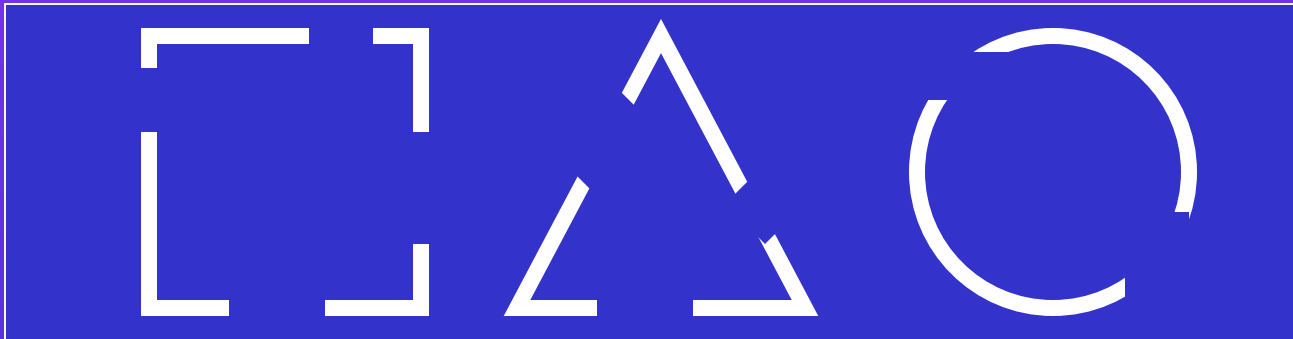
**BLUE**

**GREEN**

**PINK**

# Visual Integration

- Perception of Form
- Size Constancy
- Shape Constancy
- Brightness Constancy



# Depth Perception

- **Depth perception**
  - **The ability to perceive objects three-dimensionally**
- **Monocular cues**
  - **Motion parallax**
  - **Speed**
  - **Kinetic depth effect**
  - **Size**
  - **Linear perspective**

# Depth Perception

- Interposition
- Texture
- Shadowing
- Atmospheric perspectives
- Accomodation
- **Binocular cues**
  - Retinal disparity
  - convergence

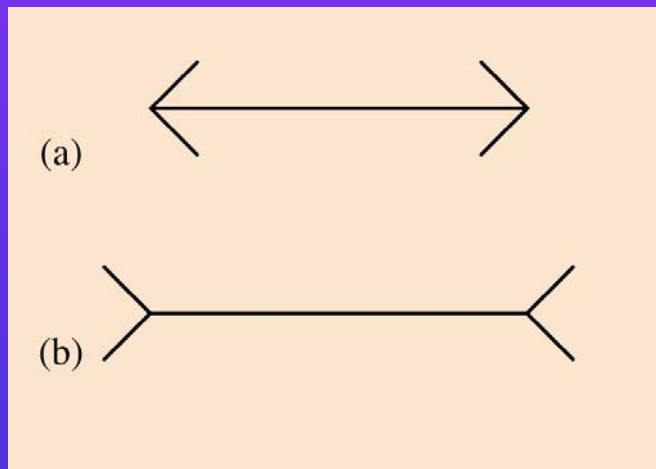
# Motion Perception

- **Apparent movement**
  - Our perception of a stationary object as being in motion
- **Stroboscopic motion**
  - The illusion of movement created by a rapid stimulation of different parts of the retina



# Illusions

- Gestalt Psychology
- Visual illusion
  - Illusion that occurs when two objects produce exactly the same retinal image but are perceived as different images



# Shape Perception

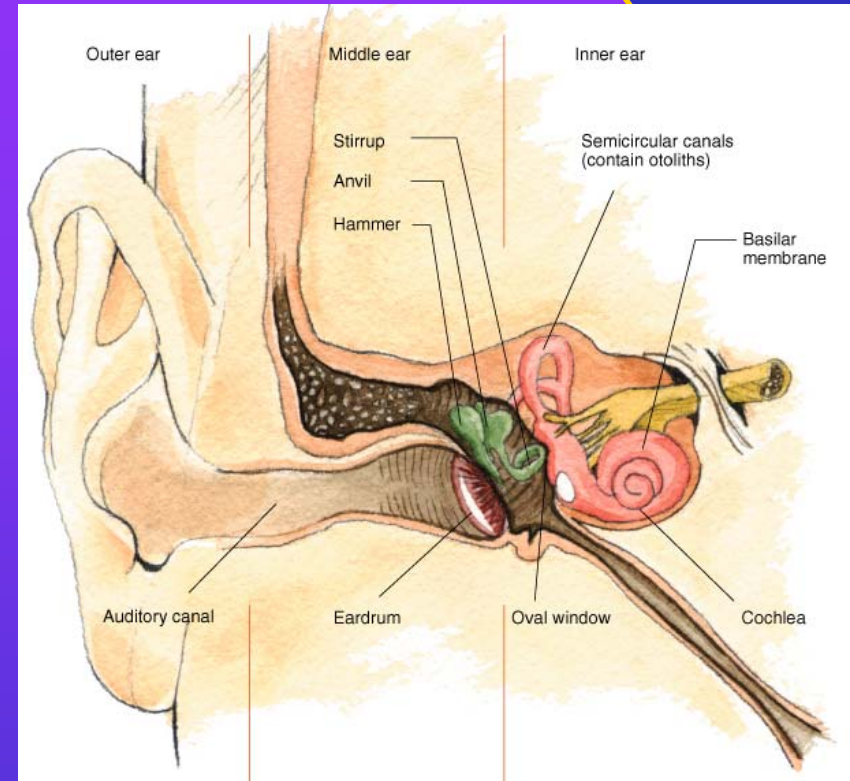
- **Contour**
- **Law of Pragnanz**
- **Figure-ground relationship**
- **Law of Proximity**
- **Law of Similarity**
- **Law of Continuity**
- **Common Fate Principle**
- **Law of Closure**

# The Auditory System

- **Sounds**
  - **Pitch**
    - Frequency
  - **Loudness**
    - Amplitude
  - **Timbre**

# Structures of the Ear

- Outer ear
  - Ear drum
- Middle ear
  - Ossicles
- Inner ear
  - Cochlea
  - Basilar membrane
  - Organ of Corti



# Theories of Hearing

- **Place theory**
  - Each frequency of sound waves produces vibrations at a particular spot on the basilar membrane
- **Frequency theory**
  - The perception of a sound's frequency is due to how often the auditory nerve fires
- **Volley principle**
  - Neural cells can fire neural impulses in rapid succession, producing a volley of impulses

# Perception: Attention

- **Selective attention**
  - **Focusing on a specific aspect of experience while ignoring others**
- **The 'cocktail party effect'**
- **Attention is shiftable**

# Approaches to Perception

- **Information-processing approach**
  - The view that perception is the process of internally representing information from the world, subjecting it to a series of internal manipulations
- **Ecological approach**
  - A view of perception that stresses an active perceiver exploring and moving about the environment

# Is Perception Learned or Innate?

- The visual cliff
- Recovery from blindness
- Culture and perception
  - Carpententered-world hypothesis
- Nature/nurture conclusions



# The Skin Senses

- Touch
- Temperature
- Thermoreceptors
  - receptors located under the skin that respond to changes in temperature
- Pain
  - The sensation that warns us that damage is occurring to our bodies

# The Skin Senses

- **Gate-controlled theory**
  - The theory that the spinal column contains a neural gate that can be opened (allowing the perception of pain) or closed (blocking the perception of pain)
- **Acupuncture**
  - Thin needles are inserted at specific points in the body to produce various effects, such as local anesthesia

# The Chemical Senses

- Taste
- Papillae
  - Bumps on the surface of the tongue that contain taste buds, the receptors for taste
- Smell
- olfactory epithelium
  - Tissue located at the top of the nasal cavity that contains a sheet of receptor cells for smell

# The Kinesthetic Sense

- **Kinesthetic sense**
  - **The sense that provides information about movement, posture, and orientation**

# The Vestibular Sense

- **Vestibular sense**
  - **The sense that provides information about balance and movement**
- **Semicircular canals**
  - **Canals in the inner ear that contain the sensory receptors that detect head motion caused by tilting the head or other bodily motion**

# Extrasensory Perception (ESP)

- **Extrasensory perception (ESP)**
  - Perception that occurs without the use of any known sensory process
- **Telepathy**
- **Precognition**
- **Psychokinesis**