Sensation and Perception

Worksheet Solutions
What is the difference between sensation and perception?

- Sensation is the process of receiving information from the environment.
- Perception is the process of organizing this information and making it meaningful.
Sensation

- Refers to how our sense receptors and nervous system physically represent our external environment (bottom-up).

Perception

- How we mentally organize and interpret this information (top-down).
What is meant by the term *adaptation*?

- Adaption refers to the process of ignoring unimportant sensory information.
- It allows us to deal with environments containing large amounts of sensory inputs, such as different background noises, while still focusing on significant ones.
- The gradual loss of attention to unneeded or unwanted sensory information.
- Examples?
Learning Goals

- What is white light?
  - White light is light as it originates from the sun or a light bulb.

- What is color?
  - White light bounces off at different speeds which results in the perception of color.

- What do we call light outside the visible spectrum?
  - Ultraviolet or infrared
Vision

- Dominant sense
- Light
  - Light originates from the sun or a light source as white light
  - What we interpret as color is simply different light wavelengths
  - We only see a small slice of the whole spectrum of electromagnetic rays
  - Wavelength determines color (or hue)
  - Intensity determines brightness of a color
Vision

The diagram illustrates the spectrum of electromagnetic radiation, showing the relationship between energy, wavelength, and the types of waves. The visible light spectrum is highlighted, ranging from 400 nm to 700 nm, indicating the wavelengths of light that the human eye can perceive. Gamma rays, X-rays, ultraviolet, infrared, radio waves, and other types of radiation are also depicted, illustrating their corresponding energies and wavelengths.
Vision

- Sclera
- Iris
- Cornea
- Pupil
- Lens
- Conjunctiva
- Vitreous
- Choroid
- Optic Nerve
- Macula
- Retina
Vision

- **Cornea**
  - The clear outer **covering of the eye**, behind which there is fluid

- **Iris**
  - Colored circular muscle that opens and closes
  - Forms larger and smaller circles to **control the amount of light getting into the eye**
  - *Have you ever walked out of a dark theater?*
Vision

Lens

- **Focuses** the objects you see on to the back of the eye, where there are receptors
- If the lens isn’t shaped correctly, objects will blur
- Eyeglasses change the angle as which the light hits the lens, so they land properly on the receptors
Vision

Pupil

- An opening that changes size as the iris muscles move to cover and uncover the lens
- Controlled by psychological factors
  - Gets smaller if we’re disgusted
  - Gets larger if we see something we really like, or if there is strong emotional arousal of any kind
Vision

- Retina
  - When light entering the eye hits the back of the eyeball, it hits the retina
  - Contains millions of receptors for light
  - Blind spot - where the optic nerve connects to the eye. (no receptors are located there)
Vision

What is the difference between Rods and Cones?

- The retina is made of two types of receptors
  - **Rod-** shaped like a rod
    - sensitive to violet-purple range of wavelengths, but we only “see” black and white with them
    - We use these for night vision
  - **Cone-** shaped like a cone
    - Used for color and daylight vision
    - Shut off at night
    - Respond best to wavelengths in the red range
    - Located towards the center of a retina
When light is dim, why is it best to look slightly away from an object?

- At night we rely on the rods in our eyes.
- These are located on the sides of the retina.

What are the three colors that make up vision?

- Red, Blue, Green
Vision

- **Color Vision**
  - All colors we see are red, blue, and green, or a mixture of the three.

- **Color Blindness**
  - The inability to perceive certain colors, such as red or green.
What does it mean to be completely color blind?
- You respond to light only with the rods in your eyes.

How is this different from the form of color blindness that is most common?
- Most color blind people see only the yellow-blue range.
- They cannot see red or green
- Most color blind people are men, but there are color blind women also.
Afterimages

- When we stare at something, chemicals in the cones are used.
- When we look away, unused chemicals are released in order to balance the system.
- This causes us to “see” an after image.
Hearing

- Another name for hearing is “audition”.
- We hear sound waves, much like we see light waves.

  - Sounds vary in **pitch**, how high or low a sound is
  - **Timbre** refers to the **complexity of a tone**
  - Sounds vary in **intensity**, it is the **loudness of a sound** (how loud they are)
  - **Decibels** is a unit of measurement.
    - The intensity of a sound (its loudness) is measured in decibels.
Hearing

Intensity is measured in *decibels*
Hearing

- **Eardrum**
  - Piece of skin stretched tightly over the entrance to the rest of the ear.
  - It vibrates and causes a small bone in the ear to vibrate.

- **Cochlea**
  - Snail-shaped part of the ear filled with fluid and small hairs that vibrate to incoming sound.
Hearing

- **Hair cells (cilia)**
  - Contain hair like extensions called *cilia* that are tuned to receive different frequencies.

- **Auditory Nerve**
  - Carries the information about sound to the brain.
  - Which part of the brain?
Our skin contains three types of cutaneous, or touch, receptors:

- Pressure
- Changes in temperature
- Injury or poison
Smell

- Smell is also called *olfaction*
- *Cilia* are hairs that collect odor molecules
- *Olfactory bulbs* communicate information about odor molecules to the brain.
Animals use smell to communicate sexual interest.

They send out odor chemicals called Pheromones.

Perfume and cologne companies try to imitate this effect in humans.

Axe Anarchy
Taste

- We have four types of taste receptors
  - Salty, sour, sweet, bitter
  - Babies do not crave salt
  - The craving for salt increases gradually with age then tapers off.
Perceptual Constants

- **Size**
  - Objects are perceived as remaining the same size regardless of distance.

- **Color and Brightness**
  - Objects are perceived as remaining the same color and brightness regardless of lighting.

- **Space**
  - The ability to keep objects in the environment steady.
Size
Color and Brightness
Space
Visual cliff

- Humans have depth perception
- It occurs very early in life (before your first birthday)
- EXPERIMENT
Retinal Disparity & Visual Texture

- How do they help in depth perception?
- Each eye sends a slightly different message to the brain
- This *disparity* helps us perceive depth
- Rough objects will seem near
- Smooth object will seem farther away
Gestalt Psychology

- Tend to perceive the world in wholes
- Gestalt means whole, shape, or form.
- Similarity
  - We group like things
  - One of these things is not like the other
- Closure
  - We have fill in the details to complete a picture
  - I don’t have a problem with closure…
- Proximity
  - We group things that are near
  - How many times do the players wearing WHITE pass the ball?
What is an illusion?

- Caused by an inaccurate perception
- Muller-Lyer illusion
  - One line is perceived as being farther away so we *mentally* stretch it. This makes it *appear* longer.
Take a very close look at the 2 vertical lines. Do you think one line is longer than the other?

Answer: They are the same size! Hard to believe; get out your ruler to measure the lines and see for yourself!
Reversible Figure

- One object is interpreted in an alternate manner
Subliminal Perception

- Occurs below mental awareness
What is your Psychological IQ?

1. The words sensation and perception mean the same thing.
   - FALSE – gathering and processing information

2. Only men are color blind.
   - FALSE – men do outnumber women

3. Generally speaking, people are able to block out background noise, focusing on only those sounds that are important to them.
   - TRUE – this is adaptation
What is your Psychological IQ?

4. Scientists have been able to prove the existence of mental telepathy by conducting carefully controlled experiments.
   - FALSE

5. People who have sight in only one eye have no depth perception.
   - FALSE – there are other clues that compensate

6. To a large extent, what we see is influenced by what we expect to see.
   - TRUE – optical illusions
What is your Psychological IQ?

7. People’s pupils frequently enlarge when they see something that pleases them.
   - TRUE

8. Children do not have depth perception until about the age of three or four.
   - FALSE – visual cliff experiment

9. Our tongues have only four different types of taste buds.
   - TRUE – sweet, sour, salt, bitter

10. The sense of touch is our most animal-like sense.
    - FALSE – it is the sense of smell
B = iris
C = pupil
D = cornea
E = lens
F = retina
G = optic nerve
EAR

A= bones (hammer, anvil, stirrup)
B= semicircular canals
C= auditory nerve
D= cochlea
E= eustachian tube
F= eardrum
G= auditory canal