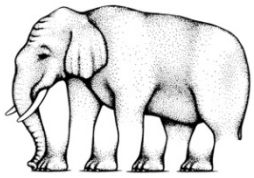
AP Psychology 12 Ms. Carey



Unit 4- Sensation & Perception

(Modules 16-21 p.156-221 Myers 3rd Edition)

MODULE 16- BASIC CONCEPTS of SENSATION & PERCEPTION

- **What are Sensation & Perception?**
  - Sensation is the process by which our sensory receptors and nervous system receive and represent stimulus energies from our environment.
  - Perception is the process of organizing and interpreting this information, enabling recognition of meaningful events.
  - Sensation and perception *are actually parts of one continuous process.*
    - **Bottom-Up Processing** is sensory analysis that beings at entry level, with information flowing from the sensory receptors to the brain.
    - **Top-Down Processing** is information processing guided by high-level mental processes, as when we construct perceptions by filtering information through our experiences and expectations.

- **How does Selective Attention direct our Perceptions?**
  - We selectively attend to, and process, a very limited portion of incoming information, blocking out much and often shifting our focus from one thing to another.
  - Focused intently on one task, we often display **inattentional blindness** (including ***change blindness***), to other events and changes around us.

- **What three steps are basic to all our sensory systems?**
  - 1) Receive sensory stimulation (often using specialized receptor cells)
  - 2) Transform that stimulation into neural impulses
  - 3) deliver the neural information to the brain

    ***Basically sense the world around us and send those sensations to the brain to be interpreted and perceived.*

Vocabulary:

- Selective Attention (*cocktail party effect*)
- Inattentional blindness
- Change blindness
- Absolute Threshold
- Difference Threshold
- Weber's Law
- Priming
- Sensory Adaptation

MODULE 17 – Influences on Perception (p.169)

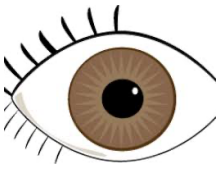
- **How do our expectations, contexts, motivation, and emotions influence our perceptions?**
  - *PERCEPTUAL SET* is a mental predisposition that functions as a lens through which we perceive the world.
  - Our learned concepts (or schemas) prime us to organize and interpret ambiguous stimuli in certain ways
  - Our motivation, as well as our physical and emotional context, can create expectations and colour our interpretations of events and behaviours.

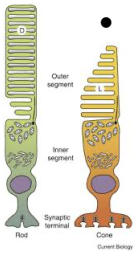
- **What are the claims of ESP and what have most research psychologists concluded after putting these claims to the test?**
  - *ESP* (Extra Sensory Perception)
  - *Parapsychology* is the study of paranormal phenomena, including extrasensory perception (ESP) and psychokinesis.
  - The three most testable forms of ESP are:
    - 1) **Telepathy** (mind to mind communication)
    - 2) **Clairvoyance** (perceiving remote events)
    - 3) **Precognition** (perceiving future events)

  - **Skeptics argue:**
    - 1) that to believe in ESP, you must believe the brain is capable of perceiving *without* sensory input
    - 2) researchers have been unable to replicate ESP phenomena under controlled conditions

Module 18- Vision: Sensory & Perceptual Processing (p.176)

- **What are the main structures of the eye? How do we see?**
  - The **hue** we perceive in light depends on its ***wavelength***, and its **brightness** depends on its ***intensity.***
  - After entering the eye through the cornea, passing through the pupil and iris, and being focused by the lens, light energy particles (*from a thin slice of the broad spectrum of electromagnetic energy*), strike the eye's inner surface- the RETINA.

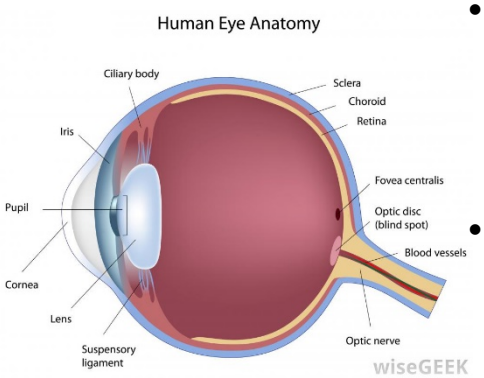




- **How do the rods & cones process information, and what is the path information travels from the eye to the brain?**
  - The retinas' light sensitive rods, and colour-sensitive cones convert light energy into neural impulses.
  - Cones are found in and around the fovea. Many cones have a direct hotline to the brain, transmitting their message to a single bipolar cell that relays it to the visual cortex in the brain.

- Rods are found in the retina's outer regions. Several rods together transmit their energy to a single bipolar cell.
- Cones & rods each provide a special sensitivity- cones to detail & colour, and rods to faint light and peripheral motion.
- After processing by bipolar and ganglion cells in the eyes' retina, neural impulses travel through the optic nerve, to the thalamus, and on to the visual cortex.

- **How do we perceive colour?**
  - *TWO* Theories on Colour Perception:



- 1) **YOUNG-HELMHOLTZ TRICHOMATIC (3 Colour) THEORY**
  - proposes that the retina contains three types of colour receptors
  - contemporary research has found 3 types of cones, each most sensitive to the wavelengths of one of the three primary colours of light (red, green or blue)

- 2) **OPPONENT-PROESS THEORY** (proposed by *Hering*)
  - proposed three additional colour process including:
    - **Red vs. Green**
    - **Blue vs. Yellow**
    - **White vs. Black**

- **Where are Feature Detectors located, and what do they do?**
  - Feature detectors, specialized neurons in the occipital lobe's visual cortex, respond to specific aspects of the visual stimulus.
  - They receive information from individual ganglion cells in the retina and pass it to the other cortical areas.

- **How does the brain use parallel processing to construct visual perceptions?**
  - Through parallel processing, the brain handles many aspects of vision (colour, movement, form, and depth) simultaneously.
    (your brain can do many things at once)

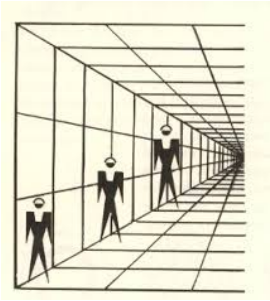
MODULE 19- Visual Organization & Interpretation (p.187)

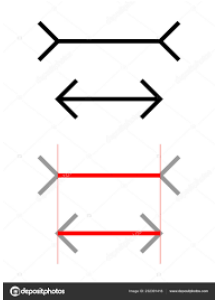
- **What is Gestalt Psychology?**
  - Gestalt psychologists searched for rules by which the brain organizes fragments of sensory data into 'gestalts' or 'wholes'. = **an organized whole.**
    "In perception, the whole may exceed the sum of its parts."

- **How do Figure-Ground and Grouping principles contribute to our perceptions?**
  - To recognize an object, we must first perceive it (see it as a *figure*), as distinct from its surroundings (the *ground*). We bring order and form to stimuli by organizing them into meaningful **groups**, following such rules as **proximity, continuity,** and **closure.**

- **DEPTH PERCEPTION**
  - Depth perception is our ability to see objects in 3-dimensions and judge distance. The VISUAL CLIFF experiment shows this…
  - **Binocular Cues**- such as retinal disparity, are depth cues that rely on information from BOTH eyes.
  - **Monocular Cues**- such as relative size, interposition, relative height, relative motion, linear perspective and light & shadow, let us judge depth using information from only ONE eye.

    Vocabulary:
    - Depth Perception
    - Visual Cliff Experiment
    - Binocular Cues
    - Monocular Cues
    - Phi phenomenon
    - Stroboscopic movement





- **How do Perceptual Constancies help us construct meaningful perceptions?**
  - ***Perceptual Constancy-*** enables us to perceive objects as stable despite the changing image they cast on our retinas.
  - ***Colour Constancy-*** is our ability to perceive consistent colour in objects, even though the lighting and wavelengths shift.

    Vocabulary:
    - *Perceptual Adaptation* (we adapt to new contexts, sounds, smells, etc)

Module 20- Hearing (p.198)

- **How do we hear?**

  - Sound waves are bands of compressed and expanded air. Our ears detect these changes in air pressure and transform them into neural impulses, which the brain decodes as sound.
  - Sound waves vary in amplitude, which we perceive as differing loudness (measured in decibels), and in *frequency*, which we experience as differing *pitch.*

- **How does the ear transform sound energy into neural impulses?**
  - The outer ear funnels sound into the middle ear (the chamber between the eardrum and the cochlea).
  - The inner ear consists of the *cochlea, semicircular canals, and vestibular sacs.*
  - Sound waves travelling through the auditory canal cause tiny vibrations in the eardrum. The bones of the middle ear (*the hammer, anvil, and stirrup*) amplify the vibrations and relay them to the *fluid-filled cochlea.* Rippling of the basilar membrane causes movement of the *tiny hair cells,* triggering neural messages to be sent (via the *thalamus*), to the *auditory cortex* in the brain.

- **Sensorineural Hearing Loss** (or *nerve deafness)* results from damage to the cochlea's hair cells or their associated nerves.
- **Conduction Hearing Loss** results from damage to the mechanical system that transmits sound waves to the cochlea
- **Cochlear Implants** can restore hearing for some people.

- **How do we detect loudness, discriminate pitch, and locate sounds?**
  - Our brain interprets loudness from the number of activated hair cells (and louder sounds activate greater number of hair cells)
    - PLACE THEORY- explains how we hear high-pitched sounds.
    - FREQUENCY THEORY- explains how we hear low-pitched sounds

      = A combination of Place & Frequency theories explains how we hear *pitches in the middle ranges.*

MODULE 21- The Other Senses (p. 205)

- **How do we sense TOUCH?**
  - Our sense of touch is actually several senses- *pressure, warmth, cold, and pain-* that combine to produce other sensations such as hot.

- **What about PAIN?**
  - Gate Control Theory- that a 'gate' in the spinal cord either opens to permit pain signals traveling to the brain or it 'shuts the gate' and blocks them releasing endorphins to help pause the pain. (ie: people in shock who feel no pain).
  - Phantom Limb Sensation – the brain creates pain

- **In what ways are our senses of TASTE and SMELL similar?**
  - Taste and Smell are both chemical senses
  - Taste is a composite of 5 basic sensations- *sweet, sour, salty, bitter, & umami-* and the aromas that interact with information from the taste receptor cells of the taste buds.
  - There are no basic sensations for smell. We have some 20 million olfactory receptor cells, with about 350 different receptor proteins.
  - Odour molecules trigger combinations of receptors, in patterns that the olfactory cortex interprets. The receptor cells send messages to the brains **Olfactory Bulb,** then to the **Temporal Lobe**, and to parts of **the Limbic System**.

Vocabulary:

- Kinesthesia
- Vestibular Sense
- Sensory Interaction
- Embodied Cognition