

PSY 341 Chapter 3

Perception

- Sensation
 - Absorbing raw energy (ex, light waves, sound waves) through our sensory organs
- Transduction
 - Conversion of this energy to neural signals
- Attention
 - Concentration of mental energy to process incoming information
- Perception
 - Recognizing, selecting, organizing, and interpreting these signals
 - Not an exact copy of the world
 - Partially based on our past experience and expectations

From Sensation to Representation

- Energy contains information about the world (usually incomplete, full of noise, and distorted)
- Sensory receptor transduces energy into a neural response
 - Equal playing field, what matters is which nerves are excited
 - Stimulation of a specific nerve provides codes for that one sense
- Sensory nerve transmits the coded activity to the central nervous system
- Thalamus processes and relays the neural response
 - For all senses but olfaction (which projects to the olfactory bulb)
- Relayed to specialized areas of the cortex

Bottom-Up Processing

Feature Matching Theories

- Recognize objects on the basis of a small number of characteristics (features)
 - Detect specific elements and assemble them into more complex forms
 - Brain cells that respond to specific features such as lines and angles are referred to as feature detectors

Physiological Evidence For Features

Hubel & Wiesel (1979)

- Simple cells detect bars or edges of particular orientation in particular location
- Complex cells detect bars or edges of particular orientation, motion, direction

Feature Searches

- Simple features seem to “pop out”
 - Fast processing
 - But sometimes need to engage in serial search for simple features
 - Occurs when distractors share simple feature as target
- Serial search
 - If feature doesn’t pop out, must rely on serial search
- Combined features don’t “pop out”
 - Don’t have conjoined feature detectors
 - Requires serial search
 - Processing speed depends on number of distractors
 - More distractors=longer processing
 - Hierarchical processing

Feature Analysis

Bottom up processing

- Perception may start with the senses
- Incoming raw data
- Energy registering on receptors

Top down processing

- Perception may start with the brain
- Persons knowledge, experience, expectations
- The use of preexisting knowledge to organize individual features into unified whole
 - Guided by higher level cognitive processes such as knowledge and expectations
- Top down processes influence how we perceive objects
 - Example: the multiple personalities of a blob

Object Perception

- Four concepts
 - Helmholtz's unconscious inference
 - Regularities Approach
 - Bayesian inference
 - Gestalt laws

Unconscious inference

- The problem: Stimulus on receptors can be ambiguous
- The solution: Helmholtz's Theory of Unconscious Inference (1860)
 - We perceive the object that would most likely cause the pattern of stimulation
 - Termed the likelihood principle
- Perceptions are the result of unconscious assumptions we make about the environment
 - We use our knowledge to inform our perceptions
 - Top down processes help us interpret the signal

Regularities in the environment

- Similar to Helmholtz's idea of unconscious inference
- This approach suggests that perception is influenced by our knowledge of regularities in the environment
- Semantic Regularities: characteristics associated with the functions carried out in different scenes
 - Scene Schemas
- Physical regularities: regularly occurring physical properties of the environment
 - Oblique effect: we are biased to perceive vertical and horizontal orientations because those are more frequent than other orientations
- Light from above assumption
- Good continuation: perceive covered object as continuous in form

Object Recognition

- Perceptual set (perceptual expectancy)
 - The tendency to perceive things a certain way because previous experiences or expectations influence those perceptions
 - Our experiences create schemas