Perception

Selective Attention

Perceptual Illusions

Perceptual Organization

- Form Perception
- Motion Perception
- Perceptual Constancy

Perceptual Interpretation

- Sensory Deprivation and Restored Vision
- Perceptual Adaptation
- Perceptual Set
- Perception and Human Factor

Selective Attention

Perceptions about objects change from moment to moment. We can perceive different forms of the Necker cube; however, we can only pay attention to one aspect of the object at a time.

Example: Cocktail Party Effect
Inattentional Blindness

Inattentional blindness refers to the inability to see an object or a person in our midst. Simmons & Chabris (1999) showed that half of the observers failed to see the gorilla-suited assistant in a ball passing game.

Change Blindness

Change blindness is a form of inattentional blindness in which two-thirds of individuals giving directions failed to notice a change in the individual asking for directions.

Perceptual Illusions

Illusions provide good examples in understanding how perception is organized. Studying faulty perception is as important as studying other perceptual phenomena.

Tall Arch

In this picture, the vertical dimension of the arch looks longer than the horizontal dimension. However, both are equal.

Illusion of a Worm

The figure on the right gives the illusion of a blue hazy “worm” when it is nothing else but blue lines identical to the figure on the left.
3-D Illusion

It takes a great deal of effort to perceive this figure in two dimensions.

Form Perception

Organization of the visual field into objects (figures) that stand out from their surroundings (ground).

Perceptual Organization

When vision competes with our other senses, vision usually wins – a phenomena called visual capture.

Visual Capture Example

e.g., movie projector voices (vision overtakes hearing)

This can be true with other senses as well
e.g., finger touch and various tones; feeling like we’re moving when simply watching an action movie

Sensory and Perception Blend

How do we form meaningful perceptions from sensory information?

We organize it!
Gestalt psychologists showed that a figure formed a “whole” different than its surroundings.

Our brains do a heck of a lot more than just merely register information about the world!
Gestalt Psychologists: Grouping

After distinguishing the figure from the ground, our perception needs to organize the figure into a meaningful form using grouping rules.

Grouping & Reality

Although grouping principles usually help us construct reality, they may occasionally lead us astray.

Patterns

- Naturally we look for patterns in life
- In addition to visual patterns, we also concoct patterns with our other senses

  e.g., We tend to hear clock’s go “tick TICK tick TICK”, but in reality, the sounds are the same—“tick tick tick”.

Depth Perception

Depth perception enables us to judge distances. Gibson and Walk (1960) suggested that human infants (crawling age) have depth perception. Even newborn animals show depth perception.

Binocular Cues:

Need the use of two eyes

Retinal disparity: Images from the two eyes differ. Try looking at your two index fingers when pointing them towards each other half an inch apart and about 5 inches directly in front of your eyes. You will see a “fingert sausage” as shown in the inset.

Binocular Cues

Convergence: Neuromuscular cues. When two eyes move inward (towards the nose) to see near objects and outward (away from the nose) to see faraway objects.

*Two eyes are better than one!
Monocular Cues:
Can use eyes together or either eye alone

Relative Size: If two objects are similar in size, we perceive the one that casts a smaller retinal image to be farther away.

Monocular Cues

Interposition: Objects that occlude (block) other objects tend to be perceived as closer.

Monocular Cues

Relative Clarity: Because light from distant objects passes through more light than closer objects, we perceive hazy objects to be farther away than those objects that appear sharp and clear.

Monocular Cues

Texture Gradient: Indistinct (fine) texture signals an increasing distance.

Monocular Cues

Relative Height: We perceive objects that are higher in our field of vision to be farther away than those that are lower.

Monocular Cues

Relative motion: Objects closer to a fixation point move faster and in opposing direction to those objects that are farther away from a fixation point, moving slower and in the same direction. This is how we compute objects’ distances.
Monocular Cues

Linear Perspective: Parallel lines, such as railroad tracks, appear to converge in the distance. The more the lines converge, the greater their perceived distance.

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Light and Shadow: Nearby objects reflect more light into our eyes than more distant objects. Given two identical objects, the dimmer one appears to be farther away.

From "Perceiving Shape From Shading" by Vilayaur S. Ramachandran. © 1988 by Scientific American, Inc. All rights reserved.

Motion Perception

Motion Perception: Objects traveling towards us grow in size and those moving away shrink in size. The same is true when the observer moves to or from an object.

e.g., driving

Apparent Motion

Phi Phenomenon: When lights flash at a certain speed they tend to present illusions of motion. Neon signs use this principle to create motion perception.

One light jumping from one point to another: Illusion of motion.

Perceptual Constancy

Perceiving objects as unchanging even as illumination and retinal images change. Perceptual constancies include constancies of shape and size.

Shape Constancy

Size Constancy

Stable size perception amid changing size of the stimuli.
Size-Distance Relationship

The distant monster (below, left) and the top red bar (below, right) appear bigger because of distance cues.

From Shepard, 1990

Alan Choisnet/ The Image Bank

Size-Distance Relationship

Both girls in the room are of similar height. However, we perceive them to be of different heights as they stand in the two corners of the room.

Both photos from S. Schwartzenberg / The Exploratorium

Ames Room

The Ames room is designed to demonstrate the size-distance illusion.

Lightness Constancy

The color and brightness of square A and B are the same.

Color Constancy

Perceiving familiar objects as having consistent color even when changing illumination filters the light reflected by the object.

Visual Illusions Video
Perceptual Interpretation

Immanuel Kant (1724-1804) maintained that knowledge comes from our inborn ways of organizing sensory experiences.

John Locke (1632-1704) argued that we learn to perceive the world through our experiences.

How important is experience in shaping our perceptual interpretation?

e.g., Amadou Diallo and police incident

Video Time

What happens when we have sensation without perception?

Restored Vision

After cataract surgery, blind adults were able to regain sight. These individuals could differentiate figure and ground relationships, yet they had difficulty distinguishing a circle and a triangle (Von Senden, 1932).

Facial Recognition

After blind adults regained sight, they were able to recognize distinct features, but were unable to recognize faces. Normal observers also show difficulty in facial recognition when the lower half of the pictures are changed.

Sensory Deprivation

Kittens raised without exposure to horizontal lines later had difficulty perceiving horizontal bars.

Blakemore & Cooper (1970)

Perceptual Adaptation

Visual ability to adjust to an artificially displaced visual field, e.g., prism glasses.
Perceptual Set
A mental predisposition to perceive one thing and not another. What you see in the center picture is influenced by flanking pictures.

(a) Loch ness monster or a tree trunk; (b) Flying saucers or clouds?

From Shepard, 1990.

Perceptual Set
Other examples of perceptual set.

Schemas
Schemas are concepts that organize and interpret unfamiliar information. Schemas develop through experience.

Children’s schemas represent reality as well as their abilities to represent what they see.

Features on a Face
Face schemas are accentuated by specific features on the face.

Students recognized a caricature of Arnold Schwarzenegger faster than his actual photo.

Eye & Mouth
Eyes and mouth play a dominant role in face recognition.

Context Effects
Context can radically alter perception.

Is the “magician cabinet” on the floor or hanging from the ceiling?
Cultural Context

Context instilled by culture also alters perception.

To an East African, the woman sitting is balancing a metal box on her head, while the family is sitting under a tree.

Perception Revisited

Is perception innate or acquired?

Perception & Human Factors

Human Factor Psychologists design machines that assist our natural perceptions.

The knobs for the stove burners on the right are easier to understand than those on the left.

Human Factors & Misperceptions

Understanding human factors enables us to design equipment to prevent disasters.

Two-thirds of airline crashes caused by human error are largely due to errors of perception.

Human Factors in Space

To combat conditions of monotony, stress, and weightlessness when traveling to Mars, NASA engages Human Factor Psychologists.

Is There Extrasensory Perception?

Perception without sensory input is called extrasensory perception (ESP). A large percentage of scientists do not believe in ESP.

- Claims of ESP
- Premonitions or Pretensions
- Putting ESP to Experimental Test
Claims of ESP

Paranormal phenomena include astrological predictions, psychic healing, communication with the dead, and out-of-body experiences, but most relevant are telepathy, clairvoyance, and precognition.

- **Telepathy**: Mind-to-mind communication. One person sending thoughts and the other receiving them.
- **Clairvoyance**: Perception of remote events, such as sensing a friend’s house on fire.
- **Precognition**: Perceiving future events, such as a political leader’s death.

Putting ESP to Experimental Test

In an experiment with 28,000 individuals, Wiseman attempted to prove whether or not one can psychically influence or predict a coin toss. People were able to correctly influence or predict a coin toss 49.8% of the time.

Premonitions or Pretensions?

Can psychics see the future? Can psychics aid police in identifying locations of dead bodies? What about psychic predictions of the famous Nostradamus?

The answers to these questions are NO! Nostradamus’ predictions are “retrofitted” to events that took place after his predictions.

Review Session

for Exam 2

Wednesday, Feb 13th
5:30-6:30pm
Location: In this room

Bring Questions!