

Psychology 343 - Perception

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- Text is *Sensation & Perception* by Goldstein (8th edition)

Lecture 1 - Course Description

Course Description. Overview of human perception. Covers the visual and auditory systems and the touch and chemical senses. Data and explanations from both physiological and behavioral approaches.

Course Requirements. The course grade is based on the scores on three exams and three short papers. Together, the short papers are counted as equivalent to an exam.

The exams are multiple choice.

The short papers are one page short essays on questions posted by the instructor.

I. What is Perception?

In humans we use this term to refer to the mental process that convert energy at the sensory receptors into a mental event that can be recognized, stored in memory, and used with other cognitive processes.

In each sensory system, we will look at:

1. The signal (the stimulus).
2. The sensory receptor(s).
3. Neural mechanisms (the brain).
4. Subjective experience.
5. Behavioral data.

II. Neural Processes

In examining perception, we will look at the brain mechanisms involved. This includes the sensory receptors and the central nervous system.

A) Receptors

The receptors perform transduction. They convert a form of physical energy (the stimulus) into an electrical (neural) signal.

B) Brain

The nervous system processes the electrical signal:

1. Transmission – A neuron or set of neurons relay signals at their input to the next set of neurons.

2. Elaboration/Recoding – The output from a neuron or set of neurons is not the same as the input. The precise information in the neural signal has been altered by a “computation” performed by the neurons.

An explanation (theory) of perception would relate these brain processes to mental processes.

III. Mental Processes

A) Terminology. A number of terms are used to describe aspects of our mind:

1. Perception. Conscious experience of the actions of our sensory systems.
2. Recognition. Our ability to put our perceptions into categories.
3. Memory. Storage and retrieval of prior perceptions (among other mental events).
4. Knowledge. Information (from memory) that our observer brings to a situation and can influence perception.

5. Action. Motor activity (walking, moving eyes) that may result from perception and can influence perception.

Keep in mind that these terms are a part of our “theory” that describes and explains the mind.

B) Subjective Experience

Mental events, such as our experience of the color **blue**, are private. That is, others can not directly observe the mental events or experience.

If someone were blind, how would you convey the nature of the experience of the color **blue** to them?

Humans use language to refer to mental experience and connect it with events in the world. However, the apparent ease with which this occurs conceals a sophisticated, complex process. Our goal in this course is to understand the mental (and biological) machinery that underlies perception.

C) Behavioral Data

Since mental processes are unobservable, how can we collect information on how perception works? We can observe animal and human behavior and/or we can observe the operation of the underlying physiology.

Behavior refers to actions by humans and animals.

1. We might project different wavelengths of light on a screen and ask our observer what color they see (subjective report).
2. Alternatively, we might project a particular wavelength and ask whether it is red or orange (forced choice).
3. We could project two wavelengths of light in different areas and ask the observer if they are the same or different (discrimination).
4. Finally, we can also measure the speed with which observers make their response (RT).

Ultimately, all behavioral data are reduced to what response the observer makes and how fast they made it.

For *non-humans*, we can not use language to tell the observer what we would like them to do and they can not use language to tell us what they experienced.

Here, the animal (or pre-linguistic human) must be trained to make different responses to different situations. Then, when exposed to something new, their response informs us how the new item was interpreted.

D) Why examine physiology?

The physiology of perception concerns the operation of the brain. We assume that the operations of the mind are based on the operations of the brain.

Understanding the brain (physiology) is important for:

1. Understanding perceptual disorders
2. Relating mental experience (mind) to the brain
3. It is one window into the private world of the mind

IV. Some questions that we hope to answer along the way.

What does it mean to experience color?

How does a cat or dog see the world?

How do we recognize objects? How do we know that it is the same object when viewed from different angles?

How do we know the size of objects?

How do we judge distance and depth?

What about the sound of a person's voice enables you to recognize who is talking? -or- What they are saying?

How can you tell the location of a sound in space?