OBJECT PERCEPTION
CHAPTER 5

PERCEIVING OBJECTS
"WHAT IS IT?"

- **TASK OF COGNITIVE PSYCHOLOGIST**
  - Is to identify _____ - Principles that must be programmed into the model in order for it to act like a human.

- If we wanted to make a robot that sees the world as we do what would you need to program into it?
  - rules for constructing the representation
  - rules for making sense out of the world
  - How would it distinguish objects from their background?

THE PROBLEMS OF PERCEPTION

- The brain constructs representations of the world from _____.
  - Parts of objects can be _____.

- **The stimulus on the receptors is ambiguous**:

- Objects need to be _____ from their environment.

- How the _____ of light onto the retina of the eye gives rise to the phenomenal experience of a _____.

- **Control Problem:** How can we perceive the constant properties of the _____ given the inevitable variations in the _____?

- The reasons for changes in lightness and darkness can be unclear.

- Objects look different from different _____.
  - **Viewpoint invariance**: the ability to recognize an object regardless of the viewpoint

How do we deal with these problems?

- **Top-Down Processing**: this processing begins by considering facts we know, our memories, _____.
  - **Word superiority effect** -

Expectancies & Perception

- **Palmer's (1975) experiment**
  - Observers saw a context scene flashed briefly followed by a target picture.
  - Results showed that:
    - Targets **congruent** with the context were identified _____ of the time
    - Targets that were **incongruent** were only identified _____ of the time
  - Conclusion:

How do we deal with these problems?

- Constraints/Biases built into the system.
  - Gestalt Principles
  - Constancies

HISTORY OF RESEARCH IN OBJECT PERCEPTION

- **Wilhelm Wundt** established the **first experimental laboratory** in psychology (Leipzig, Germany in 1879).
  - **Structuralism:** Wundt wanted to establish psychology as a **natural science.**
    - Goals were to analyze the basic elements of conscious experience _____, discover how they became connected, and specify the laws of connection.
    - Structuralists believed that _____ were created by

combining basic elements called _____.

HISTORY OF RESEARCH IN OBJECT PERCEPTION

- **GESTALT PSYCHOLOGISTS:**
  - Challenged the Structionalist's notion that conscious experience could be broken down into elements.
    - Perception is not built up from sensations but is a result of _____ _____.
  - ***"The whole is different/greater than the sum of its parts."***
    - Stressed _____**:** *it is not the elements of consciousness that are important but the relationships among those elements.*
  - Gestalt Psychology started in **Germany in 1912** with the description of visual illusion called _____.
  - **Subjective Contours** –

GESTALT PRINCIPLES OF PERCEPTUAL GROUPING

- **Organization in Visual Perception**:
- **Pragnanz or simplicity:** resulting structure is as _____.
- **Common Fate –** objects _____ in the same direction are grouped together.
- **Closure:**
- **Proximity:**
- **Similarity:**
- **Good Continuation:**

Gestalt Principles of Perceptual Grouping (Continued)

- **Familiarity or Meaningfulness -** Objects are more likely to form groups if the groups appear _____.

MORE PRINCIPLES OF PERCEPTUAL ORGANIZATION

- **Common Region** – Elements that are within the same region of _____ are grouped together.
- **Connectedness** – Things that are _____ are perceived as a unit.
- **Synchrony** – Visual events that occur at the _____ will be perceived as going together.
- **Perceptual Constancy**
  - **shape constancy** -
  - **size constancy** -

PERCEPTUAL SEGREGATION: HOW OBJECTS ARE SEPARATED FROM SURROUNDINGS

- *Separate the object from its surroundings. (Reversible Figures)*
  - Figure = object
  - Ground = background
- **Some Properties Of Figure And Ground Segregation:**
  - The figure is more "_____" and more _____ (meaningful) than the ground.
  - The figure is seen as being _____ of the ground.
  - The ground is seen as _____ the figure.

- **<u>Some Properties Of Figure And Ground Segregation (continued)</u>:**
  - The _____ separating the figure from the ground appears to _____.
  - Stimuli that are comparatively _____ are more likely to be seen as figure.
  - When you are perceiving the one pattern as figure, it is difficult, if not impossible, to _____.

Recognition-by-Components Theory
Biederman (1987, 1990, 1995)

- The basic assumption of this theory is that objects can be represented as an arrangement of simple 3-D shapes called _____.
  - There are _____ that combine to make all _____.

- **<u>Properties of geons</u>**
  - <u>View-invariant properties</u> –
  - <u>Non-accidental properties</u> –
  - <u>Accidental properties</u> –
  - <u>Discriminability</u> –
  - <u>Principle of componential recovery</u> -

EVALUATION OF BIEDERMAN'S THEORY

- **Strengths:**
  - Object centered approach
  - It shows we can recognize objects based on a small number of shapes.

- **Weaknesses:**
  - Can't explain our ability to discern _____ w/in classes of objects.
  - **Deemphasize the role of context**:
  - **Neurons**
  - There are some objects that can't be explained by geons