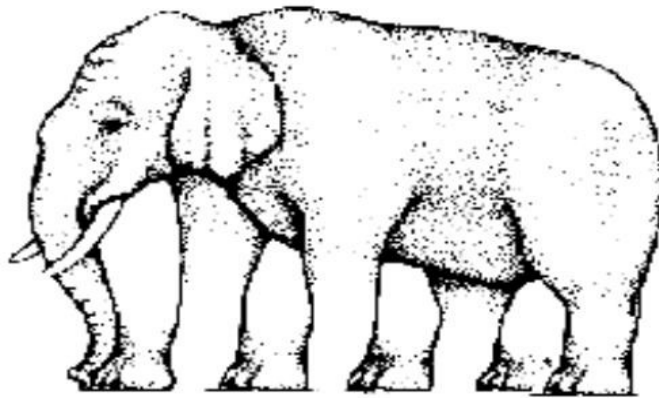


Sensation & Perception



How many legs does this elephant have?



Young Woman



Old Woman



Old or young?



What's the difference?

☞ Sensation

- Detecting stimuli from the body or environment.

☞ Perception

- Organizing sensations into meaningful patterns.

☞ Stimulus

- Form of energy that can affect sense organs.

The Basics of Sensation



1. Receptor cells in sense organs detect appropriate stimuli.
2. Convert stimuli (transduction) into neural impulses (action potential).
3. Transmit message to brain through different routes, allowing brain to differentiate physical stimuli (coding).
4. Brain assigns meaningful sensory information.

From Sensation to Perception

1

Stimulus



Example: A green light emits physical properties in the form of photons (light waves).

2

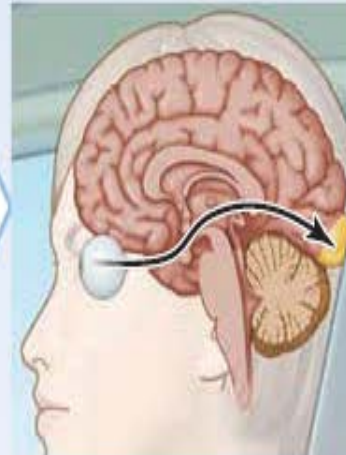
Sensation



Sensory receptors in the driver's eyes **detect** this stimulus.

3

Sensory Coding



The stimulus is **transduced** (translated into chemical and electrical signals that are transmitted to the brain).

4

Perception



The driver's brain processes the neural signals and constructs a representation of a green light ahead. The brain interprets the representation of the light as a sign to continue driving.

The human senses

-  **Vision:** Sense of sight.
-  **Auditory:** Sense of hearing.
-  **Olfaction:** Sense of smell.
-  **Gustation:** Sense of taste.

The human senses

🌀 **Vestibular:** Sense of balance.



🌀 **Tactile:** Skin senses for pressure, temperature, pain.

🌀 **Organic:** Sensation from internal organs such as hunger, thirst, drowsiness.

Sensation Related Problems



- **Motion blindness:** Unable to detect motion.
- **Prosopagnosia:** Inability to identify person by facial features.
- **Motion sickness:** Related to vestibular system.
- **Anhidrosis:** Unable to feel pain.

Psychophysics

- A subfield developed by Ernst Weber and Gustav Fechner, examines our psychological experiences of physical stimuli.

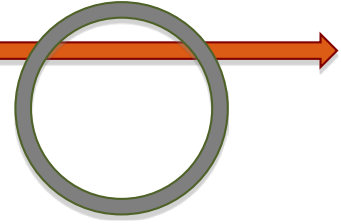
Thresholds

- Absolute threshold:
 - This is the minimum amount of a stimulus that is necessary for us to notice it 50% of the time (AKA Fechner's Law).
 - Stimuli that cannot be detected 50 percent of the time are **subliminal** (below the limen or threshold).
- Difference threshold or just noticeable difference (JND):
 - It's the smallest amount of stimulus change we can detect (AKA Weber's Law).

Adaptation

Sensory adaptation

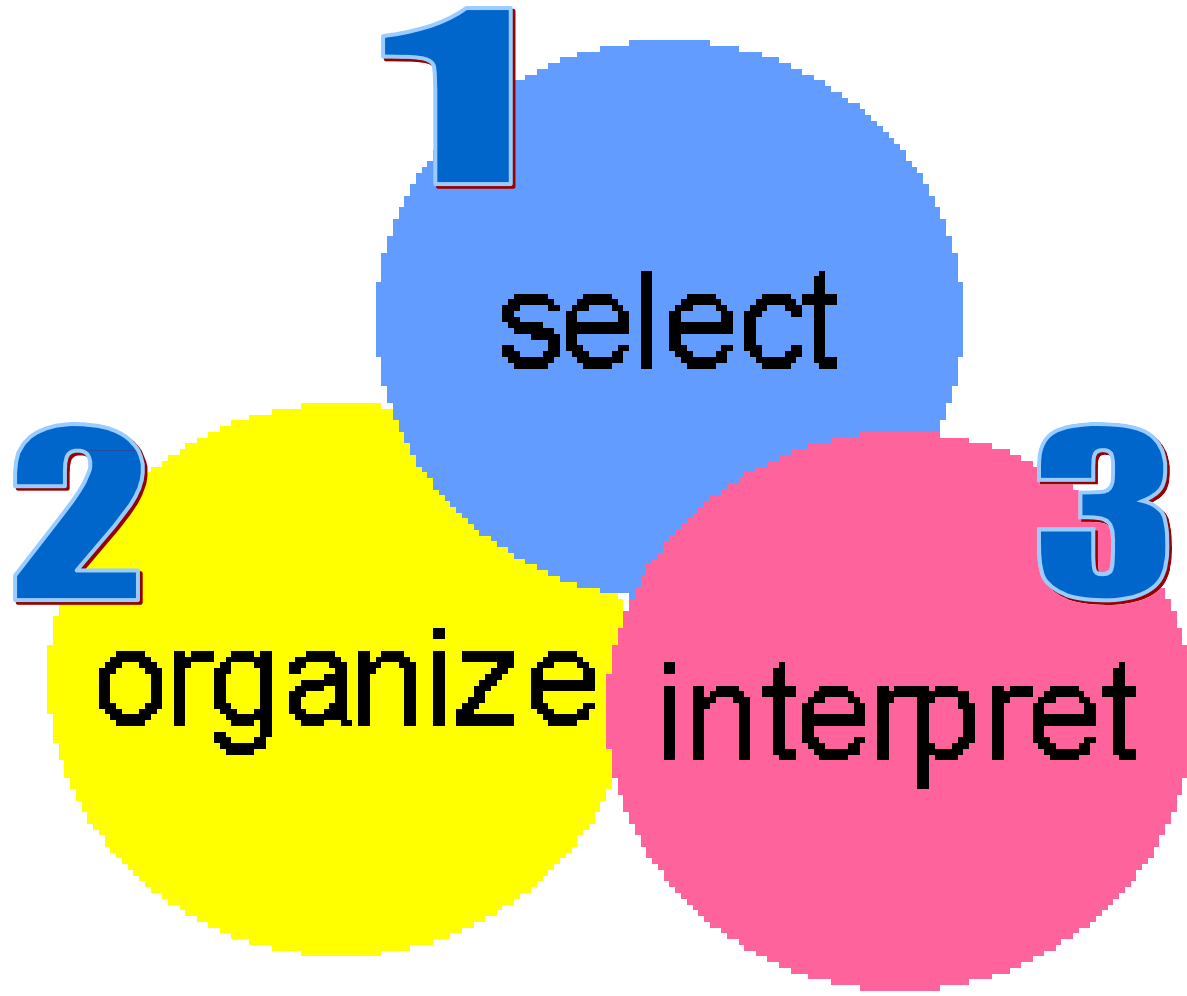
- A decrease in sensitivity (desensitization) to a constant level of stimulation
 - Suppose you visit a neighbor's house with 10 cats. You smell the animals, but the owner doesn't.
- Normally, smell and touch experience sensory adaptation readily; vision and intense stimuli do not.



Perception

Perception = Process of **selecting, organizing,** and **interpreting** incoming sensations into useful mental representation of the world.

The Perceptual Process



The first step in
perception is
selection—choosing
where to direct our
attention.

1



Attention



- 📌 Attending to one of such incoming input ignoring the rest.
- 📌 Events or stimuli that you perceive clearly are the **focus** of your experience.
- 📌 Items or stimuli that you perceive partially or vaguely are in the **margin** of your attention.

Ex. Cocktail party effect

Attention



- 📌 Attention shifts constantly.
- 📌 What is in the focus of your attention one moment may be in margin and vice versa.
- 📌 We're poor at detecting stimuli in plain sight if our attention is focused elsewhere.

Habituation



 **Habituation** = Decrease in responding to repeated stimulation of same stimuli; more responsive to changes in environment.

- Compliments from strangers are more exciting than from long-term partner!
- The song you HATED on first listen might grow on you!



How do advertisers and politicians use selective attention and habituation?

- **Capture attention with:**



Size and Intensity



Repetition



Novel



Moving



Determinants of attention

- **Size**



Determinants of attention

Repetition



Determinants of attention

- Novelty



Determinants of attention

- Novelty



Determinants of attention



- **Movement**

Internal factors



**Set or
expectancy**

**Motives or
needs**



Having selected
incoming
information, we
organize it into
patterns and
principles that will
help us understand
the world.

2



ORGANIZE



Principles of Perceptual organization

- ◆ There are 3 categories:
 - Gestalt principles
 - Perceptual constancies
 - Depth principles
- 

Gestalt Principles

- Rules that govern how we perceive objects as wholes within their overall context.

 Figure-ground

 Closure

 Similarity

 Proximity

Figure-ground

- In organizing a stimuli, we tend to automatically distinguish between a figure (object with more details) and a ground.



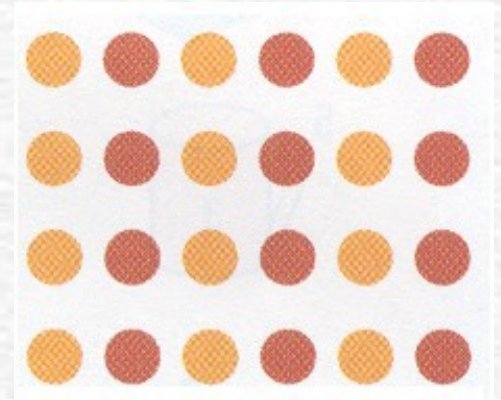
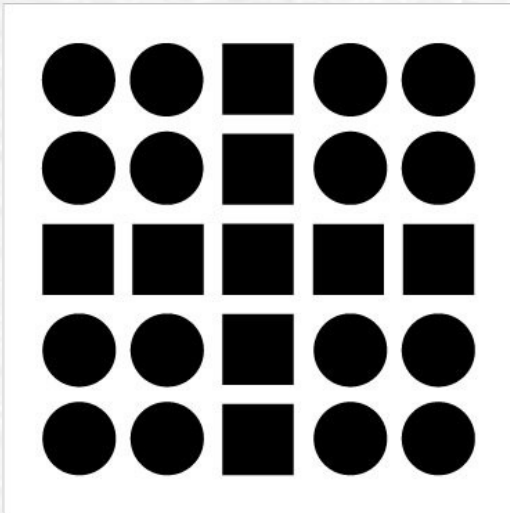
Closure

- Our brains tend to fill in gaps in a figure and see them as complete.



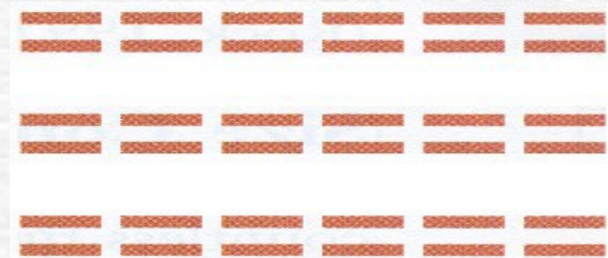
Similarity

- Parts of an image that look alike tend to be grouped together

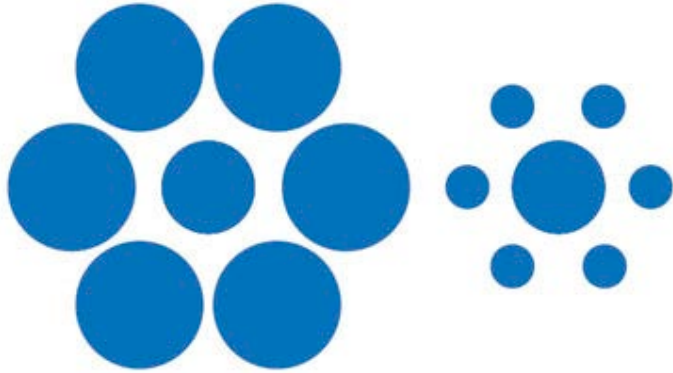


Proximity

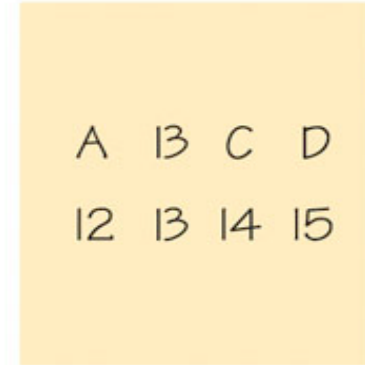
- Parts of an image that are near one another tend to be grouped together



Context



A. Are the dots in the center of the configurations the same size? Why not take a ruler and measure them?



B. Is the second symbol in each line the letter *B* or the number 13?



C. Which of the gray squares is brighter?

THE BAT

D. Is second letter in each word an “H” or “A” ?

Perceptual Constancies

- **Perceptual constancy** allows us to perceive stimuli consistency across conditions.
- We don't see the size, shape, or color of an object changing despite the objective fact that they do.
- Color perception in particular derives from context.

Size Constancy

- The tendency to perceive objects as the same size no matter how far away they are from us.



Shape Constancy

The tendency to see an object as retaining its form despite changes in orientation



Color Constancy

The tendency to perceive an object as maintaining its level of brightness in relations to its surroundings.



Depth Principles

- How is it that we perceive a 3-dimensional world when our eyes only project a 2-dimensional image on our retinas??!
- Our brain uses different cues to perceive depth. There are 2 types:
 - Binocular depth cues (retinal disparity, convergence)
 - Monocular depth cues (accommodation, pictorial cues – linear perspective, interposition, texture gradient, relative size,

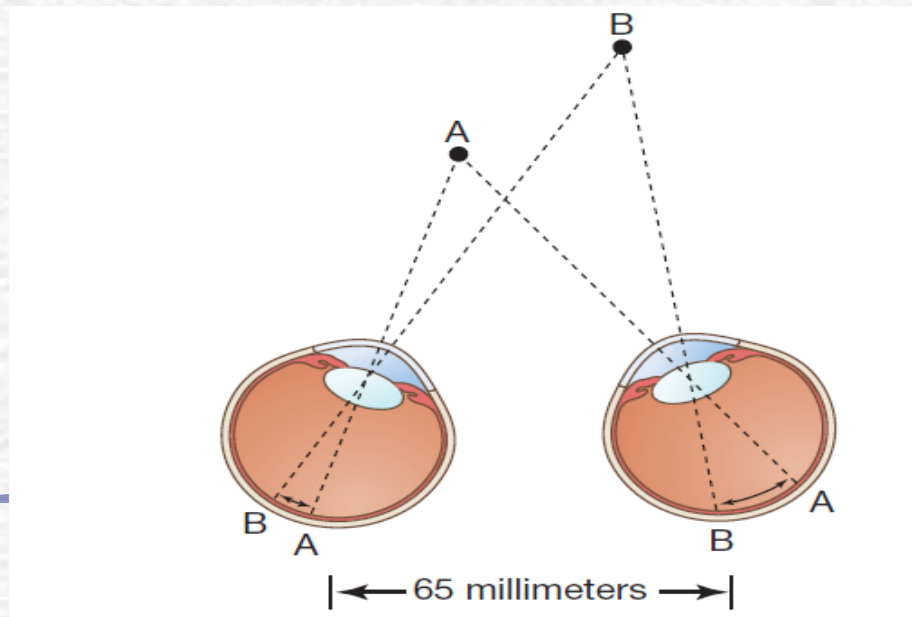
Binocular depth cues

- Our brain uses **both eyes** working together to provide information about depth and distance.
- There are two kinds of binocular cues:
 - Retinal disparity
 - Convergence

Binocular depth cues

Retinal disparity

- Refers to the difference in the location of the visual image on the retina (due to the angle of the view).
- The closer the object, the greater is the retinal disparity.

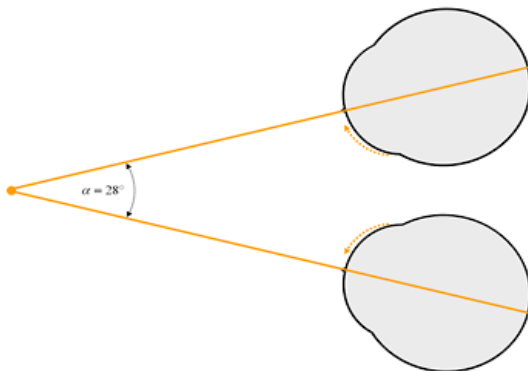


Binocular depth cues

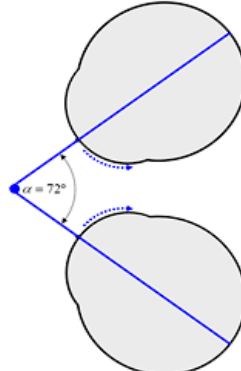
Convergence

- The brain detecting depth and distance from the changes in the tension in the eye muscles that occur when the two eyes turn inward to focus on an object

Convergence for a far target



Convergence for a near target



Monocular depth cues

Monocular cues

Our brain also uses information from the stimulus that requires the use on **only one eye**.

- Accommodation
- Motion parallax
- Pictorial cues
 - Linear perspective
 - Interposition
 - Texture gradient
 - Relative size



Accommodation

- Involves the automatic adjustment of the shape of the lens to focus an object in response to changes in how far away that object is.
- 



Motion parallax:

- The ability to judge the distance of moving objects from their speed.
 - Nearby objects seem to move faster than those far away traveling at the same speed.
- 

Monocular – pictorial depth cues

Linear perspective

- Is the apparent convergence of parallel lines as they recede (go back) into the distance



Interposition

- Occurs when one object partially block or covers another and therefore the one behind is perceived as further away



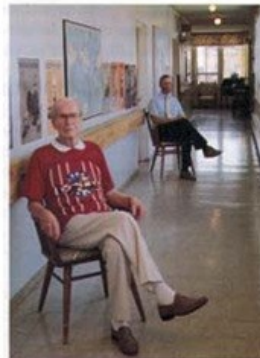
Texture gradient

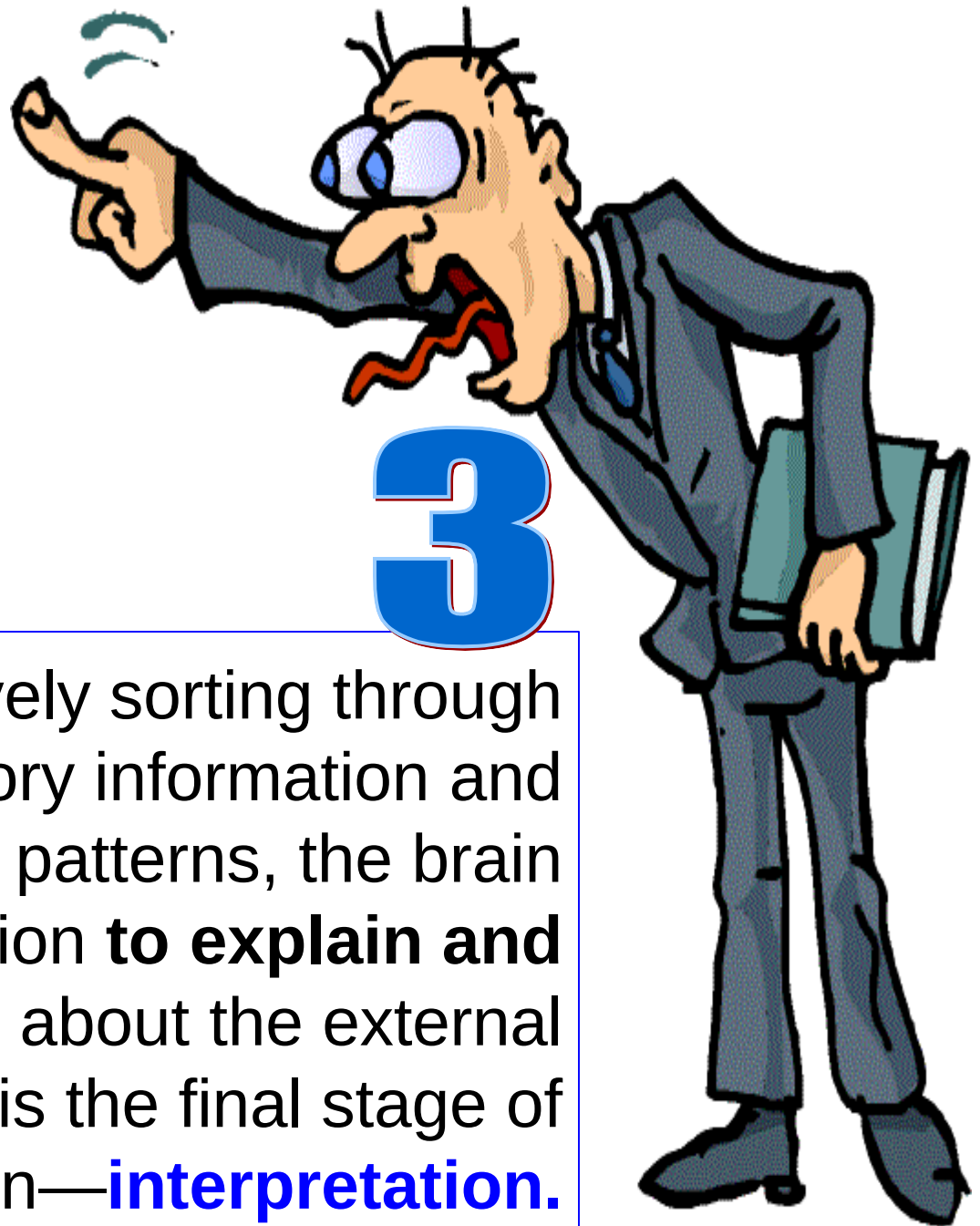
- The gradual reduction of detail that occurs in a surface as it recedes into the distance



Relative size

- The tendency to visually perceive the object that produces the larger image on the retina as being closer

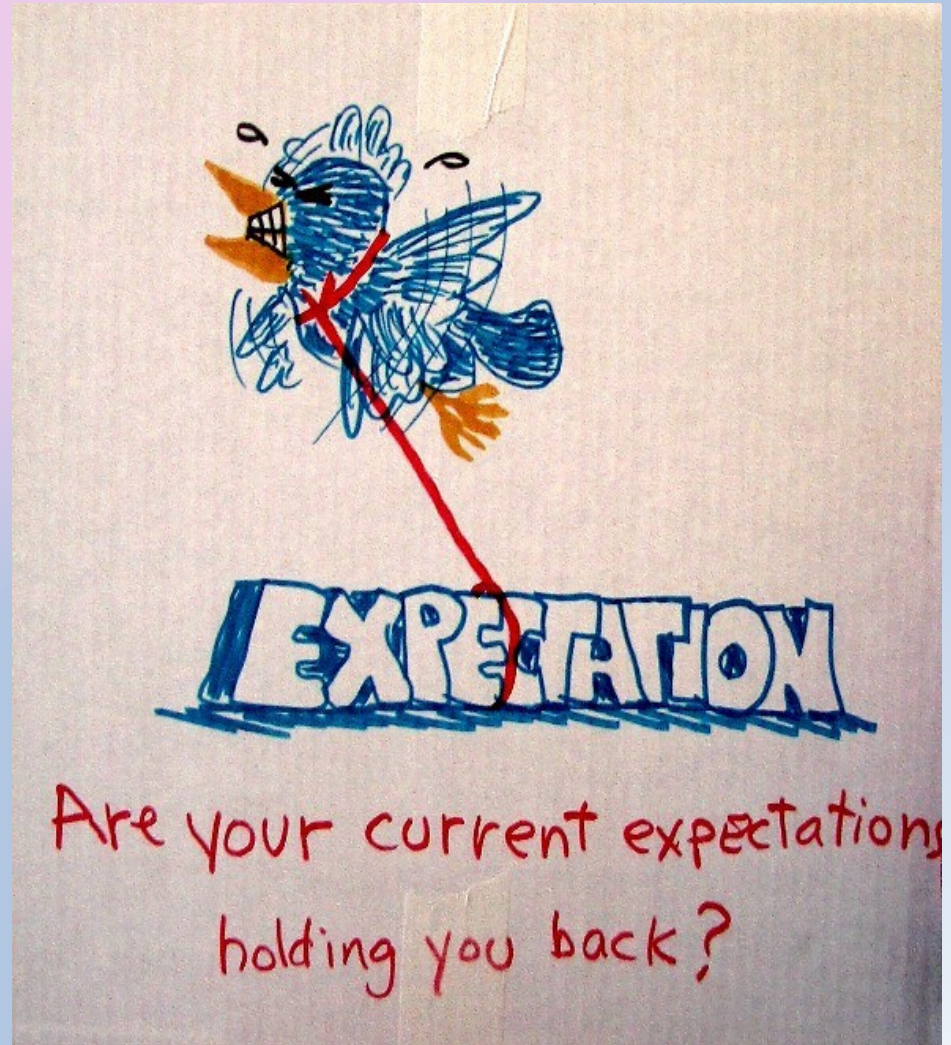




After selectively sorting through incoming sensory information and organizing it into patterns, the brain uses this information **to explain and make judgments** about the external world. This is the final stage of perception—**interpretation.**

Factors that influence perception:

- ♣ Past experiences
- ♣ Socio-cultural factors
- ♣ Situational context
- ♣ Interests or motives
- ♣ Perceptual set
(set of expectations)



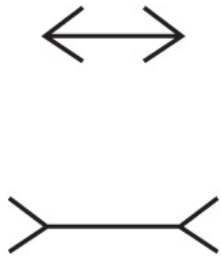
Perceptual Set Look at the drawing in the middle. What do you see? Now look at the drawings on each end. Would you have interpreted the middle drawing differently if you had looked at the drawing of the man or the kneeling woman first?



Illusion

- “Seeing is believing, but seeing isn’t always believing correctly”
- Illusion = Misleading or distorted perceptions of a stimulus that doesn’t match its physical reality.
- Illusions are NOT the same as hallucinations (false sensory experience WITHOUT external stimuli) or delusions (false beliefs).

Illusion



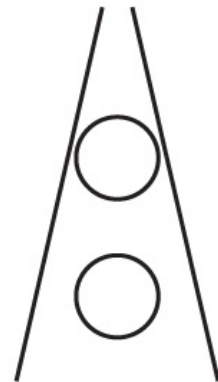
Which horizontal line is longer?



Which line is longer?



Which line is longer?



Which circle is bigger?

Extrasensory Perception (ESP)

- The perception of events that goes beyond the known channels of sensation.
- According to parapsychologists, (investigators who study ESP, ghosts and related psychic phenomena that do not normally fall into the realm of ordinary psychology) there are three major types:
 - **Precognition:** Knowledge of future events before they occur without any rational means.
 - **Telepathy:** Thought transmission from one mind to another.
 - **Clairvoyance:** Detecting the presence of objects or people that are hidden from view.

