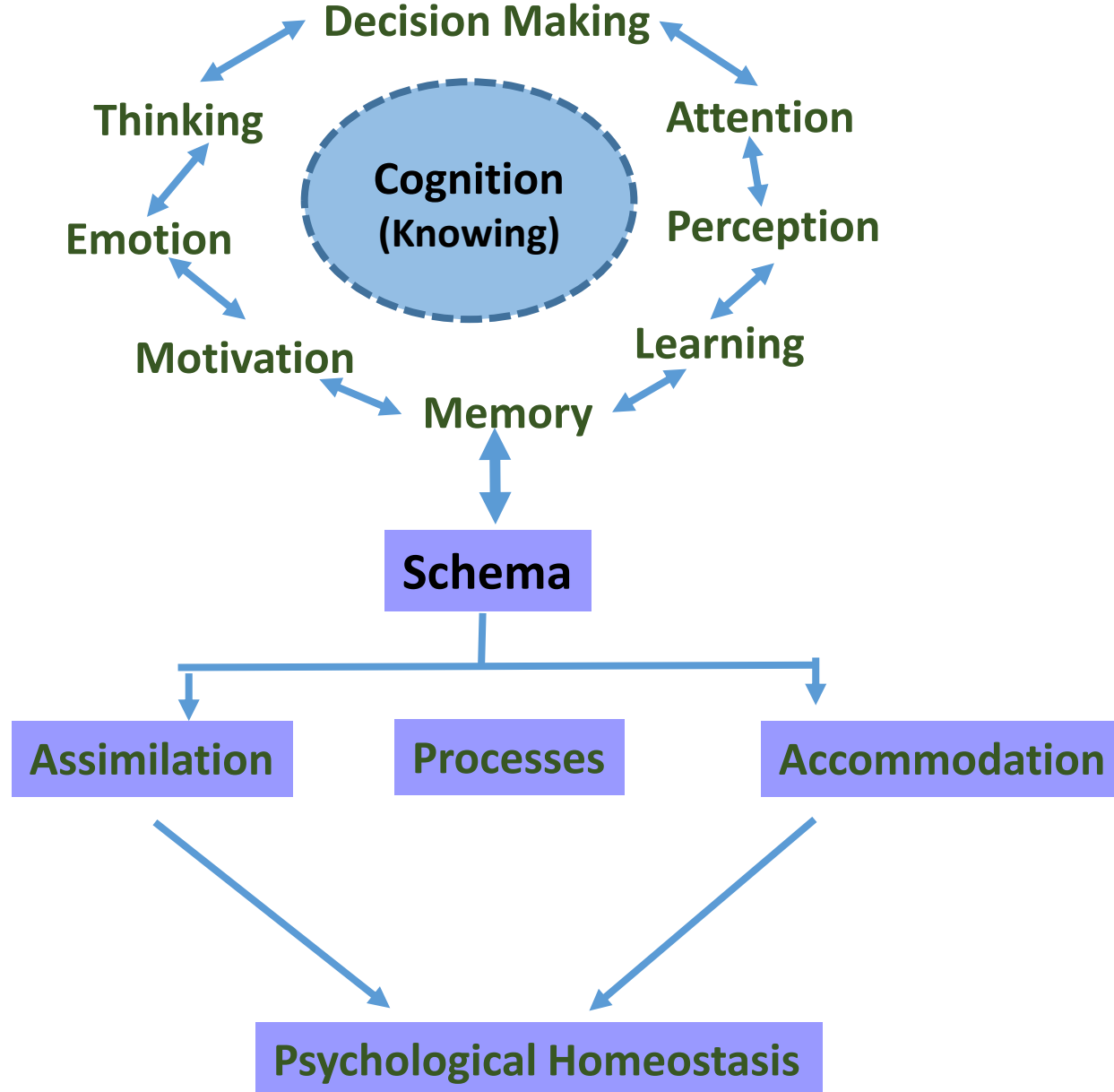


*Sensation, Attention
&
Perception*







Optometric Extension Program
Duncan, Oklahoma 73511

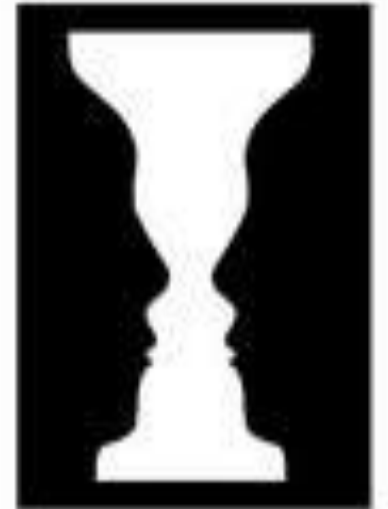
❖ Sensation

- The process through which the senses pick up visual, auditory, and other sensory stimuli and transmit them to the brain; sensory information that has registered in the brain but has not been interpreted
 - Sensation is gathering info from the environment via your senses.



❖ Perception

- The process by which sensory information is actively organized and interpreted by the brain
 - Perception is understanding what is being sensed!



Perception

- ❖ From Physical to mental
- ❖ Perception:
 - ❖ Incoming sensory information is insufficient to explain perception
 - ❖ Considerations of context and of the perceiver's expectations and prior learning must also be made

Bottom-Up/Top-Down processing

- Stage 1 - **Bottom-up processing** — *Sensory data*
Automatic
data-driven processing
- Stage 2 - **Top-down processing** — *Cognitive processes*
Active/Constructive
conceptually-driven processing → *Rumors* → *less of truth*
data is altered

❖ The process of Perception help us in-

✓ Organizing Information ✓

✓ Interpreting Information ✓

✓ Helping us to recognize meaningful objects and events

“ WE DON'T SEE THINGS AS THEY ARE,
WE SEE THINGS AS WE ARE”



Factors Influencing The Perception

❑ Factors in the perceiver

- Attitudes
- Motives
- Interests
- Experience
- Expectations

❑ Factors in the situation

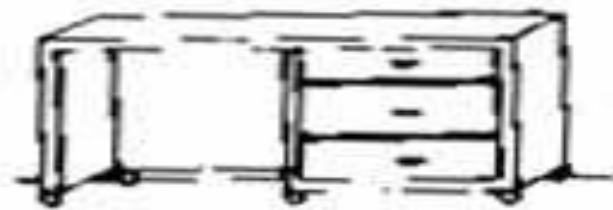
- Time
- Work setting
- Social setting

❑ Factors in the target

- Novelty
- Motion
- Sounds
- Size
- Background
- Proximity
- Similarity

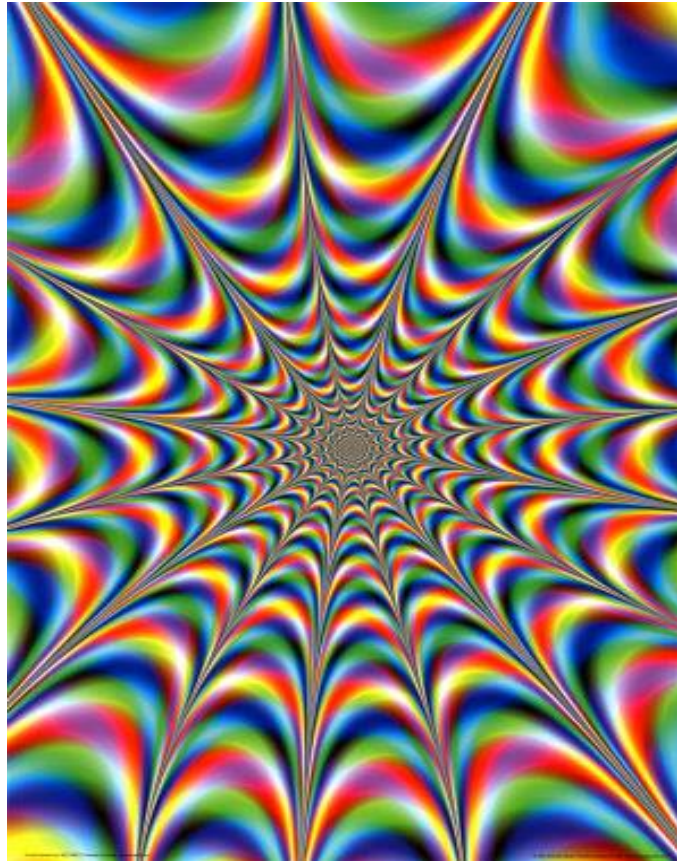
Perceptual Process

- **Sensation**
 - An individual's ability to detect stimuli in the immediate environment.
- **Selection**
 - The process a person uses to eliminate some of the stimuli that have been sensed and to retain others for further processing.
- **Organization**
 - The process of placing selected perceptual stimuli into a framework for "storage."
- **Translation**
 - The stage of the perceptual process at which stimuli are interpreted and given meaning.



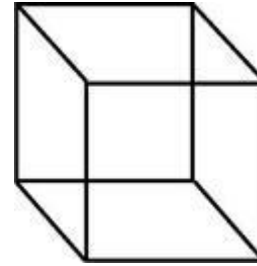


❖ What do we call it when there is a mismatch between sensation and perception – when we misinterpret the info?

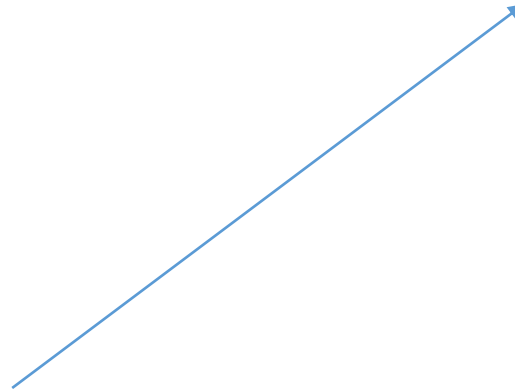


Ambiguous Figure

❖ When an object can be seen in more than one way.

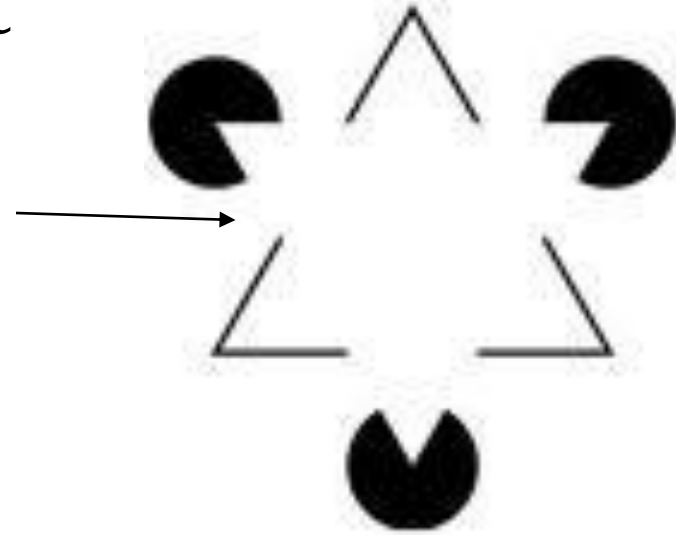


❖ Do you see a man playing the saxophone or a woman's face?



What are fictions?

- When you see something that is not there. E.g. the white triangle



Perceptual Process: A Complex Phenomenon

- *Attention*
 - Which part of the sensory environment to attend to, and
 - Which information is to further processed or discarded?
- *Localization:*
 - To determine where objects of interest are?
- *Recognition*
 - Which objects are out there?
- *Abstraction*
 - Abstract the critical features of a recognized object
- *Constancy*
 - Perceptual constancy



Attention

- ❖ The ability to focus mental resources on something
- ❖ Attention is limited
 - ❖ Think of attention as a pool of resources
- ❖ To attend to something: To pay attention to it
 - ❖ “Attended ear” - Paying attention to words in that ear

Selective Attention

- The act of focusing on one information while simultaneously ignoring irrelevant information that is also occurring.
- Dichotic Listening Task



Focusing on just one thing

- ❖ Cocktail party metaphor: You are talking to someone at a party with a lot of other people making noise.
 - ❖ Spotlight Metaphor
 - ❖ Zoom Lens Metaphor

Divided Attention

- *Divided attention* occurs when mental focus is on multiple tasks or ideas at once. Also known as multitasking, individuals do this all the time.
- Divided attention does decrease the amount of attention being placed on any one task or idea if there are multiple focuses going on at once.
- *Divided attention outside the laboratory – cell phone usage while driving*

Look at the chart and say the COLOUR not the Word

YELLOW

ORANGE

BLUE

BLACK

GREEN

RED

YELLOW

PURPLE

RED

ORANGE

GREEN

BLACK

Possible Explanation of “Stroop Effect”

- Speed of Processing Theory: The interference occurs because words are read faster than colors are named.
- Selective Attention Theory: The interference occurs because naming colors requires more attention than reading words.

Automatic Versus Controlled Processing

- *Automatic Processing* – occurs without intention, occur without involving conscious awareness and it must not interfere with other mental activity.
- *Controlled Processing* – used for difficult task and ones that involve unfamiliar processes. It usually operates serially, require attention, is limited capacity and under conscious control.

Localization

- Localization

- To determine '*Where*' objects of interest are?

- Separation of Object

- The image projected on retina is a mosaic of varying brightness and colors
- Perceptual system organizes that mosaic into a set of discrete objects projected against a background

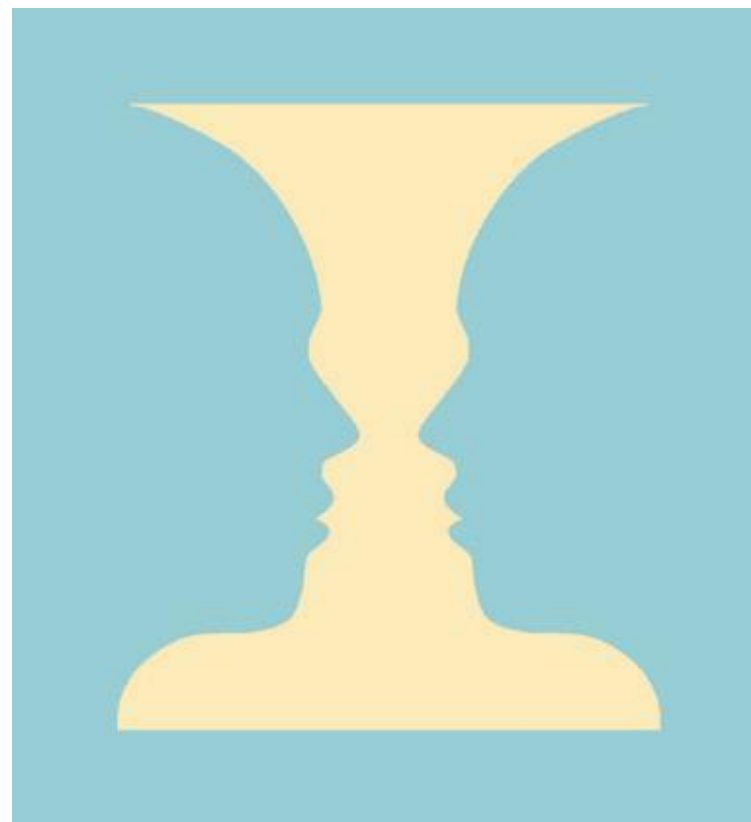
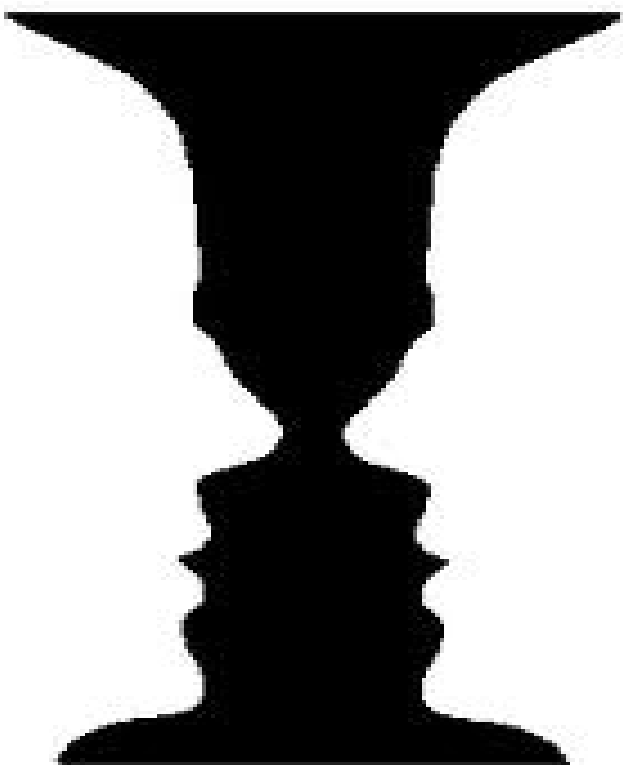
- Figure and Background

- **Figure:** Object of interest
 - Appear more solid than the background
 - Appear in front of the background
- **Background:** region that appears behind the figure

Figure and Background



The picture on the left shows a gray object (figure) resting on a white field (ground). The picture on the right shows a gray object (figure) with a hole in it (all placed on the white *background*).



General Rule: Smaller an area or shape, the more likely
it is to be seen as figure

Gestalt Laws of Grouping

- We tend to group collections of shapes, sizes, colors, and other features into perceptual wholes
- It explains how people transform raw visual input—lights, shadows, lines, points, shapes, and colors—into meaningful displays
- Grouping is not arbitrary but follows simple rules
- Implications
 - Organizational implications
 - Logo designing
 - Website designing
 - Marketing of product: grouping of objects in a store
 - Social Implications

“The sum of the Whole is something else than the some of its Parts”

or

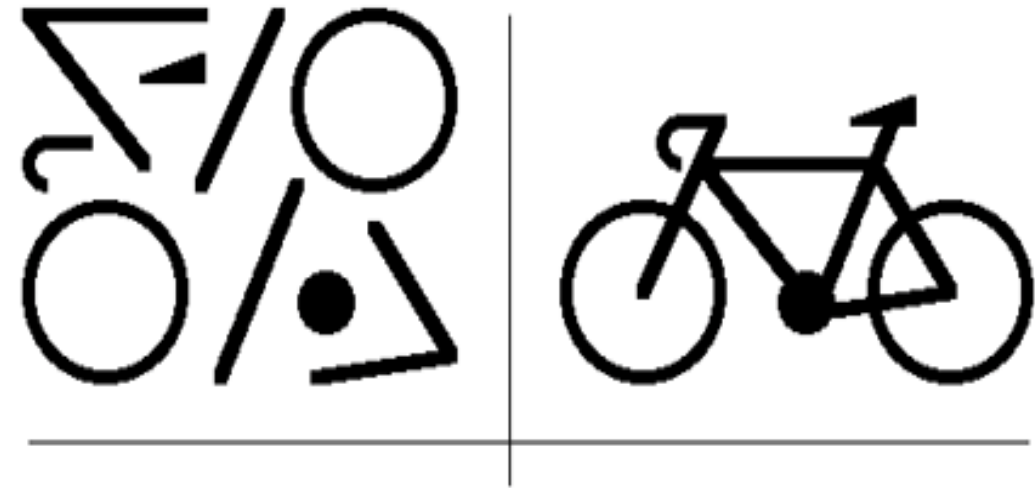
“The Whole is greater than its parts”

“When the perceptual system forms a percept or gestalt, the whole thing has a reality of its own, independent of the parts”

Example: There are 893 bits to making up a bicycle. As well constructed each Maybe they have no functionality until they are assembled properly. Until then they are just parts . once they are put together they become a powerful mode of transportation being economical, easy to store and simple to operate.



The unified whole is different from the sum of the parts.

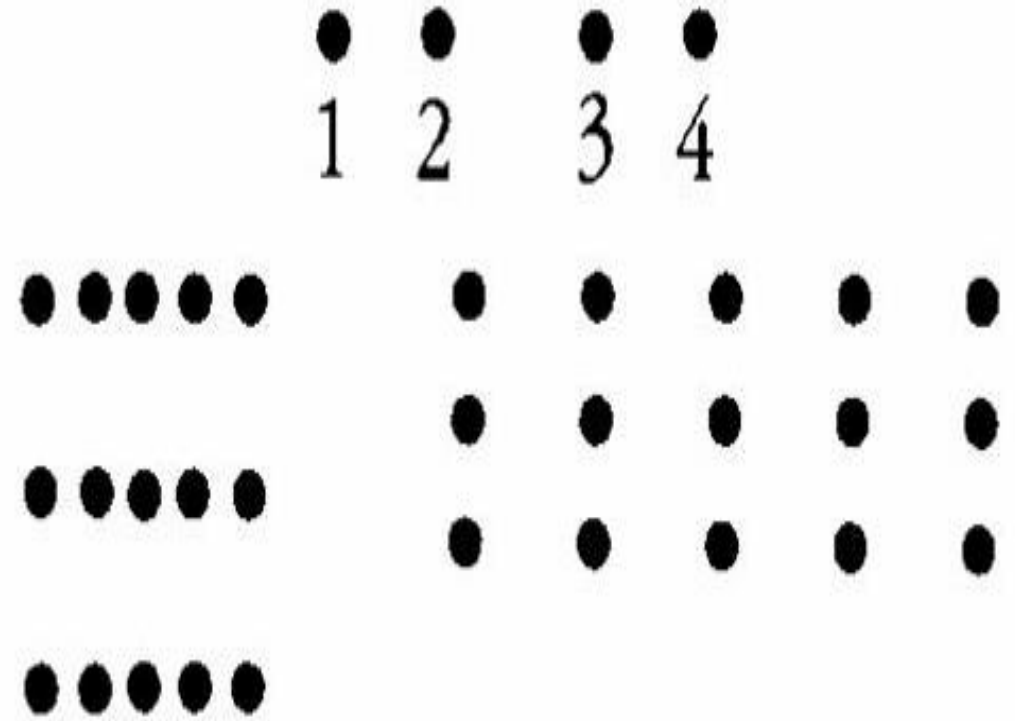


Law of Proximity

- The groups we see are
1 + 2 = as one group
3 + 4 = as another group

- Similarly, on the left, three groups of dots in three lines. What happens with the evenly spaced dots?

- The principle of proximity or contiguity states that things which are closer together will be seen as belonging together



Proximity: Element which are close are perceived as a shape

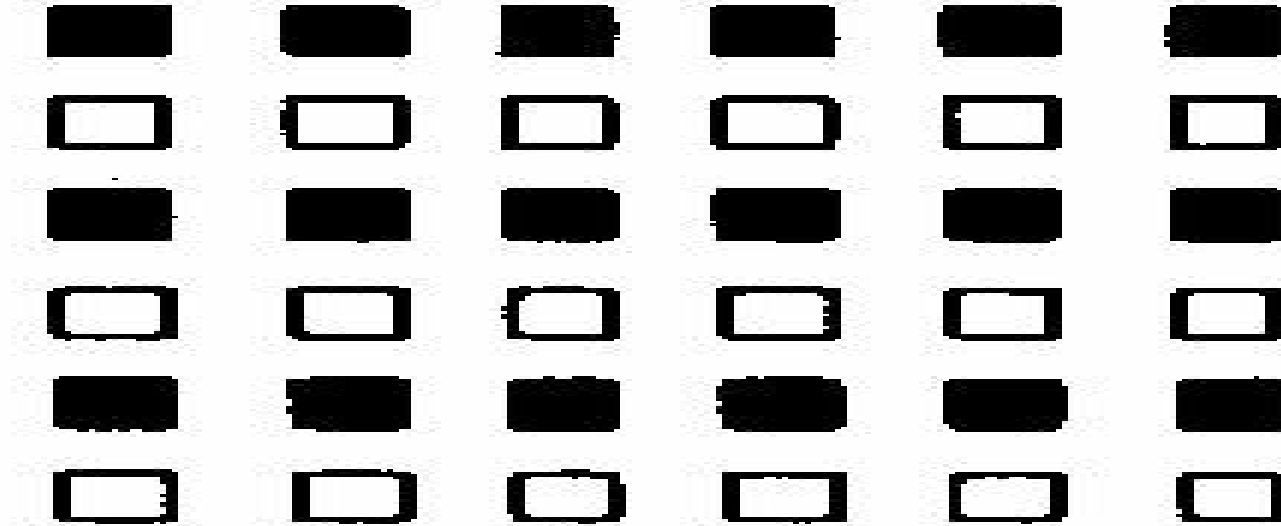


In an easy and brilliant way the designer use the proximity law to create a shape of an island and its reflection on the sea. This is the perfect combination of the brand name and the customer activity, dance music producer. The lines creating the island are clearly recognizable as equalizer lines.



A group of single objects, representing foods (bread, fish, vegetables are clearly recognizable) which grouped for proximity create a car shape.

Law of Similarity



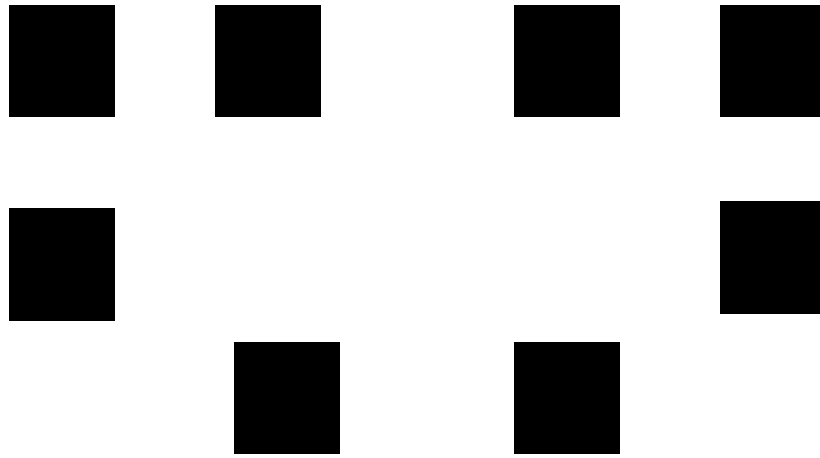
Similarity means there is a tendency to see groups which have the same characteristics so in this example, there are three groups of black squares and three groups of white squares arranged in lines.

The principle of similarity states that things which share visual characteristics such as shape, size, color, texture, value or orientation will be seen as belonging together.



The Unilever Logo makes clever use of the principle of similarity. We group blue objects that are similar in color (and maybe size) to form a larger “U”, initial of Unilever.

Law of Common Fate



- Suppose both principles of proximity and similarity are in place - then a movement takes place - the dots begin to move down the page.
- They appear to change grouping.
- Example: Flock of birds. When several birds fly in the same direction, we normally assume that they belong to a single group.

Law of Common Fate

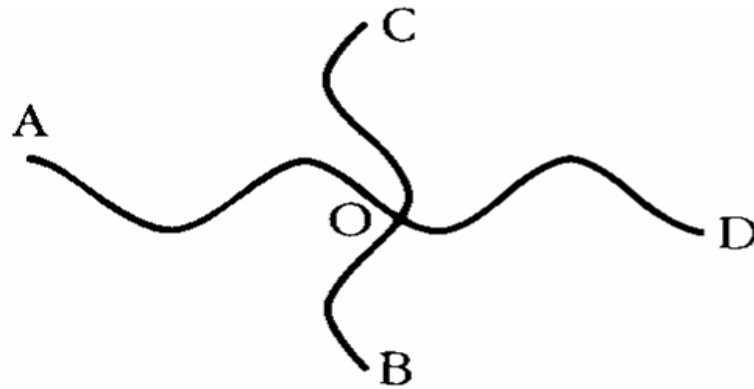


The Melbourne 2010 Cycling Championship logo makes clever use of the law of common fate to make the circles appear as a single group “moving” in the same direction and at the same speed, just like cyclists would on a track.

Law of Continuity

Continuation occurs when the eye is compelled to **move through** one object and **continue** to another object.

A to O and O to D are two lines. Similarly, C to O and O to B are two lines.





HOTEL ASSOCIATION OF CANADA
ASSOCIATION DES HÔTELS DU CANADA



In the logo above, our mind will naturally follow the smooth curve between the H until the tip lead to the maple leaf. You won't notice that there is actually NO specific line or contour except just a tip at the right and a missing space between the H.

Law of Closure

Brain tends to perceive forms and figures in their complete appearance despite the absence of one or more of their parts, either hidden or totally absent

LOOK IN IDE

This example likely requires too much effort to allow closure to occur and the message may be lost.

LOOK INSIDE

This example makes it easy for closure to occur. Therefore the message is clear.



WWF, IBM and Apple Logo

- “Everything that irritates us about others can lead us to an understanding of ourselves.” Jung
- Humans see what they want to see.”
— Rick Riordan, [The Lightning Thief](#)

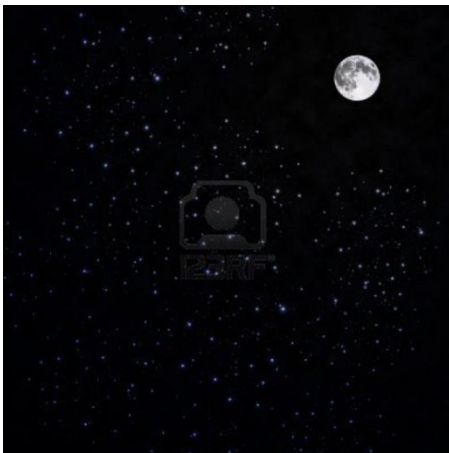
Perceiving Distance: Depth Perception

- Retina provides two dimensional surface on which three dimensional world is projected
- Depth Perception
 - ability to see objects in three dimensions
 - allows us to judge distance

Overview



Depth perception is the ability to see things in a 3-Dimensional way and to judge distance.



We use depth cues to gather information on the images we see.

These cues can be monocular or binocular.

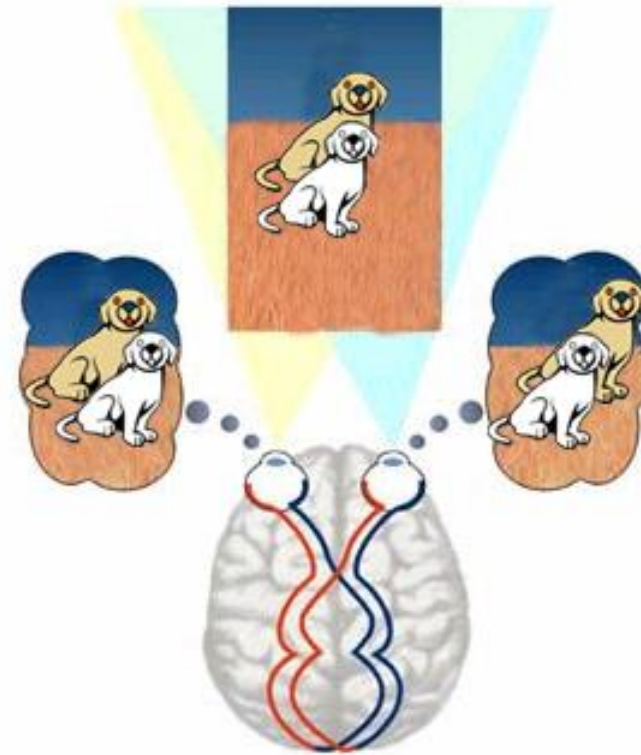
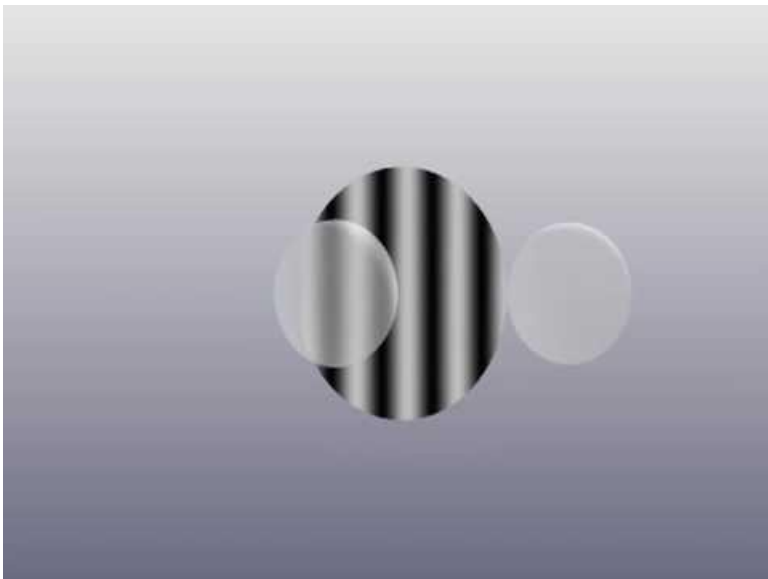
Binocular Cues

- ❖ Binocular depth cues use both eyes to perceive information on the 3-dimensional form of an object and its place in space.
- ❖ Images seen through both eyes are examples of ***stereoptic vision*** because the two eyes see two different pictures that combine as one.
- ❖ Binocular cues:
 - Retinal Disparity
 - Convergence.



Binocular Cues

The image your right eye sees is different than your left eye because they are a small distance apart. The image you see using both eyes is the two images merged.



Binocular Cues: Convergence



- When focusing on images less than 4-6 meters away, the eyes turn inward to focus on the same object rather than moving together.
- The angle the eyeballs turn towards each other is smaller when the object in focus is farther away.

Binocular Cues

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 “finger sausage” as shown in the inset.



Binocular Cue: Fun Fact

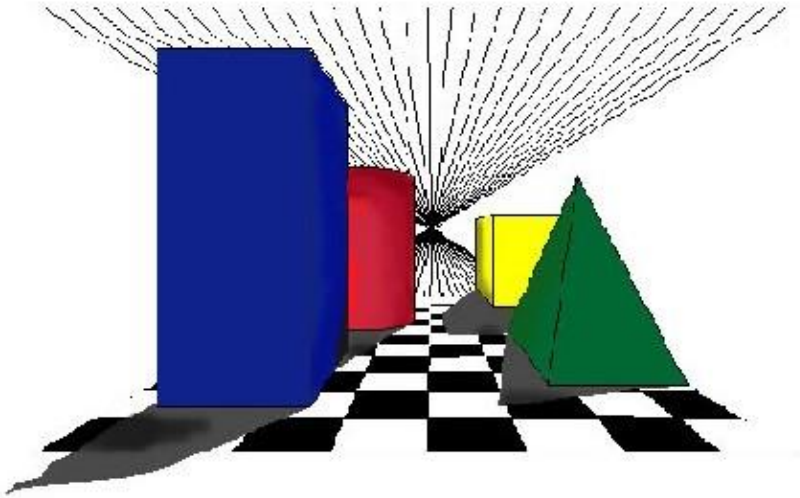


3-D movies use the idea of retinal disparity by using two close cameras and merging the image together.

Monocular Cues

Monocular cues judge the distance of an object using only one eye.

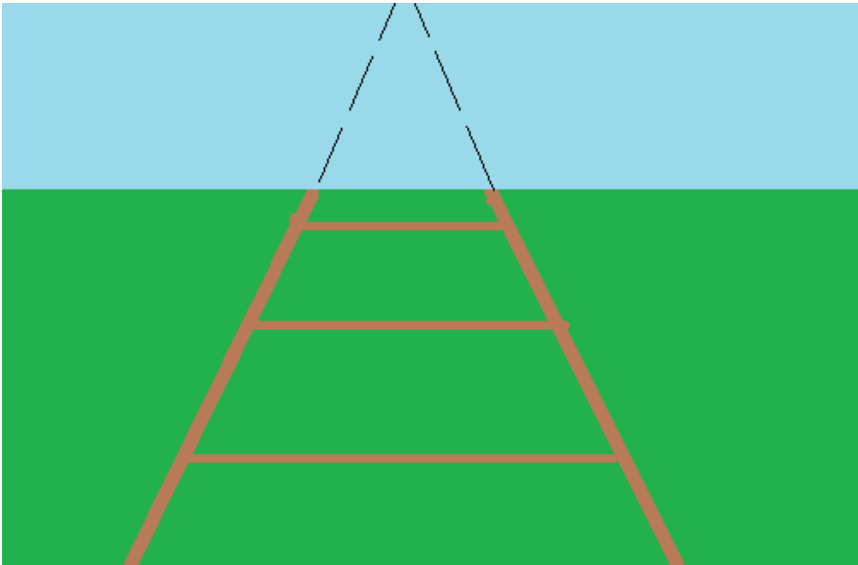
Also Known as Pictorial Cues



These cues are often used in making 2-D images appear to be 3-D, in this case they are called ***pictorial depth cues***.

Monocular Cues: Linear Perspective

As parallel lines extend into the distance, they appear to meet together.



Monocular Cues: Relative Size

When viewing two congruent objects, the farther away object will appear smaller even though the objects are still the same size.

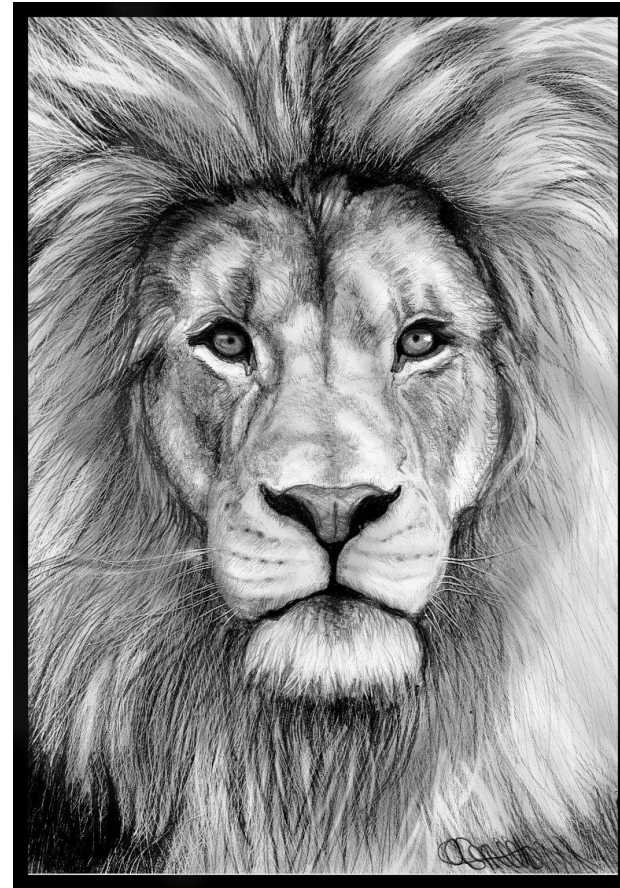


Monocular Cues: Height in the Picture Plane



Objects that are farther away appear higher up in an image, closer to the horizon line.

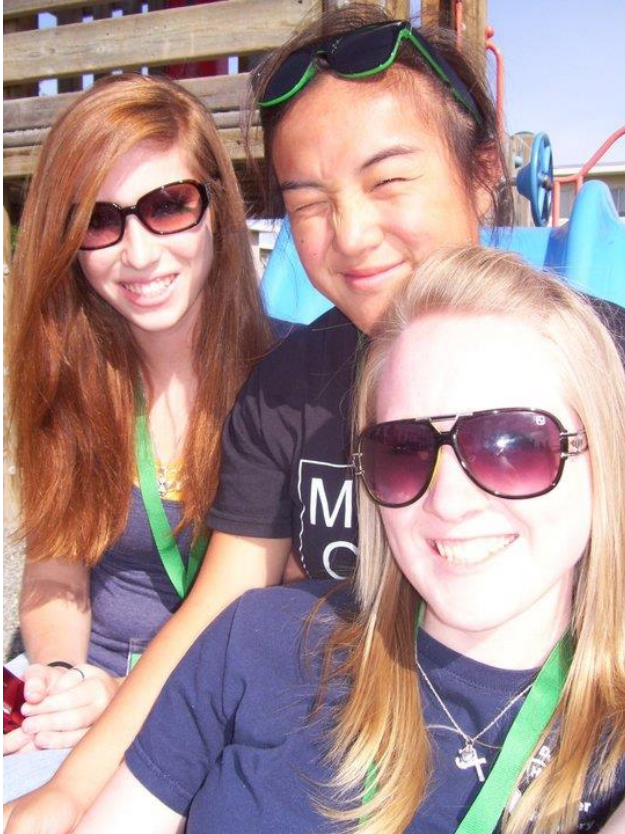
Monocular Cues: Lights and Shadows



2-Dimensional images can appear 3-D when shaded with the appropriate patterns of light and shadow found in "real objects."

Monocular Cues: Overlap

When multiple objects are in the same visual field, the closest object appears in front of those farther away.



Monocular Cues: Texture Gradient

The texture in an image appear less detailed as objects become more distant.



Monocular Cues: Aerial Perspective

Far away objects often appear less clear in color and detail due to haze.



A person typically only notices the haze when it is not present. On a clear day, far away objects may seem very close.

Monocular Cues: Relative Motion

Objects closer in the visual field appear to move by faster than those at a greater distance. The far away objects may not seem like they are moving at all.

