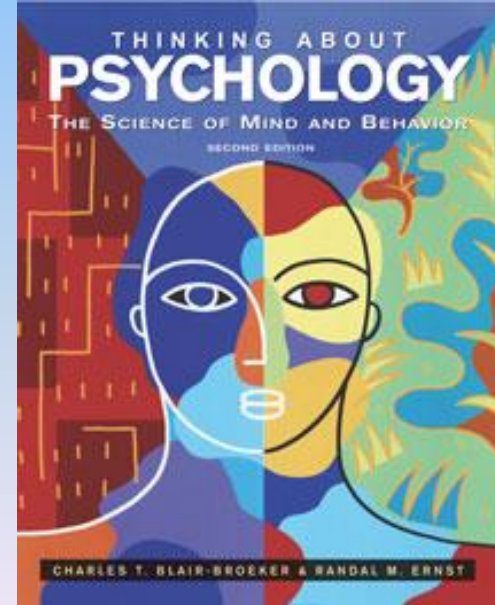


Thinking About Psychology: The Science of Mind and Behavior 2e

Charles T. Blair-Broeker
Randal M. Ernst



Sensation and Perception Chapter



Module 9

Perception

Perception

- While sensation is the process by which our sensory systems (eyes, ears, etc.) and the nervous system receive stimuli from our environment, *perception* is the process of organizing and interpreting this sensory information

Module 9: Perception

Gestalt Organizational Principles

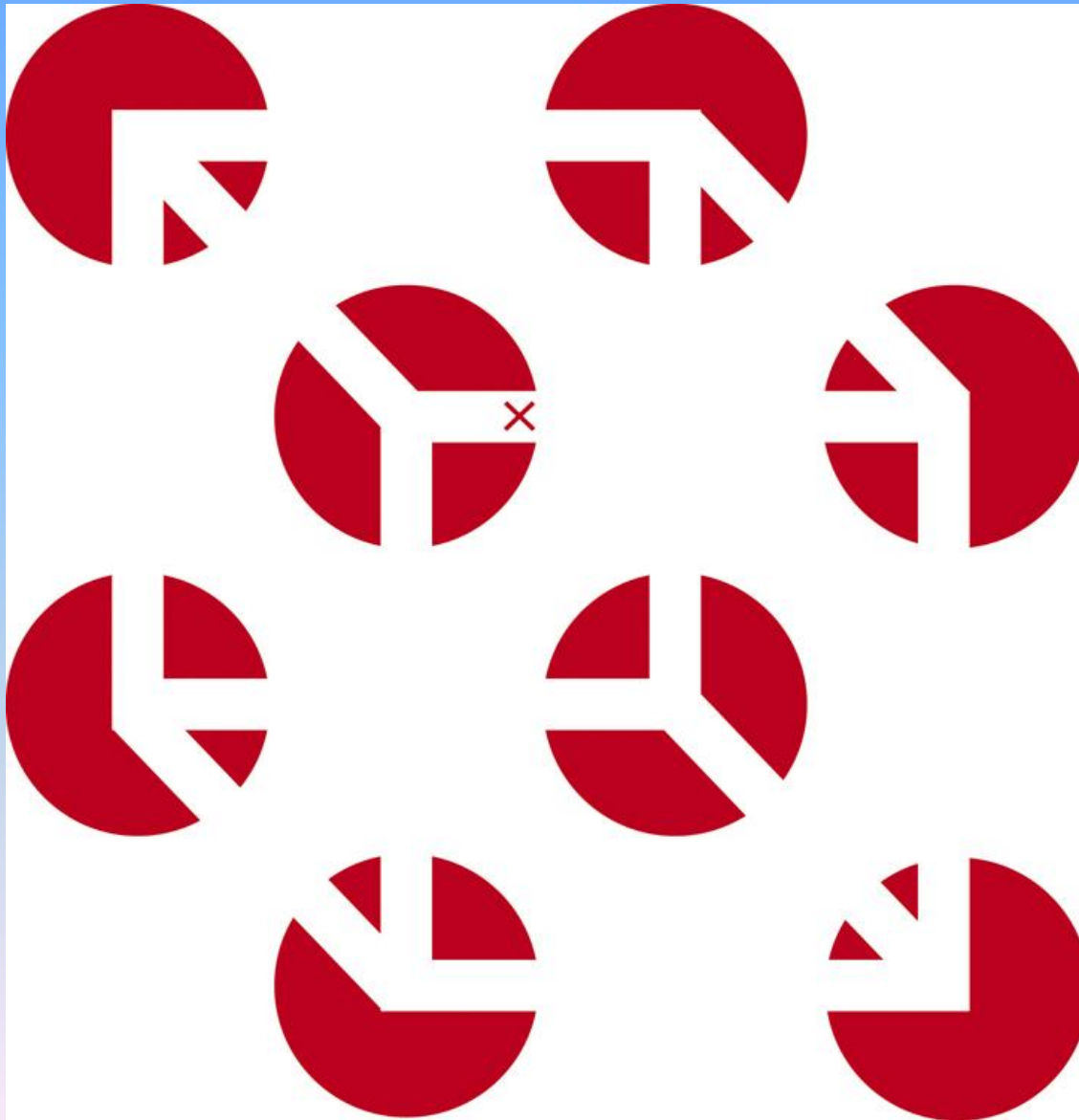
Perceptual Rules

- The German psychologist Max Wertheimer founded Gestalt psychology in the early 1900's.
- Gestalt psychologists maintained that we actively process our sensations according to consistent perceptual rules.
- These rules create *whole perceptions*, or *gestalts*, that are meaningful, symmetrical, and as simple as conditions will allow.

Gestalt

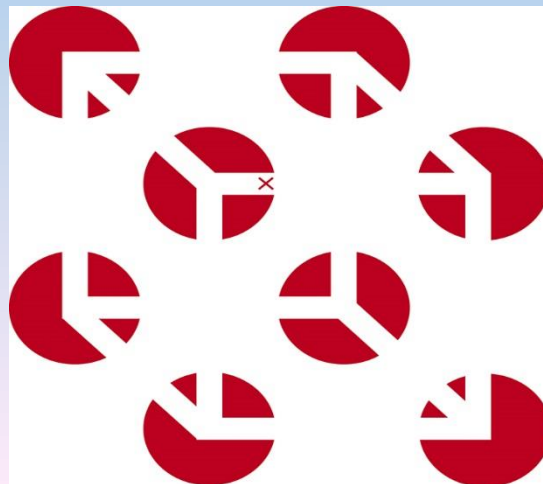
- The “whole,” or the organizational patterns that we tend to perceive
- Gestalt psychologists stressed that the *whole is greater than the sum of its parts.*
- By breaking experiences into their basic parts, something important is lost.

A Gestalt



A Cube that isn't really a Cube

- The parts of this figure are abstract red shapes on a white background.
- Yet because of the way those parts are arranged, we perceive much more.
- The red shapes become circles cut by white lines, and the white lines produce a cube.



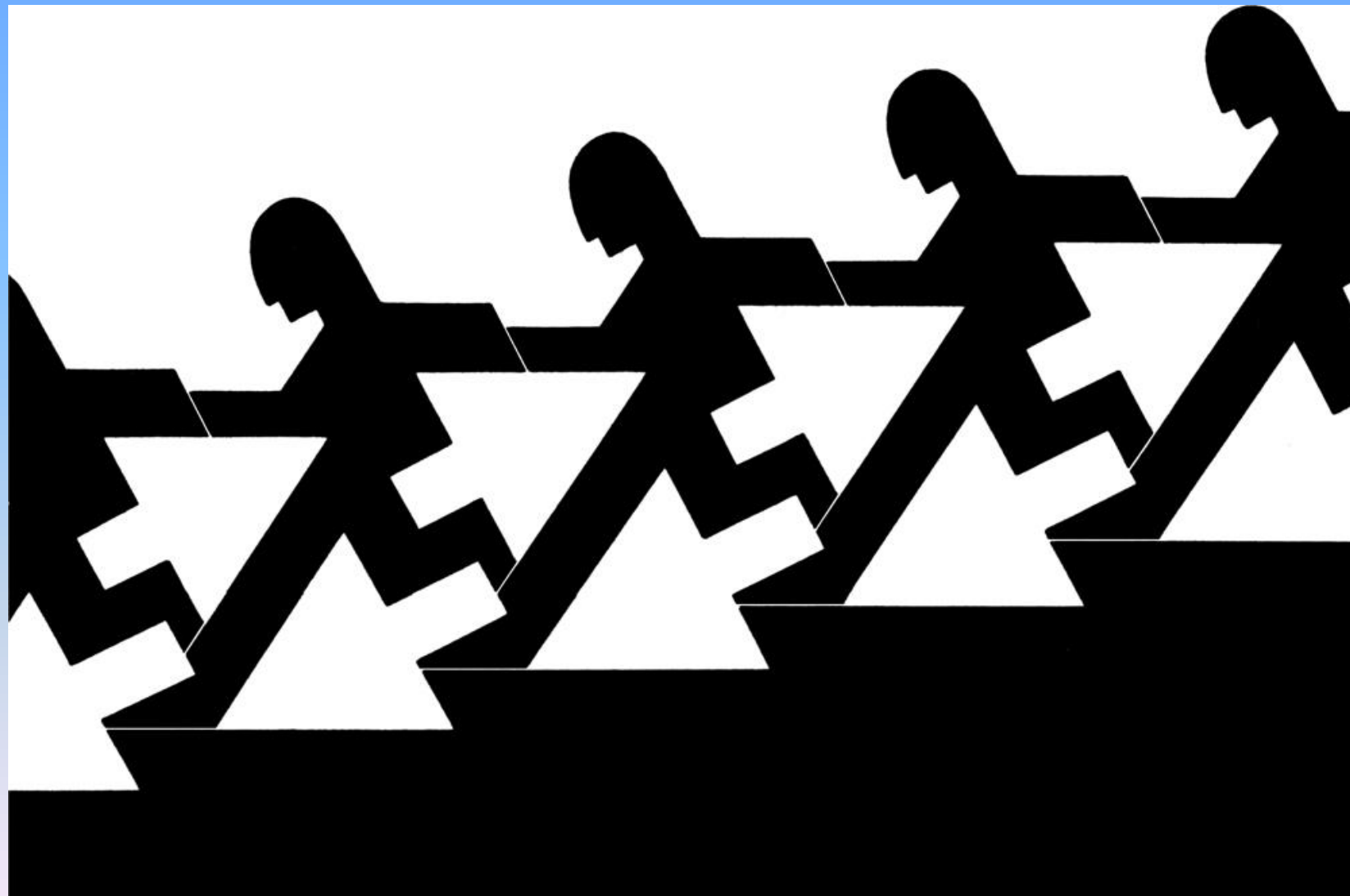
Module 9: Perception

Gestalt Organizational Principles: Figure-Ground Relationships

Figure-Ground

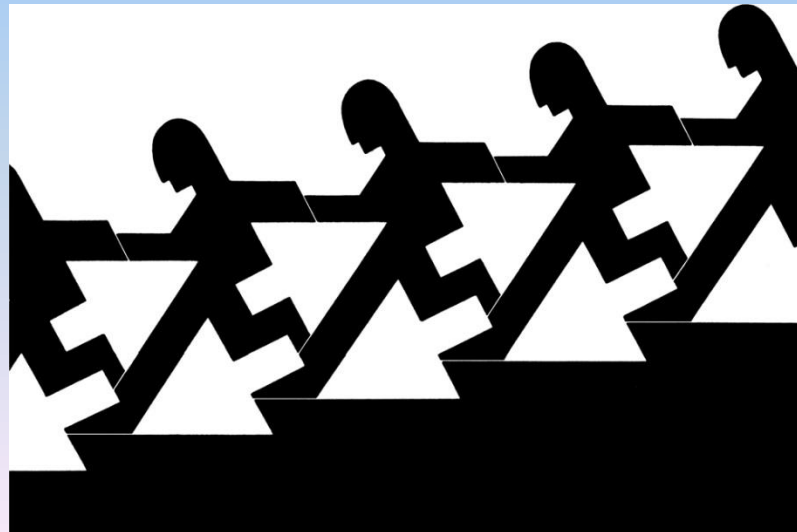
- The organization of the visual field into objects (figures) that stand out from their surroundings (ground)
- The figure is the object(s) that stands out or draws one's attention.
- The ground is the background.

Figure-Ground



What do you see?

- If black is the figure, you see men hurrying down the stairs.
- If black is the ground and white is the figure, you see arrows instead.



Module 9: Perception

Gestalt Organizational Principles: Grouping Principles

Grouping

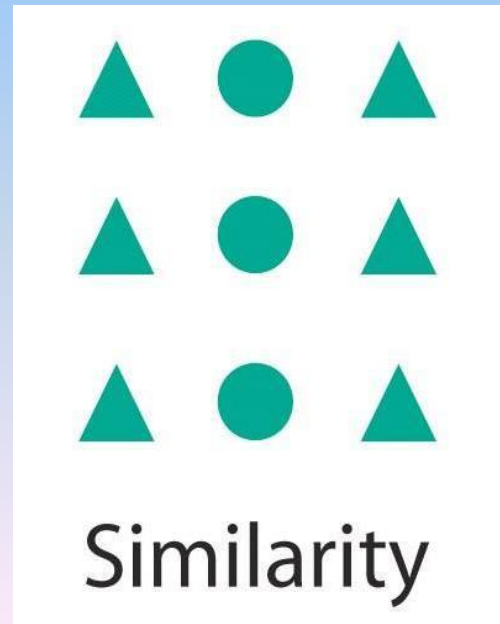
- The perceptual tendency to organize stimuli into understandable units
- Several principles of grouping include:
 - Similarity
 - Proximity
 - Closure
 - Continuity

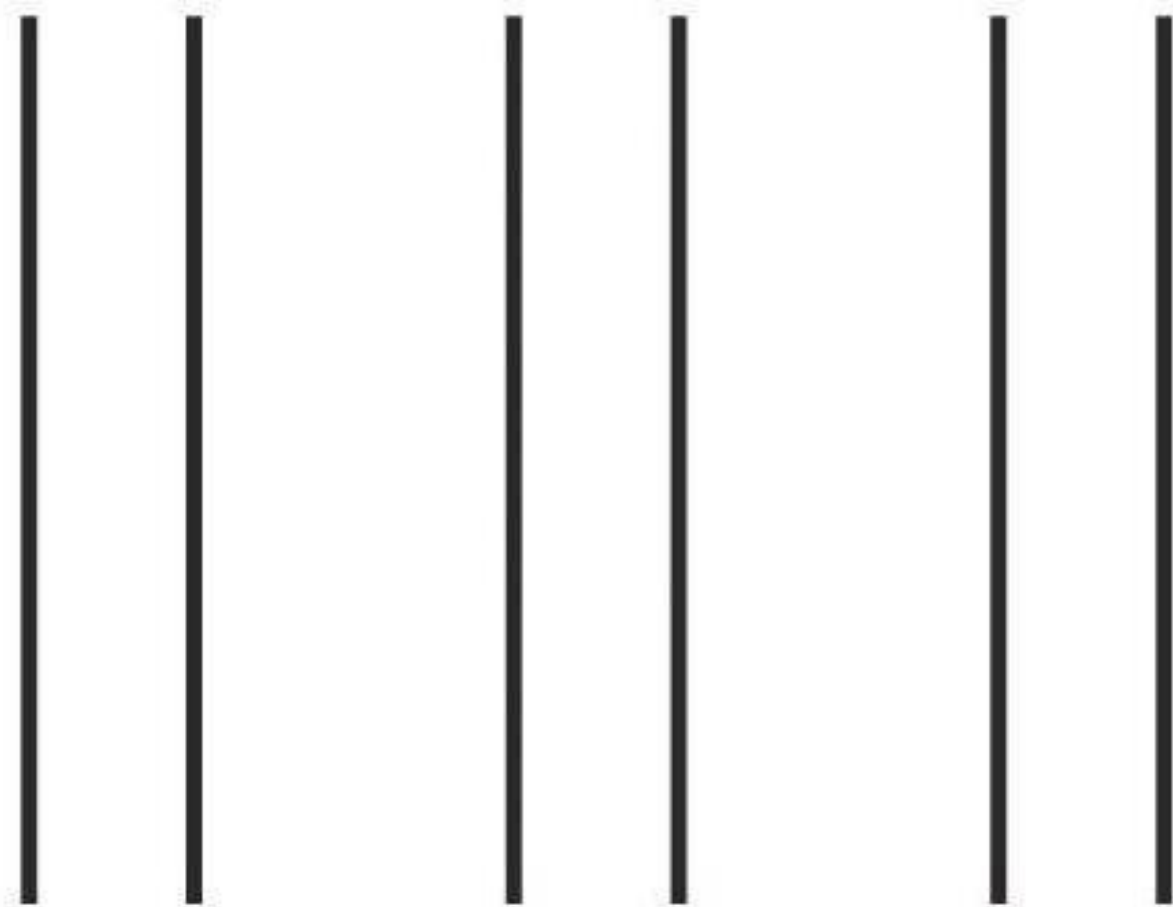


Similarity

Grouping - Similarity

- The tendency to place items that look similar into a group
- Similarity leads us to see two sets of triangles and one set of circles.

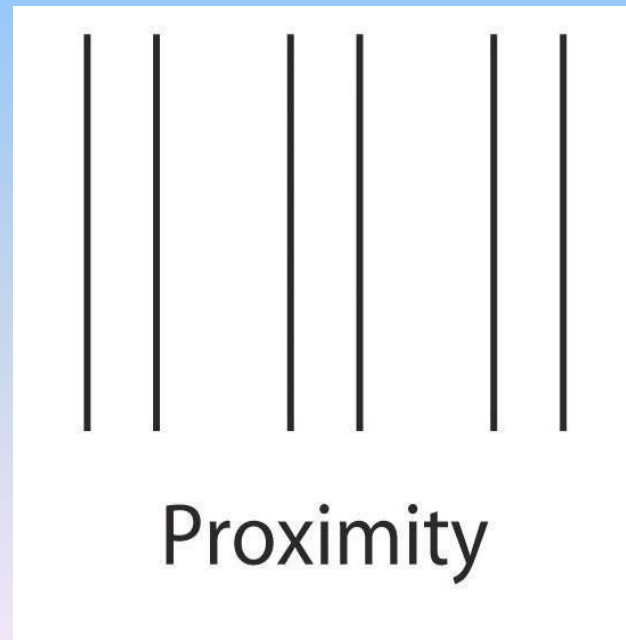


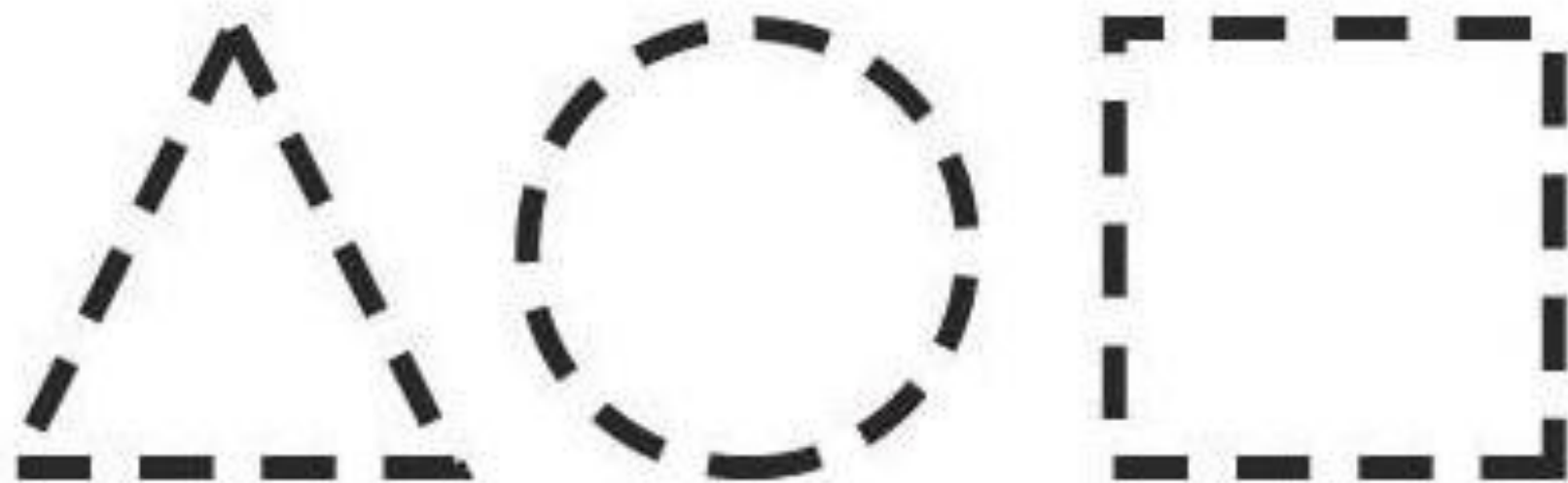


Proximity

Grouping - Proximity

- The tendency to place objects that are physically *close* to each other in a group
- Proximity leads us to see three sets of two lines.

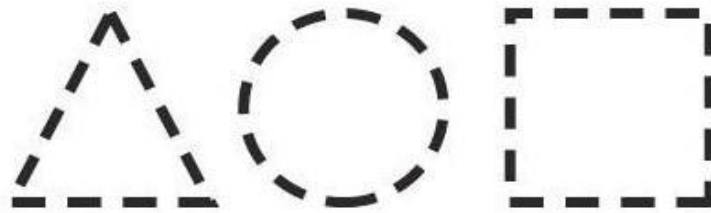




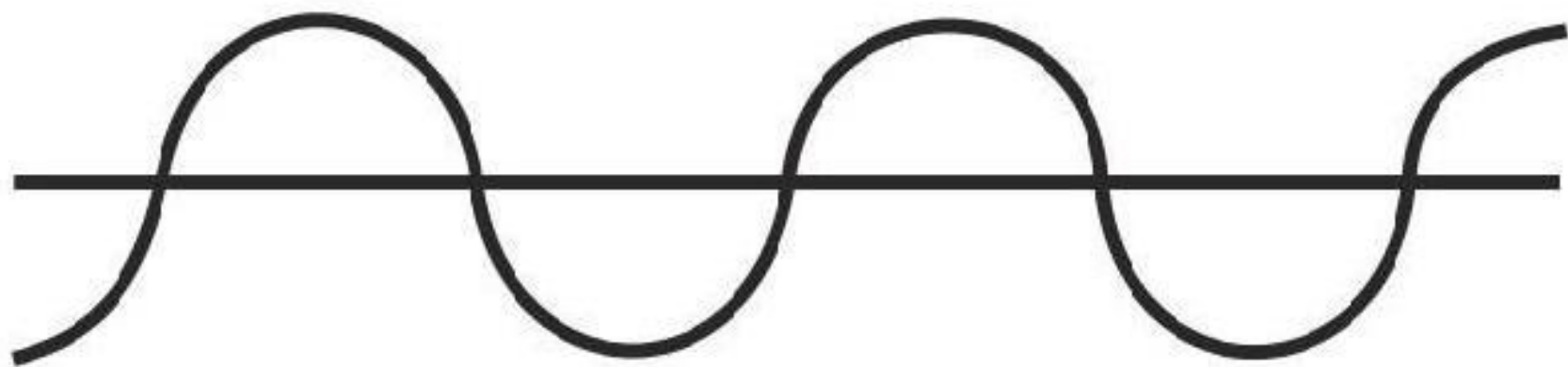
Closure

Grouping – Closure

- The tendency to look at the whole by filling in gaps in a perceptual field
- In this image, closure leads us to see intact shapes where there are none.



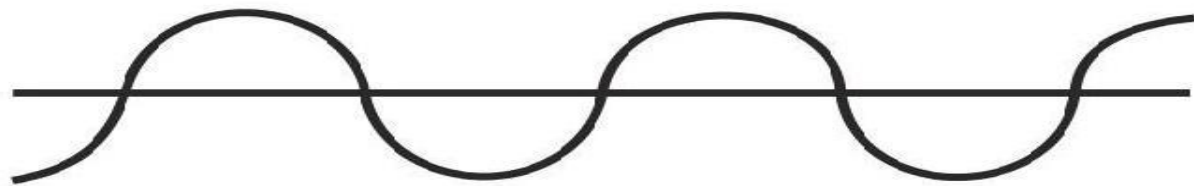
Closure



Continuity

Grouping – Continuity

- The tendency to perceive that movement of an object continues once it appears to move in a particular direction
- Continuity leads us to see one long wavy line and one straight one, rather than four half-circles in this image.



Continuity

Gestalt Grouping Principles

- Our brains are programmed to *group* objects to help us make sense of the world around us.

Module 9: Perception

Depth Perception

Depth Perception

- The ability to see in three dimensions and judge distance

Visual Cliff

- A laboratory device for testing depth perception in infants and young animals
- Infants are reluctant to crawl past the “edge” of the visual cliff
- Other animals had similar results.
- Suggests that depth perception, to some extent, is inborn

Visual Cliff



Module 9: Perception

Depth Perception: Binocular Depth Cues

Binocular Cues

- Depth cues that require the use of both eyes

Retinal Disparity

- A binocular depth cue resulting from slightly different images produced by the retina of the left and the retina of the right eye
- Is most effective when the item is quite close to the person

AP Exam Test Tip

- Many students find retinal disparity a difficult concept to grasp. Don't spend valuable study time trying to master the scientific principles of how retinal disparity works. For purposes of the AP Psych Exam the *key point is to know that retinal disparity is a binocular clue for depth perception.*

View-Master

- This classic childhood toy produces an enhanced sense of depth by exaggerating the effect produced by retinal disparity.
- A separate image is projected to each of the child's two eyes. These images were taken by two cameras placed a couple of feet apart.

Stereogram/Magic Eye

- The ability to see an intriguing image in a stereogram (or *Magic Eye* image) depends on retinal disparity.
- You have to trick your eyes into thinking that the image is either twice as far, or half as far, from your eyes than it really is.

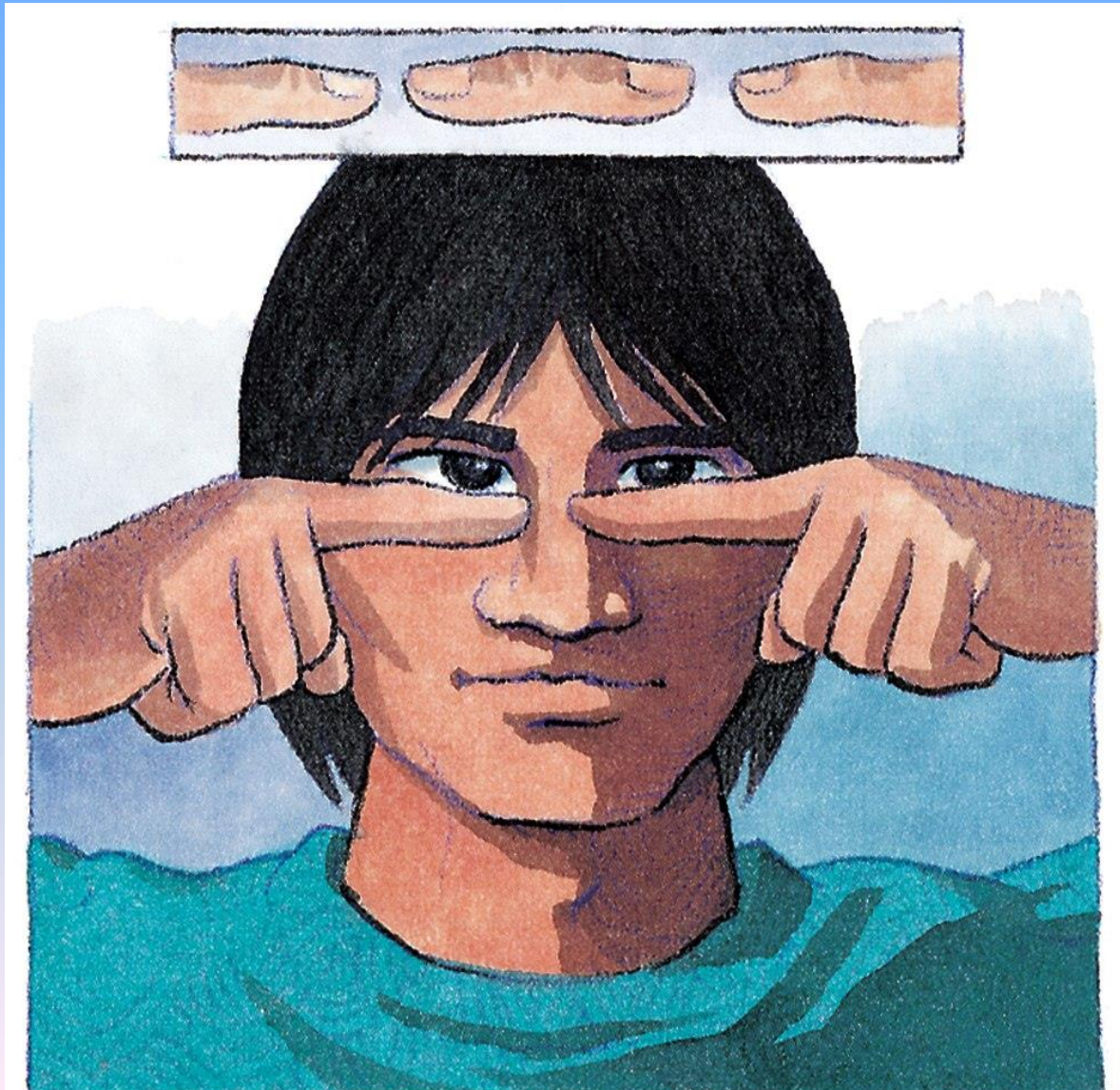
How to do it

- Try relaxing your eyes so they slowly swing outward.
- When you are at the proper depth, the dots or jumbled image projected to your right eye will align with the dots projected to your left eye to form the three-dimensional image.

The Binocular Finger Sausage

- To see a bizarre illusion created by binocular vision, point your two index fingers together with about a half-inch separation.
- Look beyond them and you will see a finger sausage.
- By adjusting the distance separating your fingers or the distance between your fingers and your eyes, you can make the sausage grow and shrink.
- When you tire of it, simply close one eye. Without binocular vision, there can be no sausage.

Binocular Depth Cues: Finger Sausage



Convergence

- A *binocular depth cue* related to the tension in the eye muscles when the eyes track inward to focus on objects close to the viewer
- The more tension required to keep both eyes aimed at the object, the closer the object is
- To feel this, focus on your finger with your arm fully extended. At this point, there is not much tension. However, as you continue to focus and slowly draw your finger closer to your nose, your eyes will “cross”. The closer your finger gets, the stronger the tension will be.

Short Distances

- Convergence, like retinal disparity, predicts depth most effectively at relatively short distances.
- Depth perception at *longer distances* relies mostly on *monocular* depth cues.

Module 9: Perception

Depth Perception: Monocular Depth Cues

Monocular Cues

- Depth cues that require the use of *only one eye*
- Monocular depth cues include: relative size, relative motion, interposition, relative height, texture gradient, relative clarity, and linear perspective.

Monocular Depth Cues – Relative Size

- Using the perceived size of a familiar object to determine depth
- The larger the object appears, the closer the object is to the viewer



Relative Size

- The fans in the foreground appear larger than the baseball players or the more distant fans.

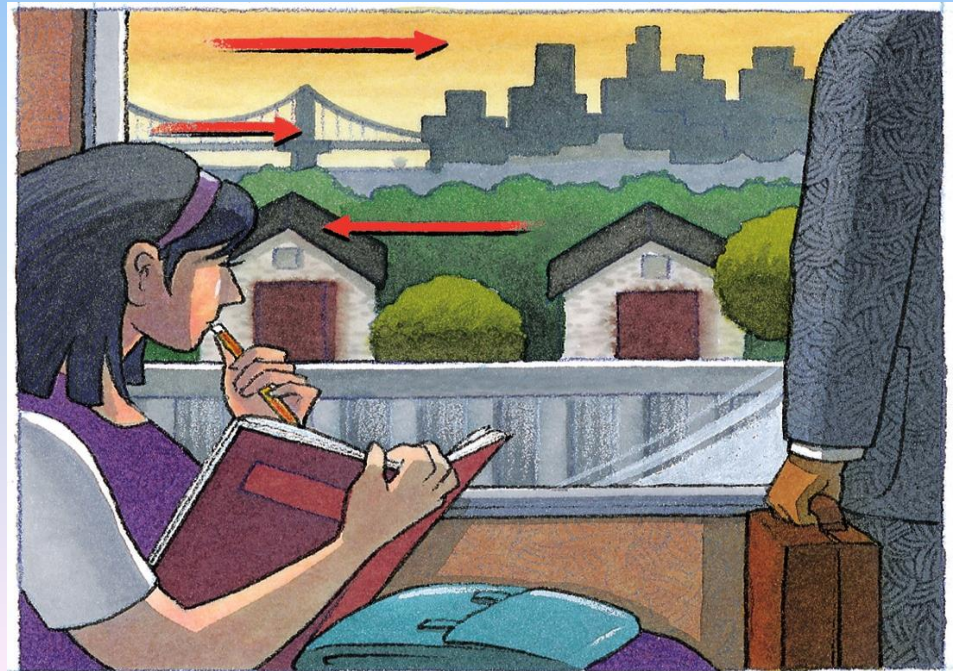


Monocular Depth Cues – Relative Motion (or Motion Parallax)

- A person who is moving can determine depth by focusing on a distant object.
- Objects further away than the object of focus will appear to move in the same direction as the subject is moving. Objects closer than the object of focus will appear to move in the opposite direction.
- For example, when you are driving on a highway, *nearby* telephone poles, fences, and roadside signs seem to *zip by faster than distant* hills.

Relative Motion

- The passenger on the train is moving past a stable world. If she fixed her gaze on the bridge, objects behind it will appear to move forward. The farther away the object is, the more slowly it will appear to move. Objects in front of the fixation point appear to move backward.



Monocular Depth Cues – Interposition

- Method of determining depth by noting that closer objects partially obstruct the more distant objects
- Also called “overlap”



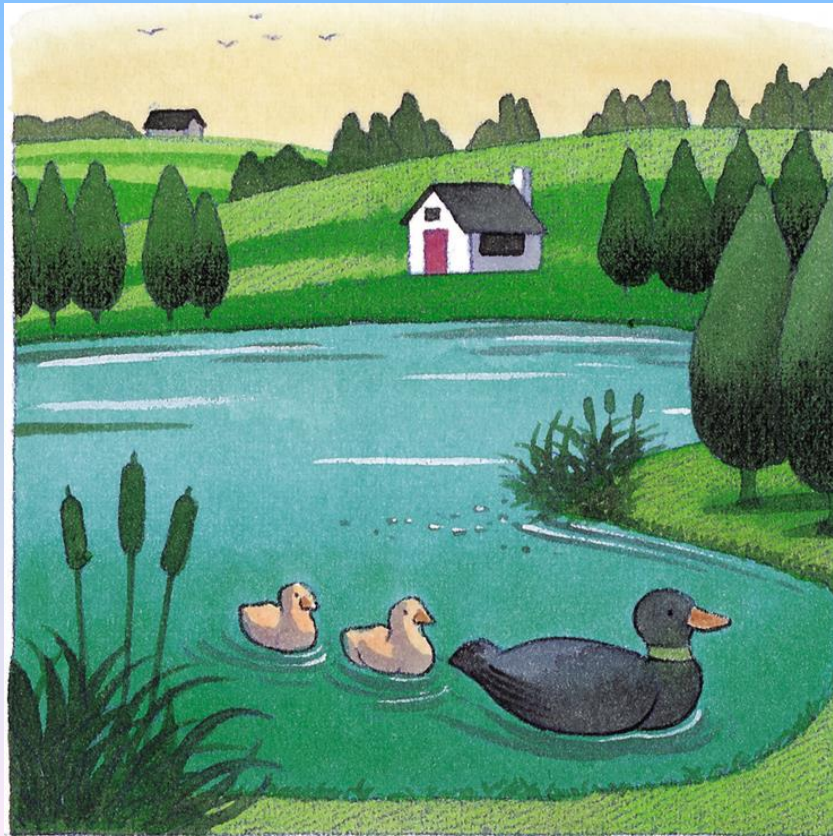
Interposition

- You know the number 7 horse is closer to you than the other horses because the number 7 horse partially blocks the view of the other horses.



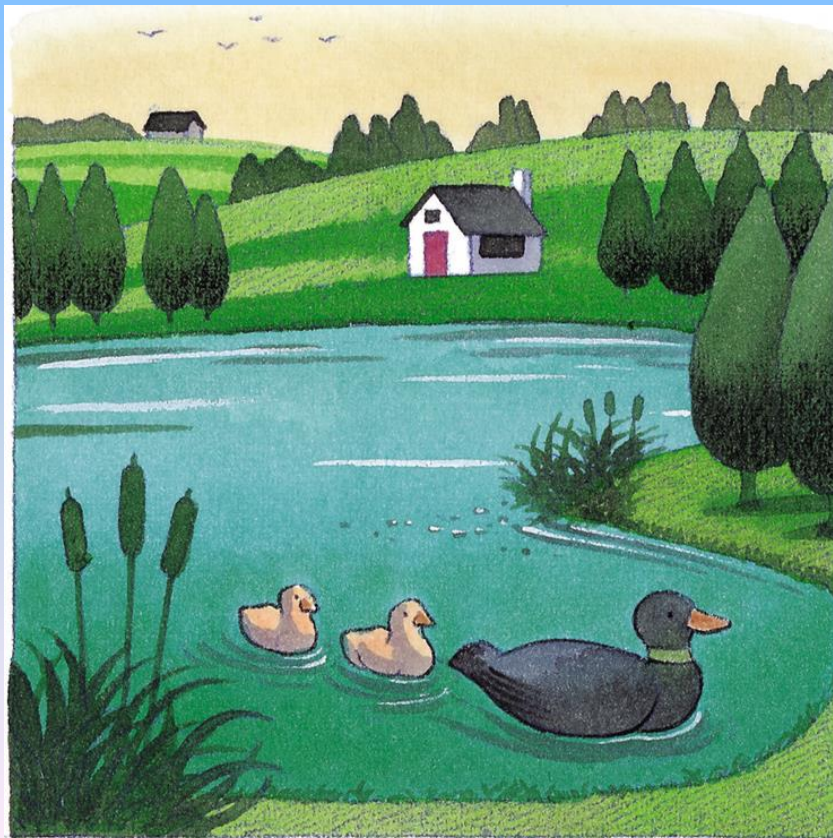
Monocular Depth Cues – Relative Height

- Method of determining depth by noting that distant objects appear higher in your field of vision than do closer objects



Relative Height

- You know that the trees and houses are farther away than the lake because they are higher in the drawing than the lake is.



Monocular Depth Cues – Texture Gradient

- Method of determining depth by noting that distant objects have a smoother texture than nearby objects



Texture Gradient

- Individual trees are visible in the foreground, but in the distance the trees look smooth and “black”, giving the Black Hills their name.



Monocular Depth Cues – Relative Clarity

- Sometimes called Aerial Perspective, this method determines depth by noting that distant objects are less clear than nearby objects
- Tends to work outdoors



Relative Clarity

- The distant mountains look blue and hazy because of dust and moisture in the atmosphere



Monocular Depth Cues–Linear Perspective

- Method of determining depth by noting that parallel lines appear to converge in the distance
- The lines appears to eventually merge on the horizon.



Linear Perspective

- The lights leading the way to this runway seem to come together in the distance



Module 9: Perception

Perceptual Constancy

Perceptual Constancy

- Perceiving the size, shape, and lightness of an object as unchanging, even as the image on the retina of the eye changes
- The understanding that objects usually remain the same

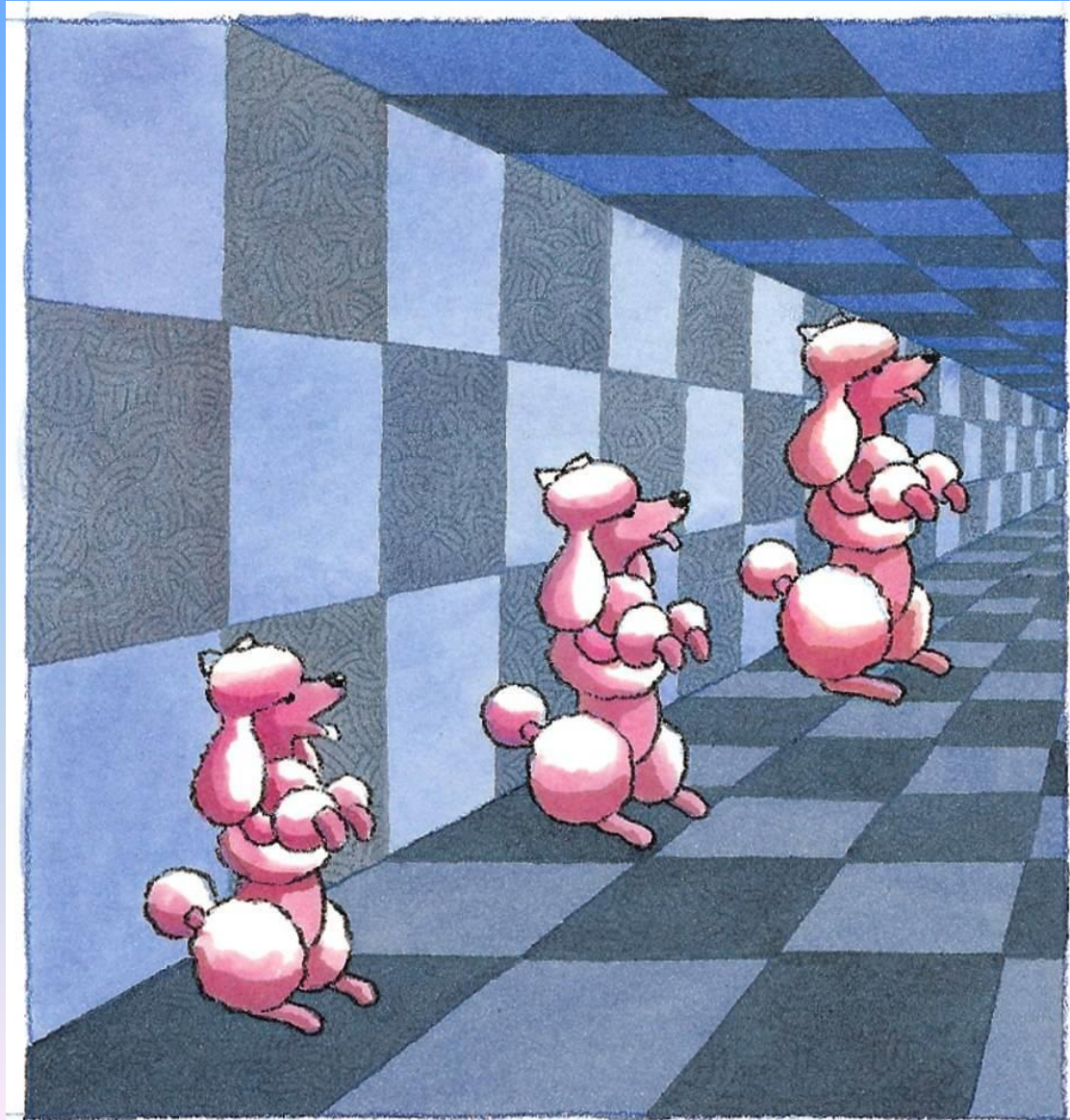
Module 9: Perception

Perceptual Constancy: Size Constancy

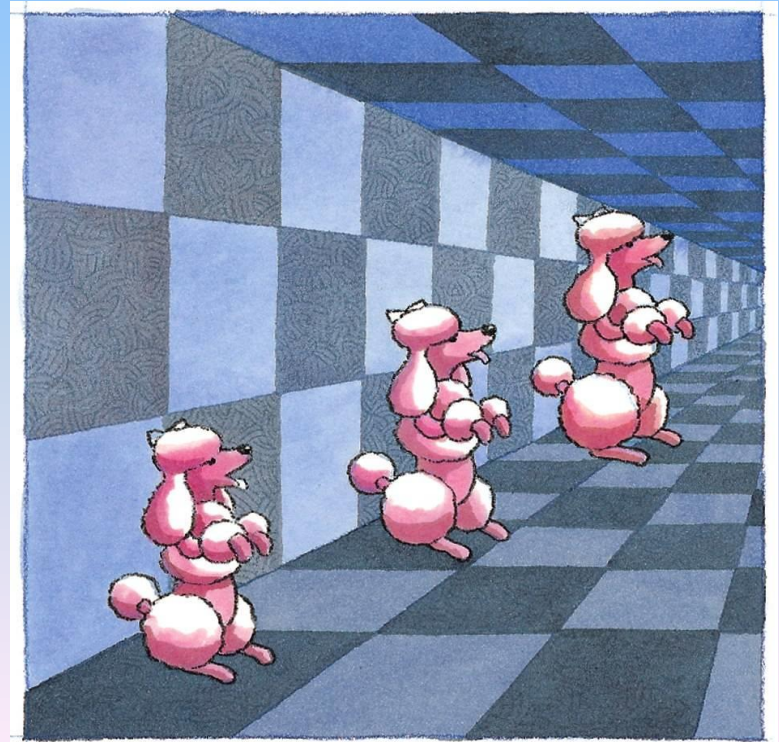
Size Constancy

- A person's understanding that as an object moves further or closer to them its actual size stays the same
- As an object appears to become larger we realize it is getting closer, not bigger.
- As an object appears to become smaller we realize it is moving farther away, not getting smaller.

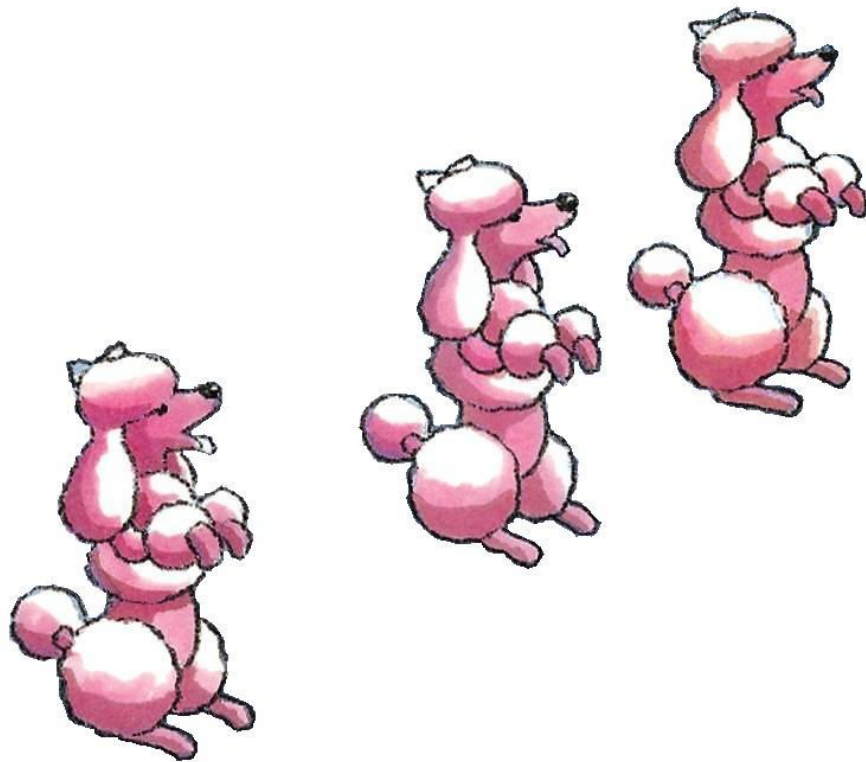
Size Distance Relationship



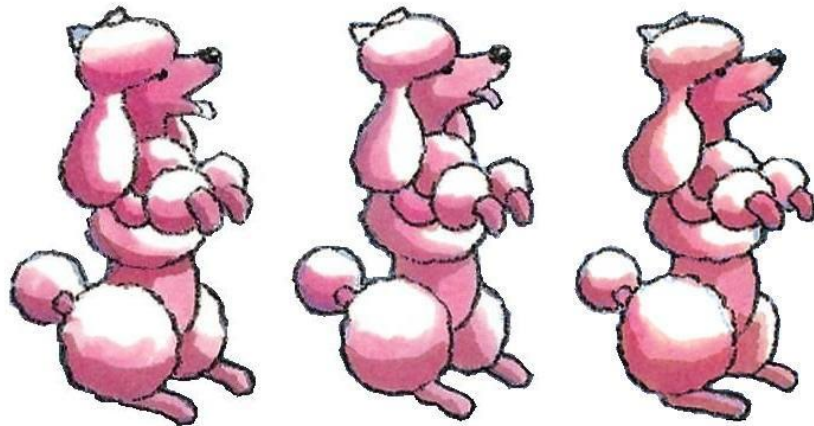
- Sometimes size and distance cues make it hard to perceive accurately.
- The monocular depth cues of *relative height* and *linear perspective* force us to see the poodle on the right as more distant.
- We therefore think that this poodle must be bigger to produce the same size image to our eyes. But all 3 are the same size.



Size Distance Relationship



Size Distance Relationship



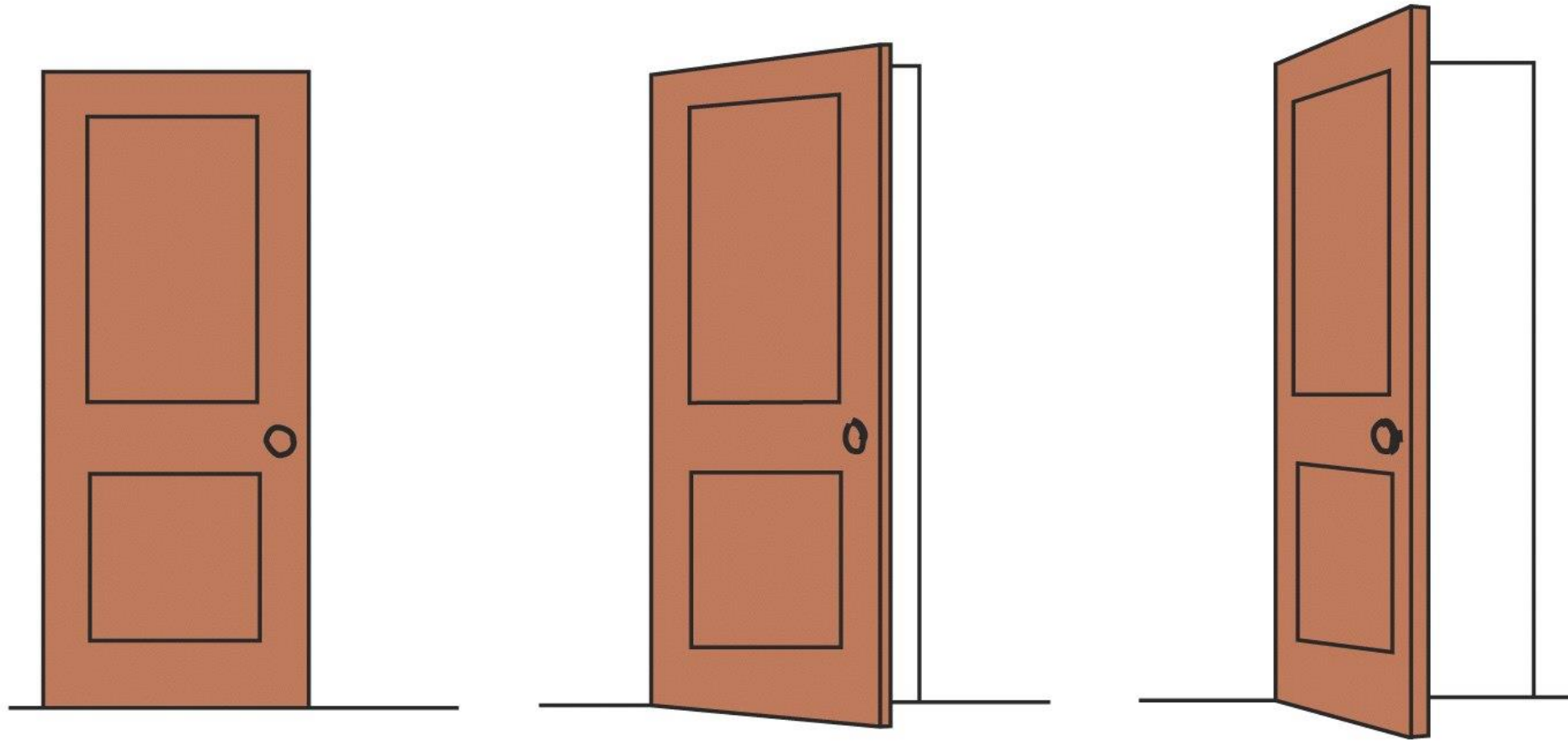
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Perceptual Constancy: Shape Constancy

Shape Constancy

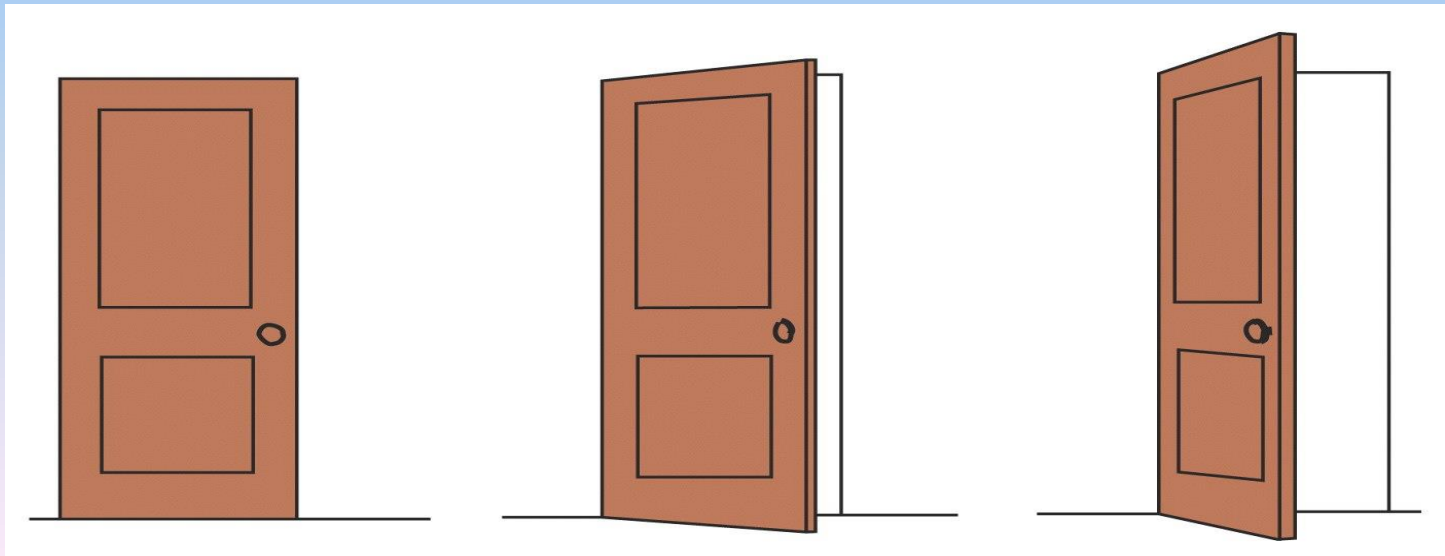
- The understanding that an object's shape remains the same even though the angle of view makes the shape appear changed

Shape Constancy



Shape Constancy

- As a door opens, its shape changes from a rectangle to a trapezoid.
- Shape constancy ensures that we *continue to perceive* the door as a rectangle.



Module 9: Perception

Perceptual Constancy: Lightness Constancy

Light Constancy

- The ability to see an object as having a constant level of lightness no matter how the lighting conditions change.
- If you look at a sheet of paper in bright sunlight, it appears blazingly white; view the same sheet in a dimly lit room, and it appears gray.
- Of course, the paper hasn't changed. We know that the “white” paper stays constant no matter what the lighting conditions are.

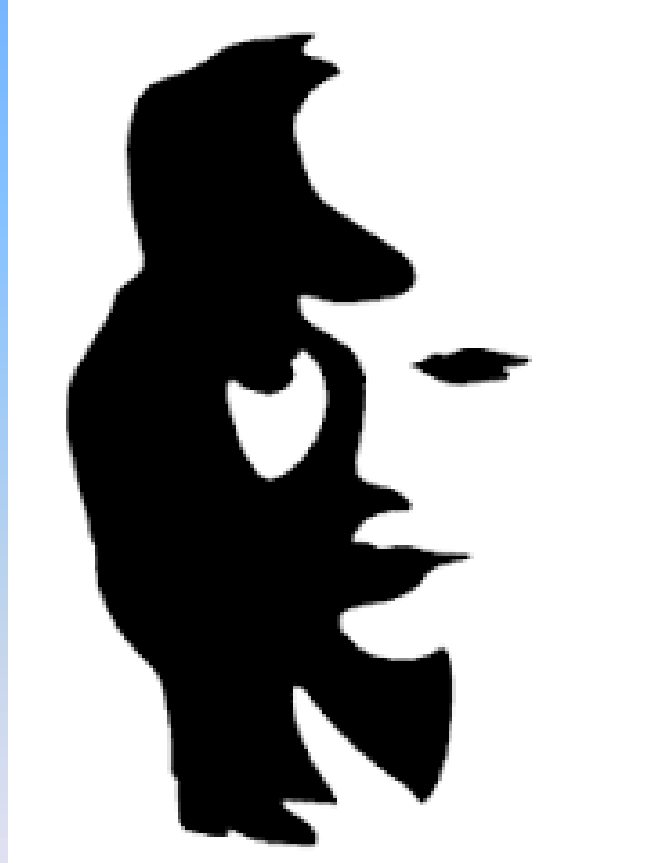
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Perceptual Set

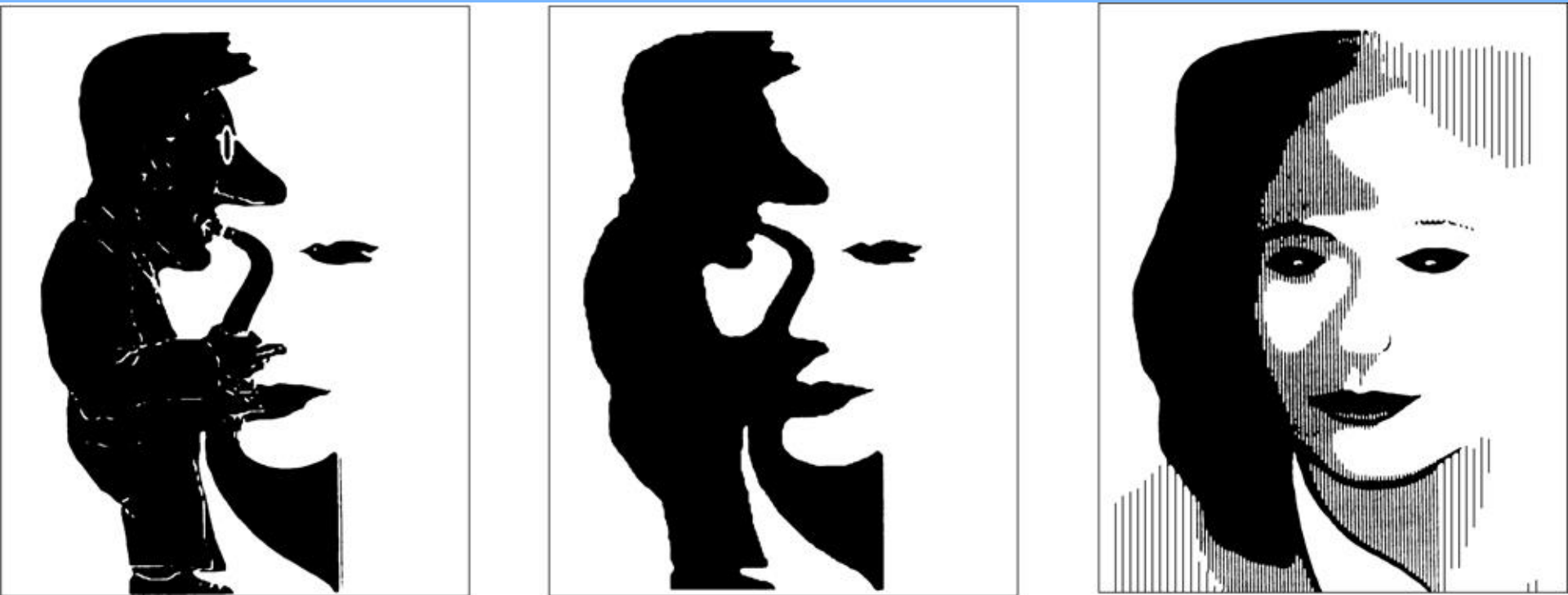
Perceptual Set

- A mental predisposition to perceive something one way and not another
- Example of *top-down processing* (drawing on our experiences and expectations to interpret incoming sensations)
- Influence of the “power of suggestion” (subliminal perception)
- Guided by *schemas*: concepts or mental frameworks that organize and interpret information

What do you see?



Do you see a saxophone player or a woman's face?



- Will be influenced by picture you glance at first

Perceptual Set

A mental predisposition to perceive one thing and not another. What you see in the center picture is influenced by flanking pictures.



From Shepard, 1990.

Module 9: Perception

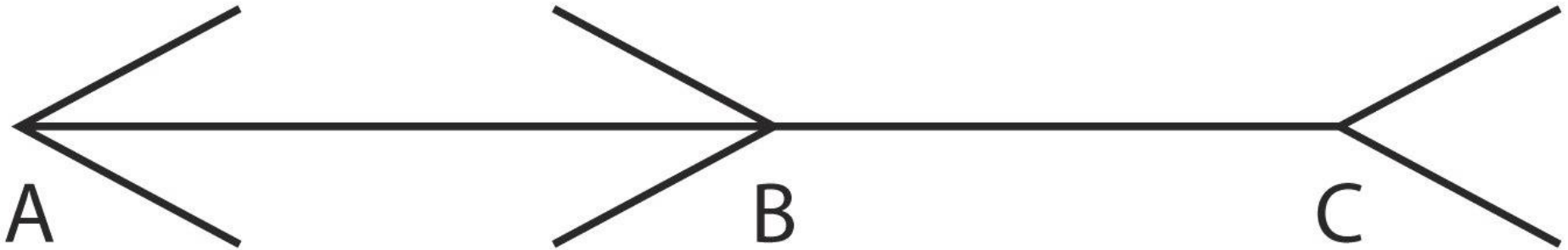
Illusions

Illusions

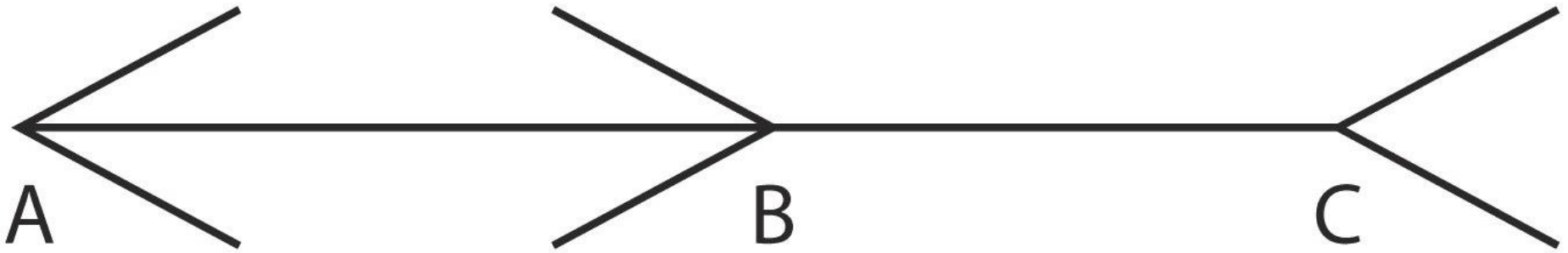
- Misinterpreting sensory stimuli
- Help researchers understand how sensation and perception normally works

Müller-Lyer Illusion

- Which line appears longer – segment AB or segment BC?



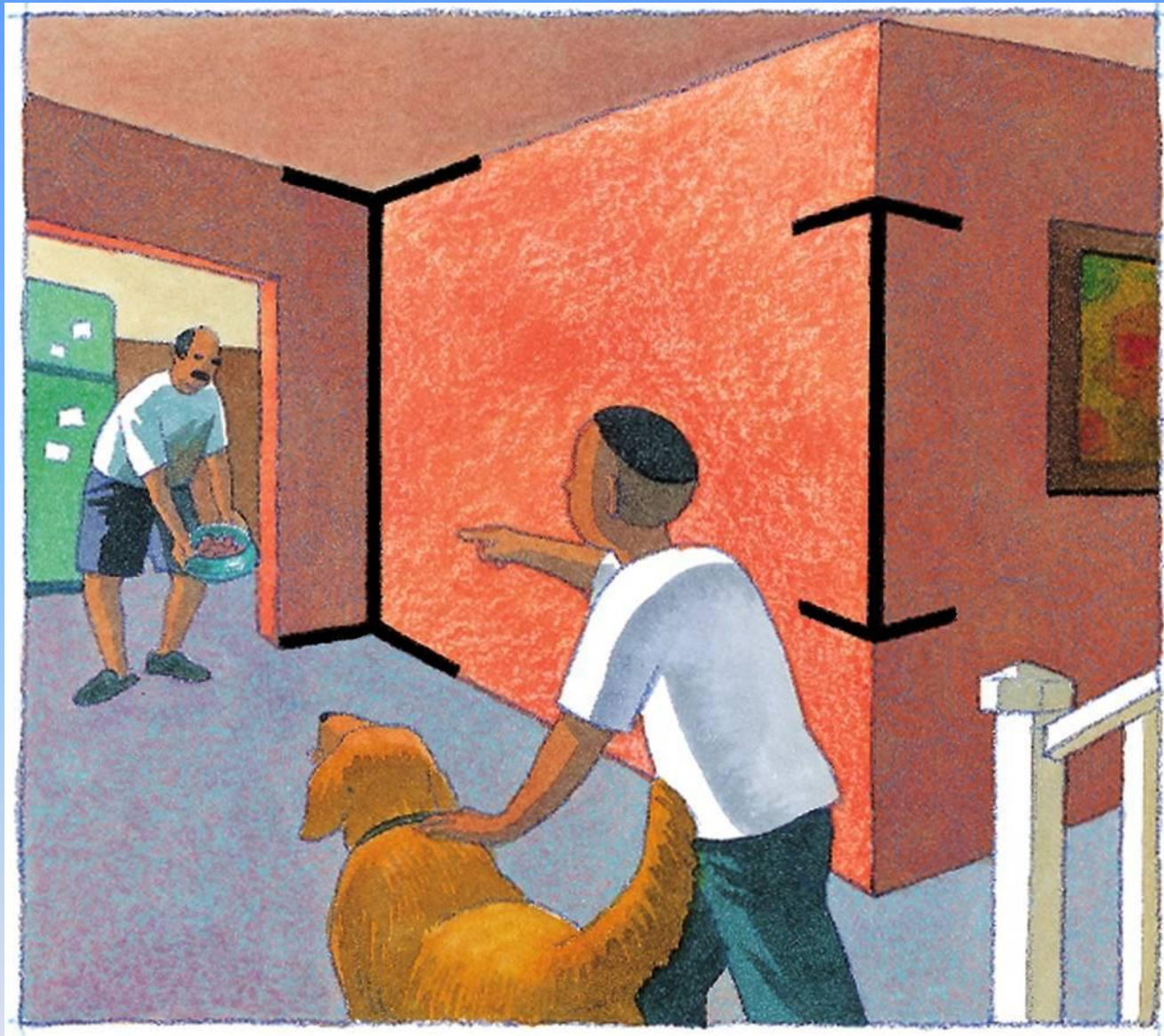
Müller-Lyer Illusion



Most people think segments AB and BC are the same. In reality AB is much longer than BC.

Müller-Lyer Illusion



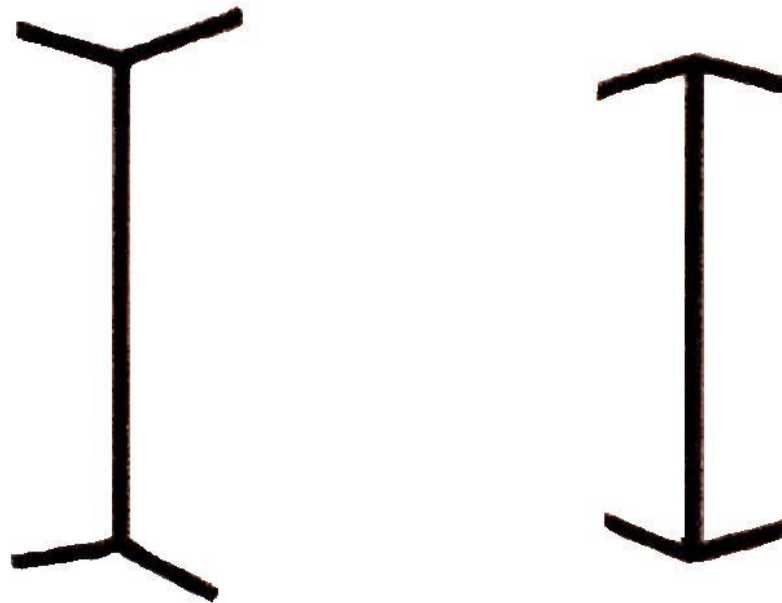


- The lines are actually the same size

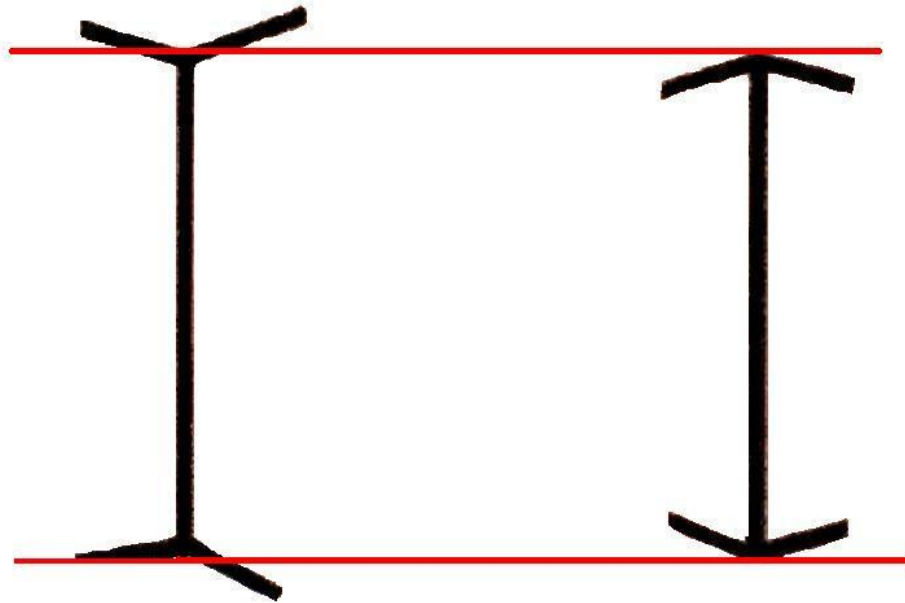
Why do we see the Muller-Lyer Illusion?

- One suggested explanation for the illusion is that we use the arrows at the ends of the lines to help judge distance and, thus, length.

Müller-Lyer Illusion



Müller-Lyer Illusion



Ames Room Illusion



Ames Room Illusion

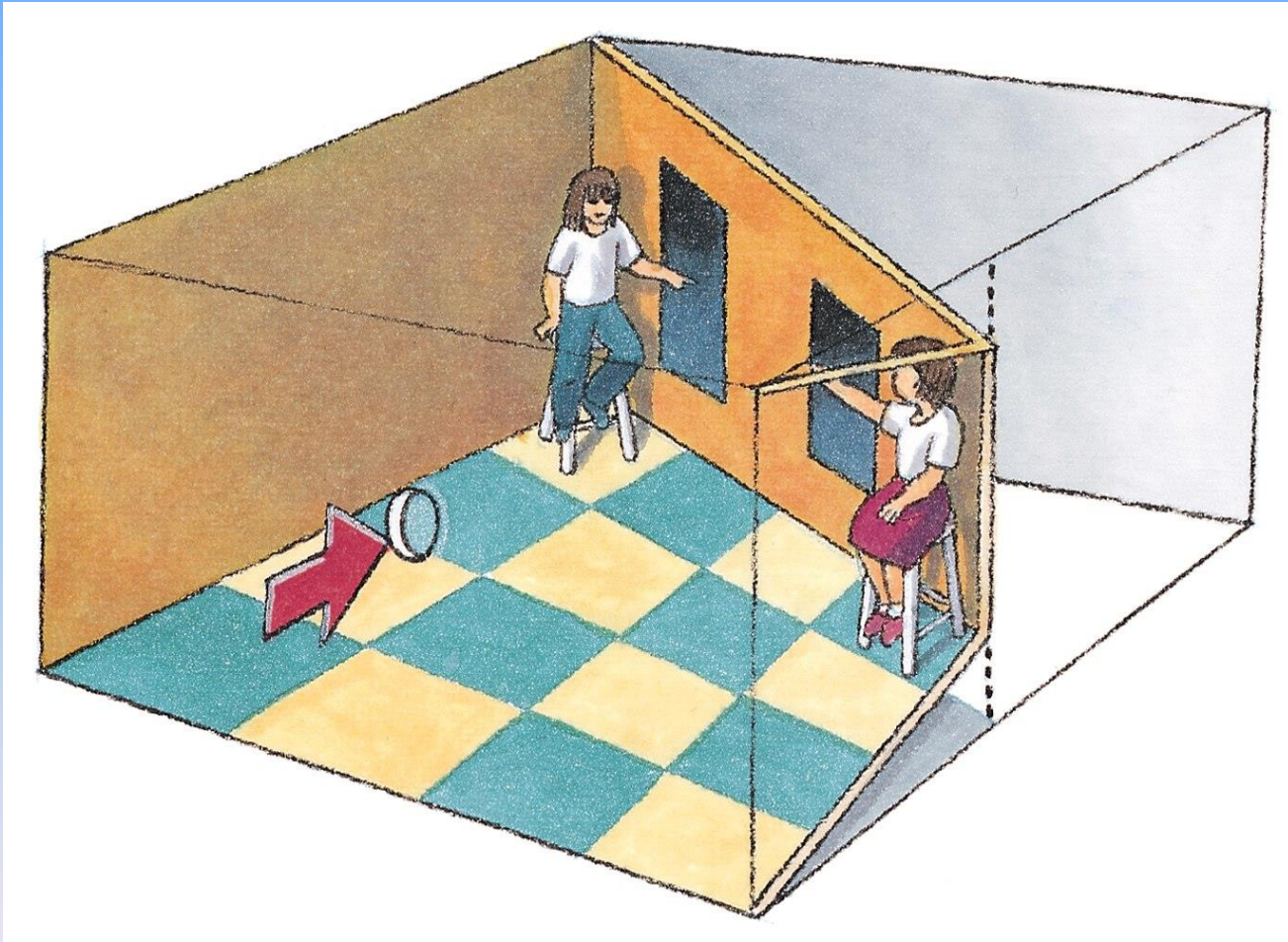


How can this be?

- In this famous illusion, the Ames room, two people seem to change size as they switch positions in the room.

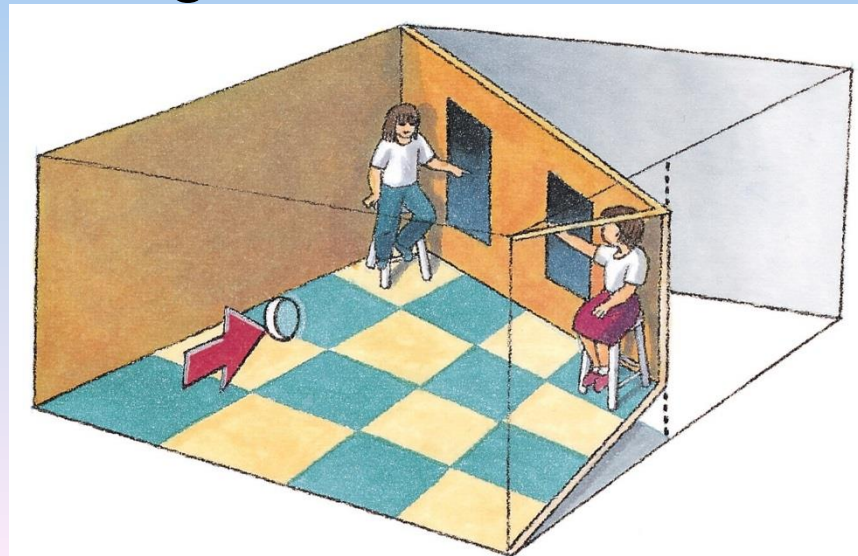


The Ames room



Ames Room Illusion: Secret Revealed

- The room is distorted. We assume it is a standard, rectangular room (why wouldn't it be?) This is why we perceive the person who is closer as being larger.
- Our minds don't let us see that person as closer because it *violates our expectations* for how a room should be constructed, and we're tricked into thinking the size of the girls has changed, rather than the dimensions and angles of the room.



The End