







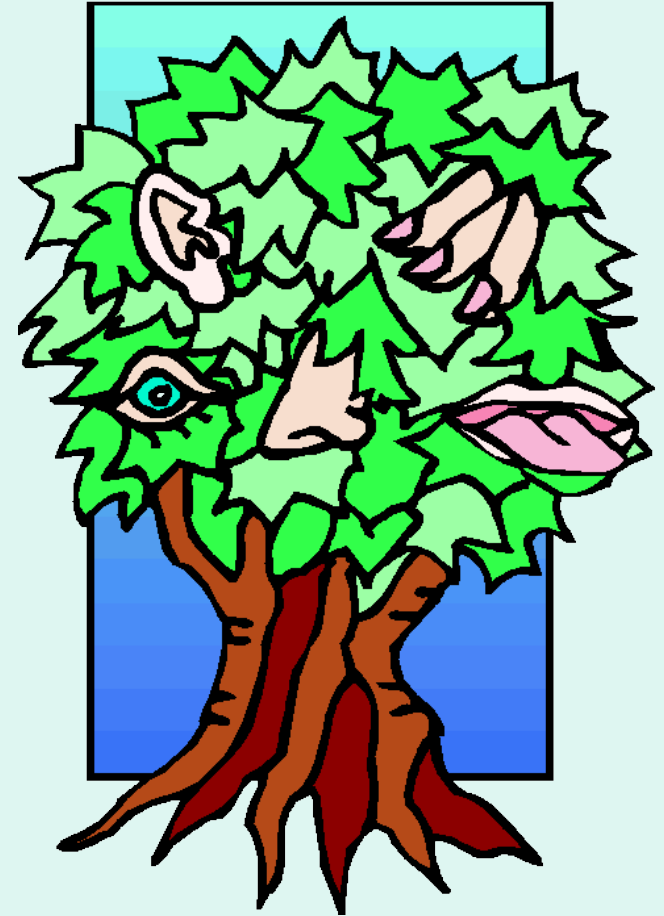


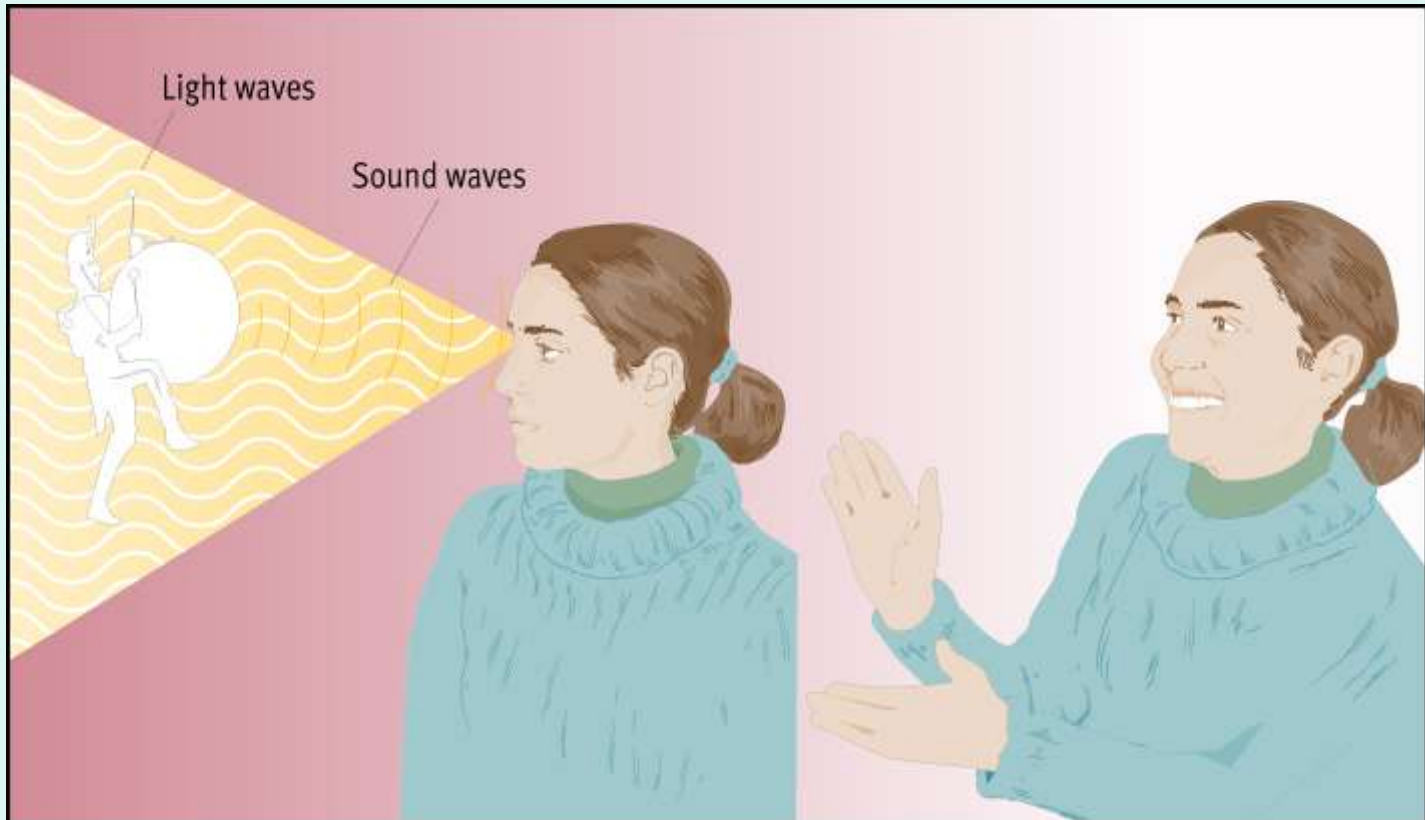




# Sensation vs. Perception

- ***Sensation*** – the stimulation of sense organs; raw data without meaning
- ***Perception*** – the selection, organization, and interpretation of sensory input; meaning is subjective





### Sensation

Sensory organs absorb energy from physical stimuli in the environment.

Sensory receptors detect stimulus energies and convert them into neural impulses, which are sent to the brain.

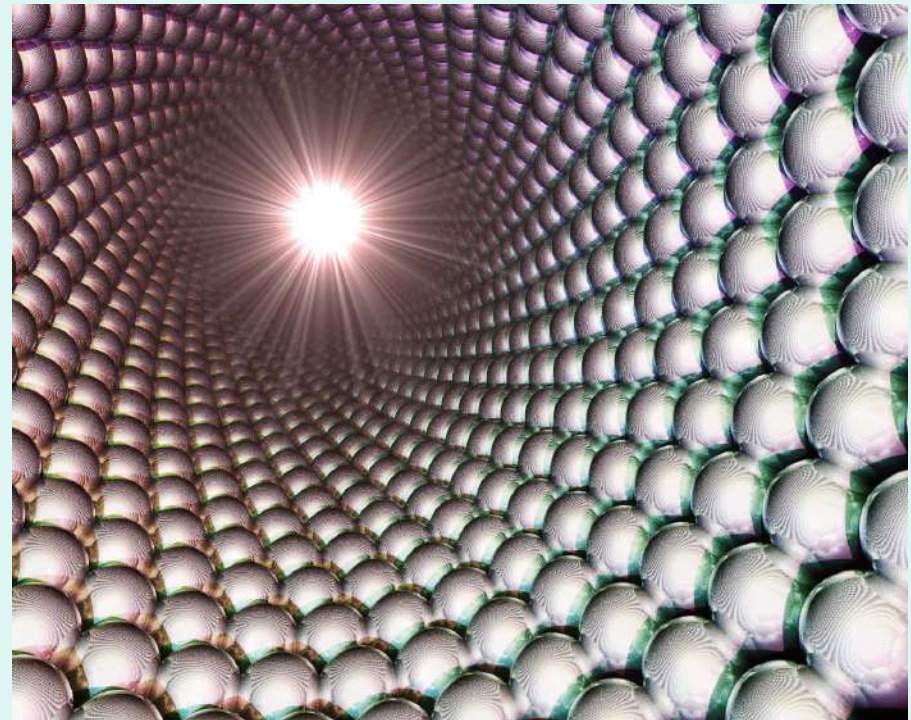
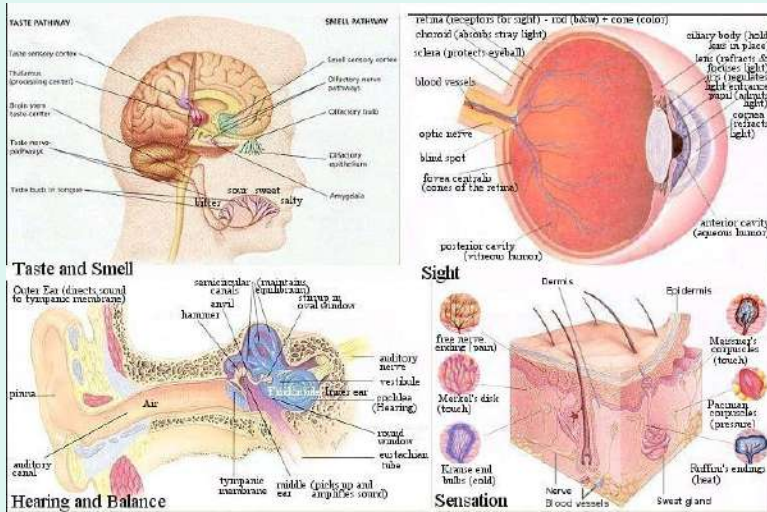
### Perception

The brain organizes this input and translates it into something meaningful.



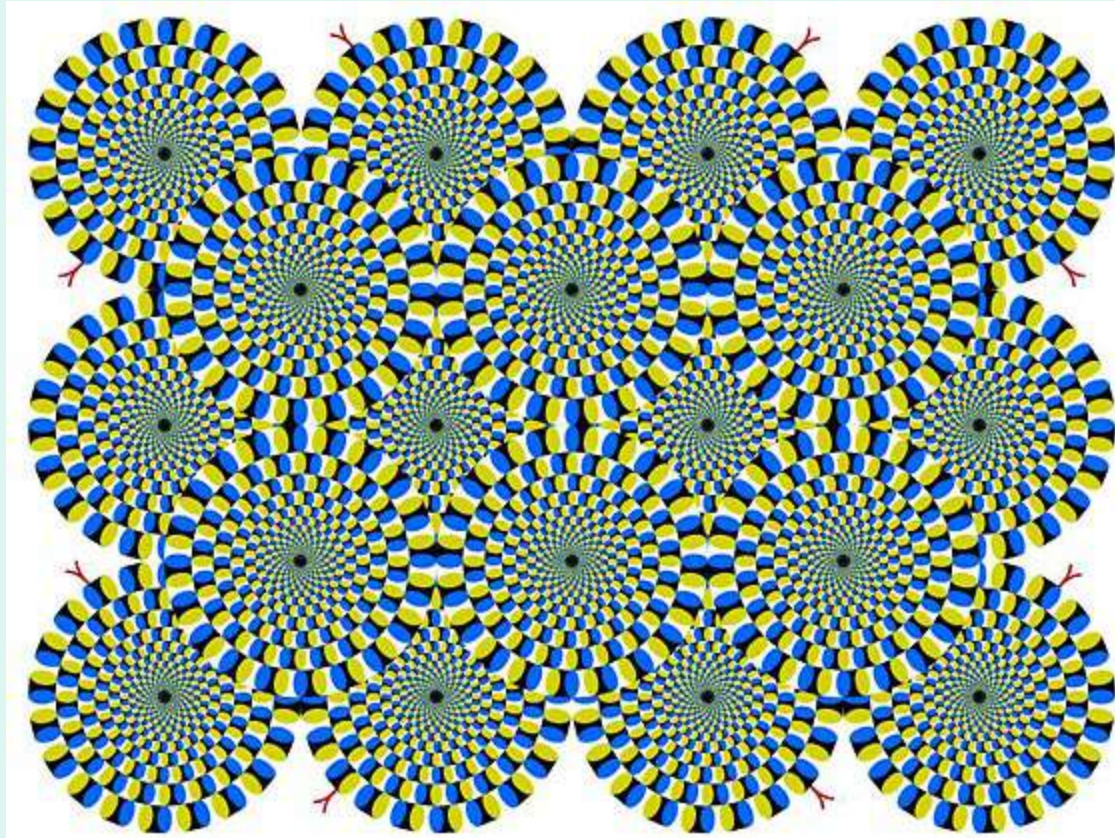
# Sensation and Perception

- 6-8% of AP exam
- Thresholds and Signal Detection Theory
- Sensory Mechanisms
- Attention
- Perceptual Processes



# Essential Questions!

- *How are our perceptions formed?*
- *How accurate are our perceptions?*



# Common Features

- All senses enter the brain through TRANSDUCTION – the process of transforming physical stimuli into neural impulses
- All sense organs have a built-in system of ADAPTATION – our awareness of the stimulation decreases if we are constantly exposed to it

# Sensory Thresholds

- **Absolute threshold** – the intensity level of a stimulus that a person *correctly* detects at least half (50%) of the time
- **Subliminal stimulus** – a stimulus that is correctly detected less than half of the time
- **Just noticeable difference (JND)** – the smallest magnitude of difference in a stimulus that a person can correctly detect at least 50% of the time

# Discovering Psychology - Sensation and Perception (Part 1 of 2)

by theBandJshow1

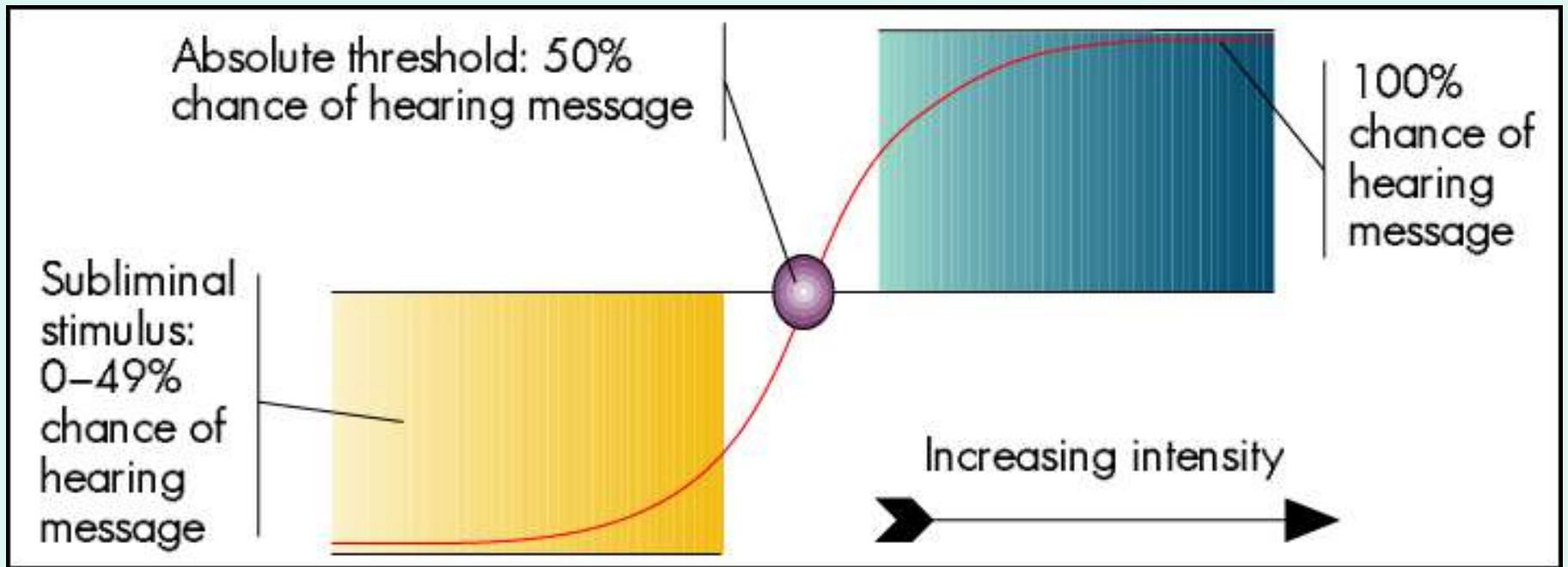


# Examples of Absolute Thresholds

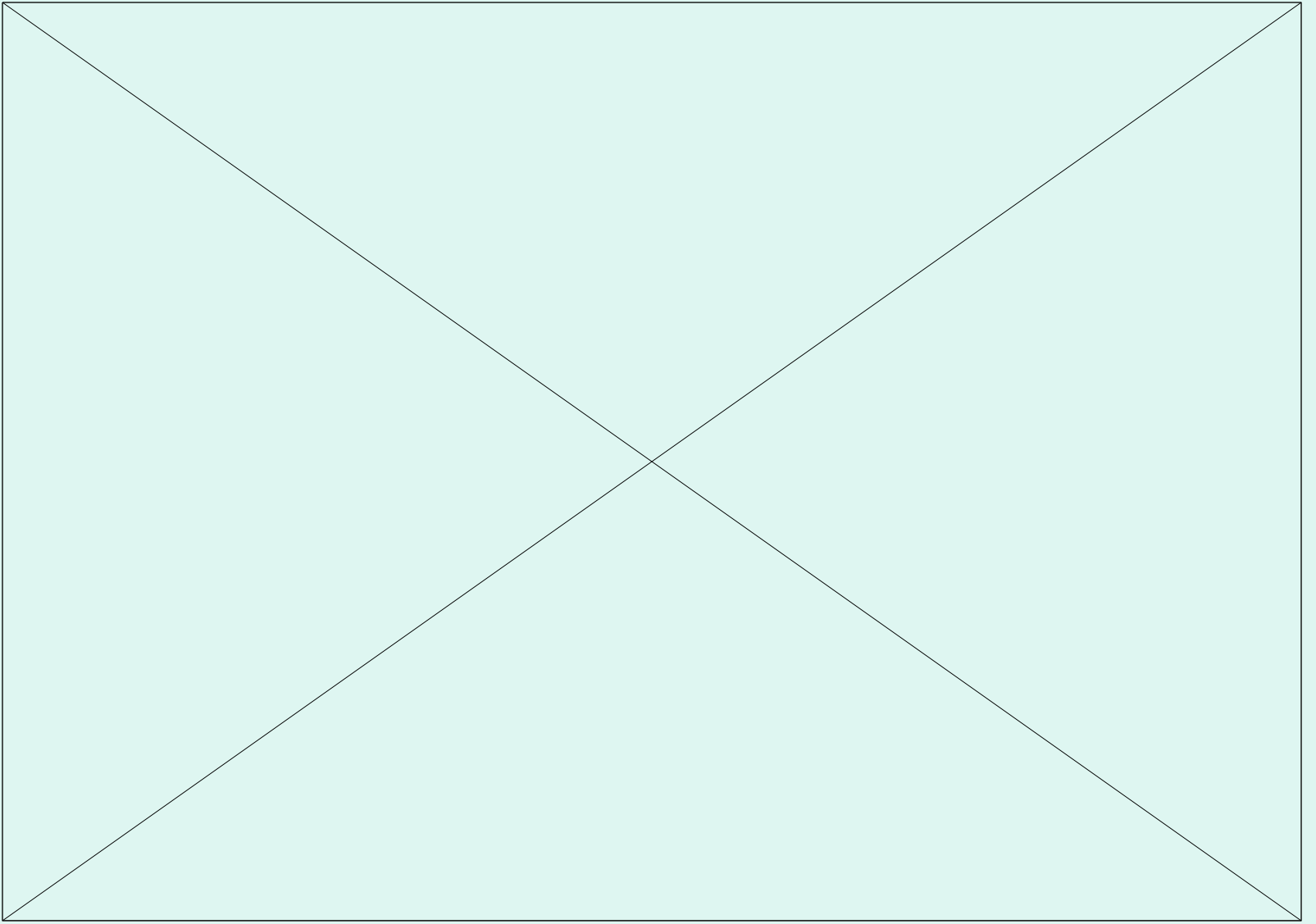
Vision	A candle flame seen at 30 miles on a dark, clear night
Hearing	The tick of a watch under quiet conditions at 20 feet
Taste	One teaspoon of sugar in two gallons of water
Smell	One drop of perfume diffused into the entire volume of a six-room apartment
Touch	The wing of a fly falling on your cheek from a distance of 1 cm

# Sensory Thresholds

- **Absolute threshold** – the intensity level of a stimulus that a person *correctly* detects at least half (50%) of the time
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Duke University Subliminal Ad Experiment



You

# Sensory Thresholds

- **Absolute threshold** – the intensity level of a stimulus that a person *correctly* detects at least half (50%) of the time
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# *Weber's Law*

- The size of the JND is proportional to the intensity of the initial stimulus

**Ex: You can tell the diff. between 1 lb. and 2 lb. weights, but not between 100 and 101 lb. weights**



## Representative Middle-Range Values for Weber Fractions

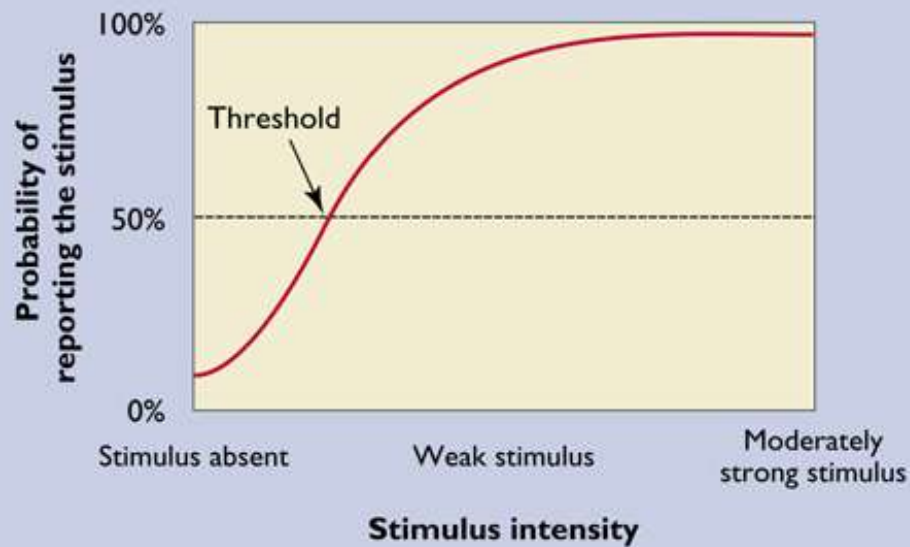
<b>Sense</b>	<b>Sensation Measured</b>	<b>Weber Fraction</b>
<b>Vision</b>	<b>Brightness, white light</b>	<b>1/60</b>
<b>Kinesthesia</b>	<b>Lifted weights</b>	<b>1/30</b>
<b>Pain</b>	<b>Heat on skin</b>	<b>1/30</b>
<b>Hearing</b>	<b>Tone of middle pitch and moderate loudness</b>	<b>1/10</b>
<b>Pressure</b>	<b>On “spot” of skin</b>	<b>1/7</b>
<b>Smell</b>	<b>Odor of India rubber</b>	<b>1/4</b>

# ***Fechner's Law***

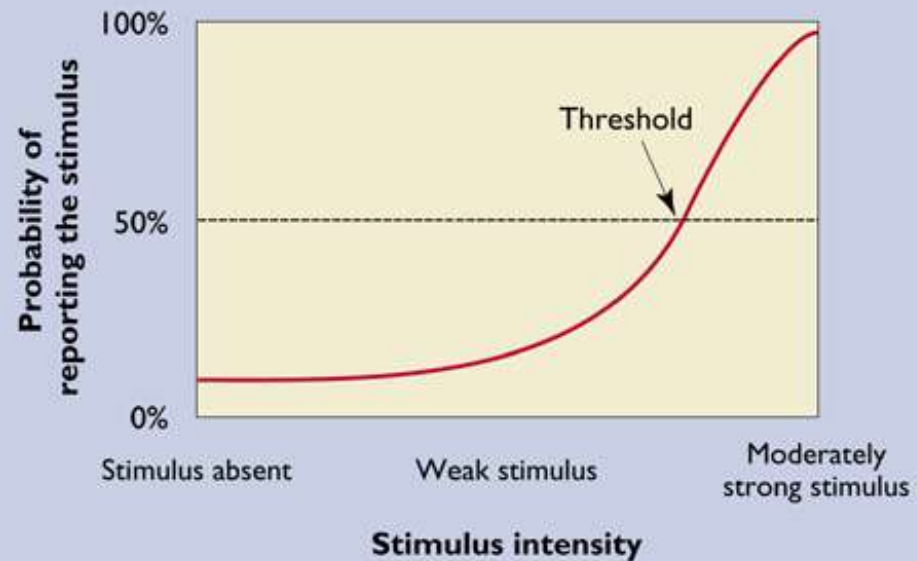
- The magnitude of a sensory experience is proportional to the number of JNDs that the stimulus causing the experience is above absolute threshold
- Constant increments in stimulus intensity produce smaller and smaller increases in the perceived magnitude of sensation

# ***Signal-Detection Theory***

- **Proposes that the detection of stimuli involves decision processes as well as sensory processes, which are both influenced by a variety of factors besides stimulus intensity**
- **Performance depends on the level of “noise” in the system; noise comes from all irrelevant stimuli in the environment**

**a**

Instructions: You will receive a 10-cent reward for correctly reporting that a light is present. You will be penalized 1 cent for reporting that a light is present when it is not.

**b**

Instructions: You will receive a 1-cent reward for correctly reporting that a light is present. You will be penalized 10 cents *and* subjected to an electric shock for reporting that a light is present when it is not.







Stimulus actually present

Stimulus actually absent

Report stimulus present

**Hit**

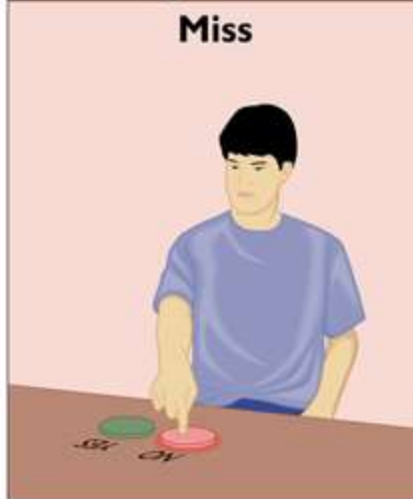


**False alarm**



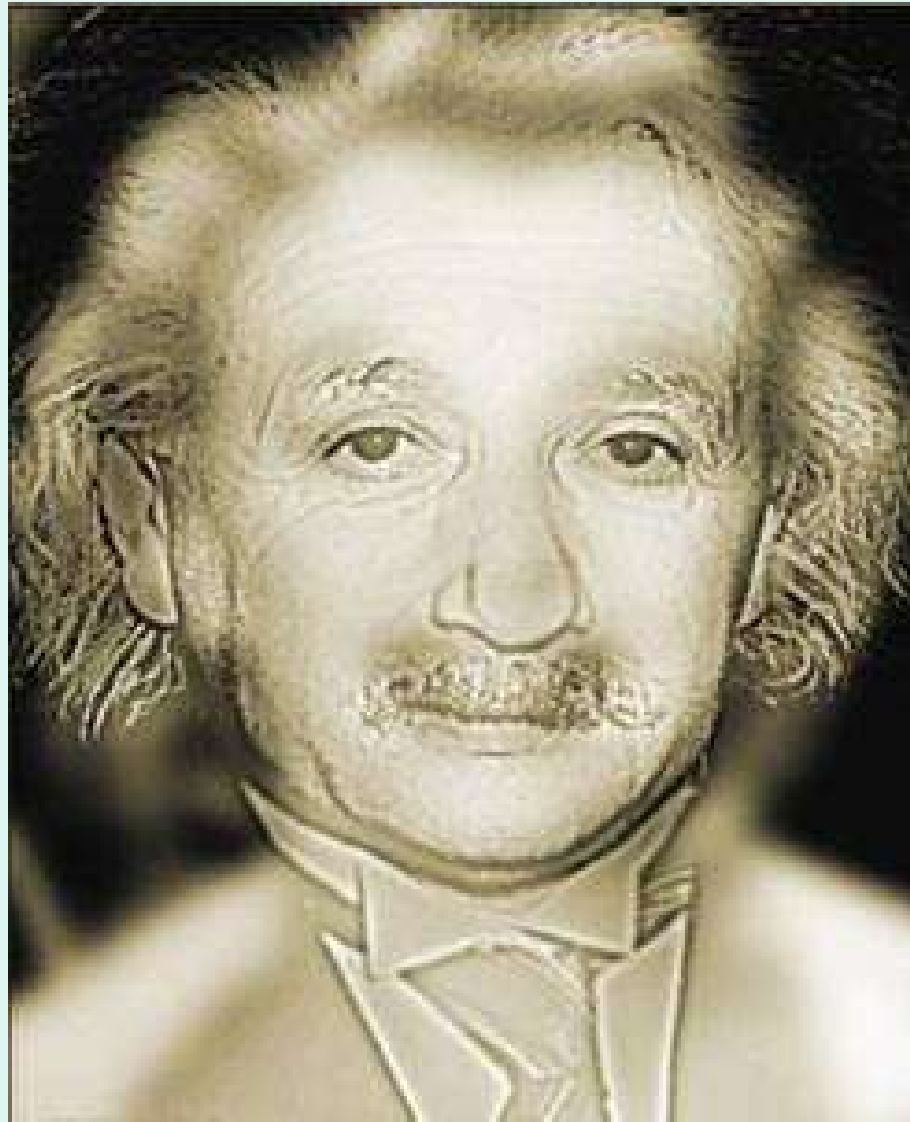
Report stimulus absent

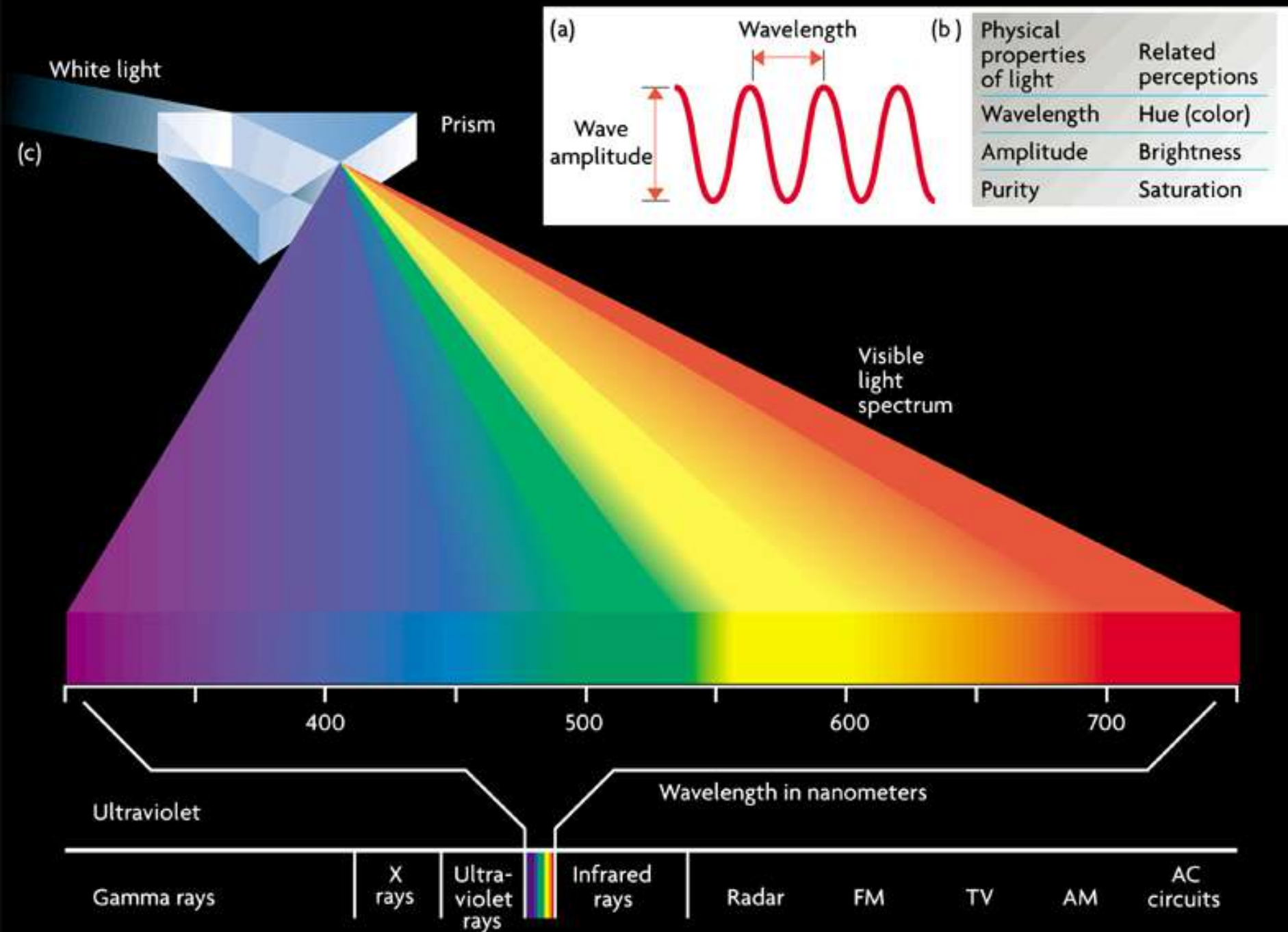
**Miss**

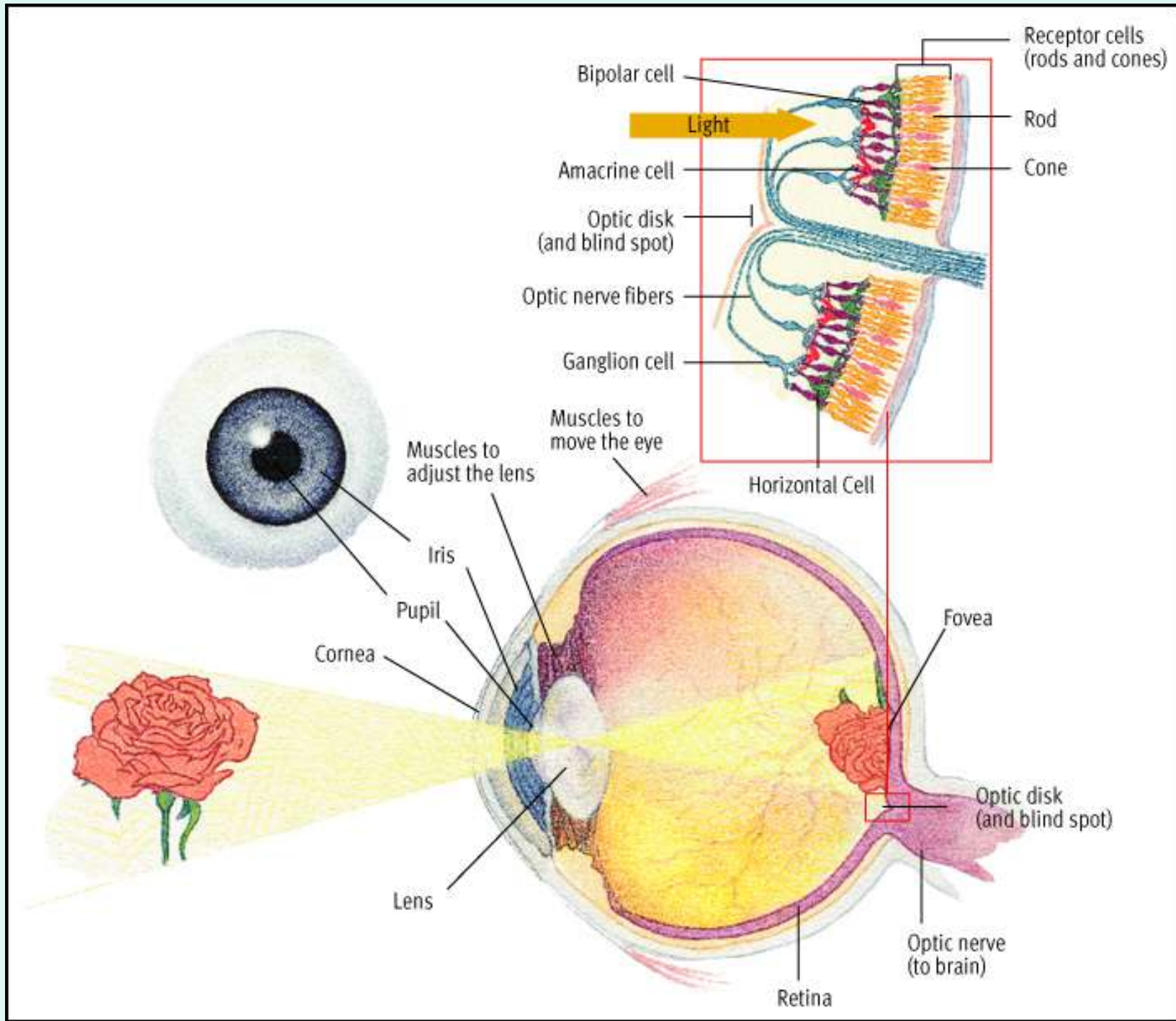


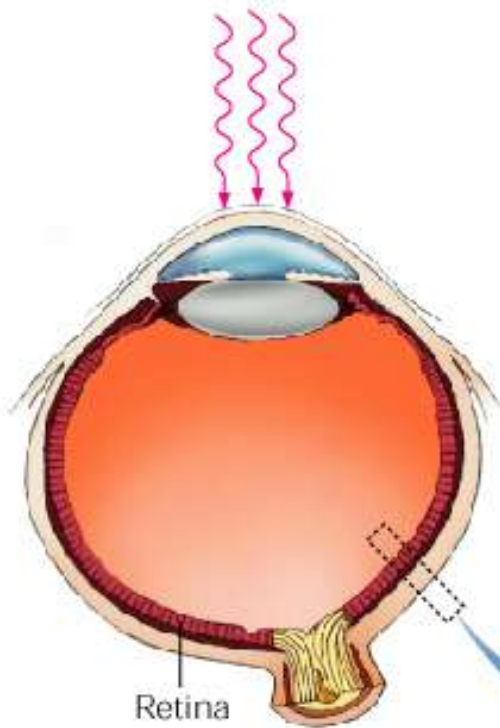
**Correct rejection**



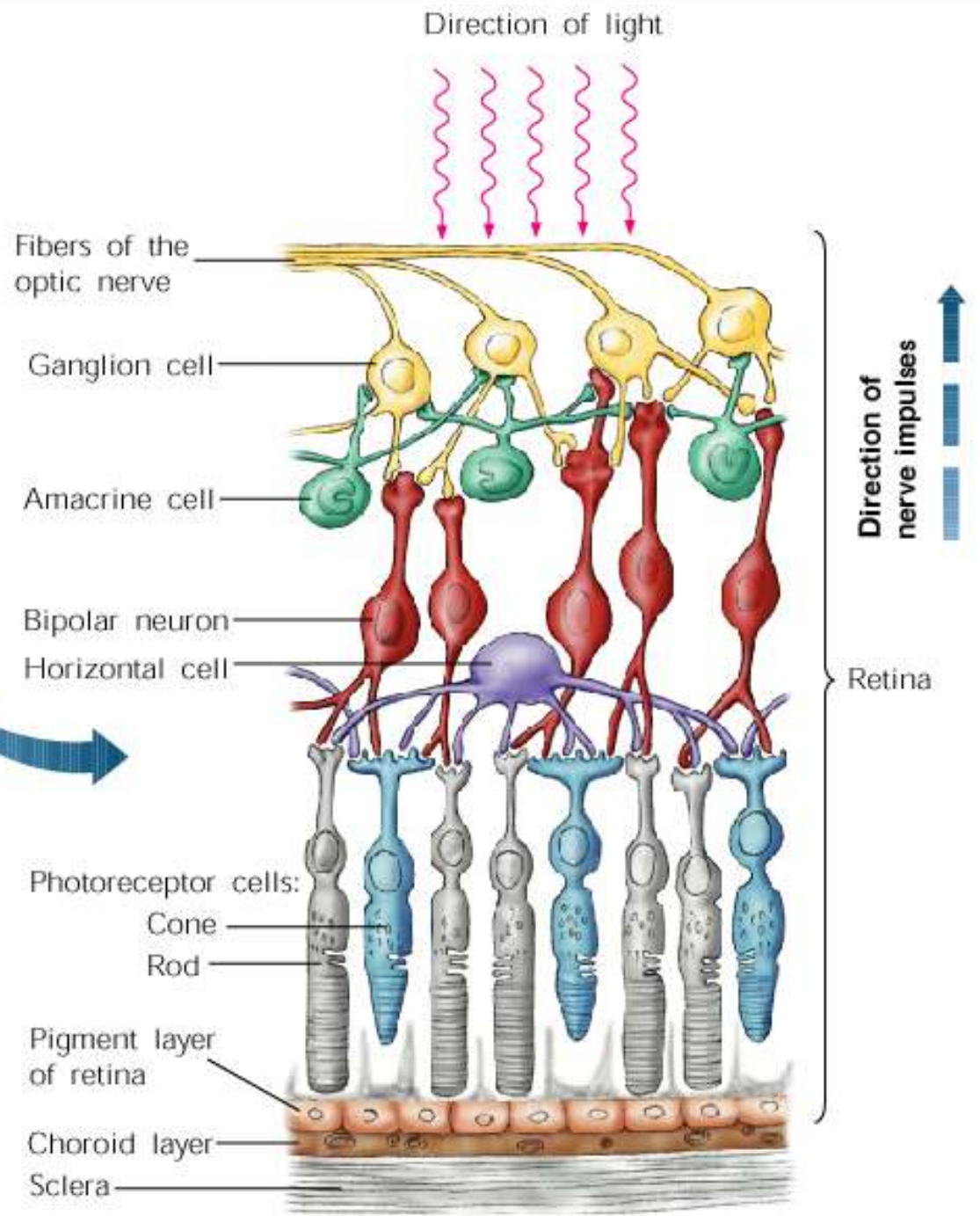
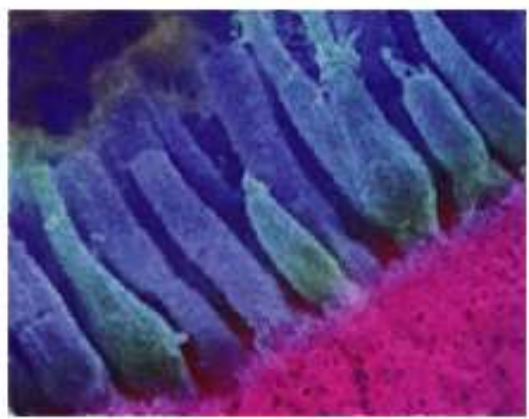




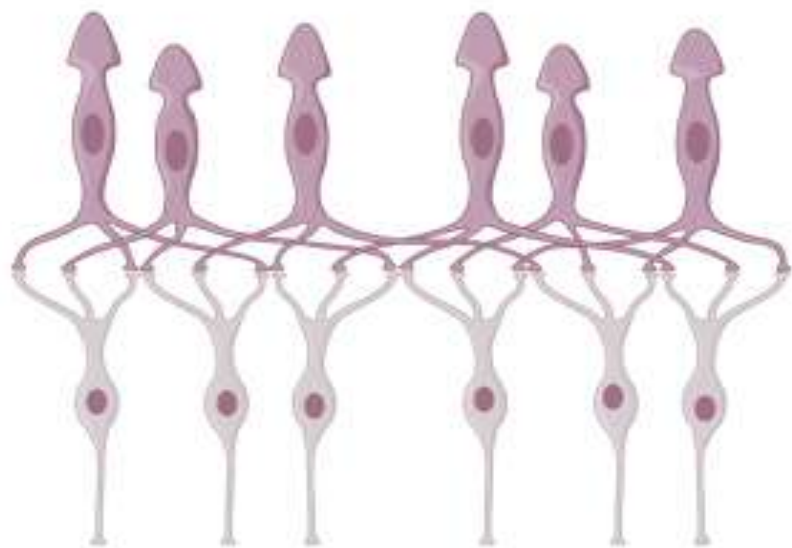




Retina



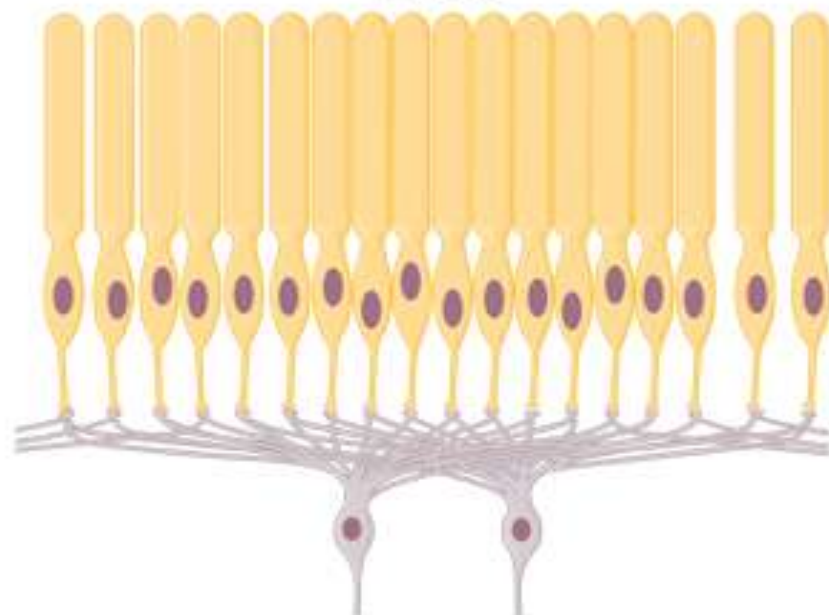
**Cones**



**a**

**Bipolar cells**

**Rods**

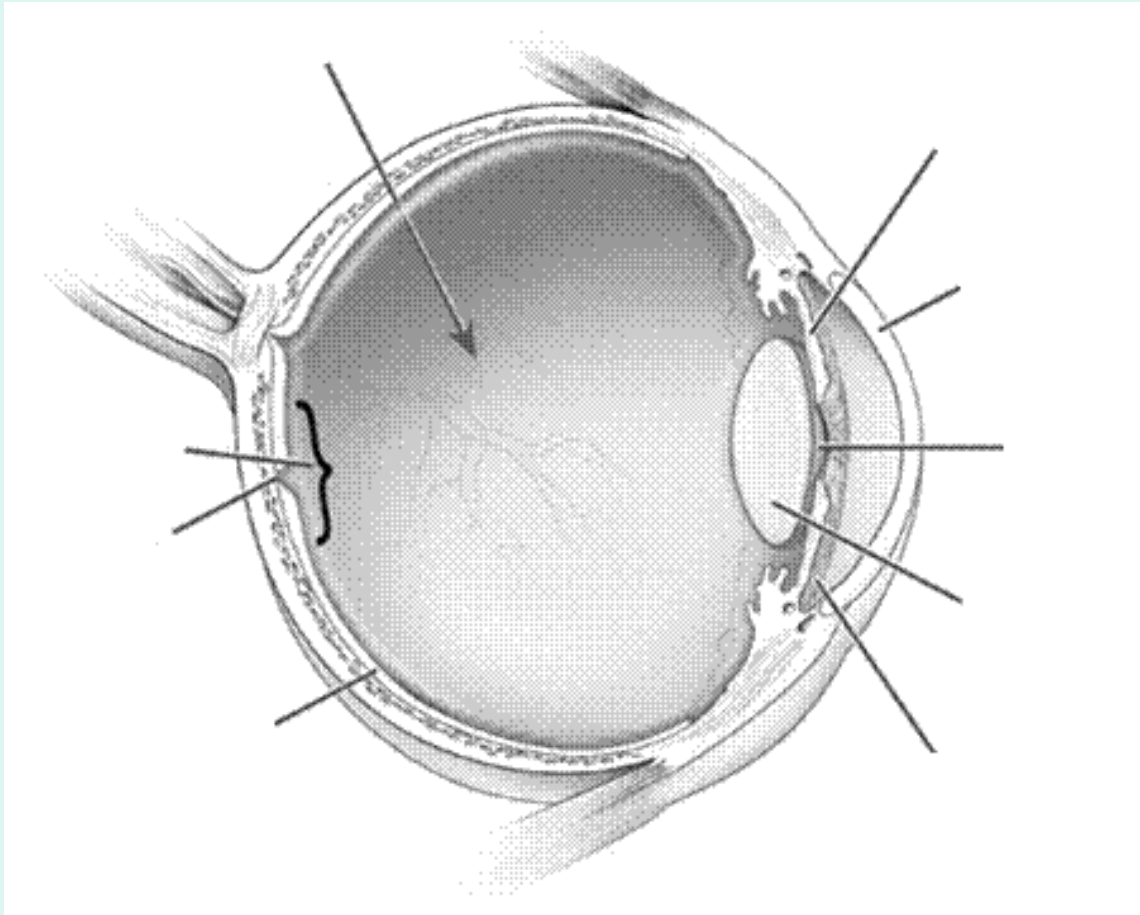


**b**

**Bipolar cells**

	Rods	Cones
Shape	Nearly cylindrical	Tapered at one end
Prevalence in human retina	90–95%	5–10%
Greatest incidence by species	In species that are active at night	In birds, primates, and other species that are active during the day
Area of the retina	Toward the periphery	Toward the fovea
Contribution to color vision	No direct contribution	Critical for color vision
Response to dim light	Strong	Weak
Contribution to perception in detail	Little	Much







Stimulus actually present

Stimulus actually absent

Report stimulus present

**Hit**

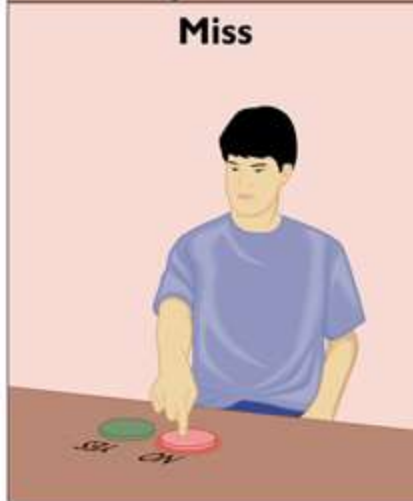


**False alarm**

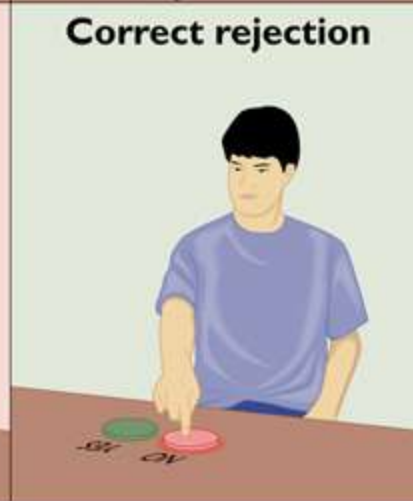


Report stimulus absent

**Miss**



**Correct rejection**

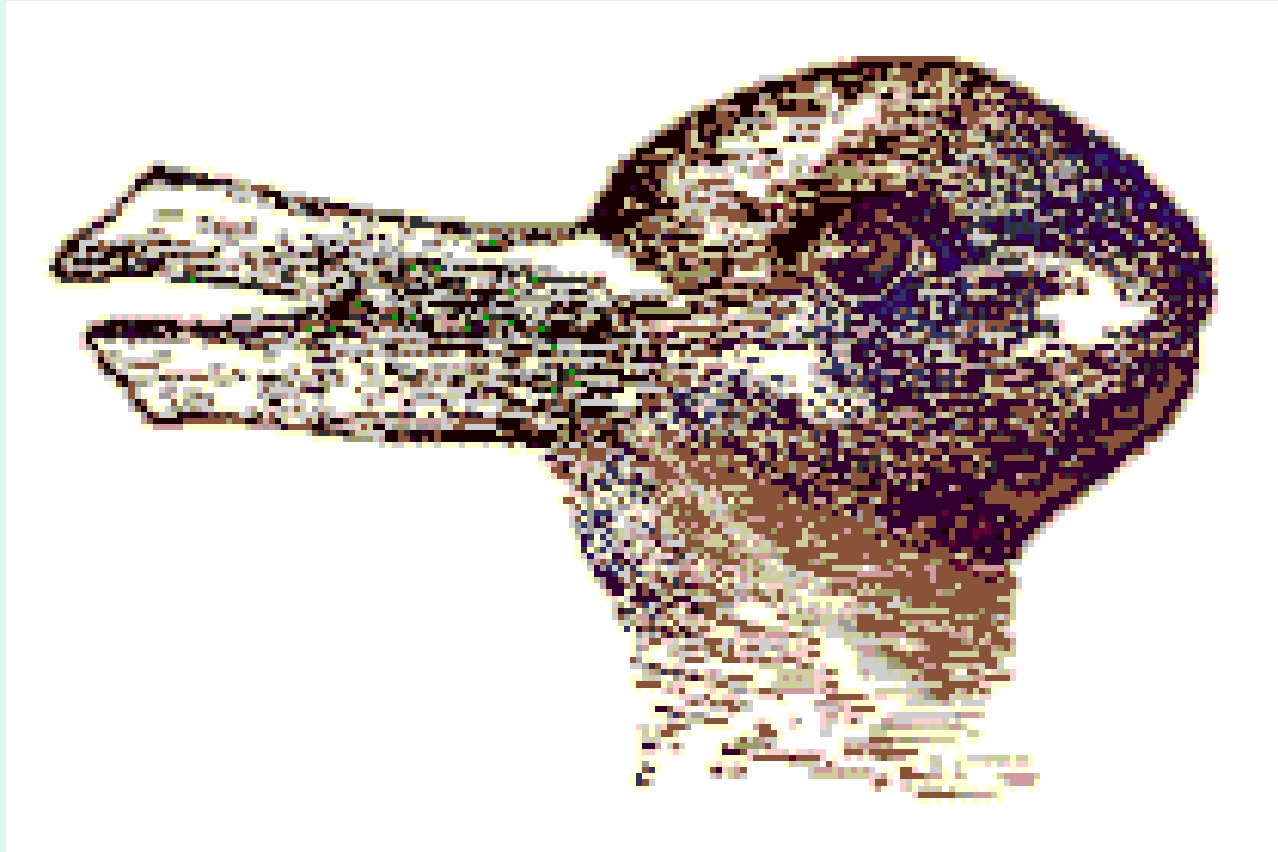










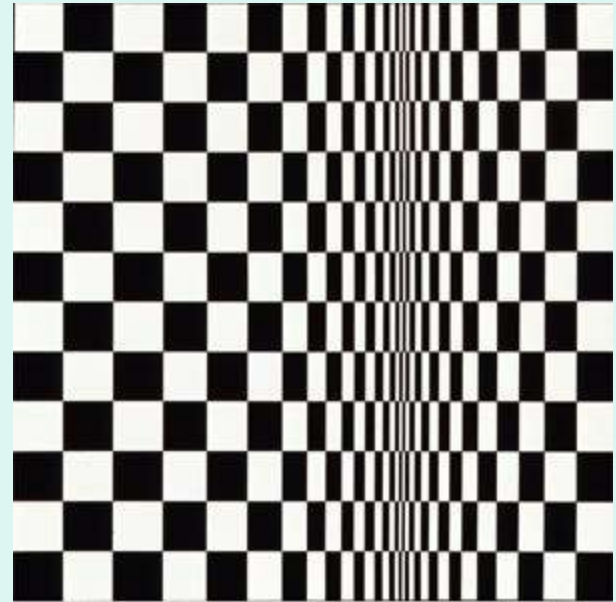


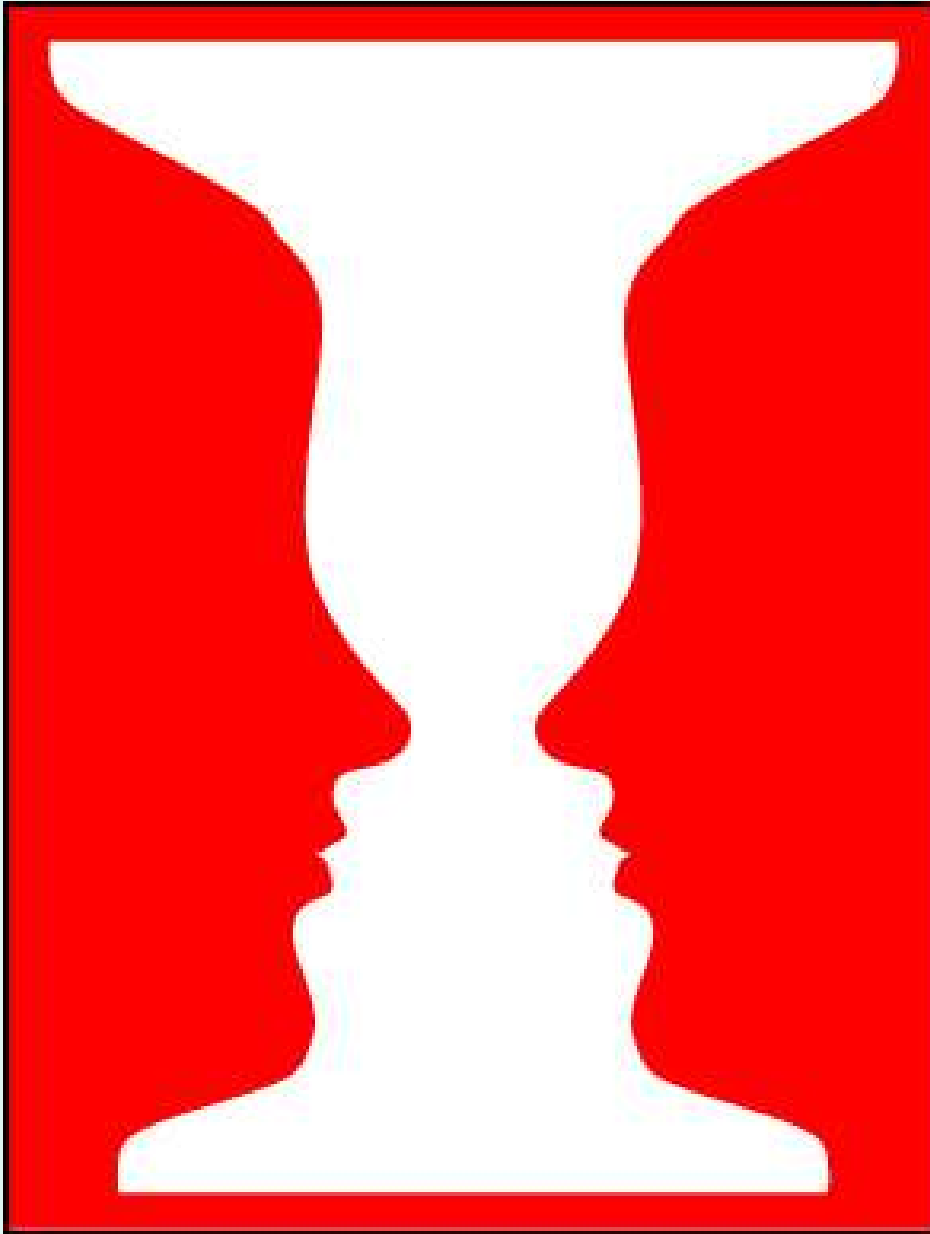
THE CAT



# Gestalt Principles of Organization

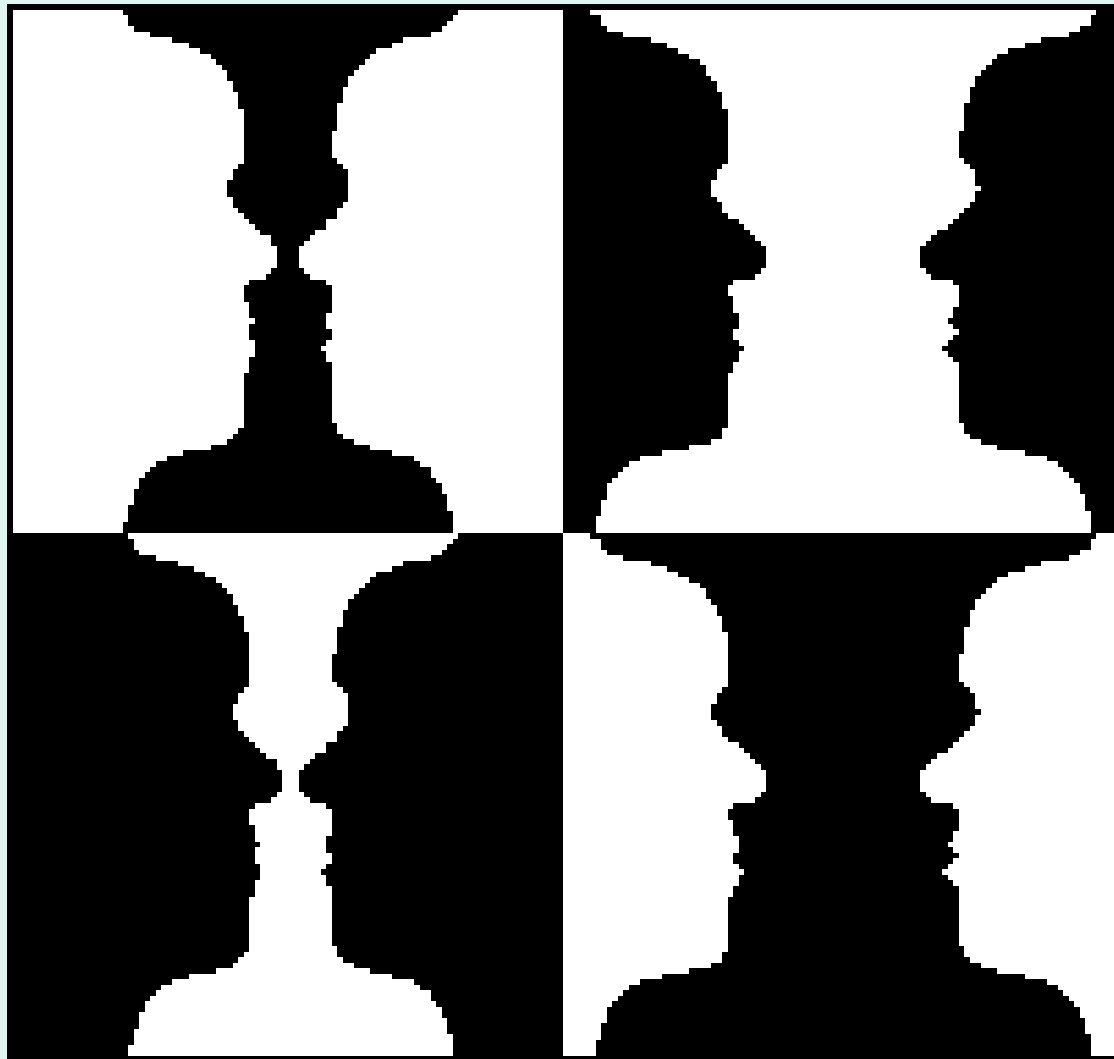
- Rules that specify how our brains organize separate pieces or elements into meaningful perceptions





## Figure-ground

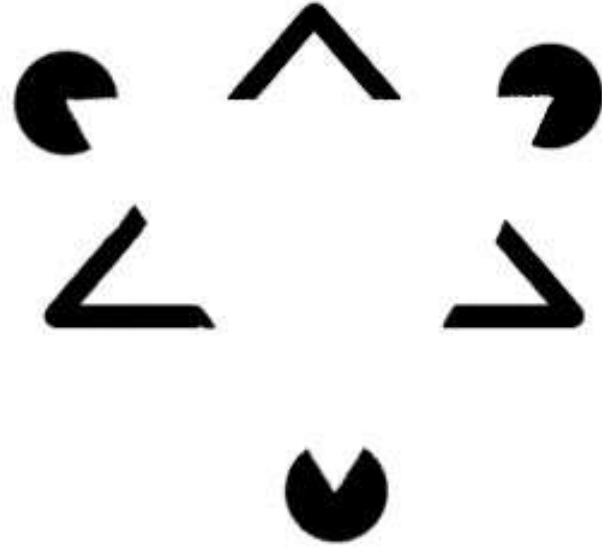
- We tend to automatically distinguish between a figure and the background
- Innate
- Typically the smaller object with more detail is the figure



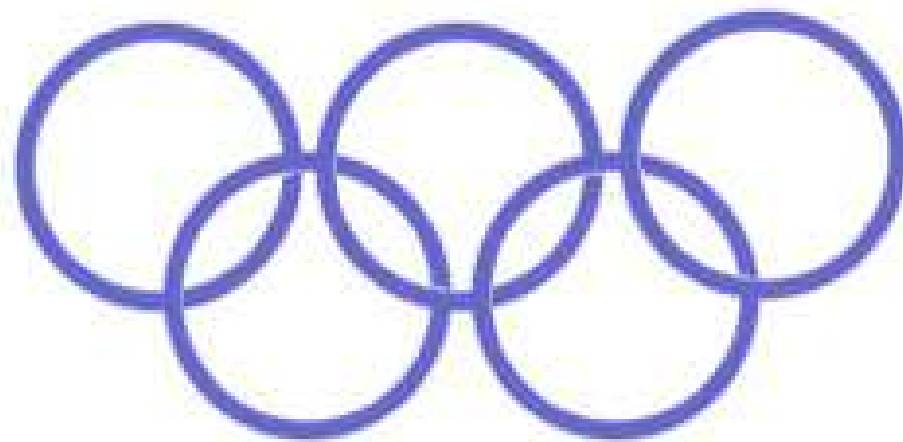


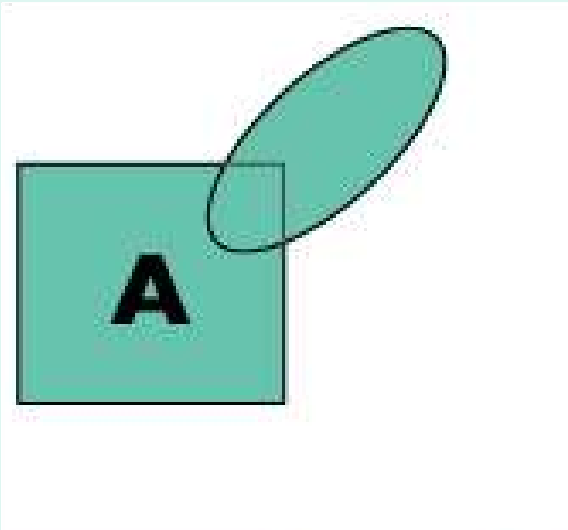
## Closure

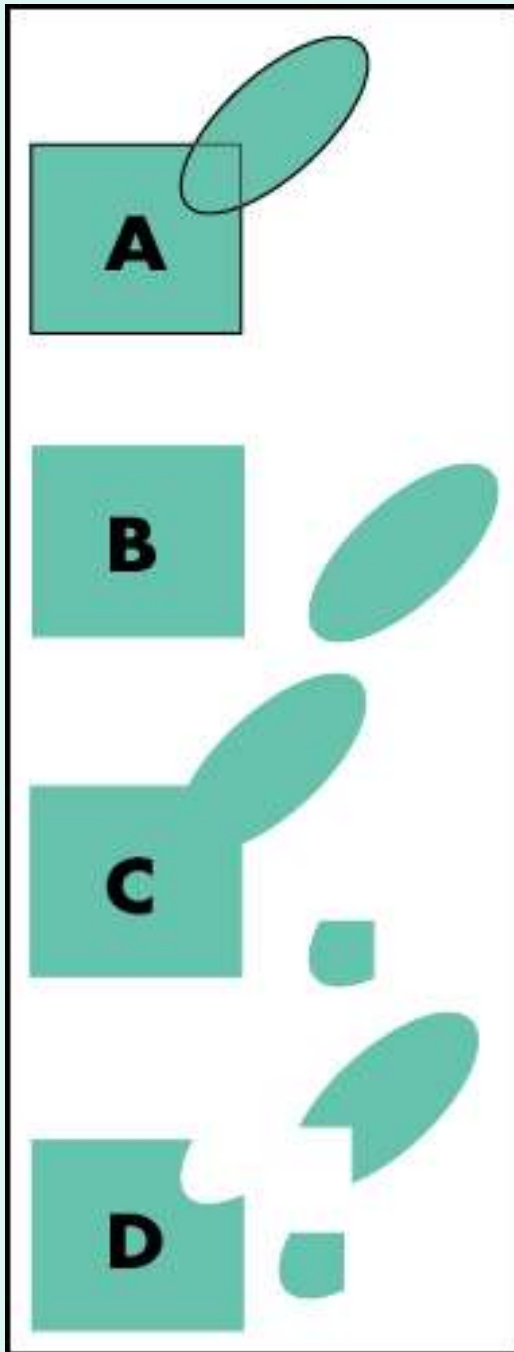
- We tend to fill in any missing parts of a figure and see the figure as complete



Law of Closure:



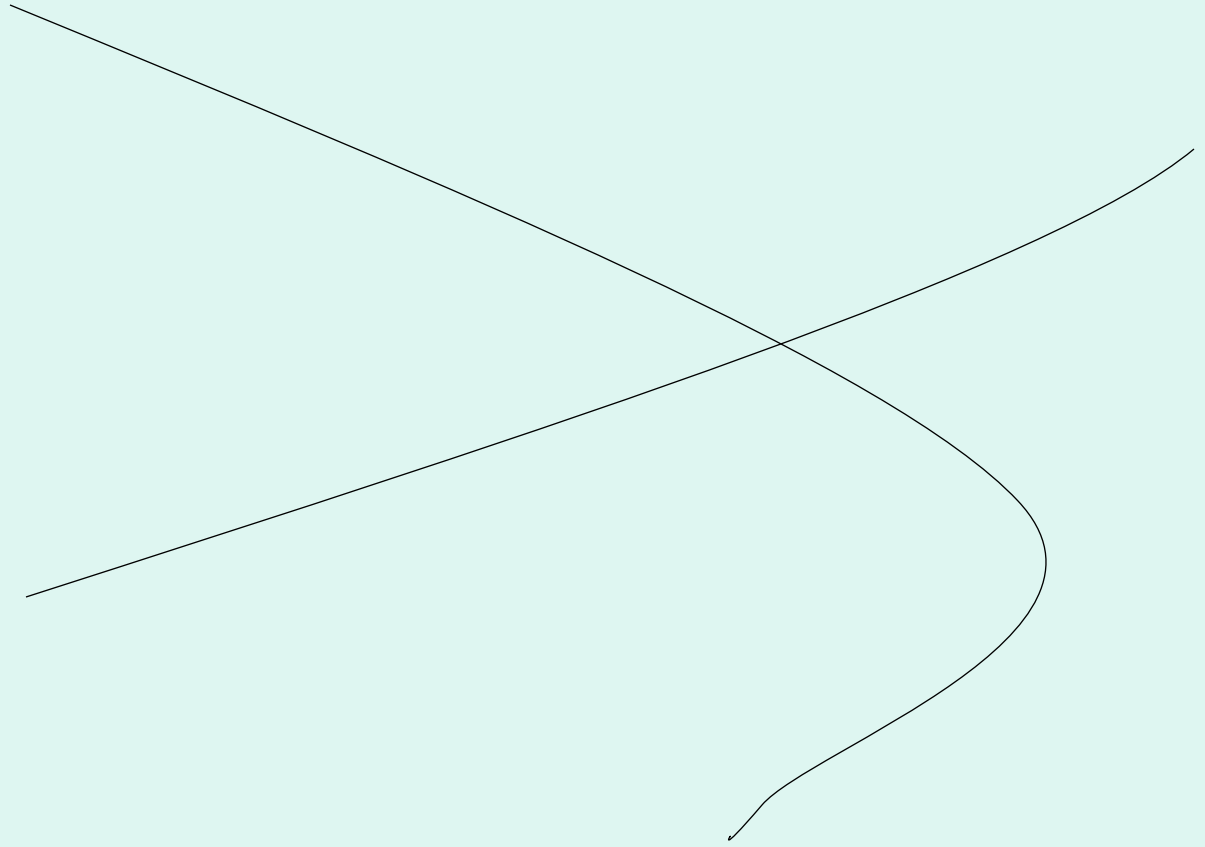


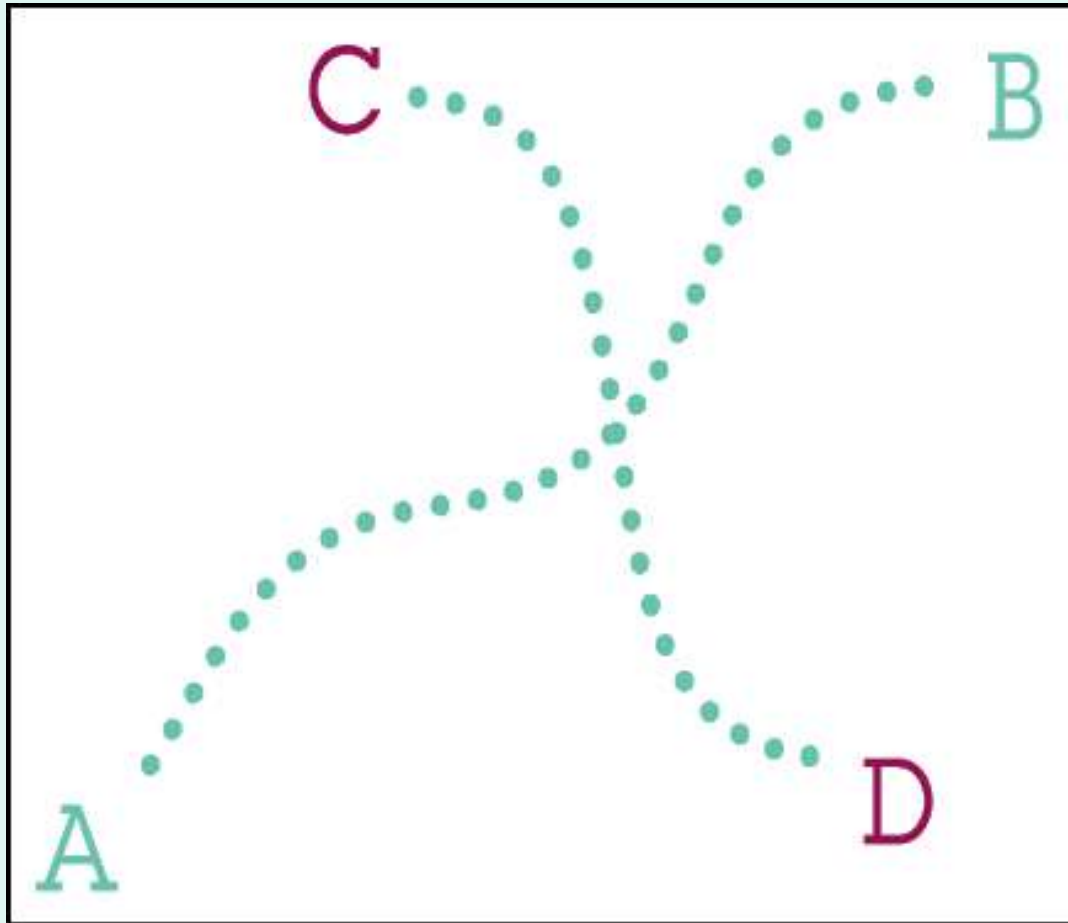


## Simplicity

- We organize stimuli in the simplest way possible

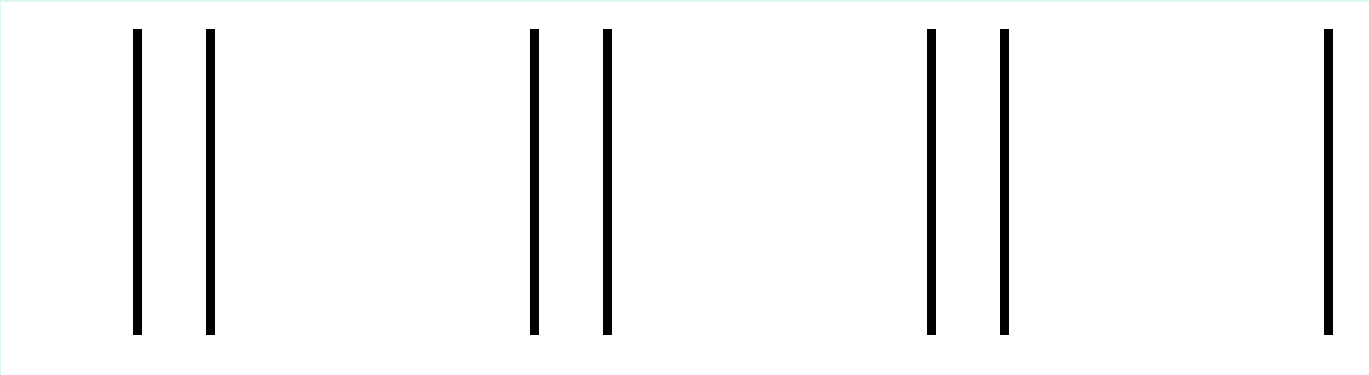


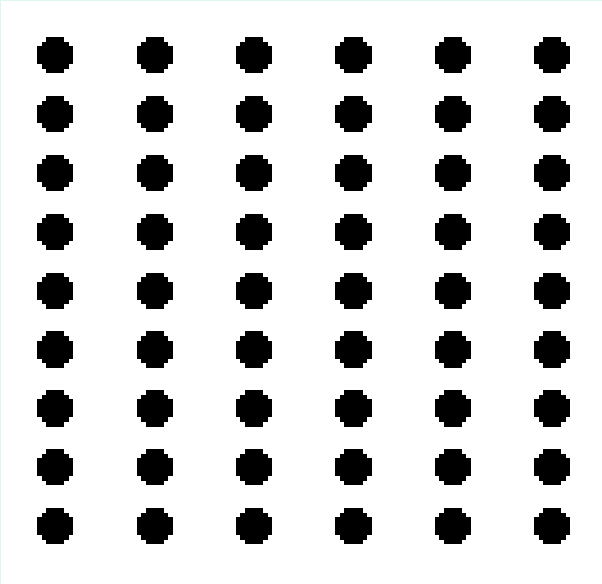




## Continuity

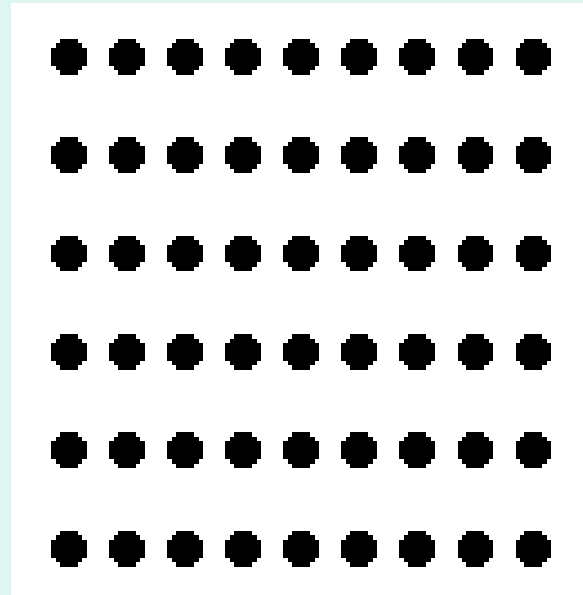
- We tend to favor smooth or continuous paths when interpreting a series of points or lines
- We follow them until their perceived end even if something is in the way

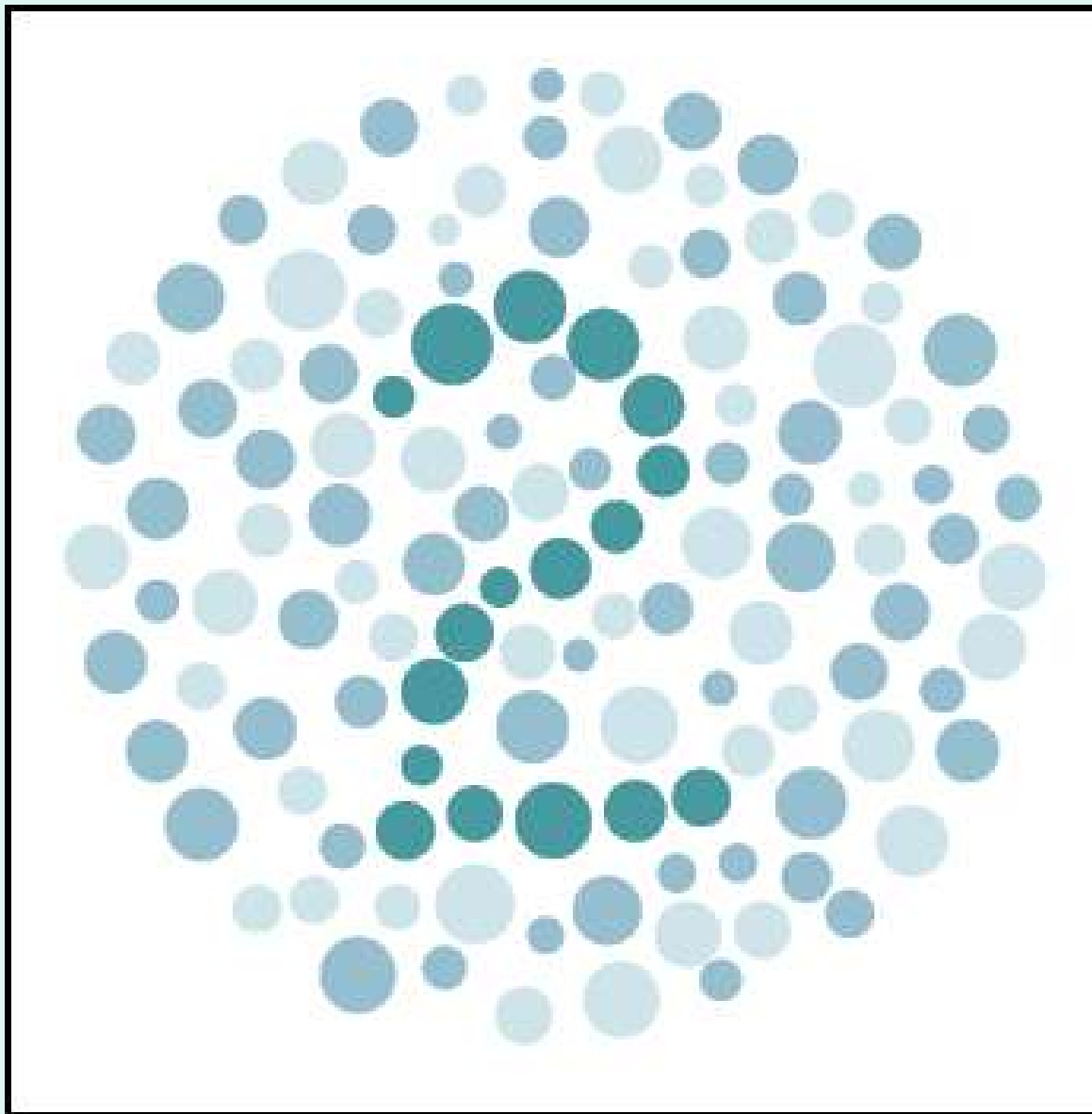


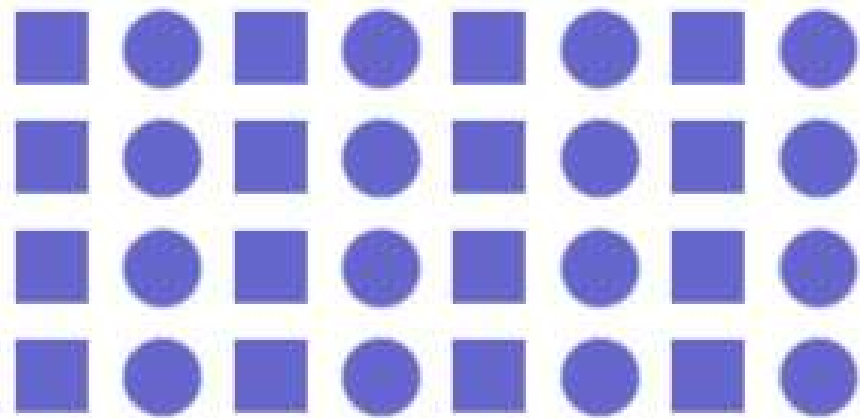


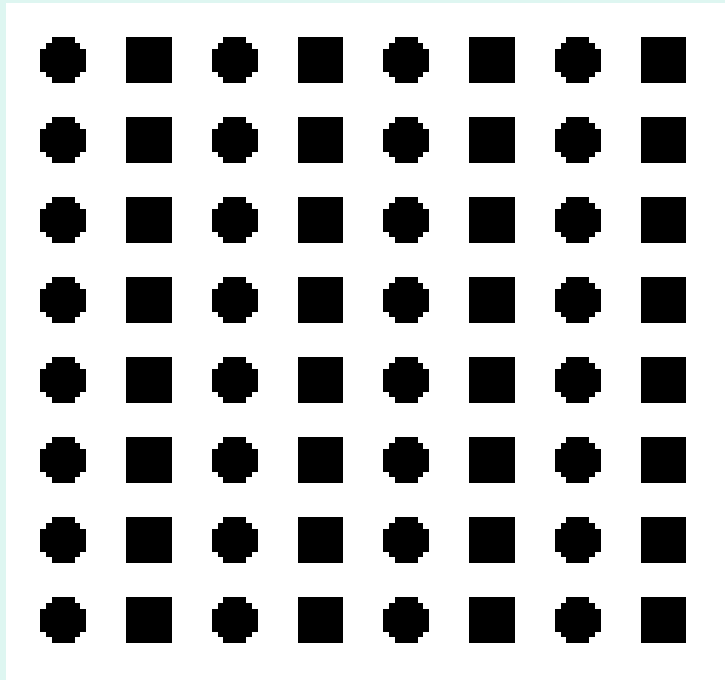
## Proximity

- We tend to group together objects that are physically close to each other



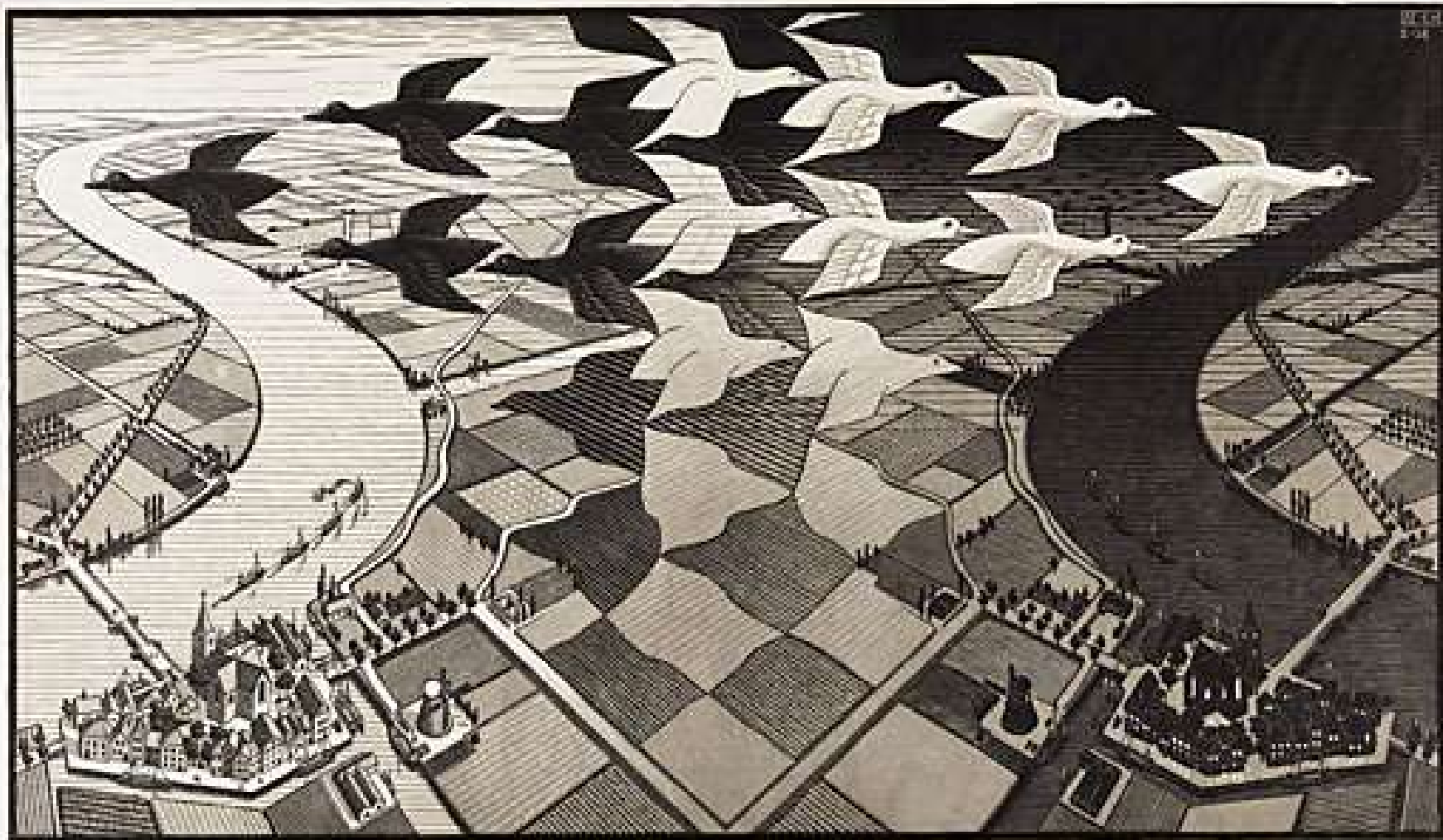




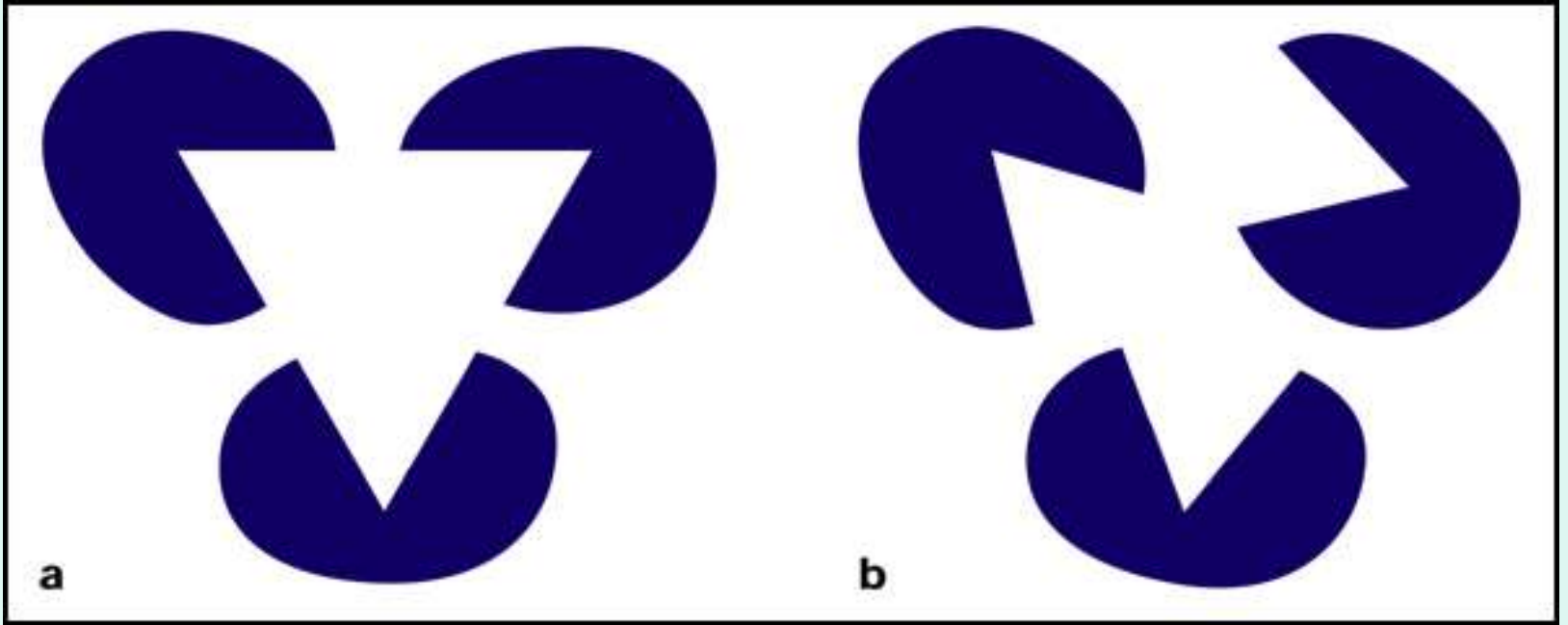


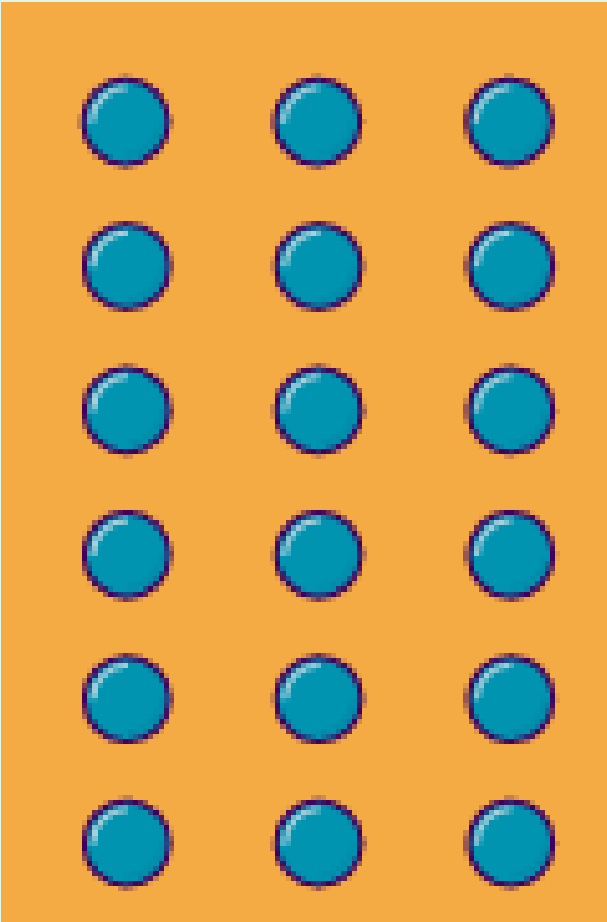
## Similarity

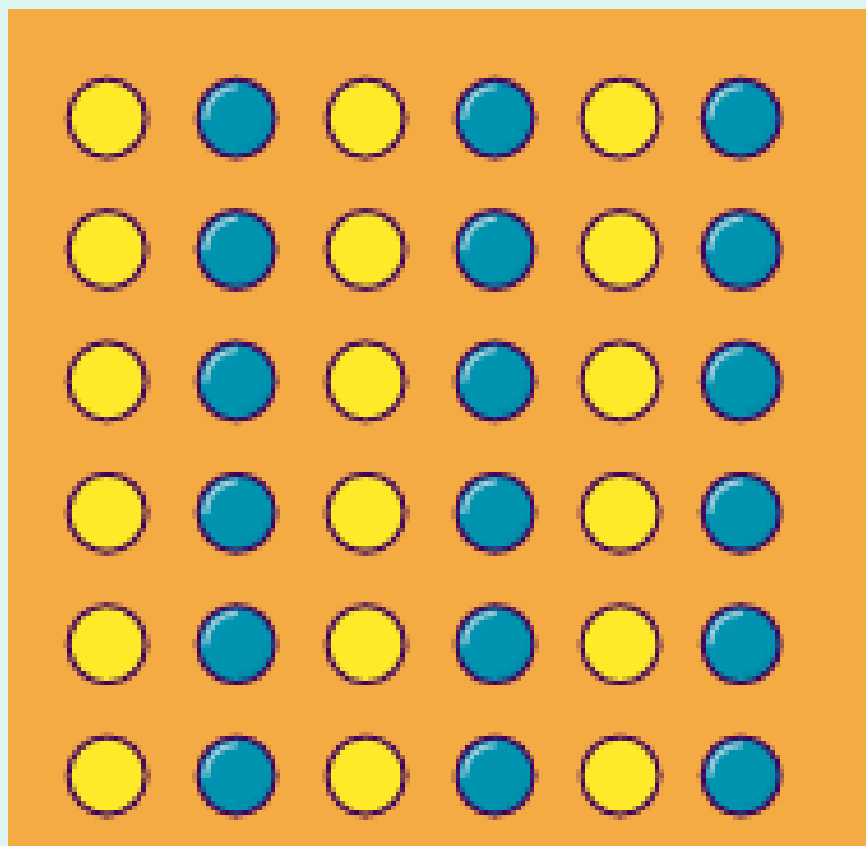
- We group together elements that appear similar

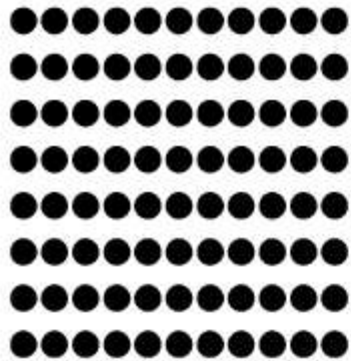












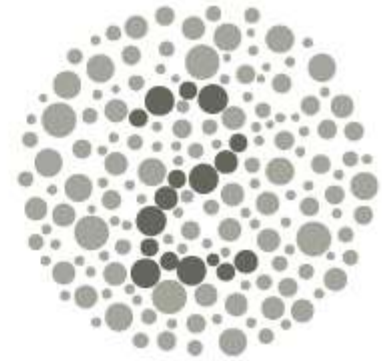
**(a) Proximity**

Elements that are close to one another tend to be grouped together.



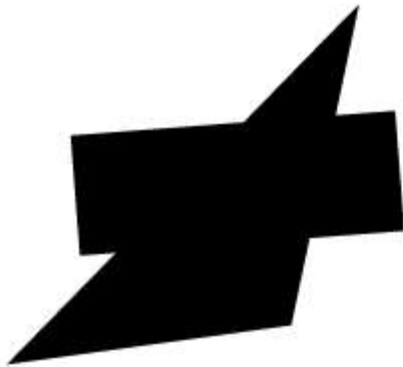
**(b) Closure**

Viewers tend to supply missing elements to close or complete a familiar figure.



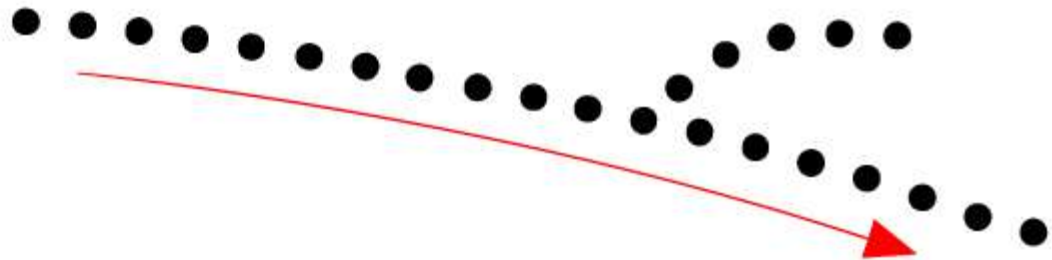
**(c) Similarity**

Elements that are similar tend to be grouped together.



**(d) Simplicity**

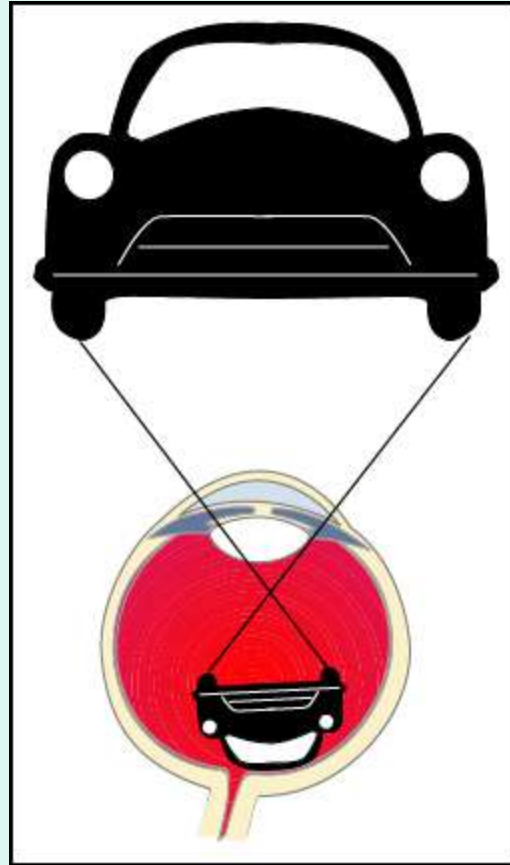
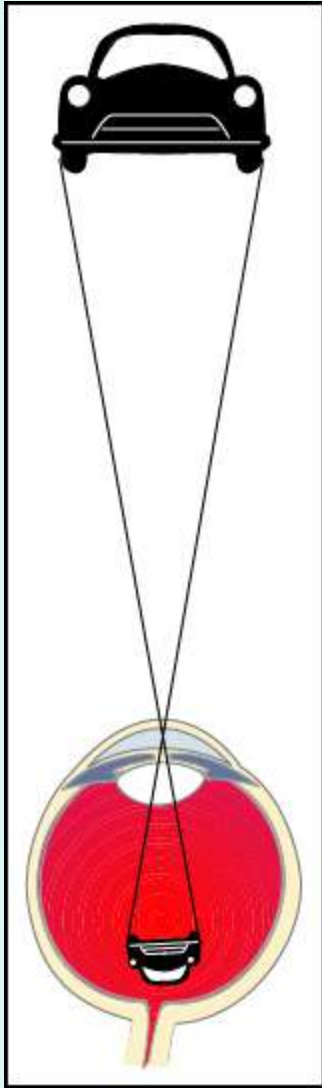
Viewers tend to organize elements in the simplest way possible.

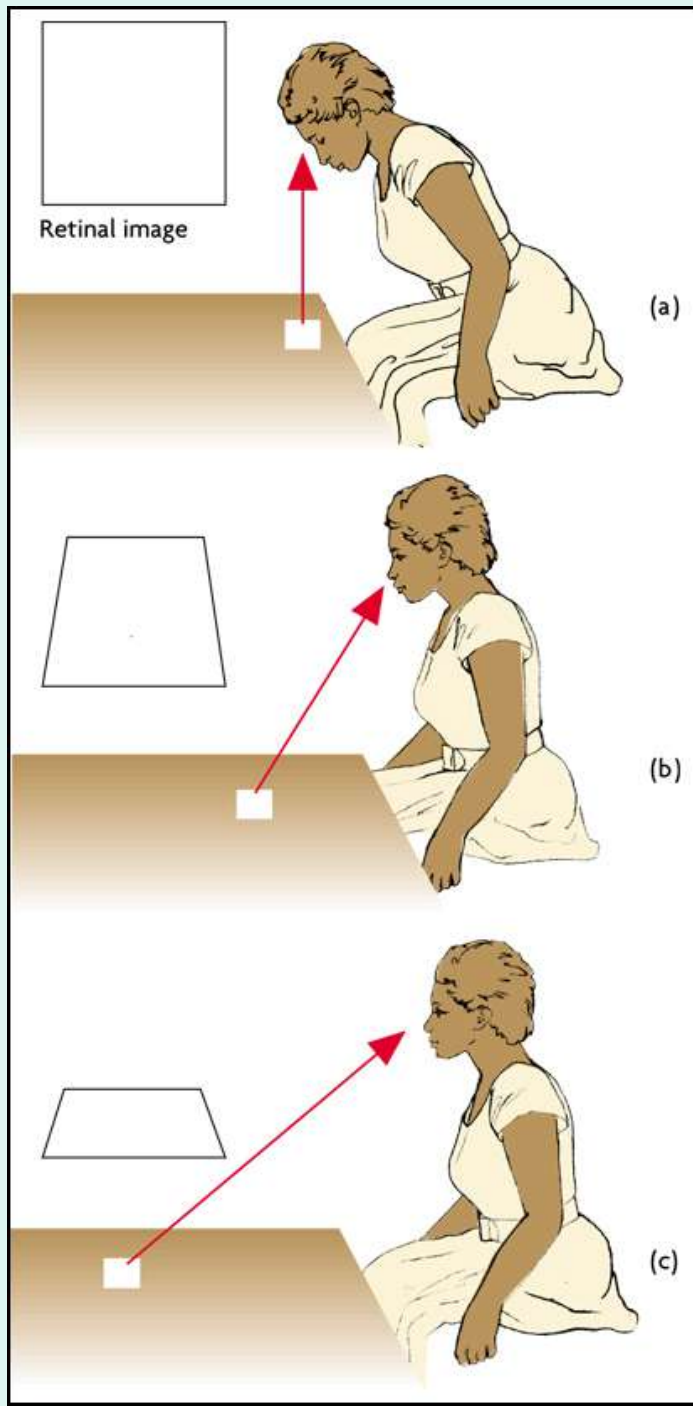


**(e) Continuity**

Viewers tend to see elements in ways that produce smooth continuation.

# Size constancy





# Shape Constancy

# Binocular Depth Cues

- **Having two eyes helps us to judge depth**
- **Retinal Disparity – the difference between the image cast on each retina, helps our brains determine depth (the closer the image, the greater the disparity)**
- **Convergence – your eyes turn inward to focus on close object; the closer an object the greater the convergence**







# **Monocular Depth Cues – need only one eye**

- **Height-in-plane – objects higher in the visual field are perceived as being farther away**
- **Interposition – when objects overlap, the object that is blocked appears farther away**
- **Linear perspective – parallel lines appear to come together at greater distances**

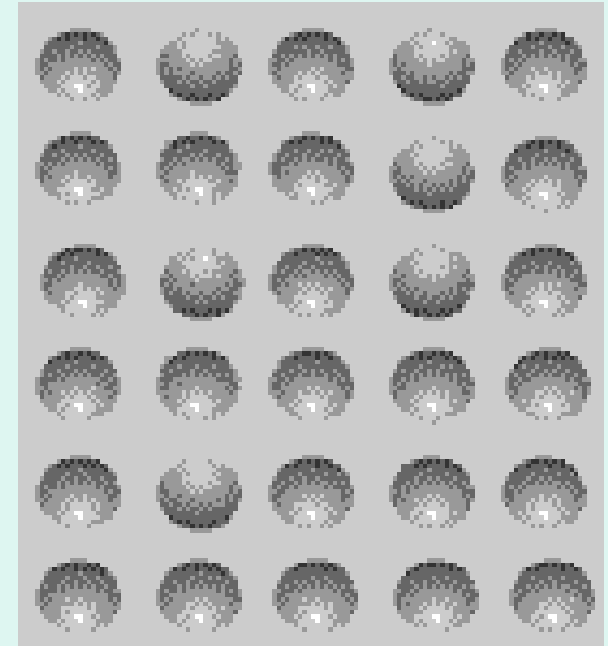
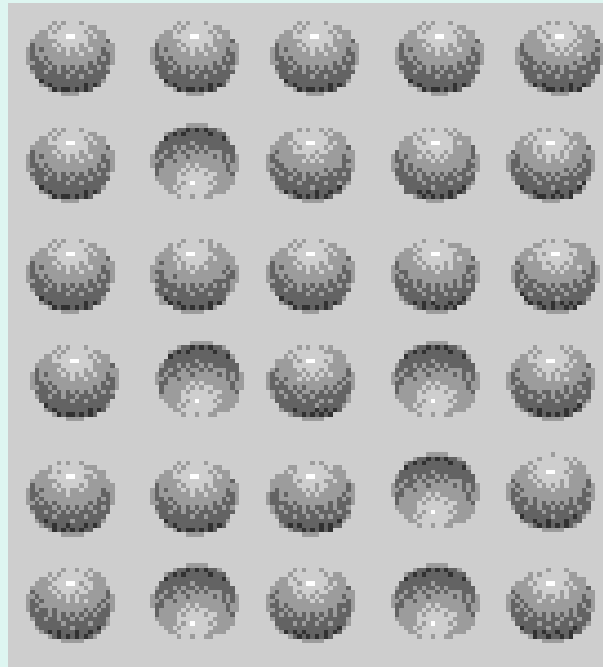
<http://psych.hanover.edu/Krantz/MotionParallax/MotionParallax.html>



Sandro Botticelli



Eugene Boudin - "The Coast of Protrieux"





"Sculls" by Gustave Caillebotte

[http://psych.hanover.edu/Krantz/art/rel\\_size.html](http://psych.hanover.edu/Krantz/art/rel_size.html)

<http://psych.hanover.edu/Krantz/art/linear.html>





“Paris Street: A Rainy Day” by Gustave Caillebotte

# Monocular Depth Cues (cont.)

- **Light and shadow** – brightly lit objects appear closer, while those in shadows appear farther away
- **Motion parallax** – we perceive objects that are blurred from motion to be closer to us
- **Atmospheric perspective** – clear objects appear closer; dust, smog, and mist make hazy objects appear farther



Photographs by Gus van Veen  
& Jan Brouwer, Used by  
Permission, "Rock Art in the  
British Landscape"  
([www.rockartuk.tk](http://www.rockartuk.tk))





“Near Salt Lake City” by Albert Bierstadt

# Monocular Depth Cues (cont.)

- **Relative size** – when we expect two objects to be about the same size and they are not, the smaller one appears to be farther
- **Texture gradient** – things with more detail appear closer and those with less detail appear farther