

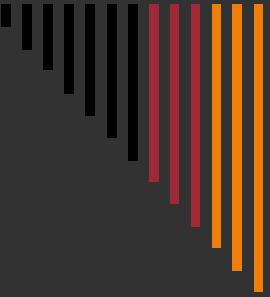
Sensation, Perception, and Consciousness

AGENDA

Business/Housekeeping:

- REG Coordinator is available to answer questions at the start of class (**REG/SONA = 4% of final grade and opportunity to earn additional 2% BONUS marks)

- Sensation and Perception
 - Levels of Consciousness
 - Sleep, Sleep Disorders, Dreams
 - Altered Consciousness
-



HOW DO SENSATION & PERCEPTION ENABLE US TO CONSTRUCT THE OUTSIDE WORLD IN OUR HEADS ?

Hello





How does this work?

Sensation

- receiving, translating, and transmitting raw sensory data to the brain
- Top-Down: Interpret through cognitive processes*

Perception

- “higher level” process
 - selecting, organizing, and interpreting sensory data
 - Interpretation process influenced by **perceptual sets** and **frame of reference**
-



Sensing Without Perceiving

Selective Attention

- The idea that people can pay attention to only one or two things at a time

For example:

- Cocktail Party Effect
- The Stroop Effect

→ ability to attend to one voice above many
inattention blindness
- unable to see extra things if not looking for it

- selective attention
↳ 11 million bits of info perceived from our senses
↳ 40 is what we actually process
↳ always selectively attending.



The Five Senses

1. Sight *

2. Sound

3. Smell

4. Taste

5. Touch *

← important to tested more heavily.

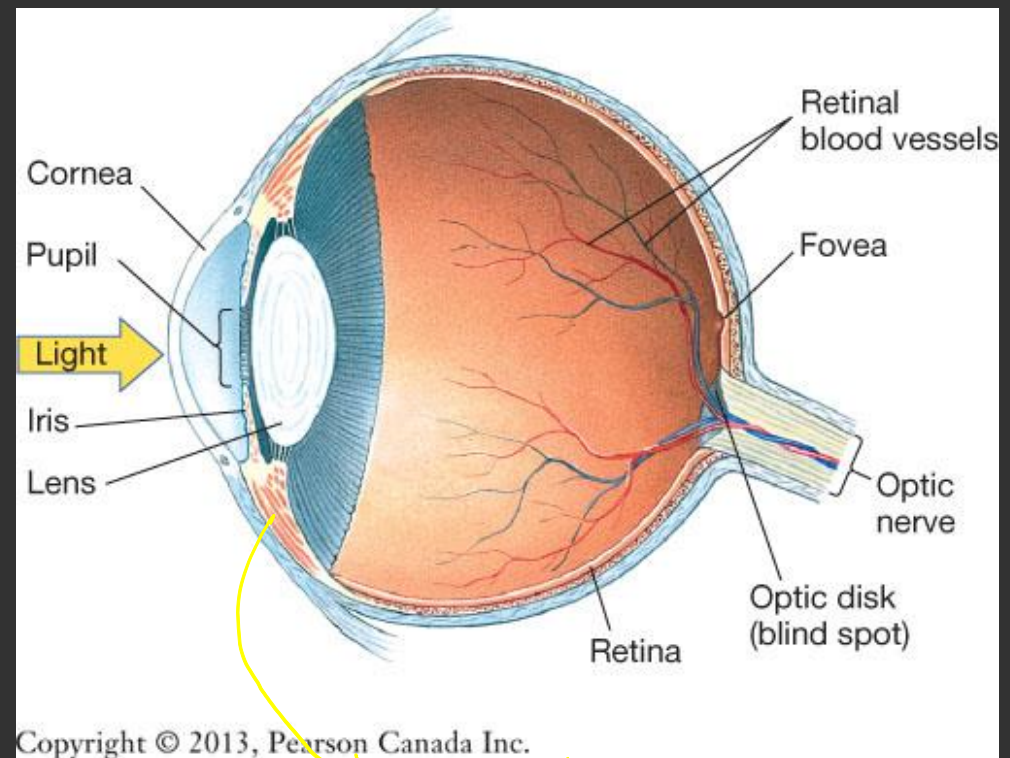
* Will be reviewed in lecture.

You should be familiar with all five.

The Visual System

- Humans derive more information through sight than any other sense

- house for neural tissue



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Contract for pupil dilation.



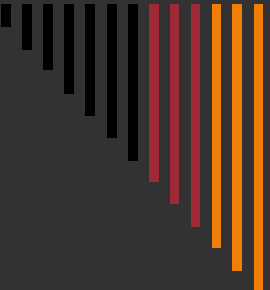
Adaptation

- The visual system must SEE the environment in order for the information to be properly interpreted by the brain
-



Adaptation

- **Dark Adaptation:** increase in sensitivity to light when illumination decreases
- **Light Adaptation:** adjustment that takes place when you go from darkness to a bright setting



The Ongoing Work of the Brain

- **Target Displacements During Eye Blinks Trigger Automatic Recalibration of Gaze Direction** (Maus, Duyck, Collins, Whitney, & Cavanaugh, 2017)
 - Blinks, eyeball rolls, and the brain's work to stabilize our vision
-



Behavioural Responses to Visual Stimuli ...

- The work of PERCEPTION



Depth Perception

- Ability to
 - perceive three dimensionally
 - estimate objects' distance from us
 - estimate distance b/w objects
 - E.G. Visual Cliff Study
 - Images appear on our retinas in 2-dimensional form yet we see a 3-dimensional world
 - In order to perceive depth, we need CUES ...
-



1. Monocular Cues

Motion Parallax: when moving, objects that are closer seem to move more quickly than those at a distance

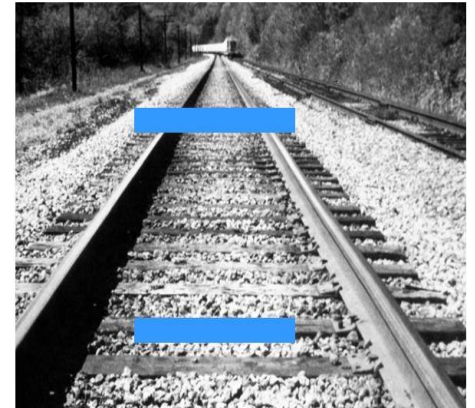


Kinetic Depth Effect:

objects which look flat when stationary appear to be 3-D when set in motion

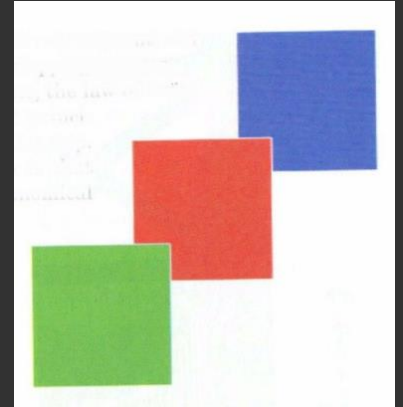
Linear Perspective: distant objects appear closer together than nearer objects

Linear perspective



Monocular Cues (cont'd)

Interposition (or overlap): when one object blocks out another, it seems closer



Texture Gradient: surfaces that have little texture or detail seem more distant

Relative Size or Familiar Size:
Experience - e.g., “knowing size of an orange”

Monocular Cues (cont'd)

Relative Height: objects positioned higher in a picture are seen as farther away

Highlighting and Shadowing: highlighted (light) objects appear close; shadowed (dark) objects appear farther away



Relative Clarity or Shading: position of light and position of viewer – perceive hazy objects as farther away



2. Binocular Cues

Combination of info provided by each eye

Retinal Disparity

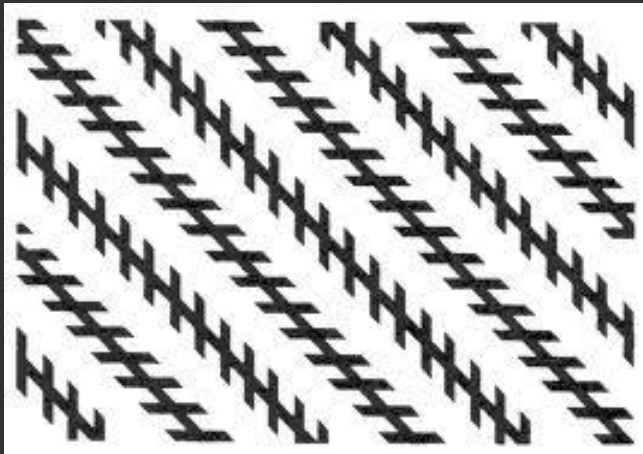
- slight difference in visual images on retinas
- combination gives us info about three dimensionality

Convergence

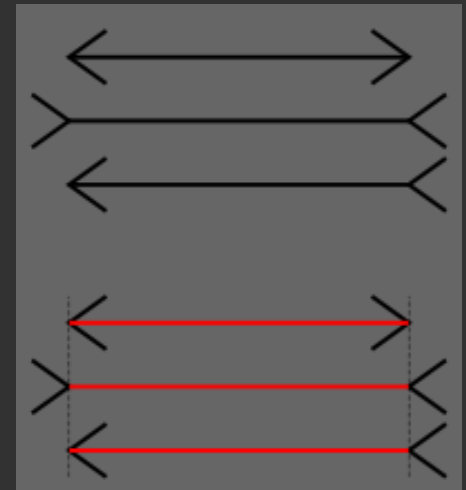
- eyes turn inward to focus on a target (when looking at nearby object)
-

Illusions

- A perception of a physical stimulus differing from measurable reality
- A “mis” perception
- 5 Well-known illusions:



1. Muller-Lyer Illusion



2. Zollner Illusion

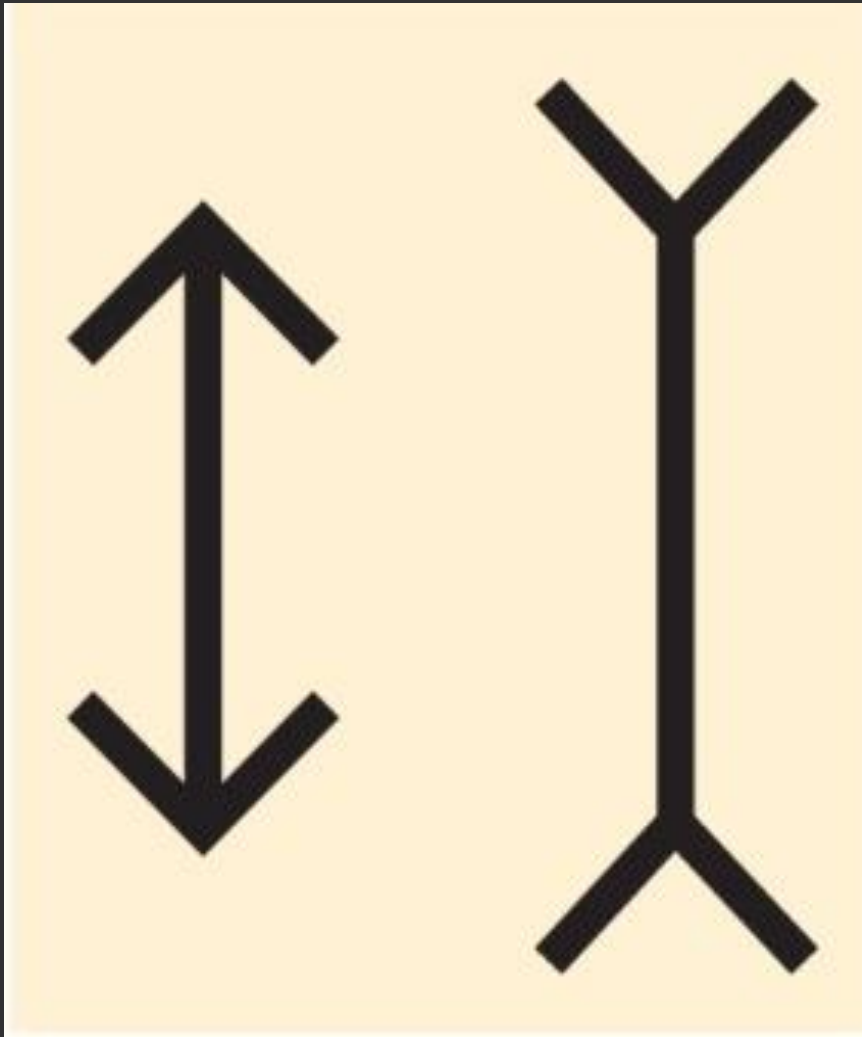


Figure 4.32 The Müller-Lyer illusion.

Go ahead, measure them: The two vertical lines are of equal length.

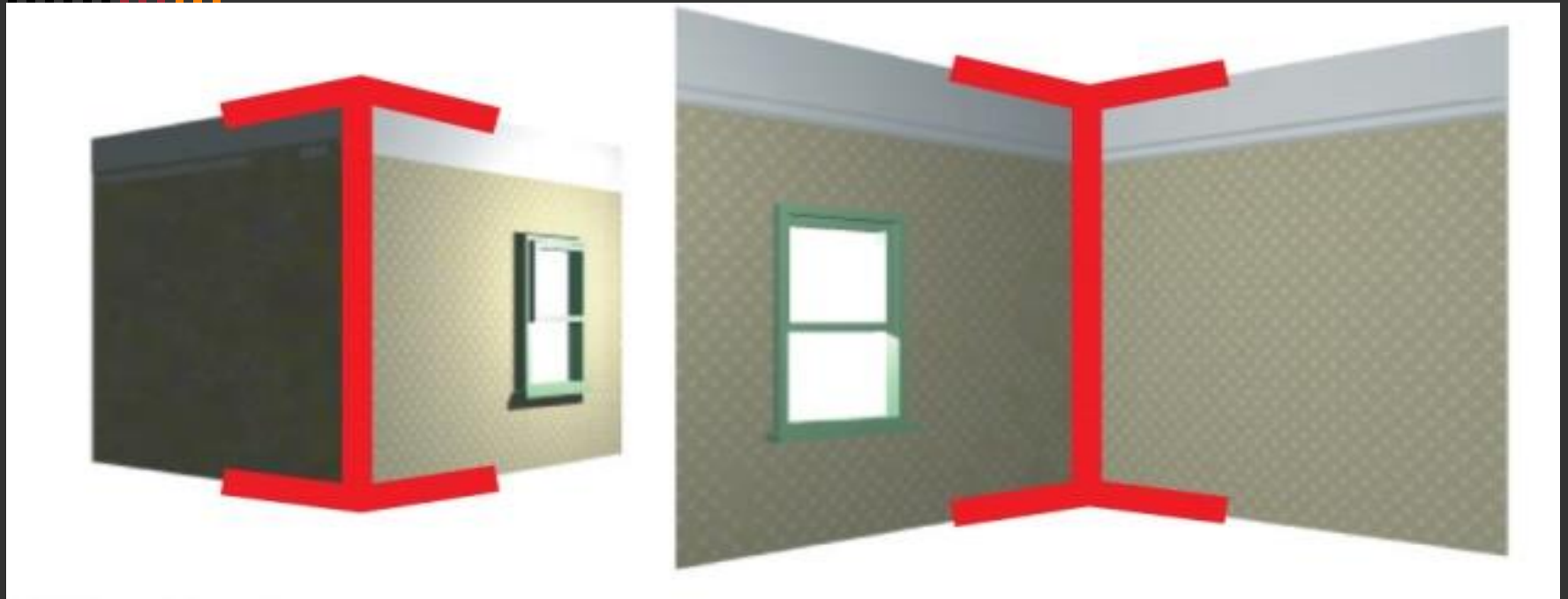
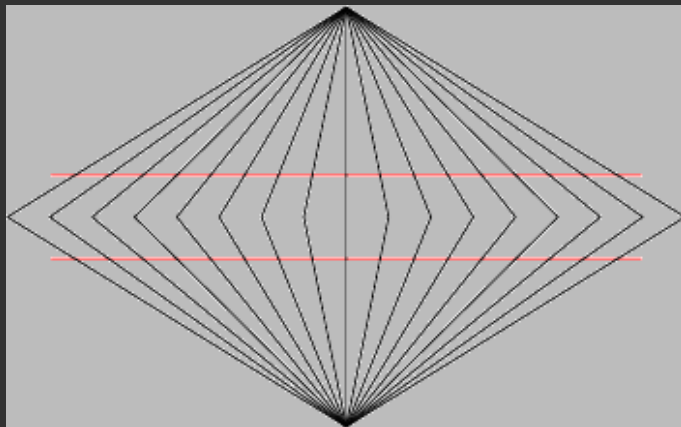
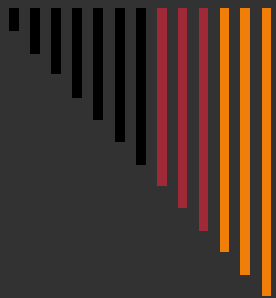


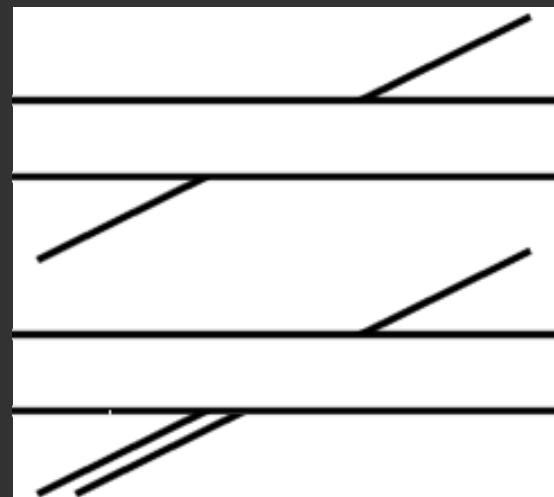
Figure 4.33 Explaining the Müller-Lyer illusion.

The drawing on the left seems to be closer, since it looks like an outside corner, thrust toward you, whereas the drawing on the right looks like an inside corner thrust away from you. Given retinal images of the same length, you assume that the “closer” line is shorter.

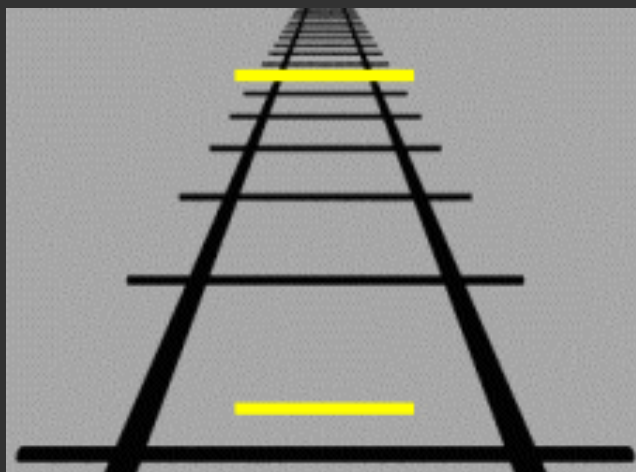


3. Wundt Illusion

4. Poggendorf Illusion



5. Ponzo Illusion





Wayne Weiten

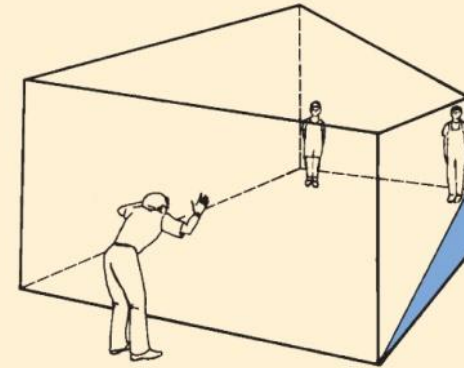


Figure 4.36 The Ames room.

The diagram to the right shows the room as it is actually constructed. However, the viewer assumes that the room is rectangular, and the image cast on the retina is consistent with this hypothesis. Because of this reasonable perceptual hypothesis, the normal perceptual adjustments made to preserve size constancy lead to the illusions described in the text. For example, naïve viewers “conclude” that one boy is much larger than the other, when in fact he is merely closer.



Gestalt Laws of Organization

- People naturally organize perceptions according to certain patterns
 - ***Gestalt***: German for “configuration,” “form” or “whole”
 - Your text reviews theories of perception
-

Gestalt Principles or Laws

Figure & Ground

- organize perceptual field into figure (what stands out) and ground (background)

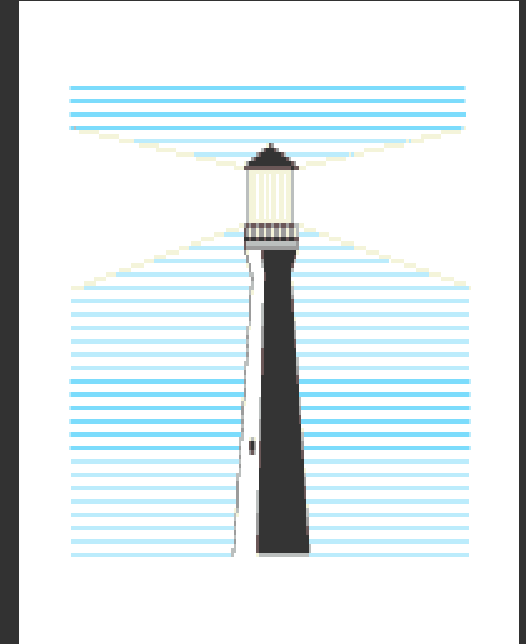
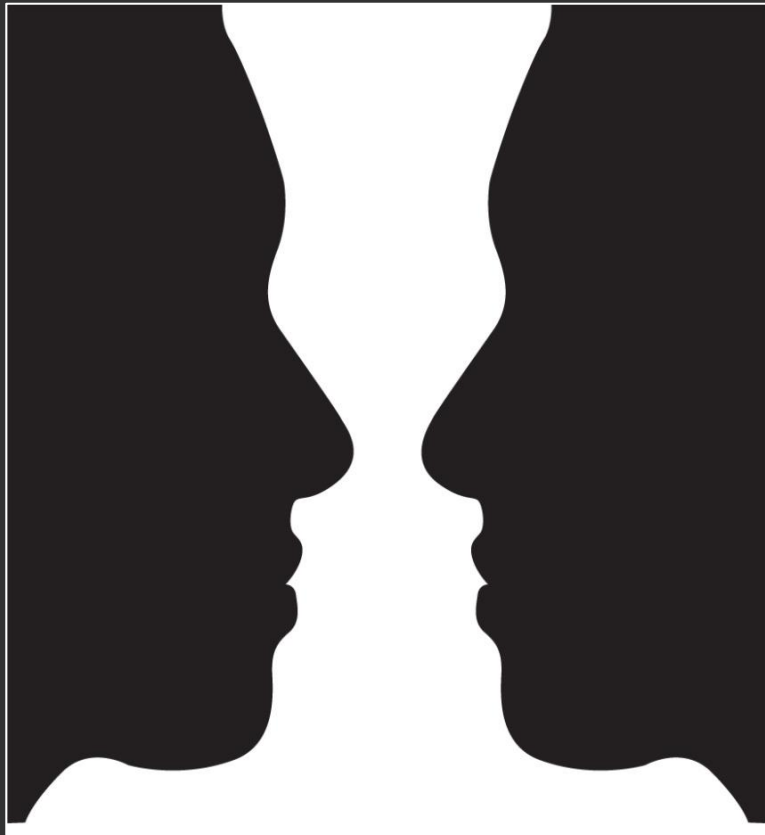




Figure 4.24

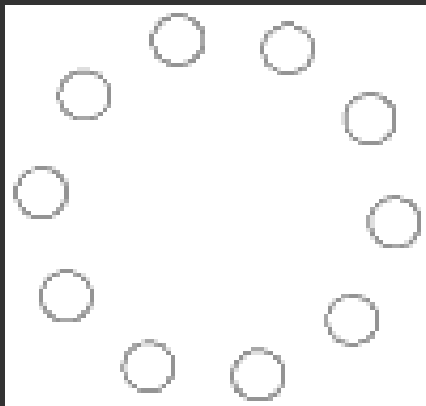
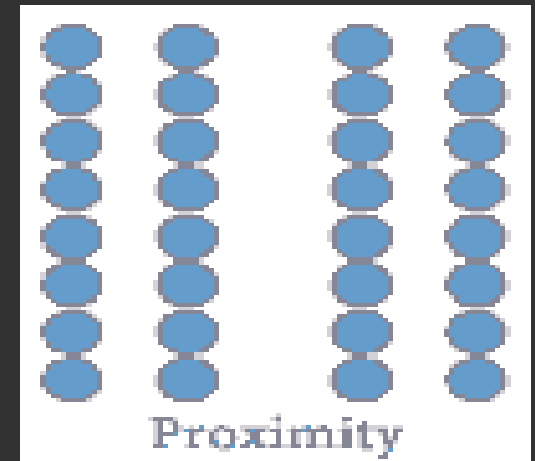
The principle of figure and ground



Whether you see two faces or a vase depends on which part of this drawing you see as figure and which as background. Although this reversible drawing allows you to switch back and forth between two ways of organizing your perception, you can't perceive the drawing in both ways at once.

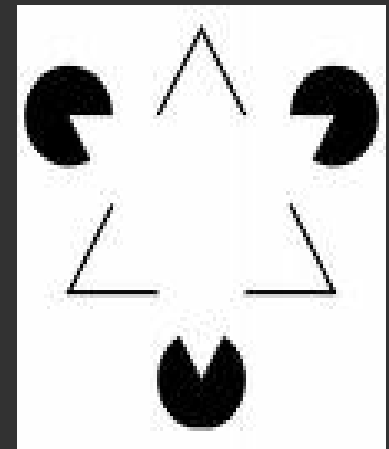
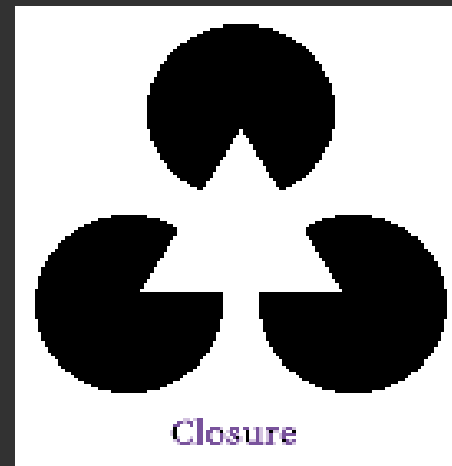
Proximity:

- when we see objects close to each other, tend to group them together



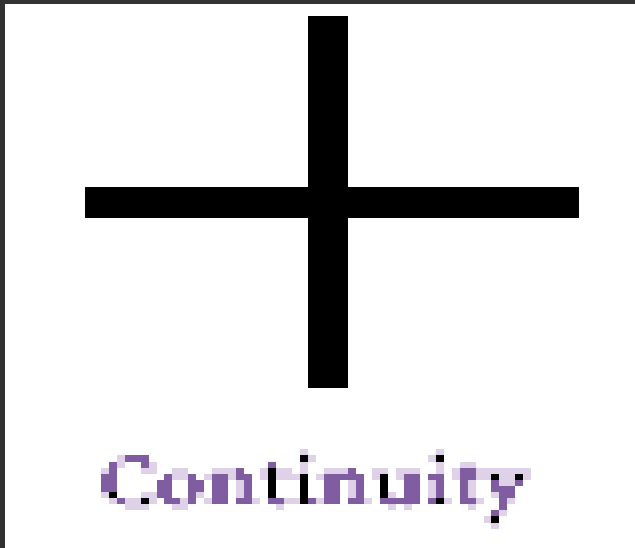
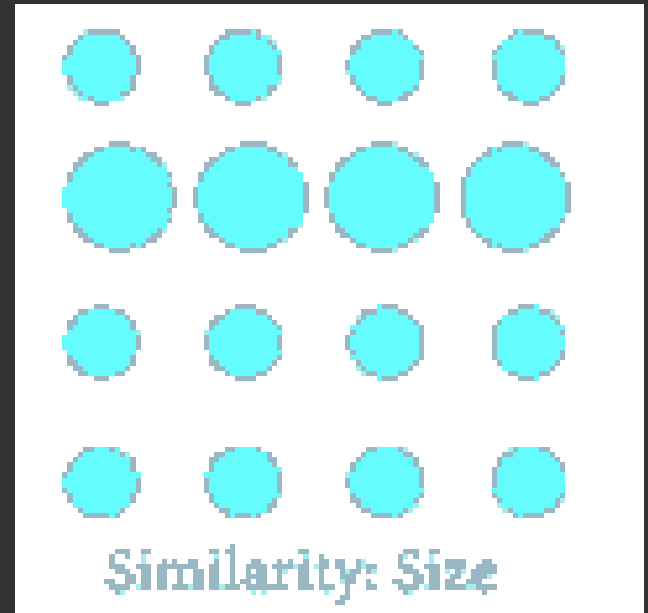
Closure:

- for a disconnected or incomplete figure, we fill in the spaces and see it as a complete figure



Similarity:

- tend to group similar
- objects together; seen as
- a unit



Continuity:

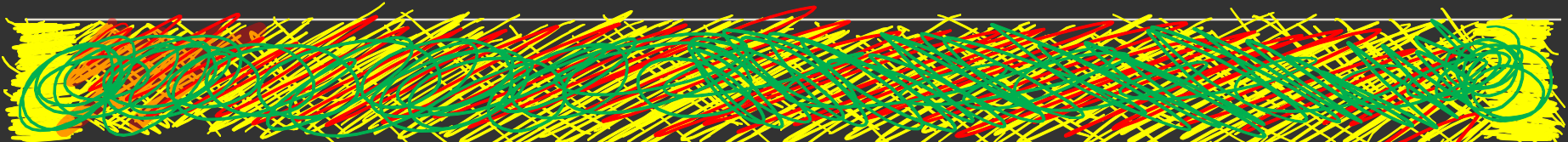
- String of items indicates where next item in a string will be found
- Perceptual preference for uninterrupted figures



Touch and Pain

Perception of pain:

- both physical and psychological
 - influenced by:
 - visual and other sensory inputs that influence interpretation of situation
 - activity of body's stress regulation system
- feeling pain is important for survival





Phantom Limb Pain

- Sensation that an amputated or missing limb is still attached to the body
 - Continued awareness and sensations
 - Also for children born without a limb ... why?
 - Sensation of our limbs is hard-wired into our brains on birth

Remember:

Perception of pain is both physical
and psychological



Phantom Limb Pain (cont'd)

- Pain described as:
 - Burning, itching, aching, squeezing (“as if the hand is being crushed in a vice”)
 - Limb may feel shorter or distorted
 - Dominant theoretical explanations:
 - Damage to nerve endings
 - “crosswiring” in brain (somatosensory cortex)
 - Due to parietal lobe functioning
-



Consciousness ...

.

.



The Nature of Consciousness

- General state of being aware of and responsive to events in the environment and one's own mental processes
 - Humans have many different levels of awareness or consciousness
 - Continuum – from alert to dreaming or drug-induced states
-



Levels of Awareness (Consciousness)

1. Higher level consciousness

Controlled Processes:

- most alert states of human consciousness
 - actively process
 - requires selective attention
-



Levels of Consciousness cont'd

2. Lower Level Awareness

Automatic Processes:

- minimal attention
- do not interfere with other ongoing activities

Daydreaming:

- between active consciousness and dreaming while asleep
 - usually spontaneous (e.g., mind wandering)
-



Levels of Consciousness cont'd

3. Altered States of Awareness

- noticeably different from normal awareness
- drugs*, trauma, fatigue, hypnosis and sensory deprivation

**See drugs and consciousness
in your text*



Levels of Consciousness cont'd

4. Subconscious Awareness

Waking Subconscious Awareness

- ideas 'incubate' below threshold of conscious awareness before emerge

Sleep and Dreams

- level of awareness lower than daydream
 - remain aware of external stimuli to some degree
-



Levels of Consciousness cont'd

4. No Awareness (Unconscious)

- **Unconscious** contains reservoir of unacceptable wishes, feelings and thoughts beyond conscious awareness

TABLE 5.1 EEG Patterns Associated with States of Consciousness

EEG Pattern	Frequency (cps)	Typical States of Consciousness
Beta (β)	13–24	Normal waking thought, alert problem solving
Alpha (α)	8–12	Deep relaxation, blank mind, meditation
Theta (θ)	4–7	Light sleep
Delta (Δ)	Less than 4	Deep sleep



Sleep: Do we really need it?

What we know:

- All animals require it
 - Restores, replenishes and rebuilds brains and bodies
 - Beneficial to physical growth and increased brain development in infants and children.
 - Role in storage and maintenance of long-term memory
-



Sleep Deprivation

- The longer a person is deprived of sleep, the greater the effect will be
 - Comparable to effects of alcohol on driving
-



Sleep Deprivation...

Affects:

- ❑ alertness and cognitive performance
- ❑ brain activity
- ❑ attention
- ❑ decision making
- ❑ immune system
- ❑ irritability
- ❑ creativity
- ❑ concentration
- ❑ communication



The Sleep-Wakefulness Cycle

- Humans and other animals seem to have an internal 24-hour biological clock
 - based on circadian rhythms
 - Light is important cue
 - Disruption to circadian rhythm may affect performance:
 - *E.G., Jet lag*
-



Sleep Cycles and Stages

(based on Kleitman & Dement)

- Stage 1:** brief, transitional (1–7 min.), alpha > theta, hypnic jerks
- Stage 2:** deeper but still very light, Theta waves interspersed with sleep spindles (10–25 min.)
- Stage 3:** transitional period between light and very deep sleep (Delta waves begin to emerge)
- Stage 4:** deepest type of sleep (>50% delta waves – often called delta sleep)
(Stages 3 & 4: slow-wave sleep, 30mins.)
- Stage 5:** REM sleep, EEG similar to awake, vivid dreaming (from few minutes to longer)



Sleep Disorders

Insomnia

- problem in falling asleep, waking up during night, or waking up too early
 - common sleep problem (may affect 1/3 of Canadian population)
 - most common among: women, older adults, & people who are thin, stressed, or depressed
-



Sleep Disorders (cont'd)

Sleepwalking (Somnambulism)

- During deepest stages
- May talk, make fairly coherent statements, but still soundly asleep
- Runs in families, decreases with age, most common among male children

Sleep Talking (Somniloquy)

- May occur in any stage of REM or NREM sleep
- Very common in young children
- Same for men and women
- Often associated with sleep/night terrors



Sleep Disorders (cont'd)

Nightmare

(not really a 'sleep disorder')

- frightening dream that awakens dreamer from REM sleep
- content usually involves danger
- common, especially for young children (peaks @ 3-6yrs)

Night Terror

- sudden arousal from sleep and intense fear
- rapid heart rate & breathing, loud screams, heavy perspiration, movement
- occur during slow-wave, non-REM sleep
- peaks @ 5-7 years, then declines



Sleep Disorders (cont'd)

Narcolepsy

- overpowering urge to sleep
- may fall asleep while talking or standing up
- immediately enter REM sleep
- inherited

Sleep Apnea

- stop breathing because windpipe fails to open or b/c brain processes involved in respiration fail to work properly
- numerous brief awakenings during the night
- affects approx 12 mil Americans & 1 mil Canadians



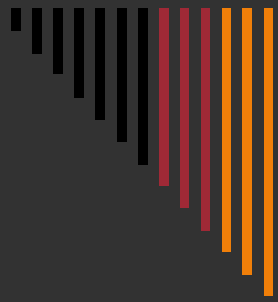
What Is a Dream?

- State of consciousness occurring during REM sleep
 - NREM dreams can occur
 - Vivid imagery
 - Occur nightly – remembering varies
-



The Content of Dreams

- Daily contacts
 - Common dream themes:
 - sex
 - aggressive incidents
 - misfortunes
 - Environmental stimuli may be incorporated
 - LUCID Dreams
-



Hypnosis

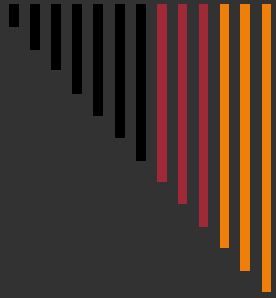
- An altered state of consciousness
- First used by Mesmer

Suggestibility

- Ability to be hypnotized
- Increased suggestibility in hypnotic state

Posthypnotic Suggestion

- Suggestion that participant should perform a particular action after the hypnotic session has ended



Good night, sleep well ...
