Altered States of Consciousness

- Naturally occurring altered states of consciousness
  - Sleep
  - Dreaming
  - Daydreaming

- Artificially induced altered states of consciousness
  - Hypnosis
  - Meditation
  - Drug-altered consciousness
Selective Attention

- **Selective attention** is the focusing of conscious awareness on a particular stimulus
  - we are bombarded with tens of thousands of stimuli per second
  - we only focus on a small fraction of these stimuli
  - Cocktail Party Phenomenon

- **Selective attention** and accidents
  - Cell phones and driving?
  - Cell phones and walking!?
Selective Inattention

- When we focus on one thing, we “miss out” on others
- **Inattentional blindness** occurs when we fail to see things because we are focused on other stimuli
- **Change Blindness** (Simons, 1996) occurs when we fail to notice a change in the environment when we are focused elsewhere (change deafness exists, too!)

- In some instances, a stimulus may demand our attention (e.g. hearing our name in noisy room → Cocktail Party Effect)
Biological Rhythms and Sleep

- Circadian Rhythms
  - 24-hour cycle of biological functioning (circa-diem)
  - Humans naturally wake with sunlight and sleep when it gets dark
I’m so good at sleeping I can do it with my eyes closed.
Sleep

- We may not be conscious, but our brain is active
- We continue to process information while we sleep
The Sleep Stages: Specifics

- **Awake but relaxed**: alpha waves dominate
- **Awake and alert**: beta waves dominate
- **Stage 1 Sleep**: slowed breathing, irregular, larger brain waves, hallucinations (*hypnagogic sensations*) – feelings of falling, Theta waves
- **Stage 2 Sleep**: deeper sleep, more difficult to awaken, sleep spindles, K-complex sleep talking
- **Stage 3 Sleep**: even deeper sleep, difficult to awaken, delta waves begin
- **Stage 4 Sleep**: very deep sleep, delta waves, sleepwalking, bedwetting
- **REM**: rapid brain waves, dreaming, increased heart rate, cortical activity, sexual arousal, “paradoxical sleep”
- In general, as sleep deepens, sleep waves increase in amplitude and decrease in frequency
K-Complex and Sleep Spindles

- **K complexes** are large waves that stand out from the background and often occur in response to environmental stimuli such as sounds in the bedroom.

- **Sleep spindles** are brief bursts of fast activity, associated with refreshment in our ability to learn.
Sleep Stages: General Trends

- Every 90-Minutes, we cycle through 5 sleep stages several times during the night (Stages 1, 2, 3, 4, and REM)
- Researchers monitor brain waves, eye movement, and facial muscle tension to study these stages
- Generally, as the night progresses, we experience **shorter stage 4 and 3 sleep and longer periods of REM sleep**
- Over a third of people report never dreaming, though they do – they just do not recall
  - We spend 20-25% of our sleeping time in REM, dreaming away…
REM is important, and when we are deprived of it, we may experience **REM Rebound**. The loss of muscle tone/paralysis that occurs during REM helps us avoid acting out our dreams. Sleepwalking and talking must therefore occur during nREM in most people. REM decreases with age.
Why Do We Sleep?

- **Protective Value**: we sleep at night, as we are not adapted for hunting/gathering in darkness.
- **Restorative Value**: we restore and repair brain tissue and prune unused neural pathways
- **Memory**: we recall better after a good night’s sleep
- **Creativity**: the break that sleep provides and even dreams allow us to awaken with a fresh new approach
- **Growth**: Pituitary releases more growth hormone during deep sleep – may explain why we spend less time in deep sleep as we age
Sleep Deprivation

- Nearly half of all Americans are sleep deprived!
- Sleep deprivation is linked with concentration difficulties, irritability, unhappiness, fatigue, illness, obesity, hypertension, and poor motor performance.
- William Dement’s research on sleep: “Sleep deprivation makes you stupid!”
- People who report getting enough sleep also are more likely to report feeling satisfied with their lives!
Sleep Disorders: Insomnia

- 1 in 10 adults; 1 in 4 older adults
- Inability to fall asleep or remain asleep
- Role of hypothalamus
  - helps “shut off” brain activity associated with wakefulness
  - Degenerates with age
- Treatments
  - Sleeping pills and alcohol?
  - Exercise but not before bed
  - Avoid caffeine and rich foods before bed; milk for serotonin instead
  - Unwind before bed – dim lights, no TV
  - Keep regular sleep schedule with no naps
  - Avoid stressors – looking at clock, ruminating, etc.
Sleep Disorders: Narcolepsy

- Sudden lapse into sleep – in severe cases, REM
- Usually brief – 5 minutes
- Linked to lack of a neurotransmitter linked to alertness, orexin, produced in hypothalamus.
- **Skeeter the Narcoleptic Dog**
Sleep Disorders: Sleep Apnea

- **Temporary cessation of breathing during the night**
- Puts great stress on heart
- Irritability, fatigue
- Linked with obesity
- CPAP and BiPAP
Sleep Disorders: Night Terrors

- Uncontrollable screaming and arousal without the ability to be awakened
- Although sleep terrors are more common in children, they can also affect adults.
- Occur during stage 4 sleep typically, not REM like nightmares
Sleep Disorders: Sleepwalking and Sleeptalking

- Stage 4 sleep disorder where individuals walk and talk in sleep and do not recall anything in the morning
- Seems to run in families
- Because children experience longer stage 4 sleep, it is more common in children
- Sleepwalkers (somnambulists) usually return to bed on their own
DON'T GIVE UP ON YOUR DREAMS
KEEP SLEEPING

Dreaming
Dreaming

- Occurs in REM sleep
- We spend 6 years of our lives in dreams!
- Sensory stimuli from the outside may intrude – alarm clock, smells – indicating some level of awareness even when unconscious
- Frontal lobe areas inactive during dreams and NTS dopamine, norepinephrine are low- makes new memory formation hard
Freud’s Concept of Mind

- Ego (executive mediator)
- Superego (internalized ideals)
- Id (unconscious psychic energy)

- Conscious mind
- Preconscious (outside awareness but accessible)
- Unconscious mind
Freud

- **Manifest Content** – actual storyline of the dreams – often reflect our experiences and preoccupations
- **Latent Content** – underlying meaning of the dream
- All based on the concept of Id, Ego and Superego
Theories of Dreaming

- Freud’s Wish Fulfillment
  - *Interpretation of Dreams* (1900)
  - Manifest and Latent Content
  - Lacks any scientific backing

- Activation Synthesis
  - Hobson and McCarley’s Theory
  - REM sleep causes neural activity that the brain weaves into stories
  - Does not explain meaning of dreams

- Information Processing
  - Sort out our day
  - Improve and organize memories
  - Does not explain dreams about places we have never seen/things never experienced

- Physiological Function
  - REM sleep brain stimulation develops and preserves/prunes neural pathways
  - Infants with developing brains spent much time in REM
Hypnosis
Hypnosis

- Greek root: hypnos, meaning “sleep”
- Anton Mesmer (1732-1815) and “mesmerism” as a cure
Hypnosis: what is it?

- Hypnosis is a systematic procedure used to produce a heightened state of suggestibility.
- Not everyone can be hypnotized.
  - Hypnotic Susceptibility Scales
  - Willingness to be hypnotized
  - Those with good imagination and fantasy life, who are able to concentrate, and who have a favorable opinion of hypnosis.
Power of Hypnosis...

- **Age Regression**: acting like of reliving one’s child-state
  - Hypnosis may cause hypnotized people to feel like children, but they often still have adult abilities
  - Memories that have been “hypnotically refreshed” are often a combination of fact and suggestion
- **Acting against one’s will?**
  - People do not do this *because* they are hypnotized
  - They may perform unlikely acts simply because anyone in authority can induce people – hypnotized or not – to act against one’s will
Hypnosis as Therapy

- Hypnotherapists try to help clients heal themselves
  - Posthypnotic suggestions: suggestion made to hypnotized client that influence client’s later behavior
  - Posthypnotic amnesia: client told they will not remember anything that happened while they were hypnotized
  - Hypnotherapy as a supplement to therapy has been shown to be helpful – particularly in managing obesity, but not for drugs, smoking or alcohol
Hilgard: The Hidden Observer

- Hypnosis has been successful in pain management
  - Hypnotized people can endure things from ice baths to surgery without anesthesia!
  - Hypnosis can be used for pain management in lieu of addictive pain killers
- The “Hidden Observer” - you can observe but not be aware of your pain
The Hypnotized State

- **Role Theory**
  - Hypnotized individuals are playing a role
  - If they trust the hypnotist, they will behave accordingly – as expected

- **Dissociation Theory**
  - A dissociation is a split in consciousness which allows thoughts and behaviors to occur simultaneously but separately
  - The hypnotized individual gives some control over these processes to the hypnotist
  - **Automatic writing**: subject writes one thing and discusses an unrelated thing at same time

- **State Theory**
  - Hypnosis is a special state of consciousness
  - Specific, distinct changes in mental processes take place during hypnosis
Meditation

- Techniques that attempt to focus attention and promote relaxation
- Deliberate attempt to alter consciousness
- **Concentrative Meditation** attempts to focus all attention on ONE thing: a word, a sound, etc. so that the same information is cycled through the nervous system repeatedly.
- **Alpha waves** predominate
- Can be used for relaxation, suppression of sympathetic nervous system
Psychoactive Drugs
True or False?

- About 70% of Americans admit to trying illicit drugs but most usage is before age 35.
- College students spend more money on alcohol than books.
- Drinking contributes to 1200 college student deaths, 70,000 sexual assaults and 500,000 injuries each year.
- Alcohol kills more people than all illegal drugs combined.
- Tobacco kills more people than all illegal drugs combined.
- From 1896-1905 Coca-Cola included an extract of the coca plant, making it cocaine tonic water.
- 5% of high school students admit to having tried cocaine.
Definitions

- Look at the definitions for the following terms:
  - Psychoactive Drugs
  - Tolerance
  - Dependence (physical vs psychological)
  - Addiction
  - Antagonist (pg 55)
  - Agonist (pg 55)
Depressants

- *Depress* the functioning of the CNS, reduce neural activity and slow body functions

- Alcohol
  - Mild euphoria, relaxation, lowered inhibitions, Slowed neural processing (don’t drive!)
  - Memory disruption: brain shrinkage
  - Highly physically and psychologically addictive
  - Agonist for GABA, serotonin, dopamine and Antagonist for glutamate
Depressants

- Barbiturates (Tranquilizers)
  - Calming, sedative effect – reduce inhibitions
  - e.g. Seconal, Nembutal, Valium
  - Mimics GABA-Agonist

- Withdrawal: tremors, nausea, sweating, restlessness, irritability, possibly death
Depressants

- Drugs that relieve pain and cause euphoria and relaxation.
- Opiates are narcotics that include heroin, morphine, codeine and their derivatives.
- Can produce quick feeling of pleasure, then calmness or drowsiness.
- Highly addictive and addiction can happen very quickly
- Work by attaching to opioid receptors in the brain
Stimulants

- Increase central nervous system activity and speed up body functions; arousal response
- Nicotine
  - Euphoria, triggers epinephrine and norepinephrine release
  - Suppresses hunger and increases alertness
  - Mimics ACh, moderate dependence
  - Withdrawal leads to insomnia, anxiety, irritability and weight gain
- Cocaine
  - Fast euphoria – fast crash
  - Block dopamine reuptake (indirect agonist)
  - HIGHLY addictive
  - Withdrawal leads to fatigue, irritability, increased appetite, depression
Stimulants

- Methamphetamine
  - Euphoria, triggers release of dopamine
  - Irritability, insomnia, seizures, depression, violence, psychosis
  - Stimulates dopamine and norepinephrine release
  - HIGHLY addictive

- Ecstasy (MDMA)
  - Stimulant and mild hallucinogen
  - Triggers release of serotonin and prevents its reabsorption
  - Destroys serotonin-producing neurons – permanent depression
  - Suppresses immune system
Hallucinogens

- Drugs that alter perceptions of reality and distort sensory and perceptual experiences
- LSD (lysergic acid diethylamide)
  - Derived from fungus ergot
  - Abbie Hoffman, Timothy Leary
  - Hours of mild euphoria, hallucinations, sensory distortion, and “mind expansion”
  - Not physically addictive, but can produce “bad trips” and flashbacks
- Unknown NTS link
Hallucinogens

• Marijuana (THC)
  ○ Several hours of euphoria, relaxation, hallucinations
  ○ ALSO a stimulant at higher doses/depressant at lower doses
  ○ Low physical addiction/moderate psychological addiction
  ○ Activates receptors for cannabinoids (agonist)
  ○ Impairs motor skills and perception, may trigger paranoia, disrupts memory, shrinks brain, intensifies sensory experiences
Influences on Drug Use

- **Biological Influences**
  - Hereditary tendencies: twin and adoptive studies
  - Dopamine deficiencies may provoke usage
  - Self medicating for biologically-based disorders?

- **Psychological Influences**
  - Feeling life is meaningless
  - People under stress or experiencing depression

- **Social Influences**
  - Peer pressure
  - Teenage rebellion and thrill-seeking
  - Seeking social networks with similar interests can perpetuate usage or help to quit