

Textbook: Chapter 3 (page 84-127)

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Definitions

- Addiction: compulsive drug craving and use, despite adverse consequences
- Alcohol dependence: alcohol used marked by tolerance, withdrawal if suspended, and a drive to continue use (aka alcoholism)
- Alpha waves: the relatively slow brain waves of a relaxed, awake state
- Amphetamines: drugs that stimulate neural activity, causing speeded-up body functions and associated energy and mood changes
- Barbiturates: drugs that depress central nervous system activity, reducing anxiety but impairing memory and judgment
- Blindsight: a condition in which a person can respond to a visual stimulus without consciously experiencing it
- Change blindness: failing to notice changes in the environment
- Circadian rhythm: the biological clock; regular bodily rhythms (for example: temperature, wakefulness) that occur on a 24-hour cycle
- Consciousness: our awareness of ourselves and our environment
- Cognitive neuroscience: the interdisciplinary study of the brain activity linked with cognition (including perception thinking, memory and language)
- Delta waves: the large, slow brain waves associated with deep sleep
- Depressants: drugs (such as alcohol, barbiturates and opiates) that reduce neural activity and slow body functions
- Dissociation: a split in consciousness, which allows some thoughts and behaviors to occur simultaneously with others
- Dream: a sequence of images, emotions and thoughts passing through a sleeping person's mind. Dreams are notable for their hallucinatory imagery, discontinuities and incongruities, and for the dreamer's delusional acceptance of the content and later difficulties remembering it.
- Dual processing: the principle that information is often simultaneously processed on separate conscious and unconscious tracks
- Ecstasy (MDMA): a synthetic stimulant and mild hallucinogen. Produces euphoria and social intimacy, but with short-term health risks and longer-term harm to serotonin-producing neurons and to mood and cognition
- Hallucinations: false sensory experiences, such as seeing something in the absence of an external visual stimulus
- Hallucinogens: psychedelic drugs, such as LSD, that distort perceptions and evoke sensory images in the absence of sensory input
- Hypnosis: a social interaction in which one person (the hypnotist) suggests to another (the subject) that certain perceptions, feelings, thought or behaviors will spontaneously occur
- Inattentive blindness: failing to see visible objects when our attention is directed elsewhere
- Insomnia: recurring problems in falling or staying asleep
- Latent content: according to Freud, the underlying meaning of a dream (as distinct from its manifest content)
- LSD (lysergic acid diethylamide): a powerful hallucinogenic drug
- Manifest content: according to Freud, the remembered story line of a dream (as distinct from its latent, or hidden, content)
- Methamphetamine: a powerfully addictive drug that stimulates the central nervous system, with speeded-up body function and associated energy and mood changes; over time, appears to reduce baseline dopamine levels
- Narcolepsy: a sleep disorder characterized by uncontrollable sleep attacks. The sufferer may lapse directly into REM sleep, often at inopportune times.
- Near-death experience: an altered state of consciousness reported after a close brush with death; often similar to drug-induced hallucinations

- Nicotine: a stimulating and highly addictive psychoactive drug in tobacco
- Night terrors: a sleep disorder characterized by high arousal and an appearance of being terrified; unlike nightmares, night terrors occur during NREM-3 sleep within two or three hours of falling asleep, and are seldom remembered
- Opiates: opium and its derivatives, such as morphine and heroin; they depress neural activity, temporarily lessening pain and anxiety
- Physical dependence: a physiological need for a drug, marked by unpleasant withdrawal symptoms when the drug is discontinued
- Posthypnotic suggestion: a suggestion, made during a hypnosis session, to be carried out after the subject is no longer hypnotized; used by some clinicians to help control undesired behaviors and symptoms.
- Psychoactive drug: a chemical substance that alters perceptions and moods
- Psychological dependence: a psychological need to use a drug, such as to relieve negative emotions
- REM rebound: the tendency for REM sleep to increase following REM sleep deprivation (created by repeated awakenings during REM sleep)
- REM sleep: rapid eye movement sleep, a recurring sleep stage during which vivid dreams commonly occur. Also known as paradoxical sleep, because the muscles are relaxed (except for minor twitches) but other body systems are active
- Selective attention: the focusing of conscious awareness on a particular stimulus
- Sleep: periodic, natural, reversible loss of consciousness- as distinct from unconsciousness resulting from a coma, general anesthesia or hibernation
- Sleep apnea: a sleep disorder characterized by temporary cessations of breathing during sleep and repeated momentary awakenings
- Stimulants: drugs (such as caffeine, nicotine, amphetamines, cocaine, Ecstasy, methamphetamine) that excite neural activity and speed up body functions
- THC: the major active ingredient in marijuana; triggers a variety of effects, including mild hallucinations
- Tolerance: the diminishing effect with regular use of the same dose of a drug, requiring the user to take larger and larger doses before experiencing the drug's effect
- Withdrawal: the discomfort and distress that follow discontinuing the use of an addictive drug

Defining Consciousness

- Consciousness: our awareness of ourselves and our environment
 - o Allows us to assemble information from multiple sources
 - o Focuses our attention when we learn a complex concept or behavior
 - o Helps us act in our long-term interests
- We flit between different states of consciousness; including sleeping, waking and various altered states
- States of consciousness:
 - o Occur spontaneously: daydreaming, drowsiness, dreaming
 - o Physiologically induced: hallucinations, orgasm, food or oxygen starvation
 - o Psychologically induced: sensory deprivation, hypnosis, meditation

Biology of Consciousness

- Cognitive Neuroscience
 - o Cognitive neuroscience: the interdisciplinary study of the brain activity linked with cognition (including perception, thinking, memory and language)
 - o Some vegetative show cognitive function (in fMRI scans)
 - o Cognitive neuroscientists are mapping the conscious functions of the cortex
 - o One view sees conscious experiences as produced by the synchronized activity across the brain
 - A strong stimulus will engage areas of the brain that are involved with activities such as language, attention and memory
 - A weak stimulus may trigger a localized cortex that quickly dies out
 - o How the synchronized activity produces awareness is unknown
- Dual Processing: The Two-Track Mind

- Everything psychological is stimulated biologically
- We appear to have two minds, each supported by its of neural equipment
- Unconscious information processing occurs simultaneously as conscious thought
- Perception, memory, thinking, language and attitudes operate on two levels:
 - A conscious, deliberate level
 - An unconscious, automatic level
- Dual processing: the principle that information is often simultaneously processed on separate conscious and unconscious tracks
 - Example: sight
 - Visual perception enables us to recognize things and plan future actions
 - Visual action guides our moment-to-moment movements
- Blindsight: a condition in which a person can respond to a visual stimulus without consciously experiencing (being aware of) it
- Before a conscious decision is made (example: to press a button), there is already brain activity before the decision corresponding to the action to be performed
- Unconscious parallel processing is faster than sequential conscious processing (ie. Solving new problems)
- Selective Attention
 - Selective attention: the focusing of conscious awareness on a particular stimulus
 - Example: cocktail party effect- the ability to attend to only one voice of many. If your name is spoken, you will instantly ring that voice into consciousness
 - Selective Attention and Accidents
 - If a demanding tasks requires it, it will get your full attention
 - People blink less when focused on a task
 - When switching attention between complex tasks, there is a delay in coping
 - Example: driving while doing other tasks (talking, texting, etc), increases chances of being involved in accidents
 - Selective Inattention
 - Inattention blindness: failing to see visible objects when our attention is directed elsewhere
 - Example: how magicians can divert the audience's attention during tricks
 - Change blindness: failing to notice changes in the environment
 - Choice blindness: a failure to detect a mismatch a switch between a chosen and a non-chosen stimulus
 - Pop-out effect: the tendency for an individual's attention to be drawn to certain stimuli due to distinctive characteristics

Sleep and Dreams

- Biological Rhythms and Sleep
 - Circadian Rhythm
 - Circadian rhythm: the biological clock; regular bodily rhythms (for example, of temperature and wakefulness) that occur on a 24-hour cycle
 - Temperature: in the morning, temperature rises and peaks in the day, then dips in the early afternoon and drops again in the evening
 - Age can alter our circadian rhythm
 - Most 20-year-old are owls, with performance improving across the day
 - Most older adults are larks, with performance declining as the day progresses
 - Around age 20, we start shifting over to morning larks
 - Sleep Stages
 - Sleep: periodic, natural, reversible loss of consciousness- as distinct from unconsciousness resulting from a coma, general anesthesia or hibernation
 - Awake
 - Alpha waves: the relatively slow brain waves of a relaxed, awake state
 - Beta waves: alert, waking state
 - Stage 1 (NREM-1)
 - Marked by slowed breathing and irregular brain waves

- May experience images resembling hallucinations (false sensory experiences, such as seeing something in the absence of an external visual stimulus)
 - May experience hypnagogic sensations- feeling of falling or floating
 - Stage 2 (NREM-2)
 - Lasts for around 20 minutes
 - Period spindles- bursts of rapid, rhythmic brain-wave activity
 - Stage 3 (NREM-3)
 - Slow-wave (deep) sleep
 - Lasts for about 30 minutes
 - Delta waves: the large, slow brain waves associated with deep sleep
 - Hard to wake up from this stage
 - REM sleep: rapid eye movement sleep, a recurring sleep stage during which vivid dreams commonly occur. Also known as paradoxical sleep, because the muscles are relaxed (except for minor twitches) but other body systems are active
 - Starts about an hour into sleep
 - Enter REM sleep through stage 2 (NREM-2)
 - For about 10 minutes, you experience rapid brain waves, heart rate rises, breathing becomes rapid and irregular, rapid eye movements
 - Rapid eye movements indicates a dream (emotional, story-like, rich hallucinations)
 - Genitals become aroused (unless you're having a very scary dream; the dream does not have to be sexual)
 - The brain's motor cortex is active, but blocked by the brainstem, resulting in a state of almost paralysis (so we cannot act out dreams)
 - Cannot be easily awakened from REM
 - Sleep paralysis: when waking from REM sleep, might experience brief paralysis
 - The sleep cycle repeats every 90 minutes
 - As the night progresses, NREM-3 grows shorter and disappears while NREM-2 and REM elongate
 - On average, 20-25% of night is spent in REM
- What Affects Sleep Patterns?
 - Infants sleep for 2/3 of the day while adults sleep for less than 1/3
 - Sleeping patterns are dictated by genetics
 - Sleeping patterns are also influenced by culture
 - Bright light activates the circadian clock by activating light-sensitive retinal proteins that send signals to the suprachiasmatic nucleus (SCN)
 - The SCN makes the pineal gland decrease its production of melatonin (sleep-inducing hormone) when waking and increases its production in the evening
- Sleep Theories
 - There are 5 reasons why we sleep
 - 1. Sleep protects
 - i. It was dangerous to be out at night (ancestral times), so humans slept
 - ii. Animals with the most need to graze and the least ability to hide tend to sleep less (example: giraffe)
 - 2. Sleep helps us recuperate
 - i. Helps restore and repair brain tissue
 - 3. Sleep helps restore and rebuild our fading memories of the day's experiences
 - i. It strengthens and stabilizes neural memory traces
 - ii. More sleep leads to better memory of recently learned material
 - 4. Sleep feeds creative thinking
 - i. People solve problems more insightfully and are better at spotting connections amongst pieces of information after sleeping on it compared to those who stay awake
 - 5. Sleep supports growth
 - i. During deep sleep, the pituitary gland releases a growth hormone necessary for

- muscle development
 - ii. As people age, they release less of the hormone (spend less time in deep sleep)
 - iii. Sleep improves athletic performance
- Sleep Deprivation and Disorders
 - o Effects of Sleep Loss
 - Those who get adequate sleep are happier with their lives
 - Sleep loss is a predictor of depression
 - REM's processing of emotional experiences helps protect against depression
 - Decreases performance through the day
 - Weight gain
 - Sleep deprivation increases ghrelin, a hunger-arousing hormone and decreases leptin, a hunger-suppressor
 - Increases cortisol, a stress hormone that stimulates the body to make fat
 - Suppress the immune system
 - Harder for the immune system to fight infections and cancer
 - Those who sleep more tend to live longer
 - Slows reactions and increases errors on visual attention tasks
 - Diminished attentional focus and memory consolidation
 - Increased risk for high blood pressure
 - Muscles: reduced strength and slower reaction time and motor learning
- Major Sleep Disorders
 - o Insomnia: persistent problems in falling or staying asleep
 - Insomnias often overestimate how much sleep they lost
 - Quick fixes: alcohol and sleeping pills
 - However, they reduce REM sleep and can lead to tolerance
 - o Narcolepsy: a sleep disorder characterized by uncontrollable sleep attacks. The sufferer may lapse directly into REM sleep, often at inopportune times.
 - Attacks usually last less than 5 minutes
 - Genetic disorder
 - Body lacks orexin, a neurotransmitter linked to alertness
 - o Sleep apnea: a sleep disorder characterized by temporary cessations of breathing during sleep and repeated momentary awakenings
 - Decreased blood oxygen arouses the person and they wake up to breathe for a bit
 - Process repeats multiple times a night
 - They lose slow-wave sleep, resulting in them feeling tired
 - More common in obese people
 - Results in loud snoring
 - Treatment: a mask with an air pump that keeps the sleeper's airway open
 - o Night terrors: a sleep disorder characterized by high arousal (walking, talking ,etc.) and an appearance of being terrified; unlike nightmares, night terrors occur during NREM-3 sleep within two or three hours of falling asleep, and are seldom remembered
 - Occurs mostly in children
 - o Sleepwalking and Sleepwalking
 - Occur in NREM-3
 - Usually childhood disorders
 - Genetic
 - As we age, NREM-3 diminished, as do night terrors and sleepwalking
 - Sleep deprivation increases the tendency to sleepwalk
- Dream: a sequence of images, emotions and thoughts passing through a sleeping person's mind. Dreams are notable for their hallucinatory imagery, discontinuities and incongruities, and for the dreamer's delusional acceptance of the content and later difficulties remembering it (occurs in REM sleep)
 - o The mind is monitoring the environment during sleep
 - o Sensory stimulation (noise, smell) can be integrated into the dream
 - o Anything that occurs 5 minutes before falling asleep is forgotten
 - o Why We Dream
 - To satisfy our own wishes

- Freud: viewed a dream's manifest content (the remembered storyline of a dream) as a censored, symbolic version of its latent content (the underlying meaning of a dream)
- To file away memories
 - Dreams help sift, sort and fix the day's experience into our memory
 - Areas of the brain active in learning are also active during REM sleep
- To develop and preserve neural pathways
- To make sense of neural static
 - Dreams erupt from neural activation spreading upward from the brainstem
 - Dreams are the brains attempt to make sense of random neural activity
 - Limbic system and visual cortex are active while frontal lobe is not, which explains the lack of logic in dreams
- To reflect cognitive development
 - Dreams are a part of brain maturation and cognitive development
 - Dreams simulate reality by drawing on our concept and knowledge
 - Emphasis on top-down control of our dream content

Theory	Explanation	Critical Considerations
Freud's wish-fulfillment	Dreams express otherwise unacceptable feelings	Lacks any scientific support, many different interpretations for the same dream
Information-processing	Dreams help sort the day's events and consolidate our memory	Why do we dream of things we haven't experienced?
Physiological function	Regular stimulation from REM sleep may help develop and preserve neural pathways	Does not explain why we experience meaningful dreams
Neural activation	REM sleep triggers neural activity that evokes random visual memories, which our sleeping brain integrates into dreams	The individual's brain is weaving the stories, which still tells us something about the dreamer
Cognitive development	Dream content reflects dreamer's cognitive development (knowledge and understanding)	Does not address the neuroscience of dreams

- REM rebound: the tendency for REM sleep to increase following REM sleep deprivation (created by repeated awakenings during REM sleep)
 - Other mammals also experience REM rebound
 - Suggests that REM sleep is biologically necessary

Hypnosis

- Hypnosis: a social interaction in which one person (the hypnotist) suggests to another (the subject) that certain perceptions, feelings, thought or behaviors will spontaneously occur
- FAQ
 - Can anyone experience hypnosis?
 - To some extent, we are all open to suggestion
 - Postural sway: when standing with eye closed and told that they are swaying, most will indeed sway a little
 - Hypnotic ability: the ability to focus attention totally on a task to become imaginatively absorbed in it
 - Can hypnosis enhance recall of forgotten events?
 - No, only some events are stored in the brain. The rest are forgotten forever.
 - Hypnotically refreshed memories combine fact with fiction
 - Can hypnosis help people heal or relieve their pain?
 - Posthypnotic suggestion: a suggestion, made during a hypnosis session, to be carried out after the subject is no longer hypnotized; used by some clinicians to help control undesired behaviors and symptoms.
 - Can relieve pain

- Explaining the Hypnotized State
 - Hypnosis as a Social Phenomenon
 - Subjects begin to feel and behave in ways appropriate for good hypnotic subjects
 - The more they like and trust the hypnotist, the more they allow that person to direct their attention and fantasies
 - The hypnotist's ideas become the subject's thoughts, which produce the hypnotic experiences and behaviors
 - Hypnotic phenomena are an extension of normal social and cognitive processes
 - Hypnosis as Divided Consciousness
 - Hypnosis involves not only social influences but also a special dual-processing state of dissociation (Ernest Hilgard)
 - Dissociation: a split in consciousness, which allows some thoughts and behaviors to occur simultaneously with others
 - For example: the hypnotist dissociates the sensation of the pain stimulus
- Hypnosis from Complementary Perspective
 - Biological influences
 - Distinctive brain activity
 - Unconscious information processing
 - Psychological influences
 - Focused attention
 - Expectations
 - Heightened suggestibility
 - Dissociation between normal sensations and conscious awareness
 - Social-cultural influences
 - Presence of an authoritative person in legitimate context
 - Role-playing "good subject"

Drugs and Consciousness

- Psychoactive drug: a chemical substance that alters perceptions and moods
- Drug's effect depends on its biological effect and the user's expectations (which vary)
- Tolerance, Dependence and Addiction
 - Tolerance: the diminishing effect with regular use of the same dose of a drug, requiring the user to take larger and larger doses before experiencing the drug's effect
 - Neuroadaptation: the user's brain chemistry adapts to offset the drug effect
 - Addiction: compulsive drug craving and use, despite adverse consequences
 - Doesn't require therapy to stop
 - Withdrawal: the discomfort and distress that follow discontinuing the use of an addictive drug
 - Physical dependence: a physiological need for a drug, marked by unpleasant withdrawal symptoms when the drug is discontinued
 - Psychological dependence: a psychological need to use a drug, such as to relieve negative emotions (example: stress-relieving drugs)
- Types of Psychoactive Drugs
 - Depressants: drugs that reduce neural activity and slow body functions
 - Alcohol
 - Alcohol dependence: alcohol use marked by tolerance, withdrawal if suspended, and a drive to continue use (aka alcoholism)
 - Acts as a disinhibitor- slows control judgment and inhibitions
 - ◆ Example: leaving extra tips, sexual aggression, casual sex
 - Slower neural processing
 - ◆ Relaxed, slow reactions, speech slurs, skilled performance deteriorates
 - Memory disruption
 - ◆ Disrupts memory formation because alcohol suppresses REM sleep, which is where permanent memories are formed
 - ◆ Long term effect: nerve cell death, reduces birth of new nerve cells, impairs the growth of synaptic connections, shrinks the brain

- Reduced self-awareness and self-control
 - Expectancy effects: User's expectations influence their behavior
 - Barbiturates: drugs that depress central nervous system activity, reducing anxiety but impairing memory and judgment (tranquilizers)
 - Examples: Nembutal, Seconal, Amytal
 - Prescribed to induce sleep or reduce anxiety
 - Large doses: impair memory and judgment
 - Mixing alcohol with barbiturates can be lethal
 - Opiates: opium and its derivatives, such as morphine and heroin; they depress neural activity, temporarily lessening pain and anxiety
 - Effects: pupils constrict, breathing slows, reduces anxiety and pain
 - Users develop a tolerance
 - The brain eventually stops producing natural endorphins (natural opiate)
 - If artificial opiates are stopped, the brain lacks normal level of painkilling neurotransmitters
- Stimulants: drugs that excite neural activity and speed up body functions
 - Effects: pupils dilate, heart and breathing rates increase, blood sugars levels rise, lack of appetite, high energy and self-confidence
 - Examples: caffeine, nicotine, amphetamines, cocaine, ecstasy
 - Amphetamines: drugs that stimulate neural activity, causing speeded-up body functions and associated energy and mood changes
 - Reasons used: feel alert, lose weight, boost mood, boost athletic performance
 - They can be addictive
 - Nicotine: a stimulating and highly addictive psychoactive drug in tobacco
 - Adolescents are more likely to start smoking (peer pressure, mature image, imitate celebrities)
 - Very addictive (develop dependence and tolerance, which results in withdrawal)
 - Effects: increased alertness, relaxed muscles, reduce stress, increased heart rate, increased blood pressure, reduced circulation to extremities, suppresses appetite
 - Withdrawal: craving, insomnia, anxiety, irritability, distractibility
 - Nicotine signals the nervous system to release neurotransmitters
 - ◆ Epinephrine diminished appetite
 - ◆ Dopamine and opioids reduce anxiety and pain sensitivity
 - Smoking correlates with higher rates of depression, chronic disabilities and divorce
 - Cocaine
 - Is snorted, injected or smoked
 - Quickly enters the blood stream
 - Produces a rush of euphoria that depletes the brain's supply of the neurotransmitters dopamine, serotonin and norepinephrine
 - Within the hour, a crash of agitated depression follows
 - Addictive
 - In situations that trigger aggression, cocaine may heighten reactions
 - Euphoria and crash
 - ◆ Cocaine binds to the sites that normally reabsorb neurotransmitter molecules, blocking the reuptake of dopamine, norepinephrine and serotonin
 - ◆ The extra neurotransmitters remain in the synapse, intensifying their normal mood-altering effects and producing a euphoric rush
 - ◆ When cocaine levels drop, the absence of the neurotransmitters produces a crash
 - Effects: emotional disturbances, suspiciousness, convulsions, cardiac arrest, respiratory failure
 - Crack: crystalized form of cocaine which produces a briefer but more intense high, followed by a more intense crash

- Psychological effects depend on form and dose of cocaine
- Methamphetamine: a powerfully addictive drug that stimulates the central nervous system, with speeded-up body function and associated energy and mood changes; over time, appears to reduce baseline dopamine levels
 - Greater effects than amphetamine
 - Triggers the release of dopamine, which stimulates brain cells that enhance energy and mood (euphoria)
 - Aftereffects: irritability, insomnia, hypertension, seizures, social isolation, depression, violent outbursts
 - Over time, may reduce baseline dopamine levels
- Ecstasy (MDMA): a synthetic stimulant and mild hallucinogen. Produces euphoria and social intimacy, but with short-term health risks and longer-term harm to serotonin-producing neurons and to mood and cognition
 - Stimulant and mild hallucinogen
 - Derivative of amphetamine
 - Triggers dopamine release
 - Releases stored serotonin and blocks its reuptake
 - Experience high energy, emotional elevation and connectedness with those around them
 - Was very popular in the 1990s
 - Effects
 - ◆ dehydration, which can lead to severe overheating, increase blood pressure and death
 - ◆ Suppresses the immune system
 - ◆ Impairs memory
 - ◆ Slows thought
 - ◆ Disrupts sleep by interfering with serotonin's control of the circadian clock
 - Long term use: can damage serotonin-producing neurons, leading to decreased output and increased risk of permanently depressed mood
- Hallucinogens: psychedelic drugs, such as LSD, that distort perceptions and evoke sensory images in the absence of sensory input
 - LSD (lysergic acid diethylamide)
 - Emotional trips vary from euphoria to panic
 - User's current mood and expectations color the emotional response
 - The perceptual distortions and hallucinations have some commonalities
 - ◆ Begins with simple geometric forms (examples: lattice, cobweb, spiral)
 - ◆ Next, more meaningful images
 - ◇ Images superimposed on a tunnel or funnel
 - ◇ Replays of past emotional experiences
 - ◆ As the hallucination peaks, people feel separated from their body and experience dreamlike scenes so real that they may become panicked or harm themselves
 - ◆ The sensations are similar to the near-death experience (an altered state of consciousness reported after a close brush with death; often similar to drug-induced hallucinations)
 - Marijuana
 - A mild hallucinogen
 - Contains THC (the major active ingredient in marijuana; triggers a variety of effects, including mild hallucinations)
 - Can be smoked or ingested
 - THC produces mixed effects
 - ◆ Amplifies sensitivity to colors, sounds, tastes, smells
 - ◆ Relaxes, disinhibits and may produce euphoric high
 - ◆ Impair motor coordination, perceptual skills and reaction times
 - ◆ Can intensify the emotions they felt before taking the drug
 - THC lingers in the body for a week or more

- Therefore, regular users may achieve a high with smaller amounts (opposite of tolerance)
- The more a person uses marijuana, they are at greater risk for anxiety and depression
- Effects
 - ◆ Disrupts memory formation
 - ◆ Interferes with immediate recall of information
 - ◆ Heavy use over long period of time = shrinkage of brain areas that process memories and emotions
 - ◆ Prenatal exposure impairs brain development
- Medicinal marijuana is legal in some countries/states
 - ◆ THC delivered through medical inhalers (smoke causes cancer, lung damage and pregnancy complications)
 - ◆ Relieves pain and nausea associated with AIDS and cancer
- How does marijuana alter thinking, movement and moods, and relieve pain?
 - ◆ THC- sensitive receptors in frontal lobes, limbic system and motor cortex
 - ◆ Are natural occurring THC-like molecules that bind with cannabinoid receptors
 - ◆ These molecules may help control pain

Drug	Type	Pleasurable Effects	Adverse Effects
Alcohol	Depressant	Initial high followed by relaxation and disinhibition	Depression, memory loss, organ damage, impaired reactions
Heroin	Depressant	Rush of euphoria, relief from pain	Depressed physiology, agonizing withdrawal
Caffeine	Stimulant	Increased alertness and wakefulness	Anxiety, restlessness, insomnia in high doses, uncomfortable withdrawal
Methamphetamine	Stimulant	Euphoria, alertness, energy	Irritability, insomnia, hypertension, seizures
Cocaine	Stimulant	Rush of euphoria, confidence, energy	Cardiovascular stress, suspiciousness, depressive crash
Nicotine	Stimulant	Arousal and relaxation, sense of well-being	Heart disease, cancer
Ecstasy (MDMA)	Stimulant; mild hallucinogen	Emotional elevation, disinhibition	Dehydration, overheating, depressed mood, impaired cognitive and immune functioning
Marijuana	Mild hallucinogen	Enhanced sensation, relief of pain, distortion of time, relaxation	Impaired learnings and memory, increased risk of psychological disorders, lung damage from smoke

- Influences on Drugs Use

- Increased drug use in the 1970s
- Use decreased in the 1980s with increased education, deglamorization
- Early 1990s, slight increase due to glamorization
- Biological influences
 - Genetic predisposition
 - Variations in neurotransmitter systems
- Psychological influences
 - Lacking sense of purpose (drugs temporarily dull the pain of self-awareness)
 - Significant stress (drugs allow them to avoid coping with stress/emotions)

- Psychological disorders, such as depression
- Social-cultural influences
 - Urban environment
 - Cultural attitude towards drug use
 - Peer influences