UNIT 5 GUIDE – 11/18/2019
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MODULE 22 – Understanding Consciousness and Hypnosis

Defining Consciousness	- **Consciousness** is our awareness of ourselves and our environment
	  - conscious awareness is ½ of our *dual processing*
	- We experience what William James calls a continuous "stream of consciousness"
	- We switch between *states of consciousness* (sleeping, waking, drugs, etc)
	  - spontaneous: daydream, drowsy, dream
	  - physiologically induced: hallucination, orgasm, starvation
	  - psychologically induced: sensory deprivation, hypnosis, meditation

Hypnosis	- **Hypnosis** may be experienced after *hypnotic induction*
	- Hypnosis as a social phenomenon: we may begin to behave in way appropriate for "good hypnotic subjects"
	  - hypnotic phenomena may be extensions of normal social/cognitive processes
	- Hypnosis as divided consciousness: hypnosis involves not only social influence, but **dissociation**, a split between different levels of consciousness (normal sensations and conscious awareness)
	  - *selective attention* may also be related

MODULE 23 – Sleep Patterns and Sleep Theories

Biological Rhythms and Sleep	- Our bodies have a 34 hours cycle of day and night using a biological clock called the **circadian rhythm**
	  - can be altered by age and experience
	  - most young people are night owls, while most older people are morning larks
	  - women become more morning oriented when they have children, and when they hit menopause
	- Around every 90 minutes our sleep cycle repeats
	- **REM sleep** is rapid eye movement sleep
	- During an awake, relaxed state, you emit slow **alpha waves**
	- The transition to **sleep** is marked by slow breathing and irregular brain waves of non-Rem stage 1
	- During NREM-1, a brief stage, you may experience **hallucinations** (sensory experiences without a sensory stimulus), feel like you're falling (*hypnagogic jerk)*
	- Relaxing more, you go into NREM-2 for about 20 minutes, emitting *sleep spindles*, bursts of rapid, rhythmic brain-wave activity
	  - It' still kind of easy to wake you up, but you're clearly asleep
	- You transition to NREM-3, deep, slow-wave sleep that lasts for about 30 minutes. You emit large, slow **delta waves**, and are hard to wake up
	- After around an hour total, you leave **NREM sleep** and return through NREM-2 (you spend ½ the night in stage 2) to REM sleep
	  - for around 10 minutes, you have rapid brain waves like in NREM-1, but your heart rate, breathing and eye movement increases
	  - you have emotional, story-like and hallucinatory dreams

	- genitals become aroused during REM sleep - motor cortex is active, but messages are blocked by the brainstem, so you have relaxed, paralyzed muscles, and are hard to wake up - *Sleep paralysis* is produced during REM sleep, and it's sometimes called *paradoxical sleep*: you're aroused, yet calm - The more you sleep, the shorter NREM-3 gets, and the longer REM and NREM-2 get - Morning light tweaks the circadian rhythm by activating light-sensitive retinal proteins that trigger signals in the brain's **suprachiasmatic nucleus** in the hypothalamus - causes the pineal gland to decrease the sleep-inducing hormone *melatonin* in the morning/increase it in the evening
Sleep Theories	- Sleep may have evolved for five reasons: - It protects; during darkness, our ancestors were better off sleeping safe in a cave than navigating in the dark, risking death - It helps us recuperate; it helps restore and repair brain tissue, giving resting neurons time to repair themselves and pruning/weakening unused connections - It restores/rebuilds memories; it consolidates our memories, strengthening and stabilizing neural memory traces. You may perform a task better after sleeping - It aids creativity; dreams have inspired many noteworthy achievements, and sleep boosts thinking/learning/making connections - It supports growth; in sleep the pituitary gland releases GH necessary for muscle development. Athletic performance can be improved

MODULE 24 - Sleep Deprivation, Sleep Disorders, and Dreams

Sleep Deprivation and Sleep Disorders	- When uninterrupted, most adults sleep at least 9 hours, waking up refreshed with better moods, and performing better work - Students are especially sleep deprived - Sleep loss is a predictor of depression (but it doesn't link reflect sleep difficulties caused by depression) - REM's processing of emotions helps prevent depression - You can gain weight: sleep deprivation increases *ghrelin*, a hunger=arousing hormone, and decreases *leptin*, a hunger-suppressing one - Sleep deprivation suppresses immune cells which fight viral infections and cancer - Our reactions and visual attention are slowed, which is especially dangerous in terms of driving, piloting and equipment operating - accidents increase after the time change that shortens sleep, and decrease after the one that lengthens it - Can cause increased inflammation and arthritis in joints, as well as reduced muscle strength and a higher risk of high blood pressure - Many people have **insomnia**, a persistent problem in falling or staying asleep - sleeping pills and alcohol, the quickest fixers, reduce REM sleep and make you feel bad the day after - People with **narcolepsy** have sudden attacks of sleepiness lasting <5 minutes

	- in some cases, people go straight to REM and lose muscular tension - in narcoleptic patients, researchers discovered a relative absence of the hypothalamic neural center producing *orexin*, a neurotransmitter linked to alertness - Many people have **sleep apnea**, causing them to intermittently stop breathing during sleep - they're woken up to snort in air hundreds of times a night, but don't recall these episodes in the morning - associated with obesity, can be relieved with a mask - **Night terrors** are mostly experienced by children, who seldom remember them in the morning. They're *not* nightmares and usually occur during the first few hours of NREM-3 - *Sleepwalking* also occurs during NREM-3, and runs in families just like narcolepsy, (can really occur in any stage)
Dreams	- **REM dreams** are vivid, emotional and bizzare, so much so that we may confuse them with reality - Our dreams commonly reflect our previous experiences - nightmares are common after trauma - playing a video game may give you dreams similar to the game - people in hunter-gatherer societies more frequently dream of animals - musicians report 2x as many dreams of music - We do *not* remember recorded info played while we're asleep, and usually forget what happens before we fall asleep - Sigmund Freud's theory was that dreams are a safe space for our otherwise unacceptable feelings (usually sexual) - **manifest content** is a dream's remembered storyline, a censored, symbolic version of the dream's **latent content**, the unconscious drives/wishes that would be a threat if directly expressed - The *information-processing* theory proposes that dreams may sort through/fix our memories of the day's experiences - there's a confirmed link between REM sleep and memory - Dreams may serve a *physiological* function by stimulating the sleeping brain to develop and preserve neural pathways - supported by infants spending a lot of time in REM - Dreams may simply erupt from random *neural activation* from the brainstem that activates the brain's visual cortex and limbic system (emotions, amygdala) while the inhibition and logic systems are dormant - emphasizes bottom-up brain activation - Dreams may be a part of brain maturation and cognitive development, simulating reality by drawing on concepts and knowledge - emphasizes our top-down control of dream content - Following REM sleep deprivation, we experience **REM rebound**, a tendency for REM to increase

MODULE 25 - Psychoactive Drugs

Tolerance and Addiction	- Some people may develop a self-harming **substance use disorder**, using substances called **psychoactive drugs**, chemicals that change perceptions and moods

	- Drug effects depend on both biological effects and user expectations - **Tolerance**, the diminishing effect of a drug with regular use, requires the user to take increasingly larger doses to experience the same effect - brain chemistry adapts to offset drug effect in *neuroadaptation* - The increasing doses can lead to **addiction**, a craving and use of the substance despite its adverse consequences - Abruptly stopping consumption can lead to **withdrawal**

Types of Psychoactive drugs	- **Depressants** are drugs like alcohol, barbiturates (tranqs), and opiates
	  - calm neural activity, slow bodily functions
	- Alcohol isn't a stimulant, it's a *disinhibitor*, slowing brain activity that controls judgement and inhibitions
	  - slows sympathetic nervous system activity in low doses, relaxing
	  - in large doses, slows reactions and speech, deteriorates performance
	  - given heavy drinking after moderate drinking, your vomiting response is depressed (dangerous) and you can be poisoned by overdosing without throwing up
	  - disrupts memory formation, has long-term effects on brain and cognition, increases nerve cell death, decreases new nerve birth, impairs synaptic connection growth
	  - may lead to blackouts, partly because it suppresses REM sleep
	  - can shrink the brain – girls are more at risk to both addiction and addiction-caused lung, brain and liver damage
	  - reduces self-awareness, awareness of inhibition and consequences
	  - **alcohol use disorder**
	- **Barbiturate** drugs, or *tranquilizers*, depress nervous system activity, and may be prescribed to induce sleep or reduce anxiety
	  - can impair memory/judgement, lethal combined with alcohol
	- **Opiates**, opium and its derivatives, depress neural functioning (heroin, *narcotics* like codeine and morphine for pain relief)
	  - pupils constrict, breathing slows, become lethargic
	  - replaces pain and anxiety with bliss, but only short-term
	  - given repeated use, we stop making *endorphins*, so lack of the drug can then cause extreme pain
	- **Stimulants** excite neural activity and speed up body function
	  - pupils dilate, heart/breathing rates increase, blood sugar levels rise, appetite drops, self confidence/energy rise
	  - caffeine, nicotine, **amphetamines,** cocaine, methamphetamine (speed) and Ecstasy (also a hallucinogen)
	  - withdrawal causes fatigue, headaches, irritability, depression
	- **Nicotine** is found in cigarettes and other tobacco products
	  - It's hard to quit, and powerfully and quickly addictive, and *tolerance* quickly develops
	  - cravings, insomnia, anxiety, irritability and distractibility
	  - nicotine signals the release of epinephrine and norepinephrine (lower appetite, more alert and efficient) and dopamine and opioids (less anxiety, reduced sensitivity to pain)
	- **Cocaine** is snorted, injected, or smoked, entering the bloodstream quickly and producing a euphoric rush of dopamine, serotonin, and norepinephrine
	  - followed by a crash of depression within the hour
	  - increases shock levels, emotional disturbances, suspiciousness, convulsions, cardiac arrest and respiratory failure

	- crack gives an intenser high and an intenser crash
	- **Methamphetamine** is related to *amphetamine* but with greater effects, triggering dopamine release which stimulates energy and mood
	  - aftereffects: irritability, insomnia, hypertension, seizures, social isolation, depression, violent outbursts
	  - reduces baseline dopamine levels
	- **Ecstasy**, or **MDMA**, is a stimulant and hallucinogen derived from amphetamine
	  - triggers dopamine release and stored serotonin release (and blocks reuptake of serotonin, prolonging effects)
	  - high energy, emotional elevation and social connectedness
	  - leads to severe overheating, increased blood pressure, and death, and can damage serotonin-producing neurons
	  - suppresses the immune system, impairs memory and thought, disrupts sleep b/c serotonin controls the circadian clock
	- **Hallucinogens** distort perceptions and evoke sensory images without sensory input
	- **LSD** results in fantastic pictures, extraordinary shapes and kaleidoscopic colors, and emotions from euphoria to panic
	  - begins with simple geometric forms, then meaningful images, sometimes on a tunnel or funnel or replays of past emotional experiences, then out-of-body and/or dreamlike scenes which seem so real they can provoke behavior
	  - similar to a **near-death experience**
	- Hemp leaves, or **marijuana**, contain **THC**, which is mimicked by *synthetic marijuana (K2* or *Spice*)
	  - a mild hallucinogen, amplifies sensitivity to color, sound, taste and smell, but relaxes, disinhibits + gives a high
	  - impairs motor coordination, perception and reaction time, but lingers in the body for a week or more, much longer than alcohol
	  - less abrupt withdrawal, get high with smaller amounts (contradicts the usual path of tolerance)
	  - can cause increased risk of anxiety/depression in adolescents, and disrupts memory formation/immediate recall of newly learned info
	  - also bad prenatally
	  - in some places, legal use of *medical marijuana* is allowed to relieve pain and nausea
	  - smoke can be dangerous and cause lung damage