



States of Consciousness

Sleep, Dreams, Hypnosis, Drugs

Why Study Consciousness?

- Consciousness, as we humans experience it, is the key difference between humans and lower animals
- We are not interested in just waking consciousness, but also altered states of consciousness such as:
 - Sleeping and dreaming
 - Hypnosis and hypnotic trances
 - Alcohol and drug use to achieve an altered state

Consciousness

- Consciousness is the awareness of the sensations, thoughts, and feelings being experienced at a given moment
- Also, our subjective understanding of both the environment around us and our private internal world, unobservable to outsiders

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internal world,
to outsiders



Waking Consciousness

- State in which thoughts, feelings, and sensations are clear and organized and the person feels alert
- We systematically carry out mental activity, focusing our thoughts and absorbing the world around us

Altered States of Consciousness

- State in which there is a shift in the quality or pattern of mental activity as compared to waking consciousness
- Thoughts and images may come to us more spontaneously
- Thoughts may become fuzzy and disorganized, you may drift from one to another

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Quiz



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Sleep Quiz

Altered States: Sleep

- Most common altered state
- Spend about one third of life asleep
- Can't live without sleep



Altered States: Sleep

- Most common altered state
- Spend about one third of life asleep
- Can't live without sleep
- The sleep-wake cycle is a biological rhythm
- A natural cycle of activity that the body must go through!



Circadian Rhythms

- Biological processes that occur repeatedly on approximately a 24-hour cycle
- Very complex
 - Sleepiness occurs not just in the evening, but throughout the day in regular patterns
 - Relative amounts of light and darkness play a role

The Hypothalamus

- Suprachiasmatic nucleus
- Internal clock that tells you when to wake up and when to go to sleep
- Sensitive to changes in light
- Pineal gland secretes melatonin
- Serotonin levels are high when sleepy
- Body temperature plays a role too



What Happens when you don't Sleep?



- Microsleeps - brief sidesteps into sleep lasting only a few seconds
- Sleep deprivation is a serious problem
- Leads to concentration problems, disorientation
- Inability to accomplish simple tasks
- Anything that disrupts the sleep-wake cycle is not good for your health

What's the big deal?

- Healthy adults randomly placed in 1 of 4 restricted sleep conditions
- Allowed 4, 6, 8, hours of sleep for 14 days
- 4th group allowed no sleep at all for 3 days
- Measured cognitive abilities during scheduled 'awake' times
- So what?

Results showed that even restricting sleep to 6 hours per night caused cognitive performance and reaction times to drop so dramatically, that by the end of 2 weeks, test participants were performing as poorly as subjects who had no sleep for 2 nights in a row!

Why do we Sleep?

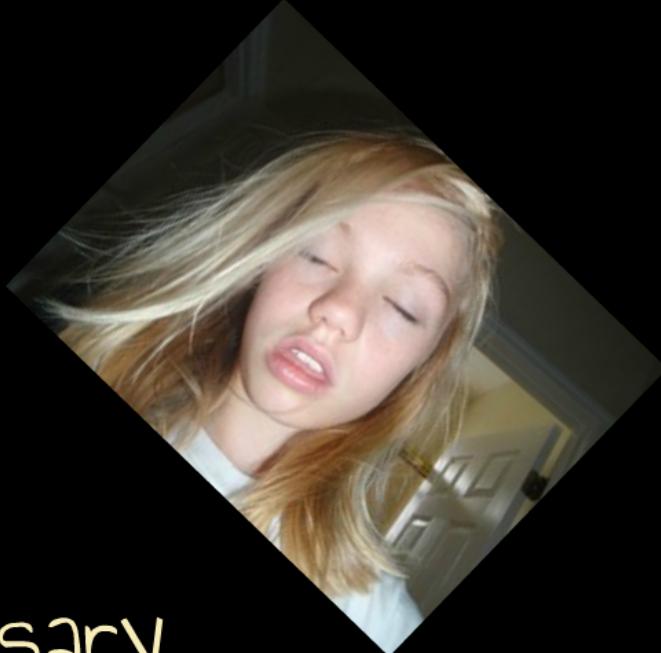
The Adaptive Theory of Sleep



- Proposes that animals and humans evolved sleep patterns to avoid predators by sleeping when predators are most active

Why do we Sleep?

The Restorative Theory of Sleep



- Proposes that sleep is necessary to the physical health of the body and serves to replenish chemicals and repair cellular damage

How Much Sleep is Enough?

- Most people need 7-8 hours in a 24 hour period in order to function well
- Varies from person to person
 - Some people need 4-5, some need 9-10
 - Age is a factor: people generally need less and less sleep as they get older

Keep in Mind:

How much Sleep you need to get thru the day and Survive and how much Sleep you need to get thru the day and thrive are totally different things!

Top 10 Reasons to go Back to Bed!

10. Sleep deprivation is becoming increasingly problematic nationwide
9. Lack of sleep can accumulate over the course of several days
8. You're a terrible judge of how tired you really are
7. If you don't, you'll die
6. The dangers of microsleeps
5. Lack of sleep is expensive
4. It's probably making you fat
3. Sleep in, save your grade
2. Sleep improves your personality
1. Because sleep deprivation is torture!

The Stages of Sleep

- There are two kinds of sleep:
 - Non - REM
 - A very deep, very restful type of sleep
 - You are least responsive to external stimulation
 - REM (Rapid Eye Movement)
 - A relatively active type of sleep when most of your dreaming takes place
 - Increased heart rate, blood pressure, and breathing rate

Stages of Sleep

1

- Non-REM Stage One: Light Sleep
 - If you are awakened at this point you will likely not believe that you were actually asleep at all
 - May experience the hypnic jerk - you are just drifting off to sleep when your knee, legs, or your whole body suddenly jerks
 - Alpha waves indicate a state of relaxation or light sleep

s of activity

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Stages of Sleep

2

- Non-REM Stage Two: Sleep Spindles
 - Body temperature drops
 - Heart rate slows
 - Breathing more shallow and irregular
 - EEG will show signs of sleep spindles, brief bursts of activity lasting only a second or two
 - If you are awakened during this stage, you will be aware of having been asleep
 - Theta waves indicate the early stages of sleep

Stages of Sleep

3

- Non-REM Stage Three : Delta Waves
 - Delta waves are long slow waves that indicate the deepest stage of sleep
 - In stage three, delta waves make up 20-50 percent of the brain wave pattern

Stages of Sleep

Stages of Sleep

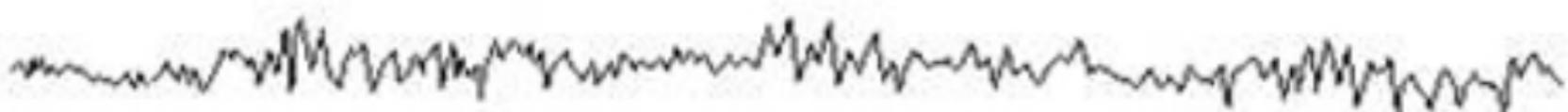
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- Non-REM Stage Four: Delta Waves
 - Once delta waves account for more than 50% of brain activity, you are said to be in stage four, the deepest stage of sleep
 - Growth hormones are released in this stage
 - Very difficult to wake up people in this deep sleep, wake up confused and disoriented

Brain Waves: EEG Tracings

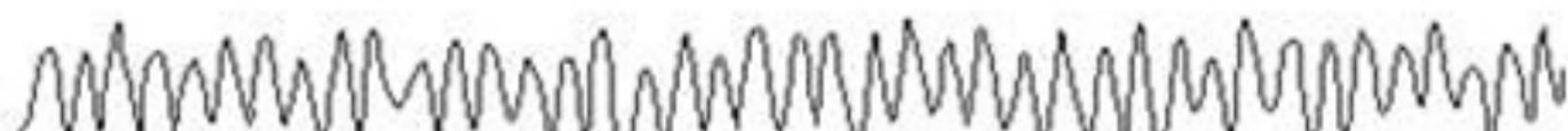
Beta (β)

13-30 Hz



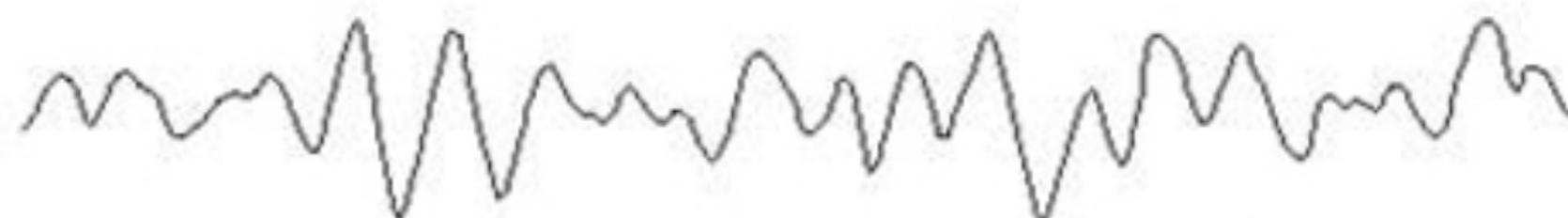
Alpha (α)

8-13 Hz



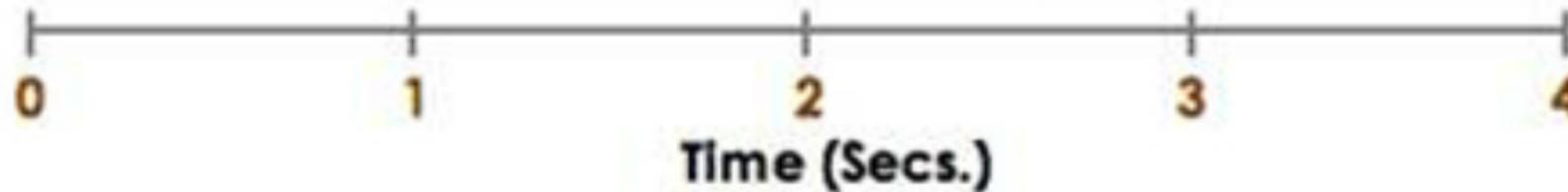
Theta (θ)

4-8 Hz



Delta (δ)

0.5-4 Hz



Stage Four Sleep Disorders

Sleepwalking (Somnambulism)

- Occurs in 20% of the population
- More common in childhood
 - Occurs more frequently in boys than girls
- Not dangerous to wake a sleepwalker
- Sleepwalkers rarely remember being up



"I didn't mean to leave work early yesterday. I must have been walking in my sleep."

Stage Four Sleep Disorders

Night Terrors

- Very rare, more likely to occur in childhood
- A state of panic experienced while sound asleep
- May sit up, scream, run around the room, not uncommon to feel unable to breathe
- Different than a nightmare

Stage Four

Sleepwalking (Somnambulism)

- Occurs during deep sleep
- More common in children

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Stage Four Sleep Disorders

Sexsomnia

- Symptoms can range from loud sexual moaning, masturbation, aggressive groping, and even sexual assault of a partner
- Never waking
- No memory of the assault the next morning

REM Sleep

Stages of Sleep

- Eyes move rapidly under the eyelids
- Body is almost as aroused as in waking state
- Brain waves resemble beta waves
- Associated with dreaming
- REM Rebound - If you are deprived of REM sleep one night, you will experience greatly increased amounts of REM sleep the next night



REM Behaviour DiSorder

- Rare disorder in which the mechanism that blocks the movement of the voluntary muscles fails, allowing the person to thrash around and even get up and act out nightmares
- Usually seen in men over 60, can also be seen in younger men and women

Insomnia

- Sleep Apnea

Insomnia

- Not just the inability to sleep
- Can also mean the inability to stay asleep, or get a good quality of sleep
- Sleeping tips:
 - Go to bed only when you are sleepy
 - Don't watch TV or study in bed
 - Don't try too hard to sleep
 - Don't take sleeping pills or alcohol or anything that will slow down the nervous system



Common Sleep Disorders

- Sleep Apnea
- Narcolepsy
- Restless leg syndrome
- Nocturnal leg cramps
- Hypersomnia
- Circadian rhythm disorders
- Enuresis



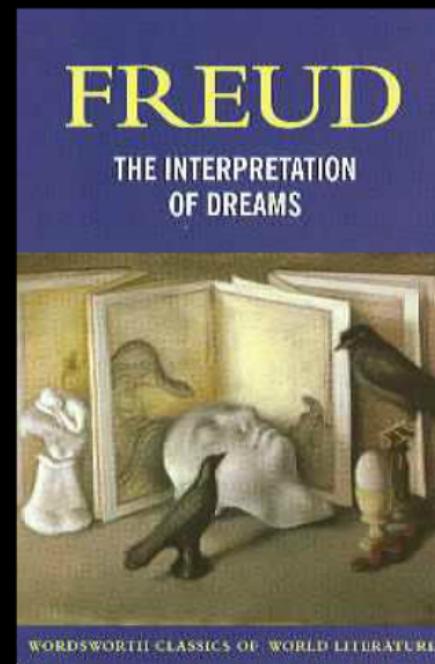
The Einstein Approximation!

http://www.free-tv-video-online.me/internet/the_big_bang_theory/season_3.html



Dreams

- Freud's *The Interpretation of Dreams* (1900) kicked off the real inquiry into the process of dreaming
- He believed that conflicts, events, and desires would be represented in symbolic form in peoples dreams
 - Manifest content - the actual dream itself
 - Latent content - only expressed in symbols



The Activation-Synthesis Hypothesis

- Theory that the higher cortical centres of

The Activation-Synthesis Hypothesis

- Theory that the higher cortical centres of the brain create dreams in response to the random activation of brain stem cells that occurs during REM sleep periods
- A dream is merely another kind of thinking that occurs when people sleep

What do people dream about?

- Most people dream in colour
- Dreams of Americans are more aggressive in content to dreams of people from the Netherlands
- Women dream about people they know, but men and women feature equally, dream about family and home, personal appearance
- Men have more male characters in their dreams, typically outdoor, may involve weapons, tools, cars, roads, and sex with unknown and attractive partners

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Altered States: Hypnosis

- A state of consciousness in which the person is especially susceptible to suggestion
- Key seems to be a heightened state of suggestibility
- 80% of people can be hypnotized
- Only 40% are good hypnotic subjects
- You are still in control when you are hypnotized - you won't commit any illegal acts or do anything indecent



Two Theories of Hypnosis

- Hypnosis as dissociation - the Hidden Observer
 - Hypnosis works only on the immediate conscious mind of a person, while a part of that person's mind (a hidden observer) remained aware of all that was going on
- Social-Cognitive Theory of Hypnosis
 - People are not in an altered state but are merely playing the role expected of them in the situation



Fact or myth.....

- | | |
|--|--|
| <ul style="list-style-type: none">• Can relieve pain (allows you to remove conscious attention to pain)• Can alter sensory perceptions (smell, hearing, vision, taste sense)• Can create amnesia for what happens in the hypnotic session for a brief time | <ul style="list-style-type: none">• Cannot give people superhuman strength• Cannot enhance memory (actually increases risk of false memories)• Cannot regress people back to childhood |
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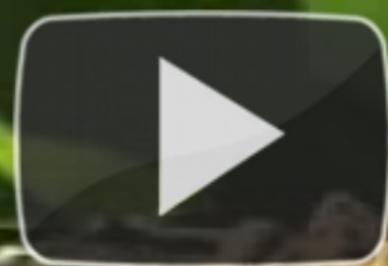
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Altered States – Psychoactive Drugs

- Drugs that alter thinking, perception, and memory
- These types of drugs can be useful but also pose certain risks
 - Physical dependence
 - Psychological dependence
 - Drug overdose



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YouTube

Physical Dependence

- Drug tolerance
 - Larger and larger doses needed to achieve the initial effect of the drug
- Withdrawal
 - In the absence of the drug, physical symptoms that can include:
 - Nausea
 - Pain
 - Tremors/shaking
 - Crankiness/irritability
 - Cramping
 - Dangerously elevated blood pressure

Drug Categories

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Psychological Dependence

- The feeling that the drug is needed to continue a feeling of emotional or psychological well being
- The rewarding properties of the drug cause the dependency to develop
- Positive and negative reinforcement are at work in this situation
- Psychological dependencies last forever

Drug Categories

- The effect of different drugs depends on the category to which it belongs and the neurotransmitter the drug affects
- Major drug categories include:
 - Stimulants
 - Depressants
 - Psychogenic drugs

Stimulants

Amphetamines

- Stimulants that are synthesized (made) in laboratories rather than being found in nature
 - Cause the sympathetic nervous system to go into overdrive
 - When drug wears off, crash is inevitable
 - Doses easily become toxic and deadly
 - Amphetamine psychosis
 - Used to treat narcolepsy, and in diet pills



Cocaine

- Natural drug derived from the leaves of the coca plant
- Produces feelings of euphoria, energy, power, deadens pain, suppresses appetite
- Can cause convulsions or death in first time users



- Severe mood swing into depression after use, followed by fatigue, nervousness, inability to feel pleasure and paranoia

Stimulants

Stimulants

Nicotine

- Relatively mild but toxic stimulant producing a slight 'rush' or sense of arousal as it raises blood pressure and accelerates the heart, as well as providing a rush of sugar into the bloodstream by stimulating the release of adrenalin



Stimulants



Caffeine

- A mild stimulant found in coffee, tea, most soda drinks, chocolate, many over-the-counter drugs and several other plant-based substances
 - Helps maintain alertness
 - Can increase the effectiveness of some pain relievers like aspirin

Depressants

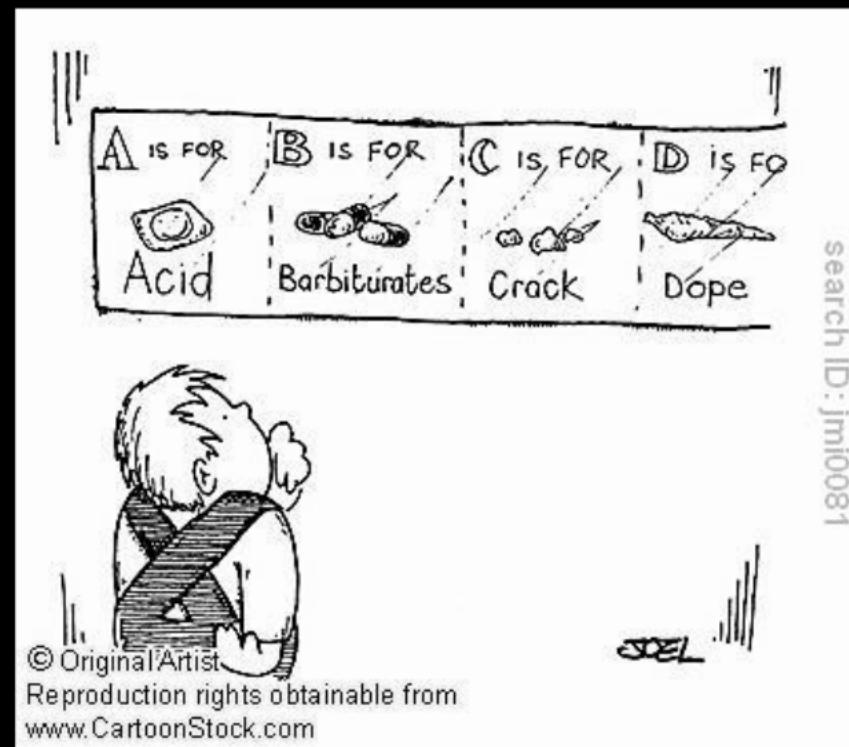
- Drugs that have the effect of slowing down the central nervous system
- Among the most widely used drugs in the world today
- They operate by affecting neurons in the CNS, which leads to symptoms such as drowsiness, relaxation, decreased inhibition, anaesthesia, sleep, coma and even death.
- All depressants have the potential to be addictive

Depressants

Depressants

Barbiturates or Major Tranquilizers

- Drugs that have a sleeping effect
- Mild sedation to sleepiness to unconscious to coma
- Highly addictive
- Withdrawal can cause convulsions
- Drug interaction might cause overdose or death



Depressants

Benzodiazepines or Minor Tranquilizers

- Used to lower anxiety, reduce stress, treat sleep problems, nervousness
- Considered safer than barbiturates
- Common ones include Valium, Xanax, Halcion, Ativan, Librium, and Rohypnol

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Alcohol



- Most commonly used and abused depressant
- Alcohol is a chemical resulting from the fermentation or distillation of various kinds of vegetable matter
- A depressant that gives the illusion of stimulation
- The first thing alcohol depresses are a person's inhibitions
- Leads to poor decision making

Opioids & Psychedelics



hythm
body must go

- Considered safer than alcohol
- Common ones include Halcion, Ativan, Librium

Narcotics

- Class of drugs that suppress the sensation of pain by binding to and stimulating the nervous systems natural receptor sites for endorphins
- All narcotics are a derivative of opium
 - Opium
 - Morphine
 - Heroin



orium, and Rohypnol

- Leads to poor decision making

Hallucinogens & Psychedelics

- Hallucinogens actually stimulate the brain into altering its interpretation of sensations
- Hallucinations, or false sensory perceptions are often experienced
- There are two basic types - natural sources and laboratory created

Manufactured Highs

LSD - Lysergic acid diethylamide

- Consciousness expansion, colours more intense, sounds more beautiful, out of the real world and into a world of the brain's creation
- Experiences can be disturbing 'bad trip'
- Real dangers and hazards may go unnoticed

PCP - Phenyl cyclohexyl piperidine

- Can be hallucinogenic, stimulant, depressant or analgesic
- Can lead to violent acts against others or suicide

MDMA - Ecstasy

- Classified as a stimulatory hallucinogenic
- Causes dehydration which combined with intense physical activity like dancing can be deadly

Non-manufactured Highs

Mescaline - comes from the buttons on the peyote cactus plant

- A part of many Native American religious and spiritual rituals
- Hallucinogenic effects last longer than LSD

Psilocybin - naturally occurring hallucinogen found in a certain type of mushroom

- 'magic mushrooms'
- Neither has been shown to cause physical dependency, but psychological dependency is possible



Marijuana

Mild hallucinogen derived from the leaves and flowers of a particular type of hemp plant



- Best known for it's ability to produce a feeling of well being, mild sensory distortions or hallucinations
- Does not produce physical dependency or physical withdrawal symptoms
- Long term use can produce signs of withdrawal such as irritability, sleep difficulties, increased aggression
- Also has some medical benefits