States of Consciousness

Unit 2:

Standards

- **SSPBF2: The student will compare different states of consciousness.**
  - **A. Describe the sleep cycle and circadian rhythm,**
  - **B. Explain why we sleep and dream.**
  - **C. Investigate the validity of hypnosis as a state of consciousness.**
  - **D. Analyze the physical and psychological issues associated with addiction.**
  - **E. Explain how the major drug classes (stimulants, depressants, and hallucinogens) affect neurotransmission and behaviors.**

Essential Questions

- What are the 3 levels of consciousness and what are altered states of consciousness?
- What are Circadian Rhythms and how do they impact sleep cycles? (SSPBF2a)

Levels of Consciousness

- Consciousness: organism's awareness of, or possibility of knowing, what is going on inside or outside itself.
- Subconscious: Consciousness just below our present awareness. Ex. A vague feeling at a party that people are acting strangely towards you.
- Unconscious: Thoughts, information, or desires that we have no true or direct knowledge of. Possibly provides us with intuition. Ex. Doing something and then having no explanation for it.

Waking Consciousness

A. Our awareness of ourselves and our environments

B. Occurs in varies states

1. Normal- seeing, hearing, reasoning, remembering, daydreams, fantasies.
2. Altered States- sleep, hypnotic, chemically induced hallucinations, near death experiences

Waking Consciousness

C. Levels of Processing

1. Process information in and outside our awareness/ Conscious v. Subconscious
2. Meet someone- subconsciously react to gender, race, appearance
3. Some things require conscious effort: Ex. Driving
4. Cannot do some things b/c both require conscious effort
    1. Volunteer?

Daydreams and Fantasies

- People daydream and fantasize to escape their normal life.
  - Young people daydream more
  - It isn't always escapism it can also involve details of life
    - Imagine self doing an approaching task
    - Replay personal encounter
- Purposes:
  - Help us to prepare for future events/ mental rehearsals
  - Enhance creativity
  - Substitute for impulse behavior

Biological (Circadian) Rhythms

Biological rhythms are controlled by internal "biological clocks."

1. Annual cycles: On an annual cycle, geese migrate, grizzly bears hibernate, and humans experience seasonal variations in appetite, sleep, and mood. *Seasonal Affective Disorder (SAD)* is a mood disorder people experience during dark winter months.

Biological Rhythms

2. 28-day cycles: The female menstrual cycle averages 28 days. Research shows menstruation may not affect moods.

3. 24-hour cycles: Humans experience 24-hour cycles of varying alertness (sleep), body temperature, and growth hormone secretion.

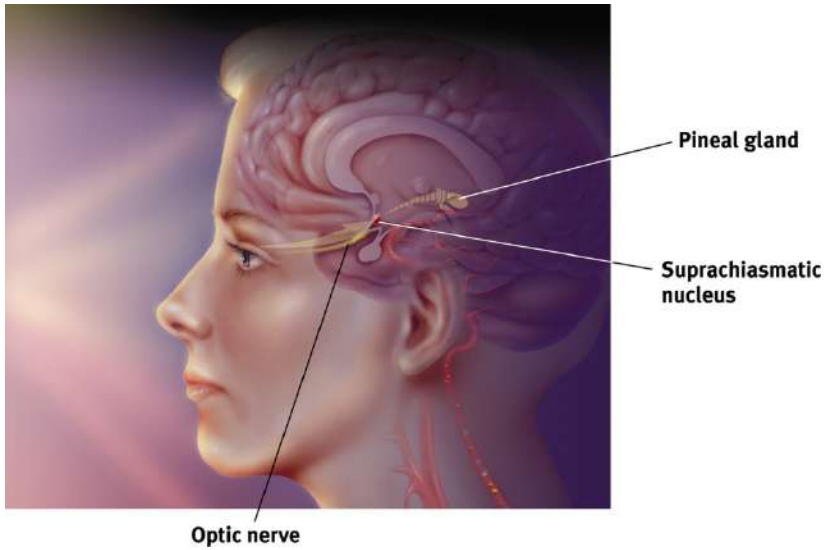
4. 90-minute cycles: We go through various stages of sleep in 90-minute cycles.

Activity: What's you Rhythm?

- Using computer paper: Draw three separate time lines to represent daily, monthly, and yearly changes that you have noticed. Lines can be wavy to represent up and down. Ex. energy, moodiness, etc.

Rhythm of Sleep

Circadian Rhythms occur on a 24-hour cycle and include sleep and wakefulness, which are disrupted during transcontinental flights.



Normal Interruptions

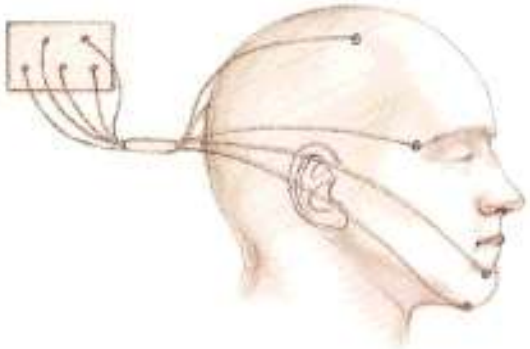
- Jet Lag- Circadian rhythm out of sync: irritability, fatigue, fuzzy thinking and memory
- Night Shifts- out of sync with environment
- Mid-Morning Brain Fog- Weekend- reset biological clock and melatonin cycle.

Essential Question

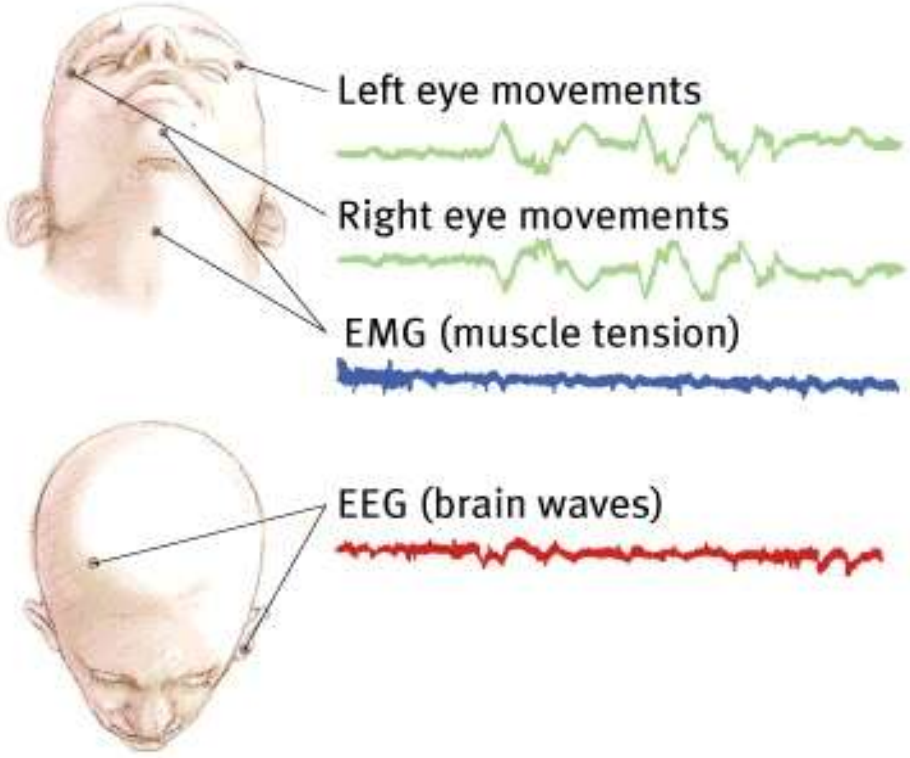
- What are the stages of sleep (REM & NREM) and why do humans require sleep and what happens to the brain during each stage? (SSPBF2b)
- What is sleep deprivation and what are the risks associated with it? (SSPBF2b)
- What are the four sleep theories and five sleep disorders? (explain each) (SSPBF2b)
- Why do humans dream? (explain each dream theory) (SSPBF2b)

Sleep Stages

Measuring sleep: About every 90 minutes, we pass through a cycle of five distinct sleep stages.



Hank Morgan/ Rainbow



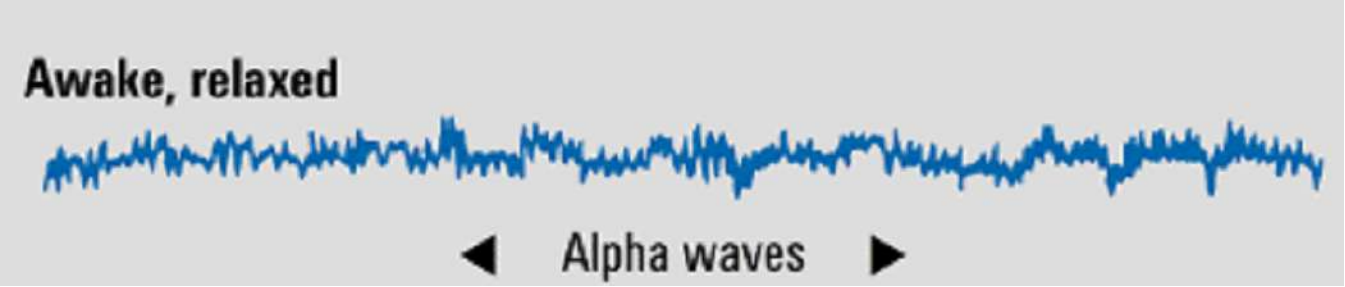
Awake & Alert

During strong mental engagement, the brain exhibits low amplitude and fast, irregular beta waves (15-30 cps). An awake person involved in a conversation shows beta activity.

Beta Waves

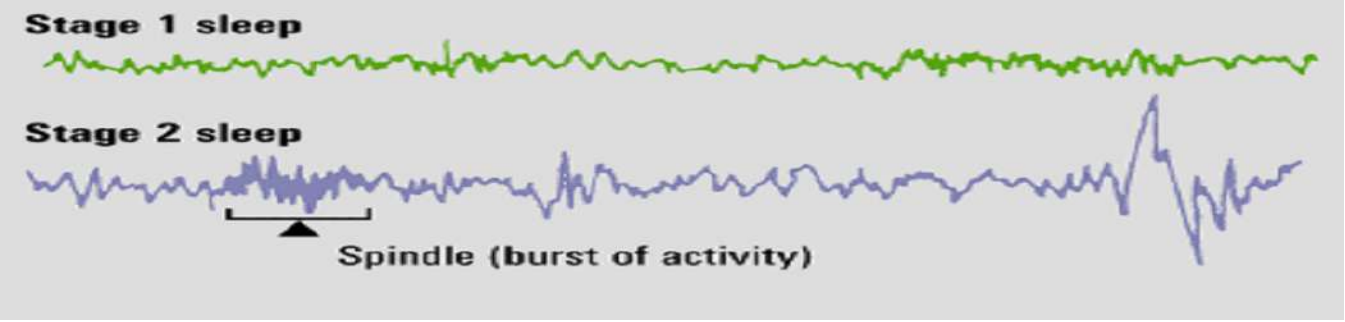
Awake but Relaxed: Stage 1 sleep

When an individual closes his eyes but remains awake, his brain activity slows down to a large amplitude and slow, regular alpha waves (9-14 cps). A meditating person exhibits an alpha brain activity. May experience hypnagogic sensations: falling or floating weightlessly. Lasts about 2 minutes. Breathing rate slows and brain rate slower and irregular



Sleep Stage 2

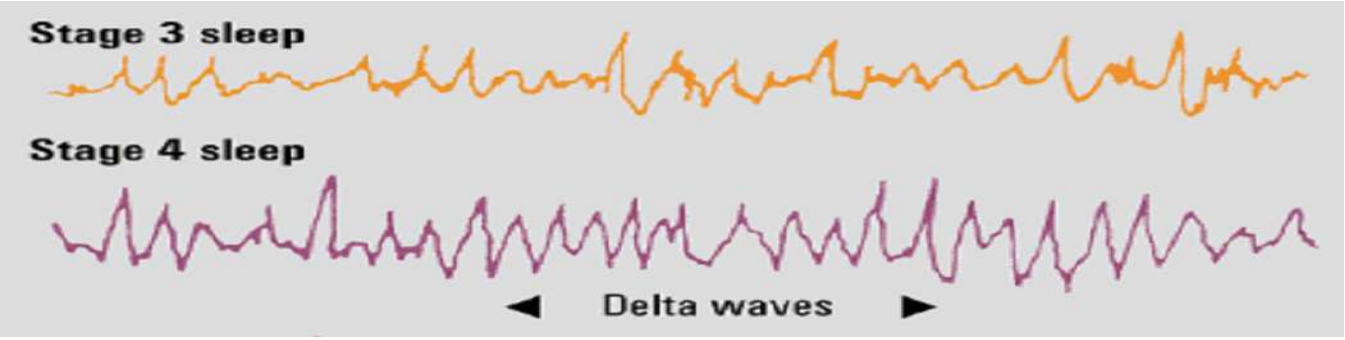
Stage 2- 20 minutes. Bursts of Rapid Rhythm. Can be awakened easily. Sleep talking can begin.



◄ Theta Waves ►

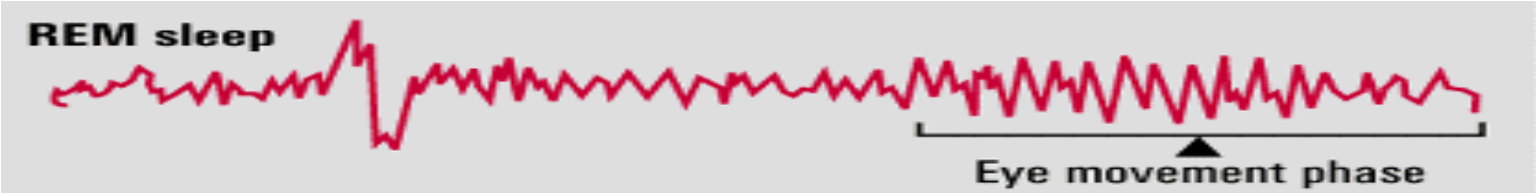
Sleep Stages 3-4

Stage 3- Transitional stage to deep sleep 5-10 min. Delta waves begin and increase into stage 4
Stage 4- 30 minutes- hard to wake. Breathing and pulse at lowest. Muscles relaxed. Sleep walking and wetting bed. Deepest sleep
Stages 1-4 referred to NREM or non rapid eye movement



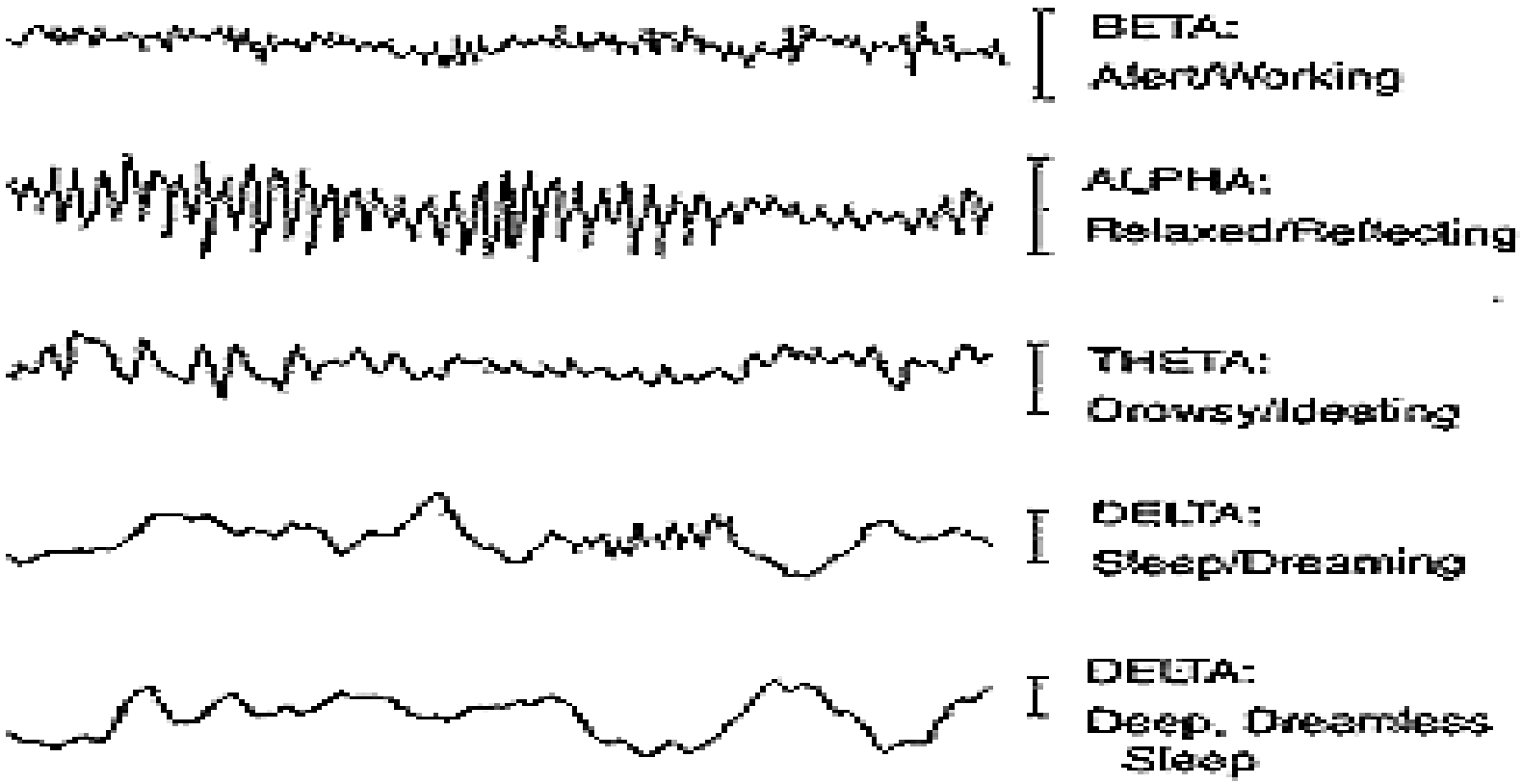
Stage 5: REM Sleep

After 1 hour- stage 5. Brain waves like those nearly awake. (alpha) Heart rate rises and breathing becomes more rapid and regular. Every ½ minute eyes dart around.



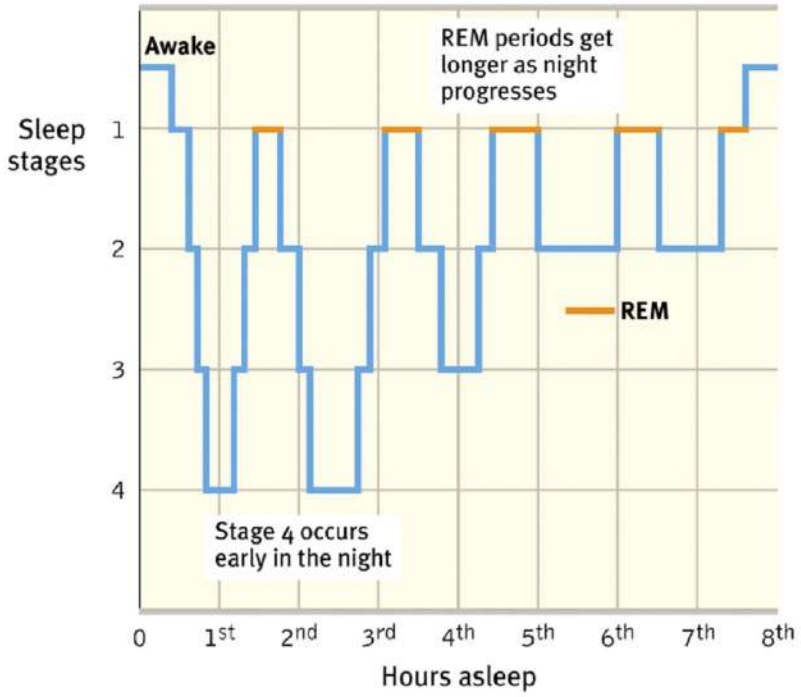
A person during this sleep exhibits
Rapid Eye Movements (REM) announces a dream
and reports vivid dreams (paradoxical sleep: body internally aroused externally calm).

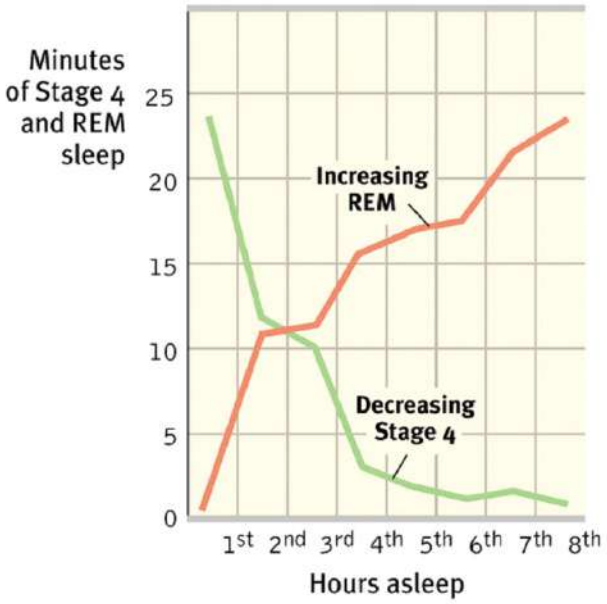
Brain Waves


BETA:
Alert/Working
ALPHA:
Relaxed/Reflecting
THETA:
Drowsy/Ideating
DELTA:
Sleep/Dreaming
DELTA:
Deep, Dreamless
Sleep

90-Minute Cycles During Sleep

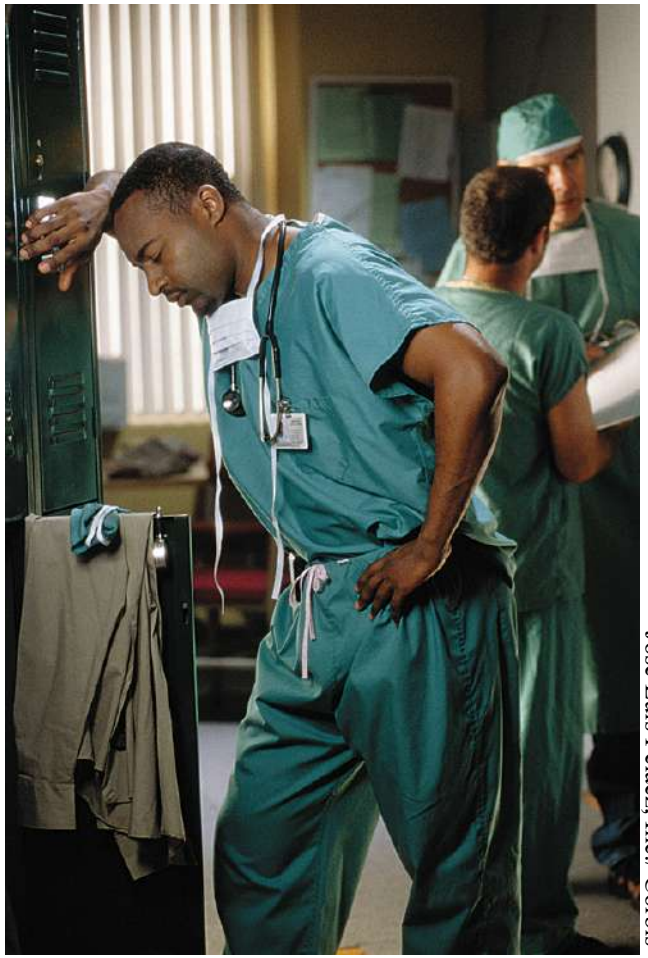
With each 90-minute cycle, stage 4 sleep decreases and the duration of REM sleep increases.





Why do we sleep?

We spend one-third of our lives sleeping.
If an individual remains awake for several days, they deteriorate in terms of immune function, concentration, and accidents.



Jose Luis Pelaez, Inc./Corbis

Sleep Deprivation

Fatigue and subsequent death.

Impaired concentration and creativity.

Emotional irritability.

Depressed immune system.

Greater vulnerability.

Sleep Theories

Sleep Protects: Sleeping in the darkness when predators loomed about kept our ancestors out of harm's way.

Sleep Recuperates: Sleep helps restore and repair brain tissue.

Sleep Helps Remembering: Sleep restores and rebuilds our fading memories.

Sleep and Growth: During sleep, the pituitary gland releases growth hormone. Older people release less of this hormone and sleep less.

Sleep Disorders: Insomnia

1. Somnambulism: Sleepwalking.

2. Nightmares: Frightening dreams that wake a sleeper from REM.

3. Night terrors: Sudden arousal from sleep with intense fear accompanied by physiological reactions (e.g., rapid heart rate, perspiration).

Sleep Disorders: Insomnia

4. Narcolepsy: Overpowering urge to fall asleep that may occur while talking or standing up.

5. Sleep apnea: Failure to breathe when asleep.

Dream Facts

- One-third of your life is spent sleeping.
- In an average lifetime, you would have spent a total of about six years of it dreaming. That is more than 2,100 days spent in a different realm!
- Dreams have been here as long as mankind. Back in the Roman Era, profound and significant dreams were submitted to the Senate for analysis and interpretation.
- Most healthy people have dreams. Some people don't believe they dream at night when in fact they just don't remember.
- Dreams are indispensable. A lack of dream activity may imply some protein deficiency or a personality disorder.
- On average, you can dream anywhere from one to two hours every night. Moreover, you can have four to seven dreams in one night.
- Five minutes after the end of the dream, half the content is forgotten. After ten minutes, 90% is lost.

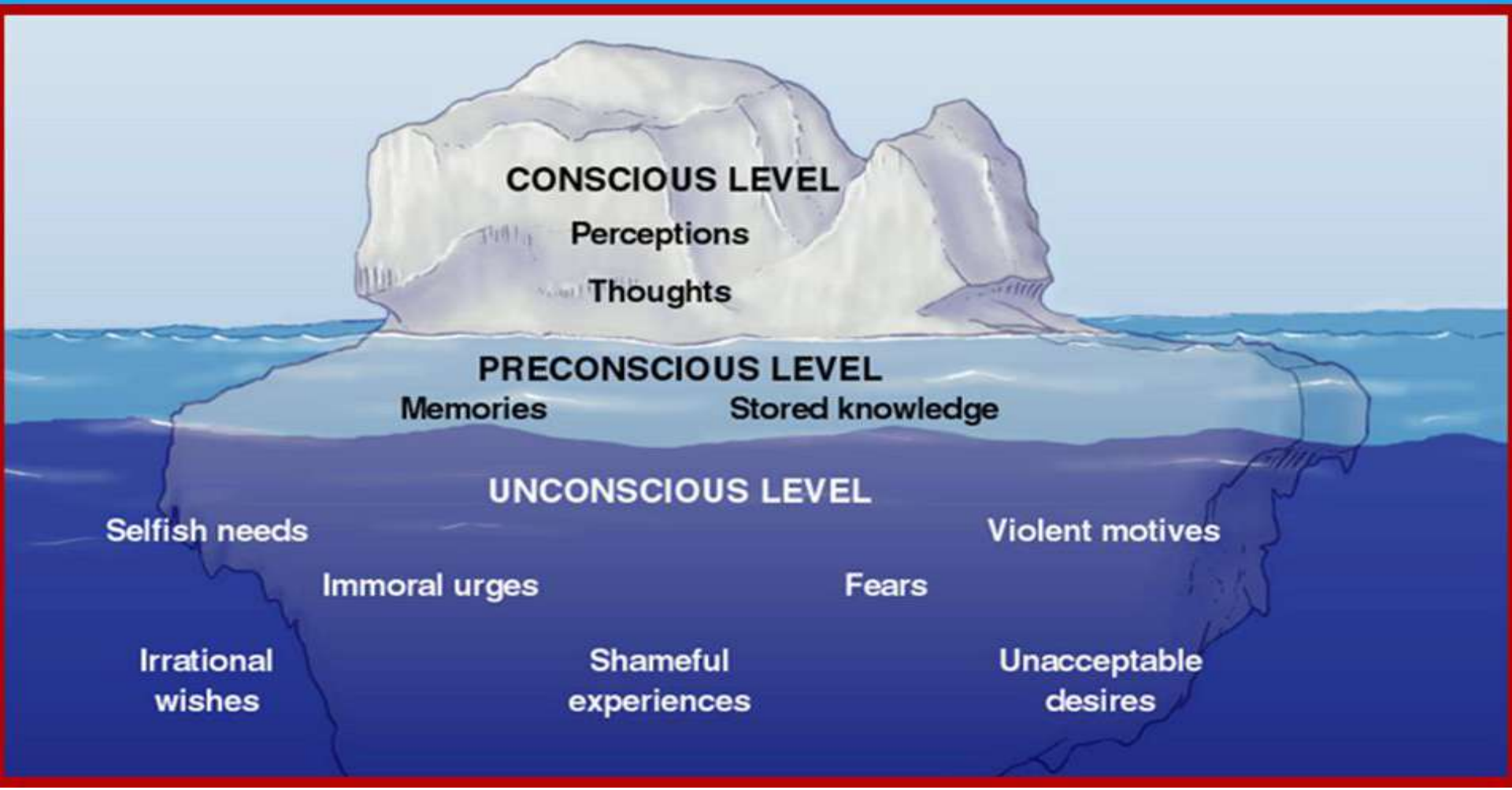
What do we Dream?

1. Negative Emotional Content: 8 out of 10 dreams have negative emotional content.
2. Failure Dreams: People commonly dream about failure, being attacked, pursued, rejected, or struck with misfortune.
3. Sexual Dreams: Contrary to our thinking, sexual dreams are sparse. Sexual dreams in men are 1 in 10; and in women 1 in 30.
4. Dreams of Gender: Women dream of men and women equally. Men dream more about women than men.

Why do we dream?

1. Wish Fulfillment: Sigmund Freud suggested that dreams provide a psychic safety valve to discharge unacceptable feelings. The dream's manifest (apparent) content may also have symbolic meanings (latent content) that signify our unacceptable feelings.
2. Information Processing: Dreams may help sift, sort, and fix a day's experiences in our memories.

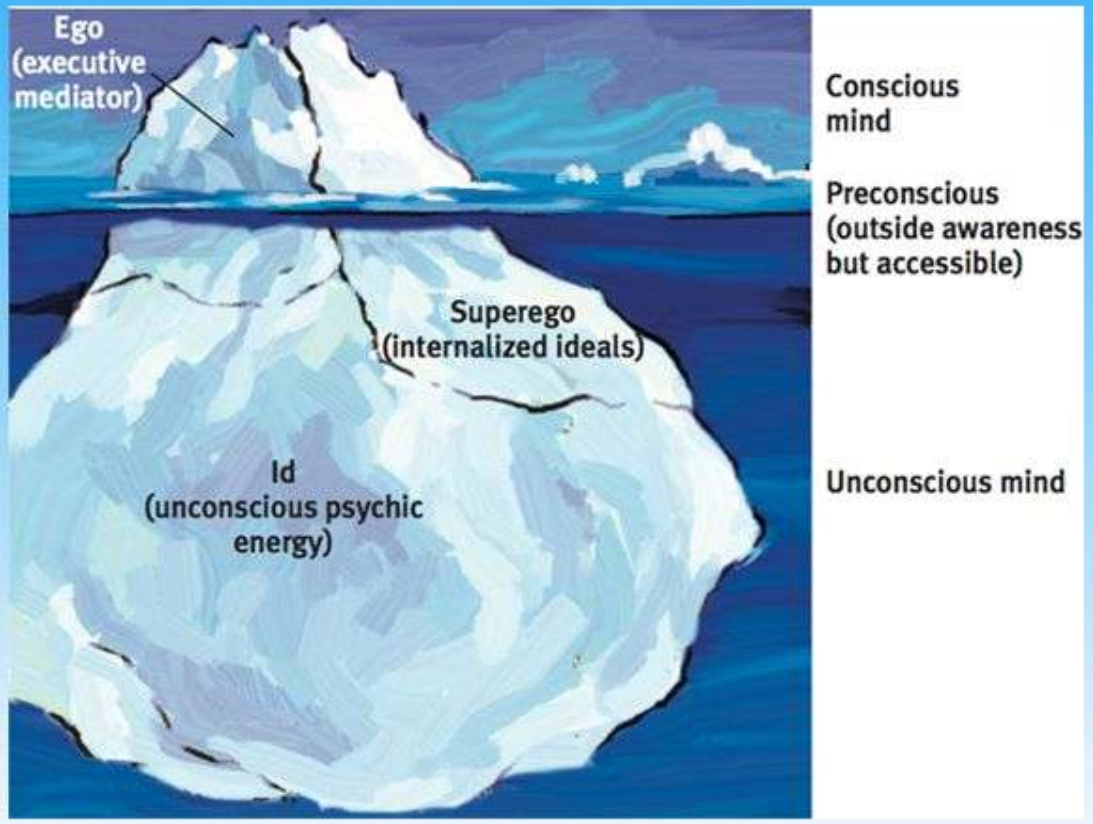
Freud's "iceberg" of personality:

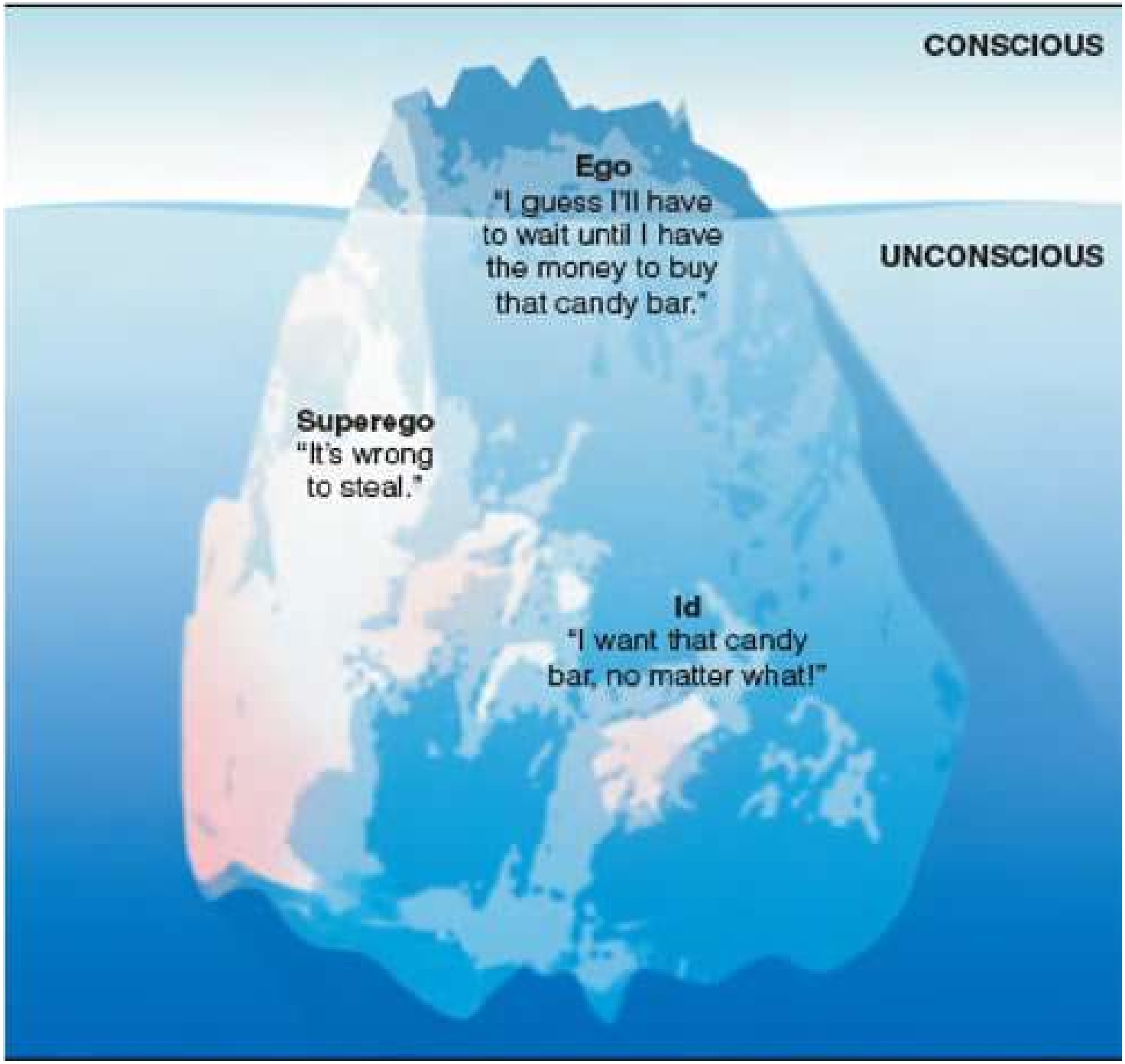


Psychoanalytic Theory's Core Ideas

Personality Structure

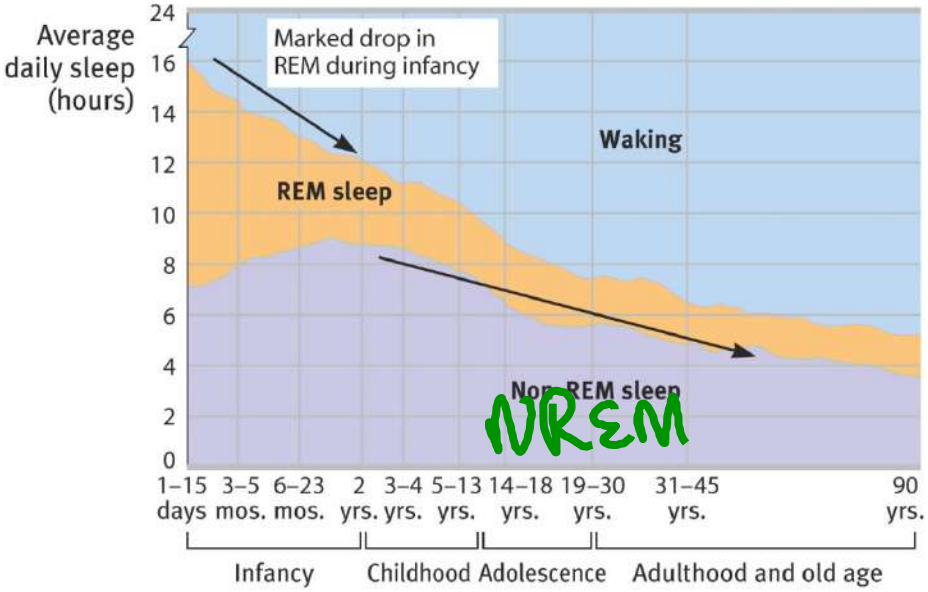
- Personality structure
  - Id
    - **Pleasure principle**
  - Ego
    - **Reality principle**
  - Superego
    - **conscience**




CONSCIOUS
Ego
"I guess I'll have to wait until I have the money to buy that candy bar."
UNCONSCIOUS
Superego
"It's wrong to steal."
Id
"I want that candy bar, no matter what!"

Why do we dream?

3. Physiological Function: Dreams provide the sleeping brain with periodic stimulation to develop and preserve neural pathways. Neural networks of newborns are quickly developing; therefore, they need more sleep.



Why do we dream?

4. Activation-Synthesis Theory: Suggests that the brain engages in a lot of random neural activity. Dreams make sense of this activity.
5. Cognitive Development: Some researchers argue that we dream as a part of brain maturation and cognitive development.

All dream researchers believe we need REM sleep. When deprived of REM sleep and then allowed to sleep, we show increased REM sleep called REM Rebound.

Dream Theories

DREAM THEORIES

Theory	Explanation	Critical Considerations
Freud's wish-fulfillment	Dreams provide a "psychic safety valve"—expressing otherwise unacceptable feelings; contain manifest (remembered) content and a deeper layer of latent content—a hidden meaning.	Lacks any scientific support; dreams may be interpreted in many different ways.
Information-processing	Dreams help us sort out the day's events and consolidate our memories.	But why do we sometimes dream about things we have not experienced?
Physiological function	Regular brain stimulation from REM sleep may help develop and preserve neural pathways.	This may be true, but it does not explain why we experience *meaningful* dreams.
Activation-synthesis	REM sleep triggers impulses that evoke random visual memories, which our sleeping brain weaves into stories.	The individual's brain is weaving the stories, which still tells us something about the dreamer.
Cognitive theory	Dream content reflects dreamers' cognitive development—their knowledge and understanding.	Does not address the neuroscience of dreams.

Essential Question

- What is the validity of hypnosis as a state of consciousness? (SSPBF2c)

Hypnosis

A social interaction in which one person (the hypnotist) suggests to another (the subject) that certain perceptions, feelings, thoughts, or behaviors will spontaneously occur.

http://iddiokrysto.blog.excite.it

Hypnos: Greek god of sleep

Aspects of Hypnosis

1. Posthypnotic Suggestion: Suggestion carried out after the subject is no longer hypnotized.

2. Posthypnotic Amnesia: Supposed inability to recall what one experienced during hypnosis.

Facts and Falsehood

Those who practice hypnosis agree that its power resides in the subject's openness to suggestion.

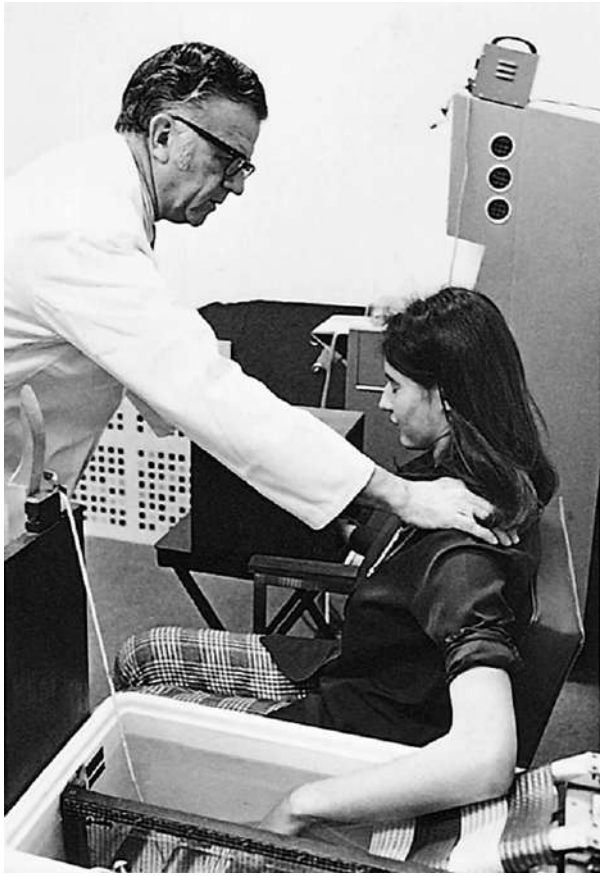
Can anyone experience hypnosis?	Yes, to some extent.
Can hypnosis enhance recall of forgotten events?	No.

Facts and Falsehood

Can hypnosis force people to act against their will?	No.
Can hypnosis be therapeutic?	Yes. Self-suggestion can heal too.
Can hypnosis alleviate pain?	Yes. Ex. Lamaze

Is Hypnosis an Altered State of Consciousness?

1. Social Influence Theory: Hypnotic subjects may simply be imaginative actors playing a social role.
2. Divided Consciousness Theory: Hypnosis is a special state of dissociated (divided) consciousness (Hilgard, 1986, 1992).



Courtesy of News and Publications Service, Stanford University

(Hilgard, 1992)

Both Theories

Attention is diverted from an aversive odor. How?

Divided-consciousness theory:

hypnosis has caused a split in awareness

Mimi Forsyth

Social influence theory:

the subject is so caught up in the hypnotized role that she ignores the odor

Essential Questions

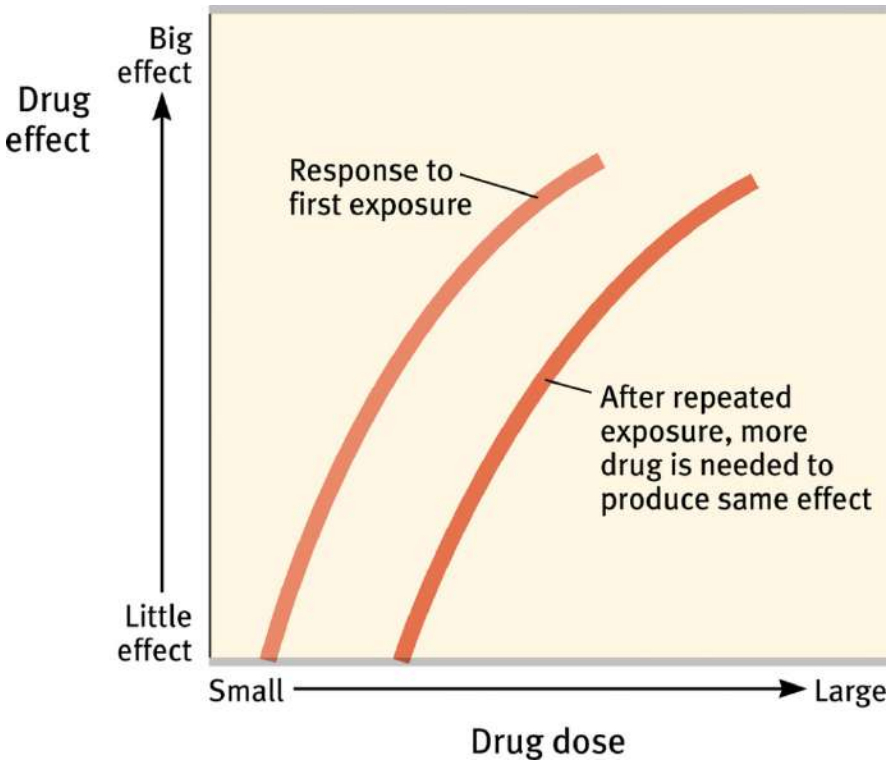
- **What are the physical and psychological issues associated with addiction? (SSPBF2d)**
- **How does the major drug classes (stimulants, depressants, and hallucinogens) affect neurotransmission and behaviors? (SSPBF2e)**

Drugs and Consciousness

Psychoactive Drug: A chemical substance that alters perceptions and mood (effects consciousness).

Dependence & Addiction

Continued use of a psychoactive drug produces tolerance. With repeated exposure to a drug, the drug's effect lessens. Thus it takes greater quantities to get the desired effect.



Withdrawal & Dependence

1. Withdrawal: Upon stopping use of a drug (after addiction), users may experience the undesirable effects of withdrawal.

2. Dependence: Absence of a drug may lead to a feeling of physical pain, intense cravings (physical dependence), and negative emotions (psychological dependence).

Misconceptions about Addiction

Addiction is a craving for a chemical substance, despite its adverse consequences (physical & psychological).

1. Addictive drugs quickly corrupt.

2. Addiction cannot be overcome voluntarily.

3. Addiction is no different than repetitive pleasure-seeking behaviors.

Psychoactive Drugs

Psychoactive drugs are divided into three groups.

Depressants
Stimulants
Hallucinogens

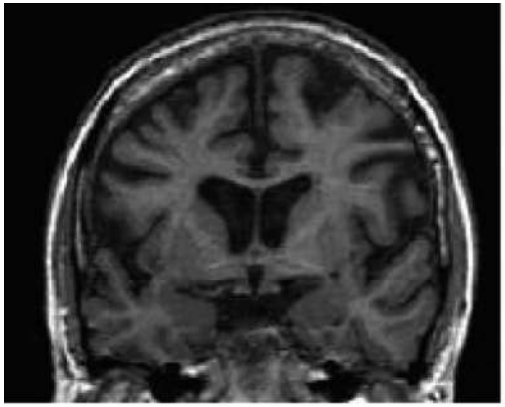
Depressants

Depressants are drugs that reduce neural activity and slow body functions. They include:

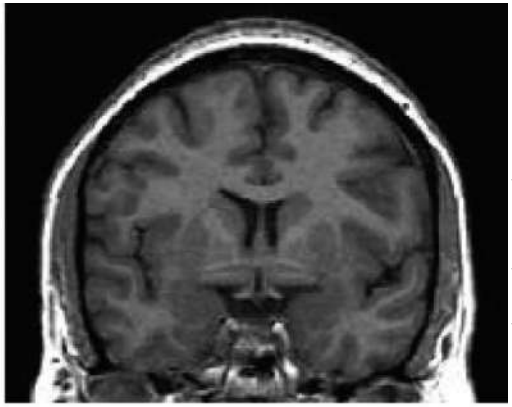
Alcohol
Barbiturates
Opiates

Alcohol

1. Alcohol affects motor skills, judgment, and memory…and increases aggressiveness while reducing self awareness.



Scan of woman with alcoholism



Scan of woman without alcoholism

Daniel Hommer, NIAAA, NIH, HHS

Ray Ng/ Time & Life Pictures/ Getty Images

Drinking and Driving

Barbiturates

2.Barbiturates: Drugs that depress the activity of the central nervous system, reducing anxiety but impairing memory and judgment. Nembutal, Seconal, and Amytal are some examples.

Depressants

3. Opiates: Opium and its derivatives (morphine, fentanyl, oxycodone, codeine, and heroin) depress neural activity, temporarily lessening pain and anxiety. They are highly addictive.

http://opioids.com/timeline

Stimulants

Stimulants are drugs that excite neural activity and speed up body functions.

Caffeine
Nicotine
Cocaine
Ecstasy
Amphetamines
Methamphetamines

Caffeine & Nicotine

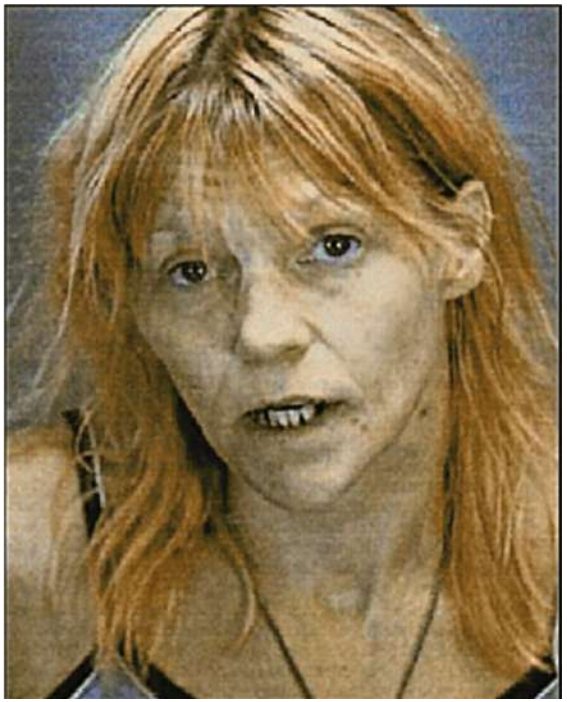
Caffeine and nicotine increase heart and breathing rates and other autonomic functions to provide energy.

http://www.tech-res-intl.com

http://office.microsoft.com/clipart

Amphetamines

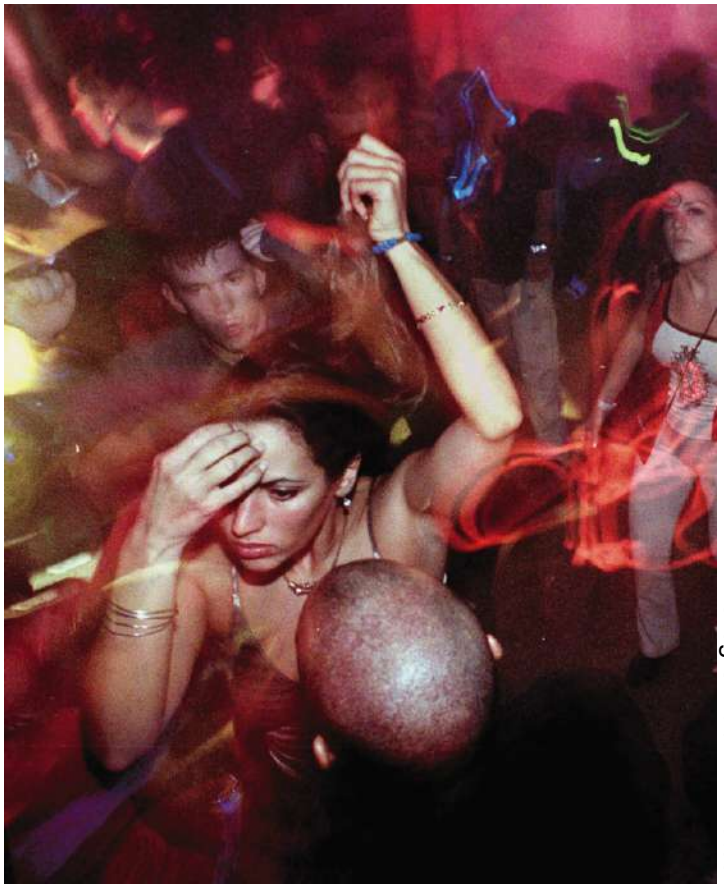
Amphetamines stimulate neural activity, causing accelerated body functions and associated energy and mood changes, with devastating effects.



National Pictures/ Topham/ The Image Works

Ecstasy

Ecstasy or (MDMA) is a stimulant and mild hallucinogen. It produces a euphoric high and can damage serotonin-producing neurons, which results in a permanent deflation of mood and impairment of memory.

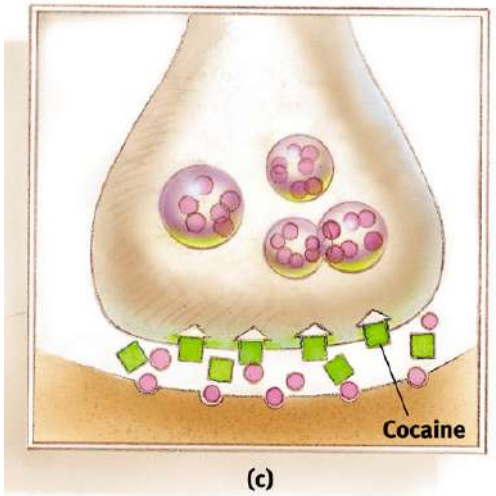


Greg Smith/ AP Photos

Cocaine

Cocaine induces immediate euphoria followed by a crash. Crack, a form of cocaine, can be smoked. Other forms of cocaine can be sniffed or injected.

http://www.ohsinc.com

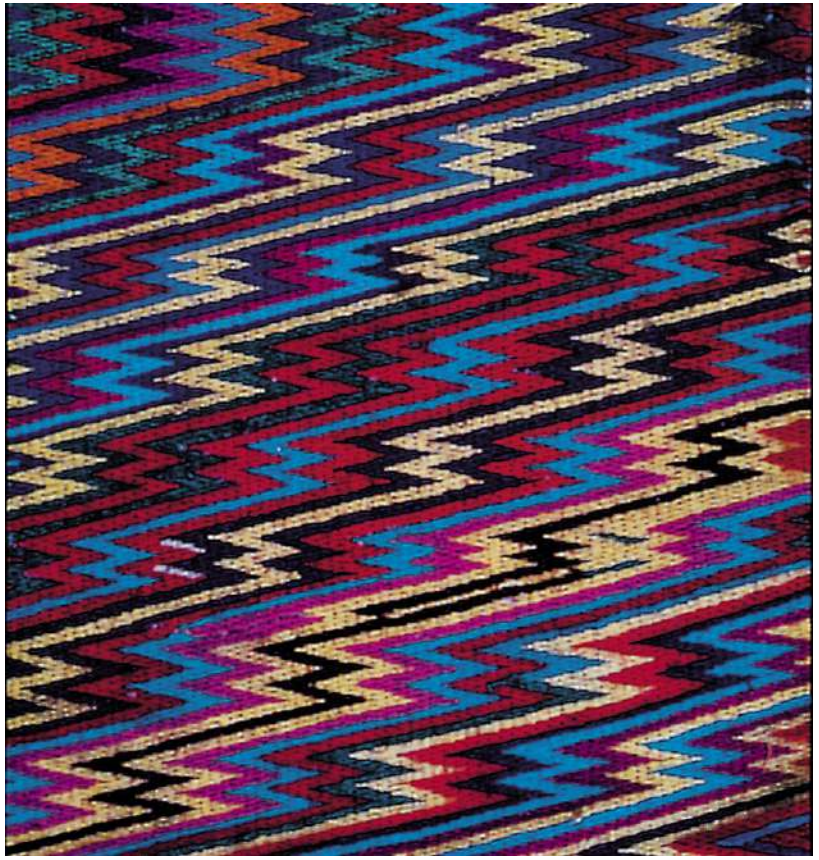


(c)

By binding to the sites that normally reabsorb neurotransmitter molecules, cocaine blocks reuptake of dopamine, norepinephrine, and serotonin (Ray & Ksir, 1990). The extra neurotransmitter molecules therefore remain in the synapse, intensifying their normal mood-altering effects and producing a euphoric rush. When the cocaine level drops, the absence of these neurotransmitters produces a crash.

Hallucinogens

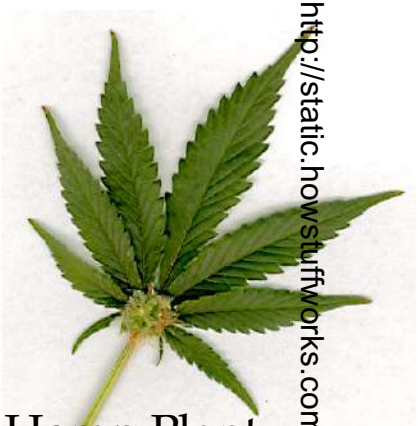
Hallucinogens are psychedelic (mind-manifesting) drugs that distort perceptions and evoke sensory images in the absence of sensory input.



Ronald K. Siegel

Hallucinogens

1. LSD: (lysergic acid diethylamide) powerful hallucinogenic drug (ergot fungus) that is also known as *acid*.
2. THC (delta-9-tetrahydrocannabinol): is the major active ingredient in marijuana (hemp plant) that triggers a variety of effects, including mild hallucinations.



Hemp Plant

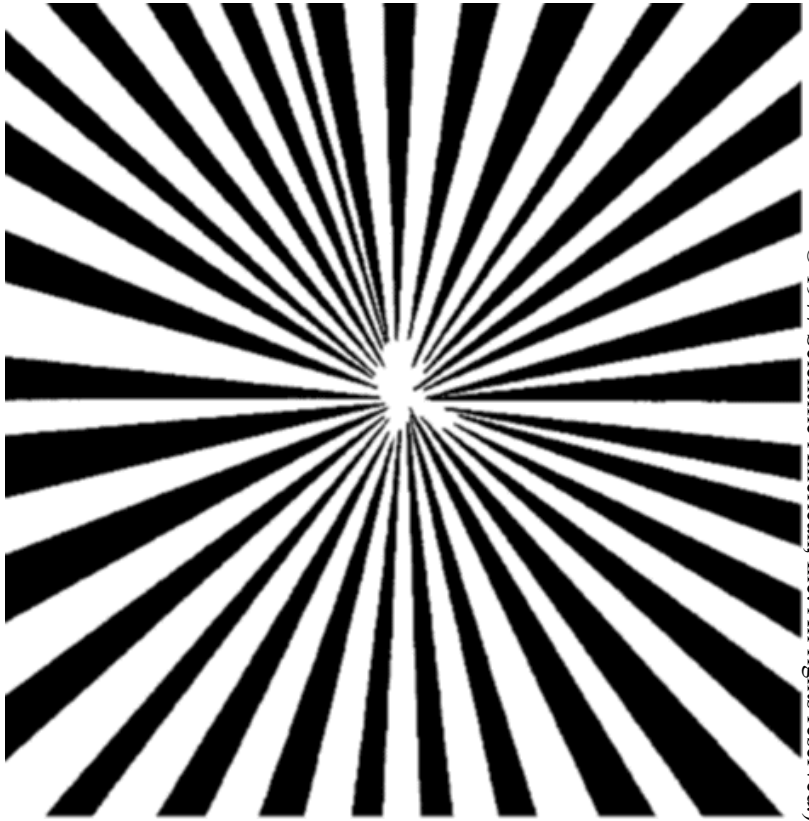
Drugs

A GUIDE TO SELECTED PSYCHOACTIVE DRUGS

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, and insomnia in high doses; uncomfortable withdrawal
Methamphet-amine ("speed," "ice")	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 (from tars)
Ecstasy (MDMA)	Stimulant; mild hallucinogen	Emotional elevation, disinhibition	Dehydration, overheating, and depressed mood, cognitive, and immune functioning
Marijuana	Mild hallucinogen	Enhanced sensation, relief of pain, distortion of time, relaxation	Impaired learning and memory, increased risk of psychological disorders, lung damage from smoke

Near-Death Experiences

After a close brush with death, many people report an experience of moving through a dark tunnel with a light at the end. Under the influence of hallucinogens, others report bright lights at the center of their field of vision.



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Mind-Body Problem

Near-death experiences raise the mind-body issue. Can the mind survive the dying body?

1. Dualism: Dualists believe that mind (non-physical) and body (physical) are two distinct entities that interact.

2. Monism: Monists believe that mind and body are different aspects of the same thing.