I. What Is Consciousness?

Definition

- Awareness of things inside you and outside you

Freud’s Three Levels of Consciousness

Sigmund Freud compared consciousness to...

...an iceberg

\[ ? \]

- UNACCEPTABLE DESIRES
- IRRATIONAL WISHES
- CONSCIOUS
- PRECONSCIOUS
- UNCONSCIOUS

CONSCIOUS

Memories

PRECONSCIOUS

Unconscious

Store knowledge

WHAT YOU ARE AWARE OF RIGHT NOW

- UNACCEPTABLE DESIRES
- IRRATIONAL WISHES
- CONSCIOUS
- PRECONSCIOUS
- UNCONSCIOUS

Unconscious

Shameful experiences

Freud’s Three Levels of Consciousness

Definition

- a state of awareness that is not regular, waking consciousness

- examples?

- HYPNOSIS
- DREAMS
- DRUGS/ALCOHOL

Teens and Sleep

- 73% of high schoolers need at least 8 hrs sleep to feel best
- Average 12th grader – 6.9 hours
- Average 11th grader – 7.0 hours

% Get Less Sleep Than Needed on School Nights

- 53%
- 68%
- 63%
- 72%
II. Sleep

- **Circadian Rhythms**
  - Biological rhythms that change over a 24-hour period
  - Sleep-wake cycle
  - Also blood pressure, body temp
  - Light helps regulate...

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**Suprachiasmatic Nucleus**

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Sleep Deprivation

- Record is just under 11 days
- **Sleep debt** = lost sleep must be “paid back”
- Similar to effects of alcohol on driving

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**Why Do We Sleep?**

- REM sleep important for memory
  - 15% better on day’s learning
  - REM rebound
- Restorative
- Fight infection
- Deal with stress

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**Studying Sleep**

- **EEG** (electroencephalogram)
  - Measures electrical activity in brain (brain waves)

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**Types of EEGs**

These differ in **frequency**:

These differ in **amplitude**:

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**Sleep Stage EEGs**

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**Sleep Stages**

- **Stage 1**
  - Theta waves
  - Lightest stage, easily woken up
  - Myoclonic jerks
  - Sensation of falling
- **Stage 2**
  - Deeper than 1

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**Sleep Stages**

- **Stages 3 & 4**
  - Delta waves
  - “Deep sleep”
  - Difficult to wake person
  - Often disoriented if wake up
  - Sleepwalking, talking
- Stages 1-4 = **NREM**
Sleep Stages

**REM Sleep**
- “rapid eye movement”
- Vivid dreams
- Irregular breathing, heart rate
- Difficult to awaken from
- Body “paralyzed”
  - Sleep paralysis

Sleep Cycles in a Typical Night

Typical Nightly Sleep Stages

Development of Sleep Cycles

- before birth
- Newborns spend about 50% of sleep in REM

Development of Sleep Cycles

- From age 1 to age 10, REM decreases greatly (≈ 25% of sleep)

Sleep and Animals

- Animals who are preyed on sleep less
- Animals with big brains for their body size need a significantly higher % REM

Sleep Disturbances

**1. Insomnia**
- Problems falling or staying asleep for at least 1 month
- Up to 1 in 10 people
- Treatments
  - regular routine
  - avoid worrying in bed
  - relaxation training

**2. Narcolepsy**
- Uncontrollable REM sleep
- 1 in 2,000 people
- Can be triggered by emotions
- Partly genetic
- Effective drug treatment

**3. Sleep Apnea**
- Airflow stops at least 15 sec
- Loud snoring
- Life threatening
- CPAP machine

Sleep Disturbances
Sleep Disturbances

4. Sleepwalking
- Stage 4 sleep
  - Motor areas of brain active
  - Cognitive areas, little activity
- No memory of episode
- Runs in families
- NOT dangerous to wake sleepwalkers

5. Night Terrors
- Stages 3 & 4
- Person wakes up in state of terror, often screaming
- Usually doesn’t remember it

Most Common Dreams Around World

1. Being chased or attacked
2. Falling or drowning
3. Being lost or trapped
4. Being naked or inappropriately dressed in public
5. Being accidentally injured, ill or dying

Early Ideas About Dreams

A. What Is a Dream?
- State of consciousness that occurs during sleep
- Can occur during NREM sleep, usually less bizarre
- We dream in “real time”
### Dreams and Dreaming

#### B. The Content of Dreams
- Mostly visual, most in color
- Events/people in person's life
- Things in environment can enter dreams
- Negative emotions more common
- Most people report recurring dreams

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### The Content of Dreams
- What is your brain doing?
  - **Visual & emotional** areas very active
  - **Prefrontal cortex** very inactive
- **Lucid dreaming**
  - aware of dream as it happens

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### Dream Theories
- Psychoanalytic (Freud)
- Biological
- Cognitive

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#### Dream Theories 1: Freud

1. **Psychodynamic**
   - *Sigmund Freud*
   - 1900 - *The Interpretation of Dreams*
   - Major ideas
     - wish fulfillment
     - symbolism

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#### Two levels:
- **Manifest content**
  - "Story" of dream
  - Day's events
- **Latent content**
  - Hidden meaning
  - Dreamwork...

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#### Kinds of dreamwork:
- **Condensation**
  - Two or more elements combined into one
- **Displacement**
  - One element stands for another

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#### Interpreting Dreams
- Goal
  - uncover latent content by exploring manifest content
  - How?
    - explore associations to dream elements
    - But...
    - Can interpretation be proven?

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#### 1. Psychodynamic Views
- Carl Jung (1875-1961)
- 3 purposes of dreams
  1. Make sense of day's activities
  2. Express unconscious urges
  3. Predict future
- Collective unconscious
**Dream Theories 2: Biological**

- **Activation-synthesis Theory**
  - Sleep-wake cycle causes brain stem activity, which activates various brain centers.
  - Higher brain synthesizes (combines) the activity into a “story.”

**Problem Solving**
- Dreams reflect what concerns us in waking life: relationships, work, health

**Mental Housekeeping**
- Brain processes what was stored in memory during day

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**Controlling Consciousness**

A. **Meditation**
- Techniques to produce state of consciousness characterized by a sense of detachment
- Leads to relaxation
- Helps manage heart disease

B. **Biofeedback**
- Process of gaining awareness of systems people are not normally aware of (e.g., heart rate) by using instruments that provide “feedback:
  - Greatest success is in treating chronic headaches (e.g., migraines)
  - Many benefits are related to relaxation

C. **Hypnosis**
- A procedure in which one person suggests to another that certain changes to perceptions, thoughts, or behaviors will occur

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**Hypnosis**
- Dates to the late 1700s
  - Franz Mesmer
  - “mesmerism”
Hypnosis

- 1842, used in England for **anesthesia** during surgery
- Late 1800s, used for treatment of **mental illness**

Factors in hypnosis

- Depends more on how **hypnotizable** person is than hypnotist's skill
  - Good hypnotic participants have:
    - Good visual imagery abilities
    - High concentration
    - Can become "absorbed" in activities
    - Practice
    - Suggestibility

Hypnosis

Can affect:
1. Perception
2. How we think
3. Behavior

Hypnosis Effects

**Perception**
- Pain control
  - Used by dentists
  - Hypnobirthing

**Thinking**
- Not good at recovering memories
- Can produce false memories
- Hypnotized people more confident about memories, even if not true!

Hypnosis Effects

**Behavior**
- Post-hypnotic suggestions
  - Suggestion by hypnotist to do something when hypnosis is over

Hypnosis Effects

- **Uses of hypnosis**
  - Aids relaxation
  - Helps control pain
  - Helps people cope with stress and anxiety

Hypnosis

**Divided Consciousness or Social Phenomenon?**

- Attention is diverted from an aversive odor. How?

Hypnosis

**Stage Hypnosis**

- Why it isn't real:
  1. People are suggestible **without** hypnosis
  2. Subject selection
  3. "Hypnotized" label
  4. Tricks

Drugs

**Drug**
- Chemical substance that can alters the structure and function of the body

**Psychoactive drugs**
- Alters behavior, thought, or perceptions
  - Affect consciousness
Drugs

Psychoactive Drugs
- affect the nervous system
- cross the blood-brain barrier

Drugs

Psychoactive Drugs
- Three effects
  1. quicker release of neurotransmitters (NTs)
  2. prolonged effects of NTs
  3. mimic effects of NTs

Properties of Drugs

1. Tolerance
2. Withdrawal
3. Addiction (sometimes called "dependence")

1. Tolerance

Begin using...
- continued with same dose
- increase dose to get same effect
- decreased effect with same dose

ADDICTION
OVERDOSE

2. Withdrawal

- Physical response when not taking drug
  - smokers get irritable
  - caffeine headaches
  - alcohol WD can be fatal
- Many use drug to reduce/prevent symptoms

3. Addiction: In Introduction

What is addiction?
"uncontrollable drug seeking and use, even in the face of negative health and social consequences"

craving = #1 motivation

Addiction: In Introduction

Physical vs. Psychological
- physical often seen as worse
  - withdrawal (wd)
  - incorrect!
    - wd treated w/ medication
    - some dangerous drugs don’t have severe wd (crack, meth)

The Reward Pathway and Addiction

Natural Rewards
- Food
- Water
- Sex
- Nurturing
Substance Abuse vs. Addiction

- **Abuse**
  - Continued use despite social, legal, or health problems
  - Not necessarily addicted

A. Psychoactive Drugs

1. **Depressants**
   (AKA "sedative-hypnotics")
   - relax and calm a user
   - induce sleep at higher doses
   - depress brain activity
   - examples:
     - alcohol
     - opiates

Depressants

**Alcohol**
- Active ingredient = ethanol
- Which drink has most alcohol?

Because young people in Europe are taught to drink in moderation from an early age, they tend to drink much less and have fewer alcohol-related problems than American young people.

**Myth!**

- Is there a difference?
  - alcohol dependence
  - alcohol addiction
  - alcoholism
  \[\text{same}\]
Alcohol: Factors Affecting Absorption

1. Food consumption
   - Slows down, doesn’t prevent
2. Body weight and build
3. Gender
   - Lower enzyme activity in women

Alcohol’s Effects
- arousal
- inhibitions
- reaction time

Alcohol: Biological Effects
- Brain
  - Balance
  - Memory
  - Reward pathway

Alcohol: Biological Effects
- Tolerance
  - chronic use \(\rightarrow\) more liver enzymes to break it down
  - Effect on blood alcohol?
- Withdrawal
  - Severe cravings
  - Delirium tremens ("the DTs")
- Physical dependence

Alcohol-Related Diseases
- Heart disease
- Cancer: mouth, throat, etc.
- Liver diseases: cirrhosis, alcoholic hepatitis

Alcohol-Related Diseases
- Healthy liver
- Cirrhotic liver
Opiates (Narcotics)
- From opium poppy
- Medical uses = pain relief
- Psychological effects = euphoria
- Natural: opium, morphine, codeine
- Semi-synthetic: heroin, oxycodone (OxyContin®), hydrocodone (Vicodin®)

Opiates
- In brain, occupy endorphin receptors
- Natural pain relievers in brain
- When used for...
  - pleasure → tolerance, addiction
  - pain relief → addiction less likely

History of Opium
- Use dates back 6000 years to Sumerians
- Native to many regions
  - Middle East
  - Laos, Thailand, Afghanistan
  - Mexico & Colombia
- Egyptians used it medically 3500 years ago
- Common in Islamic world for medical & recreational purposes

Collision of cultures
- Opium Wars
- Chinese building railroad
- 1875 - San Francisco outlawed opium dens & opium smoking
  - Laws targeted not at opium (laudanum legal), but at Chinese
- Federal laws prohibiting opium smoking followed

Morphine
- 1803 - morphine separated from opium
- 1856 - development of hypodermic needle
- Use became widespread
- Doctors began injecting opium solutions
- Used during Civil War for injuries (dependence known as "soldier’s disease")

Heroin
- Heroin
  - 1874 - first made
  - 1898 - sold as cough medicine
  - Why "heroin"?

Heroin
- Injected, smoked, snorted
- Often "cut" with other substances

Stimulants
- mood
- alertness
- blood pressure
- fatigue
- appetite
- Short-term effects
  - Euphoria, flushing of skin
- Long-term effects
  - Addiction
  - Collapsed veins
  - Organ damage
Stimulants

Caffeine
- Found in coffee, tea, soft drinks, chocolate, some nuts, and some medicines.

Caffeine
- Found in > 60 plants
- 90% use every day
- 6 hour half life
- Blocks adenosine (drowsiness)
- Increases dopamine (pleasure)

Caffeine in Selected Drinks

<table>
<thead>
<tr>
<th>Drink</th>
<th>Caffeine (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starbucks</td>
<td>54</td>
</tr>
<tr>
<td>Red Bull</td>
<td>230</td>
</tr>
<tr>
<td>Mtn Dew</td>
<td>145</td>
</tr>
<tr>
<td>Diet Coke</td>
<td>18</td>
</tr>
<tr>
<td>Black Tea</td>
<td>0</td>
</tr>
<tr>
<td>Snapple</td>
<td>76</td>
</tr>
<tr>
<td>Starbucks</td>
<td>54</td>
</tr>
<tr>
<td>Dunkin Donuts</td>
<td>47</td>
</tr>
<tr>
<td>Deep Coffee</td>
<td>47</td>
</tr>
<tr>
<td>Coke</td>
<td>35</td>
</tr>
</tbody>
</table>

### Caffeine

- 500-600 mg/day probably OK
- Excess $\rightarrow$ anxiety, restlessness, palpitations
- Linked with osteoporosis, miscarriage

### Nicotine

- Active ingredient in tobacco
- In the U.S., 20.6% of adults smoke
  - 29% use tobacco products

### Nicotine

- Tobacco products
  - "Dip"
  - Chewing tobacco
  - Cigarettes, cigars, pipes

### Cigarette Smoking by Age, #1

1970 COST = $0.38
1970 TAX = $0.18
2009 COST = $5.33
2009 TAX = $2.19

### Trends in Current Cigarette Smoking Among
High School Students** and Adults, United States, 1965-2009
### Chemicals in Cigarettes
- Some are for flavor, but also to increase effect of nicotine
- More than 4000 chemicals in smoke

### Smoking: Psychological Effects
- Increased alertness
- Feelings of pleasure
- Teen smokers:
  - anxiety disorders
  - depression

### Smoking: Health Effects
- 1 in 5 deaths in U.S.
- Pay twice as much for life insurance
- Die average of 13-14 years earlier than non-smokers
Smoking: Health Effects
- Speeds normal skin aging
- Maybe after only 10 years smoking
- Irreversible

Smoking-Related Diseases (A Partial List)
- Lip Cancer
- Oral Cavity Cancer
- Tongue Cancer
- Pharyngeal Cancer
- Esophageal Cancer
- Stomach Cancer
- Pancreatic Cancer
- Laryngeal Cancer
- Tracheal Cancer
- Lung Cancer
- Kidney Cancer
- Urinary Bladder Cancer
- Cervical Cancer
- Acute Myeloid Leukemia
- Peripheral vascular disease
- Coronary Heart Disease
- Ischemic Heart Disease
- Cerebrovascular Disease
- Atherosclerosis
- Aortic Aneurysm
- Invasive Pneumococcal Disease
- Chronic Obstructive Pulmonary Disease
- Complications of pregnancy

Smoking: Health Effects
- Foreign warning labels

"Quitting smoking is easy...I've done it a thousand times."
- Mark Twain

Nicotine: Quitting Smoking
- Fewer than 1 in 10 trying to quit succeed on first try
- Hardest = starting before age 21 (80-90% start in teens)
- Nicotine replacement
  - Gum, lozenge, patch
  - Medication
    - Zyban®

Stimulants
Cocaine
- Coca plant
- Mid-1800s
  - Used as an anesthetic
  - Common ingredient

Cocaine
- Snorted, smoked, injected
- Street names: blow, snow, nose candy

Cocaine
- Snorted, smoked, injected
- Street names: blow, snow, nose candy

Short-term effects
- Intense euphoria
- Very fast-acting
- Effects short-lived → urge to use more

Long-term effects
- Heart disease
- Damaged septum

Stimulants
Amphetamines
- Benzedrine®, Ritalin®, Adderall®
- Increases alertness
- Decreases appetite
- Dependence & tolerance
- Altered thoughts
  - Paranoia
  - Similar to schizophrenia
Stimulants

Methamphetamine
- Similar to amphetamines, but stronger
- Made in home labs
- Pills, injected, snorted, smoked
- Street names: speed, ice, meth, crystal meth

Hallucinogens
- Affect mood, thought, memory, judgment, and perception
- Sometimes called psychedelic drugs
- Alter perception and produce vivid imagery
- Impact varies depending on the user and the particular drug

3. Hallucinogens

a. Marijuana
- Most widely used illegal drug
- Reactions vary widely
- Affects judgment and coordination
  - May produce psychological dependence in some

b. LSD
- Lysergic acid diethylamide
- Produces altered visual and auditory perception
- Sometimes causes changes in time and distance perception

3. Psychedelic Drugs

b. LSD
- Lysergic acid diethylamide
- Produces altered visual and auditory perception
- Sometimes causes changes in time and distance perception

3. Hallucinogens

c. Ecstasy
- Methylenedioxymethamphetamine (MDMA)
- Causes massive release of serotonin in the brain
  - May lead to prolonged problems regulating serotonin levels
  - May contribute to depression and memory problems

What is Substance Abuse?

If dependence has developed
- Withdrawal symptoms will occur if use is decreased or stopped
  - Withdrawal symptoms are typically the opposite of a drug's effects
  - Typically unpleasant
  - Can be stopped by taking more drugs
  - Doing so often considered addiction

What is Substance Abuse?

Genetic factors in drug use
- Alcoholism is not inherited
- Genetic factors do relate to the metabolism of alcohol
  - These create a genetic predisposition
  - Does not automatically lead to development of alcoholism