

Cannabis / Marijuana / Marihuana

Psychology 472
Pharmacology of Psychoactive Drugs

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Biology

- **Family :** Cannabaceae
- **Genus :** Cannabis
- **Species :** sativa; indica; ruderalis

Marijuana

- Most commonly used illicit drug in the world
- Adolescent use has quadrupled since 1994
- Grows throughout the world
- Past, generally grew in most temperate and tropical regions.
- Today can be grown anywhere
- Major psychoactive ingredient is THC (delta-9-tetrahydrocannabinol)
- There are 400 other active chemicals.

Why is it Important?

- Considered a Gateway Drug
 - Is correlated with other drug use
 - Is correlated with earlier sexual activity
 - Is correlated with poorer academics
 - Is correlated with other problems
- Problem
 - Correlation does not imply causation
 - Other legal drugs are also correlated with the above problems
 - Other social problems are also correlated with above

Current Statistics

- Widest used illicit substance among all age groups
 - 48% of middle aged adults 26-34 have tried marijuana and inhaled
 - Current use is highest among young adults 18-25 years of age.
 - 12-35+ yr. 32% report using in life time
 - Decreases in rates of past year use among most surveyed age groups—including the primary users (18 to 25)

Derivatives of Cannabis Sinsemilla

- Made from just the buds and flowering tops of female plants that are not pollinated.
- Average = 7.5 % THC
 - Can range as high as 24% THC
 - Canadian Bud

Other Derivatives of Cannabis

Hashish

- The sticky resin from the female plant flowers. Collected by shaking over a fine screen has an average of 3.6 % THC, with a range as high as 28%

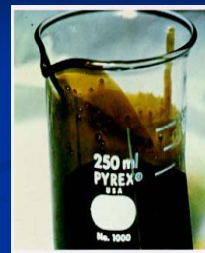


A flowering bud or cola of a female cannabis plant

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Hash oil

- Tar-like liquid distilled from hashish, has an average of 16% THC with a range and high as 43%



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Other Derivatives of Cannabis

Charas

- Used for thousands of years
 - Medicinal use and religious ceremonies.
- Cannabis grown in high altitude conditions
 - Ultraviolet radiation is strong
 - Produces substantially more THC
- Made by rubbing your hands through the flowers
 - The resin sticks to palms of hands.
- By the end of the day you have harvested perhaps 8 or 9 grams of charas.
 - To make 'Cream' it is necessary to go very slowly
 - The faster one works, the lower the quality
- Generally smoked in clay pipes
- Still is used in India as part of certain religious ceremonies

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Marijuana

Common Slang Terms

Aunt Mary	Kif
Boom	Mary Jane
Chronic (Marijuana alone or with crack)	Pot
Dope	Reefer
Ganja	Sinsemilla
Grass	Skunk
Hash	Weed.
Herb	Gangster
Indo	Bud
	Hydro

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Potency Levels

- Past - THC levels were 2 or 3 percent
- Present - Achieving 8 to 12 percent THC levels through improved cultivation methods
 - BC Bud
 - Average potency of all tested samples has increased 52.4 percent (from 5.34% THC to 8.14%) within the past 5 years (DEA.gov).

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Types of Cannabis/Marijuana

- C. Sativa
 - Is the most widespread variety,
 - Is usually tall, laxly branched, has narrower leafs
 - Found in warm lowland regions.
- C. Indica
 - Are shorter, bushier plants.
 - Have adapted to cooler climates and highland environments
 - Has poorer fiber quality than C. Sativa but has more intoxicating properties
 - Widely promoted for the manufacture of medicinal preparations.

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C. Ruderalis

- Are shorter plants
- Grow wild in Europe and central Asia.
- Are conical in shape, branchless, have relatively wide leaflets

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Quality

- Depends on the species type for intoxicating effects.
 - C. Sativa has many strains desired by smokers
 - Includes Acapulco Gold and Durban Poison
 - C. Indica considered the most potent species
 - C. Ruderalis low quality

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Brief History

- Hemp has been used in history for about 10,000 years
- Used as a food in China about 6000 years BC
- Described in the oldest pharmacopoeia (The Pên-ts'ao Ching, 2000 B.C.)
 - Prescribes marijuana preparations for "malaria, beriberi, constipation, rheumatic pains, absent-mindedness, and female disorders" (Schultes, R. E. 1967. Man and Marijuana. Nat. Hist. 82: 59-63, 80, 82).
- Mention was made of the intoxicating properties, but the medicinal value was considered more important.

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Other Countries

- In India was used recreationally.
- The Muslims used it recreationally since alcohol consumption was banned by the Koran.
- Introduced Hashish
 - Popularity spread quickly throughout 12th century Persia (Iran) and North Africa.

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Until the 1930's Was Used in Products




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Was Used in Medicines



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Was Used for Intoxication



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Effects of Cannabis on the Body

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Pharmacokinetics

- Smoking
- Eating / Drinking
- Rectal
- IV- Intravenous (toxic)

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Smoking

- Rolled into cigarette (joints, reefer)
- Placed into a pipe or bong.
- Cigars: Tobacco is removed and replaced with cannabis (called a blunt)
 - Blunt smoked with a 40 oz. malt liquor is called a "B-40"
- Can be laced with other substances (cocaine, opium products)
 - Joint + crack cocaine called "primos" or "woolies"
 - Joints + PCP called "happy sticks," "wickey stick,"

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Some Smoking Devices



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Smoking

- About 50% enters the lungs
 - Most enters the body.
- Reaches brain in about 30 seconds
- Peak levels 30-60 minutes
- Lasts about 3 - 4 hours
- Difficult to quantify dose-effect
 - User variability

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Eating / Drinking

- THC content is usually higher
- Brownies shakes and other foods
 - Absorbed slowly
 - Improved by adding cooking oil (e.g., baking).
- Brewed into a tea
- Others
- Larger oral doses are needed to have same effect
 - First pass metabolism issues

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Rectal

- Rarely used
- THC levels similar to food

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Distribution by Cardiovascular System

- THC moves from blood into fatty tissue.
 - Very rapid
 - 25–30 percent may remain in fatty tissue for a week
 - Continuous use accumulates in fat
 - May take weeks to leave after use stops
 - Chronic users may show positive urine samples for a month after stopping.
- Reason for identification of use for long periods after discontinuation of use

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Metabolism

- Mostly in liver
 - Creates active metabolites.
 - Half-life of single dose can be very variable; 20–60 hours
- Excretion:
 - 40–65% excreted in feces, remainder in urine.

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Pharmacodynamics

- Effects will depend on
 - Administration route
 - Smoking fast, Oral slower
 - Level of THC
 - Expectancy
 - Set / Setting
 - Amount consumed
 - Influence of additional compounds

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Effects

- Mild to moderate analgesia
- Motor effects
 - Ataxia, muscle weakness, tremor
 - Impaired motor coordination
- Antianxiety
 - Reduced anger and aggression
- Time and sensory distortions
- Impaired cognitive functioning
 - Impairs ability to focus attention and filter out irrelevant information.
 - Deficiencies are subtle and may involve persistent absorption of THC from fat stores.

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Other Effects

- Sedation / Sleep
 - Low Doses
 - Causes drowsiness and sleep
 - Higher doses
 - Decreased REM sleep
 - Increases slow-wave sleep.
- Nausea
 - It is effective against nausea and vomiting.
 - Tolerance develops.
- Appetite:
 - Increased consumption of "snack food" (may depend on setting or dose).
- Dry mouth, thirst

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Respiratory System Problems from Smoking

- Throat irritation
- Bronchial irritation
- Bronchial inflammation
 - All create heavy coughs.
- Emphysema
- Correlations with cancers (see NIDA.gov)
 - Can double/triple the risk
 - Smoke contains 50 to 70 percent more carcinogenic hydrocarbons than does tobacco smoke
 - Also increases enzymes that converts some hydrocarbons into carcinogenic forms
- Health effects are similar to smoking cigarettes
 - Occur faster due to the concentrations of smoke
 - Trying to hold in the smoke as long as possible
 - More exposure to carcinogenic compounds
 - Creates more inflammation and damage.

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Cardiovascular System

- Increased heart rate
- Increased blood pressure.
- Blood vessel dilation
- Increased risk of heart attack in the first hour after smoking (NIDA.gov)
- Decreases intraocular eye pressure

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Immune system

- THC depresses the immune system
 - Makes users more susceptible to cold, flu and other infections
 - Makes users more susceptible to BBPS
- Once you get a disease, it takes longer to recover.

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Reproductive system

- Males
 - Decreases production of testosterone and sperm formation.
- Females
 - Can affect menstrual cycles and hormone levels
- Fetus
 - Can cause growth reduction and maternal lung damage

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Effects on the Brain

- Acts as an initial stimulant and later a depressant
- Get psychoactive impairment
- At higher levels is a pain inhibitor
- Causes a loss of muscular coordination
 - Often due to impacts on the cerebellum
- Impairs tracking ability and causes “trailing”
- Impairs short-term memory
 - Long term use associated with permanent memory loss

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Receptors

- Usually impacts presynaptic elements
 - Inhibits calcium flux
 - Facilitates potassium channels.
- Result decreased NT release

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Receptor Subtypes

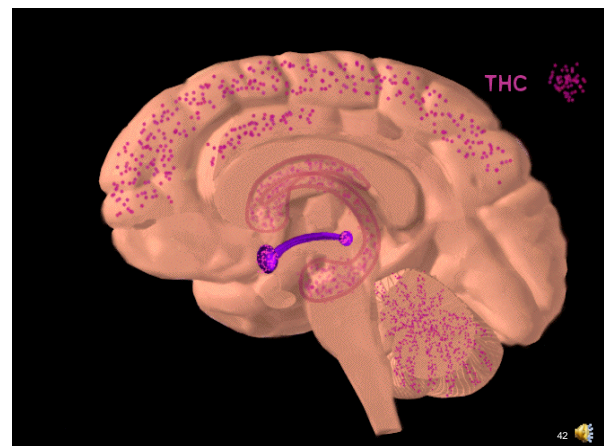
- CB₁
 - Found in brain and in other body organs
- CB₂
 - Found outside of brain
 - Found in peripheral immune system

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Concentrations of Receptors

- Main Impact sites
 - Motor
 - Basal Ganglia
 - Cerebellum
 - Memory
 - Hippocampus
 - Attention, memory, concentration
 - Prefrontal cortex


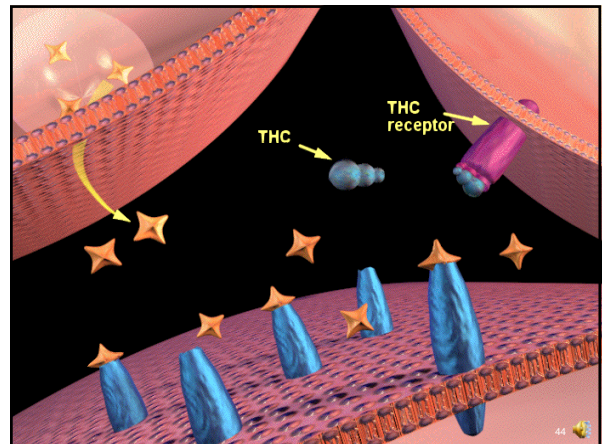
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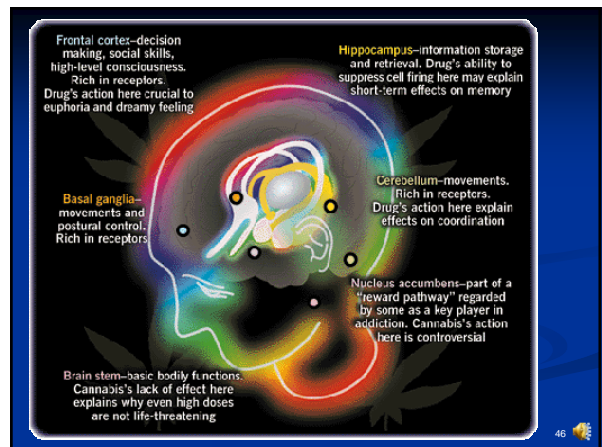
MFB Effects

- THC binds on THC receptors
 - Once bound, dopamine is released
 - Activates reward system
 - Feels good


Reward System

- Affects Medial Forebrain Bundle
 - Binding in nucleus accumbens.
 - Causes increased release of dopamine.
 - Increases of activity on reward pathway.
 - Creates addiction cycle.


Psychological Effects

- Relaxation, Euphoria, etc.
- High levels – Confusion / Paranoia
- Mental dissociation from the environment
- May develop feelings of déjà vu
- Difficulty concentrating



More Effects

- High levels can cause giddiness
- Can initially get increased alertness
- High levels can get major distortions and perceptions of time, color and sound
 - Called hallucinations
- For most users, THC exaggerates mood
- Personality becomes more suggestible



Adverse Psychological Effects

- Anxiety
- Temporary psychotic reactions
- Extreme paranoia
- Hallucinations

- All tend to be rare
- Is usually dose related
 - Usually does not occur at lower levels

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Learning and Emotional

- Slows learning and disrupts concentration
 - Disrupts hippocampal formation

- Amotivational syndrome
 - Correlated with use levels

- Problem avoidance

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Tolerance / Dependence

- Chronic users develop tolerance similar to other drugs
- THC can persist in the body of a chronic user for up to 6 months even though effects last only 2-4 hours
- Hair samples become important for testing

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Withdrawal

- Withdrawal is typically delayed
 - THC can be stored in the fat cells
 - Later, the withdrawal effect may appear
- Symptoms include
 - Anger or irritability
 - Aches, pains or chills
 - Depression
 - Inability to concentrate
 - Similar to opiate withdrawal but at a lower level

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Other Withdrawal Symptoms

- Slight tremors
- Sleep disturbances
- Decreased appetite
- Sweating
- Craving

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Neurons

- Causes down regulation and desensitization of brain cannabinoid receptors.
 - Result - Need more of the drug to get an effect (Tolerance)

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Medical Marijuana

- Advocates
 - Appetite- HIV, eating disorder, wasting syndrome.
 - Nausea & Vomiting- cancer treatment side effect relief
 - Dronabinol [Marinol] = THC in sesame oil
 - Nabilone [Cesamet] = synthetic
 - Neurological & Movement Disorders, MS, Epilepsy, Parkinson's, seizures, convulsions.
 - Analgesia
 - Glaucoma

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Problems

- Contains over 400 chemicals and 60 different cannabinoids
- Other drugs can be used for same diseases without the high
- Other drugs do not need to be used as often
- May control nausea but decreases immunological functioning
- Others

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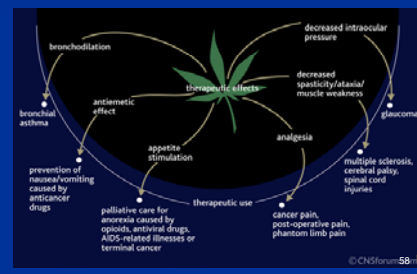
More Medical Controversy

- Testing problems
 - Application / dosage differences
 - No consistent dosage
- Natural THC vs. man made Dronabinol
 - Not advocated by most professional organizations
- Benefits verses risks
- Toxicity levels not known

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Therapeutic effect of cannabis

Perhaps the best known use of cannabis in a therapeutic setting is as an analgesic in the management of cancer pain, post-operative, and phantom limb pain. Cannabinoids have also been used in prevention of nausea and vomiting caused by anticancer drugs, and to stimulate appetite in palliative care for anorexia caused by opioids, antiviral drugs, AIDS-related illnesses or terminal cancer. Other effects include bronchodilator effect on small airways of the lungs and ability to decrease intraocular pressure. It is paradoxical that isotropic have been reported to be of therapeutic value in neurological disorders associated with spasticity, ataxia, and muscle weakness because similar symptoms can be caused by cannabis itself.



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Currently

- Is a Multi-billion dollar business.
- Has numerous web-sites
- International market place
- Hemp vs. Marijuana
- Clothing, export/import issues
- Social, medical, political implications
- NORML (National Organization Reform Marijuana Legislation)

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Conclusions

- Has been around a long time
- Use remains controversial
- Is becoming extremely more potent
 - Has implications for addiction
 - Early use in adolescents will create problems in many areas

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Conclusions

- Lower risk for death than alcohol
- Still have lots of impacts on body systems
- Is not the same marijuana that many of your parents may have used.

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Drug Slang Directory

- <http://parentingteens.about.com/cs/drugsofabuse/1/blsldicindex.htm>
- <http://www.marijuanadictionary.com/c-marijuana/marijuana.html>
 - Look at the bottom of the page for the index
- http://www.drugfree.org/Portal/drug_guide/BySlang
- <http://www.urbandictionary.com/>

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