



Alcohol:
Social Beverage/Social Drug

Drugs Crime & Society

CJUS 3630

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Introduction

- **Frequent failure to acknowledge that alcohol is a psychoactive drug**
- **Alcohol as a social beverage (social drug)**
- **Separate federal agencies**
 - **National Institute on Alcohol Abuse and Alcoholism (NIAAA)**
 - **National Institute on Drug Abuse (NIDA)**
- **Reinforcement that alcohol stands apart from other drugs of abuse**

What Makes an Alcoholic Beverage?

- **Three basic forms of alcoholic beverages: wine, beer and liquor**
- **Creation of ethyl alcohol through fermentation**
 - Alcohol content: 12-16%
- **Brewing (beer production)**
 - Alcohol content: 4.5%
- **Distillation of liquor**
 - Alcohol content: 40-50%
 - Can achieve an alcohol content of up to 95%

Alcohol Use through History

- Mead (fermented honey) was the original alcoholic beverage (8000 BC)
- Egyptians established the first brewery (3700 BC)
- Wine dates back to 5400 BC
- First distillation: wine to brandy (aqua vitae) during the Middle Ages at a medical school in Salerno, Italy
- Dutch created gin in the middle of the 17th century
 - Because easily produced, cheaper than brandy and faster acting than wine, gin was the drink of choice among all classes, especially the poor
 - Gin Epidemic in England

Alcohol in Early U.S. History

- **Pilgrims aboard the Mayflower (1620)**
 - Writing of William Bradford (“beere”)
 - Little choice but to take along alcohol as water would have spoiled easily during the sea voyage
 - Not against drinking, merely against drunken behavior
- **General approval well into the 19th century**
 - Tavern was the social focus
- **1830: average intake was 5 drinks a day (4 times the level of consumption today)**
 - Whiskey breaks (like coffee breaks)
 - Rum was favored in New England and along the North Atlantic coast
 - Elsewhere whiskey was “king”
 - George Washington went into the whiskey business at Mount Vernon in 1797

The Rise of the Temperance Movement in the U.S.

- **1830: Alcohol consumption began to decrease**
- **Growing influence of a temperance movement**
 - **Among religious leaders, physicians and social reformers**
 - **Goals originally focused on the moderation of alcohol consumption**
 - **Drew attention to long-term consequences of chronic alcohol abuse**

Patterns of Alcohol Consumption Today

- Alcohol, commercialization and economics have been linked from the very beginning
- Americans spend ~\$116 billion on the purchase of alcoholic beverages each year
- The alcohol industry spends ~\$1.42 billion advertising its products
- More than 1/3 of this advertising budget is typically devoted to television commercials for beer

Overall Patterns of Alcohol Consumption

- Annual per capita consumption of pure alcohol in the U.S. varies between 1.3 gallons (0.5 ounce per day) and 2.4 gallons (3/4 ounce per day)
 - Actual is probably somewhere in the middle
- Single half-ounce of alcohol is approximately equivalent to any of the following:
 - One 5-ounce glass of wine
 - One 12-ounce bottle or can of beer
 - One 12-ounce bottle of wine cooler
 - One shot (1.5 ounce size) of 80-proof liquor

Trends in Alcohol Consumption since the Late 1970s

- **Steady decline from 1970s to mid-1990s and has remained stable since then**
 - **Growing attention to weight, health and fitness**
 - **Industry responded with lighter wines, lighter beers, wine coolers and “ice beer”**
 - **Fewer calories and reduced or equivalent alcohol content**

Demographics of Alcohol Consumption

- Preferences for different types of alcohol are influenced by many factors:
 - Age
 - Gender
 - Education
 - Income
- Alcohol related problems among students:
 - Missing a class
 - Doing something they regretted
 - Forgetting where they were or what they did while intoxicated
 - Arguing with friends
 - Failing to practice safe sex
- Non-drinkers adversely affected by binge drinking patterns of behavior on their campus (secondhand effects)

The Pharmacology of Alcohol

- **Very small molecule, in liquid form, moderately soluble in fat and highly soluble in water**
- **Easily absorbed through the gastrointestinal tract once it is ingested**
- **20% absorbed into the bloodstream directly from the stomach**
- **80% absorbed from the upper portion of the small intestine**
- **Initially acts as an irritant, increasing the flow of hydrochloric acid and pepsin, chemicals that aid in digestion (can help digest a meal)**
- **Large amounts will irritate the stomach lining**
 - **Concern for those with stomach problems such as ulcers**
 - **Can produce ulcers**

The Pharmacology of Alcohol

- Irritating effect causes alcohol to proceed to small intestine more quickly if concentrations are high
- Chronic consumption can produce an inflammation of the stomach (gastritis) or the pancreas (pancreatitis)
- If the stomach is empty intoxicating effect is quick
- If stomach is full alcohol is retained with food and absorption is delayed
- Other factors influencing the rate of absorption:
 - Concentration of alcohol in the beverage ingested
 - If the beverage is carbonated (faster absorption)
 - Rapid pace of consumption (higher blood alcohol content)
 - Size of the person (if bigger, more body fluids to absorb the alcohol thus diluting the overall effect)

Breakdown and Elimination of Alcohol

- **Solubility in water helps alcohol to be distributed to all bodily tissues**
 - Tissues having greater water content receiving a relatively greater proportion of alcohol
- **Excretion in two basic ways**
 - **5% eliminated by the lungs (alcohol breath)**
 - **Breathalyzer tests**
 - **95% eliminated in the urine**
 - **After the alcohol has been biotransformed into carbon dioxide and water**

Breakdown and Elimination of Alcohol

- **Solubility in fat facilitates alcohol's passage across the blood-brain barrier**
- **90% of the alcohol in the blood reaches the brain almost immediately**
- **Alcohol passes the blood-placental barrier with equal ease**
 - **Fetal Alcohol Syndrome**
- **Body recognizes alcohol as a visitor with no real biological purpose**
 - **Contains calories but no nutritional value**
 - **Primary reaction is to break it down for removal**
 - **Oxidation**

Measuring Alcohol in the Blood

- **Levels vary by how much is ingested, how long ago, differences in body size and relative proportions of body fat**
- **Blood alcohol concentration (BAC)**
 - **Ratio referred to when assessing physiological and psychological effects**
 - **Refers to the number of grams of alcohol in the blood relative to 100 milliliters of blood expressed as a percentage**

Effects of Alcohol on the Brain

- **Central Nervous System (CNS) depressant drug**
- **Often misidentified as a stimulant**
- **At low doses first releases the cerebral cortex from its inhibitory control over subcortical systems in the brain**
 - **Double negative effect**
 - **Alcohol is depressing an area of the brain that normally would be an inhibitor**
 - **The result is the illusion of stimulation**
 - **Impairment in judgment and thinking stems from a loosening of social inhibitions that allow us to be relatively civil and well behaved**

Effects of Alcohol on the Brain

- As BAC levels increase more widespread areas of the brain are affected until an inhibition of the respiratory centers in the brain becomes a distinct possibility
- Acute alcoholic poisoning produces death by asphyxiation
- Effect of alcohol at the neuronal level
 - GABA receptor in the brain
 - Alcohol acts at this receptor making it more difficult for the neuron to be stimulated
 - Ability to set up a pattern of psychological dependence
 - Dopamine releasing neurons in the nucleus accumbens of the brain

Acute Physiological Effects

- **Toxic Reactions**

- To achieve a lethal BAC level of 0.50% a 165-pound man needs to have consumed ~23 drinks over a 4 hour period
- Consuming 10 drinks in 1 hour (BAC of 0.35%) is extremely dangerous
- Remember the lethal dose is the average level for a lethal effect
 - No way to predict where a particular person will fall on the normal curve
- Two mechanisms are designed to protect us
 - Alcohol as a gastric irritant causing nausea and vomiting
 - Pass out (residual danger of asphyxiation by choking on vomit while unconscious)

Acute Physiological Effects

- **Heat Loss and the Saint Bernard Myth**
 - **Alcohol is a peripheral dilator**
 - **Blood vessels near the skin surface enlarge leading to overall warmth and redness**
 - **Basis for the myth that alcohol can keep you warm in freezing weather**
 - **However, alcohol produces a greater heat loss than would be the case without it**

Acute Physiological Effects

- **Diuretic Effects**

- **Alcohol inhibits the antidiuretic hormone (ADH) a hormone that normally would act to reabsorb water in the kidneys prior to elimination in the urine**
- **Once concentrations have peaked the reverse occurs**
 - **Water is now retained (anti-diuresis) resulting in swollen fingers, hands and feet**
 - **More pronounced if salty foods are eaten**
 - **Inhibition of ADH can be a serious concern particularly following vigorous exercise when the body is already suffering from a loss of water and fluid levels are low**

Acute Physiological Effects

- **Cardiovascular Effects**

- Long-term excessive consumption of alcohol increases the risk of heart disease, elevated blood pressure, and stroke
- When alcohol consumption continues for at least two days in an extended bout of drinking the acute effects can be severe
- Increased likelihood of cardiac arrhythmia owing to the lowered threshold for ventricular fibrillation and the scarring of heart muscle

Acute Physiological Effects

- **Effects on Sleep**
 - Sleep patterns are adversely affected
 - Alcohol reduces the duration of REM sleep
 - REM sleep can be either partially or completely suppressed during the night
 - When alcohol is withdrawn, REM sleep rebounds and represents a higher percentage of total sleep time than before alcohol consumption began
 - As a result, individual sleep poorly and experience nightmares

Acute Physiological Effects

- **Effects on Pregnancy**
 - Consumption of alcohol greatly increases the risk of retardation in the development of the fetus
 - Reduction in the incidence of this behavior has been a major public health objective since 1995
 - **1999:** pregnant women reported a consumption of five or more alcoholic drinks on a single occasion or seven or more drinks per week did not decline from the numbers reported in 1995
 - Women reporting total abstinence during their pregnancy increased from 84-87%

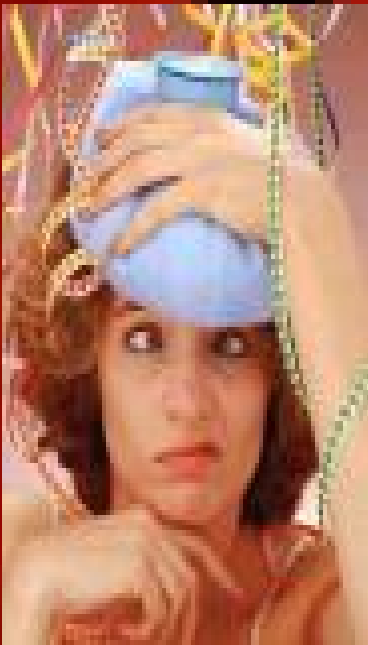
Acute Physiological Effects

- **Interactions with Other Drugs**
 - **Complex interaction of alcohol with many drugs**
 - **DAWN reports: Extremely high incidence of medical crises arising from the combination of alcohol not only with prescribed medications but also with virtually all the illicit drugs on the street**
 - **Ingestion of medications with alcohol significantly lessens the medication's benefits**

Acute Physiological Effects

- **Hangovers**

- 4-12 hours after heavy consumption
- Unpleasant symptoms of headache, nausea, fatigue and thirst may occur
- Unclear why these symptoms occur
- Beyond the amount of alcohol consumed, other factors effecting hangover symptoms include:
 - Type of alcohol consumed
 - Traces of nonoxidized acetaldehyde in the blood
 - Residual irritation in the stomach
 - Low blood sugar rebounding from the high levels induced by alcohol consumption



Acute Physiological Effects

- Remedies
 - Best treatment consists of rest, an analgesic medication for the headache and the passage of time
 - Some people have taken to the remedy of consuming more alcohol
 - “The hair of the dog that bit you”
 - May relieve symptoms but merely delays the inevitable consequences and leads to further alcohol abuse
 - Herbal products have been marketed but effectiveness remains untested
 - Chasers

Acute Behavioral Effects

- **Effects range from the relatively harmless:**
 - Exhilaration
 - Excitement
 - Talkativeness
 - Slurred speech
 - Irritability
- **To behaviors that have the potential for causing great harm:**
 - Uncoordinated movement
 - Drowsiness
 - Sensorimotor difficulties
 - Stupor

Acute Behavioral Effects

- **Blackouts**
 - An inability to remember events that occurred during the period of intoxication even though the individual was conscious at the time
 - Drinkers can be easily misled into thinking that because they can understand some information given to them during drinking they will remember it later
 - Risk of blackouts is greatest when alcohol is consumed very quickly forcing the BAC to rise rapidly

Acute Behavioral Effects

- **Driving Skills**

- **Significantly impairs the ability to drive or deal with automobile traffic**
- **40% (15,000) of the 38,252 traffic fatalities in 2003 were alcohol-related**
 - **87% resulted from drivers with a BAC of 0.08% or higher**
 - **0.08% became the standard in all U.S. states in August 2005**
- **0.08% does not have to be reached to cause impairment in driving**
 - **~0.02-0.04% have a 40% greater risk**
 - **0.05-0.09%, the risk is 11 times greater**
 - **0.10-0.14, the risk is 48 time greater**
 - **Above 0.15%, the risk is 380 times greater**

Acute Behavioral Effects

- **Alcohol, Violence and Aggression**
 - Studies show from 50-60% of all murders being committed when the killer had been drinking
 - ~40% of all acts of male sexual aggression against adult women and ~60% of all acts of child molestation involved drunkenness
 - **Several theories**
 - **Disinhibition theory**
 - **Cognitive-expectation theory**
 - **Balanced placebo design**