



## Ethanol

Psychology 470

Introduction to Chemical Addictions

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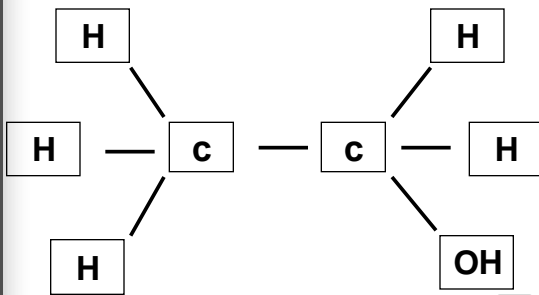
### Types

- Over 100 different types
- Ethanol =  $C_2H_5OH$
- Methanol =  $CH_3OH$
- Isopropyl =  $(CH_3)_2CH_2OH$

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### Chemical Structure



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### Background

- Fermentation to make alcohol dates back to 4200 BC
- Second most used drug in the world (caffeine #1)
- Luxembourg tops list for legal purchase and consumption (12.6 liters/person)
- Latvia tops list for legal, illegal, and homemade purchase and consumption (16-20 liters/person)
- Whites have highest alcohol consumption rates
- Americans consumed twice as much alcohol in 1830 as they do now.

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### College and University Use

- Students drink 4 billion cans of beer yearly
- 360,000 of 12 million undergraduates will die from alcohol-related causes while in school.
- Nearly ½ of college students are binge drinkers
- Average student spends \$900 per year on alcohol (books \$450/year)

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### Other Social Problems Associated with Alcohol Consumption

- Correlated with crime in general
  - Domestic violence
  - Rape
  - DWI
- Economic costs are huge
  - >82 Billion in lost productivity
  - 18.8 billion for alcohol problems
  - 9.9 billion for other drug problems
- Economic burden of alcohol and drug problems falls on the population that do not abuse alcohol or drugs.

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### Other Comments

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- Can have therapeutic effects when consumed in moderation (1 drink per day).
  - Does not depend on the beverage
- Causes body damage when consumed in greater amounts.
- Minimum age drinking laws have mixed effects.
- Most laws related to drinking and driving have minimal impacts at changing behavior. Get short term reductions and the behavior goes back to normal. (Ross)

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### Ethanol

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### Background Information

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- Is a simple molecule
- Is classified as a CNS depressant
- Contains no vitamins, minerals etc
- Only contains 210 calories/oz
- Requires no digestion
- Once in the system it stays until metabolized
- Makes it unique

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### Distribution

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- After absorption goes evenly throughout the body
- Easily crosses the blood-brain barrier
- Also crosses the placenta and enters the blood stream of a developing fetus.
- Essentially goes to all cells
- Impacts all cells

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### Behavioral Effects

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- .01 Decreased Inhibitions
- .01-.02 Vision Changes
- .03 Changes in inhibition
- .05 Buzz
- Beginning to decrease motor coordination
- .08 - .10 Decreased motor coordination, legal limit
- .15 - .20 Severe loss of judgment and muscle coordination
- .30 Passing out, coma
- .40 - .50 Death

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### Factors that Influence BACs

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- 1. Concentration that is ingested
- 2. Proof of the beverage
- 3. Speed of consumption
- 4. Carbon Dioxide
- 5. Sex of the individual
- 6. Tolerance
- 7. Altitude
- 8. Circadian Variation
- 9. Ascending vs. Descending BACs
- 10. Fructose
- 11. RO-15-4513 and others

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### Concentration that is Consumed

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- Generally, the greater the concentration, the faster it enters the bloodstream.
  - On the rocks is better than not on the rocks
- If concentration becomes too great, can decrease bloodstream entry
  - Can shut down the system

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### Proof of the Beverage

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- Amount of alcohol/volume of water
  - 100% Ethanol / 0% Water = 200 Proof
    - Only exists in airless environments
    - Usually 190 Proof is as good as you can get
  - 50% Ethanol / 50% Water = 100 Proof
  - 40% Ethanol / 60% Water = 80 Proof
- Is not the same as concentration
- The greater the proof, the faster the entry into the blood stream
- Too high (>100 proof), it can inhibit entry until the concentration is reduced.

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### Speed of Consumption

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- The faster you drink, the faster the BAC rises

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### Carbon Dioxide

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- Carbon Dioxide makes ethanol cross mucosal membranes faster than straight ethanol
- Makes you drunk faster
- Scotch and soda gets you faster than Scotch and water.

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### Sex of the Individual

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- If a male and female are the same body weight, the female will get drunk faster than the male

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### Reasons

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- Women have less alcohol dehydrogenase than men. Metabolizes alcohol slower
- Men have more muscle to fat than women. More muscle = more blood in solution dilutes the ethanol and lowers the BAC.
- Women have more body fat than men. Fat contains little blood in solution. Less solution the higher the BAC

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### Tolerance

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- The greater the tolerance, the better the person will function when under the influence.
- Note: BAC is still the same

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### Altitude

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- The greater the altitude, the faster the ethanol crosses the mucosal membranes.
- Get drunk faster

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### Circadian Variation

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- Circadian rhythms will influence how drunk you will get

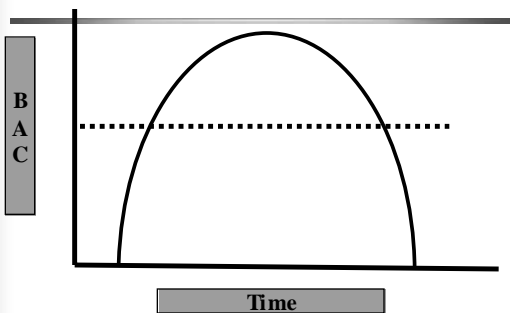
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### Ascending vs. Descending BACs

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- You are drunker on the ascending side of the BAC curve than at the same level on the descending side of the BAC curve.

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### Why

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- Neurons have adapted somewhat
- Beginning of tolerance

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### Fructose

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- Increases the metabolism of the liver
- Slightly decreases the BAC

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### RO-15-4513 and others

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- Block the effects of alcohol on receptor binding sites.
- Have the same BAC but no behavioral effects.

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