

SOCI 270  
Drugs, Society and Behavior

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PROFESSOR KURT REYMERS, PH.D.

Chapter 6  
Stimulants

Stimulants

- Stimulants, sometimes called “uppers,” are substances that keep a person going mentally and physically.

Examples:

- Cocaine and amphetamine are restricted stimulants
- Caffeine and nicotine are readily available stimulants



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## 1. Amphetamines: History

a. The Chinese used a medicinal tea made from *ma huang* (*Ephedra*)

Active ingredient = ephedrine

- **Ephedrine** is a *sympathomimetic* drug
- Stimulates the sympathetic branch of the autonomic nervous system



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## 1. Amphetamines: History

b. A new synthesized chemical similar to ephedrine, called **amphetamine**, was invented in 1887 and **patented in 1932**

Amphetamine was used medically for:

- Asthma
- Narcolepsy
- Hyperactivity in children
- Appetite suppressant
- Stimulant



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## 1. Amphetamines: History

### c. 20<sup>th</sup> century Amphetamine use

i. **1940s: Soldiers** in World War II used it to fight fatigue

ii. **1960s:** the "**speed scene**" of '60s S.F.

- Amphetamine + heroin injected together = "**speedball**"
- Most street amphetamines came from prescriptions
- "Speed scene" = a time and place in which people used and became dependent on **intravenous amphetamine**

iii. **1970s: Tighter controls** with the C.S.A.P.A.

- Many look-alikes appeared
- Some users switched back to cocaine
- Illicit manufacture of methamphetamine grew

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# 1. Amphetamines: History



## iv. 1990s: methamphetamine hydrochloride (ice, crystal meth) use began to rise.

- Limited amphetamine availability increased the number of illicit laboratories making meth
- **Manufacture of methamphetamine is dangerous** and associated with toxic fumes and residue



## v. 21st c.: The most recent “meth scare” began around 2005-2006 with the recognition of a new amphetamine “epidemic” in the U.S. by the Bush Administration.

- The TV series “**Breaking Bad**” popularizes the story of a chemistry teacher who “**goes bad**.”
- **Carl Hart** (and others) believe the scare tactics (like “**Faces of Meth**”) are doing more harm than good.



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## A recent “Drug du Jour”: Bath Salts

### vi. “**Bath Salts**”

- Designer drugs similar to amphetamines often containing substituted “cathinones” (a re-design of the molecular structure)
  - Go by street names such as “Ivory Wave,” “Purple Wave,” “Vanilla Sky,” and “Bliss”
  - DEA has made illegal the possession and sale of three of the chemicals commonly used to make bath salts – the synthetic stimulants mephedrone, MDPV, and methylene.



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# 2. Amphetamine: Pharmacology

## i. Chemical structure of amphetamine is similar to the neurotransmitters epinephrine, norepinephrine, dopamine

- ii. The structure of methamphetamine allows it to more **easily cross the blood-brain barrier**
  - Ephedrine and PPA are less able to cross the barrier and so produce more peripheral than central nervous system effects

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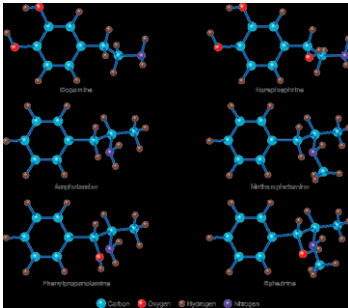
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## Molecular Structure



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## 2. Amphetamine: Pharmacology

### c. Absorption and Elimination

#### 1. Peak effects

- 1.5 hours after oral ingestion
- 5-20 minutes after intranasal administration
- 5-10 minutes following injection or smoking

#### 2. Half-life: 5-12 hours

- #### 3. Rapid tolerance
- (*tachyphylaxis*) can occur after high doses



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## 3. Amphetamine: Beneficial Uses

### a. Previous use for depression to temporarily elevate mood



- **Adjunctive therapy** - a treatment used together with primary treatment.
- The **benefit** of amphetamines is that their effects occur rapidly compared with standard antidepressant medications.

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### 3. Amphetamine: Beneficial Uses

#### b. Weight control

- Widely use to reduce food intake and body weight
- Effect is real, but small
- Combination of fenfluramine and phentermine ("fen-phen") was associated with heart valve damage and lung disease in some people



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### 3. Amphetamine: Beneficial Uses

#### c. Treatment of attention-deficit hyperactivity disorder (ADHD)

- Characterized by problems with inattention, hyperactivity, and impulsivity
- Stimulant medications can reverse catecholamine-associated deficits that may underlie ADHD
- Due to side effects and concerns about the risk of abuse, other treatments for ADHD are being studied



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### 3. Amphetamine: Beneficial Uses

#### d. "Smart pills"

- At a low level of arousal, may improve performance
- At a high level of arousal, may decrease performance, especially on complex or difficult tasks that require concentration

#### e. Athletics

- Under some circumstances, may produce slight improvements in athletic performance

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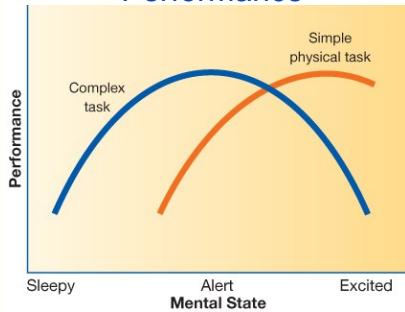
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## Effects of Stimulants on Performance



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## 4. Amphetamine Toxicity

### a. Acute behavioral toxicity

- Increases in feelings of power, suspicion, paranoia
- Potential risk of violent behavior
- Very high doses **may destroy catecholamine neurons**
- **Contaminants** formed during the manufacture of illicit methamphetamine may **have toxic effects** on brain cells

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## 4. Amphetamine Toxicity

### b. Chronic Toxicity from High-Dose Use

#### i. Paranoid psychosis

- Two possible reasons for the psychosis:
  - Heavy methamphetamine users have schizoid personalities.
  - Caused by sleep deprivation.
- Higher risk among those who inject the drug
- Claims of destructive properties to tissues (particularly of the skin and face) are overblown – scare tactic created by a small-town sheriff (cf. news story, [This Is 'Your Face On Meth.' Kids](#) and p.147 txt)

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## 4. Amphetamine Toxicity

### c. Dependence Potential of Amphetamines

- Often **no obvious withdrawal** symptoms
- Produce **psychological dependence**
- Capable of producing dependence as defined by DSM criteria
- A potent reinforcer

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