Amphetamines

Chem 2614, Fall 2018
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Introduction & Background
Our group will evaluate the effects of amphetamine on the brain.

**Purpose:**
- To create an awareness of the side effects & benefits of taking amphetamines.
- Our target audience
  - college students, a group known for a large portion of its members abusing amphetamine
  - Adults diagnosed with ADD/ADHD (9 million+)
  - 6.4 million children have been diagnosed
  - Non diagnosed users
History of Amphetamine

Past:

- Discovered ~100 years ago
  - α-methylphenethylamine
  - Benzedrine (old name)
  - G.A. Alles
- Alles, et al, found the ability of amphetamine to reverse drug-induced anesthesia & produces arousal & insomnia
- Treated:
  - narcolepsy
  - mild depression...
History of Amphetamine

Past: Drug used for ~everything

- $d$-amphetamine
  - most potent
  - Dexedrine
  - unrestricted along w/ Benzedrine until 1939 (prescription by registered med. practitioner/ Poison Register)

- Cognitive- enhancing properties
  - reduce stress
  - improve concentration
History of Amphetamine

Past: Treating ADHD

- L-amphetamine (Benzedrine)

Figure 1: 2D structure of Dextroamphetamine (PubChem)

Figure 1: 2D structure of Levamfetamine (PubChem)
History of Amphetamine

Present: Treating ADHD

- *l*-amphetamine used in mixed salts/mixed enantiomers amphetamine (MES-amphetamine)
  - *l*-amphetamine: *d*-amphetamine salts (3:1)
    - immediate release (Adderall®, generic)
    - extended release (Adderall XR®, generic)

- amphetamine prodrug
  - lisdexamfetamine dimesylate (Vyvanse®)
    - amino acid (L-lysine) covalently bonded to *d*-amphetamine
    - Metabolic route: absorbed into bloodstream→ metabolised by red blood cells→ *d*-amphetamine & L-lysine
Overview of the Project
What is Our Project

❖ Our group will collect information about the effects of amphetamine from a small pool of people in Northwest Arkansas.
❖ We then will go back to the people we surveyed and tell them about the information we collected from both research and the surveys.
How

- Data collected
  - Interviewed people close to us
  - Anonymous surveys
  - Recorded Answers on Google Docs/ MS Word
Team Members’ Tasks

❖ **Andres Garcia:** Developing surveys, analyzing data, collecting surveys, research chemical makeup

❖ **Kortnei Gabbard:** 1st powerpoint, collecting surveys, research medical studies about the drugs

❖ **Sonia Leonardo:** Research Amphetamine History, updating final powerpoint, collecting surveys

❖ **Walter Piecznski:** Setting up Google Drive folders, 1st written report, collecting surveys, research medical other medical studies
Community Aspect

How will results help the Northwest Arkansas Community?

This will help to collect data from people on a touchy issue and be able to forward to those people our findings so then they have the knowledge.
How does the project relate to the content covered in Organic Physiological Chemistry?

- Functional groups
  - Amine group
  - Methyl group
- Single chiral centre (Heal, et al., Psychopharm)
  - d (dextro-) & l (levo-) isomers/enantiomers

1-phenylpropan-2-amine
Methods & Use of Technology
Methods

❖ Outside Research done through multiple databases.
❖ Use of Google Drive to keep all contents accessible to everyone
❖ Anonymous Survey-MS word
  ➢ Interview people in our personal lives
    ■ diagnosed with ADHD
    ■ non diagnosed users
Survey Questions

1. Have you been diagnosed with ADD or ADHD?
2. How long have you been taking amphetamines? (Regardless if diagnosed or not)
3. Do you take the medicine on a regular basis or only when needed?
4. Do you sleep well while on such meds?
5. Do you feel like you perform tasks better and have heightened attention when taking these drugs?
6. Have you ever had a sense of euphoria while on such meds?
7. How do you feel emotionally/physically after the medicine wears off?
8. How do you feel emotionally/physically when you are on the medicine?
9. Have you ever taken any ADHD medicine or other amphetamines for medical/recreational use?
10. Have you ever felt any side effects? (Appetite loss, anxiety, head pains, etc.)
Results
How was Data Collected

- Collected through research on various databases
- Surveys of collegiate peers
Data and Results

- Out of the 29 peer participants, 13 people were diagnosed with either ADD or ADHD and 16 were not diagnosed.

- 15 males and 14 females were surveyed.

- The length of time that participants had been taking medications for ADD or ADHD had ranged from 6 months to 18 years.

- Many peers consumption varied from daily use and as far as a dose every 6 months.

- These participants ranged from 18-31 years of age.
Data and Results continued

● Out of 29 peers, 20 of them shared positive words such as “happy” and “hyped” to describe what they felt emotionally and physically while on the their medications.

● 6 others reported feeling normal while the remaining 3 said they felt anxious while on the meds.

● When asked how they felt emotionally and physically when off the meds, 20 participants described their feelings as sad/depressed, drained and fatigued after the meds wore off.

● The remaining 9 participants felt normal when asked how they felt off the meds.
Data and Results continued

- 18 people said they did not sleep well when on these meds and out of all of them, not one took their meds daily.
- 17 of those 18 people that did not sleep well reported to take these meds recreationally.
- The one person that did not take meds recreationally reported that they only take said meds “every now and then” and not daily.
- Another 8 peers out of the group of 29 reported that they had slept well while on meds
- All 8 of those peers had been diagnosed with ADD or ADHD and take meds daily
Conclusion:

- The 18 out of 29 peers surveyed that said they do not sleep well were not taking their drugs daily. As opposed to the 8 peer participants that had been diagnosed with ADD or ADHD. This could confirm that people who have been taking these drugs for ADD or ADHD daily will not have sleeping issues due to the consistency of their doses. The remaining 3 participants claimed that answered “sometimes” they don’t sleep well were left out.

- Last but not least everyone the one thing in common that everyone said they experienced was that they were fully focused and said they could performed many tasks while on their meds. Many described the feeling as having “tunnel vision” due to how focused they felt.
Irregularities

- Important details in surveys missing maybe due to
  - personal reasons
  - passed off a symptom as unimportant
  - does not recall a symptom(s) while taking the survey
    - Can not find words to describe
  - limited time to take survey
  - We did not add the necessary questions
Future Work

What can we do further along this project?

❖ Get more responses to our survey
  ➢ Different cities/towns near NWA
  ➢ National → International level
  ➢ Time for the information to be spread


Zheng Chang, PhD, Paul Lichtenstein, PhD, Brian M. D’Onofrio, PhD. (March 2014) Serious Transport Accidents in Adults With Attention-Deficit/Hyperactivity Disorder and the Effect of Medication