



# ADHD Medication and College Students: Prevent Misuse, Abuse, and Diversion

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# Conflicts of Interest Disclosures

- Advisor/Consultant for **Arbor Pharmaceutical Company**
- Receive research support from **Takeda Pharmaceutical Company**

# Outline

- ADHD & the double-edged sword of stimulant treatment
- Diversion – scope of the problem
- Diversion reduction – clinical recommendations
- Misuse – scope of the problem
- Misuse reduction – clinical recommendations
- Questions/Answers

# Prescription Stimulants for the Treatment of ADHD

## Stimulant medications are first-line therapy

Supported by strong evidence in guideline recommendations, and are widely accepted as some of the most effective treatments for patients with ADHD<sup>1-2</sup>

## Increasing utilization

2012 to 2019: prescriptions of ADHD stimulants increased from 49 million to 68 million per year<sup>1,3</sup>

Immediate-release (IR) amphetamine is the most commonly prescribed IR stimulant and is more often misused/abused than methylphenidate<sup>3,4</sup>

2019: Approximately one in five stimulant prescriptions filled for patients  $\leq 19$  years of age and over half of stimulant prescriptions filled for patients 20–39 years of age were for immediate release formulations<sup>3</sup>

## Risks despite benefits

When used as prescribed, ADHD stimulants are not associated with an increased risk of substance abuse<sup>5,6</sup>

When misused and/or abused, prescription stimulants can lead to a substance use disorder<sup>5</sup>

1. Wolraich ML, et al. *Pediatrics*. 2019;144:e20192528; 2. Faraone SV, et al. *Nat Rev Dis Primers*. 2015;1:15020; 3. IQVIA NPA 2019; 4. Bright GM. *Medscape J Med*. 2008;10:111; 5. National Institute of Drug Abuse; 6. Chang Z, et al. *J Child Psychol Psychiatry*. 2014; 55:878-885.

**DIVERSION**

## Prescription Stimulant Diversion is Common

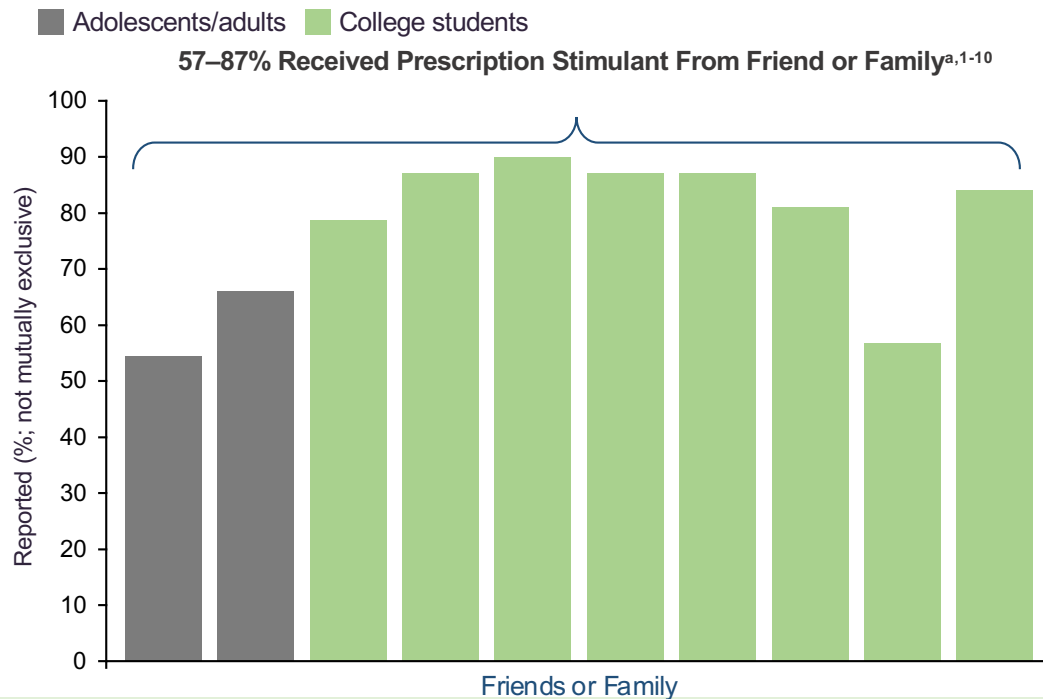
**35%** of children 10-17 taking prescription stimulants reported selling, giving or trading their prescription stimulants<sup>1</sup>

**62%** of college students prescribed ADHD stimulants have diverted their medication<sup>2</sup>

**75 – 91%** of college students who misused or abused a prescription stimulant obtained the medication from a peer<sup>3,4</sup>

**82%** of college students reported it was 'easy' or somewhat easy' to obtain stimulant medication<sup>5</sup>

# Family and Friends Are Most Common Sources of Diverted Prescription Stimulants for NMU



Survey data collected in 10 studies of individuals who reported misusing prescription stimulants

## 3 classes of individuals at greatest risk for diversion:<sup>11</sup>

- Students diagnosed with ADHD and treated with prescription stimulant medications for ADHD
- Students with or without an ADHD diagnosis and/or treatment who have conduct problems
- Nonmedical users of prescription drugs

<sup>a</sup>In Arria 2008, friend with prescription (78.7%), friend without prescription (15.6%), friend with unknown prescription status (6.7%), and family member with prescription (3.1%).

1. Cassidy TA, et al. *J Atten Disord*. 2015;19:275-83; 2. Novak SP, et al. *Subst Abuse Treat Prev Policy*. 2007;2:32; 3. Arria AM, et al. *Pharmacotherapy*. 2008;28:156-69; 4. DeSantis AD, et al. *J Am Coll Health*. 2008;57:315-24; 5. DuPont RL, et al. *Am J Addict*. 2008;17:167-71; 6. McNeil AD, et al. *J Dent Educ*. 2011;75:365-76; 7. Bavarian N, et al. *Drug Alcohol Depend*. 2013;132:665-73; 8. Hartung CM, et al. *Psychol Addict Behav*. 2013;27:832-40; 9. Jeffers AJ, et al. *Eat Behav*. 2014;15:414-8; 10. Wilens T, et al. *J Clin Psychiatry*. 2016;77:940-7; 11. Garnier LM, et al. *J Clin Psychiatry*. 2010;71:262-9.

## Diversion reduction – clinical recommendations: *Prescribers*

- ADHD in college students is most often managed in the pediatric primary care setting<sup>1</sup>
- *American Academy of Pediatrics (AAP)* recommends that pediatric PCP's “monitor prescription refill requests for signs of misuse or diversion of ADHD medication” (p. 15)<sup>2</sup>
- AAP directs prescribers to two strategies: 1) statewide prescription drug monitoring programs and 2) use of non-stimulant medications<sup>2</sup>



## PCP Diversion Prevention: *Knowledge*

- Parenting behaviors (e.g., monitoring, communication) and qualities of parent-teen relationships (e.g., warmth, acceptance, support) = ↓ risky behaviors<sup>1</sup>
- Specific knowledge about stimulant diversion risk factors such as:
  - Frequent peer victimization (most days or daily)<sup>2</sup>
  - Comorbid conduct disorder and/or substance use disorder<sup>3</sup>

1. Kumpfer & Alvarado, 2003; 2. Epstein-Ngo et al., 2016; 3. Wilens et al., 2006

## PCP Diversion Prevention: *Skills*

- Having ongoing conversations with the adolescent about diversion risk reduction behaviors such as
  - Not publicizing stimulant prescription to peers
  - Storing medication in a concealed, locked container
- Role playing scenarios with the adolescent related to diversion (e.g., peer pressures college student to share medications)
- Having conversations about the legal and health risks associated with diversion using a motivational interviewing (MI) framework

# Stimulant Diversion Risk Among College Students Treated for ADHD: Primary Care Provider Prevention Training



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## ABSTRACT

**OBJECTIVE:** To address increasing rates of stimulant misuse in college students, this study developed an evidence-based, brief clinical practice intervention for primary care providers (PCPs) to reduce stimulant medication diversion among young adults with attention-deficit/hyperactivity disorder (ADHD).

**METHODS:** College students (N=114; 18–25 years; 68% attending universities; 24% attending community college) treated for ADHD with a stimulant and their PCPs across six practices participated in this initial, uncontrolled study of pre- to post-intervention change. An educational workshop providing strategies aimed at reducing stimulant diversion was developed and delivered to providers and staff across all practices (50% pediatric; 50% family medicine). Patients and providers completed baseline and post intervention surveys.

**RESULTS:** Diversion was relatively infrequent, 16.7% at baseline and 14.9% post-intervention, respectively. Statistically significant decreases from baseline to post-intervention were found for three diversion risk factors: (1) number of times

approached to divert, (2) intent to share, sell, or trade stimulants, and (3) disclosure of stimulant use. Providers and staff reported mostly high satisfaction with the training.

**CONCLUSIONS:** This study provides initial evidence for a PCP-delivered intervention to reduce stimulant diversion. Research is needed on the efficacy of targeting college students directly, working with pharmacies and student health centers, and preventing misuse among teenagers.

**KEYWORDS:** Attention-deficit/hyperactivity disorder (ADHD); college students; prescription misuse

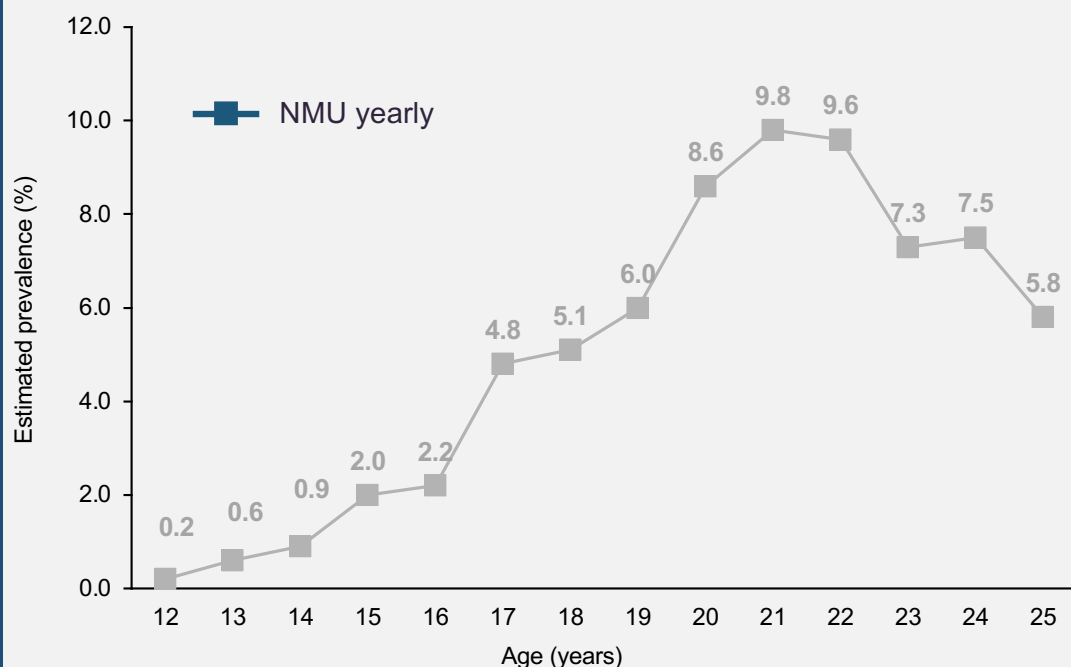
**ABBREVIATIONS:** PCPs, primary care providers; ADHD, attention-deficit/hyperactivity disorder; EMR, electronic medical records; GEE, generalized estimating equations

**ACADEMIC PEDIATRICS** 2020;20:119–127

MISUSE / ABUSE

# Yearly Prescription Stimulant NMU Increases Through Adolescence To Young Adulthood

## National Survey on Drug Use and Health Data - 2017<sup>1</sup>



### NMU of prescription ADHD stimulants was reported in:

- 6,253 of 195,728 adolescents (3.2%) in 6 studies<sup>2-7</sup>
- 2,787 of 21,718 college students (12.8%) in 12 studies<sup>8-19</sup>
- 8,472 of 135,053 adults (6.2%) in 4 studies<sup>6,20-22</sup>

NMU, nonmedical use.

1. Center for Behavioral Health Statistics and Quality. 2017 National Survey on Drug Use and Health: Detailed Tables. 2018. Table 1.25B. Substance Abuse and Mental Health Services Administration, Rockville, MD;  
2. Chen L-Y, et al. *Addict Behav.* 2015;49:1-6; 3. McCabe SE, et al. *J Am Acad Child Adolesc Psychiatry.* 2013;52:1272-80; 4. McCabe SE, et al. *Drug Alcohol Depend.* 2016;163:55-63; 5. McCabe SE, et al. *J Am Acad Child Adolesc Psychiatry.* 2017;56:226-33; 6. Chen L-Y, et al. *Addict Behav.* 2014;39:829-36; 7. Poulin C. *Addict.* 2007;102:740-51; 8. Arria AM, et al. *Pharmacotherapy.* 2008;28:156-69; 9. Arria AM, et al. *Addict Behav.* 2013;38:1643-50; 10. DuPont RL, et al. *Am J Addict.* 2008;17:167-71; 11. Egan KL, et al. *Drug Alcohol Depend.* 2013;131:71-7; 12. Garnier-Dykstra LM, et al. *J Am Coll Health.* 2012;60:226-34; 13. Holt LJ, et al. *Subst Use Misuse.* 2018;53:1068-75; 14. Kinman BA, et al. *Subst Use Misuse.* 2017;52:1256-65; 15. McNeil AD, et al. *J Dent Educ.* 2011;75:365-76; 16. Rabiner DL, et al. *J Atten Disord.* 2010;13(6) 640-8; 17. Teter CJ, et al. *J Am Coll Health.* 2005;53:253-262. 18. Tuttle JP, et al. *Acad Psychiatry.* 2010;34:220-3; 19. Wasserman J, et al. *Am Osteopath Assoc.* 2014;114:643-53; 20. Cassidy TA, et al. *J Atten Disord.* 2015;19:630-40; 21. Novak SP, et al. *Subst Abuse Treat Prev Policy.* 2007;2:32; 22. Upadhyaya HP, et al. *Am J Addict.* 2010;19:569-77.

# Motivations for NMU of Prescription Stimulants

## Adolescents/Adults

In multiple surveys, the most commonly reported motivations for any **NMU** of prescription stimulants were:<sup>1-9</sup>

- Perceived performance enhancement in academic/occupational setting
- Recreational use
- Get high
- Enhance the effects of alcohol
- Enhance social situations and socializing
- Enhance wakefulness while partying or going out with friends

## College Students

The most common motivations for non-medical, **non-oral** abuse of prescription stimulants were:<sup>10</sup>

- Perceived performance enhancement at work or school
- For energy
- Treat ADHD
- Improve mood/elevate spirit
- Get high
- Control appetite/for weight loss

1. Faraone SV, et al. *J Am Acad Child Adolesc Psychiatry*. 2020;59:100-112; 2. Novak SP, et al. *Subst Abuse Treat Prev Policy*. 2007;2:32; 3. Cassidy TA, et al. *J Atten Disord*. 2015;19:275-83; 4. Advokat CD, et al. *J Am Coll Health*. 2008;56:601-6; 5. Arria AM, et al. *Pharmacotherapy*. 2008;28:156-69; 6. Desantis A, et al. *J Stud Alcohol Drugs*. 2009;70:952-54; 7. Desantis A, et al. *J Drug Educ*. 2010;40:157-71; 8. Rabiner DL, et al. *J Atten Disord*. 2009;13:259-70; 9. Verdi G, et al. *J Atten Disord*. 2016; 20:741-52; 10. Green JL. 2019; NAVIPPRO analysis report, Arbor Data on File.

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## **Medicinal Stimulant Misuse: Justifications**

# **“Adderall is Definitely Not a Drug”: Justifications for the Illegal Use of ADHD Stimulants**

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# College Student **Justifications** for Stimulant Misuse<sup>1</sup>

**Comparison and Contrast** - Comparing and contrasting stimulants with “party drugs”

- *I’m-doing-it-for-the- right-reasons* (stimulants are being taken to get better grades, and not to get high)
- *No-external/societal-side-effects*. Stimulants have no external (*legal or societal*) side effects. “It helps me, and it hurts no one.”

## **Moderation**

- Strategic about when and why they use it (e.g., during periods of high academic stress)

## **Self-Medicating**

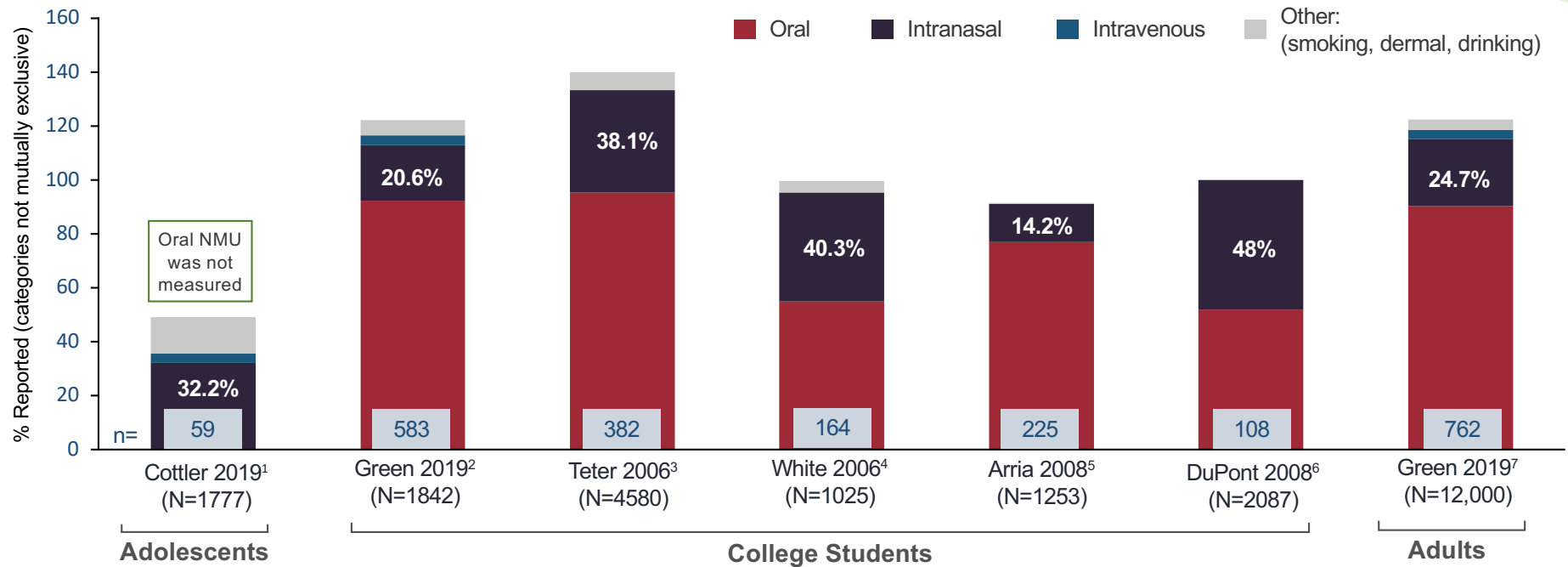
- Conclude that, given their symptoms, they must have ADHD - self- medicating is the right thing to do

## **Minimization**

- Frame stimulants as harmless, benign, and socially acceptable – equal to socially acceptable caffeine, in all its forms (coffee, soft drinks)



# Intranasal Is a Common Non-Oral Route of Administration for Those Who Nonmedically Use Prescription Stimulants



Studies may contain data on more than one route of administration per participant

N's below each bar represent the total population size analyzed; n represents the number included in the ROA analysis. ROA, route of administration

1. Cottler LB. 2019; SNAPS report, Arbor Data on File; 2. Green JL. 2019; NAVIPPRO analysis report, Arbor Data on File; 3. Teter CJ, et al. *Pharmacotherapy*. 2006;26:1501-10; 4. White BP, et al. *J Am Coll Health*. 2006;54:261-8; 5. Arria AM, et al. *Pharmacotherapy*. 2008;28:156-69; 6. DuPont R, et al. *Am J Addict*. 2008;17:167-71; 7. Green 2019.

# Misuse Prevention - University Administration

## ACADEMIC DISHONESTY

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### Lying

Lying is communicating untruths or misrepresentations in order to gain an unfair academic or employment advantage. *[Wording adopted from the Duke Fuqua School of Business code.]*

It includes, but is not limited to:

- falsifying information on a résumé;
- misrepresenting one's own research;
- providing false or misleading information in order to be excused from classes or assignments; or
- intentionally underperforming on a placement exam..

### Cheating

Cheating is the act of wrongfully using or attempting to use unauthorized materials, information, study aids, or the ideas or work of another in order to gain an unfair advantage. It includes, but is not limited to:

- plagiarism on any assignment;
- giving unauthorized aid to another student or receiving unauthorized aid from another person on tests, quizzes, assignments or examinations;
- using or consulting unauthorized materials or using unauthorized equipment or devices on tests, quizzes, assignments or examinations;
- altering or falsifying any information on tests, quizzes, assignments or examinations;
- using any material portion of a paper or project to fulfill the requirements of more than one course unless the student has received prior faculty permission to do so;
- working on any examination, test, quiz or assignment outside of the time constraints imposed;
- the unauthorized use of prescription medication to enhance academic performance;



Contents lists available at [ScienceDirect](#)

## Drug and Alcohol Dependence

journal homepage: [www.elsevier.com/locate/drugalcdep](http://www.elsevier.com/locate/drugalcdep)



### Challenging expectancies to prevent nonmedical prescription stimulant use: A randomized, controlled trial



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College student drug use  
Methylphenidate  
MPH

#### ABSTRACT

**Background:** College students continue to report nonmedical prescription stimulant use to enhance alertness and concentration. Despite increasing prevalence of this behavior, techniques for preventing or treating it are lacking. An intervention that focuses on challenging positive consequence-oriented beliefs about prescription stimulants may be efficacious in preventing use.

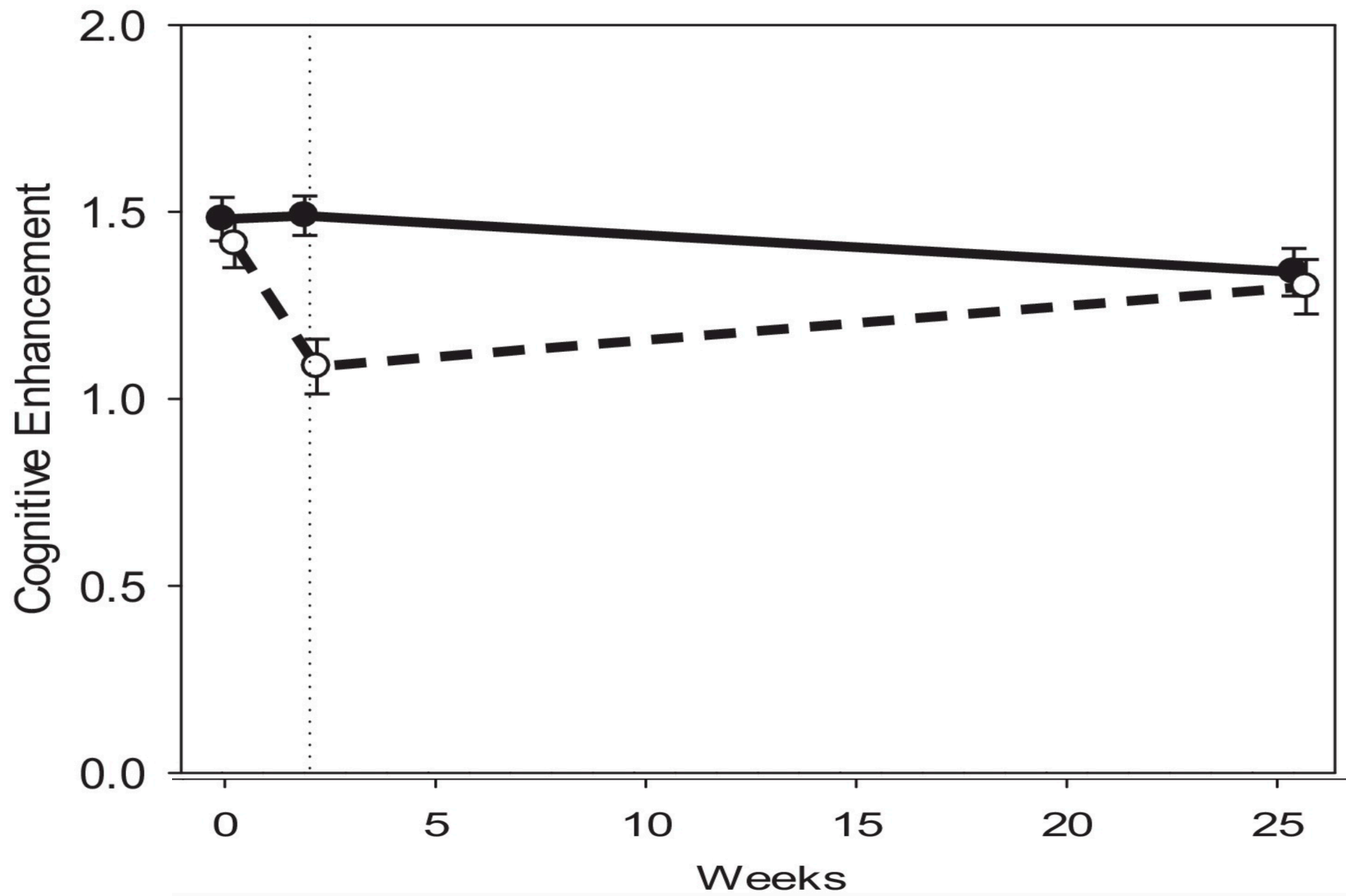
**Methods:** The current study examined the efficacy of a randomized controlled expectancy challenge intervention to prevent nonmedical prescription stimulant use among 96 at-risk, stimulant-naïve college students (i.e., low grade point average, Greek involvement, binge drinking, cannabis use). Forty-seven participants completed a brief expectancy challenge intervention aimed at modifying positive expectancies for prescription stimulants, to consequently deter initiation of use. The remaining participants received no intervention.

**Results:** The expectancy challenge successfully modified expectancies related to prescription stimulant effects. Nevertheless, this intervention group and a control group showed comparable rates of nonmedical prescription use at 6-month follow-up. However, negative expectancies were significant predictors of reduced odds of future use.

**Conclusions:** A challenge session appears to modify stimulant-related expectancies, which are related to nonmedical prescription stimulant use. Nevertheless, a more potent challenge or booster sessions might be essential for longer-term changes.

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Misuse  
Prevention –  
Clinicians





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## Addictive Behaviors

journal homepage: [www.elsevier.com/locate/addictbeh](http://www.elsevier.com/locate/addictbeh)



### Perceived academic benefit is associated with nonmedical prescription stimulant use among college students



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## Drug and Alcohol Dependence

journal homepage: [www.elsevier.com/locate/drugalcdep](http://www.elsevier.com/locate/drugalcdep)



Full length article

### Mixed-amphetamine salts expectancies among college students: Is stimulant induced cognitive enhancement a placebo effect?



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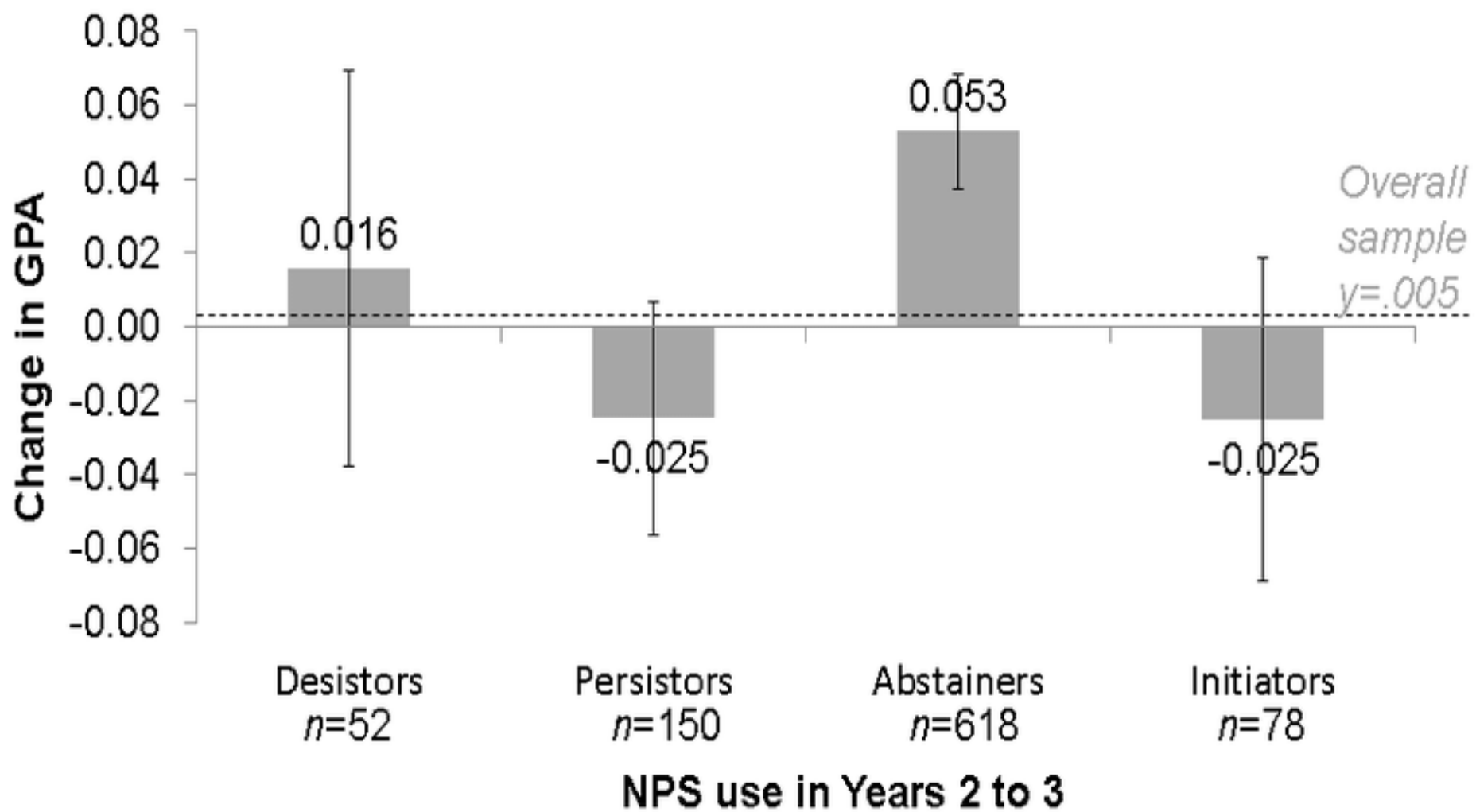
#### ABSTRACT

**Introduction:** Non-medical use of prescription stimulants for cognitive enhancement in college students is increasing, despite evidence showing little benefit in non-clinical populations. The balanced placebo design (BPD) was used to independently evaluate the pharmacologic versus expectancy effects of mixed amphetamine salts on cognitive performance among a non-clinical sample of college-aged students.

**Method:** Participants were screened and excluded for ADHD and other psychopathologies. A non-clinical sample (N = 32) completed four two-hour laboratory sessions and were administered a neurocognitive battery in each session. Medication Assignment (10 mg mixed-amphetamine salt (Adderall™) versus placebo) was crossed with Instructional Set (deception versus truth). A within-subjects design was used, such that all participants experienced each of the four conditions of the BPD during one of the four laboratory sessions.

**Results:** Participants performed no better than chance in identifying whether they received stimulant or placebo (Belief about Medication Assignment; 47% agreement;  $\kappa = -0.047$ ,  $p = 0.590$ ). Participants showed improvement on only two of 31 subtests during active medication. Expecting and receiving stimulants was associated with improved cognitive performance. However, expecting placebo was associated with worse cognitive performance, regardless of the type of medication given.

**Discussion:** This study demonstrated that although non-medical use of stimulants does not enhance cognition, expectancies prominently influence cognitive performance. Participants who believed they received active medication both subjectively rated themselves as performing better and objectively performed better on a minority of subtests, independent of medication state.



Misuse  
Prevention –  
Public Health  
Perspective

### **Primary Prevention**

Interventions designed to prevent the onset or future incidence of a specific problem

### **Secondary Prevention**

An early intervention that decreases the prevalence of a specific problem

### **Tertiary Prevention**

Treatment designed to improve quality of life and reduce the symptoms after a disease or disorder has developed

Does not reduce incidence or prevalence





Contents lists available at ScienceDirect

## Addictive Behaviors



### Psychostimulant use among college students during periods of high and low stress: An interdisciplinary approach utilizing both self-report and unobtrusive chemical sample data



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#### HIGHLIGHTS

- Patterns of psychostimulant use over periods of high and low stress
- Self-report measures and chemical wastewater analysis compared
- Psychostimulant use increased during periods of higher academic stress.
- Predictors of lifetime non-prescriptive psychostimulant use investigated

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Ritalin  
Wastewater analysis  
Stress  
Coping

#### ABSTRACT

This study quantified psychostimulant use patterns over periods of high and low stress from both self-report measures and chemical wastewater analyses and identified possible predictors of psychostimulant abuse on a college campus. Self-report data were collected at three times of varying stress levels throughout one college semester: during the first week of school ( $N = 676$ ), midterms ( $N = 468$ ), and shortly before final exams ( $N = 400$ ). Campus wastewater samples were collected over 72-hour periods during the same time frames as the surveys. The metabolites of Adderall and Ritalin were quantified through solid phase extraction and liquid chromatography–tandem mass spectrometry (LC–MS/MS). Samples were normalized with creatinine. Evidence was found to suggest an increase in psychostimulant use during periods of stress, with significant differences found from self-report data between the first week and midterms and from chemical data between these same two assessment periods as well as between the first week of classes and finals. **Key predictors of lifetime non-prescriptive psychostimulant use included self-reported procrastination and poor time-management, use of other substances (especially nicotine/tobacco, alcohol, and cocaine), and students' perception of non-prescriptive psychostimulant use as normative on campus.** The findings shed further light on psychostimulant use patterns among college students, particularly as a function of stress; the study also highlights the benefit of utilizing an interdisciplinary approach that uses both subjective and objective empirical data. The results have implications for prevention/intervention programs on college campuses designed to reduce stress and facilitate healthier coping.

1. ↓ alcohol
2. ↓ procrastination
3. Change injunctive norms



Thank you!



Questions?



*“Behold, as I guide our conversation to my narrow area of expertise.”*