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Motives for prescription stimulant use by patterns of non-medical use

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Abstract

Background: Understanding motivations behind non-medical use of prescription stimulants (NMUPS) is important to prevent such use.

Methods: Adult participants from St. Louis, MO, who endorsed NMUPS on 5 or more days in the past 12 months (n=60) were asked about their motivations for use. Associations between motives for use and patterns of non-medical use in the past 12 months were assessed using multivariable logistic regression, controlling for demographic factors and non-medical use of other prescription drugs.

Results: On average, 5.5 different motives for stimulant use were endorsed. Compared to those who only used someone else's stimulants, adults who only used stimulants other than prescribed were less likely to endorse use "to get high" (aOR=0.48, 95%CI 0.26–0.90) and more likely to endorse use "to function" (aOR=1.97, 95%CI 1.04–3.75); adults who were engaged in both patterns of NMUPS were more likely to endorse use "to function" (aOR=4.12, 95%CI 1.56–10.88) and "to modify the effects of other drugs" (aOR=2.29, 95%CI 1.13–4.61).

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Conflict of interest

There are no conflicts of interest.

Conclusion: Although using stimulants for performance enhancement is common, most people who used diverted stimulants reported using stimulants to get high. Prevention and harm reduction strategies should consider these differences.

Keywords

prescription stimulants; motives; non-medical use; prescription medications

Introduction

Prescription stimulants such as Adderall™ and Ritalin™ are commonly used to treat attention deficit hyperactivity disorder (ADHD) (Antshel, Biederman, Spencer, & Faraone, 2016). Other indications for prescription stimulant use include narcolepsy and obesity. Despite their medical use, stimulants are frequently used for non-medical purposes. In 2017, 1.8 million people in the US aged 12 years or older reported non-medical use of prescription stimulants (NMUPS) in the past month. The prevalence of NMUPS was highest among young adults aged 18–25 years, among whom 2.1% reported NMUPS in the past month. This prevalence is higher than the rate of non-medical use of prescription opioids, sedatives and tranquilizers in the same age group. (Bose, Hedden, Lipari, & Park-Lee, 2018). Moreover, NMUPS is associated with several negative consequences, including engagement in risk behaviors, overdose, mental health disorders, hypertension, myocardial infarction, and even death (Chen et al., 2016; Kennedy, Bebar, Varney, Zarzabal, & Ganem, 2015; McCabe, Knight, Teter, & Wechsler, 2005; Sussman, Pentz, Spruijt-Metz, & Miller, 2006; Westover & Halm, 2012).

Given the prevalence and negative health outcomes associated with NMUPS, a better understanding of motives for non-medical use is needed to more effectively develop interventions to prevent such use. Many studies on this subject focused on samples of college students and adolescents and among this age range, three systematic reviews consistently found that the most frequently reported motivation for use was to improve academic performance and productivity, e.g. improving concentration, staying awake while studying, or managing academic stress (Bennett & Holloway, 2017; Benson, Flory, Humphreys, & Lee, 2015; Drazdowski, 2016). Other motivations such as getting high, losing weight, satisfying curiosity, and modifying the effects of other substances were also endorsed by college students but less commonly than academic- and performance-related motives (Judson & Langdon, 2009; Lookatch, Dunne, & Katz, 2012) and were rarely endorsed as the sole motivation for use (Peterkin, Crone, Sheridan, & Wise, 2011; Rabiner et al., 2009). Weight and appetite control were more likely to be endorsed by females than males (Dussault & Weyandt, 2013; Striley, Kelso-Chichetto, & Cottler, 2017). Curiosity was more likely to be endorsed by younger students than older students (Garnier-Dykstra, Caldeira, Vincent, O'Grady, & Arria, 2012). Motives for use reflect the needs for and expectations of non-medical use of prescription medications and are critically important to understand for intervention development (Dow & Kelly, 2013; Patrick et al., 2011).

In addition to motives for use, knowing the patterns of prescription medication non-medical use (use of someone else's diverted medication or use of own medication but with an

incorrect dose, frequency, or route of administration) has important implications for developing or improving intervention (Chen et al., 2016; Garnier-Dykstra et al., 2012; McCabe, Teter, & Boyd, 2006; Wang, Cottler, & Striley, 2015). For example, if a motive is more closely associated with using someone else's drug, the intervention should be focused on preventing diversion in the community. On the other hand, knowing the motives that are commonly reported by people who are misusing their own prescription could help improve early interventions at the doctor's office when the medication is prescribed and at home by parents and family members would be appropriate. However, most previous studies have combined different patterns or targeted only one pattern of non-medical use (Drazdowski, 2016). Currently, it is not clear whether there are differences in motives for use across different patterns of NMUPS.

Based on these gaps in the field, the aim of this analysis was to examine whether there were differences in motives for prescription stimulant use across different patterns of non-medical use among a community-based sample of adults, the majority of whom were aged 18–25. We hypothesized that motivations for stimulant use would differ significantly by patterns of NMUPS and individuals who reported both using their own medications not as proscribed and using someone else's medications would endorse a greater number of motivations for use.

Methods

Sample

The *Prescription Drug Misuse, Abuse, and Dependence Study*, funded by NIDA, was conducted in St. Louis, Missouri. Participants were recruited into the study from 2008 to 2010 by community health workers using targeted sampling (Nattala, Leung, Abdallah, & Cottler, 2011). Adults who endorsed using Adderall™, Xanax™, Vicodin™, or a similar prescription drug in the last 12 months were eligible to participate. The Washington University Risk Behavior Assessment (WU-RBA) for prescription drugs, a structured interview, was administered to participants in-person (Cottler et al., 2011; Nattala, Leung, Abdallah, Murthy, & Cottler, 2012; Shacham & Cottler, 2010). Among all participants (n = 422), 60 reported NMUPS for more than 5 days in the past 12 months and were included in the current analyses. The use of "more than 5 days" as the threshold was originally developed for the Epidemiologic Catchment Area Study (ECA) and has been used ever since to indicate that drug use is "more than experimental" (Robins, 1985). The assessment was administered twice, one week apart, to test the reliability of the interview and 49 of 60 participants completed the second assessment. Answers from the two interviews were compared to assess test-retest reliability specifically for motivations for prescription stimulant use. Only answers from the first interview were used for the other analyses.

Data collected included various sociodemographic factors, non-medical use of various classes of prescription drugs, and motivations for use. Participants who used prescription stimulants non-medically were identified by asking (Q1) "how many days in the last 365 days did you use stimulants that were prescribed for you but used them in a way other than prescribed-like by using them more than prescribed or after your prescription ended or for a different reason?" and (Q2) "how many days in the last 365 days did you use stimulants that

were not prescribed for you?”. Three mutually-exclusive groups were created. Participants who endorsed non-medical use of their own prescription stimulants but did not endorse use of a diverted prescription stimulant were classified as “used other than prescribed only.” Those who did not endorse non-medical use of their own prescription stimulants but did endorse using a diverted prescription stimulant were classified as “used someone else’s stimulants only.” Those who answered at least 1 day to both questions were classified as “both.” If participants reported NMUPS on more than 5 days in the past year ($Q1 + Q2 > 5$), they were asked about motives for use. The 12 motives were categorized into three groups: recreation, performance and productivity enhancement, and other. Possible responses for each individual motive were “yes” or “no,” and respondents could endorse multiple motives. As part of the original study, focus groups were conducted during which motives for prescription drug use were explored. Motives included in the WU-RBA were selected based on the findings from those focus groups, covering most common motives for prescription drug use. Study protocols and procedures were approved by the Washington University Institutional Review Board (IRB); written informed consent was obtained from all participants.

Statistical Analysis

Fisher’s exact tests were conducted for each motive to test its association with different patterns of NMUPS. One-way ANOVA tests were conducted to compare the number of motives endorsed by different groups. Motives with a statistically significant finding ($p < 0.05$) were further analyzed using multivariable logistic regression, controlling for demographic factors and non-medical use of other prescription drugs. Cohen’s kappa and intraclass correlation coefficient (ICC) were used to assess test-retest reliability. Analyses were conducted using SAS 9.4.

Results

Of the 60 participants (aged 18 – 54 years), nearly two-thirds were between the ages of 18 and 25 years or male (Table 1). More than half reported being employed or a student, and 68% had no more than a high school degree. More than half of respondents endorsed using multiple substances in the past 12 months, including 57% who endorsed non-medical use of prescription opioids and 60% who endorsed non-medical use of prescription sedatives. Almost half of participants (48%) reported only using someone else’s prescription stimulant and another 27% reported only using their own prescription stimulant, but in a way other than prescribed. The remaining quarter (25%) reported both.

The Cohen’s kappa shows good reliability between the two interviews in reporting motivation for stimulant use except for “out of curiosity or just to experiment” (Table 2). The most frequent category of motive cited for NMUPS was performance and productivity enhancement, including “to study/to concentrate” (87%), “to stay awake” (85%), and “to increase energy level” (85%).

The proportion of participants that endorsed using prescription stimulants “to get high,” “to function” and “to modify effects of other drugs” differed significantly by patterns of NMUPS. On average, 5.5 different motives for stimulant use were endorsed by individuals.

Participants who reported using someone else's stimulants, regardless of whether they had misused their own prescriptions, endorsed more recreational motives than those who only reported using their own prescription stimulants non-medically. Participants who reported misusing their own prescription stimulants endorsed more performance and productivity enhancement motives than those who didn't have a prescription of their own and used someone else's stimulants.

After adjusting for covariates, adults who reported only using stimulants other than prescribed were significantly less likely than those who reported only using someone else's stimulants to use stimulants "to get high" (adjusted odds ratio (aOR) =0.48, 95% confidence interval (CI): 0.26–0.90) (Table 3). Compared to those who only used someone else's stimulants, adults who reported only using stimulants other than prescribed and those who reported both patterns of NMUPS were about two times (aOR =1.90, 95% CI: 1.04–3.75) and more than four times (aOR = 4.12, 95% CI: 1.56–10.88) as likely to endorse using stimulants "to function," respectively. Users who reported both patterns of NMUPS had higher odds of endorsing wanting to modify the effects of other drugs than those who used someone else's stimulants (aOR=2.29, 95% CI: 1.13–4.61).

Discussion

In our analyses, we found that performance and productivity enhancement-related motives, such as staying awake and concentrating, were the most commonly endorsed motives for prescription stimulant use. This finding is consistent with previous studies (Bennett & Holloway, 2017; Benson et al., 2015; Drazdowski, 2016), and suggests that people who use stimulants non-medically believe that these drugs will have a positive impact on their performance, though some previous studies have shown a modest negative or no association between NMUPS and performance outcomes (Evans et al., 2001; McCabe, Teter, et al., 2006). Researchers have also found that NMUPS is more normatively acceptable than non-medical use of other prescription drugs such as prescription opioids or illicit drugs, because stimulants are often considered study aids rather than recreational drugs (DeSantis & Hane, 2010; León & Martínez, 2017). Individuals may be more willing to divert prescription stimulants than prescription opioids because they believe they are benefitting the recipient rather than promoting recreational use (Kerley, Copes, & Griffin, 2015). However, we found that a majority of people using someone else's stimulants, and people using stimulants for which they have no prescription in addition to using their own prescribed stimulants in ways other than prescribed, used stimulants to get high and endorsed more recreational than performance-enhancing motives. This suggests that interventions should try to change perceptions and norms about NMUPS and prevent prescription holders from rationalizing diversion (DeSantis & Hane, 2010; Kerley et al., 2015).

Moreover, compared to adults who only use someone else's stimulants, those who only use stimulants other than prescribed and those who engage in both patterns of NMUPS were significantly more likely to endorse using stimulants "to function." Other studies have found a high rate of prescription stimulant abuse among ADHD patients for self-medication purposes (Peles, Schreiber, Linzy, Domani, & Adelson, 2015). Some users with prescriptions have failed to follow the prescribed regimen and have stocked up on

medications to take a larger dose when needed (Gallucci, Martin, Beaujean, & Usdan, 2015). However, “to function” is an indication for prescription stimulant use, and our analyses cannot differentiate between whether people endorsed this motive for medical or non-medical reasons.

Lastly, “to modify the effects of other prescription drugs” was another motive more frequently endorsed by users engaged in both patterns of NMUPS than those who only used someone else’s stimulants. Perhaps taking stimulants to modify the effects of other drugs is an unplanned and impulsive action, which stimulant users without their own prescriptions are unlikely to do because they don’t have easy access to quickly acquire stimulants. In addition, this motive is an indicator of concurrent polysubstance use, which is more dangerous than misuse of only one drug (Liu, Williamson, Setlow, Cottler, & Knackstedt, 2018; McCabe, Cranford, Morales, & Young, 2006). When physicians are prescribing stimulants, they should screen for other drug use and explain the risks associated with using more than one drug. If using more than one medication is part of the regimen, the physician should inform the patient about the safe ways to use them together. They should also remind family members that it is important not to use drugs in ways other than prescribed.

This study has some limitations. First, the sample size was relatively small with only 60 participants endorsing non-medical use of prescription stimulants and we may be underpowered to identify smaller differences. However, information on each motivation for NMUPS was reliably reported by patients with most kappa showing good to excellent agreement. This reduces the likelihood of random error in our measurement effecting the study findings. Second, the results may not be generalizable to all people who use prescription stimulants non-medically since participants were recruited from one city rather than nationally. The study also relied on self-reported information, which may result in misclassification due to errors in recall or social desirability. To minimize the likelihood of recall bias, only drug use within the past 12 months was assessed, and participants were reassured of the NIDA Certificate of Confidentiality, which protects the data collected. Despite these limitations, to our knowledge, this study is the first to examine the association between motives for use and different patterns of non-medical use among a sample of adults recruited from the community – rather than an academic or treatment – setting.

Conclusion

Examining motives for drug use can be helpful in understanding the consequences associated with NMUPS and in designing and improving interventions (McCabe, Boyd, & Teter, 2009; McCabe, Cranford, Boyd, & Teter, 2007). We found differences in the endorsement rate for using stimulants “to get high,” “to function,” and “to modify the effects of other drugs” by patterns of non-medical use. More than half of stimulant users who acquire their stimulants from someone else reported using stimulants to get high. This underscores the importance of changing prescription holders’ perception that prescription stimulants are not recreational drugs, as this perception may rationalize their diversion. In addition, we found that to function and to modify the effects of other drugs were more likely to be endorsed by people who misuse their own medication. When prescribing these medications, doctors should educate their patients regarding the risks associated with

changing the regimen to self-medicate and how to safely use more than one prescription medication if they were both in the regimen. Future studies could validate these findings with a larger and/or nationally-representative sample and further explore this relationship and clusters of motivations instead of individual motivations (McCabe & Cranford, 2012).

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References

- Antshel KM, Biederman J, Spencer TJ, & Faraone SV (2016). The Neuropsychological Profile of Comorbid Post-Traumatic Stress Disorder in Adult ADHD. *J Atten Disord*, 20(12), 1047–1055. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24567364>. doi:10.1177/1087054714522512 [PubMed: 24567364]
- Bennett T, & Holloway K (2017). Motives for illicit prescription drug use among university students: A systematic review and meta-analysis. *Int J Drug Policy*, 44, 12–22. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28343063>. doi:10.1016/j.drugpo.2017.02.012 [PubMed: 28343063]
- Benson K, Flory K, Humphreys KL, & Lee SS (2015). Misuse of stimulant medication among college students: a comprehensive review and meta-analysis. *Clin Child Fam Psychol Rev*, 18(1), 50–76. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/25575768>. doi:10.1007/s10567-014-0177-z [PubMed: 25575768]
- Bose J, Hedden S, Lipari R, & Park-Lee E (9 2018). Key Substance Use and Mental Health Indicators in the United States: Results from the 2017 National Survey on Drug Use and Health In. Substance Abuse and Mental Health Services Administration.
- Chen LY, Crum RM, Strain EC, Alexander GC, Kaufmann C, & Mojtabai R (2016). Prescriptions, nonmedical use, and emergency department visits involving prescription stimulants. *J Clin Psychiatry*, 77(3), e297–304. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26890573>. doi:10.4088/JCP.14m09291 [PubMed: 26890573]
- Cottler LB, Ben Abdallah A, Cummings SM, Barr J, Banks R, & Forchheimer R (2011). Injury, pain, and prescription opioid use among former National Football League (NFL) players. *Drug Alcohol Depend*, 116(1–3), 188–194. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/21277121>. doi:10.1016/j.drugalcdep.2010.12.003 [PubMed: 21277121]
- DeSantis AD, & Hane AC (2010). “Adderall is definitely not a drug”: justifications for the illegal use of ADHD stimulants. *Subst Use Misuse*, 45(1–2), 31–46. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20025437>. doi:10.3109/10826080902858334 [PubMed: 20025437]
- Dow SJ, & Kelly JF (2013). Listening to youth: Adolescents’ reasons for substance use as a unique predictor of treatment response and outcome. *Psychol Addict Behav*, 27(4), 1122–1131. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23276316>. doi:10.1037/a0031065 [PubMed: 23276316]
- Drazdowski TK (2016). A systematic review of the motivations for the non-medical use of prescription drugs in young adults. *Drug Alcohol Depend*, 162, 3–25. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26851986>. doi:10.1016/j.drugalcdep.2016.01.011 [PubMed: 26851986]
- Dussault CL, & Weyandt LL (2013). An examination of prescription stimulant misuse and psychological variables among sorority and fraternity college populations. *J Atten Disord*, 17(2), 87–97. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22142699>. doi:10.1177/1087054711428740 [PubMed: 22142699]

- Evans SW, Pelham WE, Smith BH, Bukstein O, Gnagy EM, Greiner AR, ... Baron-Myak C (2001). Dose-response effects of methylphenidate on ecologically valid measures of academic performance and classroom behavior in adolescents with ADHD. *Exp Clin Psychopharmacol*, 9(2), 163–175. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/11518092>. [PubMed: 11518092]
- Gallucci A, Martin R, Beaujean A, & Usdan S (2015). An examination of the misuse of prescription stimulants among college students using the theory of planned behavior. *Psychol Health Med*, 20(2), 217–226. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24783973>. doi: 10.1080/13548506.2014.913800 [PubMed: 24783973]
- Garnier-Dykstra LM, Caldeira KM, Vincent KB, O'Grady KE, & Arria AM (2012). Nonmedical use of prescription stimulants during college: four-year trends in exposure opportunity, use, motives, and sources. *J Am Coll Health*, 60(3), 226–234. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22420700>. doi:10.1080/07448481.2011.589876 [PubMed: 22420700]
- Judson R, & Langdon SW (2009). Illicit use of prescription stimulants among college students: prescription status, motives, theory of planned behaviour, knowledge and self-diagnostic tendencies. *Psychol Health Med*, 14(1), 97–104. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/19085316>. doi:10.1080/13548500802126723 [PubMed: 19085316]
- Kennedy JN, Bebartta VS, Varney SM, Zarzabal LA, & Ganem VJ (2015). Prescription stimulant misuse in a military population. *Mil Med*, 180(3 Suppl), 191–194. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/25747652>. doi:10.7205/MILMED-D-14-00375 [PubMed: 25747652]
- Kerley KR, Copes H, & Griffin OH (2015). Middle-Class Motives for Non-Medical Prescription Stimulant Use among College Students. *Deviant Behavior*, 36(7), 589–603.
- León KS, & Martínez DE (2017). To Study, to Party, or Both? Assessing Risk Factors for Non-Prescribed Stimulant Use among Middle and High School Students. *J Psychoactive Drugs*, 49(1), 22–30. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27918861>. doi: 10.1080/02791072.2016.1260187 [PubMed: 27918861]
- Liu Y, Williamson V, Setlow B, Cottler LB, & Knackstedt LA (2018). The importance of considering polysubstance use: lessons from cocaine research. *Drug Alcohol Depend*, 192, 16–28. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/30195242>. doi:10.1016/j.drugalcdep.2018.07.025 [PubMed: 30195242]
- Lookatch SJ, Dunne EM, & Katz EC (2012). Predictors of nonmedical use of prescription stimulants. *J Psychoactive Drugs*, 44(1), 86–91. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22641970>. doi:10.1080/02791072.2012.662083 [PubMed: 22641970]
- McCabe SE, Boyd CJ, & Teter CJ (2009). Subtypes of nonmedical prescription drug misuse. *Drug Alcohol Depend*, 102(1–3), 63–70. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/19278795>. doi:10.1016/j.drugalcdep.2009.01.007 [PubMed: 19278795]
- McCabe SE, & Cranford JA (2012). Motivational subtypes of nonmedical use of prescription medications: results from a national study. *J Adolesc Health*, 51(5), 445–452. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23084165>. doi:10.1016/j.jadohealth.2012.02.004 [PubMed: 23084165]
- McCabe SE, Cranford JA, Boyd CJ, & Teter CJ (2007). Motives, diversion and routes of administration associated with nonmedical use of prescription opioids. *Addict Behav*, 32(3), 562–575. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16843611>. doi:10.1016/j.addbeh.2006.05.022 [PubMed: 16843611]
- McCabe SE, Cranford JA, Morales M, & Young A (2006). Simultaneous and concurrent polydrug use of alcohol and prescription drugs: prevalence, correlates, and consequences. *J Stud Alcohol*, 67(4), 529–537. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16736072>. [PubMed: 16736072]
- McCabe SE, Knight JR, Teter CJ, & Wechsler H (2005). Non-medical use of prescription stimulants among US college students: prevalence and correlates from a national survey. *Addiction*, 100(1), 96–106. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/15598197>. doi:10.1111/j.1360-0443.2005.00944.x [PubMed: 15598197]
- McCabe SE, Teter CJ, & Boyd CJ (2006). Medical use, illicit use and diversion of prescription stimulant medication. *J Psychoactive Drugs*, 38(1), 43–56. Retrieved from <https://>

www.ncbi.nlm.nih.gov/pubmed/16681175. doi:10.1080/02791072.2006.10399827 [PubMed: 16681175]

- Nattala P, Leung KS, Abdallah AB, & Cottler LB (2011). Heavy use versus less heavy use of sedatives among non-medical sedative users: Characteristics and correlates. *Addict Behav*, 36(1–2), 103–109. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20934814>. doi:10.1016/j.addbeh.2010.09.002 [PubMed: 20934814]
- Nattala P, Leung KS, Abdallah AB, Murthy P, & Cottler LB (2012). Motives and simultaneous sedative-alcohol use among past 12-month alcohol and nonmedical sedative users. *Am J Drug Alcohol Abuse*, 38(4), 359–364. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22242567>. doi:10.3109/00952990.2011.643987 [PubMed: 22242567]
- Patrick ME, Schulenberg JE, O'Malley PM, Maggs JL, Kloska DD, Johnston LD, & Bachman JG (2011). Age-related changes in reasons for using alcohol and marijuana from ages 18 to 30 in a national sample. *Psychol Addict Behav*, 25(2), 330–339. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/21417516>. doi:10.1037/a0022445 [PubMed: 21417516]
- Peles E, Schreiber S, Linzy S, Domani Y, & Adelson M (2015). Differences in methylphenidate abuse rates among methadone maintenance treatment patients in two clinics. *J Subst Abuse Treat*, 54, 44–49. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/25605438>. doi:10.1016/j.jsat.2014.12.010 [PubMed: 25605438]
- Peterkin AL, Crone CC, Sheridan MJ, & Wise TN (2011). Cognitive performance enhancement: misuse or self-treatment? *J Atten Disord*, 15(4), 263–268. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20410324>. doi:10.1177/1087054710365980 [PubMed: 20410324]
- Rabiner DL, Anastopoulos AD, Costello EJ, Hoyle RH, McCabe SE, & Swartzwelder HS (2009). Motives and perceived consequences of nonmedical ADHD medication use by college students: are students treating themselves for attention problems? *J Atten Disord*, 13(3), 259–270. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/18664714>. doi:10.1177/1087054708320399 [PubMed: 18664714]
- Robins LN (1985). *Series in Psychosocial epidemiology, Volume 6 Studying drug abuse*: Rutgers University Press.
- Shacham E, & Cottler LB (2010). Sexual behaviors among club drug users: prevalence and reliability. *Arch Sex Behav*, 39(6), 1331–1341. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/19757011>. doi:10.1007/s10508-009-9539-x [PubMed: 19757011]
- Striley CW, Kelso-Chichetto NE, & Cottler LB (2017). Nonmedical Prescription Stimulant Use Among Girls 10–18 Years of Age: Associations With Other Risky Behavior. *J Adolesc Health*, 60(3), 328–332. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27998704>. doi:10.1016/j.jadohealth.2016.10.013 [PubMed: 27998704]
- Sussman S, Pentz MA, Spruijt-Metz D, & Miller T (2006). Misuse of “study drugs:” prevalence, consequences, and implications for policy. *Subst Abuse Treat Prev Policy*, 1, 15 Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16764722>. doi:10.1186/1747-597X-1-15 [PubMed: 16764722]
- Wang Y, Cottler LB, & Striley CW (2015). Differentiating patterns of prescription stimulant medical and nonmedical use among youth 10–18 years of age. *Drug Alcohol Depend*, 157, 83–89. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26518254>. doi:10.1016/j.drugalcdep.2015.10.006 [PubMed: 26518254]
- Westover AN, & Halm EA (2012). Do prescription stimulants increase the risk of adverse cardiovascular events?: A systematic review. *BMC Cardiovasc Disord*, 12, 41 Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22682429>. doi:10.1186/1471-2261-12-41 [PubMed: 22682429]

Table 1.

Demographic characteristics and history of substance use among people who use prescription stimulants non-medically, n = 60.

	Total n (%)	Used someone else's drug only n (%)	Used other than prescribed only n (%)	Both n (%)	Fisher's exact p-value
Total	60 (100)	29 (48.3)	16 (26.7)	15 (25.0)	
Age					
18–25	37 (61.7)	21 (72.4)	6 (37.5)	10 (66.7)	
26+	23 (38.3)	8 (27.6)	10 (62.5)	5 (33.3)	0.07
Gender					
Male	38 (63.3)	19 (65.5)	8 (50.0)	11 (73.3)	
Female	22 (36.7)	10 (34.5)	8 (50.0)	4 (26.7)	0.40
Student					
No	27 (45.0)	12 (41.4)	9 (56.3)	6 (40.0)	
Yes	33 (55.0)	17 (58.6)	7 (43.7)	9 (60.0)	0.60
Employed					
No	23 (38.3)	19 (65.5)	11 (68.8)	7 (46.7)	
Yes	37 (61.7)	10 (34.5)	5 (31.3)	8 (53.3)	0.38
Education					
High school and below	41 (68.3)	25 (86.2)	8 (50.0)	8 (53.3)	
Above high school	19 (31.7)	4 (13.8)	8 (50.0)	7 (46.7)	<0.05
Past 12-month Opioid use					
No	26 (43.3)	9 (31.0)	11 (68.8)	6 (40.0)	
Yes	34 (56.7)	20 (69.0)	5 (31.3)	9 (60.0)	<0.05
Past 12-month Sedative use					
No	24 (40.0)	10 (34.5)	9 (56.3)	5 (33.3)	
Yes	36 (60.0)	19 (65.5)	7 (43.8)	10 (66.7)	0.30

Table 2.

Motives for non-medical use of prescription stimulants by different patterns non-medical use in the past 12 months.

	Total 60 (100)	Test-retest reliability Cohen's kappa	Used someone else's stimulants only n (%) ^a	Used other than prescribed only n (%) ^a	Both n (%) ^a	Fisher's exact p value
Total	60 (100)		29 (48.33)	16 (26.67)	15 (25.00)	
For recreation						
To get high	32 (53.3)	0.71	20 (69.0)	4 (25.0)	8 (53.3)	<0.05
Out of curiosity or just to experiment	16 (26.7)	0.35	11 (37.9)	2 (12.5)	3 (20.0)	0.18
To change your mood or to be happy	26 (43.3)	0.63	14 (48.3)	5 (31.3)	7 (46.7)	0.56
To party	22 (36.7)	0.67	12 (41.4)	3 (18.8)	7 (46.7)	0.20
Any of the above four	41 (68.3)	0.65	23 (79.3)	7 (43.8)	11 (73.3)	0.05
No. of recreation-related motives, mean (SD)	1.6 (1.4)	0.75 ^c	2.0 (1.4)	0.9 (1.4)	1.7 (1.3)	<0.05 ^b
For performance and productivity enhancement						
To function	32 (53.3)	0.80	6 (20.7)	13 (81.3)	13 (86.7)	<0.0001
To stay awake	51 (85.0)	0.70	22 (75.9)	14 (87.5)	15 (100.0)	0.12
To study or to concentrate	52 (86.7)	0.73	23 (79.3)	14 (87.5)	15 (100.0)	0.18
To increase your energy level	51 (85.0)	0.70	23 (79.3)	14 (87.5)	14 (93.3)	0.53
Any of the above four	58 (96.7)	0.98	27 (93.1)	16 (100)	16 (100)	0.49
No. of performance related motives, mean (SD)	3.1 (1.1)	0.88 ^c	2.6 (1.2)	3.4 (1.0)	3.8 (0.6)	<0.05 ^b
For "other" motives						
To modify effects of other drugs	8 (13.3)	0.55	1 (3.5)	3 (18.8)	4 (26.7)	<0.05
For your nerves, to relax or calm down, or to relieve stress	7 (11.7)	0.90	3 (10.3)	2 (12.5)	2 (13.3)	1.00
To lose weight	11 (18.3)	0.73	4 (13.8)	4 (25.0)	3 (20.0)	0.69
Just because	25 (41.7)	0.69	15 (51.7)	3 (18.8)	7 (46.7)	0.10
Any of the above four	32 (53.3)	0.71	16 (55.2)	7 (43.8)	9 (60.0)	0.64
No. of "other" motives, mean (SD)	0.9 (1.0)	0.84 ^c	0.8 (0.9)	0.8 (0.9)	1.1 (1.1)	0.60 ^b
No. of any motives, mean (SD)	5.5 (2.2)	0.77 ^c	5.3 (2.2)	5.1 (2.2)	6.5 (1.9)	0.11 ^b

^aThe percentages presented in the table were the proportion of respondents answered "yes" to each motive.

^bp-value of one-way ANOVA test.

$c_{\text{Intraclass Correlation Coefficient (ICC)}}$

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Table 3.

Association between motives for non-medical use of prescription stimulants and different patterns of non-medical use, N = 60.

	Used other than prescribed vs Used someone else's aOR (95% CI) ^a	Both vs Used someone else's aOR (95% CI) ^a	Both vs Used other than prescribed aOR (95% CI) ^a
Motivation for use			
To get high	0.48 (0.26, 0.90)	0.79 (0.53, 1.18)	1.57 (0.91, 2.71)
To function	1.97 (1.04, 3.75)	4.12 (1.56, 10.88)	1.33 (0.73, 2.39)
To modify effects of other drugs	1.92 (0.75, 4.91)	2.29 (1.13, 4.61)	1.23 (0.68, 2.21)

^aaOR, adjusted odds ratio; CI, confidence interval; Adjusted for age, gender, employment status, student status, education level, past 12 months non-medical opioid and sedative use.