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Stimulants for Enhancement Purposes:
Perceptions, Attitudes, and Usage among University Students
Cara M. Karter, Lorenzo A. Washington, and Anthony J. Ludlam
Illinois Institute of Technology

Objective: Determine perceptions, attitudes, and usage of non medical prescription stimulants among students at a Midwestern technology-focused university. Participants: 241 university students. Methods: Data was collected in March 2015 through an anonymous web survey. A logistic regression model evaluated predictors. T-test was used to evaluate differences between groups. Results: 9.5% had used prescription stimulants without a valid prescription. Primary motives were academic preparation (78%) and recreation (61%). Nicotine use (OR = 8.99, CI 2.40, 33.77, p < .01), peer’s suggestion (OR = 6.95, CI 2.21, 21.84, p < .01), and positive attitudes toward use (OR = 1.99, CI 1.06, 3.72, p < .05) increased odds of nonmedical use. Users and non-users differed in estimations of nonmedical use within peers (t (239) = 3.17, p < .01) and in their field (t (239) = 3.22, p < .01). Conclusions: Administrators should acknowledge student use and develop strategies to address it.

Keywords: prescription stimulants, non-medical use, college students, technology university, attitudes, motives, perceptions, ethics.

Nonmedical use of prescription stimulants, particularly for cognitive enhancement, is an increasingly provocative subject. Media reports reveal an escalating misuse of prescription drugs (Vrecko, 2015). It is an especially salient issue in higher education, as a 2015 meta-analysis reported that 17% of college students have misused prescription stimulants (Benson, Flory, Humphreys, & Lee, 2015). Cognitive enhancement is defined by Hildt & Franke as:

“The use of drugs, biotechnological strategies or other means by healthy individuals aiming at improvement of cognitive functions such as vigilance, concentration or memory without any medical need.”

Promoted, by some as a pharmaceutical pathway to untapped potential, the notion of cognitive enhancement is at hand. Bolstered by the numbers of young adults who are afflicted with Attention Deficit Hyperactivity Disorder (ADHD), and encouraged by the easily accessible supply of prescription medications on college campus’ nationwide, the nonmedical use of prescription stimulants is purportedly on the rise. Users, in some cases, do not need to have criminal associates or engage in black market transactions to acquire these drugs. One option for obtaining prescription medications is from the legal pharmaceutical marketplace. This method involves the deliberate deception of physicians in order to obtain a diagnosis of ADHD that subsequently leads to a legal prescription for the medication (Vrecko, 2015). However the most commonly reported source from which students obtain prescription stimulants is via a friend (Vrecko, 2015). Numerous factors influence an individual’s decision to use these substances illicitly including memory aid, mood alteration, and academic performance. Findings suggest attitudes and beliefs about use by peers are significant predictors or use (Meisel & Goodie, 2015), though not as reliably as an individual’s prior use of alcohol, nicotine, and marijuana (McCabe, Knight, Teter, & Wechsler, 2005). For those students who are open to the nonmedical use of prescription stimulants, the justifications range
from the efficacy to an individual's autonomy (Cabrera et al., 2015). The motives for use in the college student population has been found to be both academic and recreational (Garnier-Dykstra, Caldeira, Vincent, O'Grady, & Arria, 2012), though a 2015 meta-analysis noted that the primary motive for use is academic (Benson et al., 2015). In a recent study Cabrera, Fritz, and Reiner (2015) focused on motivations for usage and which particular social, affective, or cognitive domain was to be enhanced as a result. They found that some reasons for usage were more socially acceptable than others.

The purpose of this study is 1) to determine whether the primary motives for usage among the student population at a Midwestern technology-focused university are different from or similar to the typical motives for use by university students across the United States, 2) to evaluate whether usage of other addictive substances predicted the use of nonmedical use of prescription stimulants, 3) to analyze whether positive attitudes toward nonmedical use of prescription stimulants and a peer’s suggestion predict an individual’s use, and 4) to determine whether users and non-users estimate significantly different usage rates among peers in their particular college and in their specific field of study.

Method

After obtaining IRB approval, a 42-item survey was created on the Google Forms platform and was divided into four sections. The first section, demographic information, asked respondents to self-identify themselves according to age, gender, race/ethnicity, college year, and field of study. The second section assessed respondent’s attitudes toward stimulant use by their rating of seven statements using a five-point Likert scale from strongly disagree to strongly agree. The third section asked respondents to evaluate their usage of several substances since beginning university, including alcohol, nicotine, caffeine, cannabis, and prescription stimulants. This section also included a question to trap careless respondents by asking respondents whether they had used a fictitious substance, Hexazytine, since starting university. In this section, respondents were also asked if they have ever used prescription stimulants without a valid prescription. If they responded positively, the survey routed them to a set of questions exploring their use of prescription stimulants including types of stimulants used, frequency of use, reasons for use, and from whom they had obtained the stimulant. Once again, Hexazytine was included as a trap question to weed out careless respondents. The fourth and final section of the survey assessed respondents’ perceptions of use in their university and in their field of study from 1-100 percent. (See Appendix 1 for the full survey questionnaire.)

A sample of 243 undergraduate and graduate students self-elected to take the survey questionnaire that was distributed through social media, flyers, and the university newsletter. Two participants were discarded as careless responders according to our method outlined above, resulting in a corrected sample of 241 students. All participants were entered into a raffle for one of three $25 gift cards.

The sample was 36% female/64% male, which was representative of the university population which is 38% female/62% male. 33% of the sample was aged 18-20, 46% were 21-24, 9% were 25-29, and 3% were 30-33. 32% of the sample was Caucasian, 30% were Asian, 16% were Hispanic/Latino, 10% were African American/Black, and the remaining 4% identified as another race/ethnicity or as mixed. The sample was also broken down by year in school (12% first year, 16% second year, 23% third year, 21% fourth year, 11% masters, and 8% other years/levels) and by field of study (46% Engineering, 17% Physical Science/Technology, 12% Liberal
Arts/Human Sciences, 7% Art/Architecture, 6% Business, and 3% Medicine).

Of the 241 responses, 27 had used prescription stimulants since beginning university studies, and 23 of those users had done so without a valid prescription. Ultimately, 9.5% of our corrected sample (23 out of 241) had used prescription stimulants without a valid prescription during their university studies.

Statistical Analysis

Descriptive Results

Our sample of users was more or less equal for both genders with 9.6% of females and 9.7% of males having used a prescription stimulant without a valid prescription. 50% of female users were ages 18-20, 38% were 21-24, and the remaining 13% of female users were 30-33. In contrast, 33% of male users were aged 18-20, 53% were 21-24, and the remaining 13% were 25-29. Our sample of male users predominantly identified as White (80% of users, versus 34% of the sample). Female users were more evenly represented among races/ethnicities, but peaked significantly in their third year in school (75% of female users, versus 23% of the sample). Male users were more or less representative across fields of study of the sample, but female users were predominantly in the liberal arts/human sciences (38% of female users, versus 18% of the sample).

Users tended to use drugs infrequently, with only 4% self-reporting that they used non-medical prescription stimulants daily, 4% weekly, 39% occasionally, 17% rarely, and 35% only once. The most often used substances were the common Attention Deficit Hyperactivity Disorder (ADHD) prescription stimulants Methylphenidate and Amphetamines, which were evenly used (each by 48% of the users). Most users were given (43%) or purchased (35%) the stimulant from a friend.

Our sample exhibited uncertainty in the overall students’ attitudes towards stimulant use, as exhibited by the wide range of responses to attitudinal questions that indicated support of nonmedical prescription stimulant use. The starkest difference in attitudes of our sample towards stimulant use was seen in differences in the perception of prescription stimulant use being the same as cheating in the athletic versus the academic realms. Prescription stimulant use for athletic performance was found to be the same as cheating by 66% of our sample, whereas only 38% of our sample found use for academic performance to be the same as cheating. Uncertainty was also exhibited in response to the question “Prescription Stimulants should be available for University Students as a coping mechanism for stress”, to which 21% strongly disagreed, 28%, disagreed, 22% neither agreed nor disagreed, and 26% agreed. This may indicate a split in students' opinions on appropriate mechanisms of stress reduction. Further uncertainty, or possibly ambivalence, is exhibited by the large percentage of students who answered each question as “Neither Agree nor Disagree” (ranging from 16-28%). Table 1 displays responses to our attitudinal measures by the percentage of the sample with the indicated strength of agreement.

Results of Data Analysis

Correlation coefficients were found to denote generally weak relationships, but were statistically significant for variables contributing to prescription stimulant use (.23 to .47). Prescription stimulant use was positively correlated with positive attitudes towards prescription stimulant use (r = .24, p < .01), someone’s suggestion to use a prescription stimulant (r = .29, p < .01), alcohol consumption (r = .19, p < .01), nicotine use (r
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= .37, p < .01), and cannabis use (r = .40, p < .01). An overview of predictor variables and their correlations with stimulant use can be found in Table 2.

Because the criterion variable is dichotomous (using prescription stimulants or not), a logistic regression method was used to model a student’s decision to use prescription stimulants. After removing caffeine as a predictor, results of the logistic analysis indicate that a 5-predictor model provides a statistically significant improvement over the constant-only model. $X^2(5, N = 241) = 25.71$, p < .01. The Nagelkerke Pseudo R Square indicated that the model accounted for 48% of the variance. This suggests that the model does discriminate somewhat between users and nonusers. Prediction success for the model was relatively high, with an overall prediction success rate of 92% and correct prediction rates of 97.2% for non-users and 39% for users.

Table 4 presents the regression coefficients (B), the Wald statistics, significance level, odds ratio [Exp (B)], and the 95% confidence interval (CI) for odds ratios (OR) for each predictor. The Wald test reports that all predictors with the exception of Alcohol and Cannabis use are significant predictors of stimulant use.

Discussion

Key Findings

Question 1: Are primary motives for use among the college student population at a Midwestern technology-focused university similar to those at other institutions in the United States? The primary motive for use in our sample was academic preparation, with 78% of respondents who reported nonmedical use of prescription stimulants reporting use for this purpose. This is consistent with the findings of Peterkin et al. (2011) which reported that 87% of respondents were motivated by academic reasons for misuse. In our sample, recreation was also a common motive for use with 61% of our sample using for this purpose. This is much higher than the non-academic use reported through other studies. (Peterkin et al., 2011; Benson et al., 2015). Table 5 displays an overview of our sample’s self-reported reasons for use.

Question 2: Does usage of other addictive substances predict nonmedical use of prescription stimulants? According to the logistical regression model, Alcohol, Cannabis, and Caffeine use were not significant predictors of nonmedical use of prescription stimulants. Nicotine, however, did significantly predict (OR = 8.99, CI 2.40, 33.77, p < .01) an increase in the likelihood of nonmedical use of prescription stimulants. This finding is consistent with findings in the current literature stating that 50% of users have smoked in the past 30 days and that users are 7.68 times more likely to smoke cigarettes (Rabiner et al., 2009). The predictive ability of Cannabis and Alcohol use may be mitigated by the small sample size and the presence of a mediation effect, as other studies suggest that cannabis and alcohol use predict stimulant misuse (Arria et al., 2013; Garnier-Dykstra et al., 2012).

Question 3: Do positive attitudes toward nonmedical prescription stimulant use and a peer’s suggestion of prescription stimulant use predict an individual’s use? Both positive attitudes toward stimulant use (OR = 1.99, CI 1.06, 3.72, p < .05) and a peer’s suggestion of use (OR = 6.95, CI 2.21, 21.84, p < .01) increased the odds of an individual’s nonmedical use of prescription stimulants. Neither of these predictors is significantly covered in the current literature and are suggested for inclusion in future studies.

Question 4: Do users and nonusers estimate significantly different usage among peers in their same university and field? Our results suggest that users and non-users vary significantly in perceptions of non-medical
prescription stimulant usage among their peers. The user group (N = 23, M = 33.83, SD = 21.90) estimated, on average, that use was 12% higher in the university as a whole than the estimation of the non-user group [(N = 218, M = 21.22, SD = 17.68): t (239) = 3.17, p < .01]. Students in the user group (N = 23, M = 32.09, SD = 27.14) also estimated more widespread use in their field - with a mean estimation approximately 14% higher than that of the non-user group [(N = 218, M = 17.72, SD = 19.53): t (239) = 3.22, p < .01]. The question of estimation of use is also not significantly covered in current literature, and is suggested for inclusion in future studies.

Limitations

This study examines only a single, small sample of self-elected undergraduate and graduate students from a Midwestern technology-focused university, thus our findings are limited in their ability to accurately represent the university population and may not hold true for populations outside of our own. Since data was self-reported by participants, our findings may be inaccurately measuring reality. We have general confidence in the honesty of our sample due to the measures taken to ensure that they remain anonymous and the alignment of our percentage of users with the rate of use at other U.S. universities. Future research is needed to be confident in our finding that users and non-users differ significantly in their perceptions of nonmedical prescription stimulant use among their peers.

Implications

Our findings have implications for both researchers and college administrators. Researchers should further study attitudes toward stimulant use among university students, motives for use, and the relationship between perceptions of nonmedical stimulant use by peers and subsequent use. College administrators should take note of the growing prevalence of nonmedical prescription stimulant use as well as the ambivalence exhibited by university students in classifying use for academic performance as cheating and develop comprehensive strategies and policies for addressing student use.

Acknowledgements

We would like to thank Professor Sam McAbee of the Illinois Institute of Technology for his help with statistical analysis of our data, and the Inter-professional Projects Program (IPRO) of the Illinois Institute of Technology for supporting the course that produced this study. We would also like to thank the IPRO course advisors, Elisabeth Hildt and Kelly Laas, who guided the course and provided support through every step of the study.

This paper is based on data collected and analyzed as part of a IPRO course held during the spring 2015 semester at the Illinois Institute of Technology titled, "Stimulants for Enhancement Purposes: Exploring Social and Ethical Issues".

Author's Notes


References


Appendix

Table 1: Responses to attitudinal measures.

<table>
<thead>
<tr>
<th>Prescription stimulants should never be prescribed for purposes other than diagnosed medical conditions</th>
</tr>
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<tbody>
<tr>
<td>Non-medical use of prescription stimulants is a normal part of the University or Higher Education Lifestyle</td>
</tr>
<tr>
<td>Penalties should be imposed on students who use prescription stimulants to enhance academic performance in the same way that student athletes are penalized for use</td>
</tr>
<tr>
<td>Taking prescription stimulants to enhance athletic performance is the same as cheating</td>
</tr>
<tr>
<td>Taking prescription stimulants to enhance academic performance is the same as cheating</td>
</tr>
<tr>
<td>Prescriptions stimulants should be available for University Students as a coping mechanism for stress</td>
</tr>
<tr>
<td>Non-medical use of prescription stimulants, such as Adderall, Ritalin, or Vyvanse, should be permitted for University Students</td>
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<table>
<thead>
<tr>
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- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree
Table 2: Correlation Table.

<table>
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<tr>
<th>Variable</th>
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<th>3</th>
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<th>5</th>
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<tr>
<td>Nonmedical Prescription Stimulant use</td>
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<td>.29</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>.63</td>
<td>.48</td>
<td>.23**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicotine Use</td>
<td>.20</td>
<td>.40</td>
<td>.47**</td>
<td>.32**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cannabis Use</td>
<td>.20</td>
<td>.40</td>
<td>.40**</td>
<td>.34**</td>
<td>.54*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Use</td>
<td>.28</td>
<td>.45</td>
<td>.33**</td>
<td>.13*</td>
<td>.16*</td>
<td>.30**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Attitudes Towards Use</td>
<td>2.62</td>
<td>.78</td>
<td>.27**</td>
<td>.07</td>
<td>.21*</td>
<td>.23**</td>
<td>.09</td>
<td></td>
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</tbody>
</table>

Notes: N = 241. ** p < .01, * p < .05

Table 3: Mean estimations of use by users and non-users

![Mean Estimates of Peer Usage](image-url)
Table 4: Logistic Regression Table

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Wald</th>
<th>Sig.</th>
<th>OR</th>
<th>CI</th>
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<td>Alcohol Use</td>
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<td>1.89</td>
<td>.17</td>
<td>4.57</td>
<td>.52, 40.05</td>
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<tr>
<td>Nicotine Use</td>
<td>2.19</td>
<td>10.59</td>
<td>.00</td>
<td>8.99</td>
<td>2.40, 33.77</td>
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<tr>
<td>Cannabis Use</td>
<td>.24</td>
<td>.12</td>
<td>.73</td>
<td>1.27</td>
<td>.34, 4.77</td>
</tr>
<tr>
<td>Suggested Use</td>
<td>1.94</td>
<td>11.01</td>
<td>.00</td>
<td>6.95</td>
<td>2.21, 21.84</td>
</tr>
<tr>
<td>Positive Attitudes Toward Use</td>
<td>.69</td>
<td>4.62</td>
<td>.03</td>
<td>1.99</td>
<td>1.06, 3.72</td>
</tr>
</tbody>
</table>

*Notes: N = 241*

Table 5: Reasons for Use

![Self-Reported Reasons for Use](image)

*Notes: Users were able to report multiple reasons for use, N = 23*