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College Students' Perceptions

of

Prescription and Non-Prescription Drug Use

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Abstract

Nonmedical use of prescription stimulants is increasingly common among college students (Schulenberg, Johnston, O'Malley, Bachman, Miech, & Patrick, 2017). Research into the motives behind this behavior indicates that students most often use prescription stimulants to enhance academic performance in response to academic stress, although there is little empirical data to suggest that using stimulants leads to positive academic outcomes. Factors that appear to perpetuate prescription stimulant use on college campuses include low perceived risk and high social acceptability associated with using diverted stimulants to improve academic functioning. The current study used experimental and self-report methods to compare perceptions stimulant use for academic purposes to other types of drug use for utilitarian and recreational purposes in a of sample (N = 243 ; 79% Caucasian; 65.4% women) college students. In general, approval of all forms of drug use, with the exception of recreational marijuana and alcohol use, was low. Consistent with hypotheses, results indicated that college students rated a peer who used Adderall for academic purposes significantly more favorably than a peer who used Adderall, Vicodin, or marijuana for recreation. However, overall social acceptability ratings for all types of diverted prescription drug use were low. This suggests that although students view using prescription stimulants as a study aid more favorably than other types of drug use, they still do believe that this is a socially unacceptable behavior.

College Students' Perceptions of Prescription and Non-Prescription Drug Use

Drug use, especially illicit prescription medication use and marijuana use, is common on college campuses. National survey data suggest that 43% of college students have used an illicit drug in the past year (Schulenberg, Johnston, O'Malley, Bachman, Miech, & Patrick, 2017). The most common category of illicit/illegal drug used is marijuana, with 39% of students reporting past-year use. Although in general college students show lower illicit and illegal drug use than their non-college-attending age-peers, this is not true for all categories of drug use. Notably, college students use diverted prescription stimulants, such as Adderall or Ritalin, at higher rates (9.9%) than do their non-college peers (6.2%). Use of a prescription medication outside of physician oversight is often referred to as nonmedical prescription drug misuse (NMPDM; McCabe, West, Teter, & Boyd, 2014). Longitudinal studies focused on NMPDM in the college population indicate stimulant use has increased steadily over the years. For example, McCabe and colleagues (2014) assessed successive waves of college students at a large university over a 10-year period regarding both their lifetime and past-year prevalence of NMPDM and found that although lifetime diverted opioid use significantly decreased (from 16.4% in 2003 to 8.8% in 2013), lifetime use of prescription stimulants increased from 8.1% to 12.7% in the same time frame. Past-year prevalence data followed the same trend: nonmedical prescription opioid use decreased from 9.3% in 2003 to 4.5% in 2013, while past-year prevalence of nonmedical prescription stimulant use increased from 5.4% in 2003 to 9.3% in 2013. Smaller studies have found similar results (Brandt, Taverna, & Hallock, 2014).

Obtaining Prescription Stimulants

Given the growing evidence that illicit use of psychostimulant medication is becoming widespread in the college population, there is increased need to better understand patterns of

supply and access. To this end, a recent qualitative study inquired about sources of diverted prescription stimulants in interviews with current and former college students who had used diverted prescription stimulants to enhance academic performance (Vreko, 2015). Results indicated that the majority of participants had obtained the prescription stimulants from friends for free. Similar results were found by DeSantis, Webb, and Noar (2008) in a larger sample (*N* = 1,811*)* and using mixed methods. Survey results indicated that 39% of participants believed that it was *very easy* to obtain prescription stimulants without a prescription, 43% believed that it was *somewhat easy*, 13% indicated that it was *somewhat difficult*, and less than 1% reported that it was *very difficult* to obtain diverted stimulants. In subsequent interviews with students, 87% of participants reported they obtained stimulant medications from friends, 4% reported they obtained stimulant medications from significant others, 8% reported they obtained stimulants from strangers or friends-of-friends, and 4% reported they had a personal prescription to treat ADHD symptoms. In response to evidence that the majority of students who misuse prescription stimulants get them from peers, a recent study focused on students who have prescriptions for stimulant medications and their motivations for diverting their medications (Schultz, Silvestri, & Correia, 2017). Results indicated that 43.8% of participants had diverted their medications at some point in their lifetime, and that diverters had more accepting views of nonmedical prescription stimulant use and believed that their friends also held more accepting views of this type of drug use than did non-diverters. In summary, it appears that illicit stimulant medications are readily available on college campuses and students use a variety of methods to acquire them. Further, results suggest that obtaining these drugs is easy, partially due to the accepting attitudes that diverters hold and perceive their peers to have. The ease of obtaining prescription stimulants

without a prescription likely contributes to the large number of students using these medications for nonmedical reasons.

Motivations and Attitudes regarding Illicit Stimulant Medication Use

Motivations and Justifications for Use: In order to specifically examine trends of nonmedical prescription stimulant use in a college population, Garnier-Dykstra, Caldeira, Vincent, O'Grady, and Arria (2012) conducted a longitudinal study that followed a stratified random sample of 1,253 students from freshman orientation through their senior year at a large public university. Interviewers inquired about motivations for nonmedical prescription stimulant use and coded each into one of five categories: 1) curiosity/experimentation; 2) to improve focus/study/work; 3) to stay awake to party; 4) to get high/feel good; 5) other reasons. Results indicated that curiosity/experimentation motives were significantly more common in earlier years than in later years, but that taking stimulants to study was the most common motive across all 4 years. This is consistent with recent findings that the majority of students who engage in diverted prescription stimulant use do so in response to increased academic stress, but that a large proportion of students also report using diverted stimulants for experimentation, or to party for longer periods of time (Bavarian, McMullen, Flay, Kodama, Martin, & Saltz, 2017). Overall, although several reasons college students choose use diverted stimulant medications have emerged, the desire to excel academically appears to be the most common motivating factor.

In addition to studying motivations for diverted prescription stimulant use, researchers have also investigated what perpetuates diverted prescription stimulant use on college campuses. Results from in-depth interviews in one such investigation revealed four primary justifications or rationalizations for use: 1) comparison and contrast; 2) all things in moderation; 3) self-medication; and 4) minimization arguments (DeSantis & Hane, 2010). The most common way

students justified their illicit stimulant use was by favorably comparing prescription stimulants to party drugs. Students with this justification reported the belief that taking prescription stimulants as a study tool was more acceptable than taking other drugs to get high, that prescription stimulants were “good” drugs because they came from pharmaceutical companies and doctors, and that prescription stimulants did not pose the same risks as drugs like alcohol and cocaine. The second concept that emerged was the idea of moderation. Students who used this justification argued that prescription stimulant use was acceptable as it is done in moderation, although definitions of moderate use varied widely in this cluster. The third rationale for use was using prescription stimulants to medicate self-diagnosed ADHD. Participants who endorsed this justification reported they experienced ADHD symptoms such as difficulty concentrating, daydreaming, and boredom, and that taking prescription stimulants corrected these symptoms and was justifiable as it treated an undiagnosed condition. The final category of justification that emerged was a general minimization of the seriousness of using diverted stimulant medication. Respondents who used this rationale compared prescription stimulants to caffeinated beverages and caffeine pills and stated that since both stimulant drugs and caffeine could reduce fatigue and increase focus, taking prescription stimulants was no worse than drinking an energy drink or taking a caffeine pill. Smaller studies have also revealed student beliefs about there being a moral distinction between use of diverted stimulants for academic goals and use of the same drugs to get high or escape reality (Kerley, Copes, & Griffin, 2015). Students held positive views of others who used stimulants for academic purposes, while reporting negative attitudes about prescription medication use for nonacademic purposes and indicating that such behavior was not acceptable. A recurring theme across responses was the belief that using diverted stimulant

medication for academic purposes was acceptable because doing so was unlikely to have the kind of deleterious impact on a person's life that use of illegal substances can have.

Attitudes about Use: Another factor that appears to motivate and perpetuate illicit prescription stimulant use on college campuses is the belief that this behavior is widely socially accepted. One line of research into how students perceive nonmedical prescription stimulant use has focused on those who have a prescription for a stimulant and choose to divert their medications. Generally, diverters appear to believe that their close friends hold approving attitudes towards nonmedical use of stimulant medication while those who do not divert their medication do not believe that their close friends hold approving attitudes of this behavior (Schultz et al., 2017). Such findings are consistent with results indicating that regardless of the motives behind stimulant use, for a majority of students a primary factor in their decision to use was the perception that use was acceptable among their peers (DeSantis & Hane, 2010). A recent study examining possible gender differences in perceptions of a student who uses diverted prescription stimulants for various motivations found that a student who used prescription stimulants as a study aid was rated significantly more favorably than a student who used prescription stimulants to get high or to lose weight, regardless of the gender of the student in the vignette or the gender of the rater (Lookatch, Moore, & Katz, 2014). Although nonmedical use of prescription stimulants is growing on college campuses, the majority of students do not engage in this behavior, and research has begun to study the reasons students choose to avoid misusing prescription stimulants (Bavarian et al., 2017). It appears that the majority of nonusers choose to abstain due to concerns that misusing prescription stimulants was an unhealthy, dangerous, or addictive behavior that could have damaging effects on mental and physical health (Brandt, Taverna, & Hallock, 2014). Many students also avoid nonmedical prescription stimulant

use because of ethical concerns related to committing an illegal act or violating academic integrity (Bavarian et al., 2017). Overall, although students who engage in nonmedical use of prescription stimulants believe that this behavior is socially acceptable and perceive similar attitudes in their peers, many college students actually hold negative attitudes towards nonmedical prescription stimulant use due to the associated health risks and ethical concerns (Bavarian et al., 2017; DeSantis & Hane, 2010).

Prescription Stimulants as a Study Aid

Enhancing academic performance is consistently the most common motive reported for using prescription stimulants for nonmedical purposes (Bavarian et al., 2017; DeSantis et al., 2008; Garnier-Dykstra et al., 2012). This begs the question—is this belief accurate? Do diverted prescription stimulants function as neuro-enhancers? A recent meta-analysis provided empirical support that prescription stimulants can increase processing speed accuracy, or the ability to quickly and accurately perceive and process information (Marraccini, Weyand, Rossi, & Gudmundsdottir, 2016). However, the results were silent about whether the findings, which were based on performance on tasks completed in a laboratory setting, apply to the real-world scenarios where prescription stimulant use is occurring. Additionally, using prescription stimulants was not associated with any changes in planning time, planning accuracy, advantageous decision-making, or cognitive perseveration. Further, a recurrent finding is that misusing prescription stimulants for academic purposes does not lead to any gains in GPA and, instead, is associated with lower GPA (Arria et al., 2017; Garnier-Dykstra et al., 2012; McCabe et al., 2005). One detailed analysis of the relation between GPA and nonmedical prescription drug use found that although lower GPA was associated with use of prescription stimulants to study on a univariate level, when multivariate associations were tested the only factors to show

unique predictive relations with stimulant use were cognitive enhancement expectancies and self-efficacy (Looby, Beyer, & Zimmerman, 2015). In other words, students who lacked confidence in their studying abilities and believed that prescription stimulants would enhance their cognitive abilities were more likely to use prescription stimulants than those who had a lower GPA alone. These results are consistent with prior research that vested interest, or the belief that a behavior will produce positive and hedonically relevant outcomes, moderates the relationship between attitudes towards and intention to engage in nonmedical prescription stimulant use (Donaldson, Siegel, & Crano, 2016). Collectively, these studies suggest that college students are likely to use prescription stimulants for academic purposes if they strongly believe that doing so will help them achieve their academic goals—despite their being little evidence that it does.

Current Study

Overall, nonmedical prescription stimulant use is a common problem on college campuses and appears to be motivated by academic pressures and perpetuated by perceived social acceptability (DeSantis et al., 2008; Schultz et al., 2017; Shulenberg et al., 2017). Further, many students believe that illicitly using prescription stimulants is less risky than using other illicit drug use such as opioids and cocaine (DeSantis & Hane, 2010). The perception that prescription stimulant use helps individuals achieve academic success while being less likely to have negative consequences leads to students feel this type of drug use is morally justifiable compared to other types of drug use (Kerley et al., 2015). A growing body of research has shown that using diverted prescription stimulants for academic purposes— the most common form of NMPDM (Garnier-Dykstra et al., 2012)— is more acceptable than using diverted stimulants or

other diverted prescription drugs for recreational purposes (DeSantis et al., 2008; Kerley et al., 2015; Lookatch et al., 2014).

The aim of the current study is to further examine how the attitudes college students hold about using various categories of drug are related to the perceived motivation to use that drug. Although some research exists on college students' perceptions of various types of illicit substance use—and the motives behind this use—much of this research has been qualitative in nature. The current study sought to add to our knowledge about diverted stimulant drug use in the college population by recruiting a large sample of undergraduate students and combining a self-report portion that gathered information about personal drug use patterns (normative study) with an experimental approach which investigated the similarities and differences in perceptions of a student engaging in one of four types of illicit substance use (experimental study). The use of both self-report component and experimental components allowed for examination of how participants' conscious approval of drug use for various reasons compared to unmotivated responding. Within this context, the following specific hypotheses were tested:

Normative Data Hypotheses

1) Marijuana use would be more common than diverted prescription stimulant use, which would be more common than diverted opioid use.
2) Participants would rate prescription stimulant use for academic purposes as more socially acceptable than prescription stimulant use for recreational purposes.
3) Participants would rate prescription stimulant use for academic purposes as more socially acceptable than both prescription opioid use to treat pain and marijuana use to cope with negative emotions such as sadness.

4) Participants would rate marijuana use for recreational purposes as more socially acceptable than both prescription stimulant use for recreational purposes and prescription opioid use for recreational purposes.
5) A significant negative relationship between GPA and prescription stimulant use for academic purposes would emerge.

Experimental Hypotheses

1) Participants would rate an individual who used prescription stimulants for academic purposes as significantly more trustworthy than an individual who used prescription stimulants for recreational purposes, an individual who used opioids for recreational purposes, and an individual who used marijuana for recreational purposes.
2) Participants would rate an individual who used diverted prescription stimulants for academic purposes as significantly less thrill-seeking than an individual who used prescription stimulants for recreational purposes, an individual who used opioids for recreational purposes, and an individual who used marijuana for recreational purposes.
3) Participants would rate an individual who used prescription stimulants for academic purposes significantly higher in work ethic than an individual who used prescription stimulants for recreational purposes, an individual who used opioids for recreational purposes, and an individual who used marijuana for recreational purposes.

Exploratory Hypothesis

1) Participants would rate an individual who used diverted prescription stimulants for academic purposes as significantly different in positive affect than an individual who

used diverted prescription stimulants for recreational purposes, an individual who used diverted opioids for recreational purposes, and an individual who used marijuana for recreational purposes.

Method

Participants

Two hundred and fifty eight participants from a midsize private Midwestern university were recruited from a psychology participant pool for the current study. Inclusion criteria were being age 18 or older. There were no exclusion criteria. Participants earned research participation credit for their time. Fourteen participants were removed from the data set due to missing data, and one was removed because of the high number of outliers in his/her data. The final sample contained 243 participants. The average age of the participants was 20 years old (*SD* = 1.77). The majority of the sample was female (65.4%), and 79% of the sample was Caucasian. With regard to class standing, 33.5% of participants were juniors, 31.6% were sophomores, 19.1% were freshmen, and 15.8% were seniors. The majority of the sample reported majoring in a social science (41.5%), followed by pre-professional (23.2%), and business (19.5%). The average GPA was 3.37 (*SD* = 0.40). See Table 1 for full demographic information.

Measures

Vignettes: Four vignettes were created for this study. Each vignette described a gender-neutral college student who engages in one of four types of drug use: 1) prescription stimulants (Adderall) used for academic purposes; 2) prescription stimulants (Adderall) used for recreational purposes; 3) prescription pain medication (Vicodin) used for recreational purposes;

and 4) marijuana used for recreational purposes. The vignette describing prescription stimulant use was as follows:

> Sam is a college student who has a final exam and a paper due Tuesday. On Sunday night Sam's friend, who has a prescription for Adderall, asks if Sam wants a pill to help focus. Sam has used Adderall in the past and found it helpful. So Sam takes an Adderall from the friend and stays up all night writing and studying.

The three vignettes describing recreational drug use were identical except for the drug the student used, which varied across Adderall, Vicodin and marijuana. The vignette assessing attitudes about Adderall use was as follows:

> **Diverted Prescription Stimulant Use for Recreation**
>
> Sam is a college student and has plans to go out with friends on Friday night. While out, one of Sam's friends takes **Adderall** and asks if Sam wants some. Sam has used **Adderall** with friends before and enjoyed it. So Sam takes an **Adderall** and stays out partying with friends.

Participants were randomly assigned to read one of the four vignettes.

Impressions Rating Scale: The Impressions Rating Scale (IRS) was developed for this study to assess participants' impressions of the student described in the vignette. The rating scale included 20 characteristics that were designed to tap into four personality domains: 1) trustworthiness; 2) thrill-seeking; 3) work ethic; and 4) positive affectivity. The domains were chosen based on prior research on college students' perceptions of drug users showing that students describe individuals who engage in stimulant use for academic purposes as hardworking and motivated to achieve; however, students describe individuals who engage in illicit drug use

for recreational purposes as untrustworthy and prone to engage in risky behavior (Kerley et al., 2015). A positive affect domain was included to maintain a balance between positive and negative characteristics. Each subscale contained five items and used an adjective rating format. Example adjectives from the four domains are: *honest* (trustworthiness subscale); *exciting* (thrill-seeking subscale); *hard-working* (work-ethic subscale) and *happy* (positive affect subscale). Participants used a 5-point Likert-type scale from 1 (*Definitely No*) to 5 (*Definitely Yes*) to indicate how much they believed each adjective applied to the student in the vignette. Five of the 20 items were reverse-scored. Subscale scores were calculated by summing the constituent items, with higher scores reflecting more agreement with the construct. Subscale scores ranged from 5 to 25. The full IRS demonstrated acceptable reliability (Cronbach's Alpha = .75). The work ethic subscale had acceptable internal consistency (Cronbach's Alpha = .76), as did the trustworthiness subscale (Cronbach's Alpha = .71), and the positive affect subscale (Cronbach's Alpha = .73). However, internal consistency for the thrill-seeking subscale was less than desired (Cronbach's Alpha = .42). Item analysis revealed that deleting the item *boring* maximized reliability and increased Cronbach's Alpha to .57. Therefore, analyses were conducted with a modified thrill-seeking subscale that included only four items: *careless, careful, exciting,* and *reckless*.

General Information Questionnaire (GIQ): The GIQ was developed for this study. The GIQ had three sections:

Section 1- Demographics: Information about participant sex, ethnicity, year in school, class standing, and GPA were collected. Participants also listed all current prescribed medications to determine if individuals who report taking prescription stimulants or pain medications are using their own or diverted prescriptions.

Section 2- Substance Use patterns: Information about participants' drug and alcohol use was collected. Participants reported their alcohol, tobacco cigarette, E-cigarette, marijuana, prescription stimulant medication, and diverted prescription pain medication use. Alcohol was assessed in standard drink units (one standard drink = 12 oz beer; 5 oz wine; 1oz liquor); nicotine was assessed in cigarette/e-cigarette units. Average consumption was calculated by multiplying the number of days used by the units consumed on a typical use occasion. Due to difficulties assessing units of marijuana, prescription stimulants, and prescription pain medications used, these types of drug use were assessed using frequency data. Participants indicated how often they used these drugs on the following scale: 1(*Never*); 2(*Every few months*); 3 (*Every few weeks*); 4 (*Weekly*); and 5 (*Daily*). Participants also reported how many times in the past semester they used a prescription stimulant that was not prescribed to them as a study aid to further assess nonmedical prescription stimulant use.

Section 3- Social Acceptability Perceptions: Information about participants' perceptions of the social acceptability of drug and alcohol use for various reasons was collected to determine if participants' views of drug use varied as a function of intended purpose. Participants used a scale of 1 (*Completely Unacceptable*) to 5 (*Completely Acceptable*) to rate a set of paired statements assessing the acceptability of using alcohol, nicotine, prescription stimulants and diverted prescription pain medication for a recreational purpose and a self-treatment purpose. An example set of statements is:

1) How acceptable is it to smoke marijuana to have fun at a party with friends? (circle one)

1…..……..…...2…..……..….3…..…….4..……...….5

Completely Unacceptable *Completely Acceptable*

2) How acceptable is it to smoke marijuana to deal with negative emotions such as sadness? (circle one)

1…..……..…...2…..……..….3…..…….4..……...….5

Completely Unacceptable *Completely Acceptable*

Procedure

Prior to initiating the study, approval was obtained from the host university's Institutional Review Board (Appendix A). Study materials were prepared by constructing packets of study measures which were ordered using a random number generator to ensure participants were randomly assigned to one of the four conditions. Data collection sessions began with a researcher reviewing an informed consent form with participants. After providing informed consent, participants received a closed packet containing one of the four randomly assigned vignettes, the IRS and GIQ. They were instructed to read the vignette carefully, answer questions that followed (the IRS), and complete the GIQ. This order was chosen so that self-reported substance use patterns did not influence participants' reported perceptions of the student in the vignette.

Results

Prior to conducting the formal analyses, the distributional properties of continuous variables were assessed for normalcy and extreme values. Outliers were defined as variables that were greater than 3.3 standard deviations away from the mean and identified as 'extreme' on box plots (Salkind, 2010). Fourteen cases had less than three data points that fulfilled both of these criteria and these were recoded to three standard deviations from the mean to maintain their position in the distribution while reducing distorting effects (Salkind, 2010). One participant's data were removed from the data set due to the presence of four outliers.

Substance Use

A super-majority of participants (86.8%) endorsed alcohol use. Only 18 (7.4%) of the sample reported having a prescription for a stimulant medication such as Adderall. However, 29 (11.9%) of participants reported using prescription stimulant medications at least occasionally, and 20 (8.2%) of participants reported using prescription stimulants as a study aid in the past semester. A total of 96 (39.5%) of participants endorsed marijuana use, whereas only 4 (1.6%) endorsed using prescription pain medications without a prescription. Tables 2 and 3 contain full substance use data.

Analyses for Normative Data Hypotheses

It was hypothesized that marijuana use would be more common than diverted prescription stimulant use, which would be more common than diverted opioid use. A series of chi-square tests of proportions supported the hypothesis. The proportion of marijuana users was significantly greater than the proportion of stimulant users, χ^2 (1) = 76.77, $p < .001$ and the proportion of opioid users, χ^2 (1) = 144.7, $p < .001$. Further, the proportion of stimulant users was significantly greater than the proportion of opioid users, χ^2 (1) = 23.11, $p < .001$. Table 2 includes the proportion of use across substances.

It was hypothesized that there would be a significant negative relation between GPA and frequency of using prescription stimulants as a study aid in the past semester. The hypothesis was supported, $r = -.14$; $p = .02$. Although significant, the strength of the relationship was small.

Acceptability: It was hypothesized that participants would rate prescription stimulant use for academic purposes as more socially acceptable than prescription stimulant use for recreation. Results of a paired samples t-test supported this hypothesis, t (242) = 9.56, $p < .001$,

CI (0.53, 0.80). It was also hypothesized that participants would rate prescription stimulant use for academic purposes as more socially acceptable than use of diverted pain medications to treat pain, and than marijuana use for coping with negative emotions. This hypothesis was tested using a one-way within-subjects ANOVA. The overall test was not significant, F (2, 241) = 0.34, p = 0.71.

It was hypothesized that recreational marijuana use would be rated as more socially acceptable than recreational prescription stimulant use and recreational diverted prescription opioid use. The hypothesis was tested using a one-way within-subjects ANOVA. The overall test was significant, F(2, 484) = 368.30, p < .001, partial η^2= .60. Pairwise comparisons indicated that marijuana use for recreation (M = 3.03, SD = 1.28) was rated as significantly higher than prescription stimulant use for recreation (M =1.28, SD = 0.82), t (242) = 18.00, p < .001, CI [1.60, 1.90]), and prescription opioid use for recreation (M = 1.60, SD = 0.59), t (242) = 22.60, p < .001, CI [1.28, 1.59]).

Experimental Hypotheses

Preliminary analyses.

Prior to testing the experimental hypotheses, a series of tests were conducted to assess for the success of randomization and equivalency of groups. Chi-square tests of equivalency were used to assess for differences across condition for categorical demographic variables and one-way ANOVAs were used to assess for differences across conditions for continuous variables. No significant demographic differences emerged (see Table 4). To assess if substance use patterns were equal across conditions, a one-way multiple analysis of variance (MANOVA) was conducted to determine if self-reported weekly use of alcohol, cigarettes, marijuana and other

illicit drugs varied across the four experimental conditions. Substance use patterns were comparable. Results indicated no significant differences in substance use pattern across conditions, Wilk's $\Lambda = .93$, F (18,662) = 1.02, p =.43 (see Table 5).

Primary Analyses

Hypothesis 1: Trustworthiness. The first hypothesis tested posited that a student who used Adderall for academic purposes would be rated as significantly more trustworthy than a student who used Adderall, Vicodin, or marijuana for recreational purposes. The hypothesis was not supported; a one-way between subjects ANOVA was conducted to assess for differences in trustworthiness ratings across the four drug use conditions. Although a strong trend emerged, the difference in trustworthiness ratings across the experimental groups failed to meet significance thresholds, F (3,239) = 2.63, p = .051. Notably, the trend was opposite in direction to predictions as trustworthiness scores were lowest for the student who used Adderall for academic purposes. See Table 6.

Hypothesis 2: Thrill seeking. The second experimental hypothesis posited that a student who used Adderall for academic purposes would be rated as less thrill-seeking than a student who used Adderall, Vicodin or marijuana for recreational purposes. A one-way between subjects ANOVA was conducted to assess for differences in thrill-seeking across the four drug use conditions. The hypothesis was supported, F (3,239) = 9.50, $p < .001$, partial $\eta^2 = .11$. As the groups showed equal variances, a Tukey test was used for post hoc comparisons. Post hoc comparisons indicated that a student who used Adderall for academic purposes was rated as significantly less thrill-seeking (M = 3.34, SD = 0.49) than a student who used Adderall for recreational purposes (M = 3.75, SD = 0.44), p<.001, CI (-0.63, -0.19), a student who used

Vicodin for recreational purposes (M = 3.71, SD = 0.47), p < .001, CI (-0.59, -0.15), and a student who used marijuana for recreational purposes (M = 3.59, SD = 0.48), p = .015, CI (-0.47, -0.04). See Table 6.

Hypothesis 3: Work ethic. The third hypothesis posited that a student who used Adderall for academic purposes would be rated as higher in work ethic than a student who used Adderall, Vicodin or marijuana for recreational purposes. A one-way between subjects ANOVA was conducted to assess for differences across the four drug use conditions. The hypothesis was supported, F (3, 239) = 6.12, p< .001, partial η^2= .071. Post hoc comparisons showed that an individual who used Adderall for academic purposes (M = 3.17, SD = 0.69) was rated as significantly higher in work ethic than an individual who used Adderall for recreation purposes (M = 2.86, SD = 0.39), p = .006, CI (0.17, 2.83), and an individual who used Vicodin for recreation purposes (M = 2.80, SD = 0.38), p = .001, CI (0.49, 3.13). However, no significant difference between work ethic ratings for an individual who used Adderall for academic purposes and an individual who used marijuana for recreation (M = 2.98, SD = 0.47), p = .18, were seen (see Table 6).

Exploratory Analysis

Hypothesis 1. The exploratory hypothesis posited that participants would rate a student who used Adderall for academic purposes as significantly different in positive affect than a student who used Adderall, Vicodin, or marijuana for recreational purposes. A one-way between subjects ANOVA was conducted to assess for differences across the four drug use conditions. The hypothesis was supported. The ANOVA was significant, F (3, 239) = 12.26, p< .001, partial η^2 = .13. Post hoc comparisons indicated that participants rated a student who uses Adderall for academic purposes (M = 3.35, SD = 0.45) as significantly lower in positive affect than an

individual who uses Adderall for recreational purposes (M = 3.80, SD = 0.47), $p < .001$, CI [-3.06, -1.42], a student who uses Vicodin for recreation (M = 3.59, SD = 0.47), $p = .005$, CI [-1.99, -0.35], and an individual who uses marijuana for recreation (M = 3.76, SD = 0.45), $p < .001$, CI [-2.84, -1.23] (see Table 6).

Additional analyses

A series of *t*-tests were conducted to assess differences in social acceptability ratings between substance use for recreation and substance use for utilitarian purposes. Using the Bonferroni method to control for multiple tests, p was set at <.008. Significant differences were found for each substance. Drinking alcohol to have fun with friends (M = 4.01, SD = .92) was rated as significantly more socially acceptable than drinking alcohol to cope with negative emotions such as sadness (M = 2.18, SD = .98), t (242) = 23.70, $p < .001$. Marijuana use for recreation (M = 3.03, SD = 1.28) was also rated as significantly more socially acceptable than marijuana use to cope with negative feelings (M = 2.19, SD = 1.21), t (242) = 11.48, $p < .001$. Participants also viewed tobacco cigarette use for recreation (M = 2.26, SD = 1.22) as significantly more acceptable than cigarette use to cope with negative feelings (M = 1.93, SD = 1.08), t (242) = 5.39, $p < .001$, and e-cigarette use as more acceptable when used for recreation (M = 2.84, SD = 1.29) than when used for coping purposes (M = 2.18, SD = 1.16), t(242) = 9.06, $p < .001$. However, diverted stimulant use for recreation (M = 1.60, SD = 0.82) was rated as significantly less socially acceptable than diverted stimulant use as a study aid (M = 2.26, SD = 1.19) t (242) = 9.56, $p < .001$ and diverted opioid use for recreation (M = 1.28, SD = 0.59) was rated as significantly less acceptable than diverted opioid use to treat a painful injury (M = 2.21, SD = 1.23), t (242) = 13.02, $p < .001$.

A second series of *t*-tests were conducted to examine sex differences in self-reported approval ratings. Using the Bonferroni method to control for multiple tests, p was set at <.004. In general, men were more accepting of substance use than women. Several significant differences emerged. Specifically, men rated drinking alcohol to have fun with friends as significantly more socially acceptable (M = 4.27, SD = 0.86) than did women (M = 3.89, SD = 0.93), t (241) = 3.13, p = .002. Men's social acceptability ratings of marijuana use for recreation (M = 3.43, SD = 1.26) were also significantly higher than women's (M = 2.82, SD = 1.24), t (241) = 3.63, p < .001. Men also rated using stimulants for recreation as more socially acceptable (M = 1.86, SD = 0.91) than did women (M = 1.46, SD = 0.74), t (241) = 3.67, p < .001.

Significant differences also emerged between men's and women's self-reported approval of prescription opioid use for utilitarian and recreational purposes. Men rated using diverted prescription opioids to treat a painful injury as more socially acceptable (M = 2.54, SD = 1.28), than did women (M = 2.04, SD = 1.17), t (241) = 3.01, p = .003, and also rated diverted prescription opioid use to have fun with friends as more socially acceptable (M = 1.45, SD = 0.74) than did women (M = 1.19, SD = 0.48), t (241) = 3.37, p = .001.

Discussion

The current study examined college students' perceptions of prescription and non-prescription drug use for utilitarian and recreational purposes using two distinct means: 1) self-reported ratings of the acceptability of tobacco, alcohol, marijuana, and non-medical prescription drug use for self-medication and recreation; and 2) a randomized experiment where participants responded to one of four vignettes depicting a college student using either marijuana for recreation, Vicodin for recreation, Adderall for recreation, or Adderall for academic purposes. It tested the hypotheses that students would rate prescription stimulant use for utilitarian purposes

as more acceptable than other-drug use for utilitarian purposes, and that students would perceive a college student who uses Adderall for academic purposes more favorably than a college student who uses Adderall, Vicodin, or marijuana for recreation. Including both a self-report component and an experimental component allowed for examination of how conscious approval of drug use for various reasons compared to unmotivated responding.

Substance Use Patterns. Overall, the sample used a variety of substances. The most common was alcohol. Fully 87% of the sample consumed alcohol and average weekly consumption was 6.94 standard drinks. The prevalence of alcohol use in the current sample is higher than the national past-year prevalence rate of alcohol use in college students of 79% (Schulenberg, Johnston, O'Malley, Bachman, Miech, & Patrick, 2017). This was followed by marijuana use; over one third (39.5%) of participants endorsed marijuana use, a rate comparable to the 39% reported in national samples of college students (Schulenberg et al., 2017). With regard to nicotine use, 9.9% of participants endorsed using tobacco cigarettes occasionally, and 5.3% reported occasionally using e-cigarettes. No participants reported daily tobacco cigarette use. These rates are lower than those in other college populations, with 18.7% of students in a national survey reporting using tobacco cigarettes in the past year and 2% reporting daily cigarette use (Schulenberg et al., 2017).

Nonmedical prescription opioid use prevalence was lower in the current sample than was reported in prior data collected at a large public university, with 1.6% of participants in the present study reporting nonmedical use of prescription opioids compared to a past-year prevalence rate of 4.5% in the prior study (McCabe et al., 2014). The most recent national data indicate 3.8% of college students report using a narcotic other than heroin, such as Vicodin or Oxycontin, in the past year (Schulenberg et al., 2017). Although the reasons for the lower use in

the current sample are unknown, one possibility may be linked to higher perceived risk of nonmedical prescription opioid use. College students tend to use drugs that have higher perceived risk less than drugs that they view as less risky (DeSantis & Hane, 2010). As the university sampled for the present study is located in an area that has been heavily impacted by the opioid epidemic (Vivolo-Kantor et al., 2018), it is possible that participants have been exposed to a great deal of information about the risks of using prescription opioids. Such messaging may have increased sensitivity to the risks associated with use of this type of drug.

Most importantly, given the focus of this study, 11.9% of participants endorsed nonmedical prescription stimulant use. Further, 9% of the sample indicated that they had used prescription stimulants that were not prescribed to them one or more times as a study aid in the past semester. For context, 9.9% of college students sampled by Monitoring the Future (MTF) in 2016 reported past-year nonmedical stimulant use (Schulenberg et al., 2017) and 9.3% of students in 2013 who attended a large public university reported nonmedical use (McCabe et al., 2014). As many students who use diverted prescription stimulants report doing so due to academic pressures (Garnier-Dykstra, Caldeira, Vincent, O'Grady, & Arria, 2012), the higher rates of nonmedical prescription stimulant use in the current sample compared to national data and data from a large public university may be related to the academic pressures associated with attending a midsize, private liberal arts university.

Self-reported Approval: In general, results indicated that students view most drug use unfavorably. The only two types of substance use that garnered net-positive approval ratings (e.g., $\geq$ 2.5 on the 5 point approval scale use) were marijuana use to have fun with friends (M = 3.03) and alcohol use to have fun with friends (M = 4.02). These results suggest that most types of drug use are not widely accepted among students in the present study. Although somewhat

lower than expected, the approval ratings were consistent with the low observed use rates, suggesting that shared norms about the unacceptability of most forms of drug use may serve to control use patterns. Related to the idea that normative beliefs influence use patterns, it was anticipated that the same drug would be viewed differently based on if it was being used for recreational or utilitarian reasons— and that the more acceptable form of use would vary across drug categories. That, in effect, a class of drug can be used to either party or address a need (study/pain/negative affect) but cannot do both. This was supported as distinct patterns emerged for each of the substances examined. In the case of prescription stimulants, the utilitarian use— e.g., use to improve academic performance—was rated as significantly more acceptable than recreational use or to have fun at a party with friends. This finding is consistent with prior results indicating that college students view using prescription stimulants as a study aid more favorably than using them to get high or lose weight (DeSantis & Hane, 2010; Kerley et al., 2015; Lookatch, Moore, & Katz, 2014). However, notably, approval was low (M = 2.30) with 60% of participants indicating the use of stimulants to study was either *unacceptable* or *completely unacceptable*. Approval was only modestly related to a history of personal utilitarian use and having used prescription stimulants as a study aid in the past semester (r = .17) and only 30% of students who reported having used stimulants to study rated doing so as *acceptable* or *completely acceptable*. These results suggest that college students—even those who engage in diverted stimulant use—do not hold favorable views of this behavior.

With regard to diverted prescription opioid use, participants again indicated little acceptance of using diverted prescription pain medicine for any reason but were more accepting —although still disapproving—if it were used to treat a painful injury than if used to have fun with friends. It is possible that students view use of prescription opioids for self-treatment

purposes as morally justifiable and less risky than recreational purposes. This theme has been seen in student perceptions of diverted prescription stimulant use (DeSantis & Hane, 2010; Kerley et al., 2015), and may also be applicable to diverted prescription opioid use. Further, past studies on subtypes of diverted prescription drug use have found that individuals who use prescription pain medications for self-treatment purposes are less likely to qualify for a substance use disorder than those who use these medications for recreational purposes (McCabe et al., 2009). It is possible that students have been exposed to peers who have used diverted prescription opioids for self-treatment purposes without lasting consequences and therefore hold more accepting views of using illicitly obtained prescription pain medications for pain—i.e., for their indicated purpose—than for recreation.

A clear finding across categories of drug is that recreational use of alcohol and marijuana is viewed much more favorably than all other forms of drug use—including use of marijuana and alcohol to cope with or manage negative emotions. Participants rated marijuana use for recreation as more socially acceptable than recreational use of any other illicit drug. However, the hypothesis that participants would rate prescription stimulant use for academic purposes as more socially acceptable than prescription opioid use to treat pain and marijuana use to cope with negative emotions such as sadness was not supported. Instead, there were no significant differences between social acceptability ratings for these types of drug use. These results suggest that college students' view of illicit drug use for utilitarian purposes is generally unfavorable. Although students believe that using prescription stimulants as a study aid is more socially acceptable than using the same drug for recreation, it is noteworthy that the favorability rating for either use was quite low. Students viewed recreational marijuana use as distinctly different from recreational use of diverted prescription drugs. Not only was the acceptability rating of

recreational marijuana significantly higher, but it was the only recreational drug other than alcohol to rate as generally favorable. However, acceptability ratings for marijuana use plummeted when it was used to manage or cope with negative feelings. A similar pattern was seen for alcohol, where using alcohol to have fun was rated as generally socially acceptable but using alcohol as a coping mechanism was viewed as unacceptable. Research on alcohol and marijuana use has found that it is more common for young adults to use alcohol and marijuana for social or recreational reasons than for self-treatment or coping reasons, and that those who use these substances for recreation are less likely to experience negative consequences than those who use for self-treatment (Banes, Stephens, Blevins, Walker, & Roffman, 2014; Kuntsche, Knibbe, Gmel, & Engels, 2005). In light of these findings and the high prevalence rates of marijuana and alcohol use on college campuses in general and in the present sample specifically, it appears that using these substances to have fun with friends is a normalized and socially accepted behavior, whereas using them to cope with feelings such as sadness is not.

Finally, nicotine use was viewed unfavorably in all forms. E-cigarette use was rated as somewhat more socially acceptable than tobacco cigarette use and participants viewed using nicotine recreationally as more acceptable than doing so to cope with negative feelings. These results suggest that the social acceptability of a substance is not solely based on legality, as marijuana—an illicit substance in the jurisdiction where the study was conducted—was rated as more socially acceptable than use of tobacco cigarettes and e-cigarettes, which are legal. Prior research has found that the *risk appraisal hypothesis*, which states that individuals' perceptions of the risks associated with a substance can change after using the substance, is applicable to both cigarette and marijuana use (Grevenstein, Nagy, & Kroeninger-Jungaberle, 2015). Further, past studies have suggested that college students are more accepting of substance use when they

do not believe it will have deleterious effects on an individual's life (Kerley et al., 2015). As a higher proportion of participants in the current sample reported marijuana use than cigarette or e-cigarette use, it is possible that students view marijuana as more socially acceptable because they have used marijuana themselves, or been exposed to peers who have used marijuana without negative consequences. This exposure, coupled with being raised during effective anti-tobacco educational initiatives such as the Truth Campaign (Truth Campaign Overview, 2009), may have led students to believe that marijuana use poses much less risk to an individual than cigarette or e-cigarette use and resulted in higher social acceptance of marijuana use than cigarette and e-cigarette use.

Experimental Results: To complement and extend the self-report results, college students' perceptions of a peer who engaged in various types of drug use was assessed experimentally. It was expected that engaging in NMPDM of Adderall for academic reasons would be viewed more positively than other forms of NMPDM. Consistent with hypotheses, a student who used Adderall for academic purposes was viewed more favorably. Four dimensions of personality were assessed: trustworthiness, work ethic, thrill seeking and positive affectivity. In regards to trustworthiness, although a strong trend occurred ($p < .051$) opposite to predictions—with the student who used Adderall for academic purposes being rated as less trustworthy—no formal differences in trustworthiness emerged across experimental groups. This result suggests that although data exists to suggest NMPDM for academic purposes is, in itself, viewed by other students as a form of academic dishonesty (Reisinger, Rutledge, & Conklin, 2016), the strength of this belief in the general student population is not pronounced. This perception, however, may be subject to intensification over time as data also shows that students who use diverted stimulants for academic purposes engage in more forms academic dishonesty

and do so more frequently than those who do not (Gallucci, Martin, Hackman & Hutcheson, 2017). As such, it may be that over time students will come to associate use of diverted stimulants to study with a variety of dishonest academic practices.

A student who used Adderall to enhance academic performance was perceived as higher in work ethic than a student who used Adderall or Vicodin for recreation. The student was also rated as less thrill-seeking than a student who used Adderall, marijuana, or Vicodin for recreation. However, as the internal consistency of the thrill-seeking measure was poor, this result should be interpreted with caution and may not be reliable. If replicated by others, viewing those who use Adderall to study as less thrill seeking would be consistent with prior research indicating college students believe that using prescription stimulants as a study aid is less risky than using prescription stimulants or other drugs for recreation (DeSantis & Hane, 2010). With regard to work ethic, Kerley and colleagues' (2015) qualitative data indicated that college students perceive a moral distinction between stimulant use for academic purposes and drug use to get high. In that study, several students reported that they felt that using stimulants to improve academic performance was acceptable because it demonstrated a dedication to academic success, whereas using drugs to get high was unacceptable because it was reckless and could have deleterious impacts on success. The current study expands on this finding as it shows quantitatively that college students view another student who used Adderall or Vicodin to have fun at a party with friends as significantly lower in work ethic than a student who used Adderall to improve academic performance. However, participants did not view a student who used marijuana to have fun with friends as lower in work ethic than a student who used Adderall to complete schoolwork. This may be explained in part by the overall social acceptability as well as

the high prevalence of marijuana use on college campuses in general and in the current sample (McCabe et al., 2014).

Due to the limited research on students' views of positive affect as it relates to drug use, it was not clear how ratings of positive affect would differ between Adderall use for academic purposes and other experimental conditions. Results showed that participants rated a student who used Adderall to improve academic performance as significantly lower in positive affect than a student who used Adderall, Vicodin, or marijuana for recreation. This result may have been partially influenced by the nature of the vignettes. The vignette pertaining to Adderall use for academic purposes described a student who has a substantial amount of schoolwork to complete in a short time frame, whereas the vignettes pertaining to recreational drug use describe a student who is out with friends. It is possible that the student engaging in Adderall use for academic purposes was rated lower in positive affect because of situational factors.

Although college students often report using diverted prescription stimulants to enhance academic performance (DeSantis et al., 2008), studies have found that this behavior is actually linked to lower GPA (Garnier-Dykstra et al., 2012). Results from the current study are consistent with these findings, as there was a modest, but significant, negative relation between GPA and using prescription stimulants as a study aid. Students appear to overestimate the amount of benefits provided by using diverted stimulant medications. Although research on the benefits of using prescription stimulants to enhance cognitive functioning and productivity have found that using these drugs is related to an increase in processing speed accuracy, there is not much support for other cognitive benefits to using prescription stimulants to temporarily boost cognitive functions (Marraccini, Weyandt, Rossi, & Gudmundsdottir, 2016). Therefore, using prescription stimulants to increase academic performance may not produce the results that

students expect or result in higher grades. Further, research has found that college students who engage in nonmedical prescription stimulant use are more likely to also use alcohol, marijuana, and other drugs as well as binge drink than those who do not (Blevins, C.E., Stephens, R., & Abrantes, A.M., 2017; Prosek et al., 2018). This was true in the present sample. Any reported use of NMPDM stimulants was significantly associated with more alcohol use ($r = .33$, $p < .001$), more frequent marijuana use ($r = .21$, $p = .001$), more frequent NMPDM opioid use ($r= .20$, $p = .002$), more frequent e-cigarette ($r = .24$, $p < .001$) and more frequent tobacco cigarette use ($r = .45$, $p < .001$). Additionally, frequency of NMPDM stimulant use to study showed significant positive associations with increased frequency of tobacco cigarette use ($r = .28$, $p < .001$) and higher alcohol consumption ($r = .25$, $p < .001$)—but not any other drug category. These data suggest that students may be using prescription stimulants to compensate for the time lost and consequences related to using other substances and that doing so at best allows them to maintain minimal grades rather than outperform their peers.

Implications: Overall, students have unfavorable views of diverted prescription drug use. Even those students who reported using prescriptions stimulants as a study aid in the past semester rated this behavior as generally unacceptable. If students already believe that using drugs like Adderall and Ritalin to enhance academic performance is an unacceptable behavior, then interventions that focus on teaching alternate ways of dealing with academic pressures might be more effective than those that focus on education about risks and consequences associated with stimulant use. Programs could increase motivation to seek alternative methods of improving academic performance by educating students that using diverted prescription stimulants as a study aid is actually associated with lower GPAs. Although students do not seem to believe that diverted prescription stimulant use is a socially acceptable behavior, it is possible

that they continue to use drugs like Adderall as a study aid due to a belief that it will help them achieve academic success. Education about the link between diverted prescription stimulant use and lower GPA, coupled with strategies for how to effectively manage coursework, could decrease the number of students who feel compelled to use diverted prescription stimulants during times of academic stress. Further, as prior findings suggest students with low self-efficacy regarding study habits are more likely to misuse prescription stimulants for academic purposes, it may be helpful for interventions to focus on increasing students' confidence in their ability to effectively manage academic demands (Looby et al., 2015). Additionally, interventions that capitalize on the dissonance many students who use stimulants to study appear to feel by highlighting how the behavior is discrepant from values may also lead to behavioral change (Miller & Rollnick, 2013).

Limitations: There are several limitations to this study. First, the sample was drawn from a mid-sized, private, Catholic university in the mid-western United States. The majority of the sample was Caucasian (79%), and 65.4% of the participants were female. As men in the current sample were significantly more approving of substance use when compared to women, it is possible that results may have emerged had the sample included equal proportions of men and women. Second, the prevalence rate of nonmedical prescription stimulant use was higher than that in the general population and at large public universities, and the prevalence of nonmedical prescription opioid use was lower than that in the general population and at large public universities. Therefore, results may not be generalizable to students at large public universities. Third, the poor internal consistency of the measure of thrill-seeking requires the findings associated with this measure be viewed with caution. A fourth limitation to the study is that the structure and wording of the vignette describing a student who uses Adderall for academic

purposes did not parallel that of the other three vignettes. It is possible these differences evoked a different cognitive set for participants, and that differences in approval ratings were impacted by other factors (e.g., needing to study versus intending to party) besides type of drug use.

Despite the study's limitations, the results add to our understanding of stimulant NMPDM by college students. Although prior studies have researched how college students view stimulant NMPDM, the majority of the data has been qualitative in nature (DeSantis et al., 2008; Kerley et al., 2015). The present study used quantitative measures and demonstrated that college students view diverted prescription stimulant use for academic purposes as more socially acceptable than use for recreation through two distinct means: self-report and experimental. Results from the experimental portion of the study showed that students view a college student who uses Adderall to complete school work as less thrill-seeking, lower in positive affect, and higher in work ethic than a college student who uses either Adderall or Vicodin for recreation. Future studies could use similar methodology to expand the personality attributes studied. The present study also compared college students' perceptions of diverted prescription stimulant use to their perceptions of marijuana use, which is increasingly common and widely accepted (Johnston et al., 2015). The self-report results showed that college students view marijuana use for recreation as more socially acceptable than diverted prescription stimulant use for recreation and the experimental results showed participants perceived a student who used marijuana for recreation as similar in terms of trustworthiness and work ethic to a student who used Adderall for academic purposes. Prior studies have found that students typically have more accepting attitudes towards drug use that they perceive as less risky (Johnston et al., 2015), which suggests that participants in the current study likely view marijuana use for recreation and diverted prescription use for academic purposes as less harmful that diverted prescription stimulant or

opioid use for recreation. Future research could investigate whether education on the risks of marijuana and diverted prescription medication for any purpose would decrease the acceptability and prevalence of these types of drug use on college campuses. Additionally, more work on the intersection of academic dishonesty and NMPDM for academic gain appears warranted as students who are considering using diverted stimulants for academic purposes may be dissuaded if doing so comes at the cost of being viewed as cheating by their peers.

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Table 1

Demographic Characteristics

Characteristic	Frequency	Percentage
Sex		
Male	84	34.60
Female	159	65.40
Ethnicity		
Black	21	8.60
Hispanic/Latino	12	4.90
Asian	9	3.70
White	192	79.00
Multiracial	7	2.90
Prefer not to respond	2	0.80
Class standing		
First Year	41	19.10
Sophomore	68	31.60
Junior	72	33.50
Senior	34	15.80
Major		
Creative Arts	4	1.70
Business	47	19.50
Education	2	0.80
Pre-professional	56	23.20

Liberal Arts	4	1.70
Traditional Science	18	7.50
Social Science	100	41.50
Undecided	9	3.70
Prescription Medications		
Stimulants	18	7.40
No Stimulants	225	92.60

Table 2

Substance Use Frequencies

Frequency	Prescription Stimulants *n (%)*	Prescription Opioids *n (%)*	Marijuana *n (%)*	Alcohol *n (%)*	Tobacco Cigarettes *n (%)*	E-Cigarettes *n (%)*
Never	214 (88.1)	239 (98.4)	147 (60.5)	32 (13.2)	219 (90.1)	231 (94.7)
Every few months	26 (10.7)	1 (0.40)	54 (22.2)	24 (9.90)	14 (5.80)	3 (1.20)
Every few weeks	2 (0.80)	1 (0.40)	22 (9.10)	73 (30.0)	6 (2.50)	7 (2.90)
Weekly	0 (0.00)	2 (0.80)	16 (6.60)	112 (46.1)	4 (1.60)	0 (0.00)
Daily	1 (0.40)	0 (0.00)	4 (1.60)	2 (0.80)	0 (0.00)	3 (1.20)

Table 3

Frequency of Stimulant Use as a Study Aid in the Past Semester

Number of occasions	Prescription Stimulants *n (%)*
0	223 (91.80)
1	11 (4.50)
2	5 (2.10)
3	0 (0.00)
4	2 (0.08)
5	0 (0.00)
6	0 (0.00)
7	1 (0.40)
8	1 (0.40)

Table 4

Demographic Characteristics across Experimental Conditions

Demographic Variable	Vignette 1 *n* = 63	Vignette 2 *n* = 59	Vignette 3 *n* = 58	Vignette 4 *n* = 63
Sex				
Male *n* (%)	19 (30.1%)	22 (37.3%)	24 (41.4%)	19 (30.1%)
Ethnicity *n (%)*				
Black	6 (9.50%)	5 (8.50%)	3 (5.20%)	7 (11.1%)
Hispanic/Latino	1 (1.60%)	3 (5.10%)	4 (6.90%)	4 (6.30%)
	2 (3.20%)	1 (1.70%)	4 (6.90%)	2 (3.20%)
Asian	52 (82.5%)	47 (79.7%)	45 (77.6%)	48 (76.2%)
White	1 (1.60%)	3 (5.10%)	2 (1.70%)	1 (1.60%)
Multiracial	1 (1.60%)	0 (0.00%)	0 (0.00%)	1 (1.60%)
Prefer not to respond				
Year in School *n (%)*				
First year	15 (24.6%)	18 (30.5%)	14 (24.1%)	14 (22.2%)
Second year	17 (27.9%)	11 (18.6%)	21 (33.3%)	21 (33.3%)
Third year	22 (36.1%)	19 (32.2%)	16 (27.6%)	23 (36.5%)
Fourth year	6 (9.80%)	10 (16.9%)	7 (12.1%)	5 (7.90%)
Fifth year	0 (0.00%)	1 (1.70%)	0 (0.00%)	0 (0.00%)
Other	1 (1.60%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Prescription Medications *n (%)*				
Prescription Stimulants	7 (11.1%)	2 (3.39%)	7 (12.1%)	2 (3.17%)
No Prescription Stimulants	56 (88.9%)	57 (96.6%)	51 (87.9%)	61 (96.8%)
Age *M(SD)*	20.20 (2.65)	20.10 (1.46)	19.80 (1.14)	20.00 (1.49)
GPA *M(SD)*	3.30 (0.41)	3.35 (0.43)	3.42 (0.36)	3.41 (0.40)

Table 5

Substance Use Per Week across Conditions

Substance	Vignette 1 *n*= 63 *M*(SD)	Vignette 2 *n*= 59 *M*(SD)	Vignette 3 *n*= 58 *M*(SD)	Vignette 4 *n*= 63 *M*(SD)
Prescription Stimulants	0.05 (0.31)	0.02 (0.13)	0.02 (0.13)	0.07 (0.34)
Prescription Opioids	0.02 (0.13)	0.03 (0.18)	0.00 (0.00)	0.05 (0.28)
Marijuana	0.25 (0.61)	0.26 (0.62)	0.38 (0.79)	0.26 (0.60)
Alcohol (standard drinks)	7.43 (9.45)	7.22 (8.51)	7.25 (8.74)	5.90 (6.58)
Tobacco Cigarettes	0.25 (0.93)	0.00 (0.00)	0.03 (0.26)	0.07 (0.38)
E-cigarettes	0.07 (0.34)	0.06 (0.32)	0.02 (0.13)	0.08 (0.40)

Table 6

Impressions Rating Scale (IRS) Domain Scores by Condition

Demographic Variable	Adderall for Academics *M*(*SD*)	Adderall for Recreation *M*(*SD*)	Vicodin for Recreation *M*(*SD*)	Marijuana for Recreation *M*(*SD*)
Trustworthiness	3.04 (0.53)	3.16 (0.48)	3.06 (0.41)	3.25 (0.48)
Work Ethic	3.17 (0.69)	2.86 (0.39)	2.80 (0.38)	2.98 (0.47)
Thrill-Seeking	3.33 (0.50)	3.75 (0.44)	3.71 (0.47)	3.59 (0.48)
Positive Affect	3.35 (0.45)	3.80 (0.47)	3.59 (0.47)	3.76 (0.45)

Note: 1 = *definitely no*; 5 = *definitely yes*

Appendix A

February 2, 2017

Lisa Gallagher

Dear Ms. Gallagher:

The IRB has completed the review of your protocol *#16-059, College Students' Perception of Prescription and Non-Prescription Drug Use* using expedited review procedures. We appreciate your thorough treatment of the issues raised and your timely response. Your study is approved in the Expedited category under Federal Regulation 45CFR46.

Approval expires February 2, 2018. A progress report, available at http://www.xavier.edu/irb/forms.cfm, is due by that date. If the IRB has not received a progress report from you before MIDNIGHT on the study's expiration date, we will AUTOMATICALLY set your study's status to "Closed". **No further data collection is allowed at that point, and if you wish to re-commence data collection, you will be required to submit a new application, along with all relevant materials, to our office.**

Although we will endeavor to send you a reminder, it is **your responsibility** as the researcher to ensure that your progress report and any request for an extension of data collection is submitted to our office before your approval expires.

If you wish to modify your study, including any changes to the approved Informed Consent form, it will be necessary to obtain IRB approval prior to implementing the modification. If any adverse events occur, please notify the IRB immediately.

If you have any questions, please contact the IRB office at 745-2870. We wish you success with your research!

Sincerely,

Morell E. Mullins, Jr., Ph.D.

Summary

Title: College Students' Perceptions of Prescription and Non-Prescription Drug Use

Problem: Drug use, particularly marijuana and nonmedical prescription stimulant use, is common on college campuses, with 39% of students reporting past-year marijuana use and 9.90% reporting past-year use of diverted prescription stimulant (Schulenberg, Johnston, O'Malley, Bachman, Miech, & Patrick, 2017). Further, prevalence rates of nonmedical prescription stimulant use have been increasing while the prevalence rates of other types of drug use such as diverted prescription opioid use have been decreasing among college populations (Brandt, Taverna, & Hallock, 2014; McCabe, West, Teter, & Boyd, 2014). Growing concern over this behavior has led researchers to investigate the factors that surround misuse of prescription stimulants. Overall, the most common motive for using diverted stimulants is to enhance academic performance (Bavarian, McMullen, Flay, Kodama, Martin, & Saltz, 2017; DeSantis, Webb, & Noar, 2008; Looby, Beyer, & Zimmerman, 2015). Students who use prescription stimulants without a prescription also appear to believe that this behavior is socially acceptable and morally justifiable (DeSantis & Hane, 2010; Kerley, Copes, & Griffin, 2015; Schultz, Silvestri, & Correia, 2017). Although students who choose to abstain from prescription stimulant misuse report doing so due to ethical and health-related concerns (Bavarian et al., 2017), a growing body of research suggests that using diverted prescription stimulants for academic purposes may be viewed as more acceptable than other types of drug use (DeSantis et al., 2008; Kerley et al., 2015; Lookatch et al., 2014). This study extended prior research by using both self-report and experimental means to investigate this are. Specifically college students' self-reported approval ratings of various types of drug use for either a recreational or utilitarian motivation were obtained, as well as their experimentally obtained impression ratings of a

student who engages in either prescription stimulant use for academic reasons, prescription stimulant use for recreation, prescription opioid use for recreation, or marijuana use for recreation.

Method: The final sample (N = 243) was 65.4% (n = 159) women, and was 79% White (n = 192). The average age of the participants was 20 years old (SD= 1.77), and the average GPA was 3.37 (SD= 0.40). With regard to class standing, 33.5% of participants were juniors, 31.6% were sophomores, 19.1% were freshmen, and 14.9% were seniors. For the experimental component, participants were randomly assigned to one of four conditions: prescription stimulant use for academic purposes, prescription stimulant use for recreational purposes, prescription opioid use for recreational purposes, and marijuana use for recreational purposes. Participants read a vignette describing a college student engaging in one of the four types of drug use, then completed a questionnaire to rate the student on perceived trustworthiness, thrill-seeking, work ethic and positive affectivity. Participants then completed a self-report measure on their personal substance use habits, as well as their perceptions of the social acceptability of substance use for utilitarian and recreational purposes.

Findings: Substance use was common. Among illicit drug use, series of chi-square tests of proportions showed that marijuana use (39.5%) was more common than prescription stimulant use (11.9%), χ^2 (1) = 76.77, p < .001, and than prescription opioid use (1.6%), χ^2 (1) = 144.7, p < .001. There was also a small, but significant negative relation between frequency of prescription stimulant use as study aid in the past semester and GPA, r = -.14; p=.02. With regard to self-reported acceptability of forms of substance use, a one-way within-subjects ANOVA indicated that stimulant use for academic purposes was rated as significantly more socially acceptable than prescription stimulant use for recreation (M = 1.60), t(242) = 9.56, p < .001, CI [0.53, 0.80]).

Also, a one-way within-subjects ANOVA demonstrated that participants rated marijuana use for recreation (M = 3.03) as significantly more socially acceptable than stimulant use for recreation (M = 1.28) $t(242) = 18.0$, $p < .001$, CI [1.60, 1.90]), and prescription opioid use for recreation (M = 1.60) $t(242) = 22.6$, $p < .001$, CI [1.28, 1.59]). Within the experimental component, ratings of the vignette protagonists were tested using a series of one-way between subjects ANOVAs. Results indicate that a student who uses prescription stimulants for academic purposes was rated as significantly less thrill-seeking (M =10.2, SD= 1.58) than a student who used Adderall for recreational purposes (M = 11.4, SD= 1.79), p<.001, CI (-1.92, -0.41), a student who used Vicodin for recreational purposes (M = 11.1, SD = 1.55), p = .021, CI (-1.61, -0.09), and a student who used marijuana for recreational purposes (M = 11.0, SD = 1.51), p = .048, CI (-1.49, -0.004). This protagonist was also rated as higher in work ethic than a student who uses prescription stimulants (M = 14.3, SD = 1.96), p =.006, CI (0.17, 2.83), or prescription opioids for recreation (M = 14.0, SD = 14.0), p = .001, CI (0.49, 3.13). Finally, participants rated a student who uses Adderall for academic purposes (M = 16.8, SD = 2.23) as significantly lower in positive affect than an individual who uses Adderall for recreational purposes (M = 19.00, SD = 2.35), p<.001, CI (-3.06, -1.42), a student who uses Vicodin for recreation (M = 17.9, SD = 2.34), p =.005, CI (-1.99, -0.35), and an individual who uses marijuana for recreation (M = 18.8, SD = 2.23), $p < .001$, CI (-2.84, -1.23).

Implications: Overall, students reported unfavorable views of diverted prescription drug use. Even those students who reported using prescriptions stimulants as a study aid in the past semester rated this behavior as generally unacceptable. Therefore, it is likely that students continue to engage in this behavior because they believe it will have positive outcomes for them, although both past research and the current findings suggest that this behavior is actually linked

to lower- not higher- GPA (Donaldson, Siegel, & Crano, 2016). Past findings suggest students are more likely to use prescription stimulants as a study aid when they have low self-efficacy regarding their study habits (Looby et al., 2015). Therefore, interventions that help students develop effective study skills while providing education that prescription stimulants are not an effective way to improve grades may help decrease diverted prescription stimulant use on college campuses. Additionally, motivational interviewing interventions that highlight how illicit prescription stimulant use is discrepant from students' values and beliefs may lead to behavioral changes (Miller & Rollnick, 2013).