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An Investigation into the Relationship Between Academic Pressure and Non-medical Prescription Stimulant Use Among University of South Carolina Undergraduate Students

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AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN ACADEMIC PRESSURE
AND NON-MEDICAL PRESCRIPTION STIMULANT USE AMONG UNIVERSITY OF
SOUTH CAROLINA UNDERGRADUTATE STUDENTS

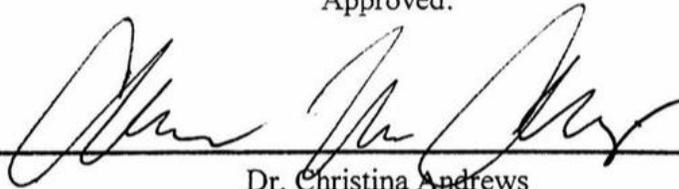
By

Arslan Valimohamed

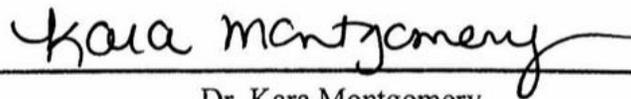
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of the Requirements for
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South Carolina Honors College

May 2019

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ABSTRACT

One hundred and six undergraduate students of the University of South Carolina were surveyed to understand misuse of prescription stimulants and how perceived academic pressure may play a role in this behavior. Overall, the survey revealed that 33.0% of participants reported illicit use of prescription stimulants in the last 30 days, and 52.8% reported illicitly using prescription stimulants at least once during their time in college. Data from the survey responses indicated that students perceiving academic pressure were more likely to have misused prescription stimulants at least once during their time in college, but only if these students also reported little perception of danger related to stimulant misuse. Bivariate analysis revealed other statistically significant associations between reported stimulant misuse and other factors including gender, perceived stimulant benefit, access to illicit stimulant providers, and marijuana use. Findings from this project suggest that students are underestimating the danger and risks associated with non-medically directed prescription stimulant use, a disposition that, when combined with academic pressure, may lead students to misuse prescription stimulants. Colleges, universities, and other educational institutions should make the effort to increase both awareness of this public health problem, as well as develop strategic intervention policies that may mitigate the prevalence of this behavior. Examples of such policies include incorporation of educative material regarding prescription stimulant misuse risks in existing mandatory substance abuse education courses and stricter policing of the sale or distribution of prescription stimulants.

INTRODUCTION

Abuse of prescription stimulants among college populations has increased in the last few decades, with experts estimating an average stimulant misuse rate between 13 – 23% among American educational institutions (Weyandt et al., 2016). Misuse of stimulants can lead to a multitude of adverse health effects, including cardiomyopathy, insomnia, and addiction. Prior research suggests that a lack of understanding of the dangers and harms associated with non-medical prescription stimulant use may be one factor influencing the high prevalence of prescription stimulants misuse. However, due to the expected effects of prescription stimulants, increased concentration, alertness, and energy, there is some evidence to suggest that stimulant misuse may be driven by academic pressure. (DeSantis & Hane, 2010). To assess the validity of this assumption, is it necessary to determine whether a relationship between students' is apparent. In this study, I assess the extent to which perceptions of academic pressure are related to prescription stimulant misuse by administering a survey of undergraduate students at the University of South Carolina.

BACKGROUND

Defining Stimulant Misuse

Stimulants were originally developed to treat attention-deficit/hyperactivity activity disorder, or ADHD, a disorder characterized by behavioral symptoms such as inattention, lack or organizational skills, and hyperactivity (Hinshaw & Scheffler, 2014). Studies show that stimulants improve concentration, reduce impulsivity, and increase self-control in individuals with ADHD. However, this promise of instantly improved concentration, energy, and focus may lead some individuals to misuse prescription stimulant drugs (Teter, McCabe, LaGrange,

Cranford, & Boyd, 2006). For the purposes of this project, non-medical prescription stimulant use, or NPS for short, is a behavior defined by the illicit use of prescription stimulants without a prescription from a physician or health care provider, the use of prescription stimulants for anything other than medical purposes, i.e. the regulation of ADHD symptoms, and/or use of prescription stimulants that exceeds what is recommended by the relevant physician or medical authority (Bavarian, Flay, Ketcham, & Smit, 2013). Stimulants intended to treat ADHD are present today in the brand names Ritalin, Adderall, Concerta, and Vyvanse.

Stimulant misuse is common in the United States. In 2002, an estimated 7.3 million persons in the United States reported misusing prescription ADHD stimulants at least once in their lifetime, representing 34.7% of all stimulant misusers, prescription or otherwise (Kroutil et al., 2006). According to more recent results from the 2016 National Survey on Drug Use and Health, 1.7 million Americans 12 years or older reported misuse of prescription stimulants within the past month (Ahrnsbrak, 2016). This figure for stimulant misuse represents over 27% of all reported prescription psychotherapeutics abuse. Furthermore, adults between the ages of 18 – 25, an age range that includes much of the college population, were well over five times more likely to abuse prescription stimulants than adults over the age of 26. These findings are extremely important, as they indicate the extent of the popularity of prescription stimulants, as well as highlight the age groups among which misuse is most common.

Harms Related to Stimulant Misuse

Similar to other pharmaceuticals, prescription stimulants interact with special neurotransmitters in the brain, a method of pharmacological action that is commonly associated with an increased risk of abuse and dependence as the brain and body adapts to a change in the

influx of neurotransmitters. The Drug Enforcement Agency (DEA) of the United States has classified prescription stimulants as schedule II drugs, along with other medications like opiates, indicating that they have a high potential for abuse and physical dependence (Wilens et al., 2008).

Prescription stimulants target the body's sympathetic nervous system, the same domain responsible for the "fight or flight" response, and increase the person's heart rate, blood pressure, and respiratory rate (Lakhan & Kirchgessner, 2012). Since these physiological effects directly relate to the cardiovascular system, many health care providers perform preliminary tests to ensure patients are not at risk of cardiomyopathy and related complications (Lakhan & Kirchgessner, 2012). While risks to users of medically prescribed stimulants may exist, the risks to users who have not received medical direction for stimulant use are even greater. Without the preliminary cardiovascular health tests and scheduled dosage regimen provided by a physician, users who misuse or abuse prescription stimulants are at higher risk of developing cardiomyopathies or even a fatal myocardial infarction.

In addition to the chronic dangers associated with NPS are the more acute symptoms that can appear within minutes of ingestion, including abdominal pain, loss of appetite, heart palpitations, insomnia, irritability, and nausea (Greydanus & Kaplan, 2012). Furthermore, in extreme cases, abuse of prescription stimulants may even lead to mental illnesses—particularly psychosis (Lakhan & Kirchgessner, 2012). While not evident in regular, prescribed users, abusers of prescription stimulants run the risk of experiencing symptoms also associated with frequent methamphetamine use including hallucinations, delusions, anorexia, and emotional blunting due to an excess of dopamine (Lakhan & Kirchgessner, 2012). Such an altered mental

state may make impact social function and may make it difficult for an abuser of prescription stimulants to function as productive member of society (Curran, Byrappa, & McBride, 2004).

Prevalence of Non-medical Prescription Stimulant Misuse Among College Populations

Nearly two-thirds of children diagnosed with ADHD receive medical stimulant prescriptions into their teenage years. In 2003, the number of children in the United States diagnosed with ADHD was 4.4 million. By 2011, this figure had risen to 6.4 million (Cuffe, Moore, & McKeown, 2005; Danielson et al., 2018). Consequently, the supply and availability of prescription stimulants for illicit distribution within school and college campuses has never been higher. In perhaps the most comprehensive investigation into the ubiquity of nonmedical prescription stimulant use among college students, researchers from University of Michigan's Substance Abuse Research Center surveyed almost 11,000 students from over one-hundred public and private colleges across America. Overall, they found that 6.9% of students surveyed reported non-medical prescription stimulant use (NPS) within their lifetime, with 4.1% reporting NPS within the last year (McCabe, Knight, Teter, & Wechsler, 2005). More importantly, rates of past year use among individual colleges varied from 0% to 25%, indicating that this issue may be strongly dependent on the specific institution. However, since this survey was completed in 2001, a time when rates of ADHD diagnosis among the American population was lower, the prevalence appears to be deflated compared to more recent findings (Hinshaw & Scheffler, 2014). When a similar study was administered to 7,000 college students from nine different U.S. colleges in the 2015/2016 academic year, the rate of nonmedical prescription stimulant use within the last six months for participants was 11.2% (Arria et al., 2018).

Contributing to the widespread prevalence of NPS among college students is the ease of access that students have to illegally obtain prescription stimulants. In a study of over 1,800 undergraduates at a single large public university, over 82% stated that obtaining illegal stimulants is “very easy” or “somewhat easy,” with less than 1% declaring that it would be “very difficult” to obtain stimulants (DeSantis, Webb, & Noar, 2008). While alcohol and some recreational drugs, such as marijuana, have existed as a staple in the American college culture for decades, it is evident by the aforementioned figures that prescription stimulants are on track to becoming another pervasive presence in college life, with potentially harmful consequences for those that choose to partake in NPS.

Perceptions of Harm Associated with Stimulant Misuse Among College Students

One possible explanation for the high prevalence of stimulant misuse is a lack of understanding of the risks and potential for harm as a result of non-medical prescription stimulant use. Prior research with college students suggests that only 2% believe use of prescription stimulants is “very dangerous.” The overwhelming majority—81%—reported that prescription stimulant use was “not dangerous at all” or just “slightly dangerous” (DeSantis, Webb, & Noar, 2008). Moreover, the research found an apparent dichotomy in attitudes of college students towards prescription stimulants versus other common “party drugs” like cocaine, alcohol, MDMA (ecstasy), and marijuana. While consumption of these “party drugs” was largely perceived by respondents to be evidence of wrongful, risky, and even dangerous, behavior, prescription stimulant misuse was seen as a more innocuous deed justified by academic intents (DeSantis & Hane, 2010).

Perhaps the most influential reason for this finding is the difference in effects of each respective type of drug. Students were likely to view prescription stimulants as a medicine like aspirin or Tylenol due in part to the lack of a “high” and cognitive impairment that is associated with other drugs like cocaine or marijuana (DeSantis & Hane, 2010). Furthermore, the interviewed students often cited the Food and Drug Administration’s approval and pharmaceutical legality of prescription stimulants as evidence of the medications’ safety and is likely a major factor in the students’ lacking perceptions of harm associated with stimulant misuse (DeSantis & Hane, 2010). Other research has pointed to the portrayal of prescription stimulants in the media as the drug of choice when “pulling an all-nighter,” perhaps furthering the general social attitude surrounding prescription stimulant misuse (Babcock & Byrne, 2000). It is evident in existing research that there is an alarming discrepancy among college students between their perception of the dangers of NPS and the reality of the potential harms and health implications associated with prescription stimulant use without medical direction.

Academic Pressure Among College Students

For many young adults, the transition to college can be a process that generates excitement as well as feelings of uncertainty, and research suggests that stress reported by college students has been on the rise nationwide. In a decade long study of over thirty colleges and universities nationwide, the results showed an increase from 16.0% of college freshmen reportedly feeling overwhelmed in 1985 to 25.3% in 1995 (J. Sax, 1997). A study conducted later in 2012 reached a similar conclusion, finding that 24% of the over five hundred undergraduates surveyed reported feeling stressed (Mahmoud, Staten, Hall, & Lennie, 2012). While some of this stress can be attributed to the physical environmental changes associated with

attending a higher education institution, most stress in college students stems from academic responsibilities (Misra & Castillo, 2004). Furthermore, there is evidence to suggest that there are cultural differences that may influence the way college students perceive and respond to academic stress. In a study conducted among a mix of 392 American and international students at two American Midwestern universities, the American students perceived higher academic stress than their international counterparts overall, with the largest discrepancy between the two types of students in their perceptions of self-imposed stress (Misra & Castillo, 2004).

Academic Pressure and Stimulant Misuse

To cope with the stress brought on by academic pressure, students may resort to prescription stimulants to improve concentration, alertness, and impulse control. In a survey of almost seven-thousand college students, those who perceived a large academic benefit from non-medical prescription stimulant use were most likely to report stimulant misuse (Arria et al., 2018). However, this phenomenon of utilizing ADHD medication for academic purposes is not limited to college students, or even to illicit non-medical stimulant use. In a study of seasonal medically-prescribed stimulant use, middle and high schoolers surveyed were 30% more likely to have their stimulant prescriptions refilled during the school year rather than the summer (King, Jennings, & Fletcher, 2014). Furthermore, the largest difference in seasonal stimulant use was present in states with the greatest accountability pressure where school performance metrics are used to determine possible rewards or sanctions, indicating that academic pressure was a very strong motivating factor for stimulant use.

A similar conclusion was reached by researchers investigating non-medical prescription stimulant use among students in medical school, a setting that is likely to include a higher

percentage of above-average students as well as an environment of more intense academic rigor than an undergraduate campus. In a survey 380 first- and second-year medical school students on a variety of subjects including stress, social networks, perceptions of drug use, and NPS, researchers found that 15.2% of students reported non-medical prescription stimulant use (Wasserman et al., 2014). This finding is significant, as that percentage is far higher than the national rate of diagnosis of ADHD that would necessitate a medical need for prescription stimulants. However, one key distinction in this finding is that perception of academic stress and associated feelings of competitiveness are pervasive in medical school given the rigorous nature of the curriculum; an undergraduate population that is more likely to contain a much wider assortment of academic stress perceptions.

Other Factors Linked to Stimulant Misuse Among College Students

Several other factors are associated with NPS. In a study of roughly 2,000 college students, NPS was most prevalent among students that belonged to a Greek organization such as a fraternity or sorority, and even more so among those who were a member of a Greek organization and resided in a fraternity or sorority house as opposed to a student apartment or on-campus dormitory (Shillington et al., 2006). In a separate study specifically looking at NPS in Greek-life members, researchers found that members of these organizations, particularly men in fraternities, were more likely to exhibit internal restlessness and sensation seeking traits that are associated with increased rates of illicit drug use overall (May, 2018). Alternatively, women in sororities were more likely to cite the appetite suppressing effects of prescription stimulants as a motive for NPS than men and non-Greek affiliated women.

Students who binge drink are more likely to participate in non-medical prescription stimulant use than students who don't (Low & Gendaszek, 2002). This is likely due to the ability of prescription stimulants to increase feelings of energy and alertness in order to offset the depressive effects of excessive alcohol consumption, an extremely dangerous practice that could lead to serious negative health implications (Kaye & Darke, 2012). Finally, in a study of 381 college students at a single university accessibility and knowledge of those that sold or provided illicit prescription stimulants were the strongest predicting factors for non-medical prescription use, indicating that lack of availability may be an impeding factor for NPS in other students (Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005). Ultimately, non-prescription stimulant use is not limited to those that exhibit any one single associated risk factor; rather, NPS is most likely the culmination of a multitude of both extrinsic and intrinsic determinants that may be present at the time.

Study Rationale

The primary research aim for this study is to determine the extent to which student perceptions of academic pressure are linked to prescription stimulant misuse among undergraduate students at the University of South Carolina. If presence of academic pressure is positively associated with reported nonmedical prescription stimulant use, it can help to elucidate a possible contributing factor to an issue plaguing colleges and universities across the country. The secondary research aim for this study is to determine the extent in which student assessment of risk and rewards related to stimulant use moderate the association between academic pressure and NPS. Findings as a result of this research aim may indicate potential intervention strategies,

such as increasing awareness and education of the risks associated with stimulant misuse, that may be effective in the effort to mitigate the prevalence of NPS.

METHODS

Study Design

In order to develop further understanding between possible predicting factors and nonmedical prescription stimulant use among college student populations, an anonymous survey was conducted at the University of South Carolina, a large public research university with roughly 26,000 undergraduate students. The study is a cross-sectional analysis of the relationship of academic pressure and stimulant misuse. A moderating analysis was also conducted to determine whether assessment of the dangers associated with stimulant use influences the strength of the relationship between academic pressure and stimulant misuse. The following hypotheses are tested in this study:

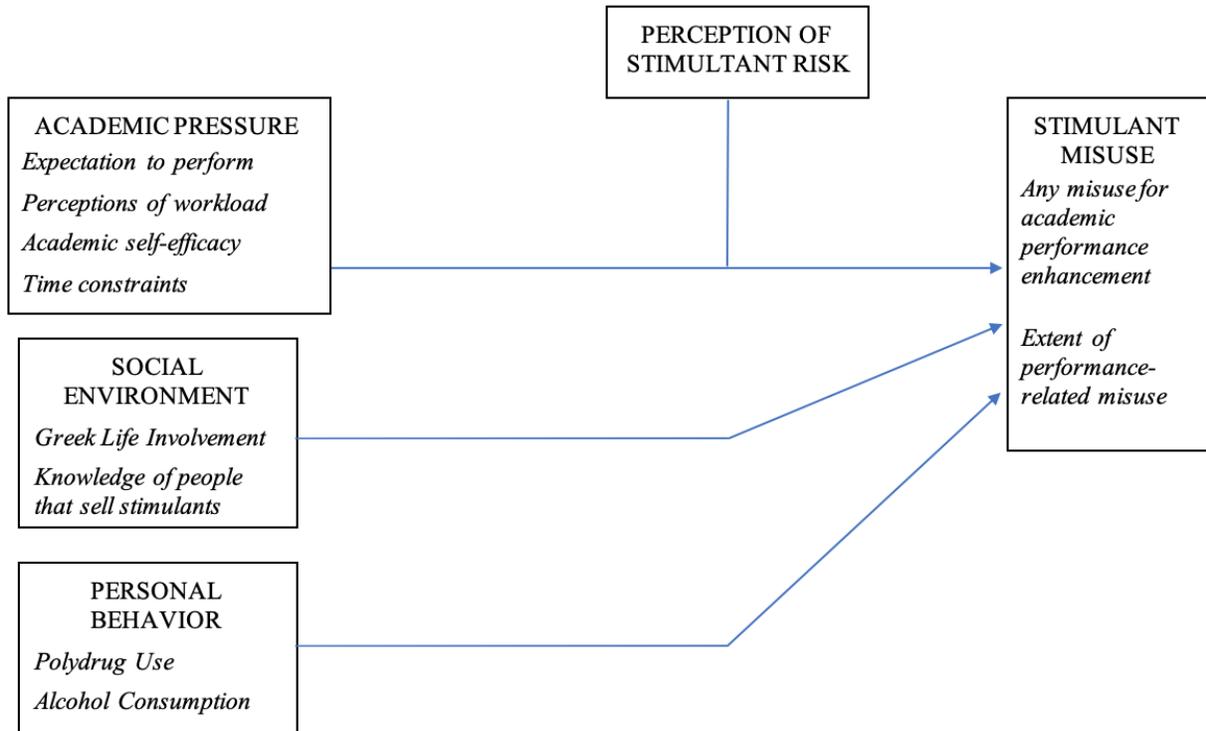
- H1: Students' perceptions of academic pressure will be positively associated with any reported stimulant misuse during college.
- H2: Students' perceptions of academic pressure will be positively associated with stimulant misuse in the past 30 days.
- H3: Greater assessment of stimulant risk will attenuate the relationship between academic pressure and stimulant misuse during college and in the past 30 days.

Conceptual Framework

Upon reviewing prior literature, a conceptual framework was drafted as a reference for the relationship among different variables. Academic pressure, social environments, and personal

behavior are all dependent on their respective subcomponents and serve as factors that may contribute to stimulant misuse independently. However, the relationship between these factors and stimulant misuse is moderated by the influential consideration of perceived stimulant risk.

Figure 1. Conceptual Framework Displaying Relationships Between Relevant Factors



Target Population

The study population included students above the age of eighteen who were enrolled as undergraduates at the University of South Carolina at the time of the survey's distribution.

Considering the university has an undergraduate population of roughly 26,000 students, in order to achieve a 90% confidence interval (Z-score 1.645) with an 8% margin of error, a sample size of roughly 106 (n = 106) students was required. Participants completed consent form outlining their rights and protections and a description of the survey subject matter included in the survey

before completing the survey (See Appendix). Participants were recruited primarily through social media and peer groups, in addition to the invites to complete the survey that were extended in various post-class presentations. The study was approved by the university's Institutional Review Board.

Study Variables

Independent Variables. The primary independent variable of interest was academic pressure. Academic pressure was determined utilizing a Likert psychometric scale where participants were asked to respond according to their level of agreement or disagreement with a proposed statement. For this study, "Strongly Disagree" responses with the proposed statement indicated a low score for that component of academic pressure were assigned to a value of 1, while "Strongly Agree" responses were assigned a value of 5. Each of the five component values were averaged to determine a final score for perception of academic pressure from 1 to 5 where scores above 3.0 were indicative of academic pressure.

Dependent Variables. The primary dependent variables were reported non-medical prescription stimulant use in the last 30 days and reported non-medical prescription stimulant use throughout college. Responses were collected using a Likert scale, but were split into binary groups consisting of those that reported misuse (coded as 1), and those that had not reported misuse (coded as 0).

Moderating Variable. The study moderating variable was student perception of danger associated with prescription stimulant use without medical direction. This variable was also measured using a Likert scale, where those that strongly disagreed that NPS is dangerous were assigned a value of 1 while those that strongly agreed that NPS is dangerous were assigned a

value of 5. A score above 3.0 indicates presence of perceived risk of non-medical prescription stimulant use.

Control Variables. Control variables included gender, race/ethnicity, class standing, GPA, Greek Life involvement, marijuana use in the past 30 days, heavy drinking in a given week, and perceived academic benefit from stimulant use. Gender was categorized into male, female, and other. Due to the small sample size of the study (92% of respondents were White), it was not possible to study racial and ethnic groups separately. Consequently, participants were in white and non-white categories. Class standing was classified into four distinct groups: freshmen, sophomores, juniors, and seniors. Greek Life involvement was also reported as a binary figure between those involved in Greek organizations including fraternities and sororities, and those that are not. Information regarding the participant's status of ADHD diagnosis was also collected. This specific measure is important in comparing the percentage of the study population that are legally, medically prescribed stimulants, and the percentage of the study population that illicitly consumes prescription stimulants.

Marijuana use in the past 30 days and heavy drinking in a given week were measured by either positive or negative responses to statements dictating this behavior. Perceived academic benefit was calculated in a similar manner to academic pressure by using a Likert psychometric scale. A score of 1-5 was determined by averaging the corresponding Likert scale responses to components of academic benefit with "Strongly Disagree" responses receiving a value of 1 and "Strongly Agree" responses to questions regarding stimulant benefits receiving a value of 5. Positive responses that were congruent to the individual components of perceived stimulant effect on increasing focus and concentration, alertness and energy, and academic performance were indicators of the presence of a perceived benefit of stimulant use in respondents.

Data Analysis

Survey results were aggregated and analyzed with statistical software. Bivariate analysis was accomplished using two distinct statistical methods. ANOVA tables were used to determine any statistically significant difference in the dependent variable, reported stimulant misuse in all of college, and between the various control groups. Due to the relatively small sample size, any p-value under 0.10 was deemed statistically significant. For the primary independent variable of interest, academic pressure, assigned values from responses to questions 7-11 (see Appendix) were averaged and used as the independent, or explanatory, variable in a logistic regression where the dependent variable was reported non-medical prescription stimulant. This statistical analysis will be duplicated for both past month and undergraduate career periods of NPS.

Logistic regression analysis was conducted, adding gender, race, class standing, GPA, Greek Life involvement, marijuana use, heavy drinking, and accessibility to stimulants as the independent variables. These logistic regressions were then repeated with perception of danger associated with stimulant misuse functioning added as a moderating variable. An interaction term to assess the moderating effect of perceived danger was created by multiplying scores of academic pressures with the binary measure of perceived danger. This allowed for the assessment of the relationship of academic pressure to stimulant use among two distinct groups: those who perceived stimulants as dangerous and those who did not. In addition, descriptive statistical analysis involving measures of central tendency (mean, median, and mode) for responses to survey questions regarding participants' use of nonmedical prescription stimulants was included as well.

RESULTS

Table 1. Descriptive Characteristics of the Study Population ($n = 106$).

| Characteristics | Percentage of the Study Population | (n) |
|---|------------------------------------|---------|
| | * unless otherwise noted | |
| Gender | | |
| Male | 55.7% | 59 |
| Female | 43.4% | 46 |
| Other | 0.9% | 1 |
| Race/Ethnicity | | |
| White | 88.7% | 94 |
| Class Standing | | |
| Freshman | 15.1% | 16 |
| Sophomore | 30.2% | 32 |
| Junior | 15.1% | 16 |
| Senior | 39.6% | 42 |
| Cumulative GPA | | |
| 2.0 – 2.5 | 2.8% | 3 |
| 2.5 – 3.0 | 6.6% | 7 |
| 3.0 – 3.5 | 34.0% | 36 |
| 3.5 – 4.0 | 56.6% | 60 |
| Greek Life Involvement | 64.2% | 68 |
| Medically Prescribed ADHD Medication | 13.2% | 14 |
| Academic Pressure | | |
| Perceived Presence of AP (score > 3.0) | 37.7% | 40 |
| Mean Score (1-5) | 2.95 (SD = 0.64)* | |
| Reported Stimulant Misuse | | |
| Within 30 Days | 33.0% | 35 |
| Throughout College | 52.8% | 56 |
| Marijuana Use in Last 30 Days | 44.3% | 47 |
| Heavy Drinking in a Given Week | 44.3% | 47 |
| Access to Illicit Prescription Stimulants | 71.7% | 76 |
| Perception of Danger from Stimulant Misuse | | |
| Perceived as Dangerous (score > 3) | 48.1% | 51 |
| Mean Score | 3.28 (SD = 1.23)* | |
| Perception of Benefits from Stimulant Use | | |
| Perceived Benefit (score > 3) | 57.5% | 61 |
| Mean Score | 3.34 (SD = 1.45)* | |

Overall, the survey revealed that 33.0% of students reported illicit use of prescription stimulants in the last 30 days, while an even higher 52.8% reported using prescription stimulant at least once during their time at college (Table 1). The results in also show that 13.2% of the students surveyed actually possess a medical prescription for stimulant medication for treatment of ADHD, which is in line with the national rate of ADHD diagnosis of around 10% (Danielson

et al., 2018). Of all respondents, 71.7% indicated having personal knowledge of someone that sells or provides stimulants, interpreted as access to stimulants for the purposes of this project.

Table 2. Bivariate Results Examining Associations Between Undergraduate Student Responses and All of College/Past 30-Day Stimulant Misuse.

| Variable | Stimulant Misuse Throughout College | | | | Stimulant Misuse in Past 30 Days | | | |
|---|-------------------------------------|----------|----------|-----------------|----------------------------------|----------|----------|-----------------|
| | Percent | St. Dev. | <i>F</i> | <i>p</i> -value | Percent | St. Dev. | <i>F</i> | <i>p</i> -value |
| Gender | | | | | | | | |
| Male | 67.8% | 0.222 | | | 45.8% | 0.458 | | |
| Female | 32.6% | 0.224 | 14.3 | 0.0003 | 15.2% | 0.152 | 12.1 | 0.0008 |
| Race/Ethnicity | | | | | | | | |
| White | 58.3% | 0.265 | | | 30.1% | 0.216 | | |
| Non-White | 52.1% | 0.252 | 0.16 | 0.6885 | 50.0% | 0.273 | 1.76 | 0.1875 |
| Class Standing | | | | | | | | |
| Freshman | 31.3% | 0.229 | | | 6.3% | 0.063 | | |
| Sophomore | 56.3% | 0.254 | | | 25.7% | 0.257 | | |
| Junior | 56.3% | 0.263 | | | 25.0% | 0.200 | | |
| Senior | 57.1% | 0.251 | 1.17 | 0.3246 | 35.7% | 0.235 | 2.99 | 0.0345 |
| GPA | | | | | | | | |
| 2.0 – 2.5 | 100% | 0 | | | 66.7% | 0.333 | | |
| 2.5 – 3.0 | 57.1% | 0.286 | | | 42.9% | 0.286 | | |
| 3.0 – 3.5 | 61.1% | 0.244 | | | 44.4% | 0.254 | | |
| 3.5 – 4.0 | 45.0% | 0.251 | 1.75 | 0.1609 | 23.3% | 0.182 | 2.23 | 0.0897 |
| Greek Life | | | | | | | | |
| Non-Member | 46.0% | 0.248 | | | 21.1% | 0.171 | | |
| Member | 57.4% | 0.255 | 1.24 | 0.2674 | 39.7% | 0.243 | 3.90 | 0.0508 |
| Academic Pressure Score | | | | | | | | |
| 1.0 – 2.0 | 30% | 0.233 | | | 30.0% | 0.233 | | |
| 2.1 – 3.0 | 46.4% | 0.253 | | | 23.2% | 0.181 | | |
| 3.1 – 4.0 | 64.9% | 0.234 | | | 35.3% | 0.233 | | |
| 4.1 – 5.0 | 100% | 0.0 | 2.72 | 0.0486 | 66.7% | 0.333 | 1.27 | 0.2864 |
| Perception of Danger from Stimulant Misuse | | | | | | | | |
| No Perceived Danger | 76.4% | 0.184 | | | 56.4% | 0.251 | | |
| Perceived Danger | 27.5% | 0.275 | 32.8 | 0.0000 | 7.8% | 0.074 | 37.6 | 0.0000 |

| | | | | | | | | |
|---------------------------------------|-------|-------|------|--------|-------|-------|------|--------|
| Perceived Stimulant Benefit | | | | | | | | |
| 1.0 – 2.0 | 6.67% | 0.064 | | | 0.0% | 0.0 | | |
| 2.1 – 3.0 | 13.3% | 0.124 | | | 13.3% | 0.124 | | |
| 3.1 – 4.0 | 91.7% | 0.080 | | | 58.3% | 0.254 | | |
| 4.1 – 5.0 | 81.1% | 0.158 | 46.8 | 0.0000 | 51.4% | 0.257 | 13.4 | 0.0000 |
| Access to Illicit Stimulants | | | | | | | | |
| No Knowledge of Access | 30.0% | 0.217 | | | 6.67% | 0.064 | | |
| Knowledge of Access | 61.8% | 0.239 | 9.36 | 0.0028 | 43.4% | 0.249 | 14.7 | 0.0002 |
| Marijuana Use in past 30 days | | | | | | | | |
| Did Not Report Use | 35.6% | 0.233 | | | 11.9% | 0.106 | | |
| Reported Use | 74.5% | 0.194 | 18.3 | 0.0004 | 59.6% | 0.246 | 35.4 | 0.0000 |
| Heavy Drinking in a given week | | | | | | | | |
| Did Not Report Use | 45.8% | 0.252 | | | 25.4% | 0.193 | | |
| Reported Use | 61.7% | 0.241 | 2.68 | 0.1044 | 42.6% | 0.250 | 3.52 | 0.0634 |

Responses pertaining to student perceptions of academic pressure seemed to loosely follow a bell curve of normal distribution, with 49.1% indicating that they did not feel significant levels of academic pressure, while 13.2% felt neutral and another 37.7% felt academic pressure. To determine whether presence of academic pressure is related to prescription stimulant misuse, I conducted an analysis of the difference in means of stimulant misuse between interval groups of perceived academic pressure, as well as a logistic regression using academic pressure to predict stimulant misuse. Table 2 indicates of those with an academic pressure score between 3 and 4—on a scale of 1 to 5—64.9% reported using prescription stimulants illicitly at least once during college, while 35.3% of respondents in this group indicated prescription stimulant misuse at least once in the last 30 days. Conversely, when looking at the respondents with an academic pressure score of 2 to 3, the stimulant misuse rate for all of college was 46.4% and 23.2% for reported use in the last 30 days. The p-value for the statistical test involving academic pressure and NPS throughout college was 0.049, indicating a statistically significant difference between

perceived academic pressure and stimulant misuse. However, no statistical significance was found for connecting academic pressure and stimulant misuse within the last 30 days.

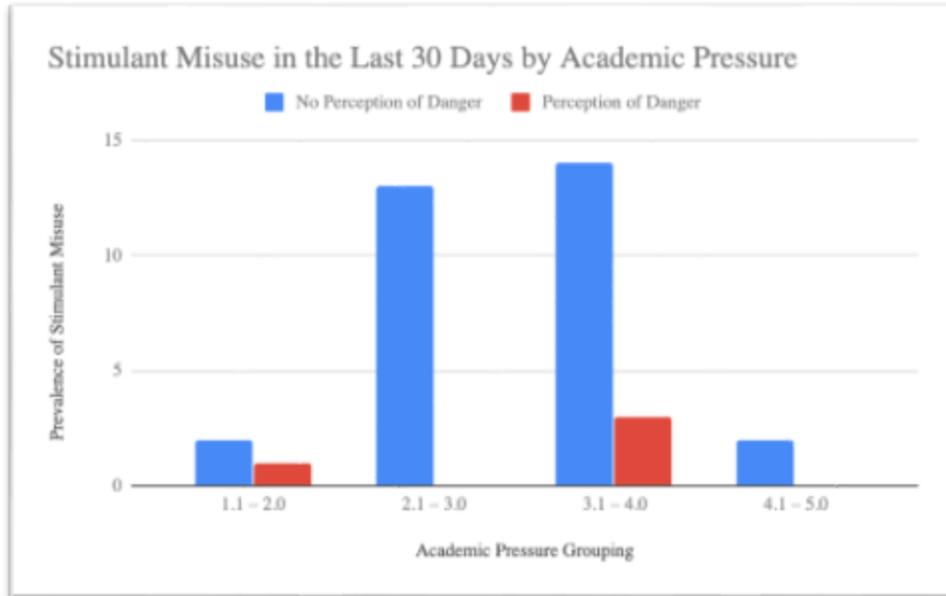


Figure 2. Bar Chart of Stimulant Misuse Frequency in the Last 30 Days by Academic Pressure

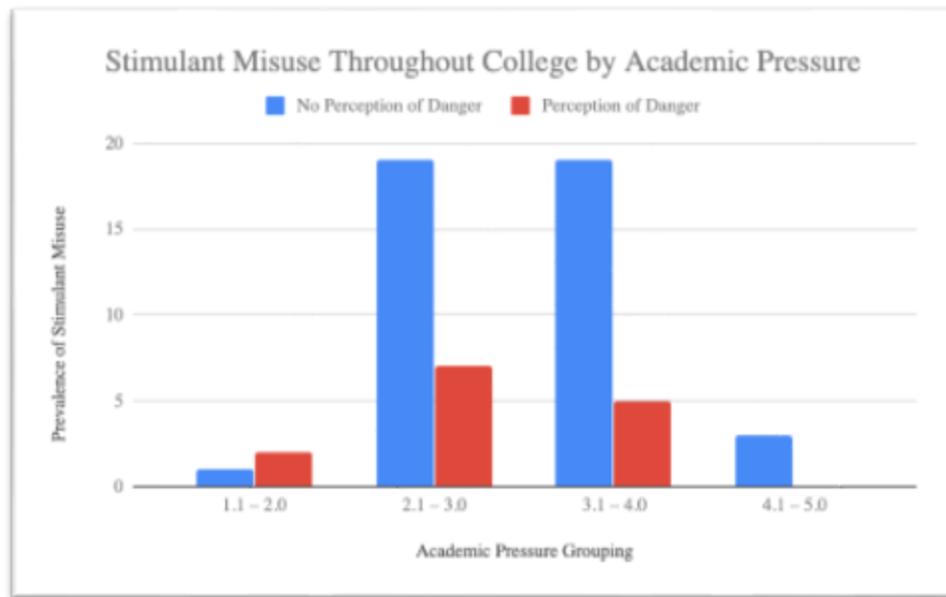


Figure 3. Bar Chart of Stimulant Misuse Frequency Throughout College by Academic Pressure

According to the logistic regression, stimulant misuse was only strongly correlated with academic pressure when there was little perceived danger from stimulant use. *Figure 2* and

Figure 3 above depict the frequency of stimulant misuse among those that perceived danger compared to those that did not perceive danger as grouped by their academic pressure score. The figures clearly illustrate an increased rate of misuse among students who did not perceive danger and fell largely toward the median of academic pressure scores. Students who felt academic pressure but did not perceive stimulant use without medical direction to be dangerous had 3.6 times higher odds of reporting misuse. These finding supports both the H1 hypothesis that student perception of academic pressure is positively associated with reported stimulant misuse throughout college and the H3 hypothesis that greater assessment of stimulant risk attenuates the relationship between academic pressure and reported stimulant misuse. However, there is no statistically significant data that indicates a relationship between academic pressure and stimulant misuse within 30 days, thereby rejecting the H2 hypothesis.

Perception of danger associated with stimulant misuse was one of the variables with the most strongly statistically significant relationship with reported stimulant misuse. Of those that considered prescription stimulant use without medical direction dangerous, only 7.8% had used stimulants illicitly in the last 30 days. This is in contrast to the 76.4% of those that did not perceive stimulant danger reporting stimulant use in the last 30 days. Of all respondents, 57.5% were found to perceive benefits from prescription stimulant use in regard to effects on focus/concentration, alertness/energy, and overall perceived improvement in academic performance. The respondents in the group that perceive the strongest benefits from stimulants, i.e. those with a perceived benefit score between 4.1 – 5.0, 81.1% reported misusing prescription stimulants at least once during college compared to 6.67% of those in the group that perceived the lowest academic benefit.

Table 3. Results of Multiple Logistic Regression Analyses for Entire College/Past 30-Day Stimulant Misuse.

| Variable | Stimulant Misuse Throughout College | | | Stimulant Misuse in Past 30 Days | | |
|--|-------------------------------------|-----------------|--------------|----------------------------------|-----------------|--------------|
| | Odds-Ratio | <i>p</i> -value | 95% CI | Odds-Ratio | <i>p</i> -value | 95% CI |
| Gender | 2.03 | 0.210 | 0.67 – 6.12 | 1.73 | 0.456 | 0.41 – 7.34 |
| Race/Ethnicity | 0.59 | 0.602 | 0.08 – 4.21 | 0.16 | 0.155 | 0.01 – 2.00 |
| Class Standing | 1.80 | 0.018 | 1.11 – 2.92 | 1.85 | 0.051 | 1.00 – 3.44 |
| GPA | 0.53 | 0.133 | 0.23 – 1.21 | 0.47 | 0.100 | 0.19 – 1.16 |
| Greek Life | 2.25 | 0.181 | 0.69 – 7.39 | 5.37 | 0.031 | 1.17 – 24.7 |
| Marijuana Use | 3.07 | 0.067 | 0.92 – 10.24 | 7.14 | 0.006 | 1.78 – 28.6 |
| Heavy Drinking | 1.01 | 0.984 | 0.33 – 3.08 | 1.10 | 0.889 | 0.30 – 4.07 |
| Access to Stimulants | 1.49 | 0.522 | 0.44 – 5.02 | 4.15 | 0.150 | 0.60 – 28.86 |
| Percept. of Danger | 0.83 | 0.674 | 0.34 – 2.01 | 1.23 | 0.698 | 0.43 – 3.56 |
| Academic Pressure | 1.94 | 0.131 | 0.82 – 4.59 | 1.45 | 0.482 | 0.51 – 4.14 |
| Adjusted Using Perception of Danger as Moderating Variable | | | | | | |
| Variable | Adjusted Odds-Ratio | <i>p</i> -value | 95% CI | Adjusted Odds-Ratio | <i>p</i> -value | 95% CI |
| Gender | 2.04 | 0.210 | 0.67 – 6.21 | 1.74 | 0.454 | 0.41 – 7.37 |
| Race/Ethnicity | 0.57 | 0.572 | 0.08 – 3.99 | 0.16 | 0.153 | 0.01 – 1.98 |
| Class Standing | 1.83 | 0.016 | 1.12 – 3.01 | 1.86 | 0.050 | 1.00 – 3.45 |
| GPA | 0.51 | 0.112 | 0.23 – 1.17 | 0.47 | 0.100 | 0.19 – 1.16 |
| Greek Life | 2.44 | 0.151 | 0.72 – 8.22 | 5.38 | 0.031 | 1.16 – 24.83 |
| Marijuana Use | 3.30 | 0.060 | 0.95 – 11.42 | 7.16 | 0.006 | 1.78 – 28.73 |
| Heavy Drinking | 1.11 | 0.859 | 0.36 – 3.46 | 1.10 | 0.883 | 0.30 – 4.13 |
| Access to Stimulants | 1.54 | 0.481 | 0.46 – 5.11 | 4.16 | 0.149 | 0.60 – 28.76 |
| Percep. of Danger | 0.90 | 0.819 | 0.36 – 2.23 | 1.24 | 0.691 | 0.43 – 3.62 |
| Academic Pressure | 3.62 | 0.068 | 0.91 – 14.4 | 1.49 | 0.504 | 0.46 – 4.80 |

Marijuana use within the last 30 days was another variable with a strongly statistically significant relationship with reported stimulant misuse, both throughout college as well as in the last 30 days. According to the results of the logistic regression, those who had consumed marijuana in the last 30 days were roughly three times as likely to report stimulant misuse in all of college, and seven times more likely to report stimulant use within the same 30-day time

period. Only 11.9% of students that did not use marijuana had misused prescription stimulants in the last 30 days while 59.6% of marijuana users had. Similarly, of those that reported heavy drinking, as defined by more than 14 alcoholic drinks for males and 7 alcoholic drinks for females in a given week, 42.6% reported misusing stimulants in the last 30 days, while only 25.4% of non-drinkers reported the same stimulant misuse.

While 32.6% percent of women surveyed reported using prescription stimulants at least once in college, 67.8% of men reported similar usage. Similarly, the percentage of males that reported using stimulants in the last 30 days was three times higher than women with 45.8% of males and 15.2% of females reporting usage. This compelling difference between the two genders may be explained by gender differences in perceptions of danger associated with stimulant misuse. On a scale of 1 – 5 with one indicating the lowest perception of danger and 5 the highest, women had an average score of 3.8 indicating perceived danger, while men had an average score of 2.8, indicating a lack of perceived danger. Those involved in Greek life at the university were over five times more likely to report using illicit prescription stimulant in the last 30 days compared to their non-Greek counterparts. Bivariate analysis and logistic regression revealed that Greek life involvement only had a statistically significant relationship with stimulant misuse in the last 30 days, but not misuse throughout all of college. No statistically significant relationships were determined between class standing, GPA, and race.

DISCUSSION

Prevalence of Stimulant Misuse

As reported by the survey results, the rate of stimulant misuse in the last 30 days of 33.0% is especially high when compared to prior research of the prevalence of stimulant misuse

among college populations. While a 2016 study of 7,000 undergraduate students at nine colleges across the nation found a stimulant misuse rate within the last six months of 11.2%, the survey outlined in this project encountered a past 30-day stimulant misuse rate of nearly three times as much (Arria et al., 2018). In the context of campus safety and the well-being of students as a whole, this finding is notable as it indicates widespread prevalence of a potentially harmful behavior.

Furthermore, prior research suggests that when certain risky behaviors are prevalent among a collective population, such as college students, the likelihood of engaging in this behavior is far higher than it would be individually (Gardner & Steinberg, 2005). If this is the case, then a positive-feedback type of mechanism may have taken place where any presence of stimulant misuse behavior among even a small portion of college students encourages other students to join in the behavior, which in turn promotes the behavior to even more students. Such an occurrence would likely result in a high prevalence of stimulant misuse that was evident among University of South Carolina undergraduate students sampled in this study.

Academic Pressure

According to the survey's results, roughly 38% of students surveyed indicated a positive presence of academic pressure, a prevalence among University of South Carolina undergraduates that is similar to other studies of academic pressure in other college populations. In fact, a relatively recent study of nearly 400 students at a single university in Ohio also found a stress prevalence rate of 38% (Beiter et al., 2015). Other literature includes rates of academic stress ranging between 20% to as high as 57% (Misra, McKean, West, & Russo, 2000; Hudd et al., 2000). Academic stress among University of South Carolina students seems to fall within the

range of other schools, suggesting that the academic perceptions among students on this campus may not be entirely unique. If this is the case, then any conclusions drawn regarding mitigation of academic pressure among University of South Carolina students may also be applicable to other educational institutions. However, it is important to note that other studies may have interpreted academic stress by utilizing a different determination process than was present in this study.

Furthermore, the presence of a relatively even distribution of academic pressure from this study is an important finding, as it lends further validity to any drawn between academic pressure and stimulant misuse. For example, if it were found that the overwhelming majority of students did or did not perceive academic pressure, discrepancies in reported stimulant misuse could not be definitively attributable to academic pressure, but rather would be due to other factors. This is an issue that arose in prior research from Wasserman et al. where a definitive conclusion could not be reached in determining a relationship between reported stimulant misuse and academic pressure in medical school students, as the vast majority of medical students reported academic pressure but had varying levels of stimulant misuse.

Relationship of Academic Pressure to Stimulant Misuse

When a perception of danger associated with stimulant misuse is present, students who perceived academic pressure had 3.62 times greater odds of having used illicit prescription stimulants at least once throughout college than their counterparts without academic pressure, controlling for other factors in the study model. While prior research has found that the primary motivating factors for stimulant misuse are largely academic in nature, this finding is unique in that it identifies the presence of an association between feelings of academic pressure,

specifically, and reported stimulant misuse. This discovery, however, is fairly rational when considering that many of the desired effects of stimulant use can be used to address specific components contributing to academic pressure. For example, 57.5% of students reported a perceived benefit from stimulant use determined by their positive opinions on stimulants' effect on focus and concentration, alertness and energy, and overall academic performance. When considering the individual components of academic pressure, such as the perceived inability to balance workload with time for rest/relaxation, it becomes apparent why a student might pursue stimulants that they believe will make them feel more focused and less fatigued.

According to the bivariate analysis, a strong statistically significant difference was identified between perceived academic benefit and reported stimulant misuse, both throughout college and in the last 30-days. Only 8.9% of participants those that did not perceive benefits from stimulant use reported ever illicitly using prescription stimulants, while an exorbitant 85.2% of those that perceived benefit reported using stimulants at least once in college. This discovery supports the notion that the decision to illicitly use prescription stimulants stems from the desire for the resulting physiological and psychological effects, such as increased energy and concentration, and their respective impact on academic performance. This desire for increased academic performance comes as a result of perception of academic pressure, thereby establishing a connection between academic pressure and eventual prescription stimulant misuse.

However, it is important to note that no statistically significant relationships were found between academic pressure and stimulant misuse in the past 30 days, regardless of perception of stimulant misuse danger. Since responses regarding academic pressure were indicative of general, sustained subjective perceptions of workload, peer competition, etc., rather than momentary sentiments at the time of the survey's distribution, academic pressure appears as a

chronic sentiment rather than one that is acutely perceived on an occasional basis. While this may be due to the fact that students are not misusing frequently in a shorter 30-day measurement period compared to all of college, another possibility is that the decision to misuse stimulants is not a reactionary to sudden academic stressors, but rather is a response to sustained feelings of academic pressure throughout one's college career. If this is the case, policy makers and officials intending to reduce stimulant misuse rates by mitigating academic pressure should do so in a systematic way rather than targeting short-lived sources of academic stress such as the week of final exams.

Moderating Role of Perceptions of Stimulant Misuse Dangers

Reported stimulant misuse, both throughout college and within the last 30 days, was significantly higher among those that did not perceive stimulant danger when compared to those that did. Understandably, a lack of understanding regarding the dangers involved in NPS seems to lower assessment of risk to a point where this sort of risky behavior is acceptable for the individual. According to previously published studies involving interviews with stimulant misusers, much of the justification for their behavior are associated with the misguided belief that moderation is an appropriate safety measure when engaging in stimulant misuse, and that the potential danger couldn't be that significant considering most stimulants are approved by the FDA (DeSantis & Hane, 2010). This revelation, in accordance with my findings, suggests that the underestimation of risk is largely due to lack of knowledge about stimulants and their adverse effects.

Other Factors Influencing Stimulant Misuse

Perception of danger and academic pressure were not the only variables with a statistically significant relationship with stimulant misuse. Survey respondents that reported marijuana use in the last 30 days were three times as likely to have illicitly used stimulants at least once throughout college and were seven times more likely to have used stimulant in the last 30 days than those that refrained from marijuana consumption. Students that participate in consumption of marijuana already indicate a lack of regard for legality of the behavior, an absence that may be equally present and influential in the decision to illicitly use prescription stimulants. Another possible reason for this finding is that those reporting marijuana use and heavy drinking have a tendency for risky behavior that extends to stimulant misuse (Bavarian, Flay, Ketcham, & Smit, 2013). Furthermore, other research has found that peer pressure in college environments not only encourages students to participate in behaviors like drinking and drug use, but actually shapes societal norms within these population so that risky behaviors may not actually be viewed as hazardous as they would have been without the influence of peer pressure (Borsari & Carey, 2001).

Another crucial aspect when considering the prevalence of stimulant misuse is to acknowledge the fact that every misused pill, tablet, or dose of prescription medication is likely coming from those that have been legally and medically prescribed a stimulant by their physician (Garnier et al., 2010). Of the survey participants, 71.7% indicated that they personally knew someone that provided or sold prescription stimulants, while only 14.2% reported “Strongly Disagreed” that they had knowledge of such a person. This figure is very similar to figures found in other research regarding ease of access for non-medical prescription stimulants (Kaye & Darke, 2012). Furthermore, access to stimulants was yet another independent variable that had a

statistically significant association with reported NPS both in the last 30 days as well as throughout all of college. Those who reported having access to stimulants had 1.5 times higher odds of misusing prescription stimulants throughout college and a steep 4.2 times higher odds of misusing stimulants in the last 30 days. One of the possible explanations for the seemingly high prevalence of stimulant access is the fact that, like other prescription medications, it is difficult for law enforcement and other authorities to monitor the sale and distribution of prescription stimulants. Unlike other controlled drugs like marijuana, prescription stimulants have no detectable odor and are completely legal for those with prescriptions and detecting those that divert their own prescription can be very challenging (Garnier et al., 2010).

With regard to relationships between various demographical characteristics and reported non-medical prescription stimulant use, many of the determinations made by other researchers were not corroborated by the results of this particular project. For example, several prior studies of illicit prescription stimulant use among college populations found that white, male students that were members of Greek organizations were the most demographics associated with the highest incidence of prescription stimulant misuse (Shillington, Reed, Lange, Clapp, & Henry, 2006) (Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005). However, the results in this project indicate no statistical significance for NPS between white and non-white respondents, though this may be attributable to the relatively small sample size of the study. Greek life involvement seemed to only be an indicator of a greater chance of reported stimulant misuse in the last 30 days, but not for stimulant misuse throughout college. One interpretation of this finding is that misuse of stimulants within the last 30 days is evidence of heavier, consistent misuse, a behavior that those involved in Greek Life are more likely to engage in to their non-Greek counterparts. This may be as a result of the general disposition of Greek life members to

engage more frequently in high risk behaviors in general, or as a result of easier access to stimulant distribution among such a high-risk group (May, 2018).

Similarly, class standings and grade point averages were not significantly related to stimulant misuse. However, a strong statistically significant relationship was found between gender and both chronological periods of stimulant misuse. Of survey participants, the percentage of men that reported stimulant misuse at least once throughout college was twice that of women. This finding is corroborated in multiple other studies involving stimulant misuse among college populations. There are several possible explanations for this discrepancy. Prior research indicates that women perceive greater likelihood of a negative outcome and less expectation of enjoyment regarding risky behaviors across many real-world domains than their male counterparts (Harris & Jenkins, 2006). According to the results of the survey this precept remains true as women perceived significantly greater stimulant danger than men. Considering that perception of danger seems to be an influential component in one's decision to illicitly use stimulants, it logically follows that men would be more likely to engage in NPS since they perceive less danger. However, there are limitations to these findings, as conclusions regarding behaviors among different demographics are considerably more reliable with a larger sample size.

LIMITATIONS

Much of the analysis and conclusions drawn from this project may have limited external validity due to the relatively small sample size and constrained scope of the survey. Furthermore, it appears some selection bias is present, due to the discrepancy between the demographics of survey participants and the actual demographics among the University of South

Carolina undergraduate student body. Of those that responded to the survey, 88.7% identified as white. According to the university, 76.7% of undergraduate students enrolled at the Columbia campus are identified as white (“Demographics - University of South Carolina,” n.d.).

Furthermore, there is overrepresentation of survey participants involved in Greek life, with 64.2% claiming membership to a Greek organization in the survey, and 25.6% claiming Greek membership among all students. Furthermore, there is the possibility of other validity concerns as a result of reporting bias. Considering the nature of the survey and the inclusion of questions regarding personal illicit behavior, there is the possibility that survey participants may have falsified responses for a multitude of reasons including, but not limited to, fear of repercussions, reliability of memory, and peer pressure (DeSantis & Hane, 2010).

Furthermore, while a correlation between academic pressure, among other factors, and reported stimulant misuse was identified, the chosen study design does not allow for causation to be determined. The study utilized in this project is cross-sectional and could therefore assess prevalence of stimulant misuse among the surveyed population at a certain point in time but lacks the substantive evidence to determine which variable was the cause and which variable was the effect. To accomplish this, a longitudinal study over an extended period of time would have to be performed. Specifically, a cohort study could be utilized where selected students are examined to determine presence of academic pressure and reported stimulant misuse at different times throughout their college career. If it were found that stimulant misuse only became present in individuals after their perceptions of academic had increased, then proper causation could be determined. While the limited scope and timeframe of this project meant that such a longitudinal study was not feasible, future researchers may find that employing a cohort study would result in

far more compelling evidence and decisive conclusions regarding academic pressure and stimulant misuse.

IMPLICATIONS

Considering that over half of students surveyed reported using non-medical prescription stimulants at least once during their time at college, the findings of this study indicate great cause for concern. Beyond the serious potential negative health implications associated with non-medically directed stimulant use, such as cardiomyopathy and psychosis, there is also a concern that those diverting or selling their prescribed medication may not be receiving the full treatment benefits (Kaye & Darke, 2012). With prevalence of stimulant misuse increasing across the nation's college campuses, it is important for university administrators to formulate strategies to prevent—or at least mitigate—the misuse of prescription stimulants. Identifying academic pressure, accessibility to stimulants, high perception of benefits, and low perceptions of danger as factors associated with prescription stimulant misuse may represent a small but compelling justification for continued research. If further research corroborates the findings of this project regarding academic pressure, administrators and councilors may find that encouraging alternative methods for relief from academic pressure may be a potent strategy for mitigating stimulant misuse among college students.

Unlike alcohol and other drugs, the negative effects of prescription stimulant misuse are seemingly overshadowed or underrecognized by literature distributed by institutional organizations. For example, incoming University of South Carolina students are required to complete several hours of an online education module called *AlcoholEdu* before their first day of classes (“Substance Abuse Prevention and Education” | University of South Carolina,” n.d.).

While this module delves into the significant risks associated with alcohol abuse, there is minimal discussion on the dangers of other relevant drugs, such as prescription stimulants. Therefore, increasing the number of students that perceive stimulant misuse is dangerous, perhaps through education initiatives, may lead to lower incidence of such behavior overall.

Other successful public health campaigns, such as the effort to reduce cigarette smoking, have seen great success through the use of policy changes and educational measures (CDC, n.d.). As the majority of efforts meant to reduce substance abuse on campus are focused on alcohol and marijuana, there appears to be insufficient attention to other obviously significant issues such as stimulant misuse. The University of South Carolina's own Substance Abuse Prevention and Education office offers and promotes self-assessment tools meant to help students understand the negative consequences of their actions and encourage healthy decision-making but are only available for behaviors regarding alcohol and marijuana use ("Substance Abuse Prevention and Education | University of South Carolina," n.d.). Excessive prevalence of stimulant misuse among undergraduate students may be an unexpected consequence of omitting other substance misuse problems from the university's provided literature and resources.

Considering that this study found a strong statistical relationship between perception of danger and stimulant misuse, campus-wide campaigns meant to highlight the health risks associated with stimulant use may be an effective tool in reducing prevalence of the behavior. While academic pressure was shown to have some association with stimulant misuse, it would be far more effective for institutions to target perceptions of danger, as a lack of said perception seemed to be a prerequisite for linking academic pressure and stimulant misuse. There are several steps an institution such as the University of South Carolina can pursue to accomplish this including incorporating changes to existing structures and curricula such as *AlcoholEdu* and

freshman orientation programs to include literature regarding the adverse effects of prescription stimulant misuse. This literature should include a brief overview of the physiological effects of prescription stimulants and the corresponding side effects such as insomnia, cardiomyopathies, and nausea (Greydanus & Kaplan, 2012). The potential psychological repercussions associated with frequent use such as psychosis and addiction should be heavily emphasized as well, as these afflictions can be chronic and extremely difficult to rectify (Lakhan & Kirchgessner, 2012). Furthermore, the illusion that prescription stimulants may be safe on the basis that they are FDA approved or prescribed by physicians should be strongly refuted by emphasizing the fact that the chemicals used in prescription medication can be extremely potent, sometimes more so than uncontrolled substances sold on the street (DeSantis & Hane, 2010). Additional attention should be drawn to the illegality of the sale, purchasing, and distribution of prescription stimulants, a crime that may result in institutional penalties such as probation or suspension or even legal consequences such as fines and jailtime.

The above recommendations are from a position of abstinence only, however, many of the university's current substance abuse intervention strategies, primarily with alcohol, focus on harm-reduction instead. While this approach may be not be as effective in reducing the outright prevalence of the behavior, it may be more effective in reducing the overall harm caused. Many of the acute dangers associated with illicit stimulant misuse is as a result of improper or excessive dosage (Kaye & Darke, 2012). To address this issue from a harm-reduction standpoint, a concept similar to that used to promote safer drinking habits in *AlcoholEdu* may be utilized. In the existing online modules, visualizations of one standard drink of alcohol among different forms is shown, i.e. 1.5 ounces of liquor is roughly equal to 12 ounces of beer. Incorporation of educational material regarding the various types of prescription stimulants,

Adderall, Ritalin, Vyvanse, etc. and their respective safe dosages may be an effective and practical method of ensuring the safety of students who cannot be dissuaded from misusing prescription stimulants.

Ultimately, by advancing research in this topic, administrators, public health officials, and social workers alike may be able to more effectively educate the public of the risks associated with stimulant misuse, support those currently using, and implement policies that may suspend the momentum of this phenomenon, thus making our nation's college campuses healthier and safer.

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APPENDIX

Survey of Perceptions of Academic Pressure and Non-Prescribed Stimulant Use Among University of South Carolina Students

- 1. What is your gender?**
 - a. Male
 - b. Female
 - c. Other
 - d. No Response

- 2. What is your Race/Ethnicity?**
 - a. White
 - b. African-American
 - c. Asian
 - d. Hispanic
 - e. Other
 - f. No Response

- 3. What is your current class standing?**
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Other
 - f. No Response

- 4. What is your current cumulative GPA?**
 - a. 0.0 – 2.0
 - b. 2.0 – 2.5
 - c. 2.5 – 3.0
 - d. 3.0 – 3.5
 - e. 3.5 – 4.0
 - f. No Response

- 5. Are you a member of an IFC Fraternity or Panhellenic Sorority at the University of South Carolina?**
 - a. Yes
 - b. No
 - c. I'm not sure
 - d. No Response

- 6. Are you currently medically prescribed a stimulant including but not limited to Adderall, Ritalin, Concerta, Vyvanse, or similar drug by a physician?**
 - a. Yes
 - b. No
 - c. I'm Not Sure
 - d. No Response

- 7. My teachers/parents/authority figures have unrealistic academic expectations for me.**
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
 - f. No Response

- 8. I feel as though I have enough time to balance my current academic workload with time to relax.**
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
 - f. No Response

9. I am confident that I will be a successful student this semester.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

10. Even if I do well/pass in my degree, I am worried about finding a job.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

11. I feel as if there is a lot of competition between myself and my academic peers.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

12. I intend to attend a graduate school within 3 years of completing my undergraduate degree.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

13. I have taken non-prescribed ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) at least once in the last 30 days.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

14. I have taken non-prescribed ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) at least once while I've been at college.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

15. I have taken non-prescribed ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) for academic purposes.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree

f. No Response

16. I have taken non-prescribed ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) for recreational purposes.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
f. No Response

17. ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) helps me stay focused and concentrate on my work.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
f. No Response

18. ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) helps me feel more energetic and alert.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
f. No Response

19. Consuming ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) enhances my academic performance.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
f. No Response

20. Consuming ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) without a doctor's prescription is dangerous.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
f. No Response

21. I believe using ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) without a prescription provides an unfair academic advantage.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
f. No Response

22. I personally know someone who illicitly sells or provides prescription ADHD medication (Adderall, Ritalin, Concerta, Vyvanse, etc.) including myself.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

23. I have consumed marijuana within the last 30 days.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response

24. I consume more than 14 alcoholic drinks (Male) or 7 alcoholic drinks (Female) in a given week.

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree
- f. No Response