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The Effects of Education on Non-Medical Prescription Stimulant Use Among College Students

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Non-medical prescription stimulant use is a growing problem in the United States, especially among individuals aged 18-25 with 29.2% reporting use at least once in their lifetime (Compton & Volkow, 2005). Within 18-25 year olds, college students are more likely to use prescription stimulants non-medically over their same-aged peers not attending college (McCabe, Knight, Teter & Mechsler, 2004). There is a great deal of research examining the most common non-medical prescription stimulant user; white males who have a grade point average of "B" or lower in a fraternity attending an institution with higher admission standards are more likely to use non-medical prescription stimulants (Hamilton, 2009). There is little research, though, examining effective interventions in the prevention of use. This study will examine the effectiveness of education on non-medical prescription stimulant use among college students attending various four-year public institutions throughout the United States. Participants will be required to attend a seminar at the beginning of each academic year and will be given a survey assessing stimulant use at the conclusion of every semester.

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Non-medical prescription drug use is a growing problem in the United States (Compton & Volkow, 2005). Non-medical prescription drug use is defined as any intentional use of a medication with intoxicating properties outside a physician's prescription for a valid medical condition, excluding accidental misuse (Compton & Volkow, 2005). The non-medical use of prescription drugs has increased by 123% between 1994 and 2001 (Hamilton, 2009). The U.S. Drug Enforcement Administration noted an increase in non-medical prescription drug use from 3.8 million users in 2000 to 7 million in 2006 (Drug Enforcement Agency, 2006).

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According to the 2009 National Survey on Drug Use and Health, 20.6% of individuals aged 12 and older reported non-medical use of a prescription drug in their lifetime, with seven percent having used in the past month. Non-medical prescription drug use is most common among ages 18-25 years (McCabe, Teter & Boyd, 2006) with 29.2% reporting use at least once in their lifetime (National Survey on Drug Use and Health, 2009).

There are four major classes of prescription drugs that are commonly abused. These include sedatives, stimulants, tranquilizers, and analgesics (painkillers) (Arkes & Iguch, 2008). Of these, the most commonly abused prescription drugs are stimulants (Dykstra-Garnier, Calderia, Vincent, O'Grady & Arria, 2012). Stimulants are a class of drugs that enhance brain activity and are most commonly prescribed to individuals with attention deficit hyperactivity disorder (Rozenbroek & Rothstein, 2011). There are many health risks and adverse side effects associated with prescription stimulant abuse

including headaches, anxiety, anorexia, gastrointestinal distress, problems sleeping, hallucinations, and addiction (Hamilton, 2009). Additionally, in the U.S., prescription stimulant bottles are required to have a black box warning, which are cautionary statements placed on prescription bottles that are used to draw attention to the drug's potential serious or life-threatening risks (Food and Drug Administration, 2012).

Non-medical use of prescription stimulants is most prevalent among college aged individuals (Arkes & Iguchi, 2008). According to the Monitoring the Future Survey, a study of the behaviors, attitudes, and values of grade-school students, college students, and young adults, rates of non-medical prescription drug use are higher among college students than their same-aged peers who do not attend college (McCabe, Knight, Teter & Wechsler, 2004). According to a study executed by McCabe et al. (2004), 6.9% of college students have used prescription stimulants non-medically in their lifetime with 4.1% using in the past year and 2.1% of students using in the past month.

The statistics on reported non-medical prescription stimulant use varies across college campuses. Non-medical prescription stimulant use is most prevalent at colleges and universities in the Northeastern region of the United States (McCabe, Knight, Teter & Wechsler, 2005). Garnier-Dykstra et al. (2012) found that 61.8% of college students attending a large public university in the mid-Atlantic region were offered prescription stimulants at least once with 31% having used them during their college career. Similarly, one recent study reported that 55% of college students attending a public Southeastern university had used prescription stimulants non-medically (DeSantis, Noar, and Webb, 2009). Rozenbroek and Rothstein (2011) found that 7.8% of undergraduate students attending an urban mid-Atlantic university had used stimulants non-medically. Notably, the percentage of students using stimulants medically with a valid prescription (5.3%) was lower than students using it recreationally (Rozenbroek & Rothstein, 2011). This means that more students use prescription stimulants illicitly than those with a prescription.

Those who use prescription stimulants illicitly most often receive their stimulants from friends or peers with a prescription (McCabe & Boyd, 2005; Garnier-Dykstra et al., 2012). Results from a study conducted by Garnier et al. (2010) indicated that 62% of college students with a valid stimulant prescription diverted their medication. Diversion of a prescription drug refers to the selling, sharing, or trading of medication to someone it is not prescribed (Garnier et al., 2010). Sharing of medication was more common than selling, with 33.1% of all diverters sharing and 9.3% selling (Garnier et al., 2010). Of all the prescription stimulants diverted, 70.5% was

amphetamine-dextroamphetamine, commonly known as the drug Adderall, which is commonly prescribed for attention deficit disorders (Garnier et al., 2010). Adderall seems to be the stimulant of choice among non-medical stimulant users. Hamilton (2009) suggests that this is because amphetamine-dextroamphetamine creates higher levels of dopamine in the brain, a neurotransmitter associated with happiness and pleasure. One possible reason for the increase in non-medical stimulant use and diversion of stimulant medications is the increase in ADHD diagnoses (Llana & Crismon, 1999; Bruchmüller, Margrad & Schneider, 2011).

Though non-medical prescription stimulant use is a growing issue, college students may not see it as a problem because of the misinformation and myths surrounding its use (Arria & DuPont, 2010). One myth held by college students is that prescription stimulants are "performance enhancers" and are helpful for students who are struggling academically. Another myth, commonly held by physicians, is that stimulants are only used during finals week as a study aid to help students function better, not to get high. Once this stressful period is over, students discontinue the abuse. This leads many college students, parents, and physicians to the conclusion that non-medical stimulant abuse is not a problem (Arria & DuPont, 2010). Finally, Compton and Volkow (2005) suggest that because current college students grew up in a society where the common theme was "take your medicine, it will make you better", stimulants prescribed by doctors are perceived as not so dangerous to take even if it is not prescribed by their own doctor.

Unlike motives for other drugs, the reasons that college students use prescription stimulants illicitly are not always to get high (Teter, McCabe, Cranford, Boyd, & Guthrie, 2010). The most common reasons that college students use prescription stimulants illicitly are for academic purposes. These motives include improving concentration, increasing alertness (Teter et al., 2010; Arkes & Iguchi, 2008), to aid studying (Garnier-Dykstra et al. 2012), to better focus in class, and to better perform on tests (Weyandt et al., 2009). Although these are conceivable motives, there is no evidence supporting the claims that prescription stimulants improve academic performance for individuals without attention deficit disorders (NIDA, 2013).

Similarly to common motives for use, there is a common typology for non-medical prescription stimulant users. Non-medical prescription stimulant use is highest among white males with a grade point average of a "B" or lower attending a college with higher admissions criteria (Hamilton, 2009; McCabe et al., 2004). Students who belong to a sorority or fraternity have higher rates of non-medical prescription stimulant use (McCabe et al., 2003). Frequent binge drinking, cigarette smoking, marijuana

use, and poly-drug use are also predictive of non-medical prescription stimulant use (McCabe et al., 2004; DeSantis et al., 2009; Lanier & Farley, 2011). Desantis et al. (2009) found that upperclassmen students who were living off campus were also more likely to use prescription stimulants non-medically.

In 2010, 8,148 adults aged 18-25 went to the emergency room to be treated for adverse reactions from prescription stimulant medications. This shows a dramatic increase since 2005 when there were 2,131 emergency room visits related to prescription stimulant medications (Substance Abuse and Mental Health Service Administration, 2013). There is a growing amount of evidence that supports the increased use and dangers of non-medical stimulant drugs (Compton & Volkow, 2005). Non-medical use of prescription stimulants is more dangerous than college students understand (Teter et al., 2010). Though much research has been done on the most common non-medical stimulant user and locations where use is most prevalent, little research has been done examining effective interventions for preventing prescription stimulant abuse. We hypothesize that proper education prior to the start of freshman year will decrease the rates of non-medical prescription stimulant use.

RESEARCH QUESTIONS

1. What is the effect of education on non-medical prescription stimulant use among college students?
2. What is the relationship between non-medical prescription stimulant use and the user's amount of sleep, academic progress, and exercise routine?

PROPOSED METHODS

Study Design

We will conduct a four-year longitudinal experimental study that will examine the effects of education on the non-medical prescription stimulant use among undergraduate college students.

Participants

We plan to study male and female undergraduate students from various four-year public universities across the United States. The students must be an incoming freshman, at least 18 years old, and not be prescribed stimulant medication at the start of the study. There will be sixteen institutions involved in this study; four from the Northeast, four from the Southeast, four from the Northwest, and four from the Southwest regions of the United States. Within each of the four schools in each region, two schools will be matched for similar

characteristics such as average SAT scores, selectivity, student population size, retention rate, and average GPA. There will be two sets of two matched schools in each region for a total of eight pairs of matched schools within the whole study.

Measures

We will first administer a questionnaire to participants which will include demographic questions such as age, sex, and ethnicity. This survey is designed to establish a baseline for non-medical prescription stimulant use and to collect student demographic information. Students who have a valid stimulant prescription will be excluded from the study. At the end of every semester, participants will be given a survey asking various questions about their non-medical prescription stimulant use, state of their physical and psychological health, and academic progress (see Appendix A). The survey is designed to track the progression of non-medical prescription stimulant use.

Procedure

Within each set of matched schools, there will be one experimental school and one control school. Eight universities will be in the experimental group and eight universities will be in the control group for a total of sixteen schools. All incoming freshman involved in the study will be asked to sign an informed consent form before the experiment begins. No identifying information will be included on anything. During the first educational seminar, the participants will be given an ID number. The participants will be instructed to choose their own login name and password online with this ID number after the seminar in order to keep our data anonymous. They will use this login name and password throughout the duration of the study. The participants will be informed that no one will have access to the information except for the researcher.

The incoming freshmen of the experimental schools will be required to attend an educational seminar on non-medical prescription stimulant use before the beginning of every fall semester each academic year. The instructors of the experimental schools will be trained on specific topics and presentation techniques. Every seminar at each experimental school will feature the same PowerPoint presentation, lecture notes, and handouts in order to control extraneous variables. Topics of the seminar will include the physical and psychological dangers, legal implications, and statistics of non-medical prescriptions stimulant use. The seminar will also include strategies for time management and study skills without the use of these stimulants. The seminar will last no longer than 60 minutes. Students will be compensated with \$20

for every seminar they attend each year. Attendance will be taken at the seminars. The incoming freshman participants of the control schools will not receive any education on non-medical prescription stimulant use.

At the conclusion of each semester, participants from both the control and experimental schools will be required to complete an anonymous survey. Participants will be compensated with \$5 for every survey completed. Additionally, they will be rewarded with an extra \$20 for every survey that is completed on time. Late surveys will be accepted, though those students will not receive the additional five dollars for completing it on time. Participants will be removed from the study if they do not attend one of the four seminars or if they do not complete one of the eight surveys.

The data will be analyzed to evaluate if education has an effect on the non-medical prescription stimulant use among college students. Additionally, an auxiliary analysis will be conducted to determine if there is a relationship between amount of sleep, academic progress, and exercise routine and non-medical prescription stimulant use.

CONCLUDING REMARKS

Limitations

In this experiment, one possible limitation is student drop-outs. The sample sizes may vary greatly between schools at the conclusion of the four years. Additionally, even though students are being monetarily compensated for their participation, there is no way to guarantee that they will attend the seminars or complete the surveys. Furthermore, although these surveys are anonymous, students could provide false or socially desirable answers. These answers could invalidate the data. More research needs to be done in order to study the effectiveness of educational interventions in younger age groups.

Although the schools will be matched based on similar characteristics such as average SAT scores, selectivity, student population size, retention rate, and average GPA, there is no way to ensure that the schools are exactly the same. Commonalities within schools such as demographic attributes and gender ratios cannot be perfectly matched. Therefore, this study is not a perfect experimental design.

Significance

The results of this study will contribute to the areas of psychology and education. Based on past research, there is a clear lack of education and knowledge among college students on the severity of non-medical

prescription stimulant use. If it is determined that these educational interventions are effective, we can attempt to reduce emergency room visits and fatalities associated with its use. Our study will address what effect educational intervention has on non-medical prescription stimulant use among college students. A longitudinal study is an effective method that will allow us to examine long-term effects. The data from our study will also allow us to look at the correlation among non-medical prescription stimulant use and additional variables such as amount of sleep, academic progress, and exercise routine.

There are many myths surrounding the perceived safety of the drug; college students believe that because a doctor prescribed the drug, even if it's not their own doctor, it must be safe to take (Compton & Volkow, 2005) and that use of the drug is not a problem (Arria & DuPont, 2010). These myths prevent students from knowing the real dangers of prescription stimulant use.

The educational interventions in this study aim to debunk these myths surrounding non-medical prescription stimulant use and to raise awareness about what risks are involved. By examining the effectiveness that educational interventions have on college students, colleges and universities can use these resources to decrease the rates of non-medical prescription stimulant use.



Appendix A

Please answer the following questions:	
I.D. Number	
Age	
Sex (circle one)	

Please answer the following questions to the best of your ability:

Do you think that using prescription stimulants that are not prescribed to you is safe?	YES	NO
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Have you used prescription stimulants in the past semester? (circle one)	YES	NO			
If Yes, how many times? (circle one)	1-3	4-6	7-9	10-12	12+

Have you been approached to use prescription stimulants in the past semester? (circle one)	YES	NO			
If Yes, how many times? (circle one)	1-3	4-6	7-9	10-12	12+

Have you been approached to purchase prescription stimulants in the past semester? (circle one)	YES	NO			
If Yes, how many times? (circle one)	1-3	4-6	7-9	10-12	12+



How many hours of sleep do you normally get per night? (circle one)	Less than 3	4-5	6-7	8-9	10+
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What was your GPA for the past semester? (circle one)	Less than 1.5	1.6-2.0	2.1-2.5	2.6-3.0	3.1-3.5	3.6-4.0
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How many hours per week do you exercise? (circle one)	0	1-4	5-8	9-12	12-15	16+
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Please rate your average stress level for the past semester. (circle one)	<i>Very low</i>	<i>Low</i>	<i>Neither High nor Low</i>	<i>High</i>	<i>Very High</i>
	-2	-1	0	1	2

How many times have you been sick this past semester? (circle one)	0	1-2	3-4	5-6	7+
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