

Nonmedical Prescription Stimulant Use: Exploring Student Perceptions and University  
Response

by  
Austyn Foss

A THESIS

submitted to

Oregon State University  
University Honors College

in partial fulfillment of  
the requirements for the  
degree of

Honors Baccalaureate of Science in Microbiology  
(Honors Scholar)

Presented May 13, 2016  
Commencement June 2016



## AN ABSTRACT OF THE THESIS OF

Austyn Foss for the degree of Honors Baccalaureate of Science in Microbiology presented on May 13, 2016. Title: Nonmedical Prescription Stimulant Use: Exploring Student Perceptions and University Response .

Abstract approved: \_\_\_\_\_

Ray Tricker

This thesis explores trends and perceptions surrounding nonmedical use of prescription stimulants by university students throughout the United States. Furthermore, this study evaluated how universities in Oregon have responded to increased rates of nonmedical prescription stimulant use on campuses across the country. The following research questions are addressed: 1) What are students' perceptions about their own prescription cognitive stimulant use? 2) How do students who do not use cognitive stimulants perceive other students' use of these drugs? 3) What is the role of counselors and physicians on campus in educating university students about nonmedical use of prescription cognitive stimulants? 4) Do regulations imposed by universities and the legal system have any influence on students' use of prescription cognitive stimulants? 5) Are the resources available to students at universities in Oregon well-developed to educate and prevent nonmedical use of prescription cognitive stimulants? This study was limited to the scope of published literature on the topic, and further research still needs to be done to accurately identify potential areas for improved education and regulation relating to prescription stimulant use.

**Key Words:** Prescription drug abuse, university students, nonmedical use, prescription stimulants, Adderall, Ritalin, education

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I understand that my project will become part of the permanent collection of Oregon State University, University Honors College. My signature below authorizes release of my project to any reader upon request.

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Austyn Foss, Author

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## INTRODUCTION

The illicit use of prescription drugs has been a growing phenomenon in the United States in a variety of different populations. Prescription-type drugs with abuse liability fall into four main categories: pain relievers, tranquilizers, stimulants, and sedatives. These drugs are considered to be legal in the United States with a valid prescription from a medical doctor or other physician, to only be used by the individual to whom it is prescribed and according to written instructions. Illicit or nonmedical use of prescription drugs is defined by the National Institute on Drug Abuse, NIDA (2014), as “the use of a medication without a prescription, in a way other than prescribed, or for the experience or feelings elicited.” Drugs that are commonly abused include opioids, central nervous system (CNS) depressants, and stimulants. Nonmedical prescription drug use has been trending upward over the past two to three decades, indicated by a related increase in treatment admissions, emergency room visits, and overdose deaths (NIDA 2014).

According to the drug use survey by the Substance Abuse and Mental Health Services Administration, approximately 6.8 million Americans used prescription medications that have legitimate medical uses, but for non-medical purposes in 2012 (SAMHSA 2012). This same study also reported that an estimated 2.9 million persons aged 12 or older used an illicit drug for the first time. Of those 2.9 million, more than 1 in 4 individuals initiated with nonmedical use of prescription drugs (SAMHSA 2012). These statistics can, in part, be attributed to increased number of prescriptions being written and the consumer culture developed towards prescription medications (NIDA 2014). However, a particularly important factor to consider is society’s perception about the safety, legality, and ethics of nonmedical use. Americans perceive prescription medications to be high in benefit and low in risk. Adverse side effects are often

attributed more to patient sensitivity or actions by the physician rather than the drug itself (Drug Information Journal 2007). Despite these perceptions, prescription drug abusers have been shown to be at risk of developing many adverse health consequences including seizures, cardiovascular complications, respiratory arrest, coma, and addiction (Volkow NIDA).

Physicians, patients, and the public as a whole can be better equipped to promote safe and effective drug use by focusing on perceptions of at-risk populations. University students are one of these specific at risk populations. A national survey released by the Partnership for Drug-Free Kids found that 1 in 5 college students report abusing prescription stimulants at least once in their lifetime, compared to 1 in 7 non-students. The study found that young adults are most likely to abuse prescribed stimulants known by the following trade names: Adderall™ (60%), Ritalin™ (20%) and Vyvanse™ (14%) (Partnership for Drug-Free Kids 2014). Access to these drugs is increasing with rates of Attention Deficit Hyperactivity Disorder, ADHD diagnosis and stimulant prescriptions on the rise across the country (OHSU 2013). Research also shows that social acceptance of the behavior of prescription stimulant abuse is also contributing to students' misuse of these medications. Additionally, students admitted to viewing prescription stimulant use as "less risky than the abuse of prescription pain relievers, smoking cigarettes, or binge drinking." (NIDA 2014). Despite their perceived safety, prescription stimulants are closely related in structure and function to cocaine and methamphetamine, and come with risks affecting heart and brain function, as well as dependency issues (Arria, 2008).

University students typically have access to on-campus student health centers and counseling services in order to maintain their physical and mental health while away at school. Twelve universities in Oregon provide students with services that include mental health counseling, general ambulatory care, direct pharmacy access, and outreach programs that aim to

raise awareness surrounding common health concerns. These services generally place an emphasis on three main areas affecting student health, including responsible alcohol use, marijuana education and prevention, and promotion of safe sex practices. These focus areas tend to align with the Drug-Free Schools and Communities Act (DFSCA) of 1989, a policy that all twelve universities abide by in their student and faculty codes. The emphasis of the DFSCA does not include prescription drug abuse, and as a result, many student health organizations do not offer specific assistance to students suffering from abuse or education efforts to prevent abusive practices.

Student perceptions about cognitive stimulants are an important prerequisite to improving communication and education efforts on Oregon university campuses. Additionally, by comparing differences in perception among demographically different groups, more accurate at-risk populations can be determined. According to research from the Journal of American College Health (2008), cognitive stimulants are continuing to gain popularity and usage on campuses across the country (DeSantis 2008). Students will need to be educated on the risks associated with buying, selling, and using a cognitive stimulant. A relevant presentation of the facts regarding health risks, legal concerns, and ethical factors would be highly beneficial to a student deciding whether or not to use a prescription stimulant non-medically. University students are a unique population who lack fully developed decision-making processes in the brain, and are under extreme academic and social demands. These components all contribute to the importance of educating students about cognitive stimulant use, risk, and outcomes.

Important factors arise when educating university students about nonmedical use of prescription stimulant drugs like Ritalin and Adderall™. The following literature review

examines prescription cognitive stimulants, the students who use them, and the resources currently available to educate students or help those dealing with addiction or other side effects.

## **REVIEW OF THE LITERATURE**

### **Defining cognitive enhancement**

Cognitive enhancement is a term used to describe substances or treatments that noticeably alter and aim to improve function in specific areas of the brain (Foley, 2012). Drugs that aim to enhance cognitive function are also referred to as nootropic drugs, or smart drugs. They typically target cognition to enhance focus and attention on a short-term scale. Common cognitive enhancers that dominate today's commercial market include stimulants like Ritalin and Adderall™, caffeine, and illegal substances like cocaine (Foley, 2012). Though cognitive enhancers aim to elevate an individual's cognitive abilities in a stable way, they often result in a distracted and uncontrolled elevation. According to Bostrom and Sandberg, leading researchers in the field, cognitive enhancement is "the amplification or extension of core capacities of the mind through improvement or augmentation of internal or external information processing systems (Bostrom & Sandberg, 2009). Definitions surrounding cognitive enhancement are implicitly vague partially because there is a significant lack of proven research regarding the question of how successful cognitive enhancement technology actually is. For the purpose of this thesis, cognitive enhancement will refer to elevating cognitive functions including information processing, learning, reasoning, attention, and memory.

### **Types of Cognitive Stimulants**

The drugs most commonly used for cognitive enhancement currently are central nervous system stimulants, specifically Ritalin and Adderall™. They are typically prescribed for the

treatment of Attention Deficit Hyperactivity Disorder (ADHD) because of their effects on increasing executive central nervous system function. Their most notable effects include improving ability to focus attention, manipulate information in working memory, and flexible control of responses. Both Adderall™ and Ritalin™ require a doctor's prescription and are Schedule II drugs according to the U.S. Drug Enforcement Agency (DEA), meaning that they have a “high potential for abuse” and may lead to “severe psychological or physical dependence.”

Ritalin has the chemical compound Methylphenidate, with the IUPAC name methyl phenyl(piperidin-2-yl)acetate (National Center for Biotechnology Information, 2016). The molecular formula  $C_{14}H_{19}NO_2$ , is highly similar to that of the commonly abused amphetamine, cocaine (UTAH). MPH is an odorless, white solid powder with crystalline structure (EPA, 1998).

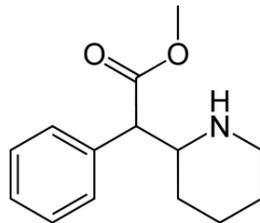


Figure 1: Chemical structure of Methylphenidate

Adderall™ is a racemic combination of two amphetamine isomers, dextroamphetamine and levoamphetamine (NCBI, 2016). Adderall™'s IUPAC name is 1-phenylpropan-2-amine, and has a molecular formula of  $C_9H_{13}N$  (NCBI, 2016). In its solid form, amphetamine is a colorless salt.

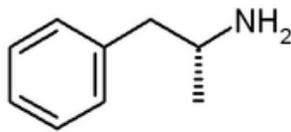


Figure 2: Chemical structure of Amphetamine

### **Mechanism of Action**

Ritalin and Adderall™ both have the same overall effect in the brain, increasing the activity of dopamine, a neurotransmitter associated with pleasure. However, the methods of action vary between the two drugs. Ritalin blocks transporters that reuptake dopamine into a neuron after release. By blocking transporters, Ritalin allows dopamine to reach more receptors, which directly correlates with increased attention signaling in the brain (NCBI, 2016).

Adderall™ functions to stimulate dopamine release from neurons in the brain, and thus increases dopamine interaction with receptors (NCBI, 2016). Both Ritalin and Adderall™ are meant to be taken orally, producing slow release, dose-dependent, short-term effects in the body. Ritalin tends to have a shorter behavioral half-life than Adderall™, sometimes requiring multiple doses per day for children completing a full school day (Pelham, 2016). When inhaled or injected, effects from both drugs occur immediately causing euphoric highs in the individual that can then cause the user to “crash” with severe depression, anxiety and fatigue as its effects quickly diminish (DEA, 2000).

### **Historical background**

Lazar Edeleanu, a Romanian chemist, first synthesized amphetamine in 1887. Despite its stimulatory effects, amphetamine was initially patented as a nasal congestion treatment in 1932. However, by the end of the 1930s, amphetamine’s popularity was surging due to its long lasting stimulatory effects and wide availability. Amphetamine saw another increase in popularity during World War II, during which it was utilized by American, British, German, and Japanese

militaries to keep soldiers awake and alert in wartime (University of Maryland, 2013). A paper published by Weiss and Laties in the early 1960s concluded that amphetamines were “vastly superior to caffeine at improving human performance in a variety of mental and physical activities” (Weiss & Laties, 1962). Amphetamine was first patented and marketed as a salt blend in 1996 by Shire Pharmaceuticals to treat ADHD (Kent, 2014). Later, the Adderall™ XR capsule was developed to ensure a low but steady dose to users throughout a full day (Kent, 2014).

Methylphenidate was first synthesized in 1944 and was commercialized for sale in the late 1950s. Ciba Pharmaceutical Company marketed the drug for a short time in 1960 in combination with hormones and vitamins as a tonic to “improve mood and maintain vitality,” known as Ritonic (UMD, 2013). MPH was later developed into Ritalin™ to treat a variety of conditions, including depression, narcolepsy, and hyperactivity (University of Utah, 2016). Throughout the 1970s and 1980s, the use of Ritalin™ as a treatment for ADHD steadily increased. Between 1991 and 1999, Ritalin™ sales spiked, increasing by nearly 500 percent in the United States (UMD, 2013).

### **Rates of Use**

Ritalin™ is currently prescribed to approximately six million people in the United States (University of Utah, 2016). Despite its effectiveness, children with ADHD are typically taken off Ritalin™ upon reaching adulthood. When taken as directed, Ritalin™ has not been shown to exhibit addictive qualities. Researchers believe that the oral route of admission is safer due to delayed arrival and effects in the brain. Taking Ritalin™ in high doses, as well as snorting, injecting, and other improper use can greatly increase its addictive properties (University of

Utah, 2016). Research shows that 30-50% of adolescents in drug treatment centers report experience of Ritalin™ abuse (Arria, 2012).

Adderall™ is more commonly used in adults after phasing off of Ritalin™. Between 2008 and 2012, the number of privately insured adults using Adderall™ increased by 53% according to pharmacy prescription data (Gholipour, 2012). In 2010, more than 18 million Adderall™ prescriptions were written in the United States (Schwarz, 2013). In 2012, the nation was faced with an Adderall™ shortage when the DEA's dictated amphetamine production quota did not meet increasing demand for the drug (DEA, 2015). Though each drug can be more or less effective depending on the individual, both Ritalin™ and Adderall™ are some of the most popularly prescribed medications in the United States.

### **Attention deficit hyperactivity disorder (ADHD)**

Attention deficit hyperactivity disorder (ADHD) is a disorder of the brain resulting in patterns of inattentive, hyperactive, and impulsive behavior. The disorder is diagnosed according to guidelines from the American Psychiatric Association's Diagnostic and Statistical Manual, Fifth edition (DSM-5). The DSM-5 lays out a series of criteria that ensures a diagnostic standard across the entire country in order to promote accurate diagnoses. These criteria are broken down into two main categories: Inattention and Hyperactivity. Individuals must display six or more symptoms from one or both categories that persist for at least six months and are inappropriate for the individual's developmental level (American Psychiatric Association, 2013). Symptoms from both categories include trouble holding attention on tasks or activities, reluctance to do tasks that require mental effort over a long period of time, talking excessively, and difficulty waiting (CDC, 2016). Diagnosis requires a comprehensive evaluation by a

pediatrician, psychologist, or psychiatrist and usually occurs during a child's elementary school years (NIMH, 2016).

After diagnosis, treatment plans are determined based upon symptom presentation in the individual, as well as age and other personal factors. Treatment options for ADHD include behavior therapy, medications, and school accommodations and interventions (CDC, 2016). Medications are prescribed to individuals six years of age and older to help control behavioral issues that are affecting every day life. According to the Centers for Disease Control and Prevention (CDC), stimulants like Adderall and Ritalin are the best-known and most widely used ADHD medications. Between 70 and 80 percent of children diagnosed with ADHD experience fewer ADHD symptoms while taking stimulant medications. A study from the *Journal of Pediatrics* found that 9 out of 10 children with ADHD were treated with medication and/or behavioral therapy. Of this same group of children, 4 out of 10 were being treated with only medication (Visser, 2015).

Changing trends in ADHD diagnosis rates and treatment strategies have raised concern about increased accessibility to stimulants, possible side effects, and long-term health outcomes associated with them. It is important to note that estimates of diagnosis rates can vary widely due to diversity in methodology, geographical settings, and socioeconomic factors affecting various populations. Data from the 2003 National Survey of Children's Health reported approximately 2.5 million children aged 4-17 years were taking medication to treat ADHD symptoms. This number is part of an upward trend according to the National Center for Health Statistics (NCHS), which found the percentage of children diagnosed with ADHD increased from 6.9% to 9% from 1998-2000 through 2007-2009 (NCHS, 2011). Another study from the *American Journal of Psychiatry* confirmed this trend, reporting an increase in adolescent

stimulant use between 1996 and 2008 by an annual growth margin of 6.5% (Zuvekas, 2012). ADHD prevalence was consistently highest in the Southern region of the United States, and lowest in the Western region (NCHS, 2011). Boys are much more likely (13.2%) than girls (5.6%) to be diagnosed with ADHD (CDC, 2016). Overall, stimulant use to treat pediatric ADHD has been slowly but constantly increasing for at least the past 12 years (Zuvekas, 2012).

### **Desired Effects for Non-Medical Users**

Individuals with ADHD are not the only ones using prescription drugs like Ritalin™ and Adderall™. Nonmedical users of cognitive stimulants choose to use Adderall™ and Ritalin™ for a wide variety of reasons. These individuals report weight loss, academic purposes, athletic performance, staying awake, and recreation as the most common reasons for illicit use (Addiction Center, 2014). Individuals struggling with eating disorders have reported abusing Adderall™ for its appetite suppression (Addiction Center, 2014). The unique ability of cognitive stimulants to help users stay focused and awake for a perceived “longer than normal” period of time make them highly attractive to students and professionals (Addiction Center, 2014). College students in particular, make up a significant portion of cognitive stimulant abusers. A national survey released by the Partnership for Drug-Free Kids found that 1 in 5 college students report abusing prescription stimulants at least once in their lifetime, compared with 1 in 7 non-students (Partnership for Drug-Free Kids, 2014).

### **University Use of Adderall and Ritalin**

University students who use prescription cognitive stimulants non-medically usually report doing so because they believe it will help them do better on a test or study more effectively (Arria, 2012). Other studies find that students believe smart drugs will provide an edge over fellow students and increase their capacity for learning (Greely H, 2008). A survey

published in *Addiction Journal* estimated that almost 7% of students in US universities have used prescription stimulants non-medically, and that on some campuses up to 25% of students had used them in the past year (McCabe, 2005). The primary source for cognitive stimulants on university campuses is diversion from students with legitimate prescriptions. Diversion is a term used to describe the “illicit sharing, selling, and trading of prescription medications” (Garnier LM, 2010). Studies report that 5.3% of college students were currently prescribed ADHD medications (Garnier LM, 2010). This same study of 81 college students with ADHD found that 62% diverted their medication to someone without a prescription (Garnier LM, 2010).

### **Stimulant Dosing Practices among University Students**

Nonmedical use of prescription drugs can describe behaviors including inappropriate dosing and using inappropriate routes of administration. A study of university students taking prescription stimulants not prescribed to them by a doctor were asked to select from five routes of administration including orally, snorting, smoking, injecting, and inhaling. Oral administration and snorting were consistently listed as the top two routes of administration respectively (Teter et al., 2006). Little research is available on specific dosing practices among university students when using stimulants non-medically. Trends around university students’ stimulant use can provide information to infer specific dosing practices. Studies have found students tend to take stimulants for exam preparation, writing term papers, and preparing presentations (Hildt, 2014). In these cases, stimulants are most often taken on the night before an exam to compensate for lost time. Wastewater analysis of amphetamine at a college in the Pacific Northwest found that students’ amphetamine use increased during periods of high stress, such as midterms, and decreased during periods of low stress (Burgard, 2013). This research

shows that students are self-dosing their stimulant intake sporadically, according to their stress level and academic requirements at any given time within the term.

### **Sports and Military Use of Adderall™ and Ritalin™**

Nonmedical use of Adderall™ and Ritalin™ goes beyond the scope of academia. The United States military has long recognized the use of amphetamines to enhance performance in soldiers to improve focus, with the goal of increasing positive outcomes in training and active missions (Bonne, 2003). In 2010, the Department of Defense spent \$39 million for over 32,000 prescriptions of Adderall and Ritalin for active-duty soldiers (Kent, 2014). The number of military prescriptions has increased 10-fold since 2005 (Kent, 2014). The World Anti-Doping Agency is also addressing nonmedical use of both Ritalin™ and Adderall™, placing both drugs on their list of substances banned from sports competitions (Docherty, 2008). These regulations are in place due to advantages conferred on an athlete after stimulant consumptions. Such advantages include increasing cardiac output, increased alertness, and decreased fatigue. It is important to note that these drugs are only banned during competition, since they confer advantages in a “transient nature.” (Docherty, 2008). The National Football League experienced a record-breaking number of drug-related suspensions due to Adderall™ abuse (Bradley, 2013). Other leagues, including the Major League Baseball, NBA, Major League Soccer, and NCAA have all placed bans on Adderall™.

### **Stimulant Dosing Practices among University Students**

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### **Demographical Characteristics of Stimulant Users**

It is important to determine which factors make specific groups of university students more likely to use cognitive stimulants. A study prepared by the Center on Young Adult Health and Development at the University of Maryland first aimed to determine opportunity to use and nonmedical use of prescription stimulants based on year of academic standing. Results showed that students in their junior year were most likely to be offered prescription stimulants (41.1%) as well as to use them (20.1%). Freshmen were least likely to use stimulants (13.3%), but were offered at a comparable level to older students (Arria, 2012). Researchers at the University of Michigan studied six "college characteristics" to determine factors that correlate with non-medical prescription stimulant use. These characteristics were gender, race, fraternity/sorority membership, grade point average, admissions criteria, and geographical region of the college. Students who were male, white, members of fraternities/sororities, had lower grade point

averages, attended colleges in the North-eastern region of the U.S., and attended more selective colleges had the highest likelihood of past-year use (McCabe, 2005). Other associated factors included depression or depressed mood, skipping classes, and low perceived harmfulness of prescription drugs (Arria, 2012).

### **Co-occurring drug use and risky behaviors with stimulant use**

Certain characteristics or behaviors are often associated with illicit drug use. Adderall and Ritalin use in university students can also co-occur with excessive drinking and other drug use. Research conducted by the Society for the Study of Addiction found that students who used prescription stimulants non-medically in the past year were almost ten times more likely to also report marijuana use in the past year (McCabe, 2005). The same study found that past-year users were also seven times more likely to report frequent binge drinking, and over twenty times more likely to report cocaine use in the past year. Risky behaviors associated with past-year non-medical stimulant users in the study included driving after binge drinking. While nonmedical use of prescription stimulants has steadily increased between 2003 and 2013, opioid abuse has steadily declined over the same period of time (McCabe, 2014). College campuses in the same study with high (over 50%) or medium (36-50%) aggregate levels of binge drinking showed significantly higher rates of non-medical prescription stimulant use compared to schools with lower aggregate levels of binge drinking (McCabe, 2005).

### **University Student Health Services and Resources**

Students studying away from home while at universities have long been offered access to health care services on campus. Student Health Service organizations on university campuses aim to addressing health needs and concerns present in the campus community, usually among students and faculty alike. Today's understanding of germ theory and the importance of

preventative care has helped student health centers to become drivers of healthy behaviors and lifestyles on campus rather than simply reactionary treatment centers. On campus health centers typically offer clinical services including immunizations, contraceptive care, and basic healthcare treatment. In addition, counseling for issues with sexual health, nutrition, tobacco use, drinking behavior, and stress management are often available to students.

### **Drug Free Schools and Communities Act of 1989**

The majority of American colleges and universities today cite the Drug-Free Schools and Communities Act of 1989 in academic and student conduct policy codes. This legislation was passed in response to President George H. W. Bush's efforts to control drug use across the nation. After the DFSCA was signed into law in 1989, schools, colleges, and universities began to implement and enforce its policies as a condition of eligibility for federal assistance. The legislation lays out a set of minimum standards that schools must follow and be able to provide evidence of upon review. It requires that standards of conduct clearly prohibit unlawful possession, use, or distribution of illicit drugs and alcohol by employees and students while on the school's property or while participating in school-sanctioned activities. Schools must also provide descriptions of applicable legal sanctions under local, state, and federal law for drug offenses, health risks associated with the use of illicit drugs and abuse of alcohol, as well as available counseling, treatment, or rehabilitation programs. Lastly, disciplinary sanctions that will be administered by the school must be defined in a clear statement to students and staff. The federal government upholds these standards by performing reviews, and encourages schools' to conduct their own biennial reviews to determine effectiveness and needed changes (Ball State University, 2016).

The guidelines laid out by the federal government aim to promote and establish drug-free learning environments where students can succeed. Funding for the programs established by the DFSCA typically go towards developing comprehensive drug and violence prevention programs that promote behaviors including early intervention, mentoring and counseling, and rehabilitation referrals. Another important piece of the program is educating school personnel, law enforcement officials, and other community members with the proper professional training to promote safe, drug-free environments.

### **Drug Policies of Universities in Oregon**

The following descriptions relate to the specific practices and policies regarding illicit drug use of twelve Oregon universities. These universities include both public and private universities that range in size, geographical location, admission requirements, and demographics.

- Oregon State University, total enrollment: 28,886

Oregon State University follows DFSCA prevention regulations and policies. The OSU Student Health Services offer a variety of voluntary programs to educate students with the goal of preventing misuse of “alcohol and other drugs.” A key component of these efforts are offering free presentations for faculty, staff, coaches, student organizations, and the Greek community through programs like up2u, e-CHUG (alcohol), e-TOKE (marijuana), and IMPACT. OSU Student Health Services has published data from their 2012 National College Health Assessment, indicating OSU students are engaging in greater rates of high-risk drinking (45%) compared to the national average (34%).

- University of Oregon, total enrollment: 24,125

The University of Oregon currently has policies in place in accordance with the DFSCA. The university is a smoke, tobacco, and marijuana free campus, with specific conduct policies to address violations of these standards. The University of Oregon offers counseling and testing through the University Health center, providing “medical consultations, cessation advice, and referral services to students who have a substance abuse problem. The overall emphasis of prevention efforts focus on a primary goal of “changing the culture of drinking” to reduce the misuse of alcohol on campus. This goal is being addressed via a two-part approach involving both harm reduction and primary preventative approaches.

- Portland State University, total enrollment: 28,076

Portland State University follows DFSCA policies under the PSU Alcohol and Drug Free University Policy. PSU is in the process of becoming a smoke and tobacco free campus, after pledging to this agreement in 2013. PSU is a member of the Network of Colleges & Universities Committed to the Elimination of Drug & Alcohol Abuse. Their biennial review reported 115 patient visits over the span of two years (2012-2014) related to alcohol and/or drugs to their Student Health and Counseling center. The emphasis of policies and sanctions outlined in student conduct policies involved alcohol, tobacco, and marijuana use.

- Southern Oregon University, total enrollment: 6,203

Southern Oregon University has policies in place defined by the DFSCA. The SOU Student Health and Wellness Center reports that a National College Health Assessment conducted in 2010 reported 20% of students had used prescription drugs

that were not prescribed to them within the previous year (SOU NCHA, 2010). The Student Health and Wellness Center offers counseling, screening and assessments, life skills workshops, recovery steps, and referral for appropriate intervention when needed. The main emphasis of these prevention and education efforts is to prevent high risk drinking and to promote safe sex.

- Western Oregon University, total enrollment: 6,214

Western Oregon University has policies in place in accordance with the DFSCA and is a tobacco-free campus. The university's philosophy statement has six defined points concerning alcohol and drug use within the community and on campus. All six points address alcohol use, while only three mention drug use. Students at WOU are offered confidential counseling through the Student Health and Counseling Center, and also cites academic advisors as a possible source of assistance for students with concerns about alcohol or drug use. Otherwise, WOU offers referral information to off-campus resources should students need it. The main emphasis of WOU's health programs is to address bystander violence prevention, and to prevent alcohol and tobacco use on campus.

- Eastern Oregon University, total enrollment: 3,348

Eastern Oregon University follows the guidelines set by the DFSCA. EOU prohibits the possession or use of alcohol in any campus location or university sponsored activity regardless of age. Tobacco products may only be used in authorized locations on campus. The EOU student handbook explicitly address prescription drug use, prohibiting the use and/or possession of prescription drugs belonging to another. EOU Health Services offer individual wellness counseling for tobacco cessation, and

ADD/ADHD strategies for success. EOU had a wide variety of emphasis, promoting overall personal wellness through specialized counseling services and specifically prohibiting alcohol, tobacco, legal, and illegal drugs on campus.

- University of Portland, total enrollment: 3,911

University of Portland address smoking, drugs, and alcohol in their university policies. Designated smoking areas are defined, and otherwise the campus is smoke free. UP prohibits the possession and/or use of alcohol, marijuana, synthetic substances and other illegal drugs on campus. The UP Health Center encourages students to educate themselves on all aspects of how alcohol and marijuana can effect you. The Substance Abuse Prevention Team (SAPT) coordinates substance abuse prevention efforts on campus through education, coordination, and advising. They emphasize that students must be aware of the risks, understand the policies, and then make an informed choice about whether or not to use.

- Concordia University, total enrollment: 2,506

Concordia University has policies in place that follow the DFSCA requirements. Concordia is a drug free campus, defined as the absence of alcohol and illegal mood altering substances. Drug paraphernalia and hookahs (for tobacco use) are also not allowed on campus. Concordia does not offer extensive resources aimed at specific drugs or behaviors in particular. Rather, the Counseling Services center addresses student needs on a case-by-case basis. Students with addiction or concerns beyond the scope of individual counselors at Concordia will be referred elsewhere for outside help.

- Willamette University, total enrollment: 2,827

Willamette University clearly outlines and abides by the guidelines set forth by the DFSCA. Willamette has a defined alcohol policy that allows alcohol use on campus by individuals who are 21 or older and follow local, state, and federal alcohol use laws. Other student conduct policies prohibit possession, use, and or distribution of drugs and other controlled substances. Willamette offers no-cost professional assessments and referral services to all students, and has on-campus groups for Adult Children of Alcoholics, abstinence support, and members of Alcoholics Anonymous. The Bishop Wellness Center offers short-term counseling services

- George Fox University, total enrollment: 3,712

George Fox University promotes a Christ-centered education and environment. This strict policy expects students to follow a lifestyle that excludes the use or possession of non-medicinal drugs, alcohol, and tobacco. The use of alcohol at university-sponsored activities is not allowed, and the presence or use of illegal drugs or alcohol is not allowed on the George Fox campus. Illegitimate use of prescription drugs is also against student conduct policy. Campus Health and Counseling Services do not address addiction, drug and alcohol prevention, or counseling in any capacity.

- Pacific University, total enrollment: 3,500

Pacific University follows the guidelines set forth by the DFSCA and provides all necessary information to students and staff. The Campus Wellness center is open to address the fact that “most Pacific University students choose to use alcohol and other drugs safely.” Education efforts by Campus Wellness staff promote “knowing your limits,” being aware of consequences of alcohol and drug use, and watching out for

others in the community. Confidential counseling is offered on an individual case-by-case basis, and further assistance is referred outside of the university.

- Corban University, total enrollment: 1,024

Corban University complies with DFSCA policies and follows the outlined guidelines in Alcohol, tobacco, and controlled substances policy. Corban students may not possess, manufacture, or distribute tobacco, alcohol, or illegal drugs while associated with the University. Students who do not comply with these policies may be forced to pay for testing and counseling to address the offense. Corban University offers individual counseling on a case-by-case basis that is extended for a short term period. Other resources provided by the university refer the student to outside resources to address drug and alcohol use.

Regardless of size, location, and other factors that make each of the twelve universities above unique, they all seem to follow similar trends in policies and services associated with drug use by students. Nearly all of the universities explicitly stated that they follow the DFSCA, which is to be expected from all universities that receive any type of federal aid. The two largest universities, Oregon State University and University of Oregon, offered the widest variety of resources to students that aimed to reach as many students as possible. The smaller universities offered comparable counseling services, but followed a more voluntary model that students had to seek out on their own. There was an overall lack of information and resources from all universities regarding nonmedical prescription drug use by students. Most preventative and education efforts were aimed at alcohol and marijuana, using blanket terms like “alcohol and other drugs.”

## **Student Perceptions about Stimulant Use**

Nonmedical use and abuse of prescription drugs is a significant public health concern throughout the United States. A study by the National Institute on Drug Abuse estimates that 52 million people have used prescription drugs for nonmedical reasons at least once in their lifetimes (NIDA, 2014). Prescription drug abuse is highest among the young adult age group between 18 and 25, with 5.9 percent reporting nonmedical use in the past month (NSDUH, 2010). This growing phenomenon has many contributing factors. Availability of many commonly abused prescription drugs has increased with growing numbers of prescriptions being written since the early 1990s (IMS Health, 2012, Hall, 2005). Another significant factor to address is the public's perception of prescription drugs as less harmful than illicit drugs, and a national attitude trending towards "taking a pill for what ails you" (Volkow, 2014).

A study published in the *Journal of Prevention Science* conducted personal interviews with 1,253 first-year college students to evaluate perceived harmfulness of nonmedical prescription stimulants (Arria, 2008). The interviews revealed that only one in four students perceived a great risk of harm from occasional nonmedical use of prescription stimulants (25.2%). Increased risk of nonmedical use was directly associated with both low perceived harmfulness and all levels of sensation-seeking behavior. Furthermore, nonmedical users could be statistically distinguished from non-users based upon perceived harmfulness given the opportunity to use. Another study surveyed young adults via Facebook, a popular online social networking site and yielded 527 valid responses from young adults with a mean age of 20 years (Lord, 2014). Results of this study found that respondents used prescription drugs nonmedically because they were easy to hide, did not produce a hangover, produced longer-lasting effects than alcohol and other drugs, and lead to less trouble in the event of being caught. On average, the

respondents perceived only a slight risk of harm associated with nonmedical use of prescription drugs used occasionally.

Another component to consider is students' perception of individuals who are using prescription stimulants nonmedically. Young adults tend to model behavior according to the behavior of their peers due to external and internal pressures. A common perception among university students is that "everyone is doing it." Despite the popularity of this belief, a study from the Ann Arbor Institute on Social Research found that in 2011, less than one in ten adolescents used prescription stimulants nonmedically. Another common perception is that most students who use prescription stimulants nonmedically do better academically than students who do not. Conversely, many studies have associated nonmedical use by students with lower overall GPAs (Clegg-Kraynok, 2011). This same study reported students reporting high GPAs were least likely to use psychostimulants nonmedically. Lastly, students often believe that using prescription stimulants nonmedically will help to improve cognitive performance to gain a competitive edge. Research in this field is quite controversial, some studies reporting improved cognitive function while others do not. Overall conclusions report that both Adderall and Ritalin may confer enhancement in some aspects of cognitive performance, but do not confer statistically significant enhancement in decision-making tasks like an exam (Agay, 2010).

### **Brain Development in Traditionally Aged University Students**

The National Center for Education Statistics defines the age range for the average college student between 18 and 24 years old (NCES, 2015). It is widely understood that adolescence is a critical period in the brain's development, during which it is especially vulnerable to stress and struggles with complex problem-solving (Monastersky, 2007). Further findings also indicate that higher-order cognitive capacities that begin to develop in adolescence do not fully develop

until adulthood. Research using MRI neuroimaging on children, adolescents, and adults found that greater activation in the lateral cerebellum corresponded with full developed cognitive processes in adults. The average age at which characteristics of completed or near-completion cognitive development took place averaged to be approximately 24.2 years (Beatriz, 2000). Other studies have made similar conclusions, finding that adolescent brains possess mature logical and verbal processing abilities comparable to that of an adult brain (Giedd, 2004). However, capacities for self-regulation, goal-setting, planning, and emotional and cognitive control are still developing into early adulthood (Yurgelun-Todd, 2007). Traditional college students are undergoing these final, significantly transformative developments throughout their college experience.

### **Summary of Literature Review**

Past studies have addressed nonmedical use of prescription stimulants in a variety of settings. Prescription stimulants are not new to the market, and have been used by students for their effects on cognition since their introduction in the late 1930s (University of Maryland, 2013). Increased rates of ADHD diagnosis across the country has contributed to increasing prescription rates and production of prescription stimulant drugs in the United States that far outpaces the rest of the world (IMS Health, 2012, INCB, 2009). This increase in availability has made it easier for students to get their hands on powerful drugs like Adderall and Ritalin. These drugs have become highly desirable on college campuses for their positive effects on memory, focus, and overall increased time spent studying or performing various academic tasks (Arria, 2012, DeSantis, 2008, Aikins, 2011). Low perceived side effects and negative outcomes are also major contributors to the popularity of prescription stimulants among college students (Aikins, 2001, DeSantis, 2008). Universities across the country tend to focus on responsible alcohol use,

as well as marijuana and tobacco prevention when providing educational resources to students about drug use. These resources as well as university academic and behavioral codes often fail to address estimates that 34% of students may be using prescription stimulants illicitly (DeSantis, 2008). Three of Oregon's largest universities have 8% of students self-reporting nonmedical prescription stimulant use (House, 2011). At this point, it is no longer a question of whether students will be presented with the opportunity to abuse drugs like Ritalin and Adderall. Now, the question being asked is how prepared students will be to make their decision.

## **LIMITATIONS OF THE STUDY**

This study is based upon the literature that the author has selected and presented. The perceptions, conclusions, and recommendations presented in this thesis are influenced by the scope of the literature reviewed. The evaluation of university policies and resources was limited to published materials. The research questions presented in this thesis were formulated and analyzed according to these limitations.

## **DISCUSSION OF RESEARCH QUESTIONS**

The following research questions address important factors relating to nonmedical use of prescription cognitive stimulants by university students in Oregon:

1. What are students' perceptions about their own prescription cognitive stimulant use?
2. How do students who do not use cognitive stimulants perceive other students' use of these drugs?
3. What is the role of counselors and physicians on campus in educating university students about nonmedical use of prescription cognitive stimulants?
4. Do regulations imposed by universities and the legal system have any influence on students' use of prescription cognitive stimulants?
5. Are the resources available to students at universities in Oregon well-developed to educate and prevent nonmedical use of prescription cognitive stimulants?

## *1. What are students' perceptions about their own prescription cognitive stimulant use?*

### **Introduction**

Rates of nonmedical use of Ritalin™ and Adderall™ have been steadily increasing since the 1990s, especially among college students (Arria, 2008). According to the National Survey on Drug Use and Health Report (2009), full-time college students were twice as likely to have used Adderall non-medically as their non-student counterparts. This trend is consistent with another study, which reported as much as 34% of students admitted to illegal use of ADHD stimulants at a public research university in the southeastern United States (DeSantis, 2008). These trends continue to increase with little signs of plateauing. It is critical that university and student health officials understand student perceptions about cognitive stimulant use in order to address the issue effectively. Students are often experiencing an important transition in brain development and overall independence during their college years. Health care providers, counselors, and other on-campus resources for students must work to understand the thoughts that go into making a student's decision before it is made, in order to maximize educational and preventative efforts.

### **Perceived harmfulness**

Upward trends of Adderall™ and Ritalin™ use on university campuses have gained attention from students, parents, the media, and researchers alike. A study headed by Dr. DeSantis at University of Kentucky aimed to improve understanding of student perceptions by asking about safety and the possibility of harmful health risks resulting from prescription stimulants. Only 2% of students thought amphetamines were "very dangerous" while 81% thought their illicit use was either "not dangerous at all" or only "slightly dangerous" (DeSantis, 2008). Another study from University of Maryland supported these results, reporting that only

one in four students perceived a great risk of harm from occasional nonmedical use of prescription stimulants (Arria, 2008). This study went on to find that low perceived harmfulness was directly associated with increased risk of nonmedical use when holding demographic characteristics constant. Furthermore, the protective effect of high perceived harmfulness could be seen across all levels of sensation-seeking, excepting high sensation-seekers (Arria, 2008). Researchers from the Society for Prevention Research (2008) suggested that increased perceived harmfulness may be a viable prevention strategy for the majority of students.

### **Perceived side-effects**

Another component of student perception about risk and harmfulness is the prediction of side effects. Before students decide to use stimulants nonmedically, they may spend time considering possible side effects. These side effects were classified into two unique forms: internal/physical and external/societal. Most students interviewed in the DeSantis study reported doing some research into physical side effects before nonmedical stimulant use. Research on the long term physical safety and outcomes of prescription stimulant use is extremely variable. Some studies have proposed possible links between prescription ADHD stimulants and extreme physical side effects like acute myocardial infarction, cerebral arteritis, and other serious cardiovascular events (Schelleman, 2012). Other research has done the opposite, suggesting that long term use of prescription stimulants is safe with little risk for adverse physical effects other than mild insomnia and appetite disturbance (Ahmann, 1993). Despite various findings on potential side effects of ADHD stimulant use, many students felt that FDA warnings were not evidence based, rather meant to “scare” people into responsible use.

External side effects reference societal outcomes, including potential legal risks or stigma associated with stimulant use. Students interviewed in the DeSantis study tended to focus on the

lack of concern displayed by law enforcement to prove stimulants' safety and morality (DeSantis, 2008). Many students also cited knowing many friends and peers who had been using stimulants nonmedically without incurring legal repercussions (DeSantis, 2008). Societal side effects were also perceived as minimal. Students at Stanford University minimized the criminal aspect of using Adderall and Ritalin nonmedically due to their FDA approval and widespread presence on campus (Huet, 2010). These factors, along with easy availability to obtain the drugs, diminish social stigma related to their use (Huet, 2010). This perception was also supported by another study in which students noted that prescription stimulant use was socially acceptable because of the drugs' tendency to enable intense academic labor in an environment where such behavior is encouraged (Aikins, 2011). Furthermore, students cited diversion of stimulant medications as more common than marijuana dealing, and were reluctant to think of prescription diversion as "dealing" (Aikins, 2011).

### **Common justifications for use**

A follow-up study conducted in-depth interviews with 175 participants from DeSantis' previous work with the goal of improving understanding of student justifications for their own illegal stimulant use. There are many justifications that students use when explaining their nonmedical stimulant use to an interviewer. One of the most common justifications was an argument of general morality. This widely used justification asserts that students are taking stimulants for the promotion of a positive outcome. Students understand wanting better grades and overall improved academic performance as a morally justifiable goal with stimulant use as a morally justifiable means (Low, 2002). Another justification places trust in the medical establishment, framing ADHD stimulants as "good" legal pharmaceuticals compared with "bad" illegal street drugs. Students reported feeling safe using ADHD stimulants because they were

produced by pharmacists in laboratories and are heavily regulated by the FDA. The third most common justification for stimulant use again uses a comparison between “bad” drugs and “good” drugs based on their effects on cognition and motor skills. Students felt justified in their stimulant use due to perceived positive effects on concentration, alertness, and memorization abilities (Smith, 2013).

### **Ethics of Using Prescription Stimulants**

Most American colleges and universities do not have specific rules regarding cognitive enhancement drugs in their academic regulations or codes. However, discussing the fairness of using these drugs for cognitive enhancement poses a controversial ethical debate. Students at Stanford who use study drugs found them to be extremely helpful in academics, but did not consider their use as cheating (Huet, 2010). Many students in the DeSantis study even equated Adderall to caffeine (DeSantis, 2008). One student explained that “taking Adderall lets me put in the work that I would do anyway, just in a shorter amount of time, it’s not making me smarter.” (Huet, 2010). Other students felt justified in their use, believing they were simply undiagnosed cases of ADHD (Aikins, 2011). Further studies found more controversy among student opinions on the ethics of using stimulants for cognitive enhancement. Some students agreed that their use could be amounted to cheating and may be an issue of academic fairness (Aikins, 2011). Students at Vanderbilt claimed that illicit stimulant use posed an unfair advantage in terms of academic performance. Student opinions are clearly very mixed, leaving room for critical and valuable discussion of the ethics behind illicit stimulant use.

## Summary

Students who use prescription stimulants, both medically and nonmedically, overwhelmingly reported that the drugs enhanced their ability to perform academic tasks. Beneficial effects associated with Adderall™ and Ritalin™ commonly included increased focus, mental stamina, calming effects, concentration, and improved overall time management (Aikins, 2011). Several other factors contribute to students' perceptions about using prescription stimulants nonmedically. Adderall™ and Ritalin™ are easily accessed drugs on university campuses, where drug diversion is common and carries little social stigma. The lack of societal repercussion for prescription stimulant use is another contributing factor. Legal authorities and university administrators alike have shown little response to illicit use of smart drugs. The ethics behind using prescription stimulants nonmedically are the greatest source of controversy and differing opinions among students who use.

## ***2. How do students who do not use cognitive stimulants perceive other students' use of these drugs?***

### **Introduction**

Another critical point of discussion in addressing the upward trend of nonmedical prescription stimulant use is student perception of other students' use. Research has supported the commonly understood belief that college years are a time of experimentation, part of which includes drug use. The highest rates of psychoactive and recreational stimulant use is reported among 18 to 25 year olds (Babcock & Byrne, 2000). Students often make decisions at this age with regard to decisions of their peers. A study by NIDA and University of Michigan found that approximately 8.6% of high school seniors had used Adderall™ or Ritalin™ illicitly in the previous year (NIDA, 2014). This same study found that over 80% of high school seniors disapproved of amphetamine use, with high proportions disapproving even trying amphetamines once (NIDA, 2014). However, current estimates of Adderall™ and Ritalin™ use by college students are reported anywhere between 15 and 34% (DeSantis, 2008). This evidence shows a significant transition in perception of illicit amphetamine use from high school to college. A major factor contributing to this transition may be students' perception of nonmedical use by their peers.

### **Rates of use by other students**

A common perception that students who do not use prescription stimulants have, is that "everyone else is doing it" (Arria, 2008). Evidence suggests that most college students overestimate the prevalence of illicit prescription stimulant use on their campus. A survey of over 3000 college students reported that 70.2% of students overestimated the prevalence of nonmedical use of prescription stimulants among peers on their campus (McCabe, 2008).

Students estimated past year prevalence to be approximately 20% higher than actual reported past year use (McCabe, 2008). Another study of 1100 undergraduates at a public university in the Pacific Northwest found major discrepancies between their normative perceptions and actual reported nonmedical use (Kilmer, 2015). Over half of study participants reported thinking the typical student used stimulants on at least three to five occasions in their lifetime (Kilmer, 2015). However, the same study found that 81% of students had never used prescription stimulants nonmedically (Kilmer, 2015). A student from Stanford University who regularly uses Adderall™ summed up the possible implications of these misconceptions, stating “It is about the pressure, it’s about catching up with other students.” (Huet, 2010).

### **Perceptions of academic outcomes**

Students use prescription stimulants nonmedically for a variety of reasons, including weight loss, recreation, and academic enhancement. Nonmedical prescription stimulant use on college campuses has been trending upward in large part due to academic use. A recent study found that 76% of students who are nonmedical users believe that stimulants improve their grades (Peterkin, 2011). Non-using students also seem to share similar perceptions about prescription stimulants and academic performance. Many students believe that individuals who use prescription stimulants have higher GPAs and are more successful overall academically (Arria, 2011). Some students cited the fairness debate, believing that using prescription stimulants nonmedically can improve cognitive performance and give users a competitive edge (Arria, 2008). These perceptions are mostly skewed from the reality presented by scientific research. Nonmedical use of prescription stimulants has actually been associated with lower average GPAs by many studies (Garnier-Dykstra, 2012). Furthermore, nonmedical users also tend to have a history of heavy drinking and other drug involvement (McCabe, 2005). Other

studies have called to question whether prescription stimulants serve any real benefit to nonmedical users who do not have ADHD or other prescribed disorders (Hotze, 2011).

## **Summary**

Though research studies on nonmedical prescription stimulant use vary significantly in reporting rates and prevalence, they all agree on one factor. The majority of university students are not using stimulants nonmedically. Statistics show that between a student's senior year of high school and college years, a significant shift in perception towards stimulant use takes place (NIDA 2014, DeSantis 2008). These two factors combined show the importance of non-using students in efforts to address growing rates of nonmedical stimulant use on university campuses across the country. Non-using students compose the majority of campus, and hold unique perceptions about their peers who do use stimulants nonmedically. They continually overestimate rates of use by their peers, perpetuating the idea that "everyone is doing it" (McCabe 2008, Arria 2008). Furthermore, many students who do not use feel like they may be at an academic disadvantage to those who do (Arria, 2008). This is another misconception, shown by correlations between stimulant use and decreased academic performance (Garnier-Dykstra, 2012). These perceptions may play a role in increased stimulant usage rates on university campuses throughout the United States, and could be an important factor to address in education and preventative efforts.

### *3. What is the role of counselors and physicians on campus in educating university students about nonmedical use of prescription cognitive stimulants?*

#### **Introduction**

Nonmedical use of prescription stimulants is becoming an increasingly important part of the illicit drug use problem among college students (SAMHSA, 2008). Drugs like Adderall™ and Ritalin™ are readily available on college campuses through friends and peers at costs that are affordable to students (Garnier-Dykstra, 2012). Their reputation as “smart drugs” with minimal side effects make prescription stimulants a tempting choice for many students under intense academic and social stress. However, many students who use stimulants nonmedically determine their own doses, paying little attention to medical guidelines and safety warnings (Adderall at Vanderbilt, 2016). Furthermore, nonmedical use of stimulants has been correlated with higher prevalence of other drug use and engaging in other risky behavior (McCabe, 2005, DeSantis, 2008). Both Methylphenidate and Amphetamine are Schedule II drugs under the Controlled Substances Act, carrying high risks for abuse that could potentially lead to severe psychological or physical dependence (U.S. DEA, 2016). When students are attending school, university student health programs are often the most accessible form of healthcare available. Counselors, physicians, and other healthcare staff on university campuses need to be aware of the upward trend in prescription stimulant abuse and must be prepared to provide effective education and support to students.

#### **Prescribing**

Production of methylphenidate medications (e.g. Ritalin™, Concerta™) increased by 900% between 1990 and 2000 while amphetamine production increased by 5,767% between 1993 and 2001 (Hall, 2005). In 2010, American consumer spending on prescription stimulants

grew 14.5% to approximately \$7.5 billion (IMS, 2011). These statistics indicate that cognitive stimulant production has ramped up in order to keep up with increasing numbers of prescriptions being written by physicians every year. Physicians are the initial gatekeepers to these types of drugs, and could have a significant impact on the market and resulting availability of these drugs by modifying the prescribing process. Currently, obtaining an ADHD diagnosis and subsequent stimulant prescription involves a comprehensive evaluation of symptoms from a well-defined list that must persist for at least six months and be inappropriate for the individual's developmental level (American Psychiatric Association, 2013).

Despite the strict guidelines surrounding ADHD diagnosis set out by the Diagnostic and Statistical Manual, Fifth edition (DSM-5), prescriptions are still finding their way into the wrong hands. A recent survey of patients' medical records found that nearly a quarter of adults who seek treatment for ADHD may be exaggerating or faking their symptoms (Marshall, 2010). Another recent study bolstered these findings, using three groups of students to attempt to beat the system and produce a "fake diagnosis." The study used students with and without ADHD to evaluate two self-reporting tests that are used by doctors in ADHD diagnosis, the ADHA Rating Scale and the Conners Adult ADHD Rating Scale. Ultimately, neither test could reliably distinguish between students with ADHD and those "faking it" (Sollman, 2010). Approximately 5.3% of college students were currently prescribed ADHD medications in 2010 (Garnier, 2010). A recent survey of prescription stimulant users reported nearly half of the student participants had used ADHD medications illicitly before obtaining ADHD diagnoses and prescriptions of their own (Aikins, 2011).

University students display similar trends in prescription stimulant use over a variety of studies in various regions and types of universities. Physicians providing care to college students

could benefit from understanding trends associated with prescription stimulant use. An example of these similar trends includes usage patterns around the academic calendar. Students typically use stimulants most frequently immediately preceding academic deadlines (Aikins, 2011). Examples of academic deadlines that correlate with increased stimulant use include midterm and final exam weeks. A study utilizing wastewater analysis for amphetamine supported this trend, finding increased amphetamine traces during periods of high stress on campus, and decreased traces during periods of low stress (Burgard, 2013). Other trends that seem to maintain consistency across a variety of studies and universities include demographical factors associated with increased stimulant use. Several researchers have associated white, male, fraternity members attending selective universities, and having lower GPAs with increased prescription stimulant use (McCabe, 2005, DeSantis, 2008, Aikins, 2011). These are factors that physicians need to be aware of when prescribing ADHD stimulants to university students in order to ensure accuracy of diagnosis.

### **Diversion**

Diversion includes the illicit sharing, selling, and trading of prescription medications (Arria, 2012). Many studies have shown that most students who use stimulants nonmedically obtain the drugs from a friend who has a prescription of their own (Garnier-Dykstra, 2012, DeSantis, 2009, Desantis, 2010). One study reported 61.7% of college students diagnosed with ADHD admitted to diverting their prescription stimulants to other students (Garnier, 2010). Possible risk factors for diversion include childhood conduct problems and other drug use (Garnier, 2010, Garnier-Dykstra, 2012). Another study reported 56% of students with prescriptions had been approached by a peer to give or sell them their medication within six months of being interviewed (Rabiner, 2009). Over 13% of these students reported that they had

been approached at least six times within the previous six months (Rabiner, 2009). Many students reported paying between \$5 and \$10 per pill, depending on the dose for Adderall™ (Teter, 2006, Aikins, 2010). However, other students even reported diversion of stimulant medications for free to friends (Aikins, 2010). Diversion typically doesn't carry the same social stigma associated with "dealing" other drugs like marijuana (DeSantis, 2010, Arria, 2010).

## **Education**

Two main factors student health officials must address in education and preventative efforts include widespread availability and diversion of prescription stimulants on campus. Leading experts and researchers on this topic have several suggestions to counselors and physicians who are tasked with educating students about prescription stimulants, their risks, and the decision to use them. All of these suggestions center around education and encouraging conversation between health care providers and students.

Dr. Sean McCabe suggests health education and prevention efforts that focus on reducing misperceptions regarding nonmedical use. He cites similar, multifaceted approaches for reducing alcohol misuse among college students that have shown notable success as examples to follow (McCabe, 2009). Dr. Alan DeSantis agreed with McCabe, specifically identifying harmful misconceptions that need to be addressed by educators. He recommended education that would attack the illusion of safety students have towards prescription drugs and communicate the serious physical risks associated with ADHD stimulants. He also encourages educators to dispel the belief that ADHD medications are "nothing more than a stiff cup of caffeinated coffee" and to communicate the effect they have on the brain's neurotransmitters. Lastly, DeSantis emphasized the importance for education on ADHD to reduce the trivialized attitude many students have towards the disorder (DeSantis, 2010). Dr. Amelia Arria shared similar

recommendations, but also encouraged campus health care providers to develop early intervention strategies to assess risk and to work to de-stigmatize college students who do not divert their medications or engage in illicit use (Arria, 2011).

## **Summary**

Physicians and counselors associated with student health services are often critical resources for students as they manage their physical and mental wellbeing while at school. Prescription stimulant abuse on university campuses is a health concern that students and providers alike must address as trends steadily increase. Physicians have a key role to play in the process of diagnosing ADHD and prescribing stimulants as treatment. The guidelines and testing standards in current practice are not 100% effective in diagnosing ADHD, and can be taken advantage of by individuals willing to exaggerate or fake symptoms (Sollman, 2010). Furthermore, a significant proportion of students with their own ADHD diagnosis and prescription are diverting their medications to other students for illicit use (Aikins, 2010, Arria, 2008). Diversion or prescription stimulants provide an abundant and affordable source of drugs for nonmedical users on campus. According to leading experts in the field, student health counselors and physicians have an obligation to educate students about the misconceptions and risks of nonmedical stimulant use (DeSantis, 2008, Arria, 2010, McCabe, 2005). Experts agree that opening up lines of communication between health resources and students at risk for illicit use could help inform students and lower potential stimulant abuse on campus.

#### ***4. Do regulations imposed by universities and the legal system have any influence on students' use of prescription cognitive stimulants?***

##### **Introduction**

Adderall, Ritalin, and many other study drugs are classified as schedule II drugs under the Controlled Substances Act, which is regulated by the U.S. Drug Enforcement Agency. Despite this clear distinction, regulations and their actual enforcement remain variable from state to state, and university to university. There are two key regulatory bodies that need to be addressed when considering illicit use of prescription stimulants by college students. The first is the federal legal body, and the laws that they define regulating stimulant possession, use, and sale. The second, unique to students and faculty, is regulation composed by university authorities for student behavior and academic code. Both regulatory bodies have two key problems to consider when establishing prescription stimulant policies. Some students truly require stimulant medications as therapeutic treatment in order to function properly. However, other students exploit these functions of prescription stimulants, obtaining an unfair competitive academic edge over non-users. Prohibiting cognitive stimulants in a strict approach remedies the second problem, but would exacerbate the first. When addressing this issues and composing regulation, it is important to take a critical analysis of current policies and their effectiveness.

##### **Federal regulation**

The Drug Enforcement Agency has a defined mission statement that includes enforcing the controlled substances laws and regulations of the United States. They aim to accomplish this mission by bringing organizations involved in growing, manufacture, or distribution of controlled substances to the criminal and civil justice system of the United States (U.S. DEA). More specifically within the DEA, the Office of Diversion Control aims to prevent, detect, and

investigate the diversion of controlled pharmaceuticals and listed chemicals from legitimate sources (U.S. DEA). Amphetamine possession without a valid prescription is a crime, but selling without authorization or possession with the intent to sell, is a felony that carries a much higher penalty (21 U.S.C. 841). Furthermore, under the Controlled Substances Act, a person convicted of selling or attempting to sell amphetamines near a school face twice the maximum prison sentence, twice the maximum fine, and twice the term of supervised release (21 U.S.C. 860). Typical sentences for persons convicted of selling or attempting to sell amphetamines range from 5 to 20 years in prison and/or a \$250,000 fine.

Examples of execution of these regulations on university campuses vary on a case by case basis between states and universities. In 2010, five Columbia students were arrested after selling \$11,000 worth of cocaine, marijuana, LSD, and Adderall™ to undercover police over the course of several months (Schram, 2010). This bust, known as Operation Ivy League, was part of a five-month investigation that ultimately resulted in jail time for only one of the students (Schram, 2010). More recently, two University of Colorado students were arrested in 2013 on felony drug charges after a campus employee reported seeing them sell a prescription pill to another student for \$5 on campus (Byars, 2013). These types of cases are fairly rare considering estimated illicit diversion and usage on university campuses. It is difficult to locate and address students diverting medication on a small scale to friends, which seems to be the most common route of access (Aikins, 2011, DeSantis, 2010).

### **University regulation**

Colleges and universities are critical settings for prevention and early intervention, especially since most young adults initiate or increase drug use during their college years (Johnston, 2012). Over the past two decades, colleges have introduced and executed large scale

preventative efforts to curb binge drinking and other risky behaviors associated with alcohol. These programs have shown varying but notable degrees of success (DeSantis, 2008). However, very few universities have comparable programs aimed to prevent or reduce prescription drug use. Most universities prohibit illicit possession, use, or distribution of prescription stimulants in their student conduct policies using blanket statements like “controlled substances” or “prescription medications.” These broad regulations do not always translate to effective regulation. A survey of major universities in the Washington region reported nearly 1,400 drug-related cases over the course of two school years. Of those cases, only 36 were related to prescription drugs, most of which were ADHD medications (Johnson, 2011). This lack of enforcement is common at other universities as well. University of Maryland only reported three cases involving prescription stimulants between 2009 and 2011 (Johnson, 2011).

School officials and campus police attribute the lack of visible enforcement to difficulty identifying illicit users. Daniel Swinton, president of the Association for Student Conduct Administration at Vanderbilt University communicated this issues saying “study drugs are kind of a silent issue. Everyone’s aware of it, but I think we’re all focused on the more prevalent one – alcohol” (Johnson, 2011). Universities across the country are struggling to address this “silent issue,” as shown by an overall lack of preventative policy, regulation, and enforcement of prescription stimulants. Duke University, however, may be signaling a change to this silence and is on the forefront of addressing illicit stimulant use by students. In 2011, Duke declared that illegal use of prescription stimulants is a violation of the academic dishonesty code (Duke University Student Affairs, 2011). Many students responded in support of the decision, comparing a scholar on stimulants to a football player on steroids (Johnson, 2011). President Obama and the Office of National Drug Control Policy followed suit in 2011 with the release of

the National Drug Control Strategy. Obama identified prescription drug abuse by young adults as one of three main policy priorities (National Drug Control Strategy, 2011).

### **Summary**

Current regulation efforts by the federal government and university authorities alike have minimal impact on illicit prescription stimulant use. Research shows that few students consider stimulant medication diversion to be an illegal or dangerous activity compared with acquiring or consuming “harder” drugs (Aikins, 2011). Students even use the “lack of concern displayed by law enforcement” to justify the safety and morality of prescription stimulant use (DeSantis 2010). University authorities have struggled to produce meaningful and effective regulation for two main reasons. First, illicit prescription stimulant use is difficult to identify in students, rarely resulting in admission to healthcare facilities or criminal disturbances. Another issue is the perceived benefit of prescription stimulants outweighing risks for many students (DeSantis, 2010, Arria, 2008). Federal regulations have faced similar struggles in producing effective policies aimed at university students. Though work may be in progress to increase regulatory efforts by the federal government and university authorities, current regulation has minimal effect on students.

***5. Are the resources available to students at universities in Oregon well-developed to educate and prevent nonmedical use of prescription cognitive stimulants?***

**Introduction**

Students, university administrators, and researchers express significant variability in the prevalence of nonmedical prescription stimulant use on college campuses. Estimates vary from as low as 2% to as high as 34% (DeSantis, 2010). A factor that may contribute to this variance is geographic location, as well as university admission standards and other demographical factors (Arria, 2008). Student health surveys at University of Oregon, Portland State University, and Oregon State University reported approximately 8% of respondents admitted to using stimulants without a prescription. However, several students from these universities suspected actual numbers are closer to DeSantis' estimate of 34% (House, 2011). A Portland State University student commented that "So many kids have Adderall prescriptions. A lot of kids just will give it away for free" (House, 2011). A psychiatrist at the University of Oregon student health center, Rick Friedrich, regularly sees students in his office with fake ADHD symptoms, hoping to get their own stimulant prescription (House, 2011). Oregon universities are not immune to the upward trend of nonmedical prescription stimulant use and distribution on campus. It is important to take a critical evaluation of what resources are available to students in Oregon to educate and prevent nonmedical use.

**Resources available**

Twelve Oregon universities were contacted and researched in order to evaluate resources offered by their student health services to address prescription stimulant use. All of the universities complied with guidelines set out by the Drug Free Schools and Communities Act, presenting information on commonly abused drugs and their associated risk factors, conducting

biennial reviews, and publishing disciplinary actions that may be incurred on students for failing to follow policies. Eleven of twelve universities offered counseling services for students who had concerns about prescription drug use. These services varied between universities. The largest public universities, Oregon and Oregon State, offered long-term counseling services for students within the student health services. Other, smaller universities only offered short-term counseling services on a case-by-case basis, and would otherwise offer referral to resources outside of the university. George Fox University, a private, religious university, did not address any resources for drug or alcohol prevention in any capacity. Six of the universities promoted workshops on skills like test taking and studying, aimed to combat students' perceived need to use prescription stimulants.

### **Resources that are lacking**

Each university had its own student health organization, consisting of unique programs, services, and events. However, all twelve universities seemed to focus preventative efforts on misuse of alcohol, marijuana, and tobacco cessation. In most cases, references to stimulants like Adderall and Ritalin were addressed only under blanket terms like “controlled substances” and “prescription drugs.” A survey of student health services offered in Oregon clearly shows well-established and well-funded efforts for marijuana, alcohol, and tobacco with major promotion going to programs like IMPACT, e-CHUG, e-TOKE, and Alcoholics-Anonymous. Furthermore, several universities publicized their stats as tobacco-free, smoke-free, or alcohol-free. There is a clear lack of materials and programs promoting awareness of prescription stimulant use and the potential risks that go along. Educational resources seem to focus on individual, self-identifying students, rather than campus-wide efforts.

## **Summary**

It is difficult to determine whether the resources available to Oregon students are effective in educating them about prescription stimulant use. Little data exists to compare Oregon university student's usage rates with national rates. A survey of three of twelve universities in Oregon reported 8% of students admitting to using prescription stimulants without a prescription (House, 2011). However, students and campus health care providers alike called this number into question for underestimating actual usage rates. Students who are struggling with prescription stimulant use have access to counseling resources at nearly all Oregon universities. These services vary in their length and depth depending on the university, but all are valuable resources for students. One major limitation of these counseling services is that in most cases, students must self-identify and take the initiative to pursue them. Furthermore, Oregon universities lack the same large-scale programming for prescription drug abuse that currently exist for alcohol, marijuana, and tobacco.

## SUMMARY OF RESEARCH QUESTIONS

Research has shown that availability of prescription stimulants like Adderall and Ritalin is on the rise, and university students are taking advantage for their own academic benefit (IMS Health, 2012, DeSantis, 2008). Though usage rates vary, many studies agree that nonmedical use of prescription stimulants by university students is on the rise (DeSantis, 2008, Aikins, 2011, Arria, 2008, Arria, 2012). In order to better understand the factors behind these increasing trends, it is critical to understand what factors are influencing students' decision to use. These factors include student perceptions of stimulant drugs and their outcomes, perceptions of their peers' use, and how university and legal regulations influence the decision to use. Students are using prescription stimulants like Adderall™ and Ritalin™ to take advantage of their associated effects, including increased focus, concentration, and overall mental stamina (Aikins, 2011). Students often receive their drugs from another student who is diverting their own medication (Aikins, 2011, Arria, 2008). Most students are doing so without fear of consequence, in the form of physical or societal side effects (DeSantis, 2008, Aikins, 2011).

Universities tend to follow guidelines set out by the DFSCA, and have established focus areas in reducing binge drinking and other risky behavior surrounding alcohol use, and reducing marijuana and tobacco use by students. Twelve Oregon university student health programs were assessed, and seemed to follow the national precedent. However, an estimated 8% of students are using prescription stimulants nonmedically in Oregon (House, 2011). Other than individual counseling services, Oregon universities lacked services and outreach programs aimed at educating students about prescription stimulant use. Though these resources are currently lacking, there is significant potential for university administrators and health care providers to

utilize research on student perceptions and use of prescription stimulants to develop educational and preventative programs.

### **Student perceptions of prescription stimulants**

- Low risk, high reward mentality
- Pressure to perform and perceived competitive edge gained
- Social stigmas surrounding diversion
- High availability of prescription stimulants on university campuses

### **Available resources & University Response**

- Counseling resources at Oregon universities
- Room for growth in student health education, prevention, outreach programs in Oregon
- Lack of clarity in academic/conduct codes

## CONCLUSIONS

College is a time of significant growth and transition for young adults who are finding new independence. These college years, however, are often highly demanding in a multitude of ways. Today's college students are finding themselves under ever increasing academic and social demands that they struggle to balance. A common coping mechanism that has been steadily gaining popularity on campuses is the use of prescription stimulants like Adderall and Ritalin. Despite their growing availability and popularity as treatments for ADHD, these prescription stimulants are classified as Schedule II controlled substances by the U.S. Drug Enforcement Agency due to high risk for addictive outcomes. Other research suggests that prescription stimulant use is associated with lower overall GPAs and can co-occur with other drug use and risky behaviors. It is critical that university administrators and health care providers understand the trends and perceptions surrounding nonmedical prescription stimulant use in order to provide effective resources and support to students.

A review of the literature cited research from many experts on prescription drug abuse and use on university campuses. The two most commonly abused medications were Adderall and Ritalin (Arria, 2008). The rates of nonmedical use among students is a controversial topic, and is variable based on student demographics, geographic location, university admission standards, and presence of Greek organizations among other factors (Arria, 2012, McCabe 2005). Students acquired their drugs by faking symptoms to get a prescription, or through friends and peers who diverted their own medications to others (Aikins, 2011, Garnier-Dykstra, 2012, DeSantis, 2009). Upperclassmen were more likely to abuse stimulants, especially male, white students who were members of fraternities (Arria, 2012). The most common reasons for misuse of prescription stimulants stemmed from academic demands on students, as shown by

increased rates of use around midterm and final exams (Greely, 2008, Hildt, 2014, Burgard, 2013). Students cited lack of social stigma, easy availability, low perceived side effects, and high perceived academic benefits as their main reasons for use (DeSantis 2008, Huet, 2010, Aikins, 2011). Nationally, few universities address illicit prescription stimulant use as cheating in academic code and many fail to provide specific resources aimed at education and prevention among students.

All twelve of Oregon's universities have made efforts in drug education and prevention in accordance with the Drug Free Schools and Communities Act. These universities varied in size, location, academic offerings, and included both private and public schools. Despite these differences, all twelve universities address and condemn illicit drug and alcohol use in their student conduct codes. Several universities went further, banning tobacco products, alcohol, and or other drugs from their campuses altogether. Eleven of the twelve universities presented information and resources to students about commonly abused drugs and their associated risk factors. These same eleven universities provided counseling resources for students who had concerns about prescription drug use. The larger public universities offered more counseling services on a long-term basis within student health services, while smaller universities could only provide shorter-term counseling on a case-by-case basis. Both large, public universities, University of Oregon and Oregon State University, also provided programming including workshops and presentations to address various risky behaviors and drug use topics for student organizations. Their university pharmacies and health care providers also reported efforts to reduce Ritalin and Adderall™ availability on campus by introducing tighter restrictions on prescriptions. Overall, individual counseling for students on an individual, self-reporting basis is the primary resource being offered to Oregon university students.

Prescription stimulant use by students on college campuses is not a new trend, dating back to the 1940s (University of Maryland, 2013). However, university health services and authorities tend to place their emphasis on responsible alcohol use, and marijuana and tobacco prevention. Recent surveys report that 8% of Oregon university students are using prescription stimulants nonmedically, though other estimations are higher (House, 2011). Student health physicians are often faced with students “faking” ADHD symptoms or attempting to get prescriptions increased and filled early (House, 2011). It is apparent that Oregon universities may be part of the steadily increasing trend of prescription stimulant abuse around the country. The review of literature evaluated resources at each university for students struggling with drug use, and found that counseling was the most commonly available. Most universities lacked specific resources to educate students on prescription stimulant use, and the risks associated. The lack of available resources tailored to educate students and reduce nonmedical use of these drugs is a common characteristic of all Oregon universities. Furthermore, none of the Oregon universities evaluated had established policies prohibiting prescription stimulant use in their academic codes. Overall, Oregon universities have yet to establish wide-scale resources or policies addressing prescription stimulant use among students.

College students are a unique portion of the population that is at significant risk of abusing illicit and prescription drugs. Brain development processes are still incomplete in the majority of traditional college students. Peer pressure is a significant factor to consider within this population, as students struggle to manage academic and social demands under high levels of stress. Prescription stimulants are often highly touted by students for their beneficial effects on focus, memorization, and studying efficiency (Aikins, 2011, Arria, 2008, DeSantis, 2008). Evaluations of student perceptions surround prescription stimulant use show that many are

minimizing or simply overlooking potential negative outcomes associated with the drugs (DeSantis, 2008). Despite this general attitude, it is important to address both known and unknown side effects of prescription stimulant use. Studies by the FDA and U.S. DEA have shown addictive tendencies among Adderall™ and Ritalin™ users that have led to its classification as a Schedule II controlled substance (U.S. DEA, 2016). Though some immediate side effects are well-studied and understood, there is a critical lack of research into long term effects of Adderall and Ritalin on students who are self-dosing and using nonmedically. Prescription stimulants ultimately exert the majority of their effects on the heart and brain, two of the body's most essential organs (Lakhan, 2012). These are important considerations to address for students who use or intend to use prescription stimulants nonmedically.

Prescription stimulants are being prescribed and produced at higher than ever rates, with minimal signs of slowing down (IMS Health, 2012, U.S. DEA, 2016). These drugs are widely available to students on college campuses across the country, and Oregon is no exception. Students are willing and able to divert their medications to others who wish to use the drugs nonmedically for academic benefit (Aikins, 2011, DeSantis, 2008). Over the years, Adderall™ and Ritalin™ have established a reputation as “study drugs” that have benefits far out-weighing any possible negative side effects (Aikins, 2011, Huet, 2010). With upwards of 34% of students using prescription stimulants nonmedically, it is no longer a question of whether students will be faced with the decision of whether or not to use these drugs. Studies of student motivations, perceptions, and practices in prescription stimulant use are critical to develop educational resources that universities can provide to students, as well as physicians, counselors, advisors, and other campus staff.

## PERSONAL STATEMENT

This thesis was made both more interesting and more difficult to write due to my own personal experiences and preexisting opinions on the topic. When I selected a topic to pursue at the very beginning of this process, I knew that it had to provide new insights for the academic community, but also had to provide insights into questions that were burning inside me. My transition from high school to Oregon State University was not always easy, and pushed me to work harder than I ever had before in the classroom. In many ways, I felt unprepared for the amount of stress I would be under. I lacked time management and study skills that were essential to success in college. After expressing my struggles to many of my friends and classmates, Adderall™ and Ritalin™ kept coming back as the answer. Hearing that these drugs were the key to success for people that I looked up to and admired left me with even more questions. This thesis, in some way, was my own personal answer to a lot of questions surrounding these drugs and those who use them.

As a university student, I am a part of the group this thesis addresses. Furthermore, as a white, sorority member with a highly demanding field of study, I fit several of the common risk factors for use of prescription stimulants. After conducting an extensive review of the literature, I also found that many of my perceptions about these drugs were consistent with generalized student perceptions. Like many other students across the country, I too associated Adderall and Ritalin use with higher GPAs and improved overall academic performance. I also feel as though I overestimate my peers' use of prescription stimulants, as it often feels like "everyone else is doing it." I differed from generalized student perceptions in my thoughts surrounding risks and social stigmas. Being raised in a strict, Catholic education system I immediately assumed these

drugs would do me harm, and others would view me negatively if I used them. My overall perception of illicit prescription stimulant use was negative.

Over the course of this project, I was surprised by the lack of research and university response surrounding the topic. Misuse of amphetamine and prescription stimulants has been noted since the late 1930s in the United States. These drugs were used extensively for their effects on focus and increased mental alertness throughout World War II by the United States military and other countries. Their abuse for benefit in the sports arena, primarily Major League Baseball, was also rampant throughout the 1980s and 1990s. Knowing this extensive history led me to surprise and confusion over the lack of research on these drugs' long-term effects. It also left me wondering why universities as a whole have not formed a more united response to address illicit use, educate students, and provide support to those who need it. These drugs are not new to the market, and their illicit use is not new either. More extensive research is absolutely necessary to determine potential long-term health effects in order for students to make an informed decision considering the full list of potential outcomes.

On the same account, universities need to provide more resources to students in order to answer questions about prescription stimulants. In my own experience, I had experienced peer pressure and exposure to alcohol, marijuana, and tobacco before coming to college. However, when it came to Adderall™ and Ritalin™, I had no prior experiences or knowledge to make an informed decision off of. Educational resources for new students presented during orientation could be invaluable in preventing prescription stimulant diversion and use on campus. At the very least, education on potential risks associated with these drugs could help students make an informed decision that takes into account their own personal health, whatever the ultimate outcome. Despite these areas for development and improvement, I was very impressed with the

counseling resources offered by Oregon universities. These resources were on an individual basis and I believe they are highly underutilized by students. The majority of student health organizations I contacted seemed to have a special interest in making sure their students receive the help that they need to have a positive college experience. The counseling services available could go a long way to help students manage stress, improve study skills, and address any issues surrounding prescription stimulant use or addiction.

The process of reviewing literature and answering research questions about this topic has opened my eyes to many differing opinions and perceptions surrounding nonmedical prescription stimulant use. Ultimately, I have come to the conclusion that one must make their own decision by formulating their own answers to many questions regarding use. The first question addresses academic fairness of nonmedical prescription stimulant use. The second question addresses the ethics of nonmedical use. Ultimately, the third question forces individuals to extensively weigh and evaluate the benefits and risks associated with use. I personally believe that using prescription stimulants without a medically proven need and without a prescription is unfair to other students and ultimately should be classified as cheating in academic code. The risks and potentially harmful outcomes of using these drugs nonmedically far outweigh the benefits in my opinion. I worry about increasing rates of use, and future generations of students for whom there will be little choice. I believe that education about prescription stimulants is key to ensuring a level playing field for all students on all campuses across the country.

I have learned so much over the course of completing this thesis. There is so much yet to be done and so many questions left to answer within this field. However, I feel that I have gained an invaluable insight into the decision-making that goes into nonmedical prescription stimulant use among the best and brightest resources in our country, college students. I am confident that

with increased time and energy put into development of educational resources for students, rates of nonmedical use will decrease. I am grateful to my mentor, Dr. Ray Tricker, for his guidance in exploring these difficult questions. I am grateful to my family and friends who were so incredibly supportive over the past year. I am thankful for all of your advice and kind wishes, even to those of you who jokingly encouraged me to use Adderall™ and Ritalin™ to help complete my thesis. This thesis is one of my greatest accomplishments to date, and I sincerely hope that it may benefit others seeking to answer questions within this field.

## REFERENCES

- Aikins, R.D. (2011). Academic Performance Enhancement: A Qualitative Study of the Perceptions and Habits of Prescription Stimulant-Using College Students, *J. College Student Development*, 52(5): 560-576.
- Arria AM, Caldeira KM, Vincent KB, O'Grady KE, Wish ED. Perceived harmfulness predicts nonmedical use of prescription drugs among college students: Interactions with sensation-seeking. *Prev Sci*. 2008;9(3):191-201.18.
- Arria AM, Garnier-Dykstra LM, Caldeira KM, Vincent KB, O'Grady KE, Wish ED. Persistent nonmedical use of prescription stimulants among college students: Possible association with Attention Deficit Hyperactivity Disorder symptoms. *J Atten Disord*. 2011;15(5):347-356.
- Arria, A. M., Caldeira, K. M., O'Grady, K. E., Vincent, K. B., Johnson, E. P., & Wish, E. D. (2008). Nonmedical use of prescription stimulants among college students: associations with attention-deficit-hyperactivity disorder and polydrug use. *Pharmacotherapy*, 28,156-169.
- Arria, A. M., & DuPont, R. L. (2010). Nonmedical prescription stimulant use among college students: why we need to do something and what we need to do. *Journal of Addictive Diseases*, 29, 417-426.
- Bonne, Jon. (2003, January 9). "Go pills": A war on drugs? Air Force use of amphetamines raises questions. Retrieved from [http://www.nbcnews.com/id/3071789/ns/us\\_news-only/t/go-pills-war-drugs/](http://www.nbcnews.com/id/3071789/ns/us_news-only/t/go-pills-war-drugs/).
- Bostrom, N., Sandberg, A. (2009). Cognitive Enhancement: Methods, Ethics, Regulatory Challenges, *Journal of Sci Eng Ethics*, 15: 311-341. DOI 10.1007/s11948-009-9142-5
- Bradley, Bill (2013). Report: Adderall remains drug of choice for many NFL players. National Football League. <http://www.nfl.com/news/story/0ap1000000242017/printable/report-adderall-remains-drug-of-choice-for-many-nfl-players>
- Clegg-Kraynok MM, McBean AL, Montgomery-Downs HE. Sleep quality and characteristics of college students who use prescription psychostimulants nonmedically. *Sleep Med*. 2011;12(6):598-602.
- DeSantis A, Noar SM, Webb E. Nonmedical ADHD stimulant use in fraternities. *J Stud Alcohol Drugs*. 2009;70(6):952-954.12.
- DeSantis A, Noar SM, Webb EM. Speeding through the frat house: A qualitative exploration of nonmedical ADHD stimulant use in fraternities. *J Drug Educ*. 06 2010;40(2):157-171.
- Docherty, J.R., (2008). Pharmacology of stimulants prohibited by the World Anti-Doping Agency (WADA). *Journal of Pharmacology*, 2008154529-541.541.

Drazdowski, T.K., Kliewer, W. (2015). Predictors of problematic non-medical prescription pain and stimulant use. Virginia Commonwealth University.

Drug Enforcement Administration, Methamphetamines and Amphetamines.  
[http://www.dea.gov/concern/meth\\_factsheet.html](http://www.dea.gov/concern/meth_factsheet.html).

Garnier-Dykstra, LM, Caldeira, KM, Vincent, KB, O'Grady, KE, Arria, AM. (2012). Nonmedical Use of Prescription Stimulants During College: Four-Year Trends in Exposure Opportunity, Use, Motives, and Sources, *Journal of American College Health*, 60:3, 226-234, DOI:10.1080/07448481.2011.589876

Garnier LM, Arria AM, Caldeira KM, Vincent KB, O'Grady KE, Wish ED. Sharing and selling of prescription medications in a college student sample. *J Clin Psychiatry*. 2010;71(3):262-269.

Herman-Stahl, M. A., Krebs, C. P., Kroutil, L. A., & Heller, D. C. (2006). Risk and Protective Factors for Nonmedical Use of Prescription Stimulants and Methamphetamine among Adolescents. *Journal of Adolescent Health*, 39 (3), 374–380.  
<http://doi.org/10.1016/j.jadohealth.2006.01.006>

Hildt E, Lieb K, Bagusat C, Franke A.G. (2014). Reflections on Addiction in Students Using Stimulants for Neuroenhancement: A Preliminary Interview Study. *Biomed Research International*, <http://dx.doi.org/10.1155/2015/621075>

House, Kelly. (2011). ADHD-drug abuse popular on Oregon campuses: university health officials fight back.  
[http://www.oregonlive.com/health/index.ssf/2011/12/as\\_prescription\\_stimulant\\_abus.html](http://www.oregonlive.com/health/index.ssf/2011/12/as_prescription_stimulant_abus.html)

Kent, James (2013). Adderall: America's Favorite Amphetamine.  
<http://www.hightimes.com/read/adderall-americas-favorite-amphetamine>

Low KG, Gendaszek AE. Illicit use of psychostimulants among college students: A preliminary study. *Psychology, Health and Medicine*. 2002;7(3):283–287.

McCabe, S.E., Teter, C.J. (2007). Drug use related problems among nonmedical users of prescription stimulants: A web-based survey of college students, *Drug and Alcohol Dependence*, 91: 69-76.

McCabe, SE. (2007). Misperceptions of non-medical prescription drug use: A web survey of college students, *Journal of Addictive Behaviors*, 33(5), 713-724.  
doi:10.1016/j.addbeh.2007.12.008

McCabe, S.E., Teter C.J., Boyd, C.J. (2006). Medical use, illicit use and diversion of prescription stimulant medication, *Journal of Psychoactive Drugs*, 38: 43-56.

McCabe, S.E., Teter, C.J., Boyd C.J., Knight, J.R., Wechsler, H. (2005). Non-medical use of prescription opioids among US college students: prevalence and correlates from a national survey, *Addictive Behaviors*, 30, 789-805.

McCabe, S.E., West, B.T., Teter, C.J., Boyd, C.J. (2014). Trends in Medical Use, Diversion, and Nonmedical Use of Prescription Medication among College Students from 2003 to 2013: Connecting the Dots, *Addictive Behaviors*. doi: 10.1016/j.addbeh.2014.03.008

Pharmacotherapy: A Pathophysiologic Approach by Joseph T. Dipiro, Robert L. Talbert, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, and L. Michael Posey Chapter 65 Childhood Disorders pp. 1029-1040. Seventh Edition McGraw Hill Medical.

Quinn-Zobeck, Ann. (2016). Addressing Prescription Stimulant Medication Misuse, Abuse, and Diversion with Peer Education, Ohio State University.  
<https://u.osu.edu/genrxvoices/2016/01/06/addressing-prescription-stimulant-medication-misuse-abuse-and-diversion-with-peer-education/>

Rabiner, D.L., Anastopoulous, A.D., Costello, J, Hoyle, R.H., McCabe, S.E., Swartzwelder, H.S. (2009). Motives and perceived consequences of nonmedical ADHD medication use by college students: are students treating themselves for attention problems? *Journal of Attention Disorders*, 13, 259-270.

Substance Abuse and Mental Health Services Administration (2005). The NSDUH Report: College Enrollment Status and Past Year Illicit Drug Use among Young Adults: 2002, 2003, and 2004. Office of Applied Studies. <http://oas.samhsa.gov/2k5/College/college.pdf>

Substance Abuse and Mental Health Services Administration (2007). Results from the 2006 National Survey on Drug Use and Health: Detailed Tables. Office of Applied Studies. <http://www.oas.samhsa.gov/NSDUH>

Teter C.J., McCabe S.E., Boyd, C.J., Guthrie, S.K. (2003). Illicit methylphenidate use in an undergraduate student sample: prevalence and risk factors, *Pharmacotherapy*, 23, 609-617.  
Teter, C.J., McCabe, S.E., LaGrange, K, Cranford, J.A., Boyd, C.J., (2006). Illicit use of specific prescription stimulants among college students: prevalence, motives, and routes of administration. *Pharmacotherapy*, 26, 1501-1510.

Teter, C.J., Falone, A.E., Cranford, J.A., Boyd, C.J., McCabe, S.E. (2010). Nonmedical use of prescription stimulants and depressed mood among college students: frequency and route of administration. *Journal of Substance Abuse Treatment*, 38, 292-298.

Visser, S.N., Bitsko, R.H., Danielson M.L., Ghandour, R.M., Blumberg, S.J., Schieve, L.A., Holbrook, J.R., Wolraich, M.L., Cuffe, S.P. (2015). Treatment of Attention Deficit/Hyperactivity Disorder among Children with Special Health Care Needs. *Journal of Pediatrics*, 166(6):1423-40. Doi:10/1016/j.jpeds.2015.02.018.

Wish, E.D., Falls, B, Nakamura E. (2005). College students' perceptions of non-medical use of prescription stimulants by their peers. Center for Substance Abuse Research, University of Maryland.

Young, A. M., Glover, N., & Havens, J. R. (2012). Nonmedical use of prescription medications among adolescents in the United States: a systematic review. *Journal of Adolescent Health, 51*, 6-17.

Zuvekas, S. H., & Vitiello, B. (2012). Stimulant medication use in children: a 12-year perspective. *American Journal of Psychiatry, 169*, 160-166.