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# Academic Procrastination And Stimulating Substance Use Among College Undergraduates

Katlyn Moes

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ACADEMIC PROCRASTINATION AND STIMULATING SUBSTANCE USE  
AMONG COLLEGE UNDERGRADUATES

by

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Bachelor of Arts, University of North Dakota, 2014

A Thesis

Submitted to the Graduate Faculty

of the

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for the degree of

Master of Arts

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2016

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This thesis, submitted by Katlyn Moes in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.



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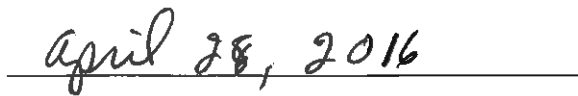


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This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.



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To my mom Teresa and my dad Paul  
For letting your superstar shine

## ABSTRACT

Today's college students have a larger workload than past generations and are expected to work at a faster pace, all while adjusting to a new environment. Some students are able to successfully navigate these demands, while others become overwhelmed and engage in behaviors that allow them a diversion from academics and school life, such as avoidance and procrastination. When students procrastinate, they may find themselves with a lot to do in a short period of time. Past work indicates that stimulating substance use is on the rise among college students, particularly when they need to have focused periods of concentration. This study examined the association between academic procrastination and use of stimulating substances (caffeine, energy drinks, energy products, and prescription stimulants) through quantitative measures. Data were taken from a sample of UND undergraduates. Results showed that who reported higher levels of academic procrastination were more likely to use any stimulating substance to stay awake, alert, or energetic. It was also seen that male students were more likely to use energy products, and energy drinks.

## CHAPTER I

### INTRODUCTION

College marks a period of expanding social networks, experiences, and a change in lifestyle for many students, all of which can be stressful at times. It is difficult for some students to balance the new social and educational demands they face (Armstrong & Hamilton, 2013; Zimmerman, Greenberg, & Weinstein, 1994). One common response to stress is procrastination and avoidance (Milgram, Dangour, & Raviv, 1991; Rothblum, Solomon, & Murakami, 1986). When students feel academic stress, they may respond by engaging in activities that offer instant satisfaction rather than focus on the task at hand (Misra & McKean, 2000; Panek, 2014). For instance, Milgram and colleagues (1991) found that students who associate anxiety and pressure to succeed academically with assignments are more likely to postpone completing them.

When students engage in procrastination and avoidance, the work does not go away. Instead, they are just left with a smaller window of time during which to complete it. What then? There is a common belief among students that stimulating substances have a positive influence on academic performance (Moore, Burgard, Larson, & Ferm, 2014; UWIRE: College Press Releases & Wire Services, 2014). Stimulating substances include things such as caffeinated beverages (e.g., Diet Coke, coffee), energy products (e.g., 5 Hour Energy), energy drinks (e.g., Monster), and prescription stimulant medication (e.g., Adderall, Ritalin), also called “smart drugs.” Past research indicates that students who believe that stimulating substances will help them succeed

academically are more likely to actually use them (Jardin, Looby, & Earlywine, 2011). For some students, academic procrastination may be “solved” by using stimulating substances in order to enhance alertness and improve concentration (Teter, McCabe, Cranford, Boyd, & Guthrie, 2005).

### Research Question and Significance

For this thesis, the social cognitive theory of self-regulation (SRT) will be used to explain the relationship between academic procrastination and stimulating substance use. SRT proposes a three-stage process of guiding one’s thoughts, behaviors, and feelings to reach personal and institutional goals (Bandura, 1991; Steel, 2007). The three principle stages of SRT are (1) self-monitoring one’s behavior, (2) judgment of behavior in relation to personal standards and environmental circumstances, and (3) self-reaction. Students who exhibit poor self-regulation and then judge themselves as lacking, may favor external solutions like using stimulating substances as a self-reaction to resolve poor behaviors such as procrastination, avoiding schoolwork, and lack of motivation.

In this thesis, I examine whether academic procrastination is related to the use of four types of stimulating substances, including caffeinated beverages, energy products, energy drinks, and smart drugs. Each of these substances holds the promise of increased energy, concentration, and focus. Previous research has indicated that procrastination is a key predictor for smart drug use, especially among students who suffer academically (McCabe, Knight, Teter, & Wechsler, 2005; Moore et al., 2014). The first generation to be prescribed stimulant medications for behavior disorders is now attending college (Frankenberger, Lozar, & Dallas 1990), and students report that it is fairly easy to find smart drugs should they want to take them (Garfield et al., 2012). It should come as no

surprise then that college students are the most likely to report illicitly using these prescription medications (Babcock & Byrne, 2000). During the academic year the use of smart drugs increases among those who have a prescription for them, and those who do not (Baumeister, Vohs, DeWall, & Zhang, 2007; Jardin et al., 2011).

In addition to smart drugs, there are reasons to believe that college students may also turn to other types of stimulating substances when they have engaged in academic procrastination. Young adults are the target population for many stimulating products like energy drinks and energy products (Lal, 2007; Mintel Global New Products Database, 2009; O'Brien, McCoy, Rhodes, Waginer, & Wolfson, 2008). Companies including Monster and Red Bull target young adults by sponsoring sporting events and concerts where they are the primary customers (Agriculture and Agri-Foods Canada, 2008; Bailey, 2015). Furthermore, abusing one substance has been linked to the use of other substances (Miller & Quigley, 2011).

Understanding why students use stimulating substances is important because of the serious consequences they can have. Many stimulating substances contain caffeine. When taking large doses of caffeine, an individual can develop an addiction and cardiovascular complications (White, Becker-Blease, & Grace-Bishop, 2006). Other side effects from misusing stimulating substances are increased blood pressure, headaches, panic episodes, aggressive behaviors, and in the worst cases suicidal or homicidal tendencies (Adams & Kopstein, 2003). High doses of stimulating substances are unsafe and can become addicting (Attwood, 2012).

## Organization of Thesis

The remainder of this thesis is organized as follows. Chapter Two will discuss previous literature on academic procrastination and the four stimulating substances in this study (caffeine, energy products, energy drinks, and prescription stimulant medication, “smart drugs”). The methods used to examine this relationship will be laid out in Chapter Three. Analysis of the results will be included in Chapter Four and the final discussion will be presented in Chapter Five.

## CHAPTER II

### LITERATURE REVIEW

This thesis examines the relationship between academic procrastination and stimulating substance use. Uses for stimulants vary from getting high, studying, and losing weight. King, Jennings, and Fletcher (2014) discovered use of stimulant medication increases during the academic year by those who are prescribed stimulant medication, and Moore and colleagues' (2014) research indicated procrastination and poor time management are key predictors of whether a student uses prescription stimulants. This suggests there is an association between the emotions and situations created during the academic year and stimulant use. When students come to college they leave the regulated environment set by the K-12 educational system and their parents. They experience new freedoms, such as being able to do whatever they want, whenever they want. With that, short-term satisfactions like hanging out with friends may take precedent over long-term satisfactions like career building (Panek, 2014). These distractions can lead a student to procrastinate or avoid doing schoolwork. To compensate, students may turn to stimulating substances to have the energy and motivation to complete any schoolwork they have set aside to do at the last minute. Misra and McKean (2000) found that students misuse stimulating substances during "rough" periods of the school year.



## Overview of Chapter

There are many ways to improve energy levels throughout the day, some as simple as getting enough sleep. For a “quick fix,” supplements can also be used to increase alertness throughout the day. For the purpose of this study, the stimulating substances examined are caffeine, energy products, energy drinks, and smart drugs. In this chapter each of these stimulating substances is reviewed, followed by a review of previous literature on academic procrastination. Lastly, in this chapter the social cognitive theory of self-regulation will be examined to understand the association between academic procrastination and use of stimulating substances.

### Stimulating Substances

#### *Caffeine*

A popular way people wake themselves up and gain energy is by utilizing caffeine (e.g., drinking coffee or Diet Coke). Caffeine is known to “rev up” one’s metabolism. People drink caffeinated beverages such as coffee for a “pick me up.” Beverages like coffee can give the feeling of having more physical and mental energy than before consumption (Booth & Kiefer, 2015). Health professionals recommend taking caffeine from natural sources, such as tea or coffee, rather than supplements. National Coffee Drinking Trends (Brown, 2015) reported 59% of Americans drink coffee daily. Forty-two percent of those between the ages 25 and 29 consume coffee daily, with those ages 18 to 24 reporting similar levels of consumption (Brown, 2014). With these rates, it can be said coffee is the top choice behind water for most Americans (Brown, 2015). Caffeine is also found in soft drinks (e.g., Diet Coke). Soft drinks are consumed daily by 41% of adults in the United States (Brown, 2014). However, Esterl (2015)

reported soft drink consumption is at a recorded low, which may be due to the increased popularity of “calorie counting” among individuals who are stepping away from sugary drinks. To keep their sales going, soda companies have created “zero calorie” drinks and 7.5 ounce cans to attract more consumers (Esterl, 2015).

The Natural Medicines Comprehensive Database (2014) suggests up to 400 milligrams (mg) of caffeine daily, with moderate levels around 250 mg for young adults (Rosenbloom, 2014; Swenson, 2013). This is equivalent to four cups of coffee, ten cans of soda, or two “energy shot” drinks. Although many adults use caffeine safely, large doses are not safe for children and some adolescents. It is easy to overload on caffeine if unaware of how much is in products. For instance, a Grande brewed coffee at Starbucks contains 320 mg of caffeine (CSPI, 2014). Caffeine abuse is an emerging problem with increasing amounts of caffeine appearing in more products. Over a three-year span at the Illinois Poison Center in Chicago, there were 250 cases regarding medical complications due to consumption of caffeine supplements. Of these, 12% were hospitalized and the average age of callers was 21 years (Charis, 2011).

### *Energy Products*

Besides caffeine, there are other supplements people use to increase their energy throughout the day. Vitamins and herbs can be used to improve mood, concentration, and energy. For instance, Booth and Kiefer (2015) points out that use of the herb Guarana can help young adults deal with mental strain. Other energy products used by individuals include concentrated caffeinated drinks with other additives (like vitamins), such as 5 Hour Energy. Energy shots like 5 Hour Energy usually contain caffeine, B vitamins, Guarana, and taurine – an amino acid found in most foods (Lee & Zelman, 2009).

Though smaller in size and fewer calories than most caffeinated beverages, most energy shots contain the same amount of caffeine or more than an eight-ounce cup of coffee (180 mg), or a 12-ounce can of Coke (35 mg). Because there is little research on how these ingredients in energy shots react with the body, Lee and Zelman (2009) warn to moderate daily consumption. A dangerous aspect about energy shots is that they do not need FDA approval to be on the market because they are considered dietary supplements (Lee & Zelman, 2009). Alone, high doses of B vitamins can be toxic, causing nerve damage, tingling, flushed skin tone, and numbness in limbs.

Since 2004, when Living Essentials pioneered 5 Hour Energy, sales of two to three ounce energy shots have drastically increased. Other companies like Coca-Cola and Rockstar have made their own version of an energy shot and in 2008 sales doubled from 2007 to over \$500 million (Lee & Zelman, 2009). As 5 Hour Energy (Living Essentials, 2015) advertises, it is “made for hard working people” and is “quick, simple, and efficient.” Most energy shot companies target the working adult who experiences fatigue during the middle of the workday. Young men are the most likely to consume energy shots, but overall consumption of energy shots is growing for those ages 25 to 45 years (Lee & Zelman, 2009). Despite the perception among participants that energy products improved concentration and alertness, Buckenmeyer and colleagues (2015) found there was no significant short-term or long-term improvement in college-aged participants’ cognitive function for selected computer-based tasks. Outside of fatigue, a popular reason for young adults to consume energy shots is to be more alert while drinking alcohol (Zeratsky, 2015).

## *Energy Drinks*

Energy drinks can be classified as beverages that contain a combination of caffeine, and energy-enhancers such as taurine, herbal extracts, and B vitamins, and are advertised to increase energy, improve mood, enhance physical endurance, reduce mental fatigue, and improve reaction time (Heckman, Sherry, & de Mejia, 2010). Energy shots have been classified as energy drinks due to similar ingredients, but data shows energy drinks such as Monster and Red Bull have larger production quantities and do not contain the common additive of Guarana found in energy shots (Bailey, 2015; Heckman et al., 2010). Thus, for this thesis, they are considered separately from energy products. The global research firm Mintel predicts the US energy drink market will grow 52% from 2014 to 2019 (Bailey, 2015).

Since the late 1990s, when energy drinks were introduced, their popularity among young adults (18-29 years old) has increased exponentially (Lal, 2007; Reissig, Strain, & Griffiths, 2009). For example, Branum and colleagues (2014) found the rate of energy drink consumption by college students (ages 19 to 22 years) increased from virtually nothing in 1999 (0%) to 10% in ten years. Even though some studies focus only on college students in terms of energy drink consumption, Wells and colleagues (2013) found young adults consumed energy drinks at the same rate as peer college students. The range of how much a college student consumes energy drinks varies across studies. Malinauskas and colleagues (2007) indicated that nearly half of their sample consumed an energy drink in the last month, whereas Miller (2008) found roughly a third of college students consumed at least one energy drink within the last month.

Energy drinks with a high concentration of caffeine offer increased energy, stamina, and alertness, which attract young adults and college students (Hidiroglu, Tanriover, Unaldi, Sulun, & Karavus, 2013; Smit & Rogers, 2002). Nordt and colleagues (2012) found over 50% of their sample used energy drinks to increase energy. Other reasons were for studying or work projects, for long distance drives, to enhance performance, and while drinking alcohol. Smit and Rogers (2002) found after drinking either a 150-milliliter (ml) energy drink or a 250 ml energy drink, participants showed energizing, alerting, and revitalizing effects that lasted up to an hour. This supports why students may consume energy drinks for a quick burst of energy and to enhance alertness. Miller (2008) states that energy drinks are ever-present and college campuses are a recreational hot spot for them because students are compensating for insufficient sleep, lack of energy, and to remain alert while partying.

### *Smart Drugs*

Smart drugs are any drug, supplement, or functional food that improves aspects of mental functioning, such as memory, cognitive ability and intelligence. This thesis focuses on prescription stimulants such as Adderall and Ritalin. There has been an increase in the diagnosis of Attention Deficit and Hyperactive Disorder (ADHD) in the past few years, leading to wider availability of prescription stimulants such as Adderall and Ritalin (Garfield et al., 2012; Hall, Irwin, Bowman, Frankenberger, & Tewett, 2005; Jardin et al., 2011). Prescription stimulant medications are commonly made from methylphenidate, which is listed as a schedule II drug by the DEA (White et al., 2006). Since the 1990s, amphetamine (used in Adderall) and methylphenidate (used in Ritalin) production has increased as much as 40% (Drug Enforcement Administration (DEA),

2002; Hall et al., 2005; White et al., 2006). The first cohorts to use stimulant medications for behavior disorders are now attending college (Frankenberger et al., 1990). College students are among those most likely to report illicit use of prescription medications (Babcock & Byrne, 2000). When taking large doses or frequently using stimulant medications, an individual can develop an addiction and cardiovascular complications (White et al., 2006). Other side effects from misusing stimulant medications are increased blood pressure, headaches, panic episodes, aggressive behaviors, and in the worst cases suicidal or homicidal tendencies (Adams & Kopstein, 2003).

Previous research has examined when students are most likely to use prescription stimulants. McCabe and colleagues (2005), as well as Trudeau (2009) found students are more likely to misuse stimulant medications during stressful periods of the academic year (e.g., mid-terms). Ford and Schroeder (2008) also discovered high levels of depression are linked to illicit prescription stimulant use. When students are asked why they misuse stimulant medication, several motives are mentioned. The most common motives found by researchers are related to academic performance rather than recreational use (Adams & Kopstein, 2003; Gallucci, Usdan, Martin, & Bolland, 2014; Graff Low & Gendaszek, 2002; Hall et al., 2005; Judson & Langdon, 2009; Teter C. J., McCabe, Boyd, & Guthrie, 2003; White et al., 2006). Recently, Judson and Langdon (2009), Moore and colleagues (2014), and a report from UWIRE (2014) uncovered that there is a common belief that stimulant medications will have a positive effect on academic performance in the long run. However, Hall and colleagues (2005) found only 14% of undergraduate misusers agreed that prescription stimulants had a positive effect on their academic performance

and Moore and colleagues (2014) found that the use of smart drugs is associated with low grade point averages.

In summary, a number of stimulating substances are consumed to increase concentration and improve energy. These include caffeine, energy products, energy drinks, and smart drugs. This thesis examines whether students are more likely to use stimulants when they report high levels of academic procrastination. Students cannot control when finals are or when projects are due, but they do have control over when they complete their schoolwork. Coming to college often means that formal regulations and supervision they may have had in high school are lessened or absent. This sense of freedom may lead some students to choose activities offering smaller short term gain (e.g., online video watching) over those with larger long-term gains like school-related activities (Panek, 2014). When they procrastinate and avoid schoolwork, are they more likely to use stimulating substances to make up for lost time and concentration? In the next section, the literature on academic procrastination is reviewed.

#### Academic Procrastination

People are driven to complete tasks based on internal and external rewards. In general, people are motivated more by internal rewards than external rewards (Ryan & Deci, 2000). Yet, movement through the educational system conditions students to be motivated by extrinsic rewards. Often parents and schools reward students if they are at the top of the class, or if they get good grades. Few teach autonomy and self-monitoring. As such, students may come to value the extrinsic praise or reward instead of feeling satisfaction from the final product. This may be problematic because self-regulation is hindered by the adoption of extrinsic goals (Pintrich, 1999). Learning the value of

education, and developing confidence in one's capabilities develops when one has intrinsic motivation, and self-regulation (Deci, Vailierand, Pelietier, & Ryan, 1991). It becomes difficult to finish school related tasks with poor self-regulatory skills, especially when there is no external reward. Poor self-regulation is related to procrastination. Procrastination as defined by Lay and Schouwenburg (1993) is the unnecessary delay of activities that one ultimately intends to complete, often to the point of emotional discomfort. Procrastinators regard many tasks as impositions to be resisted passively and covertly rather than as tasks that need to be completed (Milgram et al., 1991). For those who procrastinate it is easier to give in to temptations and avoid schoolwork when there is a large amount of time between the present and a due date (Schouwenburg & Groenewoud, 2001).

The university is one context where factors converge to encourage procrastination. For instance, many students experience diminishing motivation under institutions that put importance on high ability and competition for grades (Meece, Anderman, & Anderman, 2006). Other aspects of the college experience may also encourage procrastination. The social change and the pressures experienced in a college setting can cause many students to feel emotional discomfort, including stress and anxiety (Arnett, 2007; Misra & McKean, 2000; Rothblum et al., 1986). When students feel stress, they may react by engaging in avoidance. That is, they may try to ignore the cause of their stress. Wolters (2003) associated work avoidance with procrastination and proposed that those now attending college may not have strong studying skills or be efficient time managers. When students have poor self-regulating abilities, they may engage in protective behavioral strategies, like compensating for lack of motivation by



using stimulating substances. For example, D’Lima and colleagues (2012) discovered that among students with poor self-regulating abilities, low levels of motivation were associated with greater alcohol related consequences. LaBrie and colleagues (2009) theorize students who engage in risky behaviors (such as substance abuse) are coping for the anxiety brought on by the transition to college. The link between procrastination and stimulating substance use can be explained by the social cognitive theory of self-regulation.

### Theoretical Framework

As human beings, we engage in conscious processes of decision-making. We adjust our behavior to improve ourselves and be accepted by others. Aside from managing our impression on others, we develop individual goals and aspirations (Wallace, 1991). The social cognitive theory of self-regulation (SRT) explains a system of conscious personal management that involves the process of guiding one’s thoughts, behaviors, and feelings to reach goals (Steel, 2007). Bandura (1991) proposed that the three principle stages of SRT are (1) self-monitoring one’s behavior, (2) judgment of behavior in relation to personal standards and environmental circumstances, and (3) self-reaction.

The first of these stages, self-monitoring or self-observation, provides information needed for an individual to set realistic goals and to evaluate their progress towards meeting them (Bandura, 1991). For example, Kanfer and colleagues (1996) used SRT to explain how people monitor their health. The goal is to maintain good health. If someone is not in good health, he or she first needs to be reflective and become aware of his or her behavior to then be able to understand why they are not well. Second, when personal

goals and standards are not being met, an individual begins to self-diagnose the problem (Steel, 2007). Self-diagnosis involves judging any recognized behaviors by using standards that are significant not only to the individual, but also to those around them (Wallace & Wolf, 1991). This thinking process affects one's emotional states, level of motivation, and performance (Kanfer et al., 1996).

After a person has engaged in self-monitoring and judgment, they will then have to react to change the poor behavior. This is the final stage proposed by SRT. When there are incentives to achieve an outcome along with internal drive, people are more willing to put the required motivation and effort forth that is needed to produce an outcome (Bandura, 1991). In contrast, those who lack self-regulation will look to external means in order to correct the poor behavior. Instantly correcting the poor behavior through external means, rather than taking the time to correct it internally, will not prevent a person from acting poorly in the future (Bandura, 1991).

This process of self-regulation can be seen in academic performance. Ley and Young (1998) recognized that when there is self-regulation in an educational context, it shapes how students personally activate, alter, and sustain their learning. When a student recognizes they are not reaching personal or institutional academic standards (self-monitoring), they will then take stock of their current strategies and behaviors related to schoolwork (self-diagnosis and judgment). Students with good self-regulatory skills will take responsibility and attempt to acquire new skills and knowledge instead of depending on external sources to correct their behaviors (self-reaction) (Ley & Young, 1998; Zimmerman, 1988). Relying on external sources for correction may not support learning in that they do not provide the motivation and persistence needed to correct the behavior

(Meece, 1994). In theory, SRT suggests that students with self-regulation learn with a deliberate, judgmental, adaptive process whereby they are constantly making adjustments based on feedback from their time-management and learning strategies, and sense of self-efficacy (Butler & Winne, 1995). Those without good self-regulation enter a negative cycle whereby they rely on external corrective means but do not ultimately correct a negative behavior.

The ability to self-monitor behavior is more relevant for college students than students in the K-12 educational system (Ley & Young, 1998). When students come to college they are leaving the regulated environment set by the K-12 educational system and their parents. As a result, they may have difficulty balancing social demands and educational demands of the higher education experience (Armstrong & Hamilton, 2013; Zimmerman et al., 1994). If academics suffer, students must first observe and acknowledge that they are making poor academic progress. Students may then begin to assess their options. One choice is to improve motivation, with the understanding that to not do so may result in poor grades or failure to move forward academically. For those who exhibit poor self-regulation, such as procrastination, avoiding schoolwork, and lack of motivation, students may favor external solutions like using stimulating substances to compensate and provide short-term gains.

### Summary and Hypotheses

For this thesis, on the basis of the previous literature and the theory of self-regulation, I propose five hypotheses related to academic procrastination and substance use:

1. Students who experience high levels of academic procrastination are more likely to use caffeine to stay awake, alert, or energetic throughout the day.
2. Students who experience high levels of academic procrastination are more likely to use energy products to stay awake, alert, or energetic throughout the day.
3. Students who experience high levels of academic procrastination are more likely to use energy drinks to stay awake, alert, or energetic throughout the day.
4. Students who experience high levels of academic procrastination are more likely to use smart drugs to stay awake, alert, or energetic throughout the day.
5. Of the four stimulating substances, academic procrastination will have the strongest relationship with students' use of caffeinated beverages.

Studies have linked academic procrastination and poor academic performance to smart drug use, but not any other stimulating substance. Substances like coffee, Five Hour Energy, and Monster are more readily available for the average college students than those like Adderall and Ritalin. Previous research has also shown procrastination to be a factor predicting substance use (D'Lima et al., 2012). This study will provide insight into whether this prediction is accurate, and an association that needs to be further analyzed. The fifth hypothesis is proposed due to the vast quantity and availability of caffeinated beverages. Caffeinated beverages like Diet Coke and coffee are much more readily available for college students than the other three substances.

The next chapter of this thesis outlines the method used to examine these hypotheses regarding the relationship between stimulating substance use and academic procrastination. It will include information regarding how the data were collected, the variables used in the analyses, and the proposed analytical strategies.

## CHAPTER III

### METHOD

#### Overview of Chapter

This thesis examines the relationship between academic procrastination and stimulating substance use. Four hypotheses were proposed. To test these hypotheses data from the College Students' Health and Stress (CSHS) 2015 study is analyzed. The following chapter will review the data collected, independent and dependent variables, and the chosen analytical strategies.

#### Data

CSHS was collected in the spring of 2015. Undergraduate students at the University of North Dakota were surveyed to understand their academic procrastination and stimulating substance use. Other topics included demographics, physical and mental health, behavioral outcomes, and family relations. A web-based survey was generated using Survey Monkey. From a list of undergraduate courses offered in the spring of 2015, a stratified random sample of courses was selected. Every tenth course was chosen, resulting in a total of 124 courses. An informative email about the study was sent, in which instructors were asked to share the survey with current students enrolled in the sampled course. An email was sent a week later containing a link to the survey. Instructors were asked to share the link with their students via email or Blackboard. The survey was open for a one-month period. After one month a total of 575 students completed and submitted the survey.

### *Participants*

The sample ( $N = 575$ ) for this study is composed of undergraduate students. There were more women (59.4%) participants than men (40.6%) and participants ranged from 18 years to 25 years and older with an average age of 21 years. There was a good representation of each class level; half of the participants were in their sophomore (31.5%) and junior year of college (22.6%) and the rest were nearly evenly split between freshmen and seniors. The majority of the participants identified as white or Caucasian (89%), followed by participants identifying as multiracial (3.3%), and Asian/Pacific Islander (2.6%).

During the academic year of 2014-2015 (Division of University and Public Affairs, 2014), the undergraduate population at the University of North Dakota was 11,537 students, with male students making up 56.5% and female students making up 43.5% of the undergraduate student body. Just less than 10% of the undergraduate population (8.8%) were affiliated with a Greek organization. By class level, the majority of students were classified as seniors (34.5%) and the smallest class was junior level students (18.9%). The average age of an undergraduate during this academic year was 22 years of age and the majority of undergraduates identified as white or Caucasian (78.9%), followed by Hispanic American (2.82%), multiracial (2.71%), and black non-Hispanic American (2.3%).

### *Measures*

This study examines the association between stimulating substance use and academic procrastination. In the multivariate models, control variables include sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis.

### *Dependent Variables*

Four measures asked how often students used stimulating substances: (1) “How often do you use coffee or caffeinated beverages (e.g., Diet Coke, excludes energy drinks) to stay awake, alert, or energetic?” (*caffeine*), (2) “How often do you use “energy products” or over-the-counter supplements (e.g., 5 Hour Energy) to stay awake, alert, or energetic?” (*energy products*), (3) “How often do you use energy drinks (e.g., Monster, Redbull) to stay awake, alert, or energetic?” (*energy drinks*), and (4) “How often do you use Ritalin, Dexadrine, or Adderall to stay awake, alert, or energetic?” (*smart drugs*). Students ranked their responses from never to always, (never = 1, rarely = 2, sometimes = 3, frequently = 4, always = 5). Because there were some response categories for each stimulating substance that very few students selected, all four of these measures were recoded into dichotomous variables where 0 equals never used, and 1 equals ever used.

### *Independent Variable*

To understand students’ motivation to complete schoolwork and accomplish academic tasks, three items were used to create an *academic procrastination scale* ( $\alpha = 0.818$ ). Students were asked to indicate whether each item reflected their feelings and behaviors, or not: “I am a procrastinator when it comes to school work;” “I avoid doing homework/studying;” and “I don’t feel very motivated when it comes to school.” Responses were recorded using a Likert scale ranging from strongly disagree (1) to strongly agree (5). Items were summed and then averaged to conform to the original coding. The higher the score, the more academic procrastination the student reported. Identifying poor behaviors is part of the first stage proposed by SRT. A high score

indicates students recognize poor academic behaviors; the theory then predicts that they will take action to correct these behaviors.

### *Control Variables*

For this study, the association between a student's substance use and academic procrastination is examined while controlling for the variables sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis. In this sample, *sex* is a dichotomous variable (male = 0, female = 1). Previous studies have found men are more likely to use and abuse stimulating substances than women (Graff Low & Gendaszek, 2002; McCabe et al., 2005; Wells et al., 2013). Male students have also reported higher levels of procrastination (Flett, Blankstein, Hewitt, & Koledin, 1992) and poorer time management skills than female students (Misra & McKean, 2000).

*Age* is an ordinal variable with inputs ranging from 18 to 25 years and older (1 = 17 years and younger to 9 = 25 years and older). McCabe and colleagues (2014) found a significant negative association between age and prescription stimulant use. As well, a student's adjustment to college is associated with age (Kolpidou, Costin, & Morris, 2011), which means older students may be able to better prioritize short-term and long-term satisfactions, and not have to compensate for their choices by alternate means such as substance use. The ordinal variable *class level* was measured by asking students how many credits they had completed. Responses included 0 to 23 credits (freshman = 1), 24 to 59 credits (sophomore = 2), 60 to 89 credits (junior = 3), and 90 credits and more (senior = 4).

The measure *Greek affiliation* asked students if they are part of a Greek organization (no = 0, yes = 1). Students affiliated with Greek organizations are more



likely to engage in other forms of substance abuse (e.g., alcohol) and are more likely than non-Greek students to use smart drugs (Ford & Blumenstein, 2013; Gallucci et al., 2014; McCabe et al., 2005). The last control variable examined in the four regression models is *ADD/ADHD diagnosis*. Students were asked if they had ever been diagnosed with Attention Deficit Disorder or Attention Deficit Hyperactive Disorder by a medical professional (no = 0, yes = 1). Studies have shown those who have been diagnosed or prescribed stimulant medication are more likely to abuse other substances than those who have not (Baumeister et al., 2007; Jardin et al., 2011).

### Summary and Analysis

Statistical analysis for this thesis was performed in four separate models for each stimulating substance. Results from these analyses are reported in Chapter Four. First, descriptive statistics will be reported for each variable. Second, bivariate analysis through independent-samples *t*-tests will allow for an examination of the relationship between academic procrastination and each of the dependent variables. Lastly, logistic regression analysis will be used to evaluate students' use of each stimulating substance (caffeine, energy products, energy drinks, and smart drugs) with the predictors of academic procrastination, sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis.

## CHAPTER IV

### RESULTS

#### Overview of Chapter

The following chapter will cover the statistical analyses testing the relationship between stimulating substance use and academic procrastination. Statistical analysis was performed using four separate models for each stimulating substance examined in this study: caffeinated beverages, energy products, energy drinks, and smart drugs. First, descriptive statistics were generated for each variable. Second, a series of independent-sample *t* tests were used to examine the level of academic procrastination among those who used and did not use of caffeinated beverages, energy products, energy drinks, and smart drugs. Lastly, logistic regression analysis was used to evaluate the use of each stimulating substance while controlling for sex, age, class level, Greek affiliation, ADD/ADHD diagnosis, and academic procrastination.

#### Descriptive Statistics

##### *Dependent Variables*

As stated in Chapter Three, the dependent variables relating to the use of caffeinated beverages, energy products, energy drinks, and smart drugs were coded as dichotomous variables where a value of 0 equals never used, and 1 equals ever used. Descriptive statistics for all study variables are reported in Table 1. Results show that the most popular stimulating substance was caffeinated beverages, with over three-fourths of students (81.90%) ever using them to stay awake, alert, or energetic throughout the day.

The second most commonly used substance was energy drinks: 30.40% of students reported ever having used them to stay awake, alert, or energetic. Energy products were used less frequently, by 19.90% of the sample. Students were least likely to use smart drugs to stay awake, alert, or energetic throughout the day. Only 11.30% reported use.

#### *Independent Variable*

The independent variable *academic procrastination* measured a student's academic procrastination, avoidance, and lack of motivation on a Likert scale ranging from strongly disagree (1) to strongly agree (5). The higher the score, the more academic procrastination the student reported. The average level of academic procrastination was 2.93 ( $SD = 1.00$ ), just above the mid-point of the scale.

#### *Control Variables*

For this thesis, five control variables are identified: sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis. There were slightly more female students (59.40%) in the sample than male students (40.60%). On the ordinal scale, most participants were 19 years of age; the average age of participants was between 20 and 21 years of age ( $SD = 1.84$ ). There was an almost equal representation of students in each class level: 20.50% of participants were freshmen, 31.50% were sophomores, 22.60% were juniors, and 25.40% were seniors. Only 17.50% of participants belonged to a Greek organization and 5.70% had been diagnosed with Attention Deficit Disorder (ADD) or Attention Deficit/Hyperactive Disorder (ADHD).

Table 1. Descriptive Statistics

<b>Variable</b>	<b>Response (%)</b>	<i>Mean</i>	<i>SD</i>
<b>Academic Procrastination</b>		3	1.00
<b>Caffeine</b>		1	0.39
<b>Never Used (0)</b>	18.10		
<b>Ever Used (1)</b>	81.90		
<b>Energy Products</b>		0	0.40
<b>Never Used (0)</b>	80.10		
<b>Ever Used (1)</b>	19.90		
<b>Energy Drinks</b>		0	0.46
<b>Never Used (0)</b>	69.60		
<b>Ever Used (1)</b>	30.40		
<b>Smart Drugs</b>		0	0.32
<b>Never Used (0)</b>	88.90		
<b>Ever Used (1)</b>	11.30		
<b>Sex</b>		1	0.49
<b>Male (0)</b>	40.60		
<b>Female (1)</b>	59.40		
<b>Age</b>		21 (4)	1.84
<b>17 and under (1)</b>	0.00		
<b>18 (2)</b>	7.90		
<b>19 (3)</b>	29.20		
<b>20 (4)</b>	24.20		
<b>21 (5)</b>	14.50		
<b>22 (6)</b>	10.70		
<b>23 (7)</b>	4.90		
<b>24 (8)</b>	1.80		
<b>25 and older (9)</b>	6.08		
<b>Class Level</b>		2	1.08
<b>Freshmen (1)</b>	20.50		
<b>Sophomore (2)</b>	31.50		
<b>Junior (3)</b>	22.60		
<b>Senior (4)</b>	25.40		
<b>Greek Affiliation</b>		0	0.38
<b>No (0)</b>	82.50		
<b>Yes (1)</b>	17.50		
<b>ADD/ADHD</b>		0	0.23
<b>No (0)</b>	94.30		
<b>Yes (1)</b>	5.70		

## Bivariate Analysis

Through a series of independent-sample *t* tests, average level of academic procrastination for those who used and did not use each stimulating substance was examined. As indicated in Table 2, the average level of academic procrastination is statistically significantly different for the two groups for all four of the stimulating substances examined. The average level of academic procrastination was higher among those who have ever used caffeinated beverages (*Mean* = 2.99, *t* = -3.30, *p* < 0.001), energy products (*Mean* = 3.12, *t* = -2.16, *p* < 0.032), energy drinks (*Mean* = 3.13, *t* = -3.06, *p* < 0.002), and smart drugs (*Mean* = 3.58, *t* = -5.38, *p* < 0.000) to stay awake, alert, or energetic throughout the day. In each model equal variance was assumed..

Table 2. Independent Samples *t* Tests Comparing Academic Procrastination among Those Who Used and Did Not Use Stimulating Substances

	<b>Model 1 (N=504)</b>	<b>Model 2 (N=503)</b>	<b>Model 3 (N=504)</b>	<b>Model 4 (N=503)</b>
	<b>Caffeine</b>	<b>Energy Products</b>	<b>Energy Drinks</b>	<b>Smart Drugs</b>
<b>Never (0)</b>	2.61	2.88	2.84	2.84
<b>Ever (1)</b>	2.99	3.12	3.13	3.58
<b>Mean Difference</b>	-0.38	-0.24	-0.29	-0.74
<b>T</b>	-3.30***	-2.16*	-3.06**	-5.38***
<b>Df</b>	502.00	501.00	502.00	501.00
<b>SE Difference</b>	0.12	0.11	0.10	0.14

Note: \* *p* < 0.05, \*\* *p* < .01, \*\*\* *p* < .001

## Multivariate Analysis

Four logistic regression models were generated to examine the use of caffeinated beverages, energy products, energy drinks, and smart drugs. Each model included the independent variable academic procrastination, and control variables sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis.

In Model 1 ( $N = 442$ ), logistic regression analysis was used to test the relationship between the use of caffeinated beverages and academic procrastination, sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis. As indicated in Table 3, this model can be inferred to the general population ( $X^2 = 14.49$ ,  $df = 6.00$ ,  $p < 0.025$ ). Academic procrastination had a statistically significant positive association with caffeine use when controlling for sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis. As academic procrastination increased, the odds were greater for a student to have used caffeinated beverages to stay awake, alert, or energetic throughout the day ( $Exp(B) = 1.44$ ). Age also had a statistically significant positive association with caffeine use. As seen in Table 3 (see Model 1), for each increase in age the odds of having used caffeinated beverages increased ( $Exp(B) = 1.27$ ). Sex, class level, Greek affiliation, and ADD/ADHD diagnosis were not significantly associated with caffeine use.

Model 2 (see Table 3,  $N = 441$ ) examines the relationship between energy product use and academic procrastination, sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis. The results from this model can be inferred to the general population ( $X^2 = 25.67$ ,  $df = 6.00$ ,  $p < 0.000$ ). Three variables were statistically significantly associated with the use of energy products: academic procrastination ( $Exp(B) = 1.28$ ), sex ( $Exp(B) = 0.43$ ), and age ( $Exp(B) = 1.22$ ). There was an increase in odds for a student to have used energy products to stay awake, alert, or energetic as academic procrastination increased and among students the odds were also higher for male students to have used energy products than for female students. The remaining variables, class level, Greek affiliation, and ADD/ADHD diagnosis were not statistically significantly associated with the use of energy products.

The use of energy drinks and academic procrastination, sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis was tested in Model 3 ( $N = 442$ ). The results from model can be inferred to the general population ( $X^2 = 23.52$ ,  $df = 6.00$ ,  $p < 0.001$ ). As indicated in Table 3, academic procrastination was statistically significantly associated with the use of energy drinks. When a student's level of academic procrastination increased by one unit, the odds of having used energy drinks increased by 33%. A statistically significant association was found between sex and energy drink use ( $Exp(B) = 0.50$ ), indicating that male students had greater odds of ever having used energy drinks to stay awake, alert, or energetic throughout the day when controlling for academic procrastination, age, class level, Greek affiliation, and ADD/ADHD diagnosis. There was no statistically significant association found between the use of energy drinks and age, class level, Greek affiliation, and ADD/ADHD diagnosis.

Lastly, in Model 4 the use of smart drugs was tested. The model can be inferred to the population ( $X^2 = 44.02$ ,  $df = 6.00$ ,  $p < 0.000$ ). Two measures had a statistically significant positive association with the use of smart drugs as seen in Table 3: academic procrastination ( $Exp(B) = 2.33$ ), and Greek affiliation ( $Exp(B) = 2.82$ ). The odds of having used smart drugs more than doubled when academic procrastination increased by one unit and if was student is affiliated with a Greek organization. There was no significant association seen for the measures sex, age, class level, and ADD/ADHD diagnosis.

Table 3. Logistic Regression Models Predicting Stimulating Substance Use

	<b>Model 1</b> <b>Caffeine Use (N = 442)</b>				<b>Model 2</b> <b>Energy Product Use (N = 441)</b>			
	<i>Beta</i>	<i>SE</i>	<i>Wald</i>	<i>Exp (B)</i>	<i>Beta</i>	<i>SE</i>	<i>Wald</i>	<i>Exp (B)</i>
<b>Academic Procrastination</b>	0.39	0.12	7.47**	1.44	0.25	0.12	3.88*	1.28
<b>Sex</b>	0.39	0.25	0.93	1.30	-0.82	0.23	11.73***	4.27
<b>Age</b>	0.29	0.10	5.04*	1.27	0.23	0.08	5.36*	1.22
<b>Class Level</b>	-0.14	0.16	0.58	0.88	-0.28	0.14	2.07	0.80
<b>Greek Affiliation</b>	0.06	0.33	0.06	1.09	0.15	0.31	0.37	1.21
<b>ADD/ADHD</b>	0.03	0.57	0.00	1.03	0.14	0.48	0.09	1.15
<b>Constant</b>	-0.34	0.56	0.38	0.71	-2.02	0.56	12.80***	0.13

	<b>Model 3</b> <b>Energy Drink Use (N = 442)</b>				<b>Model 4</b> <b>Smart Drug Use (N = 441)</b>			
	<i>Beta</i>	<i>SE</i>	<i>Wald</i>	<i>Exp (B)</i>	<i>Beta</i>	<i>SE</i>	<i>Wald</i>	<i>Exp (B)</i>
<b>Academic Procrastination</b>	0.29	0.10	6.83**	1.33	0.81	0.17	22.40***	2.33
<b>Sex</b>	-0.73	0.20	10.14***	0.50	-0.61	0.30	3.02	0.57
<b>Age</b>	0.10	0.07	1.17	1.09	0.05	0.12	0.07	1.03
<b>Class Level</b>	-0.13	0.13	0.60	0.90	-0.14	0.20	0.86	0.82
<b>Greek Affiliation</b>	0.37	0.27	2.62	1.55	0.99	0.34	8.47**	2.82
<b>ADD/ADHD</b>	-0.05	0.44	0.01	0.95	0.89	0.52	2.91	0.01
<b>Constant</b>	-1.42	0.49	8.47**	0.24	-4.40	0.83	27.85***	0.01

Note: \*  $p < 0.05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### Summary

The analysis reported in this chapter revealed several significant associations with stimulating substance use. In all four statistical models, academic procrastination was statistically significantly associated with stimulating substance use. These results support the proposed hypotheses one through four in which high levels of academic procrastination are positively associated with stimulating substance use. While



controlling for sex, age, class level, Greek affiliation, and ADD/ADHD diagnosis, students who experienced high levels of academic procrastination were more likely to use caffeinated beverages, energy products, energy drinks, and smart drugs. When comparing the beta coefficients in the four regression models, academic procrastination is most related to the use of smart drugs (Beta = 0.81); followed by caffeine with a Beta coefficient equal to 0.39, then energy drinks (Beta = 0.29), and lastly energy products (Beta = 0.25). From these results, the fifth hypothesis is not supported. Other important factors that were measured are sex and age of the student, which were with associated stimulating substance use in two of the four models. Greek affiliation was associated with the use of smart drugs.

The proceeding chapter will provide a discussion of the results of this thesis in relation to the theory of self-regulation and previous literature regarding college students, use of stimulating substances, and academic procrastination. Chapter Five will also discuss the limitations of this study and suggest areas of future research involving stimulating substance use and academic procrastination on college campuses.

## CHAPTER V

### DISCUSSION AND CONCLUSIONS

#### Overview of Chapter

The purpose of this thesis was to examine the relationship between the use of stimulating substances and academic procrastination. After surveying 575 students and quantitative analyses, it was found that stimulating substance use was positively associated with academic procrastination. As noted in Chapter Four, four hypotheses were supported from the data collected. In this chapter, the findings for each stimulating substance will be discussed in light of the theory of self-regulation and previous research. Limitations of the study, implications, and suggestions for future research will be presented.

#### Discussion

In this thesis, there was a statistically significant association between the use of stimulating substances and academic procrastination. Those who reported higher levels of academic procrastination were more likely to report ever using caffeinated beverages, energy products, energy drinks, and smart drugs to stay awake, alert, or energetic. These findings support previous research that shows procrastination, lack of motivation, and poor school performance as key factors linked to substance use (McCabe et al., 2005; Moore et al., 2014). These findings also confirm that students who have poor self-

regulating abilities may engage in protective behavioral strategies like using stimulating substances to increase their energy (D’Lima et al., 2012).

These results support a process of self-regulation. To compensate for academic procrastination, students are more likely to react by consuming stimulating substances after recognizing their poor behavior and comparing their behavior to personal standards and environmental circumstances. When a student with good self-regulatory skills recognizes their current behaviors towards schoolwork involve procrastination, avoiding school, and lack of motivation they will take responsibility and attempt to acquire new skills to improve their academic progress. Previous research indicates that those with poor self-regulatory skills are more likely to depend on external sources (Ley & Young, 1998; Zimmerman, 1988). This is also seen in the current study with the statistically significant positive associations between academic procrastination and stimulating substance use. Relying on external sources only corrects the poor behavior for the short term (Meece, 1994). Using stimulating substances may work briefly for students, but may end up having long-term consequences. Those who use stimulating substances to compensate for procrastination, avoiding schoolwork, and lack of motivation for a long period of time may suffer physical side effects, as noted earlier in this thesis. Each stimulating substance will now be discussed.

A secondary finding in this study is that older students were more likely to use caffeinated beverages. These results are consistent with the national data confirming those between the ages 25 and 29 to be the largest consumers of coffee daily (Brown, 2015), but unlike previous research that shows age having a negative relationship with substance use (Kolpidou et al., 2011; McCabe et al., 2014). Some theorized students

would partake in these risky behaviors early on in college due to transitioning from a regulated environment created by the K-12 educational system to the unregulated environment presented on college campuses (Kolpidou et al., 2011; McCabe et al., 2014; Panek, 2014). However, these findings suggest otherwise. Two of the four regression models showed older students are more likely to use stimulating substances to compensate for academic procrastination.

### *Stimulating Substance Use*

Caffeine was the preferred stimulating substance in this study, with over three-fourths (81.9%) of participants reporting that they ever used it to stay awake, alert, or energetic throughout the day. Caffeinated beverages are widely available and the easiest stimulating substance to purchase. This result is consistent with the findings of a national survey in which over half of the participants reported drinking a caffeinated beverage over other options (Brown, 2014). Along with academic procrastination, the age of students was associated with caffeine use when trying to stay awake, alert, or energetic throughout the day (while controlling for academic procrastination, sex, Greek affiliation, class level, and ADD/ADHD diagnosis).

Energy products such as 5 Hour Energy are advertised to improve concentration and are targeted towards the young working adult, especially males between the ages 25 and 45 (Lee & Zelman, 2009). Little is known about the side effects and the impact energy products have on the body, which can explain why less than one-fourth of participants (19.9%) in this sample have ever used them to stay awake, alert, or energetic throughout the day and that it is the least related to academic procrastination. As targeted, men in this sample were more likely to use energy products to stay awake, alert, or

energetic. Academic procrastination was associated with energy product use when controlling for other variables. Older male students were most likely to use energy products, thus it appears that this advertising is effective.

The rate of energy drink consumption has increased exponentially since their debut in the 1990's (Lal, 2007; Reissig et al., 2009). Energy drinks were the second most frequently used stimulating substance among participants in this study (30.4%). This rate is similar to that reported by Miller (2008), who also found roughly a third of college students consumed at least one energy drink within the last month. Of the six variables examined with energy drink use, only academic procrastination and sex showed a statistically significant association. With the understanding that energy drinks are similar to energy products, it is no surprise that male students in this sample were also more likely than female students to use them to stay awake, alert, or energetic when experiencing academic procrastination. Energy drinks have been reported to be a popular choice among college students to increase energy not only for academic purposes but also for nightlife activities (Miller, 2008; Nordt et al., 2013).

Finally, the findings of this study related to smart drug use support previous research indicating that students are inclined to use smart drugs for academic purposes (Gallucci et al., 2014; Judson & Langdon, 2009; White et al., 2006). While only 11.3% of participants in this sample reported ever using smart drugs, academic procrastination and Greek affiliation predicted use. Thus, students were more likely to use smart drugs when academic procrastination was high. In fact the use of smart drugs was the most related to academic procrastination. As well, previous research has shown that students affiliated with Greek organizations are more likely to abuse illicit substances than non-Greek

students (Ford & Blumenstein, 2013; Gallucci et al., 2014; McCabe et al., 2005).

Although previous research indicates that those who have been diagnosed with ADD/ADHD and prescribed stimulant medication are more inclined to abuse substances than those who have not (Baumeister et al., 2007; Jardin et al., 2011), results from this study did not support this relationship. In all four regression models, a diagnosis of ADD/ADHD was not related to students' stimulating substance use.

### Limitations

There are some limitations of this thesis that should be addressed. The data collected for this thesis is part of a cross-sectional study that looked at students' stimulating substance use and academic procrastination on the University of North Dakota campus. Although statistically significant results were found, this data only describes a snapshot in time on a single campus. To truly understand how a student's academic procrastination affects their stimulating substance use, data should be collected at multiple points throughout the school year. For instance, previous research has shown an increase in substance use, especially smart drugs, during "tough times" of the school year like mid-terms and finals (Misra & McKean, 2000). For this study, the survey was not administered around either of these times.

This study is assuming academic procrastination leads to the use of stimulating substances based on the finding. However, this relationship may be more complex. For example, school stress was not taken into consideration for this study. Stress from academics as a whole may cause a student to use stimulating substances and cause them to procrastinate. Instead of a causation seen from this study, the relationship between

academic procrastination and stimulating substance use may a correlation driving by another factor such as school stress.

Academic procrastination was measured by three items. Students self-reported the degree to which they procrastinated, avoided, or had a lack of motivation to do schoolwork. This gives the participant the ability to interpret the meaning of procrastination, avoidance, and lack of motivation. To have a more accurate measure of academic procrastination, several measures should be compiled, such as the Academic Procrastination Scale Short-Form that has been used to measure procrastination and attention of students and young adults in other studies (Beck, Koons, & Milgram, 2000; Ferrari, 2000). This may reduce variation in how students interpret key concepts. Because of the limited measures used to define academic procrastination, this data was not able to provide information on the student's personality traits. Self-regulation is an individual act. Therefore, the act of procrastinating and using external means like stimulating substances to correct bad behavior may both stem from poor self-regulator skills.

#### Implications and Future Research

This research suggests several implications and recommendations for future research. By understanding that students' academic procrastination impacts their use of stimulating substances, student health centers and support services can generate programs to benefit their students. Programs should focus on reducing academic procrastination and improving students' time management skills, key aspects of self-regulation. Some programs are already in existence, like that seen at the University of Wisconsin Green Bay. They offer tutoring services that provide the opportunity for students to map out the academic semester. This map gives students the opportunity to identify committed

personal and academic time, estimate study time, establish a study plan, and revise a plan when needed (UWGB, 2016). This plan is consistent with the principles and process proposed by SRT, in that it focuses on improving self-regulatory skills. Through self-monitoring, students are encouraged to identify areas that need improvement. Then, based on the tutoring services they receive, a study plan is created to improve the identified areas, and lastly, adjustments are made to the plan as needed to achieve the desired outcomes.

Age was a significant factor in half of the regression models, but class level was not significantly predictive of stimulating substance use. Thus, although a student's progress in school may not impact their substance use, it was seen in this sample as students age, they are more likely to report substance use. Non-traditional students may have more commitments outside of school like family and careers. This may leave them with little time to complete schoolwork and the need for extra "help" to complete schoolwork in a short period of time. Previous research has indicated that a student's age is negatively related with their substance use (Kolpidou et al., 2011; McCabe et al., 2014). Yet, this does not seem to be the case in the current study.

Future research can also examine the difference between the types of stimulating substances older students are more likely to use when experiencing academic procrastination. It was seen on Table 3, older students had greater odds of using caffeine (27%) and energy products (22%) over energy drinks and smart drugs. Outside of energy drinks, these students may not have easy access to smart drugs due to location and peer connections.



Another area to look further into is the relationship between Greek affiliation and smart drugs use. As indicated, previous research has also linked Greek affiliation with substance use. Greek students may experience larger time constraints and have a larger social network as compared to non-Greek students. These time constraints and interactions with a vast pool of peers may not only foster academic procrastination but also substance use.

### Summary

The findings of this thesis suggest that academic procrastination is related to the use of stimulating substances among college undergraduates. Statistical analysis also suggests that age, sex, and Greek affiliation are predictive of the use of stimulating substances to stay awake, energetic, and alert throughout the day. As noted above, student support services can implement programs to help students identify weak areas in their academic performance and develop a plan to correct them according to the process proposed by the theory of self-regulation.

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