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High school students' perceptions of the non-medical use of ADHD prescription stimulant medications

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HIGH SCHOOL STUDENTS' PERCEPTIONS OF THE NON-MEDICAL USE OF ADHD PRESCRIPTION STIMULANT MEDICATIONS

By

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Abstract

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A review of existing literature has documented a rise in the misuse of stimulant medications by those with a prescription for ADHD, as well as, the nonmedical or illicit use of stimulant medications by those without a prescription or a diagnosis of ADHD. This phenomenon has been particularly present on college campuses. The purpose of this study was to examine prevalence of misuse and nonmedical use of ADHD prescription stimulant medications in high school students, as well as, the attitudes and perceptions of high school students about the misuse and nonmedical use of ADHD prescription stimulant medication. Specifically, this study investigated the rising social norm of academic enhancement by the misuse and nonmedical use of ADHD prescription stimulant medication. A sample was obtained from multiple undergraduate students enrolled in Intro to Psychology courses at Rowan University. College students were asked to retrospectively recall activity regarding the misuse or illicit use of ADHD prescription stimulant medications *in high school* in a thirty-part questionnaire. Correlational analyses and analyses of variance were used to evaluate data.

Table of Contents

Abstract	iii
List of Figures	vi
List of Tables	vii
Chapter 1: Introduction	1
1.1 Need for Study	1
1.2 Purpose	2
1.3 Hypothesis	3
1.4 Operational Definitions	4
1.5 Limitations	4
1.6 Summary	4
Chapter 2: Literature Review	6
2.1 Prevalence of ADHD Diagnoses and Stimulant Medication Prescriptions	6
2.2 The Misuse of Prescription Stimulant Medication	8
2.3 The Illicit or Nonmedical Use of Prescription Stimulants	11
2.4 Characteristics Effecting Misuse or Illicit Use of Prescription Stimulant Medication	13
2.5 Motives for the Misuse and Illicit Use of Prescription Stimulant Medications	14
2.6 Attitudes and Perceptions of the Misuse and Illicit Use of Prescription Stimulant Medication	15
2.7 Risk of Prescription Stimulant Use	18
2.8 Implications	24

Tables of Contents (Continued)

Chapter 3: Methodology	26
3.1 Sample	26
3.2 Procedures	26
3.3 Measures	27
3.4 Design	28
Chapter 4: Results	30
4.1 Characteristics of Sample	30
4.2 Inferential Statistical Analyses	30
4.3 Correlational Analyses	33
4.4 Analyses of Variance: Socioeconomic Status	36
4.5 Analyses of Variance: High School Class Size	46
Chapter 5: Discussion	51
5.1 Conclusions Regarding Sample Population	51
5.2 Conclusions Regarding Correlational Analyses	54
5.3 Conclusions Regarding Analyses of Variance	58
5.4 Limitations	61
5.5 Future Directions	63
List of References	65
Appendix A Survey of Misuse and Nonmedical Use of Prescription Stimulant Medication	73
Appendix B Alternate Consent	80

List of Figures

Figure	Page
Figure 1 Comparing variance of agreement to social acceptability of nonmedical prescription stimulant use according to socio-economic status.	37
Figure 2 Comparing variance of agreement to social acceptability of nonmedical prescription stimulant use according to socio-economic status.	39
Figure 3 Comparing variance of agreement to prevalence of nonmedical prescription stimulant use according to socio-economic status.	41
Figure 4 Comparing variance of agreement to the safety of misuse of prescription stimulant medications according to socio-economic status.	43
Figure 5 Comparing variance of agreement to the ethicality of misuse of prescription stimulant medications according to socio-economic status.	45
Figure 6 Comparing variance of agreement to the ethicality of nonmedical prescription stimulant use according to high school class size.	48
Figure 7 Comparing variance of agreement to the ethicality of the misuse of prescription stimulants according to high school class size.	50

List of Tables

Table	Page
Table 1 Descriptive Statistics: Sample Population	31
Table 2 Variance of Agreement to social acceptability of nonmedical prescription stimulant use according to Socio-Economic Status	36
Table 2.1 Average Agreement Score according to Socio-Economic Status	37
Table 3 Variance of Agreement to social acceptability of the misuse of prescription stimulant medication according to socio-economic status	38
Table 3.1 Average Agreement Score according to Socio-Economic Status	39
Table 4 Variance of Agreement to prevalence of nonmedical prescription stimulant use according to socio-economic status	40
Table 4.1 Average Agreement Score according to Socio-Economic Status	41
Table 5 Variance of Agreement to safety of misuse of prescription stimulant medication according to socio-economic status	42
Table 5.1 Average Agreement Score according to Socio-Economic Status	43
Table 6 Variance of Agreement to ethicality of misuse of prescription stimulant medication according to socio-economic status	44
Table 6.1 Average Agreement Score according to Socio-Economic Status	45
Table 7 Variance of Agreement to ethicality of nonmedical prescription stimulant use according to high school class size	47
Table 7.1 Average Agreement Score according to High School Class	47
Table 8 Variance of Agreement to ethicality of the misuse of prescription stimulant medication according to high school class size	49

List of Tables (Continued)

Table	Page
Table 8.1 Average Agreement Score according to High School Class	49

Chapter 1

Introduction

Need for Study

There has been documented increase in both the diagnosis of ADHD and the prescription of stimulant medication, such as Adderall, Ritalin, and Dexedrine, as an antidote for symptoms. In 2008, studies reported an average of 1 in every 10-15 children in the United States was diagnosed with the disorder and 1 in every 20-25 were treated with stimulant medication (Mayes, Bagwell, & Erkulwater, 2008; Desantis, Webb, & Noar, 2008). Additionally, there has been documented rise in the misuse of stimulant medications by those with a prescription for ADHD, as well as, the nonmedical or illicit use of stimulant medications by those without a prescription or a diagnosis of ADHD. This phenomenon has been particularly present on college campuses (DeSantis et al., 2008; White, Becker-Blease, & Bishop, 2006; Swanson, Wigal, & Volkow, 2011). One study reports that 45% of undergraduate students prescribed to stimulant medication for the treatment of ADHD admitted to misusing their medication (Jardin, Looby, & Earlywine, 2011). Other research has indicated rates of illicit or nonmedical use of stimulant medication in colleges to range from 3% to as high as 36% in some studies (McCabe, Teter, & Boyd, 2006). A government report found that more full-time college students than nonstudents had used stimulants nonmedically between 2002 and 2004 (DuPont, Coleman, Bucher, & Wilford, 2007).

Much research has been conducted on college students' prevalence, motivation, and perceptions of abuse of stimulant medications, as well as, commonly correlated demographics. For example, motives for the misuse *and* illicit use of stimulant

medications include, ‘to improve academic performance,’ ‘increased concentration,’ ‘ability to stay awake while studying,’ ‘to prolong intoxicating effects of alcohol or other drugs,’ ‘to get high,’ and, ‘as an exercise aid (Low & Gendaszek, 2002).’ The most common motivations for the misuse or illicit use of stimulant medication focused on academic enhancement (Rabinar, Anastopoulos, Costello, Hoyle, McCabe, & Swartzwelder, 2009; Raymond, 2012; Judson & Langdon, 2009). In an interview with 175 college undergraduates, DeSantis and Hane (2010) found that students believed that illicit stimulant was both physically harmless and morally acceptable (DeSantis & Hane, 2010).

However, research has failed to adequately investigate the potential for this phenomenon to occur within the high school environment. Research on the prevalence of misuse or nonmedical use of prescription stimulant medication *in high school* is limited. Additionally, there is very little research examining the perceptions and attitudes of high school students towards the misuse and nonmedical use of prescription stimulant medication. Finally, the effects on society and the potential rise of nonmedical stimulant use as a “social norm” or a “cultural construct” should be explored.

Purpose

The purpose of this study was to examine prevalence of misuse and nonmedical use of ADHD prescription stimulant medications in high school students, as well as, the attitudes and perceptions of high school students about the misuse and nonmedical use of ADHD prescription stimulant medication. Specifically, this study aims to investigate the potentially rising social norm of academic enhancement by the misuse and nonmedical use of ADHD prescription stimulant medication. Also, this study will examine the

societal effects of such a high prevalence of academic enhancement by the misuse and nonmedical use of prescription stimulant medication. For example, research has indicated that such misuse and nonmedical use of ADHD prescription stimulant medication is most common in areas of higher socioeconomic status (McCabe, Knight, Teter, & Wechsler, 2005). Other research has indicated that students coming from lower socioeconomic status areas face greater difficulties and more obstacles academically (Willingham, 2012; Chenoweth, 2007). Will such common misuse and nonmedical use of prescription stimulant medications for the purposes of academic enhancement widen the already existing achievement gap between higher socioeconomic status students and lower socioeconomic status students? Will the academically advanced become even more advanced and therefore increase the standards for all other schools? Will this greater gap create even more academic difficulty for those students from lower socioeconomic areas, who might not have access to academic enhancing stimulant medications? Will it make the climb that much harder?

Hypothesis One

High school students' perceptions and attitudes towards the misuse and nonmedical use of ADHD prescription stimulant medication will be similar to those of college students. The misuse and nonmedical use of ADHD prescription stimulant medication will be viewed as posing no potential health or societal risks. The misuse and nonmedical use of ADHD prescription stimulant medication will also be viewed as socially and ethically acceptable.

Operational Definitions

1. Attention Deficit Hyperactivity Disorder (ADHD): A behavioral condition that makes focusing on everyday requests and routines challenging (American Psychological Association, 2013).

"People with ADHD typically have trouble getting organized, staying focused, making realistic plans and thinking before acting. They may be fidgety, noisy and unable to adapt to changing situations (American Psychological Association, 2013)."

"Adderall (mixed salts amphetamine), Ritalin (methylphenidate), and Dexedrine (dexytamphetmine) are considered first-line pharmacotherapy for ADHD (DeSanits, Webb, Noar, 2008)."

2. *Misuse* of prescription stimulant medication: the inappropriate use of stimulant medication that was initially prescribed for treatment of ADHD (Sepulveda, Thomas, McCabe, Cranford, Boyd, & Teter, 2011).

3. *Illicit* or *nonmedical* use of prescription stimulant medication: the recreational use of psychostimulant medication without prescription (Sepulveda, Thomas, McCabe, Cranford, Boyd, & Teter, 2011).

Limitations

The sample obtained for this study will be from a small northeastern university. Students will be randomly selected from an undergraduate survey pool. Since the sample will be both small and only from a single college, a limitation of this study may be generalizability to the entire population. Also, since the method of study will be both a self-report and retrospective survey, there may be limitations in the accuracy of responses.

Summary

Current research has succeeded in investigating the phenomenon of misuse and nonmedical use of ADHD prescription stimulant medications by college students. Research has determined many correlating factors such as predictors, motivation, prevalence, and perceptions. However, the present study aims to assess the prevalence of

misuse or nonmedical use of prescription stimulant medication *in high school students*. Additionally, this study will examine the perceptions and attitudes of high school students towards the misuse and nonmedical use of ADHD prescription stimulant medication.

Chapter 2

Literature Review

Prevalence of ADHD Diagnoses and Stimulant Medication Prescriptions

Attention-deficit/hyperactivity disorder (ADHD) was originally thought to be a predominantly childhood disorder characterized by inattention, hyperactivity, and impulsivity. Common struggles faced by those diagnosed with ADHD include academic difficulties pertaining to focus, attention, information-processing speed, and organization and completion of assignments (Kazdin, 2000). Methods of treatment for this disorder include behavioral therapy, medical intervention, or a combination of both. Most commonly, however, a medical regimen alone is pursued. A class of drugs referred to as psychostimulants is used as intervention for this disorder (NIMH, 2013; Visser, Danielson, Bitsko, Holbrook, Kogan, Ghandour, Perou, & Blumberg, 2013; CDC, 2010). Adderall and Ritalin are among the most frequently prescribed (Mayes, Bagwell, & Erkulwater, 2008). Studies on the pharmacotherapy of attention-deficit/hyperactivity disorder across the lifespan revealed that 70% of children treated with psychostimulants had improvements in symptoms of hyperactivity, impulsivity, inattention, associated behavior, social functioning, and most importantly, academic performance (Meijer, Faber, van den Ban, Tobi, 2009; Santosh & Taylor, 2000).

The greatest increase in youth diagnosed with ADHD occurred in the 1990s, during which time the prevalence of physician visits for stimulant pharmacotherapy increased fivefold (Mayes et al., 2008). Though the numbers still remained low throughout this decade, by the year 2000, the prevalence of children treated for ADHD in

the United States averaged at least one to two students per classroom (Mayes et al., 2008). In 2008, the Centers for Disease Control and Prevention reported a national prevalence of 7.8%, more than 4.4 million children, aged 4-17 years old diagnosed with ADHD. Prescription stimulants were reported as use of treatment for 2.5 million of these children (DeSantis et al., 2008) The same year, Mayes et al. (2008) reported an average of 1 in every 10-15 children in the United States was diagnosed with the disorder and 1 in every 20-25 were treated with stimulant medication (Mayes et al., 2008). Research by Jardin and colleagues (2011) shows no change in these numbers as of 2011 (Jardin, Looby, & Earlywine, 2011). More recently, attention has been raised to the disorder's persistence into adulthood. About two-thirds of children diagnosed with ADHD will retain their diagnosis into adulthood. As of 2008, the disorder also affected about 4.5% of adults, specifically, 2-8% of college students (Advokat, Guidry, & Martino, 2008; Sepulveda, Thomas, McCabe, Cranford, Boyd, Teter, 2011).

As a result of this rise in ADHD diagnoses, there has also been a substantial increase in the production of stimulant medication for treatments. Between 1990 and 1994, alongside the increase of physician visits for stimulant pharmacotherapy, there was an almost 300% increase in the supply of the MPH or Ritalin stimulant (Swanson, Wigal, & Volkow, 2011). By 1997 the total increase of production of MPH or Ritalin since 1990 reached 650%. Between the years of 1993 and 2000, production of the stimulant medication, Adderall, began, and, by 2000 this drug accounted for 42% of stimulants produced in the United States (Woodworth, 2000; Moline & Frankenberger, 2001; Aikins, 2011). In 2008, it was reported that the International Narcotics Control Board's (INCB) supply of both Ritalin and Adderall would be sufficient to treat 6,391,872

individuals of the US population (304,374,846) for all 365 days of the year. According to Swanson and colleagues (2011) only about 3.84 million individuals would require actual medical use if all prescriptions were used as intended, meaning that, only 70% of the supply would be devoted to actual medical use and 30% would have to be devoted to nonmedical use (Swanson et al., 2011).

Implications for the increases in diagnosis of ADHD, use of stimulants as treatment, and the production of such stimulants leads to the phenomenon of misuse and illicit or nonmedical use of stimulant medication prescribed for ADHD in high school and college students (Arria & DuPont, 2010; Kaloyanides, McCabe, Cranford, & Teter, 2007; Smith & Farah, 2011). *Misuse* of prescription stimulant medication is defined as, "the inappropriate use of stimulant medication that was initially prescribed for treatment of ADHD." For example, if an individual takes more medication than his or her prescribed dosage, if an individual takes his or her medication in combination with other substances for the purpose of intoxication, or if an individual consumes his or her medication through methods other than instructed by a physician, such as nasally. *Illicit* or *nonmedical* use of prescription stimulant medication can be defined as, "the recreational use of an ADHD psychostimulant medication without prescription (Sepulveda et al., 2011)."

The Misuse of Prescription Stimulant Medication

Since the research states that only 70% of stimulant medication produced in the United States is used as legitimate treatment, one might ask where the other 30% of stimulant medication is attributed. Though the answers are many and various, there is one area of particular concern: the *misuse* of stimulant medication by those with legitimate

prescriptions. According to Markus and Durkin (2011) students prescribed to stimulant medication for the treatment of ADHD adhere to their medical regimens for only 18.6% of the grading periods during the school year (Swanson et al., 2011). This means that medication was not taken daily for a full year, which indicates that a student with a prescription for stimulant medication may be left with an excess supply of the medication. White, Becker-Blease, and Grace-Bishop (2009) reported some students that admitted to misusing their medication by, "stockpiling medication and consuming a higher dose than prescribed when under high academic demand," but other times this may mean diversion of medication to those without ADHD or a prescription to stimulant medication (White, Becker-Blease, & Grace-Bishop, 2006).

In a small study by Jardin and colleagues (2011), 45% of 43 undergraduate students prescribed to stimulant medication for the treatment of ADHD admitted to misusing their medication. Of those who reported misuse, 27.9% specified using an alternative route of administration. For example, students might consume the drug nasally instead of orally. Others who reported misuse, 62.8%, specified taking a higher dosage than recommended and 23.3% specified mixing their medication with other drugs or alcohol to feel intoxicated (Jardin et al., 2011).

In another sample of 55 students, 22% of students prescribed to stimulant medication admitted to misuse of their medication, or use of medication in ways not intended by the physician's prescription. Specifically, 10% admitted to using their medication to "get high" and 31% took their medication with alcohol or other drugs (Wilens, Gignac, Swezey, Monuteax, & Biederman, 2006). Sepulveda et al.'s (2011) sample of 55 students prescribed to stimulant medication yielded a 40% rate of past-year

misuse. Rabinar and colleagues (2009) found that 31% of their 115 students diagnosed with ADHD misused their prescriptions (Rabinar, Anastopoulos, Costello, Hoyle, McCabe, & Swartzweider, 2009). Finally, in a larger study, 25% of 344 college students reported using their own prescription to stimulant medication to "get high (Upadhaya, Rose, Wang, O'Rourke, Sullivan, Deas, & Brady, 2005)."

Diversion of medication is the act of giving, trading, or selling one's prescription ADHD medication to those lacking a diagnosis or a prescription. This is another area that may account for the 30% of nonmedical use of stimulant medication produced in the United States. Sepulveda and colleagues (2011) indicated that 54% of students with a prescription to stimulant medication are approached to sell, trade, or give away their medication each year. In another study of 1,550 students, 85% of those diagnosed with ADHD reported being asked to *give* away their medication, 54% were asked to *sell* their medication, and 19% were asked how to fake ADHD symptoms (Advokat et al., 2008). Other research studied the rate at which students were *offered* prescription stimulants throughout four years of college. Results indicated that by their fourth year in college 61.8% of students were offered stimulants at least once since year one. 45.8% of students who were offered prescription stimulants chose to use them nonmedically at least once during the same year in which they were first offered (Garnier-Dykstra, Caldeira, Vincent, O'Grady, & Arria, 2012).

The Illicit or Nonmedical Use of Prescription Stimulant Medication

Considerable research has indicated rates of illicit or nonmedical use of stimulant medication in colleges to range from 3% to as high as 36% in some studies (McCabe, Teter, & Boyd, 2006). A government report found that more full-time college students than nonstudents had used stimulants nonmedically between 2002 and 2004 (DuPont, Coleman, Bucher, & Wilford, 2007). In 2003, a survey of 9,161 undergraduate students from a large public midwestern university reported an 8.1% lifetime prevalence rate of nonmedical or illicit use of stimulant medication. 5.4% of the sample reported nonmedical use of stimulant medication within the past year (McCabe et al., 2006).

Two years later (2005), 3,639 students from another Midwestern 4-year university responded to questions regarding nonmedical use of stimulant medication. 8.5% reported a life-time prevalence and 6.0% reported a past-year prevalence of nonmedical stimulant use (McCabe & Teter, 2007). In 2006, 8.3% of 4,580 undergraduate students reported past-year illicit use of stimulant medication (DuPont et al., 2007). In another study that year, a sample of 1,025 students from New Hampshire University indicated a 16.2% rate of lifetime nonmedical use of stimulant medication. In 2008, a survey of 1,253 college students found that 13.3% had used prescription stimulants illicitly or nonmedically in their lifetime and 10.8% had within the past year (Arria, O'Grady, Caldeira, Vincent, & Wish, 2008). Another study done that year, taken at a large southern public university reported that 591 students out of 1,550 used stimulant medication without a prescription (Advokat et al., 2008). Finally, in 2012, a small study of 206 college students indicated a 26.1% prevalence rate of nonmedical use of stimulant medication within the past year (Lookatch, Dunne, Katz, 2012).

The largest study to date was conducted in 2005 by Sean McCabe and colleagues. 10,904 undergraduate students from 119 nationally representative 4-year colleges in the United States were distributed a questionnaire regarding illicit use of stimulant medication across the lifetime. Results indicated a 6.9% overall lifetime nonmedical use of stimulant medication, a past-year use of 4.1%, and a past-month use of 2.1% (McCabe et al., 2005).

A pattern is evident within the research that as the sample size grows the rate of illicit use of stimulant medication decreases. However, when individual schools of smaller populations are examined the rates of illicit use are higher. This may suggest that it may not be as easy to obtain stimulant medication for nonmedical purposes in a larger population. A student is likely to know a greater percentage of the students in a smaller school than in a larger school, which allows for easier access. This is evident in a study assessing predictive factors related to illicit use, "For men, that factor was accessibility. For women, the main predictor was whether another student had offered the stimulant medication. For both male and female students, a predictor of unauthorized use was that they knew students who used stimulants illicitly (Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005)."

Also, as suggested by Advokat and colleagues (2008), results may be affected by the students' living status, whether or not the student lived on campus or not. It may be more difficult for students who live off campus and commute to school to engage in illicit drug use (Advokat et al., 2008). In a survey of college students from Massachusetts College of Liberal Arts, Babcock and Byrne (2000) found that nontraditional students (students who lived off-campus) were less likely to report illicit use of stimulants. Since

nontraditional students make up 27% of the college it is not surprising that 20% returned surveys were from nontraditional students. Babcock and Byrne (2000) proposed that since nontraditional students don't live on campus they may be unaware of the substance abuse trends of stimulant medications (Babcock & Byrne, 2000). Therefore, student living status may be responsible for lower prevalence rates found in the larger studies such as McCabe et al.'s (2005) national sample.

Additionally, it is important to note in McCabe and colleagues' (2005) study, overall rates of illicit use of stimulant medication may seem low, but individual university rates still remained high. Specifically, "the aggregate past year prevalence rates of non-medical use at individual colleges ranged from 0-25%." Twenty schools out of the 119 universities reported a 0% rate, which may account for the low overall prevalence. However, twelve schools reported a greater than ten percent rate of nonmedical stimulant use on campus (McCabe et al., 2005). Finally, limitations exist regarding the students' self-report. It cannot be determined whether the students surveyed reported honestly about their use or nonuse of stimulant medications.

Characteristics Effecting Misuse or Illicit Use of Prescription Stimulant Medication

Further research has been done in attempt to determine characteristics that are associated with the illicit use or misuse of prescription stimulants. It is important that such characteristics may be investigated for the sake of prevention. For example, it was evident in several studies that males were more likely than females to misuse or illicitly use prescription stimulants, Caucasians more often misused and illicitly used prescription stimulants than Asians and African-Americans, and fraternity and sorority members more often misused and illicitly used prescription stimulants (Teter, McCabe, Cranford, Boyd,

& Guthrie, 2005; Teter, McCabe, Boyd, & Guthrie, 2003). Additionally, the misuse or illicit use of prescription stimulants was associated with lower grade point average, indicating that those already struggling academically are more likely to abuse prescription stimulants (Arria, 2011). Higher rates of other drug use were also associated with the misuse or illicit use of stimulants. Research found greater heavy episodic drinking among those who abused prescription stimulants. Finally, those who misused or illicitly used prescription stimulants were more likely to come from a higher socioeconomic status and from schools with highly competitive admissions standards (Teter et al., 2003; McCabe and Boyd, 2005; Teter, McCabe, LaGrange, Cranford, & Boyd, 2006).

Motives for the Misuse and Illicit Use of Prescription Stimulant Medications

Motives for the misuse *and* illicit use of stimulant medications include, 'to improve academic performance,' 'increased concentration,' 'ability to stay awake while studying,' 'to prolong intoxicating effects of alcohol or other drugs,' 'to get high,' and, 'as an exercise aid (Low & Gendaszek, 2002; McCabe & Boyd, 2012).' The most common motivations for the misuse or illicit use of stimulant medication focused on academic enhancement (Rabinar et al., 2009; Raymond, 2012; Judson & Langdon, 2009). Peterkin and colleagues indicated that 76% of students who misuse or illicitly use prescription stimulants *believe* that it improves their grades (Peterkin, Crone, Sheridan, & Wise, 2011). Specifically, in a survey of 689 college students who reported illicit use of prescription stimulant medication, 397 said that they took the medication because it "helps me concentrate," and 297 said that it "increases my alertness (Teter, McCabe, Cranford, Boyd, & Guthrie, 2005)." DeSantis et al. (2008) surveyed 585 students who

admitted to illicitly taking prescription stimulants. From this sample, 420 students reported taking the drug "to stay awake and study," 389 reported taking the drug "to concentrate on work," 213 reported taking the drug "to help me memorize," and 70 reported taking the drug "to make work more interesting (DeSantis et al., 2008)."

Attitudes and Perceptions of the Misuse and Illicit Use of Prescription Stimulant Medication

After considering the particular motivations behind the misuse or illicit use of stimulant medication by college students it is important to investigate their attitudes and perceptions of such illicit use or misuse. Research has indicated the nonmedical or illicit use of prescription stimulants to be socially and morally acceptable (Aikins, 2011). One study asked students if they believed their illicit or nonmedical use of stimulant medications pose a health risk. Two percent of students believed that these drugs were "very dangerous," while 81% believed the illicit use of these drugs was either "not dangerous at all" or only "slightly dangerous (DeSantis et al., 2008). Another study found that religious beliefs had no protective effect for the illicit use of prescription stimulants. Meaning that, religious beliefs did not prevent students from using prescription stimulants nonmedically. This suggests that such students don't feel that this behavior violates moral beliefs (Herman-Stahl, Krebs, Kroutil, Heller, 2006). Interviews of 175 undergraduate students about their attitudes towards the illicit or nonmedical use of prescription stimulant medication reported that students believed illicit stimulant use was both physically harmless and morally acceptable and four arguments of justification were identified: Comparison/Contrast, All-Things-In-Moderation, Self-Medicating, and Minimization (DeSantis & Hane, 2010).

The most common justification for the illicit use of stimulants was a *comparison and contrast* between prescription stimulants and "party drugs" or street narcotics. Students argued that they "were doing it for the right reasons." Since students were taking the prescription stimulants to improve their academics, whereas street narcotics are taken for pleasure, illicit use was morally justifiable. Also, students believed that since prescription stimulants came from legal pharmaceuticals as opposed to illegal street narcotics they must be safe (DeSantis et al., 2010).

When asked, students described street narcotics as, "substances that impair cognition or motor skills." They did not believe that prescription stimulants impacted such functions and therefore it was acceptable to take them. For example, prescription stimulants were compared to alcohol in that they did not cause the same "sloppy feeling" as alcohol. They did not impair the function of the body. One student quotes, "Adderall is nothing like alcohol. It is actually like a good drug as far as that goes. You never see anybody fall down or throw up." Another says, "Since you can function on Adderall, you can go to work or drive." Also, prescription stimulants do not have the same negative side effects such as brain damage, addiction, death, and crime, as street narcotics. Not one of the 175 students interviewed believed that prescription stimulants posed any health risk. One response said, "You can't get addicted to it. I know a lot of people who take it and it is not addictive. It doesn't ruin your life like coke or other drugs like that (DeSantis et al., 2010)."

Finally, students compared the legal and societal side effects of prescription stimulants to those of street narcotics. For example, students focused on law enforcement's obvious lack of concern for illegal use of these drugs. Specifically, "Other

drugs have jail sentences that people get for using them and distributing them. Adderall is not as controlled by the police. If they don't think its bad, why should I?" Also, prescription stimulants are not perceived to have the same societal harm as street narcotics. When asked if he felt guilt about using prescription stimulants one student replied, "Hell no. It helps me and it hurts no one. People aren't being shot or kingpins aren't killing people. It doesn't hurt or kill people like other drugs do. There are no victims (DeSantis et al., 2010)."

The second major argument made for the justification if illicit stimulant use was *moderation.* Students viewed their stimulant use as occasional or moderate because they only used them during periods of high academic stress such as midterms and finals week. Students compared the use of stimulants, again, to the much more frequent consumption of alcohol. Others considered *moderation* to be determined by the dosage or drug consumed. It was quoted, "As long as I don't abuse it then its not hurting me," "If you are not excessive, then there is no problem," and "Just don't abuse the milligrams. There are some guys who take 30 milligrams of the stuff. That's too much. I only take 10 or 15 (DeSantis et al., 2010)."

The third major argument for the illicit use of prescription stimulant medication is the *self-medicating* argument. Illicit use becomes physiologically and morally justifiable because these students claimed that they probably suffer from ADHD themselves. According to DeSantis and Hane (2010), students first identified some of their behaviors as undiagnosed symptoms of ADHD. Then, they discussed how their experience with the use of stimulants alleviated such symptoms and draw conclusions from their success rate that they must have ADHD. After one student explains that she is, "just making a self-

diagnosis and kind of medicating," she quotes, "but there is no doubt that it works. So I guess that I am right cause it works." Further justification is made by the accusation that, "It's too expensive to actually get tested. If the government doesn't feel guilty making it too expensive, and my insurance doesn't cover it, then I don't fee guilty about taking something that I need to concentrate and get good grades (DeSantis et al., 2010)."

Finally, students make the *minimization* argument where they frame prescription stimulants as harmless, benign, and socially acceptable antifatigue aids and equate them to nothing more than "a stiff cup of coffee." "It's like saying it's illegal to take coffee. I mean it's a stimulant. Caffeine is a drug and everyone uses that, and so I don't feel like it's bad (DeSantis et al., 2010)."

Risk of Prescription Stimulant Use

Health Risks. Despite such misperceptions, the nonmedical use of prescription stimulant medication *does* pose both health risks and societal risks. Though they are often disregarded, immediate side effects of improper use of stimulant medications include appetite reduction, sleep problems, irritability, depression and other mental health problems, and withdrawal (Rabinar et al., 2009; Hertz & Knight, 2006). More rare side effects of such stimulants if used improperly include stroke, cardiac arrest, violent behavior, and suicidal ideation and contrary to popular belief, one *can* overdose on these medications (Iversen, 2006).

Between the years of 2003 and 2005, 36% of adverse drug events presented to the emergency room in the United States were nonmedical or illicit users of ADHD prescription stimulant medications. Also, 16% of the total adverse drug events presented to the emergency room had combined ADHD stimulant medications with other drugs

(Cohen, Jhung, & Budnitz, 2006). In 2006, the Drug Abuse Warning Network reported that 7, 873 patients were brought to emergency room across the nation for methylphenidate (Ritalin) or amphetamine-dextroamphetamine (Adderall) poisoning. Of the 7, 873, 48% of visits were presented for the nonmedical or illicit use of ADHD prescription stimulant medications and 34% of visits were presented for adverse reactions to the *legitimate medical use* of ADHD prescription stimulant medications (DAWN, 2006). This indicates that the side effects even for legitimate medical use can also be sufficiently serious. In 2005, the US Food and Drug Administration had to issue a public health advisory for both Adderall and Adderall XR because there were reports of twenty sudden, unexplained deaths and twelve strokes in pediatric patients prescribed to these medications (FDA, 2005a; Harvard Mental Health, 2006).

Although, research suggests that the abuse potential of ADHD prescription stimulants may be lower in the actual patients, particularly with the extended release prescriptions, stimulant medications like Adderall and Ritalin have a very high abuse and dependence potential because they are also highly addictive (Kollins, 2007; Smith et al., 2011; Drug Enforcement Administration, 2005; US Department of Justice; 1995). The US Food and Drug Administration classifies ADHD prescription stimulant medications as Schedule II Controlled Substances alongside cocaine and morphine because they share the same addictive ability. Also, case reports have indicated that these ADHD prescription stimulants *can* lead to tolerance and psychological or physical dependence (Drug Enforcement Administration, 1995; Upadhaya, Desaiah, Schuh, Bymaster, Kallman, Clarke, Allen, 2013).

Both Adderall and Ritalin reduce the symptoms of ADHD by blocking the reuptake of norepinephrine, dopamine, and serotonin and increasing the levels of catecholamines in the brain (Sherzada, 2012; Wilens, 2006). As a result, the brain's reward centers are innervated by the excess dopamine neurons, which causes psychological effects such as pleasure, but also, a potential for addiction and dependence (Robbins & Everette, 1996; Smith et al., 2011). According to Kroutil and colleagues, as of 2006 one out of every twenty individuals who illicitly uses prescription stimulants meets the DSM-IV criteria for dependence and abuse (Kroutil, Van Brunt, Herman-Stahl, Heller, Bray, & Penne, 2006).

Jason Pine of Duke University compares such stimulants to that of the street drug "speed," because they essentially do the same thing, "flood the brain with dopamine and induce euphoria, alertness, and alacrity (Pine, 2007)." Sofuoglu and Sewell (2008) support this claim, "the effects of cocaine and other amphetamines are mediated by increased synaptic concentrations of monoamines- dopamine, serotonin, and norepinephrine (Bardo, 1998; White & Kalives, 1998). Like prescription stimulants, the rewarding and addicting effects of drugs like cocaine and amphetamines are due to the increase of dopamine in the brain's reward centers (Koob, 1992; Tzschentke & Schmidt, 2000). According to Heil and colleagues (2002), the amphetamine scale of the Addiction Research Center Inventory shows increased scores with the MPH (Ritalin) stimulant in healthy adults, as compared with placebo (Heil, Holmes, Bickle, Higgins, Badger, Laws, & Faries, 2002). In another study, cocaine users report similar subjective effects following administration of MPH (Ritalin) as with administration of cocaine (Rush & Baker, 2001).

Societal Risks. Besides posing major health risks, the abuse of ADHD prescription stimulant medications threatens to effect society as well. Some research has expressed concern over the nonmedical use of prescription stimulants as a rising "social norm" and "cultural construct (Santosh et al.,, 2000; Timimi & Taylor, 2004; Stolzer, 2009; Pine, 2007)." As of 2000, 90% of the world sales of methylphenidate (Ritalin) were accounted for by the US. In Western Europe, such as in the UK and Germany, stimulant prescription is fifteen to thirty times less common (Robinson, Sclar, Skaer, & Galin, 1999). In a study on the misperceptions of non-medical prescription drug use, McCabe (2008) found that because many students view the nonmedical use of ADHD prescription stimulants at socially and morally acceptable, as well as physically harmless, such behavior is further promoted and the social norm is strengthened. "Perceived norms may predict later substance use as well as substance use behaviors may predict later perceived norms (McCabe, 2008)."

Some researchers venture as far as to argue *for* the use of prescription stimulants for cognitive enhancement in already healthy individuals. Greely and colleagues (2008) suggest that current regulation of psychoactive prescription drugs should be relaxed in order to bring drug regulatory systems up to date with emerging social norms (nonmedical use of prescription stimulants for cognitive enhancement). They argue that this would make it is easier to use such drugs for enhancement purposes and decriminalize the act. Finally, Greely and colleagues (2008) suggest that pharmaceutical companies be allowed to develop and market cognitive enhancing drugs to healthy individuals (Greely, Sahakian, Harris, Kessler, Gazzaniga, Campbell, & Farah, 2008).

Cognitive Enhancement Vs. Performance Enhancement. Other research is concerned about the implications this may have on the integrity of intelligence and academics. The use of stimulants and performance enhancers was first banned from the Olympics in 1968 because of their undeniable health risk, as well as, their potential to provide an unfair competitive advantage (Puffer, 1986; Verroken, 1988). Efforts to ban stimulants and performance enhancers from all sports continue to this day. It is also argued that the use of stimulants and performance enhancers in athletics threatens the integrity of the sport. According to The Olympic Movement, "mutual understanding, spirit of friendship, solidarity, and fair play are fundamental to the sport," and therefore the use of stimulants and performance enhancers in the Olympics has been outlawed (Ashby, 2010). The World Anti-Doping Agency believes that, "the integrity of the sport is fundamental to the spirit of the sport and that integrity is threatened by the use of performance enhancers (WADA, 2013)." The United Nations Educational, Scientific, and Cultural Organization division on anti-doping believes that, "doping jeopardizes the moral and ethical basis of sport and the health of those involved in it (UNESCO, 2013)." Finally, the National Football League states in its own steroid policy that steroid use, "threatens the fairness and integrity of athletic competition (NFL, 2013)." Such values and codes can be applied to the nonmedical use of prescription stimulants as performance enhancers in academics as well. Currently, both MPH (Ritalin) and AMP (Adderall) on the list of substances banned from sports competitions by the World Anti-Doping Agency (Docherty, 2008). If the use of such stimulants by healthy athletes is outlawed it should remain illegal for healthy individuals to use them in academics as well.

Achievement Gap. Another problem with the use of prescription stimulants for cognitive enhancement, legal or illegal, is the problem of distributive justice. As mentioned earlier, it is more common for students from higher socio-economic status and schools with highly competitive admissions standards to misuse or illicitly use prescription stimulants for academic purposes. Extensive research has illustrated the indisputable struggle of students from low socio-economic families. These students already face multiple obstacles just to achieve the same academic level as students from higher socio-economic families (Nalven, Hoffmann, & Bierbryer, 1967; Fredrickson, 1977; Chenoweth, 2007, Willingham, 2012). For instance, according to Daniel Willingham's (2012) Family Investment Model, parents from high socio-economic statuses have more capital, which allows them to invest more into their child's development (i.e. educational resources, healthcare, nutrition, living conditions, and early childhood daycare). Contrarily, his Stress Model indicates that low socio-economic status is associated with long- term stress, making the parents less effective and leading to direct biological consequences for the child's developing brain (Willingham, 2012).

The implicating factors of such a reality are that the addition of cognitive enhancements into the school systems will only widen that already existing achievement gap between low socio-economic students and high socio-economic students by adding to the advantages of the elites (Bostrom & Sandberg, 2009). Not only will access to such cognitive enhancements for students from low socio-economic status will be much more difficult, but the use of such cognitive enhancements for these students has the potential to only bring them up to the same academic level as those students from high socio-economic status (Farah, Illes, Cook-Deegan, Gardner, Kandel, King, Parens, Sahakian, &

Wolpe, 2004; Singh & Kelleher, 2010). However, if those students already with higher academic ability increase that ability then the existing achievement gap has just been maintained with the high academic levels getting higher and the low academic levels staying low.

Implications

Evidently, considerable research has been done on college students' misuse and illicit use of ADHD prescription stimulant medications. Prevalence rates, motivations, and perceptions on abuse of prescription stimulant medications, as well as, commonly correlated demographics have all been identified. However, research has failed to adequately investigate the potential for this phenomenon to occur within the high school environment. One study does indicate that it *is* in fact a phenomenon. The 2005 National Survey on Drug Use and Health found that 6.4 million persons twelve years or older reported intentional abuse of prescription medication. Of the sample, 1.1 million reported using prescription stimulants (Lessenger & Feinberg, 2008). Also, the National Institute on Drug Abuse found that nearly 1 out of every 4 adolescents, ages 12-17, admitted to the nonmedical use of prescription stimulants or pain medications. Specifically, 7% of eighth graders and 11% of tenth graders reported misusing or illicitly using prescription stimulants or pain medications (Johnston, O'Malley, & Bachman, 2005).

A study by Boyd and colleagues (2006) indicates that high school students' *motivations* for misusing or illicitly using ADHD prescription stimulants are similar to that of college students (for concentration, alertness, to study) but include also: to get high; experimentation; to counteract other drugs; weight loss; and addiction. However, as opposed to college students, high school students were much more likely to endorse

"experimentation" and "getting high" as reasons for use (Boyd, McCabe, Cranford, & Young, 2006).

Despite these findings, research on the prevalence of misuse or nonmedical use of prescription stimulant medication *in high school* is still very limited. Additionally, there is very little research examining the perceptions and attitudes of high school students towards the misuse and nonmedical use of prescription stimulant medication. Finally, the effects on society and the potential rise of nonmedical stimulant use as a "social norm" or a "cultural construct" should be explored. Therefore, the current study aims to further investigate such notions. Specifically, this study will examine the prevalence of misuse and illicit use of ADHD prescription stimulant medications *in high school students,* as well as, the attitudes and perceptions of high school students about the misuse and illicit use of ADHD prescriptions stimulant medication. Additionally, the study hopes that results may provide insight into the potentially rising social norm of academic enhancement by the misuse and nonmedical use of ADHD prescription stimulants and other effects this phenomenon may have on society. It was hypothesized that high school students' perceptions and attitudes towards the misuse and nonmedical use of ADHD prescription stimulant medication will be similar to those of college students. The misuse and nonmedical use of ADHD prescription stimulant medication will be viewed as posing no potential health or societal risks. The misuse and nonmedical use of ADHD prescription stimulant medication will also be viewed as socially and ethically acceptable.

Chapter 3

Method

Sample

The current study obtained its sample from multiple undergraduate students enrolled in courses at Rowan University. Students completed a questionnaire through an internet-based university subject pool. Students who completed the survey received credit towards their course grade. Since, the study was administered through the subject pool, students who were under the age of 18 and unable to provide consent were asked not to participate. The total sample yielded 95 participants, however, not all surveys were fully completed. Therefore, it is important to note that the sample size for the various statistical tests conducted vary according to the available response data for the selected survey items in question.

Procedures

In order to obtain the sample, a 31-part web-based questionnaire was posted on the university subject pool (See Appendix A). Participant identification was needed in order to grant credit for completing the survey, therefore, participants information was kept confidential on a secure flash drive kept on the principal researcher at all times. Participants were given an alternate consent form ensuring confidentiality (see Appendix B). In this questionnaire participants were asked questions regarding their diagnosis of ADHD and their prescription to stimulant medication (if applicable). Students without a diagnosis of ADHD or a prescription to stimulant medication were asked questions regarding their nonmedical use of prescription stimulants and any motives behind such use (if applicable). Students were asked to recall this information from their high school

years. All students were asked to report their agreement on a likert scale to statements regarding the prevalence and social acceptability for the misuse and nonmedical use of prescription stimulant medication.

Measures

The purpose of this study was to examine the prevalence rates of misuse or illicit use on ADHD prescription stimulant medication among high school students, as well as, high school students' perceptions and attitudes regarding the misuse or illicit use of ADHD prescription stimulant medications. This study asked college students to retrospectively recall activity regarding the misuse or illicit use of ADHD prescription stimulant medications *in high school*. The survey was adapted from a questionnaire developed by Dr. Andrew Gallucci from Baylor University for completion of his doctoral dissertation. In order to determine reliability and validity, Dr. Gallucci, "conducted a Principal Components Analysis (PCA) that determined the internal consistency, the number of factors included in each section, and excluded questions cross-loaded or loaded that did meet the loading threshold of 0.400 (Floyd & Widaman, 1995). In addition, a Cronbach's alpha test to assess the internal consistency and reliability of each factor as well as both theoretically based *nonmedical use of prescription stimulants* (NMUPS) and diversion scales (Gallucci, 2011)."

Sample questions for students with a diagnosis for ADHD and a prescription to stimulant medication include, "Have you **ever** taken your prescription stimulant medications (*such as Ritalin, Adderall, Concerta, or Dexedrine) in excess or for a reason other than what the medication was prescribed for*?" and "On how many occasions did you take your prescription stimulant medications *in excess or for reasons other than what*

the medication was prescribed for?" Sample questions for students without a prescription for stimulant medication include, "Have you taken a prescription medication *(such as Ritalin, Adderall, Concerta, or Dexedrine) without a prescription for the medication?"* and "On how many occasions did you take your prescription stimulant medications *in excess or for reasons other than what the medication was prescribed for"* Students chose either yes or no for appropriate questions or chose one answer from a number of options provided. All students rated their agreement to statements regarding the prevalence and social acceptability of misuse and nonmedical use of prescription stimulant medications a likert scale from ranging from *strongly disagree* to *strongly agree*. Sample statements include, "At my high school, it was common for students **without** a prescription to take stimulant medications," and, "At my high school, it was socially acceptable for students **without** a prescription to take stimulant medications."

Design

This study investigated analyses of variance and correlational relationships between participants' high school class size and also the socio-economic status of the high school and participants' prevalence, perceptions, and attitudes towards the misuse or non-medical use of prescription stimulant medication. Additionally, this study investigated correlational relationships between participants' level of agreement on different questions.

The first three questions of the survey were intended to obtain a demographic profile of the participant so that possible correlations could be made between demographics and the prevalence of misuse or non-medical use of prescription stimulant medication, as well as, the attitudes and perceptions of misuse or nonmedical use if

prescription stimulant medication. For example, does a correlation exist between high school class size and the prevalence of misuse or non-medical use of prescription stimulant medication? These questions included name and location of high school, socio-economic status of high school, size of high school class.

The second set of questions pertained to participants who *were* prescribed to stimulant medications for the treatment of ADHD. These questions assessed the prevalence of the *misuse* of stimulant medications by those with a prescription and the motivation behind such misuse. The third set of questions pertained to participants *without* a prescription for stimulant medication. These questions assessed the prevalence of the *non-medical* use of stimulant medications by those with a prescription and the motivation behind such use. The final set of questions, of the likert type, assessed participants' agreement to statements regarding the misuse and non-medical use of prescription stimulant medication. The use of the Likert scale provides for scoring of an ordinal manner. The response values are assumed to be equidistant from one another and each response is assigned a positive integer value: *Strongly Disagree* (1), *Moderately Disagree* (2)*, Slightly Disagree* (3), *Neutral (Neither agree nor disagree)* (4), *Slightly Agree* (5), *Moderately Agree* (6)*, Strongly Agree* (7).

Chapter 4

Results

Characteristics of Sample

The present study was based on a sample of 95 undergraduate students from the university's subject pool. The majority of the sample reported attending a high school from "middle socio-economic status (n=75, 78.9%) and from a class size ranging from 101-300 students (n=36, 37.9%).

Inferential Statistic Analyses

When response scores to Likert items are used in analyses, the numerical scale corresponds to the responses in the following way *Strongly Disagree* (1), *Moderately Disagree* (2)*, Slightly Disagree* (3), *Neutral (Neither agree nor disagree)* (4), *Slightly Agree* (5), *Moderately Agree* (6)*, Strongly Agree* (7). In this way, a mean score of 5 or above signifies a participant's agreement with a survey item or grouping of items. A mean score of 3 or below signifies a participant's disagreement with a survey item or grouping of items. A mean score of 4 indicates a participant's feelings of neutrality towards the survey item.

Descriptive statistics revealed the average response to questions regarding the research hypothesis. The results in Table 1 are descriptive statistics pertaining to the entire body of participants and their corresponding responses to the most pertinent survey items. To summarize, the mean response to the misuse *and* nonmedical use of prescription stimulant medication was "no." The mean response to "It was socially acceptable for students *without* a prescription to use stimulant medications," was a 3.30

(SD=2.05). On average, response to, "It was socially acceptable for students *with* a prescription to take stimulant medications in excess," was a 3.02 (SD= 2.07). This means that, the average response to *both* statements was "slightly disagree." Descriptive statistics also revealed that on average, students responded that they "slightly disagree" that *both* the use of stimulant medication *without* a prescription and the excess use of stimulant medications by those *with* a prescription was common. Finally, the mean response to, "In high school, I believed it was safe for students *without* a prescription to use stimulant medication," was 2.14 (SD= 1.63). This means that the average response was closest to "moderately disagree." The mean response to, "In high school, I believed it was safe for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," was 2.05 (SD=1.58), also indicating that the average response was "moderately disagree."

Table 1

Descriptive Statistics: Sample Population

Survey Item/ Measure	**N**	**Mean**	**SD**	**Min**	**Max**
High School Class Size	95	2.5579	1.00759	.00	4.00
High School Socio-Economic Status	95	1.9789	.46078	1.00	.46078
"In high school, did you ever take your prescription medication *in excess or for purposes other than prescribed?*	95	1.0211	.56454	.00	2.00
"In high school, did you ever take stimulant medication *without* a prescription for the medication?"	95	1.0632	.43296	.00	2.00
"At my high school, it was socially acceptable for students *without* a prescription to use	95	3.3053	2.05288	.00	7.00

Table 1 (Continued)

Descriptive Statistics: Sample Population

Survey Item/ Measure	**N**	**Mean**	**SD**	**Min**	**Max**
stimulant medications."					
"At my high school, it was socially acceptable for students with a prescription to use stimulant medication *in excess or for purposes other than prescribed.*"	95	3.0211	2.07302	.00	7.00
"At my high school, the use of stimulant medication by students *without* a prescription was common."	95	3.1895	1.97481	.00	7.00
"At my high school, the use of stimulant medication (by students with a prescription) *in excess or for purposes other than prescribed* was common."	95	3.0842	1.98217	.00	7.00
"In high school, I believed it was safe for students *without* a prescription to use stimulant medications."	95	2.1474	1.63713	.00	6.00
"In high school, I believed it was safe for students *with* a prescription to use stimulant medications *in excess or for purposes other than prescribed.*"	95	2.0526	1.58025	.00	7.00
"In high school, I believed it was ethical for students *without* a prescription to use stimulant medication."	95	1.8632	1.36530	.00	6.00
"In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*."	95	1.9368	1.46455	.00	6.00

Table 1 (Continued)

Descriptive Statistics: Sample Population

Note. Scores range from 1.00 to 7.00; higher scores indicate participants' greater degree of agreement with statements regarding the misuse or non-medical use of prescription stimulant medications.

Correlational Analyses

Misuse/Safety of Illicit Use. Statistical analyses revealed relationships between participants agreement to certain survey items. The correlation between a participant's response to the question, "In high school, did you ever take your prescription stimulant medication *in excess or for purposes other than prescribed*?" and his or her level of agreement to the statement, "In high school, I believed it was safe for students *without* a prescription use stimulant medication," is statistically significant, $r(95) = +.238$, $p = .020$, two-tailed.

Illicit Use/Safety of Illicit Use. The correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "In high school, I believed it was safe for students *without* a prescription use stimulant medication," is statistically significant, $r(95) = +.332$, $p = .001$, two-tailed.

Misuse and Illicit Use/Social Acceptability. The correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "At my high school, it was socially acceptable for students *without* a prescription to se stimulant medication," is statistically significant, $r(95) = +.229$, $p =$

.025, two-tailed. Likewise, the correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "At my high school, the use of stimulant medication (by students with a prescription) *in excess or purposes other than prescribed* was socially acceptable," is statistically significant, r(95) = +.212, p = .039, two-tailed.

Misuse and Illicit Use/Ethicality. The correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "In high school, I believed it was ethical for students *without* a prescription to use stimulant medication," is statistically significant, r(95) = +.249, p = .015, two-tailed. Likewise, the correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," is statistically significant, r(95) = +.275, p = .007, two-tailed.

Social Acceptability/Safety. The correlation between a participant's level of agreement to the statement "At my high school it was socially acceptable for students *without* a prescription to use stimulant medication," and the level of agreement to the survey item, "In high school, I believed it was safe for students *without* a prescription to use stimulant medication," is statistically significant, r(95) = +.502, p = .000, two-tailed. Likewise, the correlation between a participant's level of agreement to the statement "'At my high school, it was socially acceptable for students *with* a prescription to use

stimulant medication *in excess or for purposes other than prescribed.*" and the level of agreement to the survey item, "In high school, I believed it was safe for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," is statistically significant, r(95) = +.409, p = .000, two-tailed.

Social Acceptability/Ethicality. The correlation between a participant's level of agreement to the statement "At my high school it was socially acceptable for students *without* a prescription to use stimulant medication," and the level of agreement to the survey item, "In high school, I believed it was ethical for students *without* a prescription to use stimulant medication," is statistically significant, r(95) = +.387, p = .000, two-tailed. Likewise, the correlation between a participant's level of agreement to the statement, "At my high school, it was socially acceptable for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed.*" and the level of agreement to the survey item, "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," is statistically significant, r(95) = +.438, p = .000, two-tailed.

Misuse/Prevalence. Correlations between a participant's response to, "In high school, did you ever take your prescription stimulant medication *in excess or for purposes other than prescribed*?" and his or her agreement to the statement, "At my high school, the use of stimulant medication (by students with a prescription) *in excess or for purposes other than prescribed* was common," were not significant. Likewise, correlations between a participant's response to, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her agreement to the statement, "At my high school, the use of stimulant medication by students *with* a

prescription was common," were not significant.

Analyses of Variance: Socio-Economic Status

SES/Social Acceptability. A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement, "At my high school, it was socially acceptable for students *without* a prescription to use stimulant medication," varies significantly according to a participant's indicated socioeconomic status. The findings were significant, $F(2, 92) = 5.216$, $p = .007$. Levels of agreement to this statement differed according to the indicated socioeconomic status: "Small" (M =1.8889, SD = .2.14735), "Medium" (M = 3.6400, SD = 1.99757), "Large" (M =2.1818, SD = .1.53741). Participants who reported attending a high school from a middle socio-economic status agreed more with the statement, "At my high school, the use of stimulant medication by students *without* a prescription was socially acceptable." Participants who reported attending a high school from a middle socio-economic status agreed more with the statement, "At my high school, it was socially acceptable for students *without* a prescription to use stimulant medication." The results specific to this ANOVA are presented in Table 2.

Table 2

Variance of Agreement to social acceptability of nonmedical prescription stimulant use according to Socio-Economic Status

	df	*SS*	*MS*	*F*	*p*
Between groups	2	40.342	20.171	5.216	.007*
Within groups	92	355.805	3.867		
Total	94	396.147			

Note. *The mean difference is significant at the 0.05 level.

Table 2.1

Average Agreement Score according to Socio-Economic Status

Socio-Economic Status	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
High SES	11	2.1818	1.53741	.46355	1.00	6.00
Middle SES	75	3.6400	1.99757	.23066	.00	7.00
Low SES	9	1.8889	2.14735	.71578	.00	6.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the social acceptability of nonmedical prescription stimulant use.

Figure 1 further demonstrates the evident differences between the variance of agreement to social acceptability of nonmedical prescription stimulant use according to socio-economic status.

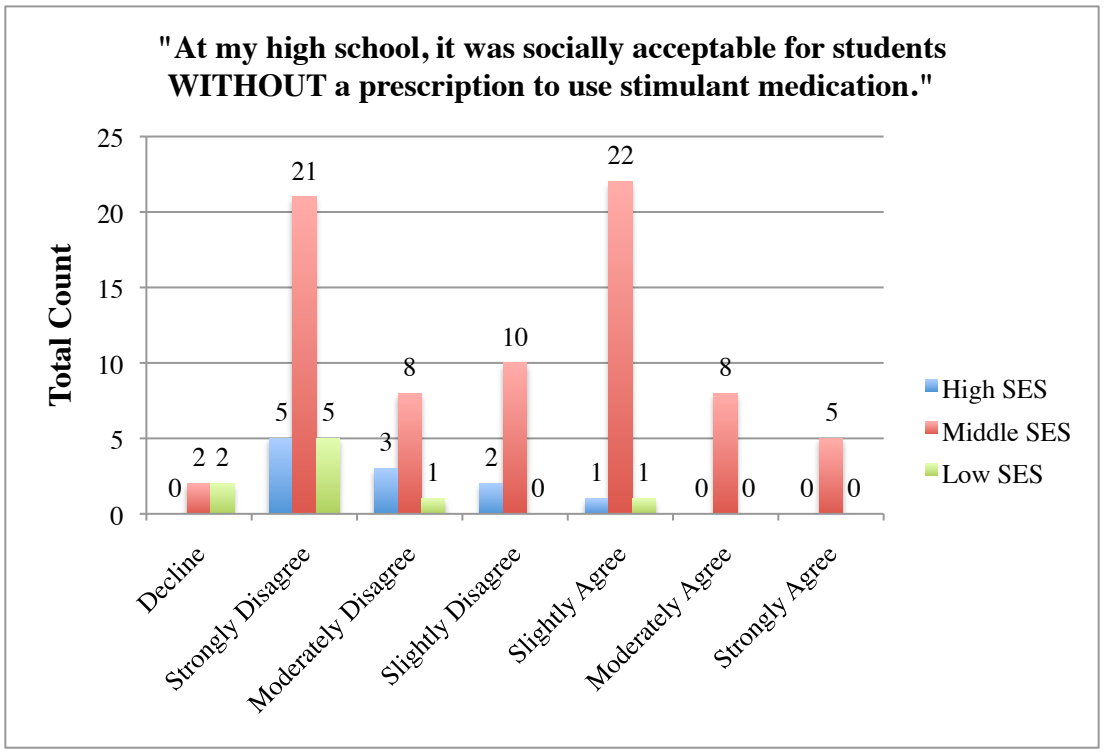

Figure 1. Comparing variance of agreement to social acceptability of nonmedical prescription stimulant use according to socio-economic status.
Note. *Finding is significant at $p < 0.05$.

SES/Social Acceptability. A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement, "At my high school, it was socially acceptable for students *with* a prescription to use stimulant medication to use stimulant medication *in excess or for purposes other than prescribed*," varies significantly according to a participant's indicated socioeconomic status. The findings were significant, $F(2, 92) = 5.971$, $p = .004$. Levels of agreement to this statement differed according to the indicated socioeconomic status: "Small" ($M = 1.3333$, $SD = 1.50000$), "Medium" ($M = 3.3733$, $SD = 2.09099$), "Large" ($M = 2.0000$, $SD = 1.26491$). Participants who reported attending a high school from a middle socio-economic status agreed more with the statement, "At my high school, it was socially acceptable for students *with* a prescription to use stimulant medication to use stimulant medication *in excess or for purposes other than prescribed*." The results specific to this ANOVA are presented in Table 3.

Table 3

Variance of Agreement to social acceptability of the misuse of prescription stimulant medication according to socio-economic status

	df	*SS*	*MS*	*F*	*p*
Between groups	2	46.411	23.206	5.971	.004*
Within groups	92	357.547	3.886		
Total	94	403.958			

Note. *The mean difference is significant at the 0.05 level.

Table 3.1

Average Agreement Score according to Socio-Economic Status

Socio-Economic Status	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
High SES	11	2.0000	1.26491	.38139	1.00	5.00
Middle SES	75	3.3733	2.09099	.24145	.00	7.00
Low SES	9	1.3333	1.50000	.50000	.00	5.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the social acceptability of the misuse of prescription stimulant medication.

Figure 2 further demonstrates the evident differences between the variance of agreement to social acceptability of the misuse of prescription stimulant medication according to socio-economic status.

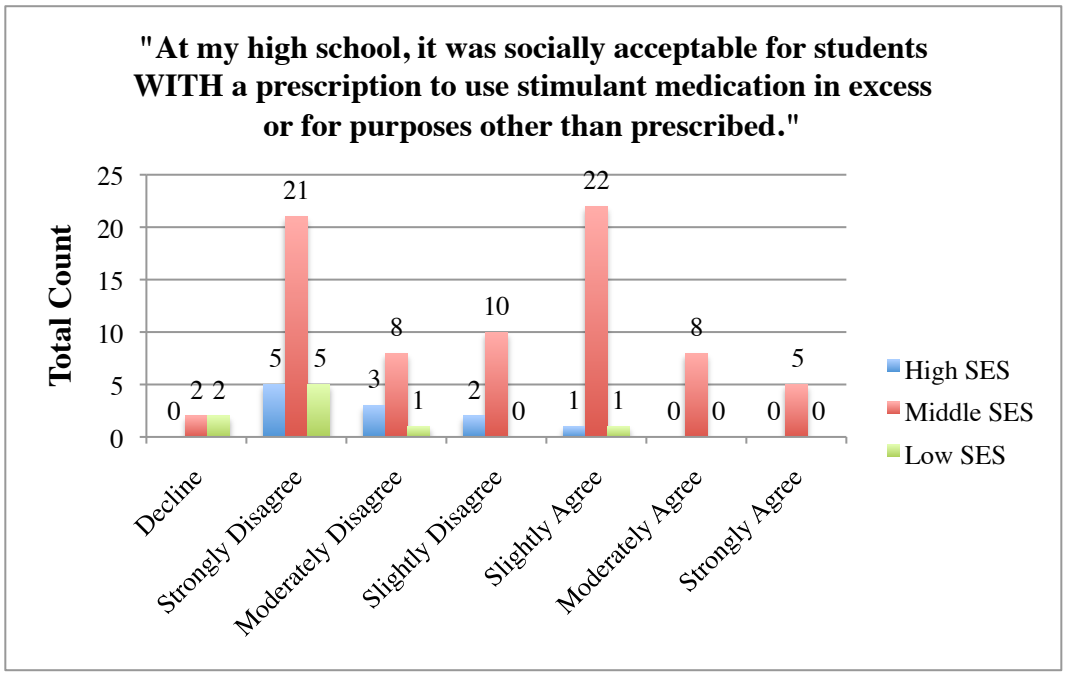

Figure 2. Comparing variance of agreement to social acceptability of nonmedical prescription stimulant use according to socio-economic status.
Note. *Finding is significant at $p < 0.05$.

SES/Illicit Use. A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement, "At my high school, the use of stimulant medication by students *without* a prescription was common," varies significantly according to a participant's indicated socioeconomic status. The findings were significant, $F(2, 92) = 7.204$, $p = .001$. Levels of agreement to this statement differed according to the indicated socioeconomic status: "Small" ($M = 1.2222$, $SD = .97183$), "Medium" ($M = 3.5333$, $SD = 1.98190$), and "Large" ($M = 2.4545$, $SD = .1.36848$). Participants who reported attending a high school from a middle socio-economic status agreed more with the statement, "At my high school, the use of stimulant medication by students *without* a prescription was common." The results specific to this ANOVA are presented in Table 4.

Table 4

Variance of Agreement to prevalence of nonmedical prescription stimulant use according to socio-economic status

	df	*SS*	*MS*	*F*	*p*
Between groups	2	49.640	24.820	7.204	.001*
Within groups	92	23.378	.531		
Total	94	33.280			

Note. *The mean difference is significant at the 0.05 level.

Table 4.1

Average Agreement Score according to Socio-Economic Status

Socio-Economic Status	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
High SES	11	2.4545	1.36848	.41261	1.00	6.00
Middle SES	75	3.5333	1.98190	.22885	.00	7.00
Low SES	9	1.2222	.97183	.32394	.00	3.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the prevalence of nonmedical prescription stimulant use.

Figure 3 further demonstrates the evident differences between the variance of agreement to prevalence of nonmedical prescription stimulant use according to socio-economic status.

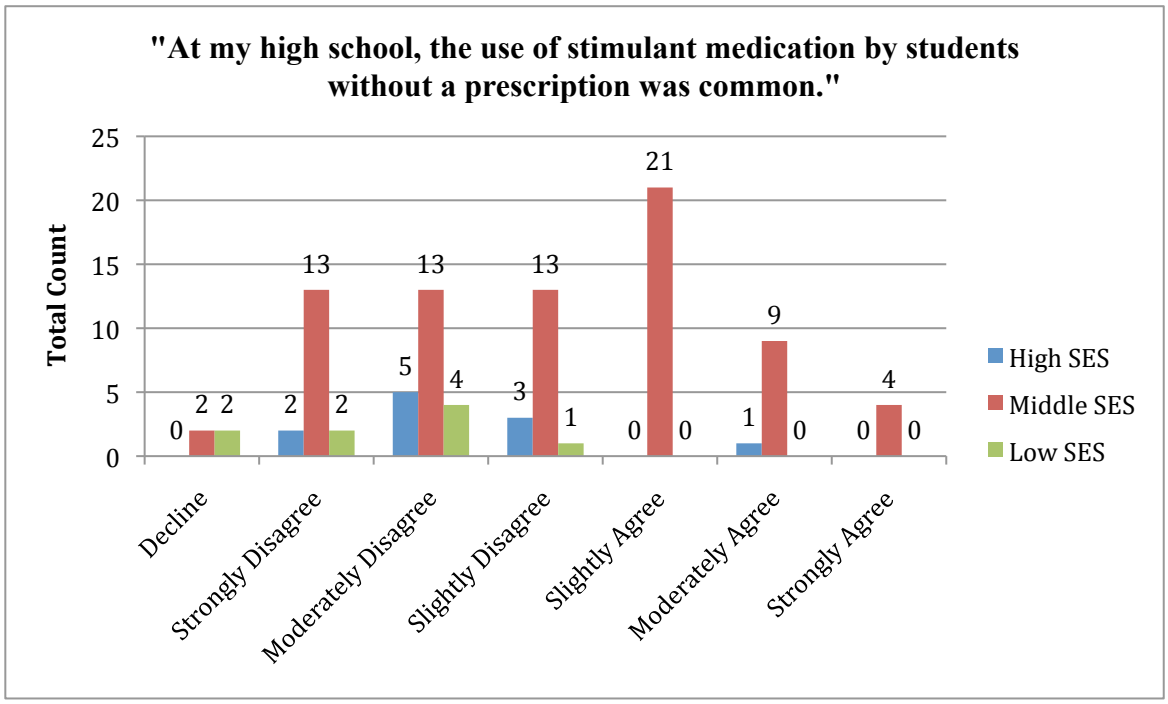

Figure 3. Comparing variance of agreement to prevalence of nonmedical prescription stimulant use according to socio-economic status.
Note. *Finding is significant at $p < 0.05$.

SES/Safety. A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement "In high school, I believed it was safe for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," varies significantly according to a participant's indicated socioeconomic status. The findings were significant, $F(2, 92) = 5.601$, $p = .005$. Levels of agreement to this statement differed according to the indicated socioeconomic status: "Small" ($M = .6667$, $SD = .50000$), "Medium" ($M = 2.0933$, $SD = 2.02260$), and "Large" ($M = 2.9091$, $SD = .2.02260$). In this case, participants from middle socio-economic status *disagreed* more with the statement, "In high school, I believed it was safe for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*." The results specific to this ANOVA are presented in Table 5.

Table 5

Variance of Agreement to safety of misuse of prescription stimulant medication according to socio-economic status

	df	*SS*	*MS*	*F*	*p*
Between groups	2	25.481	12.741	5.601	.005*
Within groups	92	209.256	2.275		
Total	94	234.737			

Note. *The mean difference is significant at the 0.05 level.

Table 5.1

Average Agreement Score according to Socio-Economic Status

Socio-Economic Status	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
High SES	11	2.9091	2.02260	.60984	1.00	7.00
Middle SES	75	2.0933	1.49931	.17313	.00	6.00
Low SES	9	.6667	.50000	.16667	.00	1.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the prevalence of nonmedical prescription stimulant use.

Figure 4 further demonstrates the evident differences between the variance of agreement to prevalence to the safety of the misuse of prescription stimulant medications according to socio-economic status.

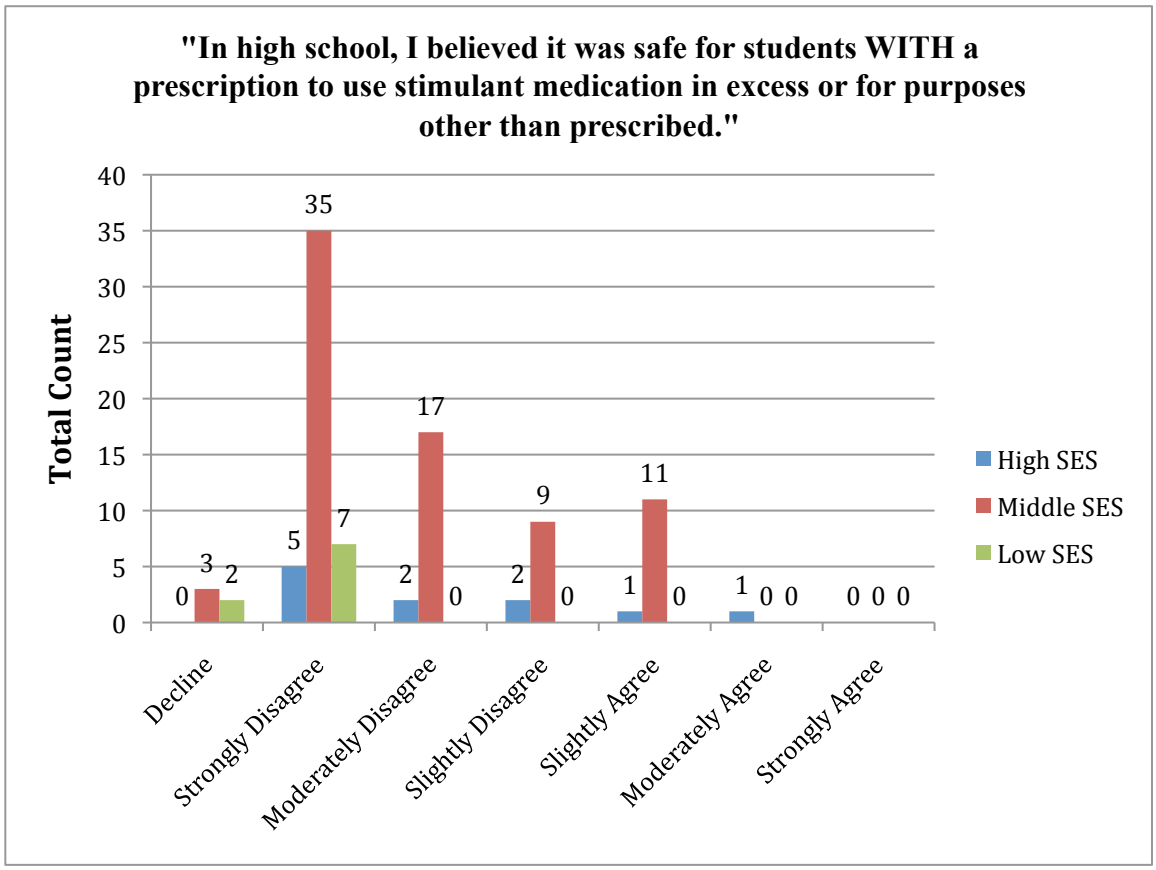

Figure 4. Comparing variance of agreement to the safety of misuse of prescription stimulant medications according to socio-economic status.
Note. *Finding is significant at $p < 0.05$.

SES/Ethicality. A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," varies significantly according to a participant's indicated socioeconomic status. The findings were significant, $F(2, 92) = 3.573$, $p = .032$. Levels of agreement to this statement differed according to the indicated socioeconomic status: "Small" ($M = .7778$, $SD = .44096$), "Medium" ($M = 2.0133$, $SD = 1.44721$), and "Large" ($M = 2.3636$, $SD = 1.74773$). Participants who reported attending a high school from a high socio-economic status agreed more with the statement, "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*." The results specific to this ANOVA are presented in Table 6.

Table 6

Variance of Agreement to ethicality of misuse of prescription stimulant medication according to socio-economic status

	df	*SS*	*MS*	*F*	*p*
Between groups	2	14.533	7.267	3.573	.032*
Within groups	92	187.088	2.034		
Total	94	201.621			

Note. *The mean difference is significant at the 0.05 level.

Table 6.1

Average Agreement Score according to Socio-Economic Status

Socio-Economic Status	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
High SES	11	2.3636	1.74773	.52696	1.00	6.00
Middle SES	75	2.0133	1.44721	.16711	.00	5.00
Low SES	9	.7778	.44096	.14699	.00	1.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the prevalence of illicit prescription stimulant use.

Figure 5 further demonstrates the evident differences between the variance of agreement to the ethicality of the misuse of prescription stimulant medication according to socio-economic status.

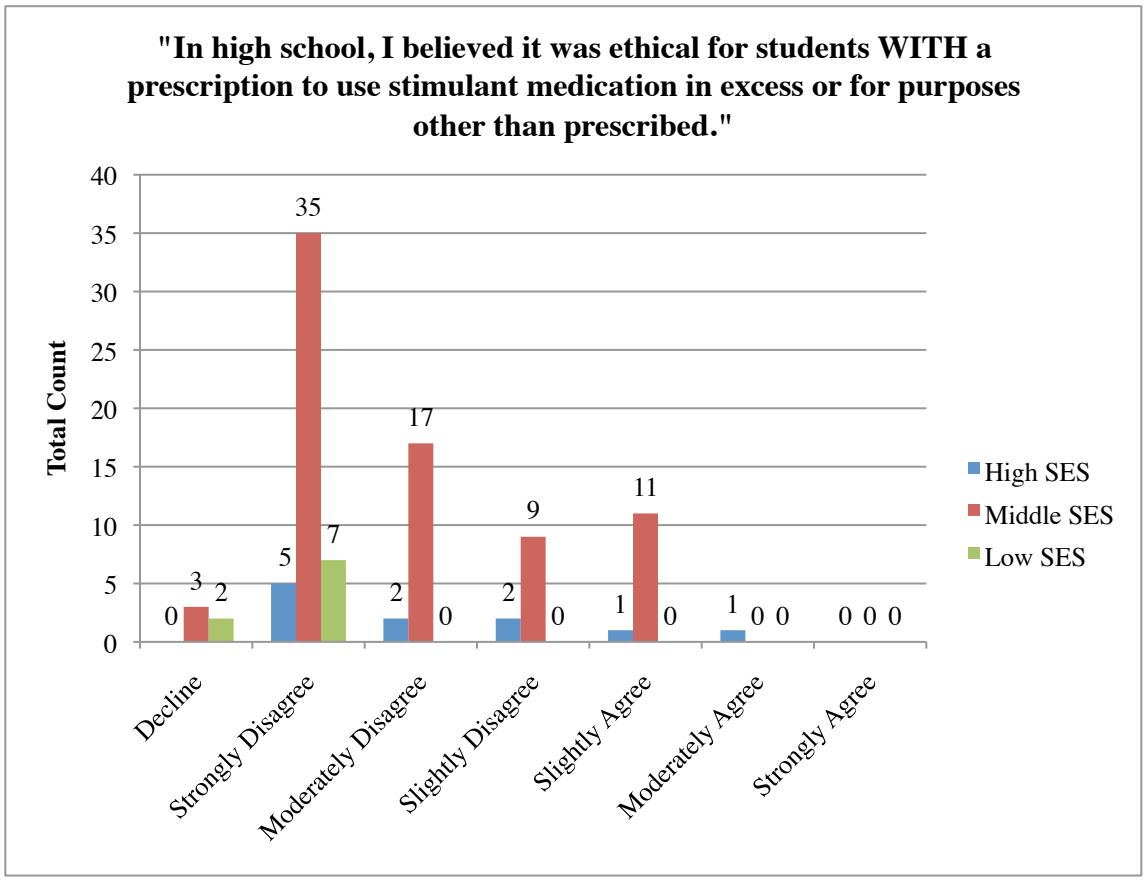

Figure 5. Comparing variance of agreement to the ethicality of misuse of prescription stimulant medications according to socio-economic status.
Note. *Finding is significant at $p < 0.05$.

Analyses of Variance: High School Class Size

A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to certain survey items varied significantly according to a participant's indicated high school class size. For these tests, two participants were discarded from the total sample because they did not indicate their high school class size. Therefore these tests were ran against a sample total of 95. The numerical scale for high school class size corresponds to the responses in the following way *1=100 students or less, 2=101-300 students, 3=301-499 students, 4=500 or more students.*

Class Size/Ethicality. A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement "In high school, I believed it was ethical for students *without* a prescription to use stimulant medication," varies significantly according to a participant's indicated high school class size. The findings were significant, $F(3, 89) = 3.832$, $p = .012$. Levels of agreement to this statement differed according to the indicated class size: "1" ($M = 3.1000$, $SD = .2.02485$), "2" ($M = 1.8056$, $SD = 1.45051$), "3" ($M = 1.5556$, $SD = .84732$), "4" ($M= 1.6500$, $SD= .93330$). Participants who reported attending a high school from *class size 1* status agreed more with the statement, "In high school, I believed it was ethical for students *without* a prescription to use stimulant medication." The results specific to this ANOVA are presented in Table 7.

Table 7

Variance of Agreement to ethicality of nonmedical prescription stimulant use according to high school class size

	df	*SS*	*MS*	*F*	*p*
Between groups	3	18.825	6.275	3.832	.012*
Within groups	89	145.756	1.638		
Total	92	164.581			

Note. *The mean difference is significant at the 0.05 level.

Table 7.1

Average Agreement Score according to High School Class

Class Size	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
1 (less than 100)	10	3.1000	2.02458	.64031	1.00	6.00
2 (101-300)	36	1.8056	1.45051	.16711	.00	6.00
3 (301-499)	27	1.5556	.84732	.16307	.00	3.00
4 (500 or more)	20	1.6500	.93330	.20869	.00	3.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the prevalence of nonmedical prescription stimulant use.

Figure 6 further demonstrates the evident differences between the variance of agreement to the ethicality of nonmedical prescription stimulant use according to high school class size.

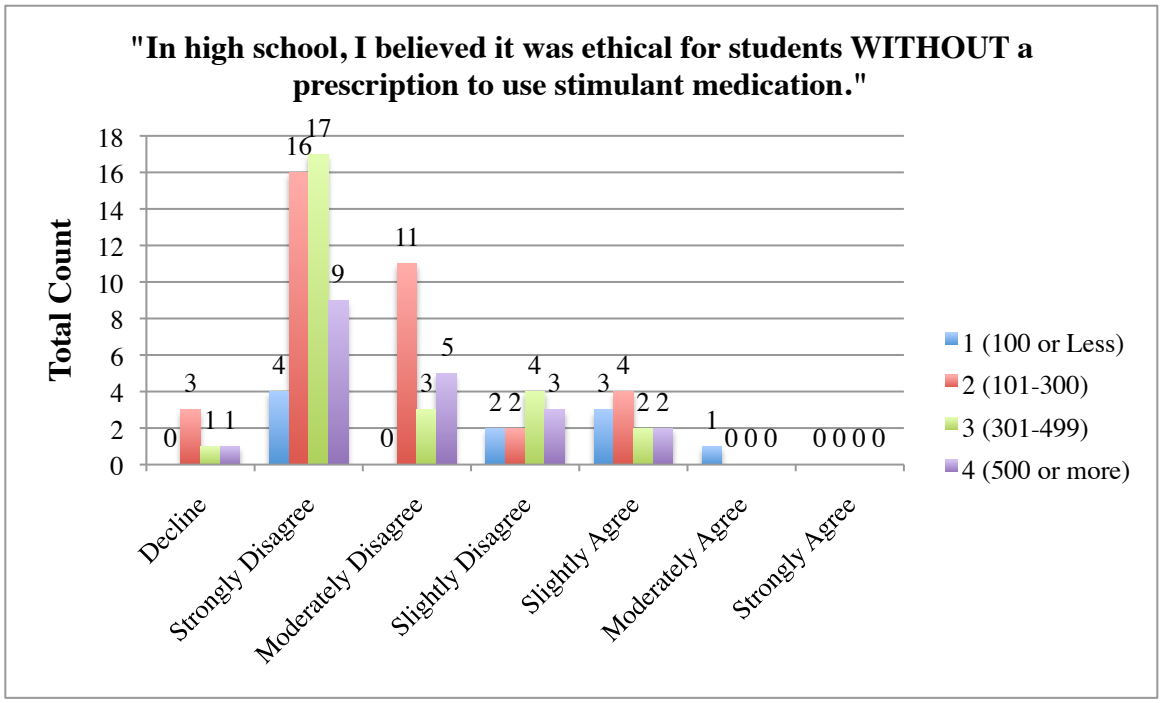

Figure 6. Comparing variance of agreement to the ethicality of nonmedical prescription stimulant use according to high school class size.
Note. *Finding is significant at $p < 0.05$.

A between groups one-way analysis of variance (ANOVA) was calculated to assess whether a participant's level of agreement to the statement "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*," varies significantly according to a participant's indicated high school class size. The findings were significant, $F(3, 89) = 2.780$, $p = .046$. Levels of agreement to this statement differed according to the indicated class size: "1" ($M = 3.1000$, $SD = .2.02485$), "2" ($M = 1.7778$, $SD = 1.35459$), "3" ($M = 1.6667$, $SD = .1.24035$), "4" ($M= 1.9000$, $SD= .1.33377$). Participants who reported attending a high school from *class size 1* status agreed more with the statement, "In high

school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*." The results specific to this ANOVA are presented in Table 8.

Table 8

Variance of Agreement to ethicality of the misuse of prescription stimulant medication according to high school class size

	df	*SS*	*MS*	*F*	*p*
Between groups	3	16.390	5.463	2.780	.046*
Within groups	89	174.922	1.965		
Total	92	191.312			

Note. *The mean difference is significant at the 0.05 level.

Table 8.1

Average Agreement Score according to High School Class

Class Size	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
1 (less than 100)	10	3.1000	2.02458	.64031	1.00	6.00
2 (101-300)	36	1.7778	1.35459	.22577	.00	5.00
3 (301-499)	27	1.6667	1.24035	.23870	.00	5.00
4 (500 or more)	20	1.9000	1.33377	.29824	.00	5.00

Note. Scores range from .00 to 7.00; .00 indicating a participant's "decline to answer"; higher scores indicate participants' greater degree of agreement with statements regarding the prevalence of the misuse of prescription stimulants.

Figure 7 further demonstrates the evident differences between the variance of agreement to the ethicality of the misuse of prescription stimulants according to high school class size.

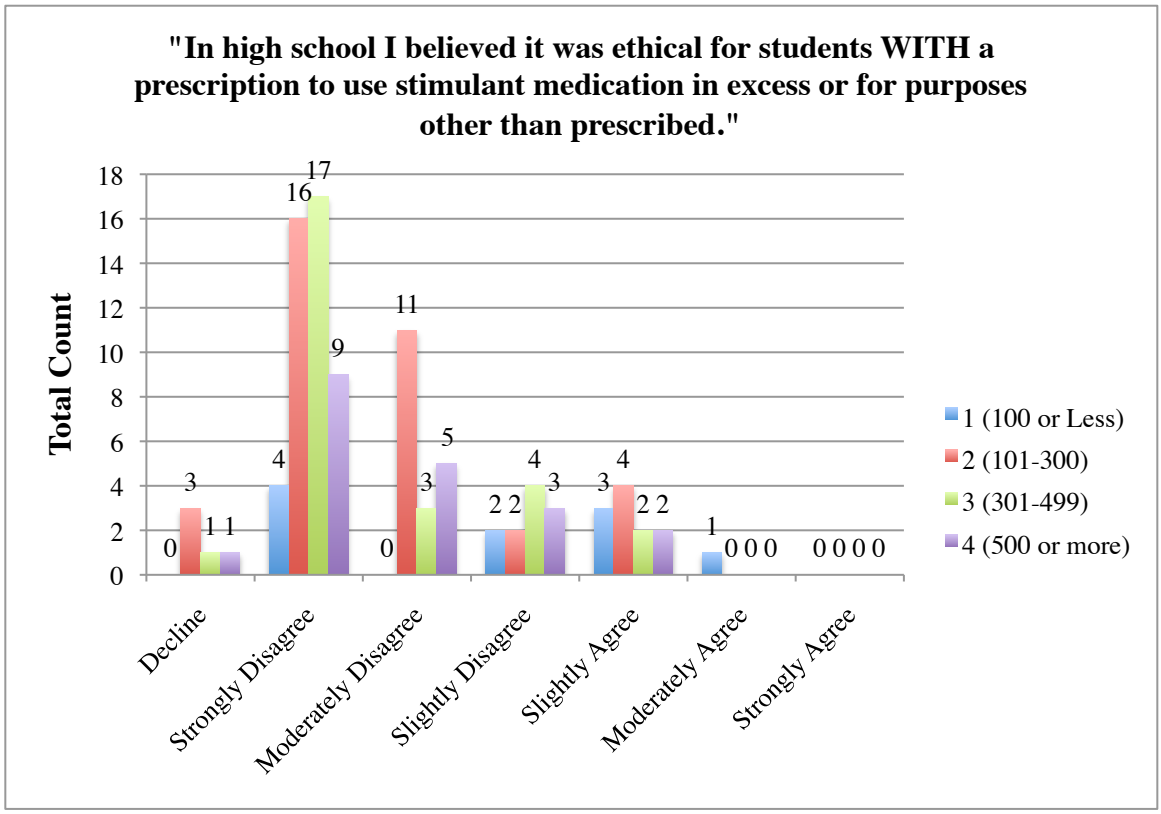

Figure 7. Comparing variance of agreement to the ethicality of the misuse of prescription stimulants according to high school class size.
Note. *Finding is significant at $p < 0.05$.

Chapter 5
Discussion

Conclusions Regarding Sample Population

The current study hypothesized that high school students' prevalence, perceptions, and attitudes towards the misuse and nonmedical use of prescription stimulant medication will be similar to those of college students: high school students will perceive the misuse and nonmedical use of ADHD prescription stimulant medication as socially and ethically acceptable and posing no potential health risks. In contrast to prior research, this hypothesis was not supported by the results of the current study. From a sample of 95 participants, the total number of participants who admitted to misusing their prescription stimulant medication was 16 or 16.8%. The total number of participants who admitted to illicitly using prescription stimulant medication was 12 or 12.6%. These numbers do not reflect the prevalence of stimulant use by college students evident in prior research. Additionally, the average perception regarding prevalence, social acceptability, safety, and ethicality do not reflect the college students' perceptions of misuse and nonmedical use of stimulants evident in prior research. However, the response averages may have been brought down by students who "declined to answer" the questions or by a large number of students who "strongly disagreed" with many of the statements (White et al., 2006; Jardin et al., 2011; Wilens et al., 2006; Sepulveda et al., 2011; Rabinar et al., 2009; Upadhaya et al., 2005; McCabe et al., 2006; Dupont, et al., 2007; Arria et al., 2008).

Social Acceptability. The mean response to, "It was socially acceptable for students *without* a prescription to use stimulant medications" was "slightly disagree." However, 41 (43%) students actually either slightly, moderately, or strongly agreed to the

statement. Contrarily, 27 (28%) students "strongly disagreed" with the statement or "declined to answer." This is the same case for social acceptability of students *with* a prescription taking stimulant medications in excess. The average response was "slightly disagree." The total number of students who slightly, moderately, or strongly agreed was 36 (37%.) Contrarily, 35 participants either "strongly disagreed," or "declined to answer," causing the average to fall into "slightly disagree." These findings suggest that almost half of the sample felt that the misuse and illicit use of stimulant medications was socially acceptable, reflecting the opinions of college students evident in prior research (DeSantis & Hane, 2010).

Prevalence. The mean response to, "At my high school, the use of stimulant medication by students *without* a prescription was common," was "slightly disagree." However, the total number of participants who slightly, moderately, or strongly agreed was 35 (36%). Still, 23 participants either "strongly disagreed" or "declined to answer." Likewise, the average response to, "At my high school, the use of stimulant medication by students *with* a prescription *in excess or for purposes other than prescribed,"* was common was "slightly disagree." The total number of participants who slightly, moderately, or strongly agreed was 32 (33%). These findings suggest that two-thirds of the sample did believe that misuse and illicit use of prescription stimulant medication was common in their high school.

Safety. The mean response to, "In high school, I believed it was safe for students *without* a prescription to take stimulant medication," was "moderately disagree." Participant response totals for this test *do* correspond with the average. Only 17 (17.8%) participants slightly or moderately agreed with the statement and 74 participants slightly

disagree, moderately disagree, or strongly disagreed. No participants "strongly agreed" to the statement, though, 4 participants "declined to respond" to the statement. Likewise, the mean response to, "In high school, I believed it was safe for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed,*" was also "moderately disagree." Participant response totals are very similar: 15 participants slightly or moderately agreed with the statement, 75 participants slightly, moderately, or strongly disagreed, and 5 participants did not respond. These results do not reflect college students' opinions on the safety of misuse and illicit use of stimulant medication evident in prior research (DeSantis & Hane, 2010).

Ethicality. Finally, responses in regard to the ethicality of the misuse or illicit use of prescription stimulant medications also fail to support the hypothesis and do not reflect college students' opinions of the ethicality of stimulant use. The mean response to, "In high school, I believed it was ethical for student *without* a prescription to use stimulant medication," was between strongly and moderately disagree. Participant totals reflect this average: 7 participants slightly or moderately agree, 82 participants slightly, moderately, or strongly disagree, and 5 participants did not respond. Likewise, the mean response to, "In high school, I believed it was ethical for student *without* a prescription to use stimulant medication," was between strongly and moderately disagree. Participant totals reflect this average: 13 participants slightly or moderately agree, 77 participants slightly, moderately, or strongly disagree, and 5 participants did not respond.

Conclusions Regarding Correlational Analyses

Correlational analyses were run to see whether a relationship existed between the ways that participants answered certain survey items. It was hypothesized that if a participant admitted to using their prescription stimulant medication *in excess or for purposes other than prescribed*, than that participant would "agree" to the statement, "At my high school, it was socially acceptable for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed,*" as well as, "At my high school, it was socially acceptable for students *without* a prescription to use stimulant medication." These analyses were not significant. Additionally, it was hypothesized that participants would agree to the statement, "At my high school, the use of stimulant medication (by students with a prescription) *in excess or for purposes other than prescribed* was common," and, "At my high school, the use of stimulant medication *without* a prescription was common." These analyses were not significant.

Misuse/Safety. There was a significant correlation between a participant's response to, "In high school, did you ever take your prescription stimulant medication *in excess or for purposes other than prescribed,*" and the level of agreement to the survey item, "In high school, I believed it was safe for students *without* a prescription to take stimulant medications." Participants who admitted to misusing their prescription stimulant medication agreed more that it was safe for students *without* a prescription to take stimulant medication. However, there was no correlation between participants' misuse of prescription stimulant medication and the level of agreement to the survey item, "In high school, I believed it was safe for students *with* a prescription to take stimulant medication *in excess or for purposes other than prescribed.*"

Illicit Use/Social Acceptability. There was a significant correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "At my high school, it was socially acceptable for students *without* a prescription to use stimulant medication." Participants who admitted to illicitly using stimulant medication agreed more that it was socially acceptable for students *without* a prescription to use stimulant medication. Likewise, participants who admitted to illicitly using stimulant medication agreed more that it was socially acceptable for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed.*

This may be an indication that the students who use prescription stimulant medication illicitly do so because they believe it to be "socially acceptable," or that they believe it to be "socially acceptable" because they do it. However, this could also be an indication that those participants who use prescription stimulant medication illicitly believe it to be more socially acceptable because they are more aware of the populations that illicitly use stimulant medication. Whereas, those participants who did not admit to using stimulant medication illicitly may not believe it is as socially acceptable because they are not associated with the population that does so. In prior research it was found that results were affected by students' living status. Nontraditional students, or students who did not live on campus, were less likely to report illicit stimulant use and it was proposed that these students may be unaware of the substance abuse trends of stimulant medications on campus (Advokat, Guidry, Martino, 2008; Babcock & Byrne, 2000). Since, the university used in the present study has a large population of nontraditional

students who live off campus, this sample may also be represented by students who are unaware of the substance abuse trends on campus.

Illicit Use/Safety. There was a significant correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without* a prescription for the medication?" and his or her level of agreement to the statement, "In high school, I believed it was safe for students *without* a prescription to use stimulant medication." Participants who admitted to illicitly using stimulant medication agreed more that it was safe for students *without* a prescription to use stimulant medication. This may indicate that students who use stimulant medication illicitly do so because they believe it is safe, or students believe it is safe because they have used stimulant medication illicitly and have experienced no negative side effects.

In prior research, in a sample of undergraduate college students, it was reported that only 2% of participants believed that illicit stimulant use was "very dangerous," and 81% of participants believed it was either "not dangerous at all," or only "slightly dangerous (DeSantis & Hane, 2008)." Also, students believed that since prescription stimulants came from legal pharmaceuticals as opposed to illegal street narcotics they must be safe. Participants also argued that prescription stimulants are safe because they do not impair the function of the body the way that street narcotics do. Finally, participants argued that prescription stimulants were not addictive, and therefore they are safe (DeSantis & Hane, 2010). Participants from the current sample may have the same perceptions as those of college students evident in prior research.

Illicit Use/Ethicality. There was a significant correlation between a participant's response to the question, "In high school, did you ever take stimulant medication *without*

a prescription for the medication?" and his or her level of agreement to the statement, "In high school, I believed it was ethical for students *without* a prescription to use stimulant medication." Participants who admitted to illicitly using stimulant medication agreed more that it was ethical for students *without* a prescription to use stimulant medication illicitly. Likewise, there was a significant correlation between a participant's response and his or her level of agreement to the statement, "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*." Participants who admitted to illicitly using stimulant medication agreed more that it was ethical for students *with* a prescription to misuse stimulant medication. This may indicate that students who use stimulant medication illicitly do so because they believe it is ethical.

When asked what was the primary reason for using someone else's prescription stimulant medication, most reasons were for academic purposes. For example, out of 29 responses, 9 participants said they used stimulant medication illicitly "to be able to concentrate better in class," and 11 participants said they used stimulant medication illicitly "to be able to concentrate better while studying." There were 66 participants who "declined to answer." In prior research, in a sample of undergraduate college students, it was reported that participants believed illicit stimulant use was both ethical and moral because they "were doing it for the right reasons," to improve academic performance (DeSantis & Hane, 2010). Therefore, participants from the current sample may have the same perceptions of illicit stimulant use as college students' perceptions evident in prior research: they believe illicit stimulant use is ethical because it is for academic improvement (DeSantis & Hane, 2010).

Conclusions Regarding Analyses of Variance

Analyses of variance were conducted to see whether the means for specific survey items differed according to socio-economic status and high school class size. Previous research indicates that the misuse and illicit use of prescription stimulants is more common in areas of high socio-economic status and in schools with highly competitive admissions standards. Additionally, research shows that the prevalence rate is smaller in school with greater populations (Hall, Irwin, Bowman, Frankenberger, & Jewitt, 2005; Teter, McCabe, Cranford, Boyd, & Guthrie, 2003; McCabe & Boyd, 2005; Teter, McCabe, Lagrange, Cranford, & Boyd, 2006).

SES/Social Acceptability. Variance of agreement to the social acceptability of illicit stimulant use was significant across socio-economic status. Participants from a middle socio-economic status agreed more with the statement, "At my high school, it was socially acceptable for students *without* a prescription to use stimulant medication." Thirty-eight participants from the middle socio-economic status slightly, moderately, or strongly agreed with the statement. Only one participant from high socio-economic status agreed with the statement and two participants from low socio-economic status agreed with the statement.

Variance of agreement of the social acceptability of the misuse of prescription stimulants was significant across socio-economic status. Participants from a middle socio-economic status agreed more with the statement, "At my high school, it was socially acceptable for student *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed.*" Thirty-four participants from the middle socio-

economic status slightly, moderately, or strongly agreed with the statement. Only one participant from both high and low socio-economic status agreed with the statement.

SES/Illicit Use. Variance of agreement of the prevalence of illicit stimulant use was significant across socio-economic status. Participants from a middle socio-economic status agreed more with the statement, "At my high school, the use of stimulant medication by students *without* a prescription was common." Thirty-four participants from middle socio-economic status slightly, moderately, or strongly agreed with the statement. Only one participant from high socio-economic status agreed with the statement and no participants from low socio-economics status agreed with the statement. These results are not consistent with previous research that indicated that illicit stimulant use was more common in areas of high socio-economic status (Teter, McCabe, Cranford, Boyd, & Guthrie, 2003; McCabe & Boyd, 2005; Teter, McCabe, Lagrange, Cranford, & Boyd, 2006).

SES/Safety. Variance of agreement of the safety of misuse of stimulant medication was significant across socio-economic status. In this case, participants from middle socio-economic status *disagreed* more with the statement, "In high school, I believed it was safe for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*." Sixty-one participants from middle socio-economic status slightly, moderately, or strongly disagreed with the statement. Eight participants from high socio-economic status disagreed with the statement and six participants from low socio-economics status disagreed with the statement. Based on previous research indicating that illicit stimulant use was more common in areas of high socio-economic status, these findings could be consistent with the research because

students from areas of high socio-economic status would find illicit stimulant use safer. If students from high socio-economic find it safe for students *without* a prescription to use stimulant medication, then it is likely that they will also find it safe for students *with* a prescription to use their stimulant medication *in excess* (Teter, McCabe, Cranford, Boyd, & Guthrie, 2003; McCabe & Boyd, 2005; Teter, McCabe, Lagrange, Cranford, & Boyd, 2006).

SES/ Ethicality. Variance of agreement of the ethicality of misuse of stimulant medication was significant across socio-economic status. In this case, participants from middle socio-economic status *disagreed* more with the statement, "In high school, I believed it was ethical for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed*." Sixty-one participants from middle socio-economic status slightly, moderately, or strongly disagreed with the statement. Nine participants from high socio-economic status disagreed with the statement and seven participants from low socio-economics status disagreed with the statement. Based on previous research indicating that illicit stimulant use was more common in areas of high socio-economic status, these findings could be consistent with the research because students from areas of high socio-economic status would find illicit stimulant use more ethical (Teter, McCabe, Cranford, Boyd, & Guthrie, 2003; McCabe & Boyd, 2005; Teter, McCabe, Lagrange, Cranford, & Boyd, 2006). If students from high socio-economic find it ethical for students *without* a prescription to use stimulant medication, then it is likely that they will also find it ethical for students *with* a prescription to use their stimulant medication *in excess*.

Limitations

The sample obtained for this study was both small and only from a single eastern university. The location of the university makes the sample unable to be generalized to the total population of undergraduate students in the United States. Though this study used high school location as a variable, the majority of the high schools reported were located in the same state at the university. Socio-economic status and high school class size were also variables, however, there was not an even distribution for socio-economic status or high school class size within the sample. This is not an accurate representation of high school students across America either. The sample yielded seventy-five participants the middle socio-economic sample, eleven participants from high socio-economic status, and only nine participants from low socio-economic status. Distribution of participants' high school class size was a little more even, however, most participants' high school class was between 101-300 students. Only ten participants reported that their high school class was less than 100 students.

Also, for this study, convenience sampling was utilized. Recruitment of subjects for this examination was limited to just one university in which the research took place. Participants obtained had a greater representation of Intro to Psychology students, as they were required to participate for credit towards the class. Therefore, this limitation also affects the generalizability of results of the study to the greater undergraduate population of the university.

Small sample size is a major limitation. It is harder to get an even distribution of participants; so ninety-five students may not give an accurate representation of the university's entire population. Also, unanswered survey items and outlier responses

easily affect averages. For example, according to the average, participants "slightly disagreed" that it was socially acceptable for students *without* a prescription to use stimulant medication. However, forty-three participants, almost half of the sample actually *agreed* that it was socially acceptable for student *without* a prescription to use stimulant medication. Twenty-three participants who "strongly disagreed," and four participants who "declined to answer," brought the average down.

Since the method of study will be both a self-report and retrospective survey, there may be limitations in the accuracy of responses. Recall bias and underreporting in relation to illegal activities are weaknesses in this method. The misuse and illicit use of prescription stimulants is illegal, therefore participants may have been uncomfortable providing accurate responses in regards to this behavior. Participants had to be kept confidential, rather than anonymous, so that credit towards courses could be administered. Though, they were administered an alternative consent and guaranteed confidentiality, this may have caused participants to be even more unwilling to respond honestly (Durant, Carey, & Schroder, 2002; Gallucci, 2000).

Finally, limitations may exist in the misunderstanding for questions and survey order. For example, when asked whether or not they had ever taken stimulant medications without a prescription many participants "declined to answer," after declining to answer participants should skip to the next section of the survey. However, many participants still reported that they had taken stimulant medications without a prescription on one or more occasions. Additionally, they also reported their reasoning for doing so. Fortunately, few participants felt uncomfortable responding to questions regarding their perceptions and attitudes (social acceptability and prevalence) of this

phenomenon.

Future Directions

Previous research has indicated that the phenomenon of misuse and illicit use of prescription stimulant medication is a trend that is moving into younger generations. The 2005 National Survey on Drug Use and Health found 1.1 million out of 6.4 million persons twelve years or older who reported intentional abuse of prescription medication (Lessenger et al., 2008). The National Institute on Drug Abuse found that nearly 1 out of every 4 adolescents between the ages of 12 and 17 admitted to the illicit use of prescription stimulants or pain medications. From this sample, 7% of eighth graders and 11% of tenth graders reported misusing or illicitly using prescription stimulants or pain medications (Johnston et al., 2005). Additionally, research has shown that, contrary to college students, high school students are more likely to endorse "experimentation" and "getting high" as reasons for misuse and illicit use of prescription stimulants. As the trend strengthens, more research will need to be done to investigate the prevalence if misuse and illicit prescription stimulant use in high school, as well as, motivations behind use.

As this phenomenon is a growing social norm, ample research needs to be done on the societal risks involved. Research states that this will be a social norm only occurring in the United States: 90% of the world sales of Ritalin were accounted for by the US in 2000 (Robinson et al., 1999). As McCabe (2008) states, "Perceived norms may predict later substance use as well as substance use behaviors may predict later perceived norms." Arguments have been made for relaxation of current drug regulations to allow for prescription stimulants to be used as cognitive enhancers. Even more, pharmaceutical companies should be develop and market cognitive enhancing drugs to healthy

individuals (Greely et al., 2008). Before such motions are set, research needs to examine the implications for cognitive enhancement as opposed to athletic enhancement and the integrity of intelligence versus the integrity of sport. Additionally, implications for socio-economic status and achievement gaps need to be reconciled (Nalven, 1967; Fredrickson, 1977; Chenoweth, 2007; Willingham, 2012).

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Appendix A Survey of Misuse and Nonmedical Use of Prescription Stimulant Medication

Please Tell Us about High School

1. What high school did you graduate from?

2. Where was it located (City, State)?

3. About how large was your graduating class?

4. From what socio-economic category would you say the majority of your class came from?
   A. High Socio-economic Status
   B. Middle Scocio-economic Status
   C. Low Socio-economic Status

*If you were ever diagnosed and prescribed stimulant medication for Attention Deficit Hyperactivity Disorder please respond to questions 5-8. If you were never diagnosed and prescribed medication for Attention Deficit Hyperactivity Disorder in **high school** please proceed to questions number 9-12.*

5. In **high school**, did you **ever** take prescription stimulant medications (such as Ritalin, Adderall, Concert, or Dexedrine *in excess or for a reason other than what the medication was prescribed for?*
   A. NO.
   B. YES.

6. In **high school**, what was your primary reason for using your prescription stimulant *in excess or for another reason other than what the medication was prescribed for?*
   A. To be able to concentrate better in class
   B. To be able to concentrate better while studying
   C. To feel less tired so I could study longer
   D. To feel less restless while studying
   E. To keep track of assignments
   F. To prevent others form having an academic advantage over me
   G. To feel better
   H. To get high
   I. To prolong the effects of alcohol or other substances
   J. To lose weight

7. In **high school**, what were other reasons you had for using your prescription stimulant *in excess or for a reason other than what the medication was prescribed for?*
   A. I did not have another reason
   B. To be able to concentrate better in class

C. To be able to concentrate better while studying
D. To feel less tired so I could study longer
E. To feel less restless while studying
F. To keep track of assignments
G. To prevent others form having an academic advantage over me
H. To feel better
I. To get high
J. To prolong the effects of alcohol or other substances
K. To lose weight

8. On about how many occasions in **high school** did you use prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for?*

A. None
B. 1-2 occasions
C. 3-5 occasions
D. 6-9 occasions
E. 10-19 occasions
F. 20-39 occasions
G. 40+ occasions

9. In **high school**, did you **ever** take prescription stimulant (such as Ritalin, Adderall, Concerta, or Dexedrine) ***without*** *a prescription for the medication?*

A. NO.
B. YES.

10. In **high school**, what was the primary reason for *using someone else's prescription stimulant medication?*

A. To be able to concentrate better in class
B. To be able to concentrate better while studying
C. To feel less tired so I could study longer
D. To feel less restless while studying
E. To keep track of assignments
F. To prevent others form having an academic advantage over me
G. To feel better
H. To get high
I. To prolong the effects of alcohol or other substances
J. To lose weight

11. In **high school**, what were other reasons you had for *using someone else's prescription stimulant medication?*

A. I did not have another reason
B. To be able to concentrate better in class
C. To be able to concentrate better while studying
D. To feel less tired so I could study longer
E. To feel less restless while studying

F. To keep track of assignments
G. To prevent others from having an academic advantage over me
H. To feel better
I. To get high
J. To prolong the effects of alcohol or other substances
K. To lose weight

12. On about how many occasions **in high school** did you take *someone else's* prescription stimulant medication?
    A. None
    B. 1-2 occasions
    C. 3-5 occasions
    D. 6-9 occasions
    E. 10-19 occasions
    F. 20-39 occasions
    G. 40+ occasions

Please rate the extent to which you agree or disagree with each of the following statements: strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree.

13. **At my high school**, it was socially acceptable for students **without** a prescription to use stimulant medications.
    A. Strongly Disagree
    B. Moderately Disagree
    C. Slightly Disagree
    D. No Opinion
    E. Slightly Agree
    F. Moderately Agree
    G. Strongly Agree

14. **At my high school**, it was socially acceptable for students **with** a prescription to use stimulant medication *in excess or for purposes other than prescribed* by a physician.
    A. Strongly Disagree
    B. Moderately Disagree
    C. Slightly Disagree
    D. No Opinion
    E. Slightly Agree
    F. Moderately Agree
    G. Strongly Agree

15. **At my high school**, my friends believed that it is ok for students **without** a prescription to use stimulant medication.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

16. **In high school,** I was motivated to comply with my friends' opinion on whether or not it is ok for students **without** a prescription to use stimulant medication.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

17. **At my high school**, my friends believed it was ok for students **with** a prescription to use the stimulant medication *in excess or for purposes other than prescribed.*

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

18. **In high school**, I was motivated to comply with my friends' opinion on whether or not it is ok for students **with** a prescription to use stimulants *in excess or for purposes other than prescribed.*

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

19. **At my high school**, the use of stimulant medication by students **without** a prescription was common.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

20. **At my high school**, the use of stimulant medication (by students **with** a prescription) *in excess or for other purposes than prescribed* was common.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

21. **In high school**, I believed it was safe for students **without** a prescription to use stimulant medications.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

22. **In high school,** I believed it was safe for students **with** a prescription to use stimulants *in excess or for purposes other* than prescribed by a physician.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

23. **In high school**, I believed it was ethical for students **without** a prescription to use stimulant medication.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

24. **In high school**, I believed it was ethical for students **with** a prescription to use stimulant medication *in excess or for purposes other* than prescribed by a physician.

A. Strongly Disagree
B. Moderately Disagree
C. Slightly Disagree
D. No Opinion
E. Slightly Agree
F. Moderately Agree
G. Strongly Agree

If you were ever diagnosed and prescribed stimulant medication for Attention Deficit Hyperactivity Disorder please respond to questions 25-31. If you were never diagnosed and prescribed medication for Attention Deficit Hyperactivity Disorder in ***high school*** *please proceed to the end of the survey.*

25. **In high school**, were you ever asked by another student to sell or give him/her a prescription stimulant medication?

A. NO (skip to end of survey)
B. YES

26. **In high school**, about how often did you **give away** your prescription stimulant medication?

A. None (skip to question #28)
B. 1-2 occasions
C. 3-5 occasions
D. 6-9 occasions
E. 10-19 occasions
F. 20-39 occasions
G. 40+ occasions

27. **In high school**, what was your primary reason for **giving away** your prescription stimulant medication?

A. To help during a time of high academic stress (finale, midterms, projects)
B. The person had run out of his or her own prescription medication
C. To be socially accepted among my peers
D. To help a person party longer

E. To help a person get high
F. To help a person lose weight
G. I did not ask

28. **In high school**, about how often did you **sell** your prescription stimulant medication?
A. None (skip to end of survey)
B. 1-2 occasions
C. 3-5 occasions
D. 6-9 occasions
E. 10-19 occasions
F. 20-39 occasions
G. 40+ occasions

29. **In high school**, what was your primary reason for **selling** your prescription medication?
A. To cover the cost of the medicine
B. To make extra money
C. To help pay bills (phone or credit cards)
D. Because people offered me money
E. To support myself financially

30. **In high school**, what was the primary reason people **wanted to buy** your prescription medication?
A. To help during a time of high academic stress (finals, midterms, projects)
B. The person had run out of his or her own prescription medication
C. To be socially accepted among peers
D. To help party longer
E. To get high
F. To lose weight
G. Did not ask

31. **In high school**, what was the average price you charged for each pill from your prescription of stimulant medication?
A. 1-2 dollars
B. 3-4 dollars
C. 5-6 dollars
D. 7+ dollars
E. Depended on dosage of pill

Appendix B Alternate Consent

Consent Form

The purpose of this survey is to evaluate is to evaluate high school students' attitudes and perceptions of non-medical use of ADHD prescription stimulant medication (such as Adderall and Ritalin). Much research has been done on the rising "social norm" of academic enhancement by the non-medical use of prescription stimulants. This study aims to assess the extent of social acceptability of non-medical use of stimulant medication in high school students.

The research, entitled, "Project Title: "High School students' perceptions of non-medical use of ADHD prescription stimulant medication," is being conducted by Kyla Lucey of the Psychology Department, Rowan University, in partial fulfillment of her M.A. degree in School Psychology. For this study you will be required to respond to questions regarding descriptive information (age and gender), high school demographics (location, population size, economic status), and your attitudes and beliefs towards non-medical use of ADHD prescription stimulant medication such as Adderall and Ritalin. Your participation in the study should not exceed 30 minutes. There are no physical or psychological risks involved in this study, and you are free to withdraw your participation at any time without penalty.

Students under the age of 18 years old should NOT participate in this study.

The data collected in this study will be combined with data from previous studies and will be submitted for publication in a research journal. Your responses and all the data gathered will be kept confidential. No student will be subject to any consequences regarding their non-medical use of stimulant medications.

By taking this survey you agree that any information obtained from this study may be used in any way thought best for publication or education provided that you are in no way identified and your name is not used.

Participation does not imply employment with the state of New Jersey, Rowan University, the principal investigator, or any other project facilitator.

If you have any questions or problems concerning your participation in this study, please contact Kyla Lucey at (609) 432- 8531, or her faculty advisor, Dr. Roberta Dihoff, dihoff@rowan.edu