

THE MISUSE OF ATTENTION-DEFICIT/HYPERACTIVITY MEDICATIONS IN A
COLLEGE POPULATION: APPLYING KHANTZIAN'S SELF-MEDICATION
HYPOTHESIS OF SUBSTANCE ABUSE

THESIS

Presented to the Graduate Council of
Texas State University-San Marcos
in Partial Fulfillment
of the Requirements

for the Degree

Master of ARTS

by

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San Marcos, Texas
December, 2011

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ACKNOWLEDGEMENTS

During the course of this thesis, there were many people who helped me in planning, organizing, and completing this project. While I could go on and on with people who helped me in one way or another, there are a couple of people who were crucial to the completion of this paper. I would first like to thank my family, for without their support, I would have never been able to finish. Additionally, I would like to thank the members of my thesis committee, Dr. Joe Etherton, Dr. Ty Schepis, Dr. John Huber, and Dr. Alex Nagurney, for they helped guide me and complete my work. Finally, I would like to thank Dr. Amy Meeks who was extremely helpful in the data gathering stage of this research as well as Dr. Paul Raffeld, who advised me with the statistics portion of this research. This thesis was first submitted for review on October 18th, 2011.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
LIST OF ABBREVIATIONS.....	x
CHAPTER	
I. INTRODUCTION.....	1
II. LITERATURE REVIEW.....	5
Attention-Deficit/Hyperactivity Disorder.....	5
ADHD Medication Misuse & Self-Medication.....	9
III. METHODS.....	12
Design.....	12
Participants.....	13
Procedures.....	14
Instruments.....	15
Data Analysis.....	17
Limitations.....	18
IV. RESULTS.....	19
V. DISCUSSION.....	27
Analysis of the Findings.....	27
Final Limitations & Future Directions.....	30
VI. Conclusion.....	32
APPENDIX A: CONSENT FORM.....	35

APPENDIX B: QUESTIONNAIRE.....	38
WORK CITED.....	40

LIST OF TABLES

Table	Page
1. Descriptive Statistics of Student Motives for Misuse of ADHD Medications	21
2. One-Way ANOVA Group Mean Statistics.....	22
3. Results of ANOVA for Misuse of ADHD Medications & Scores on the Adult ADHD Self-Report Scale.....	24
4. Post-Hoc Comparison of Misuse of ADHD Medications & Scores on a Self-Report Scale	25

LIST OF FIGURES

Figure	Page
1. Graph of Group Mean Differences on ADHD Self-Report Scale	23

LIST OF ABBREVIATIONS

Abbreviation	Meaning
ADHD.....	Attention-Deficit/Hyperactivity Disorder
DSM-IV-TR.....	Diagnostic & Statistical Manual (4 th ed.) Text Revision

CHAPTER I

INTRODUCTION

Substance use has been a common problem in society for thousands of years (Doweiko, 2009). Recent statistics demonstrate that in 2009, drug use reached its highest level in over 8 years, with estimates suggesting that 8.7% of Americans 12 years and older had used illicit drugs in the past month. While the largest increases were seen in the use of Marijuana, an illicit drug, the use of prescription drugs also saw an increase, from 2.5% in 2008 to 2.8% in 2009 (NIDA, 2010). One category of prescription drugs that has grown to become one of the most commonly abused is the group of drugs used to treat Attention-Deficit/Hyperactivity Disorder (ADHD); particularly Methylphenidate.

Methylphenidate is classified as a schedule II substance which signifies that while the drug is approved for medical use, it is known to have a high potential for misuse. Methylphenidate works by blocking the reuptake of dopamine, which is hypothesized to be at lower than normal levels in those with ADHD, causing a surplus of neurotransmitter which in turn reduces the symptoms of ADHD. One result of this drug is an increased ability to focus attention, which is an incentive to those who have a need to focus more efficiently. Coincidentally, the majority of those who misuse this medication do so for academic purposes (DeSantis et al., 2009; Rabiner et al., 2009). While misuse is

perceived to be non-harmful by students who use these drugs, a growing body of evidence has demonstrated that misuse of the medication can have harmful consequences, for overdose from the drug is possible as well as dependence (Berman et al., 2009). Misuse of these drugs has become common in the college setting, thus increasing the potential for harm.

For those who are prescribed the medication, their doctors can monitor to see if any side effects do occur or if the medication is not working properly. Additionally, they can see if the patient is overusing or becoming dependent on the medication; but for those who use the drug outside of a physician's prescription and oversight, this is not the case. Research by Khantzian and his colleagues has yielded a hypothesis as to why some use substances, suggesting that those who use do so in order to self medicate themselves. This could potentially be the case in those who misuse ADHD medications, for the drug is known to be effective in increasing focus. So if one were experiencing issues with focusing, they could potentially look towards this drug to help alleviate their problem. Interestingly prior research has indicated that the majority of those who misuse report doing so for an academic benefit (Rabiner et al., 2009).

There are three subtypes of ADHD; the combined type that requires 6 symptoms of inattention and 6 symptoms of hyperactivity-impulsivity; the predominantly inattentive type that requires 6 symptoms of inattention within the past 6 months; and the predominantly hyperactive-impulsive type that requires at least 6 symptoms of hyperactivity-impulsivity within the past 6 months. Additionally, researchers have found that as those who have ADHD progress into adulthood, the hyperactive-impulsive symptoms will subside, leaving only the symptoms of inattention.

College students with ADHD tend to have a difficult time transitioning from high school to college. According to research conducted by Shifrin, Proctor, and Prevatt (2010), students with ADHD have a harder time adjusting than students without ADHD and rate themselves lower on self-report scales on work performance. College students are expected to act responsibly, but students with ADHD who display symptoms of inattention, hyperactivity, or impulsivity might have a difficult time adjusting to studying without supervision and may easily be distracted by the events that go on in a college setting. This would also be the case for those with the disorder who may be sub-clinical or may have never been diagnosed, who may become motivated to seek out help with the transition to college life and may look towards ADHD medications, which have been demonstrated to help with these problems.

Following the research of Khantzian and his Self-Medication Hypothesis (1985), which states that those who use substances that are either illicit or not prescribed will do so due to a psychological desire to medicate and correct this problem, this research aims to examine the misuse of ADHD medications in a college population. It is hypothesized that those who misuse these medications will be more likely to experience more symptoms associated with ADHD than those who do not misuse the medications. Further addressing Khantzian's hypothesis as well as research by Rabiner and others (Rabiner et al., 2009; Novak et al., 2007, Judson & Langdon, 2007) addressing the motives for student misuse of ADHD medications, it is also hypothesized that those who misuse ADHD medications will be more likely to do so for educational related reasons as opposed to getting high, staying awake, or other reasons.

To test the hypotheses, a survey asking about the participants' misuse of ADHD medications will be administered. In addition to this survey, the participants will also be administered the Adult ADHD Self-Report Scale (Adler, Kessler, & Spencer, 2003) to measure self-reported symptoms of ADHD. The results of the survey and the Adult ADHD Self-Report Scale will then be analyzed using ANOVA to examine the relationship between misuse of these medications and the degree of ADHD symptoms reported by the students.

CHAPTER II

LITERATURE REVIEW

Attention-Deficit/Hyperactivity Disorder

ADHD is defined in the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR) as “a persistent pattern of inattention and/or hyperactivity/impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development” (American Psychiatric Association, 2000, pp. 85). Inattention “may be manifest in academic, occupational, or social situations” (American Psychiatric Association, 2000, pp. 85). More specifically describing how this may manifest, the DSM-IV-TR goes on to state that “work is often messy and performed carelessly and without thought” and that “individuals often have difficulty sustaining attention in tasks or play activities and often find it hard to persist with tasks until completion” (American Psychiatric Association, 2000, pp. 85). Additionally “they appear as if their mind is elsewhere....they often do not follow through on requests or instructions and fail to complete schoolwork, chores, or other duties.....[they] often have difficulties organizing tasks and activities” (American Psychiatric Association, 2000, pp. 85). The DSM-IV-TR also states that tasks that require sustained mental effort are typically avoided, “they are often forgetful....[and] in social

situations, inattention may be expressed as frequent shifts in conversation” (American Psychiatric Association, 2000, pp. 85-86).

Hyperactivity is the first half of the second group of symptoms associated with ADHD. According to the DSM-IV-TR, “hyperactivity may be manifested by fidgetiness or squirming in one’s seat, by not remaining seated...., by excessively running or climbing in situations where inappropriate, by having difficulty playing or engaging quietly in leisure activities, by appearing to be often ‘on the go’..., or by talking excessively” (American Psychiatric Association, 2000, pp. 86). Typically this is demonstrated in the early years and can diminish later in life. “School-age children display similar behaviors but usually with less frequency or intensity than toddlers and preschoolers” (American Psychiatric Association, 2000, pp. 86).

Impulsivity is the second half of the second group of symptoms associated with ADHD and is manifested through “impatience, difficulty in delaying responses, blurting out answers before questions have been completed, difficulty awaiting one’s turn, and frequently interrupting or intruding on others to the point of causing difficulties in social, academic, or occupational settings” (American Psychiatric Association, 2000, pp. 86). Furthermore, impulsivity “may lead to accidents and engagement in potentially dangerous activities without consideration of possible consequences” (American Psychiatric Association, 2000, pp. 86).

Typically children with ADHD display characteristics such as lack of attention and problems with controlling their impulses (Smith, Barkley, & Shapiro, 2006). This is usually noticed in the early years and it was originally believed that these symptoms would disappear in adulthood, but current research has demonstrated otherwise. It is

estimated that the disorder persists into adulthood in about 85% of those diagnosed in childhood with ADHD (Doweiko, 2009; Kessler et al., 2005).

To receive a diagnosis of ADHD, an individual must demonstrate at least six of the symptoms of inattention or six symptoms of hyperactivity-impulsivity persistent for over six months. The combined subtype of ADHD is the only type that requires both six symptoms of inattention and six symptoms of hyperactivity-impulsivity. The other two subtypes, the predominantly inattentive and predominantly hyperactive-impulsive subtypes, only require the six symptoms of inattention or hyperactivity-impulsivity.

Frick and Silverthorn (2004) note that ADHD is one of the most common reasons for children to be referred to mental health clinics. Prevalence rates of ADHD according to the DSM-IV-TR are estimated at about three to seven percent of the population. Even more concerning is that the prevalence rates stated by the DSM-IV-TR may be an underestimation of the true numbers of individuals affected by ADHD. Additionally, school-aged girls and adolescents are being diagnosed with ADHD at a much higher rate than originally estimated. This demonstrates that ADHD is being identified at higher rates among groups, such as school-aged girls, where it was assumed to be less prevalent (Whalen & Henker, 1991).

Usually, ADHD symptoms are most prominent when children are in the elementary school years, for during this period of time average children will begin to conform to classroom constraints while the symptoms of ADHD become more noticeable. It is typically believed that ADHD symptoms are particularly noticeable during these important years of development (American Psychiatric Association, 2000).

A major reason for concern is the high co-morbidity of ADHD with other disorders as well as an increased tendency to engage in dangerous behaviors. The co-morbidity of ADHD with other disorders has been estimated at roughly 44%, with the most common co-morbid disorders being Oppositional Defiant Disorder and Conduct Disorder (Doweiko, 2009; Roots & Resnick, 2003). In addition, there is an increased risk for individuals with ADHD to develop substance abuse or dependence, with 15-25% of adults who report symptoms of ADHD having an active substance abuse disorder (Doweiko, 2009). This rate is more than double the national average for substance use (US Department of Health & Human Services, 2011). Those with the disorder tend to engage in risky behavior at a higher rate than most as well, for an example of this is noted by Smith, Barkley, & Shapiro (2006), who identified that teenage pregnancy is higher in those with ADHD. Much of this is believed to be related to impaired behavior control in those with the disorder (Doweiko, 2009).

The pharmacological treatments for ADHD can be divided into two groups: stimulants and non-stimulants. The most common stimulants used to treat ADHD are methylphenidate and amphetamines. More commonly, these are known as Ritalin or Adderall. The non-stimulants that are typically used to treat ADHD are bupropion, pemoline, and atomoxetine. The most common brand from this group of medications used to treat the disorder is Strattera (Doweiko, 2009). These drugs, particularly the stimulants, have a high likelihood to be abused. The drugs increase the amount of dopamine in the brain, thus creating a pleasurable experience for the user. This effect may contribute to medication abuse later on as the user takes more of the drug. While these drugs do not have the same effects as some of the more popular illicit stimulant drugs available, such

as cocaine or methamphetamine, one effect that has many college students seeking out the drug is increased attentional focus (Manos, 2010).

ADHD Medication Misuse & Self-Medication

Misuse of medications used to treat ADHD has become an increasing problem in college campuses, for research in the field has reported prevalence rates of up to 25% in the undergraduate population (Rabiner et al., 2009). Some students believe that ADHD medications will enhance their ability to concentrate while studying, thereby improving their grades (Novak et al., 2007). Furthermore, the main reason that students choose to do so is for academic purposes, with a significant, but smaller percentage reporting using the drugs to get high (Rabiner et al., 2009; Novak et al., 2007, Judson & Langdon, 2007).

With the number of prescriptions for these drugs increasing (Goodman, 2009), the prevalence of misuse is also increasing because of a higher percentage of students in colleges who have obtained medications to treat ADHD (Novak et al., 2007; Judson & Langdon, 2007). Further, a significant percentage of those who misuse these medications are poly-substance abusers (Judson & Langdon, 2009; Rabiner et al., 2009; Novak et al., 2007; McCabe et al., 2006). Additionally, 29% of those who are prescribed ADHD medications divert these medications to those around them, while another 20% of those who misuse these medications feign symptoms of ADHD in order to obtain the drugs from physicians who do not probe thoroughly enough to make an accurate diagnosis (Rabiner et al., 2009; Novak et al., 2007).

The self-medication hypothesis was first proposed by Khantzian as an attempt to explain substance abuse (Khantzian, 1985). Khantzian hypothesized that “substance

addiction functions as a compensatory means to modulate affects and self-soothe from the distressful psychological states” (Suh et al., 2008). He later modified this to state that self-medication is not so much due to a psychiatric condition, but a wide range of subjective symptoms and states of distress (Hall & Queener, 2007). The Self-Medication Hypothesis has received wide recognition as a possible explanation for substance abuse, for this has been demonstrated by researchers who have found that there seems to be an increase of substance abuse in those with a co-occurring psychiatric disorder (Suh et al., 2008; Hall & Queener, 2007; Henwood & Padgett, 2007; Wilens et al., 2007; Harris & Edlund, 2005) as suggested by the theory. Additionally, studies that utilized a broader conceptualization of the theory were able to find more conclusive evidence for the hypothesis; however, more research is needed to test these concepts (Henwood & Padgett, 2007).

The current study seeks to apply the self-medication hypothesis to the misuse of ADHD medications. Many of those who misuse these medications may be doing so because they believe that they may have ADHD (Judson & Langdon, 2009). Many of the prior studies on the self-medication hypothesis have focused more on illicit drugs, such as alcohol, cocaine, & heroin (Suh et al., 2008), but this study differs by focusing on drugs that are medically prescribed and it is believed that the results from this study will provide more support for Khantzian’s Self-Medication Hypothesis. Additionally, findings such as that ADHD medications, while they can be misused for mood enhancement, are more likely to be misused for academic purposes (Judson & Langdon, 2009; Rabiner et al., 2009; Novak et al., 2007) provide additional support for Khantzian’s hypothesis. For this reason it is hypothesized many of those who misuse ADHD medications do so

because they have experienced symptoms of ADHD themselves and misuse the medications in order to treat these symptoms. While it would be expected that those experiencing these symptoms would possibly contact a physician, most of these symptoms are experienced in childhood and if these symptoms were not addressed or identified when the individual was younger, they may have just grown to accept the symptoms or they may have been overlooked by adults and gone on without attention.

CHAPTER III

METHODS

Design

The current study will address the ADHD symptoms self-report rates of college students who misuse ADHD medications. Using a quasi-experimental design, the study examined the scores of college students who misuse ADHD medications with the scores of college students who do not misuse ADHD medications. Students were given the Adult ADHD Self-Report Scale (Adler, Kessler, & Spencer, 2006) to measure their level of symptomology associated with the disorder. Additionally, the students were given a questionnaire asking them about demographics, prior ADHD diagnosis, and other questions related to the misuse and diversion of stimulant medications.

The recorded information from the self-report survey and questionnaire was divided into groups based on whether they have misuse and whether a prior diagnosis of ADHD existed. The information collected from these instruments was analyzed using SPSS to test the significance in mean differences between the groups. In addition, information from the questionnaire was used to calculate the frequencies of rationales given for their misuse of ADHD medications as well as prevalence rates at which students with ADHD sell, give away, or misuse their medications.

In order to address the issue of misuse of ADHD medications in a college population, the current study will attempt to compare the scores of students who misuse ADHD medications with students who do not misuse ADHD medications. Following the research of Khantzian, it was hypothesized that students who misuse ADHD medications do so because they are experiencing symptoms associated with the disorder and are seeking out medications in order to self-medicate themselves. Additionally, in order to identify the rates of misuse and the reasons for their misuse, the research will examine whether students typically misuse the medication for academic purposes. The research is guided by the following questions: Do students who misuse ADHD medications complain of symptoms associated with ADHD at a greater rate than students who do not misuse ADHD medications and do students misuse ADHD medications mostly for academic purposes as opposed to other reasons?

Participants

In order to test the hypothesis, 5 psychology courses from Texas State University-San Marcos were surveyed. There were 1,380 possible participants, with 881 students in attendance when the classes were surveyed. Out of the 881 students, 3 refused to participate and 69 surveys were excluded from the final totals due to missing data leaving the final number of participants at 809. The average age of the sample was 19.5 and 71.1% of those sampled were female, which was higher than the average found at Texas State University. Of those surveyed, 52.8% were Caucasian, 28.7% were Hispanic, 8.3% were African-American, 6.3% were Multi-Racial, 1.6% were Asian, .5% were Native American, and .1% were Caribbean. 1.7% of those surveyed were from other

nationalities. These statistics are similar to those found at Texas State University-San Marcos with the exception of those from African-American or Asian decent, which were underrepresented in the sample.

The participants were recruited from undergraduate psychology courses which are comprised of a variety of majors with the exception of the more advanced psychology courses. The students were asked if they would like to participate in a study on the misuse of ADHD medications and were informed of the confidentiality of the information provided. As an incentive, the professors of the courses offered a few extra credit points to those who do participated in the study

Procedures

Professors of undergraduate psychology courses were first approached in order to recruit participants. The courses chosen were picked using a convenience selection method, with those chosen having over 50 or more students. The professors were informed of the purpose of the study, asked if they were willing to provide extra credit as an incentive for participation, and asked if they would allow 15-20 minutes of class time for the data collection. All professors approached allowed for the researcher to approach their students to ask if they would be willing to participate.

On the days of the data collection, the students were given instructions to read through the forms which provided information about study and advised that the collected data would be confidential. If the students agreed to the terms they were to fill out the consent form and proceed with the survey. Those who did not agree to participate returned their forms and the remainder of the forms were collected upon completion and

separated immediately after all the surveys were collected. Students who did not participate were given an opportunity for extra credit as well.

The participants were administered the questionnaire first and self-report scale second and asked to fill out the data as completely as possible. In order to protect the identity of the subjects, the students were informed to not write any self-disclosing information on the form such as their name, e-mail, or student identification number. Upon completion of the data, the forms were collected and separated with the consent forms being used to inform the professors who participated in the study so that the participants could receive their extra credit points. After the data collection, the students' data were scored and entered into SPSS. In order to analyze the data, a one-way ANOVA was run as well as a chi-squared analysis and a frequency table. All the consent forms were kept separate from the data and will be kept on file for the next 5 years and all of the hard copies of the data collection sheets will be kept confidential.

Instruments

The participants were administered a researcher-created survey involving demographic data, history of ADHD diagnosis, and whether they have been prescribed medications for ADHD. Additionally, the Adult ADHD Self-Report Scale Symptoms Checklist (Adler, Kessler, & Spencer, 2003) was administered. Demographic information was gathered and included information regarding the subject's age, gender, and ethnicity. In addition to the demographic information, the participants were also asked if they had a prior diagnosis of ADHD.

Subjects who have previously been diagnosed with ADHD and have a current prescription for medications used to treat the disorder were asked about diversion and misuse of the medications. The following questions asked about the participant's misuse of ADHD medications. The most common ADHD medications were listed for the participant. They were then asked if they have ever used any of these medications without a prescription. Those who answer yes to the previous question were then asked their motives for doing so. Their options were: to study, to get high, to stay awake, or for other reasons. Participants were informed to select multiple motives if necessary if they had more than one reason as to why they had misused.

In addition to the researcher-created survey, the participant completed the Adult ADHD Self-Report Scale Symptoms Checklist. This 18-question scale was created by Adler, Kessler, & Spencer (2003) in order to help physicians assess the severity of the symptoms reported by the individual and was developed in conjunction with the World Health Organization. The 18-item scale was estimated by the developers to take roughly 5 minutes to administer. The responses provided were based on a Likert scale, with scores for each question ranging from 0 to 4. The questionnaire is divided into two parts, with one part addressing inattentive symptoms and the other part addressing hyperactive-impulsive symptoms. Scores for each section range from 0 to 36, scores below 17 suggesting a low probability of ADHD, a score of 17 to 23 suggesting a possibility of ADHD, and a score of 24 or higher suggesting that ADHD is highly likely. The assessment has been found to be a reliable and valid instrument for assessing ADHD (Adler et al., 2006).

Data Analysis

Following the data gathering stage, participant's data were analyzed using ANOVA and chi-squared with SPSS software. The data was divided into four groups, students who have used non-prescribed ADHD medications, students who have not used non-prescribed ADHD medications, students diagnosed with ADHD who have misused ADHD medications, and students who have been diagnosed with ADHD and who have not misused medications. The demographic information provided by the participants was analyzed using a chi-squared analysis and a frequency analysis to see if the groups are statistically similar in terms of age, sex, and gender to those found at Texas State University-San Marcos, which they typically were. Next, the ADHD symptoms scale scores were calculated, which provided two scores for each subject, one for Inattention and one for Hyperactivity/Impulsivity. The group scores for ADHD were compared using a one-way ANOVA. The data provided by the participants were compared to see if those who admit to non-prescribed use of ADHD medications for academic purposes report a higher percentage of ADHD symptoms than those who do not misuse ADHD medications or those who misuse ADHD medications in order to get high or for other reasons.

Frequencies of different motivations for misuse of ADHD medication was examined for each group as well as the frequency with which the ADHD positive group reported diversion of medications. Prior research has suggested that the participants will be more likely to endorse misuse of ADHD medications for academic purposes over any other reason, so in order to examine this hypothesis in the current population, students will be asked about their misuse. Research about the prevalence of those with ADHD

diverting their medication was not available, so information describing the prevalence of this issue was also addressed and analyzed using a chi-squared analysis.

Limitations

One of the only limitations of the study is the use of only self-report measures, for self-report measures are prone to misinterpretation as well as students incorrectly endorsing misuse. ADHD is a difficult disorder to diagnose through assessments and requires more in-depth researching to diagnose an individual with ADHD, but a majority of clinicians who work with clients with ADHD use self-report measures to first test for symptoms, so there is some significant reliability with the measures. While these limitations are ones that cannot be completely overcome, the information provided on the self-report surveys will be analyzed for reliability by using Cronbach's alpha to see if the measures are reliable using this particular population.

The final limitation of this study was the nature of the questions being asked. The participants were asked about their experience with illegal activities, so they may be less inclined to be completely honest about their experience. This was attempted to be controlled for by informing the students that their data will remain confidential and were asked to fill out a consent form acknowledging this. It is believed that assuring the students that their results will not be linked to them is the best way to ensure that the students answer as honestly as possible.

CHAPTER IV

RESULTS

Using a frequencies analysis and chi-squared analysis of the total 809 participants, the results yielded that 71 participants had a prior diagnosis of ADHD, which came out to about 8.8%. Of those 71 participants with ADHD, 47 (66.2%) of them had a current stimulant ADHD medication prescription and 8 (11.3%) had a current prescription for non-stimulant ADHD medication. Twenty-two and a half percent of those diagnosed with ADHD were not currently medicated. About 15% of all the males surveyed in this study were diagnosed with ADHD, while 6.1% of all females surveyed in the study were diagnosed with ADHD.

In addition to the data collected from the participants about any prior diagnosis of ADHD, those with a diagnosis were also asked a few diversion questions regarding their stimulant medications if they had a current prescription. A chi-squared analysis was calculated on the results of these questions. Out of the 47 participants surveyed with a current prescription for stimulant ADHD medications, 31.9% stated that they had sold their medications in the past, with the remaining 68.1% of the participants stating that they do not sell their medications. 53.2% of the total number of participants with a current prescription did state that they had given away their medications. Finally, the participants were asked if they had misused their own medications, with a majority of

participants, or roughly 70.2% of those with a current prescription saying that they take their medications as prescribed.

Of the 809 participants, 24% (194) stated that they had misused ADHD medications in the past six months. After running a chi-squared analysis of the data, 27.4% of all males surveyed stated that they had misused ADHD medications within the past 6 months. Additionally, 22.3% of all females surveyed in the study stated that they had misused ADHD medications. Looking at those diagnosed with ADHD in the sample population, 32.4% stated that they had misused others ADHD medications within the past 6 months. 22.9% of those surveyed without a diagnosis of ADHD stated that they had misused. Furthermore, 34% of those with a current prescription for stimulant medications stated that they had misused ADHD medications compared to 23.1% of those without a current stimulant prescription stated that they misused the medications. Only 8 of the participants in the study stated that they had a current prescription for non-stimulant medications, but 5 of them stated that they had misused stimulant ADHD medications in the past 6 months.

One of the goals of the research was to see why students misuse ADHD medications. Prior research had suggested that in those particular populations, the majority of students who misused the drug did so for academic purposes. To test to see if this was similar in the population collected from Texas State University-San Marcos, students who misused ADHD medications were asked why they had misused the medication. 67.7% of the students stated that they misused the drug for academic purposes, with another 20.3% of students stating multiple reasons for misusing the medication (this typically included academic purposes, but group sizes were not large

enough to run more informative statistics on the data). Additionally, 53.6% of the students who stated that they had misused ADHD medications in the past did so in order to get high with the remaining 5.2% stating that they misused ADHD medications in order to stay awake. The raw numbers are described in table 1 below.

Table 1: Descriptive Statistics of Student Motives for Misuse of ADHD Medications

	Frequency	Percent	Valid Percent	Cumulative Percent
To Get High	7	3.6	3.6	3.6
To Study	130	68.1	68.1	71.7
To Stay Awake	10	5.2	5.2	76.9
Other Reason	5	2.6	2.6	79.5
Multiple Reasons	39	20.4	20.4	100.0
Total	184	100.0	100.0	

As for the Adult ADHD Self-Report Scale, scores were calculated by adding the responses from the Likert scales for each of the questions, giving a total score for Inattention and a total score for Hyperactivity-Impulsivity. Internal Consistency was calculated using the data for this study with a Cronbach's alpha value of .86 for Inattention and a Cronbach's alpha value of .87 for the Hyperactivity-Impulsivity, demonstrating that both portions of the assessment were reliable using this sample population. The mean score across all groups for Inattention was 16.96 (sd =6.416), with a median score of 16 and the modal score was 13 and the mean score across all groups for

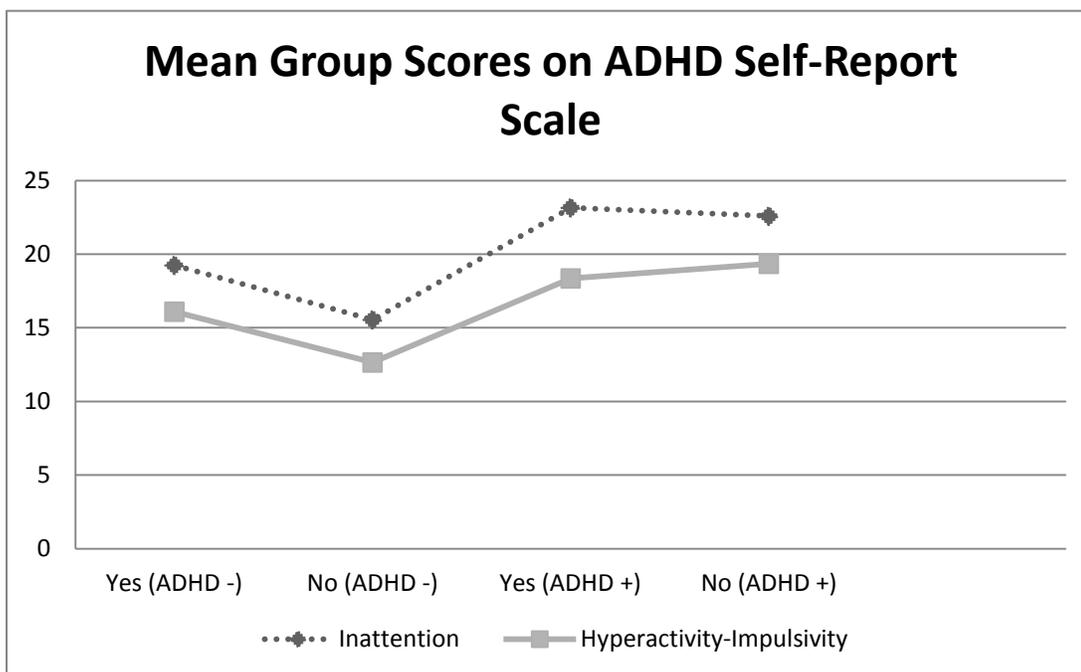
Hyperactivity-Impulsivity was 13.93 (sd=6.987), with a median of 13 and the modal score was 12.

The complete results of the descriptive statistics for the one-way ANOVA are displayed in table 2 as well as graph 1 below. The means of the groups for the scores on the Inattention came out to 19.25 (sd = 6.1) for those who misused ADHD medications and did not have a diagnosis, 15.6 (sd = 5.9) for those who did not misuse and did not have a diagnosis, 23.16 (sd = 5.9) for those who misused and had a prior diagnosis, and 22.59 (6.8) for those who did not misuse and had a prior diagnosis. The mean scores for Hyperactivity/ Impulsivity came out to 16.10 (sd = 6.6) for those who misused ADHD medications and did not have a diagnosis and 12.65 (sd = 6.6) for those who did not misuse and did not have a diagnosis. Of the two groups with a prior diagnosis of ADHD, those who did misuse had a mean score of 18.36 (sd = 5.4) and those who did not misuse

Table 2: One-Way ANOVA Group Mean Statistics

		N	Mean	Std. Dev.	Std. Error	95% Mean Conf. Interval		Min	Max
						Lower	Upper		
Inattention	Yes (ADHD-)	169	19.25	6.145	.473	18.32	20.18	7	33
	No (ADHD-)	569	15.55	5.868	.246	15.07	16.03	0	33
	Yes (ADHD+)	25	23.16	5.850	1.170	20.75	25.57	9	30
	No (ADHD+)	46	22.59	6.836	1.008	20.56	24.62	4	33
	Total	809	16.96	6.416	.226	16.52	17.40	0	33
Hyperactivity	Yes (ADHD-)	169	16.10	6.645	.511	15.09	17.11	0	34
	No (ADHD-)	569	12.65	6.616	.277	12.11	13.20	0	32
	Yes (ADHD+)	25	18.36	5.353	1.071	16.15	20.57	7	26
	No (ADHD+)	46	19.35	8.045	1.186	16.96	21.74	0	36
	Total	809	13.93	6.987	.246	13.45	14.41	0	36

Figure 1: Graph of Group Mean Differences on ADHD Self-Report Scale



had a mean score of 19.35 (sd = 8.0).

In order for the results of the ANOVA to be valid, three assumptions must be met. The first assumption that all cases were independent was met. The second assumption that the results are normally distributed was met. The final assumption that there was equality of variances was met. Results from the Test for Homogeneity of Variance, which states that there is equality among the group means was met as well. The results for Impulsivity came out to .099 and .330 for Inattention. Using a p value equal to .05, both portions of the assessment met the assumptions for ANOVA. Results from the ANOVA are displayed in table 3 below. Both portions of the assessment had a significance value of $p < .05$, this rejected the null hypothesis on both portions of the self-report. Post-hoc comparisons using the Bonferonni adjustment were calculated. Results are displayed on

Table 3: Results of ANOVA for Misuse of ADHD Medications & Scores on the Adult ADHD Self-Report Scale

		Sum of Squares	df	Mean Square	F	Sig.
Hyperactivity	Between Groups	3566.399	3	1188.800	26.673	.000
	Within Groups	35878.585	805	44.570		
	Total	39444.984	808			
Inattention	Between Groups	4433.674	3	1477.891	41.268	.000
	Within Groups	28828.897	805	35.812		
	Total	33262.571	808			

table 4 below. Results for Hyperactivity-Impulsivity portion of the scale showed that those who misused ADHD medications were significantly more likely to score higher on the Adult ADHD Self-Report Scale than those who do not misuse the medication. There was also a significant difference for Inattention between those without a diagnosis of ADHD who misused ADHD medications and those without a diagnosis of ADHD who have not misused. Significant mean differences were also found in the groups that had a prior diagnosis of ADHD.

In summary, the average age of the population was roughly 19.5, with a majority of the participants of Caucasian (52.8%), Hispanic (28.7%), or African-American (8.3%) ethnicity. 71.1% of the sample population was female and 8.8% of the population had a prior diagnosis of ADHD. 24% of students in population stated that they had misused ADHD medications in the past 6 months, with 68.1% of those who had misused ADHD medications stating that they did so for academic purposes. Finally, significant results

Table 4: Post-Hoc Comparisons of Misuse of ADHD Medications & Scores on a Self-Report Scale

Dep. Variable	(I) Misused	(J) Misused	Mean Diff. (I-J)	Std. Error	Sig.	95% Conf. Interval	
						Lower	Upper
Hyperactivity	Yes (ADHD-)	No (ADHD-)	3.449*	.585	.000	1.90	5.00
		Yes (ADHD+)	-2.259	1.431	.688	-6.04	1.52
		No (ADHD+)	-3.247*	1.110	.021	-6.18	-.31
	No (ADHD-)	Yes (ADHD-)	-3.449*	.585	.000	-5.00	-1.90
		Yes (ADHD+)	-5.708*	1.364	.000	-9.32	-2.10
		No (ADHD+)	-6.696*	1.023	.000	-9.40	-3.99
	Yes (ADHD+)	Yes (ADHD-)	2.259	1.431	.688	-1.52	6.04
		No (ADHD-)	5.708*	1.364	.000	2.10	9.32
		No (ADHD+)	-.988	1.659	1.000	-5.38	3.40
	No (ADHD+)	Yes (ADHD-)	3.247*	1.110	.021	.31	6.18
		No (ADHD-)	6.696*	1.023	.000	3.99	9.40
		Yes (ADHD+)	.988	1.659	1.000	-3.40	5.38
Inattention	Yes (ADHD-)	No (ADHD-)	3.698*	.524	.000	2.31	5.08
		Yes (ADHD+)	-3.911*	1.282	.014	-7.30	-.52
		No (ADHD+)	-3.338*	.995	.005	-5.97	-.71
	No (ADHD-)	Yes (ADHD-)	-3.698*	.524	.000	-5.08	-2.31
		Yes (ADHD+)	-7.610*	1.223	.000	-10.84	-4.38
		No (ADHD+)	-7.037*	.917	.000	-9.46	-4.61
	Yes (ADHD+)	Yes (ADHD-)	3.911*	1.282	.014	.52	7.30
		No (ADHD-)	7.610*	1.223	.000	4.38	10.84
		No (ADHD+)	.573	1.487	1.000	-3.36	4.51
	No (ADHD+)	Yes (ADHD-)	3.338*	.995	.005	.71	5.97
		No (ADHD-)	7.037*	.917	.000	4.61	9.46
		Yes (ADHD+)	-.573	1.487	1.000	-4.51	3.36

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

were found when comparing means on both categories between those who misuse ADHD medications and those who do not.

CHAPTER V

DISCUSSION

Analysis of the Findings

The findings of this study support Khantzian's Self-Medication Hypothesis of Substance Abuse. The results of the ANOVA demonstrated significant mean difference between the groups in both portions of the Adult ADHD Self-Report Scale, rejecting the null hypothesis for this study. There were also significant results when the mean group scores of the groups who had previously been diagnosed with ADHD were compared with the groups who had not been previously diagnosed with ADHD, but those would be expected given that they had already been diagnosed with the disorder so they should test high on a measure established to assess ADHD. There were no group differences in those with a diagnosis of ADHD who misuse ADHD medications when compared with those with a diagnosis who do not misuse the medications.

In the Inattention portion of the assessment, there was a significant group mean difference in those who lacked a prior diagnosis and misused ADHD medication when compared with those who lacked a diagnosis and did not misuse ADHD medications. Likewise, this pattern was also repeated in the Hyperactivity-Impulsivity portion of the self-report scale, suggesting the possibility that those without a diagnosis of ADHD who misuse medications used to treat the disorder may possibly be sub-clinical or may have

never been diagnosed as having ADHD. These results support the researcher's hypothesis, thus giving some evidence to the possibility that those who abuse substances do so in order to self-medicate themselves.

While other researchers have looked at similar issues, no research has reported significant results suggesting that Khantzian's Self-Medication Hypothesis may apply to those who misuse particular medications that are used to treat a disorder that they feel that they may be suffering from. This research addressed this issue, possibly suggesting that while not all substance abuse is associated with self-medication, a significant motivation for substance abuse of psychological prescription drugs may be reduction of symptoms associated with the condition the medications are intended to treat.

Another interesting finding from the mean scores of the groups was found when looking at the interpretation for the self-report scale. The assessment, being divided in two parts, has two separate scores. A score of 0-16 indicates that it is unlikely that this individual has ADHD. A score of 17-23 indicates that it is likely that the subject has ADHD. Finally, a score of 24 or greater indicates that it is highly likely that the subject has ADHD. Before separating the scores into groups using prior diagnosis and if they had misused, the means on both portions fell below the threshold for possible diagnosis, but when adjusted for these two factors, the results demonstrated means that would meet the diagnostic threshold for ADHD according to the self-report scale.

Those without a diagnosis of ADHD who misused had a mean score of 19.25 in inattention, suggesting a significant percentage of those who misused ADHD medications without a prior diagnosis of the disorder met the diagnostic criteria necessary to suggest a possible ADHD diagnosis. Those without a diagnosis who do not misuse the drug had a

mean score of 15.55, which fell below the threshold set forth by the authors of the scale. As would be expected, scores of those who had been previously diagnosed with ADHD were also above the threshold for inattention with mean scores for those who misuse at 23.16 and who do not misuse at 22.59. The only groups who met the threshold for diagnosis in the Hyperactivity-Impulsivity portion of the self-report scale were those who had previously been diagnosed with ADHD, but only slightly, with mean scores for those who misuse at 18.36 and those who do not misuse at 19.39. These results also give support to the belief that hyperactivity-impulsivity symptoms are less prominent in adulthood than symptoms of inattention. This also may be that those who misuse ADHD medications may only experience the inattentive symptoms associated with the disorder and their symptoms for that category fall in the sub-clinical range.

In regards to student motives for misusing ADHD medications, it was found that 67.5% of students who misuse ADHD medications do so for academic purposes with another 20.1% of students who misuse ADHD medications doing so for multiple reasons, usually including academic purposes. The results follow the results of prior research indicating that those who misuse ADHD medications do so mostly for academic purposes. This would also support Khantzian's Self-Medication Hypothesis, for students who are having educational difficulties would be more motivated to seek out drugs that may help alleviate these problems. Given that ADHD medications in those with ADHD help with attention, hyperactivity, and impulsivity; it would be reasonable for those experiencing these problems to specifically look for and misuse ADHD medications.

Final Limitations & Future Directions

The only major limitation of this study was the population size of some of the groups. With a population of over 800, there were plenty of participants, but there were only a few students who had ADHD in the study and there could have been more students who misuse ADHD medications. With a larger population of students who misuse ADHD medications, more meaningful interpretations could have been made about the reasons as to why the students misused ADHD medications. Future research looking at similar topics should look at collecting a large number of participants who have misused ADHD medications to further examine the link between the misuse of ADHD medications and the motives for the use as well as getting a larger population of students with ADHD to better assess diversion among this group.

Another limitation of the study was the use of only one measure to test for ADHD. By using multiple measures to test for ADHD, the connection between self-medication and the misuse of ADHD medications can be better examined. Since ADHD is a disorder that is typically diagnosed using a collection of self-reports from the patient as well as those around the patient, future research should look at those who misuse ADHD medications and look to get self-report measures filled out by teachers, professors, family members, and roommates.

Other recommendations for future directions are to look at any gender differences that may exist among those who misuse ADHD medications. When looking at the results of the chi-squared analysis, 15.4% of the males surveyed were diagnosed with ADHD with only 6.1% of females surveyed having a prior diagnosis of ADHD. In comparison, 27.4% of all males surveyed misused ADHD medications and 22.3% of all females

surveyed misused ADHD medications. Using the results of this study, this would suggest that there may be a discrepancy in females who misuse ADHD medications, for females may be more likely to fall into the sub-clinical range of symptoms for ADHD, which would fit with the results suggested from this college population.

CHAPTER VI

CONCLUSION

In summary, ADHD is a disorder that is typically associated with academic-related problems such as lack of focus and lack of organizational skills. The disorder is diagnosed by the presence of at least 6 symptoms of inattention and/or at least 6 symptoms of hyperactivity-impulsivity. While the symptoms of hyperactivity-impulsivity may diminish later on as the individual progresses into adulthood, symptoms of inattention do not and students suffering from this disorder may encounter educational difficulties as they progress through high school and college.

Additionally, misuse of substances has been a focus of researchers for many years and theories attempting to explain this phenomenon have, for the most part, been unsuccessful. One theory that attempts to explain substance use is Khantzian's Self-Medication Hypothesis of Substance Abuse. According to Khantzian, "substance addiction functions as a compensatory means to modulate affects and self-soothe from the distressful psychological states" (Suh et al., 2008) such as lack of focus, pain, or depression, for example. Addressing the research of Khantzian and others examining this concept, it was hypothesized by the researcher that those who misused ADHD medications, such as Ritalin, do so in order to self-medicate themselves from distressful symptoms such as a lack of focus or difficulty getting started on projects. The research

was able to support this hypothesis, finding significant group mean differences in the groups that were researched, thus not only finding support for this study, but also finding support for Khantzian's Self-Medication Hypothesis. While not all prior studies looking at Khantzian's hypothesis were able to find significant results, this may be due to how closely the drug was related to the psychological conditions being tested. Since this study used a drug that is typically used to treat problems associated with educational difficulties and focused on psychological conditions associated with ADHD, which is a disorder that displays itself in academics, it may be that Khantzian's hypothesis applies best in particular conditions, such as the ones proposed in this study.

Furthermore, this study also sought out to see the reasons as to why students tend to misuse ADHD medications. Prior studies by Rabiner et al., Novak et al., & Judson & Langdon as well as others all seemed to give support to the hypothesis that the reason students misuse ADHD medications is for academic purposes. This would also fit with the Self-Medication Hypothesis proposed by Khantzian. This research was able to find that out of those surveyed; the majority of those who misuse ADHD medications do so for academic purposes, but due to population sizes, this was not able to be examined in greater detail. Future studies should look at this issue to see if those who misuse ADHD medications who do so for academic purposes are significantly more likely to score higher on assessments testing for ADHD than those who misuse ADHD medications for other reasons.

The goal of the study was to examine Khantzian's Self-Medication Hypothesis and to test why students misused ADHD medications. The results gave support for Khantzian's Self-Medication Hypothesis by identifying significant mean differences

between two groups, those without a prior diagnosis of the disorder in question who misused drugs used to treat ADHD with those who did not misuse that particular drug, with those in the latter group scoring significantly lower than those who misused ADHD medications and lacked a prior diagnosis for the disorder.

Finally, the researcher sought out to find support for the hypothesis that the reason students misuse ADHD medications is mostly for academic purposes and while group sizes did not allow for more meaningful data to be interpreted, the percentage of those who used the drug for academic purposes was staggeringly larger than the percentage of those who used the drug for other reasons. Future researchers should also look to address this issue in further detail, possibly by looking at scores of those who misuse the drug for academic purposes on an ADHD scale with those who misuse the drug for other reasons. This research provided support for both theories and suggests that future research should look at this phenomenon in more detail to see if there is any truth in Khantzian's Self-Medication Hypothesis when applied as suggested in this study.

APPENDIX A

CONSENT FORM



CONSENT FORM

This Consent Form is for students of Texas State University who have been invited to participate in this research, titled “The Misuse of Attention-Deficit/Hyperactive Disorder Medications in a College Population: Applying Khantzian’s Self-Medication Hypothesis of Substance Use”.

Principal Investigator: Joseph Gangi [jg1650@txstate.edu, (210) 426-4529]

Organization: Texas State University, Department of Psychology

Thesis Committee: Dr. Joe Etherton, Dr. John Huber, Dr. Alex Nagurney, & Dr. Ty Schepis

We are conducting research on nonmedical use medications for ADHD (Attention-Deficit/Hyperactivity Disorder). If there is any information that is provided in this description that you do not understand, please feel free to ask me and I will take the time to explain. You have been chosen to participate in this study because of your status as a college student at Texas State University.

We are asking you to take a short questionnaire asking demographic information, some medical information, and your experiences, if any, using these types of medications prescribed for ADHD. Additionally, we will ask you to fill out a short 18 question self-report assessment that will ask you to rate yourself based on symptoms associated with ADHD. By no means does this provide a diagnosis of ADHD. If you feel after

completing this survey and questionnaire that you need to speak to a counselor, you may contact the counseling center to discuss these issues, for Texas State provides students free counseling for a limited number of sessions. The University Counseling Center is located in the LBJ Student Center Room 5-4.1. You may also call the Counseling Center at

512-245-2208 or e-mail them at counselingcenter@txstate.edu. Additional counselling in San Marcos is available by contacting Joanne M Applegate, LPC [(512) 557-1255] or Dr. Barbara A Sprott, LPC [(512) 395-5458].

Your participation in this research is entirely voluntary and you may choose to end your participation at any time without consequence. Your University and/or class standing will not be affected at all. You may change your mind later and stop participating even if you agreed earlier. Additionally, you may choose not to answer any question for any reason. If you prefer, you may complete an alternative research activity, which involves reading a research article and writing a brief summary of the article. There are no anticipated risks associated with participation in this study, but by participating in this study, participants will be helping further the research in this field and help those who feel that they need to use ADHD medications.

Participation should take no longer than 15 minutes. You will be able to contact the researcher after the study if you would like to find out more information about the study or if you would like to know the results of the study. The researcher may be contacted at the e-mail address listed at the beginning of this form.

For participating in the study, your professor may provide you with extra credit at their discretion. Upon completion of the questionnaire and self-report scale, participants will be asked to turn in the forms, including this form, to the front of the class and write their name on a piece of paper that will be provided to the professor.

The information that we collect from this research project will be stored in a secure location, and there will be no identifying information linking the data you provide with your identity. The data as stored will be anonymous. Only the researchers listed above will have access to this data.

This research has been reviewed by the IRB. If you have any questions about the research, the research participants' rights, and/or research-related injuries to participants,

please contact IRB chair, Dr. Jon Lasser (512-245-3413 – lasser@txstate.edu), or to Ms. Becky Northcut, Compliance Specialist (512-245-2102).

IRB approval #: _____

Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant: _____

Signature of Participant: _____

Date: _____ **(Day/month/year)**

Researcher's Signature: _____

APPENDIX B

QUESTIONNAIRE

Medication Misuse Screening Questions

The following questions will ask demographic questions as well as questions about medication misuse. **Misuse is defined as using medications prescribed to someone else for the feeling that it may cause. This can be done in multiple ways, such as taking pills, snorting, smoking, injecting interveniously, or through a transdermal patch.** Please answer the following questions as accurately as possible. Your answers will be used for research purposes only. Please do not put any information on this survey that can be used to identify yourself. All information provided will remain confidential.

- 1) How old are you?
 - a. 18
 - b. 19
 - c. 20
 - d. 21
 - e. 22
 - f. 23 or older
- 2) What ethnicity are you?
 - a. Caucasian
 - b. African – American
 - c. Hispanic
 - d. Asian
 - e. Caribbean
 - f. Native American
 - g. Other
 - h. Two or more
- 3) What is your gender?
 - a. Male
 - b. Female
- 4) Have you ever been diagnosed with Attention-Deficit/Hyperactivity Disorder?
 - a. Yes
 - b. No
- 5) Do you have a current prescription for stimulant ADHD medication (ex. Ritalin, Adderall, Focalin, ext.)?
 - a. Yes
 - b. No
- 6) If you answered yes to question 5, answer the following questions....
 - a. Have you ever sold your medications?
 - a. Yes
 - b. No
 - b. Have you ever given away your medications?
 - a. Yes
 - b. No
 - c. Have you ever not used your medications as prescribed?
 - a. Yes
 - b. No
- 7) Do you have a current prescription for non-stimulant ADHD medication (ex. Strattera)?
 - a. Yes
 - b. No

- 8) In the past year, have you ever, even once, used ADHD medication (Ritalin, methylphenidate, Adderall, etc) that was not prescribed for you or that you took for the experience or feeling it caused?
- a. Yes
 - b. No
 - c. Not Sure
- i. If you are not sure, elaborate: _____
- 9) If so, why did you do so?
- a. To get high
 - b. To study
 - c. To stay awake
 - d. Other _____

Thank you so much for your honesty. Please complete the following questionnaire and then give both this survey and the following questionnaire to the researcher. If, after completing this survey, you feel that you may want to talk to a counselor, Texas State provides students with counseling if needed. The University Counseling Center is located in the LBJ Student Center Room 5-4.1. You may also call the Counseling Center at 512-245-2208 or e-mail them at counselingcenter@txstate.edu

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VITA

Joseph Michael Gangi II was born on February 26th, 1984 in Carson City, NV. He began his early education in Laredo, TX and soon moved to San Antonio, TX where he remained until the last two years of high school, where he finished his early education at Ashland High School in Ashland, MA in 2002. He immediately began taking classes at Seton Hall University in South Orange, NJ in the Fall of 2002 before transferring to Texas A & M International University in Laredo, TX where he majored in Psychology and minored in Studio Art. He graduated in August, 2008 with his Bachelor of Arts degree. In the Fall of 2008, he entered the Health Psychology program at Texas State University-San Marcos to pursue his Master of Arts degree.

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