A SURVEY EXAMINING THE NONMEDICAL USE AND DIVERSION OF PRESCRIPTION STIMULANT MEDICATIONS AMONG COLLEGE STUDENTS USING THE THEORY OF PLANNED BEHAVIOR

by

ANDREW R. GALLUCCI

STUART USDAN, COMMITTEE CHAIR
DEIDRE LEAVER-DUNN
BRAD LIAN
KATHLEEN BOLLAND
JERI ZEMKE

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ABSTRACT

The purpose of this study was two-fold. First, the proposed study aimed to create a reliable survey instrument designed to examine the nonmedical use of prescription stimulants (NMUPS) and diversion behaviors using the Theory of Planned Behavior (TPB) among undergraduate students aged 18-24. Second, this study examined the utility of the TPB in predicting NMUPS and diversion behaviors.

The study utilized a cross-sectional design (n=1,026) to administer an 88-question survey assessing the nonmedical use and diversion of prescription stimulants. As part of this survey, students responded to theory-based questions for both behaviors. Results of a principal components analysis suggested strong reliability in the survey's ability to measure the theoretical constructs of diversion and NMUPS. Further statistical analyses found utility for TPB in predicting NMUPS. However, TPB had limited ability in predicting the diversion behavior.

DEDICATION

For my son, Nicholas Robert Gallucci, you are the reason for all of this;

And in loving memory of Michael Ralph Gallucci, my “pop pop” and guardian angel.

LIST OF ABBREVIATIONS AND SYMBOLS

α	Cronbach's Alpha
CI	Confidence Interval
CWID	Campus Wide Identification
MTF	Monitoring the Future Study
NMUPS	The Nonmedical Use of Prescription Stimulant
NSDUH	National Survey on Drug Use and Health
OR	Odds Ratio
PBC	Perceived Behavioral Control
PCA	Principal Components Analysis
SCT	Social Cognitive Theory
SEM	Social Ecological Model
TPB	The Theory of Planned Behavior
x^2	Chi-square Value

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The abuse of prescription drugs, illicit drugs, and alcohol continue to be problematic issues among persons in the United States today. Persons suffering from addiction and dependence on these substances create a public health concern due to the financial burden they place on society. After factoring in health and crime-related costs as well as losses in productivity, it is estimated that the total costs of substance abuse in the United States annually exceed half a trillion dollars [National Institute on Drug Abuse (NIDA), 2009]. Although these costs incorporate many substances of abuse and dependence, studies suggest that prescription drug abusers are more likely to abuse illicit drugs and alcohol when compared to control groups (Kaloyanides, McCabe, Cranford, & Teter, 2007; McCabe, Boyd, & Teter, 2009).

Stimulant medications, in particular, are a public health concern due to their high potential for misuse, abuse, and dependence. This phenomenon extends from their chemical similarities to cocaine and methamphetamine [Drug Enforcement Agency (DEA), 2002], which also contributes to several unintended side effects from their use. The nonmedical use of prescription stimulants (NMUPS) can cause increases in heart rate, blood glucose, and blood pressure as well as an irregular heartbeat, feelings of paranoia, and hostility (NIDA, 2009). In fact, the Drug Abuse Warning Network (DAWN) found that an estimated 10,146 emergency department (ED) visits in 2004 were associated with the side effects of stimulant medications [Substance Abuse and Mental Health Services Administration (SAMHSA), 2008]. Of the 10,146 ED visits, the majority of those cases (47%) were related to NMUPS (SAMHSA).

Medical Use of Prescription Stimulants

Prescription stimulants are medications designed to increase alertness and concentration by gradually increasing dopamine levels in the brain (NIDA, 2009). These medications are placed in one of three drug categories based on their chemical makeup and active ingredient (DEA, 2002). These categories are methylphenidate (e.g., Ritalin, Concerta), amphetamine salts (e.g., Adderall), and dextroamphetamine (e.g., Dexedrine) (DeSantis, Webb, & Noar, 2008; NIDA). All of these prescription stimulant medications play a vital role in the management of several medical conditions (NIDA). Stimulant medications are most commonly prescribed to treat attention deficit/hyperactivity disorder (ADHD), but can also treat narcolepsy, obesity, and bouts of depression that are unresponsive to other medical interventions (Caplan, Epstein, Quinn, & Stevens, 2007; NIDA).

Prevalence of the Nonmedical Use of Prescription Stimulants

Results from the National Survey on Drug Use and Health (NSDUH) estimated that 904,000 persons aged 12 or older used prescription stimulants nonmedically during the past month (SAMHSA, 2009). Additionally, an estimated 600,000 persons aged 12 or older had initiated NMUPS during the past year (SAMHSA). Individuals that report NMUPS are motivated to do so for a range of reasons (Arria, Caldeira, Vincent, O'Grady, & Wish, 2008; DeSantis et al., 2008; McCabe et al., 2009). Most commonly, people misuse these medications to stay awake longer, increase alertness, and improve concentration (Arria et al.; DeSantis et al.; McCabe et al.; Rabiner et al., 2009a). Although these motivations are in line with the intended use of the medication, any use without a prescription is considered misuse (McCabe et al.; Rabiner et al.). It has also been reported that people engage in NMUPS to experiment with drug

use, to suppress appetite, and because they are addicted to the medication (Arria et al.; DeSantis et al.; McCabe et al.).

Prescription Stimulant Misuse among Undergraduate College Students

College students aged 18-25 are at an increased risk to engage in a plethora of adverse health behaviors that include illicit drug use, heavy episodic drinking, and unsafe sex (Johnston, O'Malley, Bachman & Schulenberg, 2009; McCabe, Teter, Boyd, Knight, & Wechsler, 2005). In addition, three national studies revealed that prescription drug abuse is also prevalent among young adults aged 18-25 when compared to other age groups (Johnston et al.; Kroutil et al., 2006; McCabe et al., 2009; McCabe et al., 2006b; SAMHSA, 2009). Outcomes from these studies also proposed that persons aged 18-25 who attend college display higher rates of prescription drug abuse than their peers who do not attend college (Herman-Stahl, Krebs, Kroutil, & Heller, 2007; Johnston et al., 2009; McCabe et al., 2005, 2009). In fact, one national study found that 3.2% of college students admitted to the nonmedical use of Ritalin (i.e., methylphenidate) compared to 2.1% of participants who did not attend college (Johnston et al., 2009). This difference in nonmedical Ritalin use was even greater in females, with 3.8% of college females reporting stimulant misuse compared to .8% of non-college females (Johnston et al., 2009).

Other independent examinations of NMUPS among college students have found similar results to national studies. However, independent research on NMUPS among college students has identified varying prevalence rates from 0 to 45% (Darredeau, Barrett, Jardin, & Pihl, 2007; McCabe, Teter, & Boyd, 2006b; McCabe et al., 2005; Poulin, 2007; Rabiner et al., 2009a; Teter, Falone, Cranford, Boyd, & McCabe, 2010; Upadhyaya et al., 2005). These studies suggest that the discrepancies are largely explained by school location, admission standards, and the

demographics of the college or university (Darredeau et al.; McCabe et al., 2005, 2006b; Poulin; Rabiner et al.; Teter et al.; Upadhyaya et al.). Despite existing studies that examined NMUPS and its correlates, further examination of the behavior is warranted to provide a more accurate assessment of the current NMUPS prevalence.

Diversion

Diversion can be defined as the unlawful channeling of regulated pharmaceuticals from legal sources to the illicit marketplace that occurs at all points in the drug delivery process (Inciardi, Surratt, Kurtz, & Burke, 2006). It extends to all types of illicit and prescription medications such as marijuana, cocaine, stimulants, opioids, and tranquilizers (Mohamed & Fritsvold, 2006). This behavior occurs through varied avenues including peers, family members, the internet, and drug dealers (El-Aneed et al., 2009; McCabe, West, & Wechsler, 2007). Studies identify that friends (DeSantis et al., 2008; McCabe et al.; Rabiner et al., 2009a), peers (El-Aneed et al.), and family members (DeSantis et al.; El-Aneed et al.; McCabe et al.; Rabiner et al.) are the most common avenues of diverted prescription medications.

The use of illicit drugs on college campuses creates a large demand for these drugs in and around the towns in which they are located (Mohamed & Fritsvold, 2006). Students enrolled at these schools often meet this demand for drugs by becoming drug dealers (Mohamed & Fritsvold). Research on these students has found that these students mostly admit to the sale of marijuana (Mohamed & Fritsvold). However, several students in the study also indicated the distribution of ecstasy, and cocaine (Mohamed & Fritsvold).

In addition to selling illicit drugs, there is a growing trend of college students selling, giving away, and trading prescription medications (DeSantis et al., 2008; McCabe, Teter, & Boyd, 2006a; Rabiner et al., 2009a), with drugs in the opioid, tranquilizer, sedative, and

stimulant classifications most commonly distributed (McCabe et al.). Drugs in each of these categories are controlled substances that are only to be distributed by licensed professionals and the penalties for distributing these drugs without a license are equal to or more severe than those for selling illicit drugs (DEA, 2002).

Despite similar punishments for the distribution of both illicit drugs and prescription medications, a lesser stigma seems to be attached to those individuals involved in the diversion of prescription medications (DeSantis et al., 2008). In a qualitative assessment of the behavior, students often suggested that the distribution of prescription stimulant medication was “no big deal” and that it was “very common” on their college campus (DeSantis et al.). Additionally, students often characterized students supplying these medications as “good guys” or as a person just “trying to help out another friend” (DeSantis et al.). The reduced stigma associated with prescription medications seems to enhance their diversion with as many as 54% of sample admitting to the behavior (McCabe et al., 2006a).

Diversion of Prescription Medications as a Public Health Concern

Diversion is a public health concern for a pair of reasons. First, there is no medical supervision or direction provided to persons receiving the medication. All scheduled prescription medications carry associated health risks ranging from minor allergic reactions to accidental overdose (Goldsworthy, Schwartz, & Mayhorn, 2008). These health risks are normally minimized through the course of supervised medical treatment by taking a through medical history, providing follow-up medical care, and instructing the patient on how or why to take a medication (Goldsworthy et al.). However, a person receiving a diverted medication bypasses these warnings and procedures, which increases their risk of taking the medication incorrectly (Goldsworthy et al.). This misuse of the prescription medications can lead to adverse drug

interactions and side effects that would require a person to visit a physician or emergency department (NIDA, 2008).

Diversion is also a public health concern because it delays appropriate treatment of underlying conditions (Goldsworthy et al., 2008). A person treating a medical condition using drugs without his or her own prescription will delay a medical diagnosis, which can cause undo suffering or allow the progression of an otherwise treatable disease or condition (Goldsworthy et al.).

Prescription Stimulant Diversion among Undergraduate College Students

As previously stated, college students demonstrate higher usage rates for a variety of legal and illegal drugs including marijuana, cocaine, and prescription medications (McCabe et al., 2005; Mohamed & Fritsvold, 2006). However, college students are particularly more likely to use stimulant medication nonmedically compared to their non-college peers (DeSantis et al., 2008; Johnston et al., 2009). The association between the use of prescription stimulants and an increase in academic achievement partially explains this discrepancy (DeSantis et al.; Johnston et al.).

Although national studies do not investigate the prevalence of prescription stimulant diversion among college students, preliminary regional and local projects have begun to identify prevalence rates and motivations associated with the diversion of prescription stimulants on college campuses (DeSantis et al., 2008; McCabe et al., 2005 Rabiner et al., 2009a). These studies suggest that the increased prevalence of NMUPS on college campuses parallels an increase in the incidence of prescription stimulants diversion among students on those campuses (DeSantis et al.; McCabe et al.; Rabiner et al.).

Rabiner et al. (2009a) studied the misuse and diversion of prescription stimulant medications among undergraduate students aged 18-24. They found that 56% of participants with a current prescription for stimulant medication were approached to divert their medication in the preceding 6 months and that 26% of those did so (Rabiner et al., 2009a). Several other studies found similar results with 35.8% and 29%, respectively, of their undergraduate samples with current prescriptions for stimulant medication reporting diversion (Garnier et al., 2010; Upadhyaya et al., 2005).

Overall, research on diversion among undergraduate college students indicated discrepancies in the prevalence of the behavior. Studies on the behavior reported that undergraduate students divert prescription stimulants at varying rates from 11 to 54% (DeSantis et al., 2008; Garnier et al., 2010; McCabe, Teter, & Boyd, 2006b; Rabiner et al., 2009a; Wilens, Gignac, Swezey, Monuteaux, & Biederman, 2006). This variance of diversion warrants further examination to provide a current assessment of diversion prevalence rates.

Statement of the Problem

There is a consistent trend of students diverting and misusing prescription stimulants on college campuses across the United States (Babcock & Byrne, 2000; DeSantis et al., 2008; Low & Gendaszek, 2002; McCabe et al., 2005; Rabiner et al., 2009a). The diversion and misuse of stimulants is often trivialized by students due to a lack of understanding about the dangers and consequences associated with these behaviors (DeSantis & Curtis Hane, 2010; DeSantis et al.). Students commonly fail to realize that stimulants carry a high potential for addiction and use of these drugs without the supervision of a medical professional can lead to substance use and dependence issues (DeSantis & Curtis Hane; NIDA, 2009). Furthermore, undergraduates are often ignorant of the fact that diverting their prescription is an illegal behavior that carries the

same punishments associated with the distribution of street drugs (DeSantis et al., 2008; DEA, 2002).

The current project incorporated TPB to identify correlates of NMUPS and diversion to provide structure for future interventions. The information gleaned from this survey enables health educators to tailor programs aimed at the reduction of these behaviors. Outcomes produced by this project also add to the current literature by providing current prevalence rates for both NMUPS and diversion.

Statement of the Purpose

The purposed of this study was two-fold. First, the proposed study aimed to create a reliable survey instrument designed to examine the NMUPS and diversion behaviors using the TPB among undergraduate students aged 18-24. Second, this study examined the utility of the TPB in predicting NMUPS and diversion behaviors.

Significance

Current research of NMUPS is largely atheoretical with only a few published articles that use a theory to frame the behavior (Ford, 2009; Judson & Langdon, 2009). Additionally, studies using behavioral theory to frame the diversion behavior are lacking in the published literature (Judson & Langdon). In order to account for this lack of research, this study used methodological approaches that incorporated a behavioral theory to identify all potential correlates to these behaviors and provide structure for future interventions.

Furthermore, studies examining NMUPS among college students are relatively new with published literature dating back less than 10 years. These studies have identified prevalence rates that have varied from 0 to 45% (Darredeau et al., 2007; McCabe et al., 2005, 2006b; Poulin, 2007; Rabiner et al., 2009a; Teter et al., 2010; Upadhyaya et al., 2005). Based on this large

variance of prevalence rates and the novelty of the research topic, a further examination of the NMUPS behaviors is warranted.

Diversion research among undergraduate college students also indicates discrepancies in the prevalence of the behavior. Examinations of diversion have reported prevalence rates that vary as widely as NMUPS' prevalence (DeSantis et al., 2008; Garnier et al., 2010; McCabe et al., 2006b; Rabiner et al., 2009a; Wilens et al., 2006). Based on these large variances and the lack of overall studies examining diversion, a further examination of the behavior is needed.

In order to add to current literature, this examination used the Theory of Planned Behavior (TPB) to develop and assess the reliability of a survey instrument that explores diversion and NMUPS among undergraduate college students. This survey determined the extent to which attitudes, subjective norms, and perceived behavioral control explain a person's decision to divert stimulant medication and use stimulant medication nonmedically (Ajzen, 1985, 1991). Additionally, the validated survey identified prevalence rates, motivations, and correlates associated with both the NMUPS and diversion behaviors.

This study incorporated TPB in the examination of the NMUPS and diversion behaviors because of the theory's ability to predict future behavior through the examination of attitudes, subjective norms, and perceived behavioral control (Ajzen, 1985, 1991). In order to examine these behaviors through the TPB lens, the study replicated parts of a survey created by Judson and Langdon (2009) that was designed to identify prevalence rates, motivations, and correlates of NMUPS. Theoretical questions from Judson and Langdon were also modified in order to examine diversion behavior using the same TPB constructs. The resulting questions within the survey constitute the first known theory-based scale designed to examine diversion. In addition, the data produced by this survey add to previous work completed by Judson and Langdon on the

utility of TPB to explain NMUPS. The results and conclusions of this study can assist to direct future interventions to target specific subsections of undergraduate populations that are more prone to engaging in these behaviors.

Research Questions

The study had five research questions related to the nonmedical use and diversion of prescription stimulants among undergraduate students using the TPB:

1. Is the survey valid and reliable in measuring the nonmedical use and diversion of prescription stimulants?
2. What are the prevalence rates, bivariate associations, and motivations associated with misuse and diversion among undergraduate students aged 18-24 during their lifetime and in the last 30 days?
3. Are a person's attitudes, subjective norms, and perceived behavioral control correlated with NMUPS?
4. Do the attitudes, subjective norms, and perceived behavioral control differ among participants reporting NMUPS, legal use, and those who do not report use?
5. Do the attitudes, subjective norms, and perceived behavioral control differ between participants who report diversion and those who do not report diversion?

Research Hypotheses

The following hypotheses were generated for the research questions associated with this study:

1. The survey used in this study is a valid and reliable instrument that can accurately measure the nonmedical use and diversion of prescription stimulants among undergraduate students.

2. The prevalence rates, bivariate associations, and motivations associated with NMUPS and diversion among undergraduate students aged 18-24 during their lifetime and in the last 30 days will be consistent with published findings.

3. Attitudes, subjective norms, and perceived control will be correlated with NMUPS.

4. Attitudes, subjective norms, and perceived behavioral control will differ between subjects reporting NMUPS, legal use, and those who do not report use.

5. Attitudes, subjective norms, and perceived behavioral control will differ between subjects reporting diversion and those who do not report diversion.

Limitations

A number of limitations were acknowledged regarding this study. First, the collection of data relied on a participant's self-report related to the nonmedical use and/or diversion of prescription stimulant medication. This limitation existed because participants might have been hesitant to provide accurate information about activities that are illegal or considered socially undesirable (Durant, Carey, & Schroder, 2002). In order to reduce the effect that self-report had on the quality of the data, participation in this study was anonymous.

The second limitation of the study was that the data produced from the survey only provided a cross-sectional examination of the NMUPS and diversion behaviors. Therefore, the data produced from the survey cannot assess trends or changes in NMUPS or diversion during the course of an academic semester or year. Although this data collection method was not ideal, many studies in the areas of the nonmedical use and diversion of prescription stimulants have used similar methods (Arria et al., 2008; Boyd & McCabe, 2008; Boyd, McCabe, Cranford, & Young, 2006; Kaloyanides et al., 2007; McCabe et al., 2007).

The use a convenience sample of undergraduate college students also limited this study. Data resulting from a convenience sample from only one institution suggests that the conclusions of the study may not be generalizable to the entire population of undergraduate students in the United States. However, other preliminary studies in the area of NMUPS (Babcock & Byrne; 2000; Judson & Langdon, 2009; Low & Gendaszek, 2002; White, Becker-Blease, & Grace-Bishop, 2006) and diversion (Boyd, McCabe, Cranford, & Young, 2007; DeSantis et al., 2008; Poulin, 2007) have successfully used similar data collection methods in their work.

Delimitations

Participants in this study consisted of undergraduate students enrolled in classes at a large, public university in the southeastern United States during the 2010 fall semester. Students who were present on the day the survey was administered and consented to participate were asked to complete the survey. However, only undergraduates between 18 and 24 were included in this study.

Studies on a variety of adverse health behaviors including binge-drinking, illicit drug use, and prescription drug abuse consider the age range of 18- to 24-years-old to be the traditional college student (Babcock & Byrne, 2000; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). Research suggests that students under the age of 18 are commonly still in high school and students older than 24 no longer demonstrate an increased prevalence of drug use (Babcock & Byrne; Wechsler et al.). In order to maintain a sample within this age range, students who identified themselves outside of the age parameters that completed the survey were excluded during the data analysis.

Terminology

Attitude: an individuals' positive or negative evaluation of performing a particular behavior (Ajzen, 1991).

Binge Drinking: a pattern of drinking alcohol that brings blood alcohol concentration (BAC) to .08 gram percent or above. This pattern corresponds to consuming five or more drinks (male), or four or more drinks (female), in about 2 hours (Wechsler & Nelson, 2001).

Doctor Shopping: in order to obtain prescribed medications an individual visits multiple physicians, complaining of a range of symptoms (El-Aneed et al., 2009).

Diversion: the unlawful channeling of regulated pharmaceuticals from legal sources to the illicit marketplace that occurs at all points in the drug delivery process (Inciardi et al., 2006).

Illicit drugs: illegal substances that do not serve a medical purpose and are taken for recreational use. Illicit drugs include substances such as marijuana, cocaine, ecstasy, LSD, etc. (SAMHSA, 2009).

Licensed Medical Professional: any health care professional that has a Drug Enforcement Agency license number and the ability to prescribe medications (Inciardi et al., 2006).

Medical Use: the use of a prescription medication by the person for whom the drug was prescribed and within the parameters for which it is intended (Barrett, Meisner, & Stewart, 2008).

Motivation to Comply: inner or social stimulus influencing a person's choice to enact a specific behavior (Ajzen, 1991)**.**

Nonmedical Use: the use of prescription medication to create an altered state, to get high, or for reasons other than those intended by the prescribing clinician (Boyd et al., 2006; McCabe et al., 2007).

Nonmedical Use of Prescription Stimulants (NMUPS): the use of methylphenidate, dextroamphetamine, or mixed amphetamine salts by an individual without a physician's prescription or use with the intent to cause a euphoric feeling (Ghaffari, 2009).

Perceived Behavioral Control: an individual's perceived difficulty in performing a particular behavior (Ajzen, 1991).

Prescription Opioids: medications encompassing the analgesic and opiate classifications prescribed to relieve pain at varying levels (NIDA, 2009). Common brand name prescription opioids are OxyContin, Darvocet, and Lortab (NIDA).

Prescription Stimulant: medication that increases normal brain function, resulting in an elevated state of alertness, attention, and energy (NIDA, 2009). Common brand name prescription stimulants are Ritalin, Adderall, and Concerta (NIDA).

Prescription Tranquilizers: medications prescribed to slow normal brain function to relieve anxiety and treat insomnia (NIDA, 2009). Common brand name prescription tranquilizers are Xanax, Ambien, and Soma (NIDA).

Relevant Others: a referent group or individuals who hold an opinion about a health behavior valued by a person (Ajzen, 1991).

Self-treatment: prescription drug abuse motivated by the desire to alleviate symptoms consistent with the prescription drug's pharmaceutical main indication and which does not involve co-ingestion with alcohol or other drugs or non-therapeutic routes of administration (Boyd & McCabe, 2008).

Substance Abuse: a pattern of maladaptive substance use that is associated with recurrent and significant adverse consequences (APA, 2000).

Substance Dependence: a compulsive pattern of substance use characterized by a loss of control over substance use and continued use despite the significant substance-related problems (APA, 2000).

Subjective Norm: an individual's perception of social pressures or relevant others' beliefs that he or she should or should not perform a behavior (Ajzen, 1991).

Theory of Planned Behavior: model that proposes that attitudes, subjective norm and perceived behavioral control predict a person's intention to perform a specific behavior (Ajzen, 1991).

CHAPTER II

LITERATURE REVIEW

Prescription medications are an integral component of medical treatments in the United States. In 2007, the United States' spent 227.5 billion dollars on prescription medications, which was a 4.9% percent increase from the previous year (Hartman, Martin, McDonnell, & Catlin, 2009). In part, the observed increase in spending is a result of an increase of medications prescribed to patients during the course of medical treatment. Medications are commonly prescribed in order to assist in the treatment of a wide array of health conditions that include pain, attention disorders, anxiety, and insomnia (NIDA, 2009).

Most patients receiving prescription medications take these drugs safely, without complications while under the direction and care of a licensed medical professional (SAMHSA, 2009). The safety of these drugs is predicated on patients following the instructions provided by the prescriber that will allow them to avoid unintended consequences of prescription drug use such as addiction to the medication or allergic reactions (NIDA, 2009). However, in the past 2 decades a growing minority of people have started to misuse prescription medications for a variety of reasons.

Nonmedical use is defined as the use of prescription medication to create an altered state, to get high, or for reasons (or by people) other than those intended by the prescribing clinician (Boyd et al., 2007; McCabe et al., 2007). Nonmedical use typically occurs in relation to medications in the stimulant (e.g., Ritalin, Adderall), opioid (e.g., OxyContin, Lortab), tranquilizer (e.g., Ambien, Lunesta), and sedative (e.g., Xanax, Valium) classifications (Johnston

et al., 2009; SAMHSA, 2009). Nonmedical use is more common among drugs in these four classifications due to similarity in their chemical structure with common illicit drugs such as cocaine, heroin, and opium (DEA, 2002). However, these similarities also increase the potential for chemical dependency on prescription medications (DEA).

Diversion of Prescription Medications

Diversion is the unlawful channeling of regulated pharmaceuticals from legal sources to the illicit marketplace that occurs at all points in the drug delivery process (Inciardi et al., 2006). It can occur from a variety of methods that include sharing medications among family and friends, selling medications, theft, prescription forgery, and doctor shopping (El-Aneed et al., 2009; Inciardi et al.). However, most people who abuse prescription stimulants do not obtain them through a drug dealer or an internet pharmacy (McCabe et al., 2007; SAMHSA, 2009). Despite the source of the diverted medication, the action is a crime punishable by law, hefty fines and jail time of 3 to 20 years, depending on the type and amount of medication diverted (DEA, 2002).

In addition to legal ramifications, diversion poses serious health risks. Prescription stimulant diverters usually supply medications to others without providing them information about the potential effects, interactions, and side effects of the drug (El-Aneed et al., 2009; NIDA, 2009; Sussman, Pentz, Spruijt-Metz, & Miller, 2006). This lack of information can lead the recipient of diverted medications to suffer from unintentional injuries or overdose as well as dependence or addiction to the drug (NIDA; Sussman et al.).

A study has found that diversion of prescription medications can start in early adolescence and continue well into adulthood. Daniel, Honein, and Moore (2003) used a cross-sectional mail survey of 1,568 subjects aged 9 through 18 and found that 20.1% of girls and

13.4% of boys borrowed or shared prescription medications in their lifetime. Furthermore, this study concluded that the sharing/borrowing of prescription medications among students 9-11 years old was 6.4% for boys and 7.5% for girls (Daniel et al.). In contrast, the prevalence for diversion among participants 15-18 years old significantly increased ($p<0.01$) to 15.1% and 29.2%, respectively (Daniel et al.). Furthermore, girls displayed significantly higher rates of diversion (29.2% v. 15.1%) (Daniel et al.). This increased rate of diversion among girls is potentially the result of their desire to fit in with group norms at such a young age (Daniel et al.).

In a subsequent study, Darredeau et al. (2007) examined patterns of diversion among 66 adults (age 18 and older) with a current stimulant prescription in the Montreal area. Participants in this study consisted of 53% males, 91% White, with a mean age of 27 years (Darredeau et al.). Face-to-face confidential interviews of 66 adults found that 44% of the sample admitted to diverting their prescription stimulant medication during their lifetime. Furthermore, of the people who confessed to diverting their stimulant medication, 97% gave their medication away, 17% sold it, and 14% did both (Darredeau et al.).

T-tests in the present study identified that, relative to non-diverters, persons who diverted their stimulants were younger than those who did not divert their medication (22.1 yrs v. 29.5, $t=3.75$, $p<0.001$). This finding, in addition to those reported by Daniel et al. (2003), suggests the diversion might occur more in persons 18 to 25 years old. This result would be consistent with other studies that have found that NMUPS and diversion are closely related and typically display the highest prevalence in that age range (Babcock & Byrne, 2000; Johnston et al., 2009; Low & Gendaszek, 2002; McCabe et al., 2005b).

Measurement of Prescription Stimulant Misuse and Diversion

Diversion and prescription stimulant misuse are relatively new and unexplained health behaviors. To date, the majority of studies on the nonmedical use and diversion of prescription stimulant has come from the National Survey on Drug Use and Health (NSDUH; SAMHSA, 2009), Student Life Survey (SLS; UMSARC, 2010), and the Monitoring the Future Study (MTF; Johnston et al., 2009). Although several researchers have started to create and validate specific instruments used to identify attitudes, correlates, and prevalence of prescription stimulant misuse and diversion in various populations (Babcock & Byrne, 2000; DeSantis et al., 2008; Judson & Langdon, 2009; Low & Gendaszek, 2002; White et al., 2006), a theoretically based survey instrument designed to examine both the nonmedical use and diversion of prescription stimulants does not exist in published literature.

The National Survey of Drug Use and Health

The National Survey on Drug Use and Health (NSDUH) is an annual survey sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA). It was established in 1971 as part of the Public Health Service Act, which requires annual surveys to collect data on the level and patterns of substance abuse (SAMHSA, 2009). This survey involves interviewing approximately 70,000 participants, 12 years of age and older, to provide data on the level and patterns of alcohol, tobacco, and illicit substance use, including the nonmedical use of prescription drugs. Because the survey is conducted annually, it provides information on trends in substance abuse and populations that might be at an increased risk for abusing specific substances. The results of the NSDUH have been published extensively to identify at-risk populations for nonmedical prescription use (Barrett et al., 2008; Becker, Fiellin, & Desai, 2007;

Boyd & McCabe, 2008) and to serve as the basis for other instruments designed to assess the nonmedical use of prescription drugs (Arria et al., 2008; McCabe 2002).

Monitoring the Future

Monitoring the Future (MTF) is a survey that has been conducted by Michigan's Institute for Social Research since 1975. This study examines trends on many health behaviors such as illicit drugs (including prescription drug abuse), smoking, and drinking among adolescents and college students. Each year the study collects data from approximately 50,000 students from about 420 public and private secondary schools, colleges, and universities (Johnston et al., 2009). In recent years, data from the MTF has been used to identify trends in the nonmedical use of prescription drugs (Boyd & McCabe, 2008; McCabe et al., 2009) and in the creation of prescription drug abuse surveys (Arria et al., 2008).

Student Life Survey

The Student Life Survey (SLS) is a survey instrument designed by staff and faculty members of the University of Michigan's Substance Abuse Research Center (UMSARC, 2010). This survey is designed for administration to undergraduate students through web-based and paper-based formats. SLS data have been used to determine the prevalence of alcohol and other drugs among undergraduate students to identify trends and identify sub-groups at greatest risk for substance abuse (McCabe, 2002). SLS data have been published to identify the nonmedical use of prescription drugs among undergraduate students (Kaloyanides et al., 2007; McCabe et al., 2005, 2006b, 2007) and binge-drinking (Bostwick et al., 2007; Young, Morales, McCabe, Boyd, & D'Arcy, 2005).

NMUPS Instrument

Judson and Langdon (2009) developed the only published questionnaire of prescription stimulant misuse among undergraduate college students using the TPB. This study developed a web-based survey consisting of five sections that is used to examine NUMPS among undergraduate students with and without prescriptions for stimulants (Judson & Langdon). Sections in this survey were used assess demographic information, history of diagnosis (prescription holders), tendencies to self-diagnose (non-holders), illicit use of prescription stimulants, TPB constructs, and knowledge of side-effects related to nonmedical use (Judson & Langdon). Questions assessing NMUPS were derived from previous work conducted by Teter, McCabe, LaGrange, Cranford, and Guthrie (2005) and White et al. (2006).

Within this survey, Judson and Langdon (2009) developed questions pertaining to TPB constructs. These questions were developed to assess the attitudes, subjective norms, and perceived behavioral control among undergraduate students in relation to NMUPS (Judson & Langdon). Responses to each theoretical question were on a 7-point Likert-type scale, ranging from -3 (Strongly Disagree) to +3 (Strongly Agree) (Judson & Langdon).

Stimulant Medication Use Questionnaire

The Stimulant Medication Use Questionnaire (SMUQ) is a 29-question web-based survey designed to assess medical diagnosis of ADD/ADHD, NMUPS, motivations associated with misuse among students, and student perceptions of stimulant medications (White et al., 2006). The SMUQ contains five questions that assess a medical diagnosis of ADD/ADHD (White et al.). Questions in this section ascertained whether a student had ever been diagnosed with an attention disorder, their prescription status, and adherence to their prescription regimen, frequency of medication ingestion, and the reasons for taking their stimulant (White et al.).

The SMUQ also contains a number of questions aimed at assessing information from students who were engaging in NMUPS (White et al., 2006). NMUPS questions in the SMUQ identified the frequency of misuse, motivations for misuse, the sources of the medication, and the difficulty associated with obtaining stimulants (White et al.). The remaining questions in the SMUQ are used to assess student's perceptions of stimulant medication as a whole (White et al.). Questions addressing student's perceptions of stimulant medication are presented using a Liker-type scale ranging from liking it a lot to not liking it at all (White et al.).

Prevalence of Prescription Drug Misuse

Research from the NSDUH (SAMHSA, 2009) estimated that 6.2 million (2.5%) persons aged 12 or older had used a prescription medication nonmedically in the past month. The estimated number of new users for each specific drug class were 2.2 million for opioids, 1.1 million for tranquilizers, 599,000 for stimulants, and 181,000 for sedatives, respectively, in 2008 (SAMHSA, 2009). These findings are consistent with those from previous iterations of the study in 2006 and 2007, except for a slight decline in the number of new initiates for prescription stimulant use (SAMHSA, 2009).

With respect to demographics, the NSDUH found that males and females had similar rates of past-month, nonmedical use of prescription medications in all four classes (SAMHSA, 2009). However, there were age-based differences for the nonmedical use of prescription medication, with subject in the 18 to 25 age group (5.9%) using prescription medication nonmedically at greater rates than the 12 to 17 (3%) and 26+ (1.9%) age groups.

The Monitoring the Future study also examined the nonmedical use of several prescription medications (Johnston et al., 2009). This study found an upward trend in the nonmedical use of the opioid OxyContin from 1.9% to 3.9% from 2002 to 2008 among subjects

19 to 28 years old (Johnston et al.). An increase in the nonmedical use of prescription sedatives from 3.9% to 4.7% was also seen during the same period among this age group.

This study also identified steady trends of nonmedical use for prescription tranquilizer and stimulant medications. From 2002 to 2008, the nonmedical use of prescription tranquilizers during the previous year for subjects 19 to 28 did not display any statistically significant changes in prevalence remaining at approximately 7%, with a range from 6.5% to 7.1% (Johnston et al., 2009). Past year prevalence of the nonmedical use of Ritalin among subjects 19 to 28 showed an insignificant decline from 2.9% to 2.4% (Johnston et al.). This decline in prevalence could be partially explained by the fact that the survey only examined the use of Ritalin and did not include other drugs used to treat ADD/ADHD (Johnston et al.).

Undergraduate College Student Prescription Drug Misuse

The college years are a time for psychoactive drug use and experimentation that includes the nonmedical use of prescription stimulants (NMUPS) (Babcock & Byrne, 2000). Students who attend college are at risk for initiating the use of a variety of drugs including marijuana, cocaine, LSD, prescription medications, and alcohol (SAMHSA, 2009; Johnston et al., 2009). Data from the National Survey on Drug Abuse and Health (NSDUH) indicate that adult college graduates were more likely to have tried illicit drugs in their lifetime when compared to those who did not finish high school (51.8 v. 37.7%) (SAMHSA, 2009).

McCabe et al. (2006a) administered the Student Life Survey (SLS) to 9,161 undergraduate students to identify the prevalence of the medical and illicit use of prescription stimulants, opioids, tranquilizers, and sedatives at a large Midwestern university. Twenty-one percent of the sample admitted to the nonmedical use of at least one of the four types in their lifetime and 14% engaged in nonmedical use during the previous year (McCabe et al.).

Moreover, the annual prevalence for nonmedical use was highest for opioids (9%), followed by stimulants (5%), sedatives (3%), and tranquilizers (2%) (McCabe et al., 2006a). The past year prevalence for the nonmedical use of any of these medications among this sample was higher than usage rates for cocaine, LSD, crystal methamphetamine, heroin, gamma-Hydroxybutyric acid (GHB), and Ketamine (McCabe et al., 2006a).

Statistical analysis in this study identified several key findings. First, a Chi-square analysis found that men were significantly ($p<.05$) more likely to use stimulants, pain medications, and sedatives nonmedically when compared to females (McCabe et al., 2006a). Additional Chi-square analyses revealed that White and Hispanic students displayed significantly ($p<.05$) higher rates of nonmedical use when compared to their Asian and African American peers (McCabe et al.). Also of note, a multivariate logistic regression analysis found that subjects who admitted to the nonmedical use of prescription medications were significantly ($p<.05$) more likely to report the use of other illicit drugs when compared to those who did not report nonmedical use (McCabe et al.).

A subsequent study replicated the use of the SLS on 3,639 undergraduate students to examine past year prevalence for the nonmedical use of at least one of the four classifications of prescription medications (McCabe et al., 2009). Outcomes of this study identified similar prevalence rates reported by a previous study (McCabe et al., 2006a) in that 13% of participants admitted to nonmedical use in the past year, and approximately 20% used one of the four medication classifications nonmedically in their lifetime (McCabe et al., 2009). Furthermore, over one-third of the participants nonmedically used multiple categories of prescription medication. Specifically, 19.3% misused two drug classifications, 11.1% misused three

prescription classifications, and 5% identified misuse in all four prescription classifications (McCabe et al., 2009).

The same study found that student's motivations for the nonmedical use of prescription medications fell into one of three categories. Approximately 11.5% used nonmedically for recreational purposes (i.e., to get high, for the feeling), 30.9% misused for reasons consistent with the medical uses of the medication (i.e., to stay awake longer, to help concentrate), and 57.5% reported both motivations (McCabe et al., 2009). Furthermore, findings in this study built on previous outcomes reported by McCabe et al. (2006a) that suggested nonmedical users of medications were significantly more likely to use other illicit drugs. In this study, a logistic regression analysis revealed that incidences of binge drinking, illicit drug use, and positive alcohol and drug abuse screens were significantly ($p<.05$) greater for those reporting recreational or mixed motivations for the misuse of prescription medications compared to those using the drugs in a manner consistent with the drug's intended purpose (McCabe et al, 2009).

Prescription Stimulants

Stimulants are medications designed to increase normal brain functions, resulting in an elevated state of alertness, attention, and energy by regulating the amount of dopamine that are produced and absorbed by the body (NIDA, 2009). The most common stimulants are methylphenidate (e.g., Ritalin, Concerta), amphetamine salts (e.g., Adderall), and dextroamphetamine (e.g., Dexedrine) (DeSantis et al., 2008; DEA, 2002; NIDA). The most common clinical implication for these medications is a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) (DeSantis et al.; DEA; NIDA). However, stimulants are also indicated for the treatment of narcolepsy, asthma, and bouts of depression that are nonresponsive to other medical interventions (NIDA).

The neuropharmacologic profile of stimulants is similar to other commonly abused drugs such as cocaine, and crystal methamphetamine (Kollins, MacDonald, & Rush, 2001). In humans, the distribution of stimulants are almost exactly the same as illicit stimulant drugs in that they create similar responses in the production and absorption of dopamine (DEA, 2002; Kollins et al.). Because of these similarities, these medications carry a high potential for chemical abuse and dependence (DEA, 2002; Kollins et al., 2001; NIDA, 2009). Due to the chemical similarities to street drugs and potential for abuse, stimulant production and distribution are controlled by the Food and Drug Administration (FDA) and the Drug Enforcement Agency (DEA, 2002). These regulating agencies help ensure that only persons with medical conditions warranting the use of the medications are in possession of the drugs (DEA).

Prescription Stimulant Misuse

In 2008, the NSDUH estimated that 904,000 participants aged 12 or older identified themselves as current nonmedical users of prescription stimulants (SAMHSA, 2009). Additionally, it was estimated that 599,000 (.6%) people aged 12 and older initiated NMUPS during the past year (SAMHSA, 2009). Of those initiating NMUPS, participants 18-25 years showed the highest usage rate (1.1%), followed by those 25+ years (.2%), and then those <18 years(.5%) (SAMHSA). Similarly, the reports from the Monitoring the Future (MTF) study and National Epidemiological Survey on Alcohol and Related Conditions (NESARC) identify higher usage rates of prescription stimulants in the 18-25 age group when compared to the other age classifications since each study's inception (Johnston et al., 2009; McCabe et al., 2009).

Stimulant misuse is particularly troublesome due to its association with adverse physical and mental health conditions (DEA, 2002). Persons who abuse stimulants are at risk for suffering from either substance abuse or dependence issues (DEA; Kollins et al., 2001). According to the

DSM-IV-TR (APA, 2000), a person diagnosed as a substance abuser will choose to use drugs in spite of legal and health consequences. A person is diagnosed as a substance abuser if they experience one or more consequences that include a failure to fulfill major obligations, use when physically hazardous, persistent legal problems, and/or repeated social problems (APA).

Prescription stimulant misusers can also suffer from substance dependence, which is distinguished by impaired control over drug use (APA, 2000). A person who suffers from substance dependence makes using drugs his or her primary goal, despite the ramifications of their use (APA). In particular, to be diagnosed with substance dependence a person must suffer from three or more symptoms that include tolerance, withdrawal, use of large amounts of the drug over a long period, unsuccessful efforts to quit, obtaining drugs replaces other activities (i.e., work, family obligations, etc.), and continued use despite adverse consequences (APA).

McCabe and Teter (2007) used a web-based survey of 3,639 undergraduate students to assess abuse and dependence issues associated with NMUPS. The demographic characteristics of the sample of 3,639 consisted of a mean age of 19.9 years, 53.6% women with a racial distribution of 67.45 White, 12.1% Asian, 6% African American, 4.5% Hispanic, and 10.2% from other ethnic categories (McCabe & Teter). As part of this study, participants who used substances other than alcohol were asked to complete a modified version of the Drug Abuse Screening Test (DAST-10) (McCabe & Teter). The DAST-10 is a survey that asks respondents if they have suffered from a list of side effects associated with substance abuse and dependence issues and is used as a screening device for these conditions (McCabe & Teter). A respondent that has experienced three of more DAST-10 items is considered a positive screening (McCabe & Teter).

Investigators in this study identified several key findings. First, participants who engaged in NMUPS during the past year (n=212) experienced three or more DAST-10 items than other drugs users (55.2% v. 19.4%, p<.001) (McCabe & Teter, 2007). Then, a multiple logistic regression analysis indicated that past-year stimulant users were over four times more likely to have a positive DAST-10 screening when compared to other drug users after adjusting for several demographic categories (AOR=4.61, 95% CI=3.28-6.48) (McCabe & Teter). Finally, past year users were significantly more likely than other drug users to simultaneously use other drugs (53.8% v. 16.9%, p<0.001), experience blackouts (21.7% v 8.3%, p<0.001), engage in illegal activities to obtain drugs (27.4% v. 9.3%, p<0.001) and experience withdrawal symptoms (14.6% v 2.5%, p<0.001) (McCabe & Teter).

Health Risks Associated with Nonmedical Prescription Stimulant Use

In addition to substance abuse and dependence already discussed, a person engaging in NMUPS can also suffer other physical and psychological side effects (NIDA, 2009; Sussman et al., 2006). Physically, stimulant medication raises blood pressure and heart rate (NIDA; Sussman et al.). Therefore, a person misusing prescription medications for long periods of time or in high doses can put himself or herself at risk for an irregular heartbeat, high blood pressure, heart attacks, and stroke (NIDA; Sussman et al.; White et al., 2006). High doses of stimulants have also been known to cause blurred vision, dizziness, insomnia, headaches, and muscle twitches (NIDA; White et al.).

Psychologically, NMUPS can also have degenerative effects (Coetzee, Kaminer, & Morales, 2002; NIDA, 2009; Sussman et al., 2006). Misuse of stimulant medications may lead to hallucinations, paranoia, delusions, and repetitive behaviors (Babcock & Byrne, 2000; Braun et

al., 2004; NIDA; Sussman et al., 2006). Exposure to a high dose of stimulants can also increase anxiety, aggressiveness, confusion, and hostility (Braun et al.; NIDA; Sussman et al.).

Nonmedical Use of Prescription Stimulants among Undergraduate College Students

Overall, a majority of studies concluded that the prevalence of prescription stimulant misuse is highest in undergraduate college students (Babcock & Byrne, 2000; DeSantis et al., 2008; Johnston et al., 2009; McCabe et al., 2005; Rabiner et al., 2009a). Although, several studies identify that NMUPS prevalence can vary based on the geographical location and admission standards of each school (Babcock & Byrne; McCabe et al.; Rabiner et al.). In fact, prevalence rates of NMUPS in published studies show a range from 0 to 34% (Babcock & Byrne; Johnston et al.; Low & Gendaszek; McCabe et al.; Rabiner et al.; SAMHSA, 2009; White et al., 2006). The large variance in NMUPs prevalence has led most researchers to identify a need to further examination of the prevalence of NMUPS across the United States (Babcock & Byrne; DeSantis et al.; Low & Gendaszek; McCabe et al.).

In a landmark study, Babcock and Byrne (2000) used a cross-sectional, paper-based survey of 283 undergraduate students at a small liberal arts college in Massachusetts to describe the recreational use of methylphenidate (i.e. Ritalin). The survey used in this study consisted of ten yes-and-no questions and was distributed to each student's campus mailbox. Through a cover letter, students were asked to fill out the confidential survey and return it to the primary author through the campus mail system (Babcock & Byrne).

Findings of this study indicated that over 16% of the sample tried methylphenidate nonmedically in their lifetime (Babcock & Byrne, 2000). This study also found that that only traditional students (<24 yrs old) participating in the study admitted to recreational use of

methylphenidate (Babcock & Byrne). Additionally, 53.4% of participants acknowledged knowing someone who had taken methylphenidate recreationally (Babcock & Byrne).

In another landmark study, Low and Gendaszek (2002) examined 150 undergraduate students using a cross-sectional survey at a small college in the northeast. To complete this analysis, student volunteers completed questionnaires anonymously that assessed the abuse of prescription and illegal amphetamines (Cocaine, Ecstasy) (Low & Gendaszek). The survey also assessed motivations for abuse by having participants complete the Multidimensional Perfectionism Scale and the Sensation Seeking Scale) (Low & Gendaszek).

Key findings were identified from a final sample of 150 that were primarily from undergraduate psychology classes, averaging 20.1 years of age, largely White, middle class, and including similar numbers of male (n=76) and female participants (n=74) (Low & Gendaszek, 2002). First, examiners found that 35.3% of study participants confessed to NMUPS during their lifetime. Of those participants admitting to nonmedical use, 10% did so monthly and 8% used weekly (Low & Gendaszek). Second, it was discovered that the use of illegal stimulants (Cocaine, MDMA) was correlated with NMUPS ($r=0.83$, $p<0.00001$). This outcome is consistent with the work of McCabe and Teter (2007) that also found students who engage in NMUPS were four times as likely to use illicit drugs.

McCabe et al. (2005) used data from the College Alcohol Study (CAS), a cross-sectional survey of 119 American 4 year colleges and universities, to examine further the prevalence and correlates of NMUPS. Of the 119 colleges and universities, 69% attended public institutions with 23% of schools in the northeast, 29% in the south, 30% in the north central portion of the United States, and 18% in the west (McCabe et al.). Additionally, 47% of students were enrolled at large

institutions (>10,000), 23% in medium sized schools (5001-10,000) and 29% at small institutions (1000-5000) (McCabe et al.).

The final sample in this study was 10,904 students was 75.15% White (n=8195), 7.2% African American (n=787), 7.6% Asian (n=835), 8.6% with other racial backgrounds (n=938) and 63.7% females (n=6,952) (McCabe et al., 2005). From this sample, approximately 6.9% of the college students acknowledged lifetime NMUPS and 4.1% admitted to misuse during the past year (McCabe et al.). However, past year prevalence of NMUPS varied from zero to 25% among the 119 institutions with students at 20 schools not reporting any nonmedical use and students at twelve schools with a prevalence greater than 10% (McCabe et al.).

Chi-Square tests revealed several that NMUPS prevalence significantly associated with several school and user characteristics (McCabe et al., 2005). School characteristics such as admissions standards ($p<0.001$), school location ($p<0.01$) and commuter status ($p<0,001$) were all bivariately associated with NMUPS (McCabe et al.). While, gender ($p<0.001$), race ($p<0.001$), age ($p<0.001$), Panhellenic membership ($p<0.001$), grade point average (GPA) ($p<0.001$), and parental level of education ($p<0.001$) were all bivariately significant student characteristics (McCabe et al.).

However, a multivariate analysis only found 4 student and 2 school characteristics that were statistically significant (McCabe et al., 2005). A logistic regression analysis revealed that being male ($p<0.001$, AOR= 1.92), White ($p<0.001$), associated with a Panhellenic organization ($p<0.001$, AOR=2.07) and a GPA below a B ($p<0.001$,) were the only student characteristics multivariately associated with NMUPS (McCabe et al.). This multivariate examination also found that the only school characteristics were significantly associated with NMUPS were attending a school in the Northeast ($p<.001$), and high admission standards ($p<0.01$, AOR=2.57)

(McCabe et al.). Findings from this logistic regression model are consistent with the work of Babcock and Byrne (2000).

A subsequent study (DeSantis et al., 2008) also examined NMUPS of 1,811 undergraduate students using a mixture of a cross-sectional survey and face-to-face interviews. The sample used in this study consisted of 55% female, 92% White, with 44% with a Panhellenic affiliation (DeSantis et al.). Of the sample of 1,811, 585 participants (34%) had used stimulants nonmedically in their lifetime (DeSantis et al.). This rate is significantly higher than those reported by Babcock and Byrne (2000), Low and Gendaszek (2002), and McCabe et al (2005). This higher prevalence rate could possibly be explained by a rise in nationwide prevalence as the phenomenon groups, the fact that the state in which the survey was held in ranked in the top three for ADHD diagnosis, or the high proportion of students associated with a Panhellenic organization (DeSantis et al.).

Also of note, Chi-square analyses revealed several important demographic discoveries. First, nonmedical use was more likely to occur in men than women (39& v 30%, $p<0.001$). Then, chi-squares discovered that Whites (35% v 25%, $p<0.05$), association with Panhellenic organizations (48% v 23%, $p<0.001$) and upperclassman ($p<0.001$) were more likely to engage in NMUPS (DeSantis et al., 2005). Although this study did not report multivariate outcomes, these demographic differences are consistent with those found by McCabe et al. (2005). However, a review of the demographics revealed an abundance of Whites compared to other races, Greeks to non-Greeks, and an overrepresentation of freshman that could have affected the significance of each of these tests (DeSantis et al., 2008). Finally, 368 (63%) initiated NMUPS in college (DeSantis et al., 2008). This finding is consistent with a national study that identified the average age for initiation of NMUPS was 21.3 years old (SAMHSA, 2009).

Undergraduate Students at Risk for the Nonmedical Use of Prescription Stimulants

McCabe et al. (2006b) examined medical and nonmedical prescription stimulant using the Student Life Survey (SLS) on a sample of 9,161 undergraduate students from a large public Midwestern university. This sample consisted of 56% female with a racial distribution of 68% White, 13% Asian, 6% African American, 4% Hispanic, and 9% of other backgrounds (McCabe et al.). Furthermore, 14 % of study participants were associated with a Panhellenic organization (McCabe et al.).

This investigation revealed that 744 participants (8.1%) engaged in NMUPS during their lifetime and 458 participants (5.4%) had done so during the past year (McCabe et al., 2006b). A logistic regression analysis identified comparable results to those observed by DeSantis et al. (2008) and McCabe et al. (2005) in that being male ($p<0.001$), White ($p<0.001$) and being associated with a Panhellenic organization ($p<0.001$) were all significantly associated with NMUPS multivariately (McCabe et al., 2006b). This multivariate analysis also found that students with a GPA lower than a 3.5 were more than 4 times (OR=4.10, $p<0.01$) more likely to admit to NMUPS in their lifetime, and almost 7 times (OR=6.83, $p<0.01$) more likely to do so in the past thirty days compared to students with high GPAs (McCabe et al., 2006b). These rates were significantly higher than the lifetime and past 30-day rations reported by McCabe et al. (2005). This difference in odd ratios is partially explained by a greater proportion of students with high GPAs and the difference in which both studies classified a lower GPA (3.5 v 3.0) (McCabe et al. 2006b).

One of the most significant findings of this study is that it was one of the first to identify an increased risk for NMUPS among students who were prescribed their medication during secondary school or in college (McCabe et al., 2006b). A logistic regression analysis determined

that students prescribed stimulant medication in college (OR=7.72, p<0.001) or secondary school (OR= 4.25, p<0.001) were more likely to acknowledge lifetime and past thirty NMUPS when compared to those who either obtained the medication in elementary school or never received the medication (McCabe et al.).

In another study, Kaloyanides et al. (2007) used a sample of 4,580 undergraduate students to examine the relationship between the age of prescription initiation and the use alcohol, NMUPS, and other drugs. The sample in this examination consisted of 54% women with an ethnic distribution of 67% Caucasian, 12% Asian, 6% African-American, 4% Hispanic, and 10% of other backgrounds (Kaloyanides et al.). In methods consistent with a previous study (McCabe et al., 2005), students completed a web-based confidential survey that included a modified version of the DAST-10 (Kaloyanides et al.). Additionally, participants were asked to complete a modified version of the Cut Down, Annoyance, Guilt, Eye-opener (CAGE) instrument to assess issues related to alcohol abuse (Kaloyanides et al.).

Multiple logistic regression analyses revealed several significant results (Kaloyanides et al., 2007). One analysis indicated that the odds of NMUPS in the past 30 days was 13 times (OR=13, CI= 5.3-32.2, p<0.01) greater among those who received their first prescription in college compared to those who were never prescribed medication (Kaloyanides et al.). Another regression model found that participants receiving their first prescription in college were almost 10 times (OR=9.7, CI=4.7-19.5, p<0.001) more likely to report coingestion of alcohol and stimulants (Kaloyanides et al.). Students in the college initiation group were twice (OR=2.0, CI= 1.2-3.5, p<0.01) as likely to have a positive screening for alcohol abuse when compared to the no use group (Kaloyanides et al.). Finally, students who initiated the use of prescription stimulants in secondary school or college were almost four times (OR=3.7, CI= 1.9-7.1, P<0.001) more

likely to report positive indicators of drug abuse compared to the subject not prescribed stimulants (Kaloyanides et al.).

Several recently published studies have also attempted to detect predictors of NMUPS among college students. One of these recently published examinations used 843 undergraduate students recruited from one public and one private university in the southeastern United States to identify the correlated of NMUPS among this population (Rabiner et al., 2010). Students participating in this study completed a web-based survey including a modified DAST-10 during the first semester of their freshman year and then again during the second semester of their sophomore year (Rabiner et al.). Of the 843 participants, 494 (58.6%) were from the private institution and 69% of the total sample was female (Rabiner et al.). The racial breakdown of this sample was 70% White, 9% African American, 14% Asian, 5% Hispanic and 2% from other backgrounds (Rabiner et al.).

A logistic regression analysis identified three significant predictors of NMUPS (Rabiner et al., 2010). First, students who had a positive screening for a substance use disorder were almost 4 times as likely to report NMUPS compared to students with a negative result (OR=3.81, CI=2.53-5.75, $p<0.01$). This increased rate of NMUPS among students with positive drug abuse screenings is similar to the odds ratios reported by several other published examinations (Kaloyanides et al., 2007; McCabe & Teter, 2007; McCabe et al., 2005).

This examination also found that students associated with reporting attention problems and an association with a Panhellenic organization increased the risk of engaging in NMUPS (Rabiner et al., 2010). Specifically, a logistic regression analysis reported that students affiliated with Panhellenic organizations were over two times (OR=2.32, CI=1.12-4.78, $p<0.05$) as likely to engage in NMUPS when compared to students not affiliated with these organizations (Rabiner

et al.). Finally, this analysis identified that students with attention problems were almost two times (OR=1.78, CI=1.17-2.70, P<0.01) as likely to use stimulants nonmedically (Rabiner et al.).

Authors from this assessment furthered the knowledge of motives and perceived consequences associated with NMUPS in another examination of the behavior published during the same year (Rabiner et al., 2009b). This investigation used a sample of 3,407 undergraduate students recruited from the same public and private schools located in the southeastern United States (Rabiner et al.). Of the 3,407 participants, 51.4% were from the private university and 39% of the sample was male (Rabiner et al.). Demographically, participants were 70% White, 18% African American, 10% Asian, 1% Hispanic, and less than 1% of other ethnic backgrounds (Rabiner et al.).

Students in this examination completed a web-based survey to assess the prevalence, demographics, motives and consequences associated with NMUPS (Rabiner et al., 2009b).

Subgroups at an Increased Risk for NMUPS

Gender. Findings of published research conflict as to whether or not gender is a correlate to NMUPS. Several regional studies as well as one national study indicated gender as a risk factor for NMUPS (Johnston et al., 2009; McCabe et al., 2005, 2006a). However, several other regional studies did not find any significant correlation between the two (Herman-Stahl et al., 2007; White et al., 2006).

White et al. (2006) had 1,025 undergraduate and graduate students complete the Stimulant Medication Use Questionnaire (SMUQ) to identify prescription stimulant use, misuse, and abuse at the University of New Hampshire (White et al.). The sample involved in this study consisted of 6.6% with a diagnosis of ADHD and 68% of subjects were female (White et al.). Results from this study indicated that 16.2% of participants used stimulants nonmedically during

their lifetime (White et al.). Additionally, a Chi-square analysis of the male and female student who admitted to NMUPS did not identify any statistically significant differences ($p>0.05$) between the groups (White et al.).

Another examined the risks and protective factors for NMUPS using 23,645 participants aged 18 to 25 from the 2002 NSDUH (Herman-Stahl et al. 2007). The sample used in this investigation had equal proportions of for each gender (males=50%) and comprised mostly of Whites (62%) followed by Hispanics (18%), African American (13%) and others (7%) (Herman-Stahl et al.). Furthermore, 29% of participants were enrolled full-time in college, 22% as part-time and 48% had never attended college (Herman-Stahl et al.).

A multivariate logistic regression analysis failed to reveal any statistically significant differences in NMUPS between males and females (OR=1.13, CI=0.89-1.44, $p>0.05$) (Herman-Stahl et al., 2007). This analysis also found that students currently enrolled in college were almost 3 (OR=2.76, CI=1.99-3.83, $p<0.001$) times as likely to engage in NMUPS compared to those who had never attended (Herman-Stahl et al.). Subsequent analysis of the data from the 2009 NSDUH also failed to identify any statistically significant differences in NMUPS between males and females (SAMHSA, 2009). However, the lack of significance between genders in two iterations could be the result of a large proportion (48%) of participants 18-25 years old who never attended college than those used in other studies (Babcock & Byrne, 2000; DeSantis et al., 2008: Low & Gendaszek, 2002). Several studies (Babcock & Byrne; DeSantis et al.; Johnston et al., 2009; Low & Gendaszek; SAMHSA) have demonstrated that the prevalence of NMUPS is higher among persons in this age range that attend college thus the incorporation of large numbers of subjects who never attended college could normalize the gender differences seen in other studies.

Other studies on NMUPS have identified significant differences in the prevalence of the behavior based on gender (Johnston et al., 2009; Low & Gendaszek, 2002; McCabe et al., 2005, 2006b; Poulin, 2007). A preliminary study on NMUPS among undergraduate students found that male students were significantly ($t=4.4$, $p<0.001$) more likely to misuse stimulant medications than females (Low & Gendaszek). A subsequent study built on these findings revealing that males were almost two times (AOR=1.92, CI=1.49-2.48, $p<.001$) as likely to engage in NMUPS in the past year when compared to females (McCabe et al., 2005). The same analysis found that males were about one and a half times (AOR=1.66, CI=1.24-2.21, $P<0.001$) more likely to use stimulants nonmedically in the past month (McCabe et al., 2005).

McCabe et al. (2006b) used the data from a previous iteration of the Student Life Survey (McCabe & Boyd, 2005) to identify factors associated with NMUPS. Outcomes of a logistic regression analysis in this examination identified that females were less likely to use stimulants nonmedically during their lifetime than males (AOR=0.67, CI=0.52-0.86, $p<0.001$) (McCabe et al., 2006b). However, this study did not find any significant differences between the prevalence of NMUPS based on gender during the past year (McCabe et al., 2006b).

Overall, a consensus as to whether gender is a risk factor for NMUPS does not exist. Several studies indicate that males are at a greater risk for using stimulants nonmedically (Low & Gendaszek, 2002; McCabe et al., 2005, 2006b). Still other published studies suggest that gender is not a significant risk factor for NMUPS (Herman-Stahl et al., 2007; SAMHSA, 2009; White et al., 2006). In order to determine if gender is indeed a risk factor for undergraduate students to engage in NMUPS, a future examination is warranted.

Age of Prescription Stimulant Initiation. A person with a legal prescription for stimulant medication may use it for nonmedical purposes (Ghaffari, 2009). Persons with their

own prescription can hoard or alter doses in order to use the medication in a manner inconsistent with the prescribed regimen (Ghaffari; Kaloyanides et al., 2007). The odds of using prescription stimulant medication for nonmedical purposes are largely dependent on the age at which the medication was first prescribed (Darredeau et al., 2007; Ghaffari; Kaloyanides et al.). In fact, studies indicate that students who initiate the medical use of prescription stimulants in elementary school generally do not have an increased risk for misuse when compared to non-users (Kaloyanides et al.; McCabe et al., 2006b). However, several studies concluded that students who initiate the medical use of a prescription stimulant in high school or college are at an increased risk for using the drug nonmedically (Kaloyanides et al.; McCabe et al.). One study found participants who initiated the medical use of stimulants in college were more than 7 times more likely to admit to NMUPS in their lifetime (OR=7.72, CI=4.98-11.97, $p<0.001$) and during the past year (OR=7.51, CI=4.75-11.89, $p<0.001$) than students who were never prescribed the medication (McCabe et al., 2006b). Another examination of the NMUPS behavior identified that participants receiving prescriptions during college were 13 times more likely (OR=13, CI=5.3-32.2, $p<0.001$) to nonmedically use stimulants than students who were never prescribed the medication (Kaloyanides et al.). Although, the odds reported by Kaloyanides et al. were higher than those reported in previous studies, the confidence intervals associated with this odds ratio also displayed a larger variance than other studies.

Panhellenic Affiliation. Undergraduate students who are affiliated with Panhellenic organizations are at an increased risk for engaging in a number of adverse health behaviors (Johnston et al., 2009; McCabe et al., 2005; McCabe, Cranford, Morales, & Young, 2006c; SAMHSA, 2009). Most notably, these students are at an increase risk for engaging in the use of illicit drugs, underage alcohol consumption, binge-drinking behavior, and the nonmedical use of

prescription medications (Johnston et al.; McCabe et al., 2005, 2006c; SAMHSA, 2009). In addition to these behaviors, studies indicate that students who are affiliated with Panhellenic organizations are also at an increased risk for engaging in NMUPS (DeSantis et al., 2008; McCabe et al., 2005, 2006c; Rabiner et al., 2009a). In fact, McCabe et al. (2005) discovered that students affiliated with fraternities or sororities were twice (OR=2.04, CI=1.21-3.45, $p<0.01$) as likely to engage in NMUPS when compared to those who were not.

Subsequent studies examining illicit use of prescription stimulants have similarly found that undergraduate students associated with Panhellenic organizations are at an increased risk for engaging in NMUPS (Rabiner et al., 2009b; McCabe et al., 2006c). One examination of NMUPS identified that students affiliated with Panhellenic organizations were almost twice as likely to engage in the behavior during their lifetime (OR=1.77, CI=1.26-2.49, $p<0.001$) and in the past year (OR=1.93, CI=1.29-2.89, $P<0.001$) (McCabe et al., 2006c). Another inspection of NMUPS, in their study sample, found that students affiliated with Panhellenic organizations were more than twice (OR=2.32, 1.12-4.78, $p<0.01$) as likely to use stimulants nonmedically during their lifetime (Rabiner et al.).

Grade Point Average. Literature has identified significant correlations between low grade point averages (GPA) and an increased risk for NMUPS (Arria et al., 2008; McCabe et al., 2006a; Teter, McCabe, Boyd, & Guthrie, 2003; Teter, McCabe, LaGrange, Cranford, & Boyd, 2006). Arria et al. used personal interviews of 1,253 first year college students aged 17 to 20, to examine if a correlation existed between GPA and NMUPS. Bivariate analysis revealed that high school and college GPA were significantly lower among students using stimulants nonmedically when compared to those who did not misuse (Arria et al.). However, further analysis revealed several mediating factors explained the correlation between nonmedical use and lower GPAs. A

regression analysis showed that students who used stimulants nonmedically skipped more classes on a weekly basis (16% vs. 9.4%, $p<0.05$), spent more time going out socially (29.4 vs. 24.8 hrs p/wk, $p<0.05$), and dedicated less time to studying (17.2 vs. 19.7 hrs p/week, $p<0.05$) when compared to those who did not misuse stimulants (Arria et al.). These results suggest that students reporting NMUPS might be doing so in order to catch up academically for time spent in social pursuits (Arria et al.). DeSantis et al. (2008) reported similar findings, in that 72% of their sample used stimulants nonmedically to stay awake and study longer.

Routes of Administration

Methylphenidate (Ritalin, Concerta), amphetamine salts (e.g. Adderall), and dextroamphetamine (e.g. Dexedrine) are all prescription medications intended for oral administration (DEA, 2002; NIDA, 2009). Medications in each of these classes are available in varying doses designed to be released over time (DEA). Changes in the route of administration can change the rate of absorption and therefore influence the amount of time needed for a person to feel the effects of the drug (DEA). In addition to oral administration, stimulants can be smoked, snorted or injected (Darredeau et al., 2007; McCabe & Teter, 2007; Teter et al., 2006). These methods allow for a more rapid uptake of the active ingredients, causing a person to feel the effects of the drug faster (NIDA; Teter et al.).

Findings reported by several researchers suggest that people who misuse stimulant medications typically ingest the medication (Arria et al., 2008; McCabe & Teter, 2007; Teter et al., 2006; Weyandt et al., 2009; Wilens et al., 2006). These researchers described varying rates of ingestion that range from 76.9% to 95.3% of the sample (Arria et al.; McCabe & Teter; Teter et al.; Weyandt et al.; Wilens et al.). In each of these examinations, taking the medication orally was the primary route of administration reported by subjects admitting to NMUPS (Arria et al.;

McCabe & Teter; Teter et al.; Weyandt et al.; Wilens et al.). These outcomes are not surprising considering that the most popular prescription stimulant medications, Ritalin and Adderall, are dispensed to patients in pill form (NIDA, 2009).

Snorting is the second most popular route of administration for NMUPS (Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005; Rabiner et al., 2009b; Teter et al., 2006). Hall et al. using a cross-sectional survey of 381 (202 female, 179 male) undergraduate students found that 11.5% of participants reporting NMUPS had taken them nasally. However, percentages of participants snorting prescription stimulant medications varied by the number of subjects reporting substance use disorders with prevalence rates varying from 8 to 38% (Hall et al.; Rabiner et al.; Teter et al.).

In addition to oral and nasal intake of stimulants, researchers have also reported smaller percentages of persons introducing the medication through other methods (McCabe & Teter, 2007; Teter et al., 2006). Researchers have also described students who smoke and inject stimulant medications (McCabe & Teter; Teter et al.). In fact, McCabe and Teter found that 6.6% of the 212 undergraduate students who engaged in NMUPS admitted that they had smoked or injected the medication. While, Teter et al. found that less than one percent of students participating in their study injected stimulant medication and 5.6% smoking stimulants.

Motivations to Misuse Prescription Stimulants

Varieties of reasons serve as motivation for undergraduate students to use prescription stimulants nonmedically. However, motivations to misuse typically fall into academic and/or social categories (DeSantis et al., 2008). Common reasons given for academic reasons were to help study longer, increase concentration, make academic material more interesting, increase retention of academic material, and reduce restlessness during class time (DeSantis et al.; Low &

Gendaszek, 2002; Rabiner et al., 2009a, 2009b, 2010; Teter et al., 2006). Students who admitted to NMUPS for social reasons most commonly did so to get high, reduce appetite, lose weight, party longer, to have fun, or to use in combination with alcohol (DeSantis et al.; Low & Gendaszek; Rabiner et al., 2009a, 2009b, 2010; Teter et al.).

Studies conclude that academic concerns are the most common impetus for undergraduate students to misuse stimulants (DeSantis et al., 2008; Rabiner et al., 2009a, 2009b; Teter et al., 2006). One study found that no student reported misuse solely for nonacademic reasons and 58.5% only misused to improve their performance in school (Rabiner et al., 2009a). In another study, the researchers determined that students who misused stimulants within the last six months were more likely to be concerned about their academic performance than those who did not misuse (.28 vs. -0.03, $p<0.001$) (Rabiner et al., 2009b).

Published research also found that subjects commonly reported academic concerns as motivations for engaging in NMUPS with 72% (420) of their using stimulants nonmedically to stay awake or study longer and 68% (389) to help concentrate on school work (DeSantis et al., 2008). This study also concluded that students tended to misuse stimulants at higher rates during periods of increased academic stress such as finals week or weeks involving multiple tests (DeSantis et al.). Teter et al. (2006) found similar outcomes in that 65.2% of their sample misused prescription stimulants to help with concentration on academic assignments.

Participants in several studies also identify social motivations to misuse prescription stimulants. The most commonly reported social motivations were to get high and party longer (DeSantis et al., 2008; Hall et al., 2005; Sharp & Rosen, 2007; Teter et al., 2006). Sharp and Rosen, using a cross-sectional survey of 448 students from a large public university in the western United States, found that 26% of students misused prescription stimulants to prolong

nights of partying or hanging out with friends. Teter et al. found that 31% of subjects who misused prescription stimulants did so to get high. Subsequent studies identified significantly lower rates, with only 12% (Hall et al.) and 7% (DeSantis et al.) of subjects respectively misused stimulants because it was a cheap, easily accessible high (DeSantis et al.).

Losing weight was another motivation identified by undergraduate students as a motivation to engage in NMUPS (DeSantis et al., 2008; Teter et al., 2006). Although the prevalence of students who misuse stimulants for weight loss is not high, it is worth noting that a disproportionate number of women report weight loss as a motivation for NMUPS when compared to men (DeSantis et al.; Low & Gendaszek, 2002; Teter et al.). In fact, Teter et al. found that 18.2% of women were motivated to misuse stimulants to lose weight as compared to 3.2% of men. These results suggest that women are more body conscious than men are and use stimulants at a significantly higher rate as an appetite suppressant.

Prescription Medication Control

The foundation for controlling the diversion and misuse of prescription medications began with ratification of the Comprehensive Drug Abuse Prevention and Control Act of 1970. This legislation combined several existing drug control laws to establish a single system of control for substances with abuse potential (Sapienza, 2006). One of the most important parts of this legislation was the Controlled Substances Act (CSA) (Sapienza) which allowed the maintenance of a sufficient, uninterrupted supply of controlled substances in order to meet the medical needs of the United State while reducing the diversion and abuse of prescription drugs (Sapienza). The CSA was passed in order to regulate the manufacturing and distribution of controlled substances such as stimulants, depressants, hallucinogens, anabolic steroids, and chemicals used in the production of illicit drugs (DEA, 2002).

In order to reduce the abuse and diversion or prescription medications the CSA established a schedule to classify a drug based on its potential for abuse, and accepted medical use (DEA, 2002). After reviewing each drug for safety, abuse potential and medical benefit, the Food and Drug Administration (FDA) and Drug Enforcement Agency place a drug on a continuum from schedule I to V (DEA). Schedule I drugs (i.e. Ecstasy, LSD, marijuana) are placed at the high end of the continuum because they have a high potential for abuse, have no currently accepted medical use in the United States, and have a lack of accepted safety under medical supervision (DEA). The schedule V drugs (i.e. prescription cough syrup) exist at the lowest end of the continuum because they have a low potential for abuse relative to the other scheduled drugs, have a currently accepted medical use in the United States, and may lead to limited physical or psychological dependence (DEA).

Substances listed in the schedule of drugs that have been approved for medical use can only be released to a patient holding a valid prescription bearing a health care professional's valid DEA registration number, date and signature (DEA, 2002). According to the DEA, medications that are received or dispensed outside of the realm of this legal statute are considered diverted medications and this behavior is a crime punishable by law (DEA).

In addition to the DEA, the distribution of controlled substances is also monitored through oversight by state institutions such as medical boards that govern the ability of health care professionals to prescribe and dispense controlled medications (Califano, 2005). These institutions provide oversight by licensing and disciplining health care professionals under their auspices (Califano). Licensure boards provide additional supervision by employing inspectors who work with local law enforcement to ensure compliance and enforcement of state regulations

(Califano). Overall, these institutions represent the front line to manage the appropriate dispensing of controlled substances.

Diversion and Prescription Drug Abuse

Studies suggest that diversion and NMUPS are correlated behaviors (Darredeau et al., 2007; Inciardi et al., 2006; McCabe et al., 2006a; Poulin, 2007; Wilens et al., 2006). In fact, the literature provides evidence that people who admit to NMUPS are more likely to divert them than those who do not misuse stimulants (Darredeau et al.; Poulin; McCabe et al., 2005; Wilens et al.). The correlation between these behaviors is most likely due to a decreased stigma that people who engage in NMUPS have in relation to misuse and diversion (DeSantis et al., 2008).

Wilens et al. (2006), in a study of 98 subjects (mean age of 20.8) with a current prescription, examined the diversion of prescription stimulants using structured psychiatric interviews. Participants used in this study were recruited from an ongoing case-control family study (Wilens et al.). All subjects who participated in this examination had previously received a diagnosis of ADHD from both psychiatric and pediatric clinics (Wilens et al.).

Of the participants with current prescriptions for stimulants (55 subjects), 11% admitted to selling their medication, 22% altered their doses for misuse purposes, and 10% misused their medication to get high (Wilens et al., 2006). A Chi-square analysis indicated that participants who admitted to NMUPS were significantly more likely to approve of diverting it (26% v 3%, x^2=7.1, p=0.008) (Wilens et al.). Additionally, this study found that the 83% of participants who diverted and engaged in NMUPS suffered from a substance use disorder and/or conduct disorder (Wilens et al.).

Darredeau et al. (2007) documented a similar correlation between having a current prescription for a medication and diversion. A Chi-square analysis revealed that participants who

diverted their prescription stimulant medications were more likely ($p<.001$) to use illicit drugs since being prescribed their medication. Additionally, a Chi-square analysis identified persons who divert are more likely ($p<.001$) to misuse their own prescription stimulant medications when compared to subjects with current prescriptions who did not divert. Rabiner et al. (2009a) identified similar findings in that participants within their study were also more likely to admit to the diversion of stimulants when they had engaged in NMUPS during the past 6 months (59% vs. 22%, $p<0.001$).

Prevalence of Diversion

To date, national studies that examine NMUPS have not examined the diversion prevalence for any drug classifications (Johnston et al., 2009; SAMHSA, 2009). In fact, of all the national studies only the NSDUH asks participants to identify the sources used to obtain the misused prescription medication. Through this inquiry, outcomes from the NSDUH identified that over half of subjects aged 12 or older acquired the medication from a friend who had obtained the medication legally (SAMHSA). Despite the lack of national studies examining diversion, several independent researchers have examined the prevalence of diversion.

Boyd et al. (2007) used a cross-sectional web-based survey of 1,086 secondary school students in a southeast Michigan school district to determine the prevalence of prescription drug abuse and diversion. They found that between 29% and 62% of the 390 students who had a prescription for medication during their lifetime had been approached to divert their medications during the previous year (Boyd et al.). However, further chi-square analyses found no statistically significant relationship between demographic factors (i.e. gender, age, and ethnicity) and likelihood of being approached to divert (Boyd et al.). In addition, findings of this study indicated that students with current prescriptions were 2.9 times more likely ($p<0.001$) to be

approached to divert medications than students who only reported a having a prescription during their lifetime (Boyd et al.).

Results of this study also found that prescription medications were most commonly given away or loaned to others (Boyd et al., 2007). In fact, 24% of students with current prescriptions acknowledged giving away or loaning their prescription medication to someone else (Boyd et al.). Other commonly reported methods of diversion were trading medications (15%) and medication theft (11%) (Boyd et al.). Further analysis revealed that females were significantly ($p<0.05$) more likely to admit to give away or loan their medication (27.5% vs. 17.4%., $p<0.05$) than males (Boyd et al.).

Poulin (2007) studied the prevalence of prescription stimulant diversion among students (grades 7-12) in the Atlantic Provinces of Canada using data from the Student Drug Use Surveys in the Atlantic Provinces (SDUSAP). From a sample of 12,990, 264 (2.0%) had a current methylphenidate prescription (Poulin). Of these 264 students, 23.9% admitted to giving away their medication, 18.6% indicated that they had sold some of their pills, 6.0% reported theft, and 5.6% were coerced into giving away pills during the previous 3 days (Poulin). Based on these diversion prevalence rates, it is estimated that 1,842 students were in classrooms where a student admitted to some type of prescription stimulant diversion (Poulin).

A subsequent study examined the prevalence and motivations associated with diversion among participants 18 and older with current methylphenidate prescriptions. It was found that 44% of all participants diverted their stimulant (Darredeau et al., 2007). Of those who diverted in their lifetime, 97% admitted to giving away their medication away, 17% admitted to selling it, and 14% admitted to both. Furthermore, persons admitting to diversion were significantly younger (29.5 yrs v. 22 yrs, $p<0.05$) and received their prescription at a younger age (25.8 yrs

v.16.2 yrs, $p<0.05$) than participants who did not divert their medication (Darredeau et al.). Diverters were also more likely use other illicit substances since receiving their prescription (45.9% v 89.7%, $p<0.05$), and engage in NMUPS (51.7% v. 10.8%, $p<0.05$) when compared to those who did not divert (Darredeau et al.).

Goldsworthy et al. (2008), also examined the diversion behavior using one-on-one interviews of 700 participants aged 12 to 44 in various geographic regions around the United States. Of the 700 people, 22.9% loaned their medication to someone else (Goldsworthy et al.). In addition, this study also identified several hypothetical situations in which persons would be more likely to give away their prescription medications. Of all participants, 39.4% were willing to share their medications with family members, 38.6% were would give someone their medication if they had a prescription but forgot theirs, and 37.9% indicated they would share their medication in an emergency (Goldsworthy et al.).

Prevalence of Prescription Medication Diversion in Undergraduate Student Populations

The diversion of prescription medications is prevalent among young adults (17-24 yrs old) attending colleges or universities. Garnier et al. (2010) examined the results of the 2004 data from the College Life Study to estimate the prevalence of prescription medication diversion among college students. Outcomes of this particular examination of the data was derived from 483 undergraduate students aged 17-19 years old from a large public university in the mid-Atlantic region of the United States who held a prescription for a medication at the time of the survey (Garnier et al.). Demographically, the sample 483 undergraduates consisted of 46% males (n=222), 76.6% Caucasian (n=370), and 24.6% affiliated with a Panhellenic organization (Garnier et al.).

In this examination, findings indicated more than one-third (35.8%) of students with a prescribed medication had diverted at least once in their lifetime (Garnier et al., 2010). This study also found that the medications with the highest rates of diversion among the sample were stimulants (50/81; 61.7%), and opioids (14/110; 35.1%) (Garnier et al.). Of all the medications studies, the diversion rates for stimulant medications were significantly higher ($p<0.05$) than any of the other medications studied (Pain, allergy, depressants) (Garnier et al.). However, diversion among participants was an infrequent occurrence with many diverters (69.9%) only sharing or selling their medications once or twice in their lifetime (Garnier et al.).

Additionally, a multivariate logistic regression model displayed that only the number of prescription drugs used nonmedically and conduct problems were associated with increased odds of diversion independent of demographics and other risk factors (Garnier et al., 2010). Also, results of this analysis found that each prescription used nonmedically by a participant during the past year increased the odds of diversion by 52% (OR=1.16-1.99; $p<0.01$). Finally, each childhood conduct problem increased the odds of a participant engaging in diversion by 13% ($p<0.05$) (Garnier et al.).

McCabe et al. (2006a) also conducted a study to determine the rates of prescription drug misuse and diversion in a sample of 9,161 undergraduate college students at a large Midwestern university. This study found that, among students prescribed medication in the past year, 27% were approached to divert, with men being more likely to be approached than women (McCabe et al.). Additionally, students with current stimulant prescriptions (54%) were most likely to be approached to divert followed by those with prescriptions for opioids (26%), sedatives (19%) and sleeping aids (14%) (McCabe et al.). However, this study did not report the percentage of

students who were approached to divert that complied with the request. Therefore, actual prevalence rates of diversion in this sample were unreported.

Sources of Diverted Prescription Medications

Diverted prescription medications can come from a variety of sources along the chain of custody. Opportunities for diversion start at the manufacturing plant and continue after the medication has been prescribed. (Inciardi et al., 2006). However, the literature suggest that diversion occurs most commonly through the interactions of physicians, pharmacists, and patients (Boyd et al., 2006; Inciardi et al.; Johnston et al., 2009; SAMHSA, 2009). Specifically, a large majority of diverted prescription medications come from patients who receive legitimate prescriptions for medications during the course of routine medical care (SAMHSA).

Peers

Examinations of prescription stimulant diversion identify that diversion among students with stimulant prescriptions most commonly give away or sell their pills to other students (Darredeau et al., 2007; Poulin, 2007). In fact, one of these studies estimated that students sharing classrooms with participants those who admitted to diverting stimulant medication were 1.5 times ($p<0.001$) to engage in NMUPS than those in classes without diverters (Poulin).This result suggest that students are diverting medications during school hours in an underground economic market (Poulin).

McCabe and Boyd (2005), using a cross-sectional survey of 9,161 undergraduate students from a large Midwestern university, also examined the most common sources of prescription pain, stimulant, sedative and sleeping medications. Analyses of the data revealed that the most common sources for these medications were from peers that included friends, roommates, boyfriends, and girlfriends (McCabe & Boyd). Also of note, a data analysis found that

prescription stimulants (67.7%) were most commonly diverted from peers when compared to the other medication classes (McCabe & Boyd).

Family Members

The literature also suggests that family members are another common source of diverted prescription medications (Boyd et al., 2007; Daniel et al., 2003). In a study on diversion among secondary school students, Daniel et al. detected that 33% of boys and 27% of girls received diverted prescription medications from a family member in their lifetime. Subsequently, Boyd et al. reported similar findings using a cross-sectional web-based survey of 1,086 secondary school students in that found that 24% of students with a current prescription had given away or loaned medication to a family member.

Another study examined the diversion of prescription medications phenomenon using one-on-one interviews of 700 subjects between the ages of 12 and 44 (Goldsworthy et al., 2008). The sample used in this study was composed of 73% females and an ethnic distribution of 48.3% Caucasian, 24.3% African-American, 24.1% Hispanic and 1% Asian (Goldsworthy et al.). Results of these interviews identified two key findings. First, in hypothetical situations, participants were most willing to share their prescription medications with family members (39.4%, $p<0.05$) than any other group. Second, the interviews identified 22.9% of their sample had loaned their prescription medications to someone else during their lifetime (Goldsworthy et al., 2009). Of those participants in this study were most willing to share their prescription medications with family members (39.4%) (Goldsworthy et al.).

Doctor Shopping

Doctor shopping occurs when an individual visits multiple physicians, complaining of specific symptoms in order to obtain prescription for particular medications (El-Aneed et al.,

2009). Patients who doctor shop knowingly deceive or manipulate physicians in order to obtain a desired medication (Califano, 2005). According to a survey of physicians and pharmacists, identified that shopping for multiple prescriptions was the primary method of diversion (89.2%), followed by patient deception or manipulation (65.4%) (Califano).

Diversion of Prescription Stimulant Medications among Undergraduate Students

Of all prescription classifications, stimulant medications are the most commonly diverted prescriptions on college campuses (DeSantis et al., 2008; Johnston et al., 2009; Rabiner et al., 2009a). It is suggested that the impetus behind the exchange of stimulant medication is in part explained by the drug's association with an increase in academic performance (DeSantis et al., 2008; Johnston et al., 2009; Rabiner et al., 2009a). In fact, a subsequent publication of survey results from DeSantis et al. (2008) suggested that most students feel stimulant medications are not drugs and using them for academic reasons will not lead to harmful side effects (DeSantis & Curtis Hane, 2010).

Rabiner et al. (2009a) studied the misuse and diversion of prescription stimulant medications among college students using an anonymous survey of 115 undergraduate students from one public and one private university in the southeastern United States with current prescriptions. Fifty six percent of the subjects admitted to being approached to divert their medication in the preceding six months with 26% of those admitting to actual diversion (Rabiner et al., 2009a). Of those subjects who diverted stimulants, 20 students who diverted their prescription stimulant medications did so 1-2 times, five students diverted 3-5 times, three students reported 6-9 instances of diversion, and two students diverted 10-19 times (Rabiner et al.). In addition to the students who diverted medications, 5 students had their medication stolen from them in the past 6 months (Rabiner et al.).

Results of a Chi-square analysis of the study sample revealed that students who had misused their stimulant medications were significantly more likely to divert their medication that students who did not report misuse (59% vs. 22%, x^2=13.34, p<0.001) (Rabiner et al., 2009a). This finding is consistent with another publication of the diversion of all prescription drugs among undergraduate students (Garnier et al., 2010). In this examination, a multivariate logistic regression model revealed that each incidence of prescription misuse increased their chances of diversion by 52% (OR=1.16-1.99; p<0.01) (Garnier et al.).

McCabe et al. (2006b) studied the diversion of prescription stimulants using a Web-based survey of 9,161 undergraduate students from a large Midwestern university. From the total sample, 287 students had a history of stimulant prescription for symptoms of ADHD (McCabe et al.). Of those 287 students, 54% had been approached to divert their stimulant medication during the previous year (McCabe et al.). The percentage of students that were approached to divert their medication in this study was similar to the 56% that was published by Rabiner et al. (2009a). Unfortunately, researchers in this study did not ask their participants to divulge if they had accommodated the request for their medication. Therefore, a further comparison to other published researcher is impossible.

In another study of undergraduate students, Upadhyaya et al. (2005) used the Core Alcohol and Drug Survey to determine substance use patterns of prescription stimulant medications at a college in the southeastern United States. Using a sample of 334 undergraduate students comprised of 61.4% females, 84.9 % Caucasian and an average age of 20.6 yrs, investigators identified 76 participants with a lifetime history of ADHD diagnosis and treatment (Upadhyaya et al.). Of those 76 participants, 11% were still on medication for treatment of ADHD symptoms and 19% admitted to getting high on their own medication (Upadhyaya et al.).

In relation to diversion, a data analysis revealed that 22% of the sample acknowledged giving away or selling their medication to others (Upadhyaya et al.) which is consistent with the 22% reported by Rabiner et al. (2009a).

Participants in this study were not asked if they had been approached to divert their medications during their lifetime, which limited the analysis of diversion. However, use of t-tests revealed that those who diverted medications were younger (19.3 vs. 21.2, $t=3.15$, $p=0.002$) than those who did not divert (Upadhyaya et al., 2005). However, further analyses did not find any other statistically significant differences between diverters and non-diverters based on gender or race (Upadhyaya et al.).

Health Behavior Theory

Application of a health behavior theory to a problem behavior can provide a framework that identifies potential enabling forces for that behavior (Glanz, Rimer, & Viswanath, 2008). A cornucopia of theories exists that attempt to explain behaviors by identifying and accounting for varying constructs (Glanz et al.). The present study proposes the use of the Theory of Planned Behavior (TPB; Ajzen, 1991) to provide an outline of the NMUPS and diversion behaviors. Two other theories that were considered based on their incorporation of environmental factors but not used in the current study were the social ecological model (SEM) and social cognitive theory (SCT).

The social ecological model (McLeroy, Bibeau, Stecker, & Glanz, 1988) posits that health behavior should be examined using a multilevel investigation of intrapersonal, interpersonal, community, institutional and public policy factors. The success of the SEM has commonly been linked to the North Karelia Project, which used the model to implement a comprehensive intervention designed to reduce coronary heart disease mortality in Finland

(Puska, 2002). Because of the success associated with this project, SEM was originally considered to guide the present study to account for environmental factors that lead to diversion and NMUPS. However, the model is very robust and requires the examination of community and public policy factors that would be difficult to capture using a cross-sectional survey. Therefore, the model was not used as the framework of this dissertation.

The social cognitive theory (SCT) posits that a person's behavior is the result of the reciprocal relationship that exists between behavioral, personal, and environmental factors (Bandura, 2004). In SCT, behavior is influenced by the outcomes a person expects as a result of his or her action (Bandura). As proposed the theory differs from SEM in that policy factors were not considered (Montano & Kasprzyk, 2008). However, Bandura (2004) later stated that improving health behaviors is a social responsibility, leaving the distinction between it and SEM blurry at best.

The aforementioned theories have also have limited utility in the creation of a survey. Creating an instrument that incorporates the environmental factors associated with both theories would be a challenging undertaking because most students do not have a working knowledge of laws and policies as they relate to diversion and NMUPS. Based on these results, the Theory of Planned Behavior was examined for its utility in examining NMUPS and diversion.

A review revealed that TPB had previously been used to examine nonmedical use of prescription stimulants among college students (Judson & Langdon, 2009). Research using TPB had also been used to examine other addictive behaviors such as binge drinking (Collins & Carey, 2007; Huchting, Lac, & LaBrie, 2008; Norman, Armitage, & Quigley, 2007), illicit drug use (Ford, 2009), and smoking (Van De Ven, Rutger, Engels, Otten, & Van Den Eijnden, 2007).

Publications also indicate survey questions can be used to measure the constructs of TPB (Ajzen, 2002; Francis et al., 2004; Montano & Kasprzyk, 2008). It was indicated that questions assessing these constructs should use bipolar adjectives (Agree-Disagree) and lie on a 5 to 7 point scale (Francis et al.; Montano & Kasprzyk). Additionally, Judson and Langdon (2009) completed previous work in which these types of question were included in their survey on the nonmedical use of prescription stimulants.

The ability of TPB to be used to examine addictive behaviors and its ability to be incorporated into a survey made it ideal for use in the current study. Therefore the theory was adopted as the framework of the research. The survey used in this examination was then formulated around the TPB instrument developed by Judson and Langdon (2009).

The Theory of Planned Behavior

As displayed in table 1, the Theory of Planned Behavior (TPB) represents the evolution of the Theory of Reasoned Action (TRA) originally developed by Ajzen and Fishbein in 1967 (Montano & Kasprzyk, 2008). The TRA proposed that the intention to perform a volitional health behavior is formed through the interaction of beliefs (behavioral and normative), attitudes, and intentions (Ajzen, 1991). In 1980, the TPB was developed when Ajzen added the construct of perceived behavioral control and control beliefs to TRA (Ajzen, 1985, 1991). These constructs were added in order to account for behaviors over which a rational person did not have volitional control (Ajzen, 1985, 1991).

According to Ajzen (1985, 1991), the central tenet of the theory is that an individual forms an intention before performing a behavior. The theory postulates that the formation of this intention to perform a behavior is the immediate determinant of the behavior. According to TPB, behavioral intentions are formed through the three independent constructs of attitude, subjective

norms, and perceived behavioral control. The first determinant of behavioral intention is a person's attitude toward a behavior. Attitude refers to the degree to which a person has a favorable or unfavorable appraisal of the behavior of interest (Ajzen, 1985, 1991). A person who has a more favorable attitude toward a behavior will be more likely to perform that behavior (Ajzen, 1985, 1991).

The second determinant of behavioral intention is subjective norms. Subjective norms refer to the perceived social pressure to perform or not perform the behavior of interest (Ajzen, 1985, 1991). The theory postulates that subjective norms are formed through a combination of the beliefs held about a behavior by a person's referent group (i.e. family, friends) and their motivation to comply with those beliefs (Ajzen, 1985, 1991). According to the theory, a person is more likely to comply with the opinions of persons who are contextually relevant to that behavior (Ajzen 1985, 1991). Ajzen (1985, 1991) suggests that subjective norms will increase the likelihood that the individual will engage in that specific health behavior if the person values the opinion of that referent group and is motivated to comply with that opinion. (Ajzen, 1985, 1991).

The third and final determinant of behavioral intention is perceived behavioral control. This determinant was added by Ajzen (1991), as an extension of the concept of self efficacy, to account for behaviors that are not under volitional control and refers to an individual's perception of the ease or difficulty of performing a specific health behavior (Ajzen, 1985, 1991). It is theorized that the amount control a person perceives to have over engaging in a behavior is directly related to the decision of whether to enact or refrain from its inaction (Ajzen, 1985, 1991). It is assumed that perceived control reflects a person previous experiences as well as anticipated barriers to starting or stopping the behavior (Ajzen, 1985, 1991). Additionally, the

amount of perceived behavioral control a person has depends on the individual alone and is situation-specific to the action in question (Ajzen, 1985, 1991).

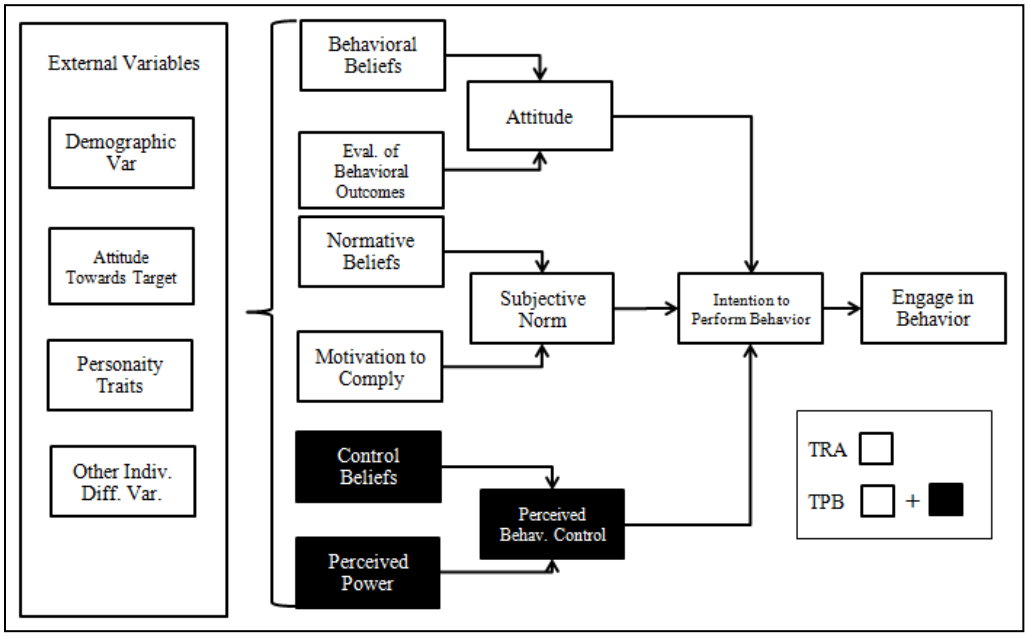

Figure 1. The theories of reasoned action and planned behavior.

Examinations of Health Behaviors Using the Theory of Planned Behavior

Binge Drinking

Several studies show that binge drinking, alcohol consumption and prescription drug misuse are correlated behaviors (Johnston et al., 2009; McCabe, West, Wechsler, 2007; SAMHSA, 2009). Since there is a lack of research using the TPB to explain NMUPS, studies examining behaviors correlated with the behavior were used to assess the usefulness of this theory. Since the TPB has been used previously to examine alcohol consumption and binge drinking behaviors in undergraduate students (Collins & Carey, 2007; Huchting et al., 2008; Norman et al., 2007) it provides an ideal window into its usefulness of the theory to examine NMUPS and diversion

Norman et al. (2007) used a test-retest design of 79 participants (M=20.10, female=68) to assess the ability of TPB to predict binge drinking intentions and behavior among undergraduate college students. A hierarchical regression analysis was used to predict binge-drinking intentions (Norman et al.). The findings of the regression analysis concluded that the TPB variables of attitude, subjective norms, and perceived behavioral control explained 58% of the variance for binge-drinking intention (Norman et al.). Additionally, a regression analysis revealed that attitudes and self-efficacy were also significant independent predictors of binge-drinking intention (Norman et al.).

A second regression analysis examined the ability of the TPB to explain actual binge-drinking behavior. This hierarchical regression analysis showed that intention, self-efficacy, and perceived behavioral control explained 22% of the binge-drinking behavior variance (Norman et al., 2007). Within this regression model, intention and perceived behavioral control surfaced as independent predictors of binge-drinking behavior (Norman et al.). However, this analysis did not find subjective norms to be a significant predictor of actual binge-drinking behavior (Norman et al.).

In a subsequent study, Huchting et al. (2008) used a survey of 247 sorority members at a midsize, private university in southern California to examine the ability of the TPB to predict drinking behaviors. A confirmatory factor analysis of the cross-sectional data showed that all item loadings of the TPB constructs were statistically significant ($p<.01$) and interrelated with the greatest correlation existing between intentions and behaviors ($r=.83$, $p<.01$) (Huchting et al.). Conversely, the weakest correlation identified by the confirmatory factor analysis of the TPB was between perceived behavioral control and intentions ($r=.33$, $p<.01$) (Huchting et al.). These results suggest that a person's attitude toward a behavior and the opinions of that person's

relevant others about drinking have a greater influence on the intention to enact a behavior than their perceived behavior control.

Using structural equation modeling, it was also revealed that attitudes (β=.39, $p<.01$) and subjective norms (β=.52, $p<.01$) were the best predictors of drinking intentions (Huchting et al., 2008). A second model found that both intentions (β=.76, $p<.01$) and perceived behavioral control (β=.22, $p<.01$) predicted drinking behavior (Huchting et al.). Results of the statistical methods used in this study suggest that use of the TPB was warranted based on an explained variance of 44.7% for intentions to drink and 73.4% of the variance in behavior (Huchting et al.).

Collins and Carey (2007) also examined the usefulness of the TPB to predict heavy episodic drinking (i.e. binge drinking) among college students. The sample of 131 college students used in this examination was comprised of 63% females (n=83) and 93% underclassman (n=123) (Collins & Carey). Moreover, the sample was predominately White (92%) but also included small percentages of Hispanics (2%), Asians (5%), and multiracial (1%) participants (Collins & Carey).

The instrument used for this study measured TPB's utility to explain drinking behaviors by incorporating sections assessing a participant's intentions to drink, attitudes about drinking, subjective norms about excess drinking, and drink refusal self-efficacy (Collins & Carey, 2007). The use of structural equation modeling found that intention was a statistically significant predictor of future heavy episodic drinking. In addition, a Chi-square analysis indicated that self-efficacy and attitude, but not subjective norms, predicted baseline heavy episodic drinking intention (Collins & Carey).

Nonmedical Use of Prescription Stimulants and the Theory of Planned Behavior

To date only one published article examines the nonmedical use of prescription stimulant medication (NMUPS) through the lens of the TPB. Judson and Langdon (2009) examined NMUPS in relation to prescription status, motives, TPB constructs, knowledge, and tendency to self-diagnose. The sample used in this study consisted of 333 undergraduate students at two small, New England colleges.

In all, the survey used in this study consisted of five sections designed to assess demographic characteristics, history of diagnosis/use by prescription holders or tendency to self diagnose for nonprescription holders, questions pertaining to all TPB constructs, and knowledge of NMUPS side effects (Judson & Langdon, 2009). Mann-Whitney tests indicated that prescription stimulant users thought that nonmedical use was significantly ($p<.0001$) more ethical when compared to non-users. Additionally, students who admitted to NMUPS were significantly ($p<.0001$) less concerned with health risks associated with misuse use when compared to those students who did not use nonmedically (Judson & Langdon).

Survey Development Methods

TPB Measurement

According to Francis et al. (2004) surveys that include questions measuring a construct of the TPB directly should use a response set with bipolar adjectives (e.g. strongly disagree-strongly agree). It is also suggested that these questions should not only include bipolar adjectives but responses of these items should be evaluated on a 5 or 7 point semantic differential scale (Montano & Kasprzyk, 2008). In these questions, responses should begin with one and end at 5 or 7 (Montano & Kasprzyk). Francis et al. (2004) also suggested that the negative and

positive end points should be mixed throughout the questionnaire, so that a respondent must read each question carefully in order to address it.

Ajzen (2002) commented that it was also possible to measure the indirect determinants of the TPB constructs. Indirect measures are best to use when either substantial prior research exists as to which specific beliefs are pertinent or surveys have been conducted to determine the beliefs pertinent to the target population. Francis et al. (2004) suggested that indirect measures should also use bipolar adjectives. However response sets in these instances should use a range that starts at -3 and progresses to +3, with 0 representing a neutral stance (Francis et al.).

Questionnaires only addressing direct constructs of TPB are sufficient when a researcher is conducting exploratory analysis to determine explained variances (Ajzen, 2002; Francis et. al., 2004). Although, research used to identify specific beliefs that influence a direct construct (i.e. reasons for holding an attitude), should incorporate the measurement of indirect and direct constructs (Francis et. al.). Questionnaires assessing both types of constructs should include a minimum of 3 questions for each construct (Francis et al.). Then, the overall scores for attitudes, subjective norms, and perceived behavior control should be regressed on the outcome variable (Ajzen, 2002).

Limitations of Self-Reported Data

Durant et al. (2002), using a sample of 358 undergraduate students examined the data quality differences between confidential and anonymous collection methods by examining item refusal and termination rates of a survey on “socially-sensitive” material such as drug use, masturbation, and binge-drinking. This study found that students who were provided anonymity were more likely to complete the survey and skip fewer questions than those provided confidentiality (Durant et al.). Specifically, undergraduate students were more likely to divulge

substance use behaviors, illegal activity and unprotected sexual behaviors when ensured of their anonymity when compared to those only ensured with confidentiality (Durant et al.). In order to provide anonymity, the survey will not include questions that could link a participant to participation in the study.

CHAPTER III

METHODOLOGY

The current study added to existing research on the diversion and nonmedical use of prescription stimulants (NMUPS) by examining these behaviors among a large sample of undergraduate students, aged 18-24, enrolled in one public university in the southeastern United States. These behaviors were studied using a paper-based survey designed to collect data from a convenience sample of students in a classroom setting. The battery of questions included in this instrument assessed the prevalence and motivations associated with NMUPS and diversion. This survey also included questions intended to examine the relationship between the nonmedical use and diversion of stimulants and the constructs of the Theory of Planned Behavior (TPB).

Previous atheoretical examinations exist on the nonmedical use (Kaloyanides et al., 2007; McCabe et al., 2006; Rabiner et al., 2009a) and diversion (DeSantis et al., 2008; McCabe et al.; McCabe & Boyd, 2005; Wilens et al., 2006) of prescription stimulants. However, only one published study was identified that used TPB to examine nonmedical use (Judson & Langdon, 2009). With respect to the diversion behavior, no published studies were identified that examined the behavior in relation to the constructs of TPB. Because of this lack of theory-based explorations, an examination of the relationships between NMUPS, diversion, and the constructs of TPB was warranted.

Purpose

There were two purposes to this study. First, the proposed study aimed to create a reliable survey instrument designed to examine the NMUPS and diversion behaviors using the TPB among undergraduate students aged 18-24. Second, this study examined the utility of the TPB in explaining NMUPS and diversion behaviors.

Research Questions

The study had five research questions related to the nonmedical use and diversion of prescription stimulants among undergraduate students using the TPB:

1. Is the survey valid and reliable in measuring the nonmedical use and diversion of prescription stimulants?
2. What are the prevalence rates, bivariate associations, and motivations associated with misuse and diversion among undergraduate students aged 18-24 during their lifetime and in the last 30 days?
3. Are the constructs of the Theory of Planned Behavior correlated with NMUPS?
4. Do the attitudes, subjective norms, and perceived behavioral control differ among participants reporting NMUPS, legal use, and those who do not report use?
5. Do the attitudes, subjective norms, and perceived behavioral control differ between participants who report diversion and those who do not report diversion?

Survey Development

The first step in creating a new survey involved the creation of a first draft (see Appendix A) to provide a foundation for further instrument development. The original version of this survey consisted of five sets of questions designed to assess the demographics of the student as well as the NMUPS and diversion behaviors. The sections included in this survey are as follows.

Demographics

The first section of the survey contained six items used to obtain demographic data from participants. Demographic items ascertained a student's current class status, gender, age, Panhellenic affiliation (i.e., Greek v. Non-Greek), and ethnicity. Questions included in this section were derived from the Stimulant Use Questionnaire (SUQ) (White et al., 2006), a survey created by Judson and Langdon (2009), and the work completed by DeSantis et al. (2008) (see Appendix B).

Prescription Status and Misuse

The second section of the original survey included 10 questions designed to ascertain several aspects of a student's prescription status and misuse. Items in this area included yes/no, multiple choice, and check all that apply formats. In this portion of the survey, students were asked about their current prescription status, history of an Attention Deficit/Hyperactivity Disorder (ADHD) diagnosis, and when they had first been prescribed the medication. In addition, items ascertained if they had ever misused their own medication, the number of times it had been misused, and the motivations that led to the behavior. Questions about frequency of use and associated motivations were designed to reflect engagement in the behavior during their lifetime and in the last 30 days. Inquiries in this area were based on findings and question formats identified by Rabiner et al. (2009a), DeSantis et al. (2008), White et al. (2006) and Judson and Langdon (2009) (see Appendix B).

Stimulant Misuse

Questions presented in this area aimed to address the prevalence, motivations, and opinions associated with the use of stimulants without a prescription. Within the stimulant misuse section, questions were ordered so that participants first answered seven items that

assessed the prevalence and motivations associated with the behavior in their lifetime and in the past 30 days. These questions were formatted into yes/no, multiple choice, and check all that apply response sets. These question formats and provided responses were based on surveys and results published by Rabiner et al. (2009a), DeSantis et al. (2008), White et al. (2006), and Judson and Langdon (2009).

The second set of questions included in this area was theoretically based questions taken or modified (Appendix B) from the work of Judson and Langdon (2009). In total, the first draft included 27 theory-based, questions with Likert-type response alternatives assessing a student's overall feeling about the misuse of stimulant medications regardless of prescription status. This subscale included 11 items assessing attitudes, 10 assessing subjective norms, and 6 items related to perceived behavioral control. Each of these questions was presented on a 7-point response scale ranging from -3 (Strongly Disagree) to +3 (Strongly Agree) (Judson & Langdon).

Diversion

Items found within this part of the survey assessed the prevalence, motivations, and opinions related to the diversion behavior. Question formats and structure included in this section closely followed those used in the prescription stimulant section. The first six items address the prevalence and motivations associated with giving away and selling of stimulant medication. These questions were formatted into yes/no, multiple choice, and check all that apply response sets and based on the publications of Rabiner et al. (2009a), DeSantis et al. (2008), White et al. (2006), and Judson and Langdon (2009).

Theory-based questions in the diversion section were modified from stimulant misuse questions in the survey (Appendix B) created by Judson and Langdon (2009) to fit the diversion behavior. In total, the first draft included 25 theory-based, questions with Likert-type response

alternatives assessing a student's overall feeling of the giving away and selling of stimulant medications. This subscale included 11 items assessing attitudes, 12 assessing subjective norms, and 2 items related to perceived behavioral control. Each of these questions was presented on a 7-point response scale ranging from -3 (Strongly Disagree) to +3 (Strongly Agree) (Judson & Langdon).

Panel Review

After development of the survey draft, the instrument was subjected to a panel review. This evaluation was completed in order to provide an estimate of the time needed to complete the survey and scrutinize it for typographical errors, ease of reading, and visual appearance. The central aim of this analysis was to increase the readability, face validity, and the likelihood of completion of the survey. Additionally, this appraisal was used to confirm that the survey could be complete during the allotted class time.

In order to complete this process, the investigator recruited seven outside reviewers to examine the instrument. Outside reviewers included two recent graduates, two doctoral candidates, and three professors, all from the university at which the research took place. Review participation was solicited in person or via email communication.

After recruiting the needed reviewers, the investigator divided the survey into thirds and had each of the professors review a section of the instrument. Reviewers were instructed to inspect approximately 26 questions and provide feedback on how to improve the instrument. This review resulted in minor changes in wording and revisions to response options. A copy of instructions provided to the evaluators and their suggestions are included in Appendix C.

After adjusting the survey to reflect changes suggested in the initial review, two doctoral candidates reviewed the instrument. These reviewers provided valuable information on how to

increase the overall presentation and decrease the length of the survey. Suggestions from the reviewers resulted in a format change in questions 23-49 and 64-88 from being presented independently to a grid pattern display. This change in formatting reduced the instrument's length by 10 pages and created a better presentation of the items.

Finally, two recent graduates completed the survey to estimate the amount of time needed to finish the instrument. Each person was instructed to complete the survey as if he or she had misused and diverted a stimulant in the last 30 days. This outcome would ensure that both graduates completed all of the questions included in the survey. This process resulted in completion times of 16 and 20 minutes. This result confirmed that the surveys could be completed in the class time that would be allotted by recruited classes.

In addition to completing the instrument, the final evaluators ensured that all skip patterns were appropriate and questions would be comprehensible. Neither evaluator indicated that any changes to the survey were needed. Based on this feedback, the final version of the survey (Appendix D) was completed and submitted for approval from the Institutional Review Board (IRB).

Approval from the Institutional Review Board

The final version of the survey and study procedures was submitted to the IRB. This application was approved by the IRB at The University of Alabama (UA). The approved IRB paper is provided (see Appendix E).

Sampling

Following the approval of the IRB, 41 instructors teaching classes during fall 2010 were contacted via email in August 2010 to solicit class time for data collection purposes. Of the 41

instructors contacted, 20 agreed to volunteer class time during the fall 2010 semester to administer surveys. The volunteered class time resulted in the collection of 1,200 surveys.

The instructors agreeing to allow for data collection taught sections of HHE 270: Personal Health, HHE 273: Community and Public Health, HHE 370: Principles and Foundations in Health Promotion, HHE 378: Drug Awareness, HD 101 Life Span of Human Development, HD 202: Child Development, HD 250 Career Development and Planning, KIN 199: Ecological Approach to Health and Fitness, NHM 101: Introduction to Human Nutrition, NEW 222: Academic Potential, ATR 257: Introduction to Athletic Training, ATR 272: First Aid and Safety, and CE 480: Forensic Engineering at The University of Alabama. These classes are housed within the College of Human Environmental Sciences, New College, and the College of Engineering at the University.

Data Collection Procedures

The investigator scheduled class time with the instructors to disseminate the questionnaire between September 20 and October 4, 2010. At the beginning of scheduled class time, a brief explanation of the study was provided and information sheets were distributed to all of the students in the class. The information sheet supplied to students provided a more detailed description of the study and made clear that all responses would remain anonymous. This information sheet also informed students that involvement in the study was voluntary, that refusal to participate in the study would not result in any penalty or loss of benefits to which the participant was otherwise entitled, and that participation could be discontinued at any time without penalty or loss of benefits. In order to maintain their anonymity, students were not required to sign this document and were free to keep it for their records.

Upon completion of the study description, the investigator distributed the survey to the students. During distribution, the potential participants were notified that filling out their survey would serve as their consent and they should not provide any information on the survey that could be used to identify them. Students were also told that they should not complete the survey again if they had already finished it in another class.

At the conclusion of survey distribution, the instructor of the participating class was asked to step outside of the classroom while surveys were completed to avoid any possibility for identification or biases in the answers provided by participants (Durant et al., 2002). After the instructor had left the classroom, students were given 20 minutes to complete their survey. Students with completed surveys brought the document to the front of the class and placed it in one pile on the other side of the room from the researcher to avoid possible identification. When all surveys were completed, the investigator collected the stack of surveys, transported them back to the office, and locked them in a file cabinet.

Data Management

Prior to any data entry, each survey was inspected for age and undergraduate classification. First, surveys of students outside of the 18- to 24-year-old range were removed, placed into separate file cabinet, and excluded from data entry. Second, I removed and excluded the surveys of students who identified themselves as graduate students or did not identify their class status. This survey audit resulted in the removal of 174 participants from entry into the data set.

The surveyor then created an online version of the survey using Vovici Online Survey Software® (2010). The results of 1,026 participants were then numbered and entered online.

This data set was then extracted for data cleaning and analysis using the Statistical Package for Social Sciences (SPSS) version 18.0 (2010).

During data entry, answers within the prescription misuse, stimulant misuse, and diversion domains were examined for inconsistencies. Within the prescription misuse series of questions (Q6-15), several errors occurred as a result of participants who did not follow the appropriate skip patterns. The following protocols were employed to account for these discrepancies. If the participant answered *no* to having a current prescription and then answered the following questions in a logical manner (i.e., feasible occasions and motivations), the answers were accepted. If the subject answered no to initial prescription items followed by nonsensical scores, the data were changed to missing.

Concerning prescription misuse (Q9), responses by participants reporting prescription misuse without a history of ADHD (Q6) or having a current prescription for the medication (Q7) were treated as missing data. Responses by subjects reporting misuse without a current prescription with a history of ADHD who answered the remaining questions in a logical manner were accepted. If responses to the remaining questions were nonsensical, they were treated as missing data.

At several junctures in the survey, participants were asked if they had engaged in the misuse or diversion of stimulants (Q9, Q16, and Q50) followed by questions assessing prevalence and motivations. Responses that were initially *no* but contained valid answers to the remaining questions were changed to *yes.* Based on personal communication with established researchers, this method was selected after determining that the addition of these cases had no bearing on the statistical significance of the bivariate or multivariate techniques but would affect prevalence rates included in this study.

Students who completed the survey were also required to answer questions that assessed their primary motivation for engaging in NMUPS (Q10, Q17, Q21) by selecting one answer. The response set in these questions was divided into *academic* (i.e., to help study, concentrate better) and *nonacademic* (i.e., to party longer, lose weight). Based on personal communication with established researchers, it was decided that responses that initially checked more than one academic or nonacademic motivation were recoded as 11 (academic) and 12 (nonacademic). All responses that included both types of motivations were coded as 99 for missing data.

Finally, respondents were asked to respond to theoretically based questions using a grid ranging from *strongly disagree* to *strongly agree*. In several cases, participants provided two responses to the same question. In this instance, the response entered into the data set was determined by a coin flip. Any unanswered questions within this grid were entered as (.) missing data.

Data Entry

After cleaning all of the surveys for errors, I entered the data from 1,026 participants into an online version of the instrument using Vovici Online Survey Software® (2010). After completing data entry, the data set was transferred to SPSS 18.0 (2010). Then, the investigator selected 10% of all surveys and cross-referenced the original surveys with responses labeled in the existing data set to identify the amount of error incurred during the entry process. The completion of this error check detected an error rate of 0.018%.

Statistical Analyses

Research Question #1

Is the survey valid and reliable in measuring the nonmedical use and diversion of prescription stimulants?

As previously mentioned, professors and graduate students reviewed the survey to increase the readability and face validity of the instrument. Additionally, to assure the validity of the survey, the researcher 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 NMUPS and diversion scales.

The PCA determined the extent to which the theoretically based items (i.e., subjective norms, attitudes, perceived behavioral control) emerged empirically. To complete this analysis, I completed a PCA with a Direct Oblim rotation to determine the initial number of factors included in each subscale (DeCoster, 1998). The eigenvalues of these initial factors were examined and any factor that was less than 1 was removed (Floyd & Widaman, 1995). Then I inspected the factor loadings and crossloadings of each question. Survey items that displayed a loading of greater than .4 were retained in the survey and questions loading below this level were removed (Floyd & Widaman). In addition, subscale questions that loaded above .4 on more than one factor were taken out of the analysis to avoid cross loading factors (Floyd & Widaman).

After removing items or factors that did not exceed the predetermined thresholds, the PCA was repeated and analyzed for eigenvalues and crossloadings. The remaining items in the NMUPS and diversion subscales as well as each factor were then subjected to Cronbach's alpha test in order to assess the internal consistency of these scales (DeCoster, 2005). A subscale that

displayed a coefficient between .70 and .90 was considered to have appropriate internal consistency (Morgan, Gliner, & Harmon, 2006).

Research Question #2

What are the prevalence rates, bivariate associations, and motivations associated with NMUPS and diversion among undergraduate students aged 18-24 during their lifetime and in the last 30 days?

The Nonmedical Use of Prescription Stimulants. First, respondents were asked if they had a current prescription for a stimulant medication. Respondents that indicated possession of a current prescription were then asked follow-up questions to determine if they had misused these stimulants during their lifetime or in the 30 days prior to completing the survey. The questions used to assess prescription misuse were (a) Have you ever, or (b) In the past 30 days have you taken your prescription stimulant medication (such as Ritalin, Adderall, Concerta, or Dexedrine) in excess or for reasons other than those for which the medication was prescribed? Students who answered affirmatively were then asked on how many occasions they had engaged in this behavior during their lifetime and in the past 30 days with a response scale of (a) none, (b) 1-2 occasions, (c) 3-5 occasions, (d) 6-9 occasions, (e) 20-39 occasions, and (f) 40 or more occasions (Johnston et al. 2009; McCabe et al, 2006a, 2006b).

Stimulant misuse was assessed with the following questions: (a) In your lifetime or (b) In the past 30 days, have you taken a prescription stimulant (such as Ritalin, Adderall, Concerta or Dexedrine) without a prescription for the medication? Students who answered affirmatively to these questions were then solicited to provide the number of occasions on which they had enacted the behavior with the same response scale reported for prescription misuse.

For purposes of statistical analyses, students admitting to prescription misuse, stimulant misuse, or both were considered to have engaged in the NMUPS. In order to determine the

prevalence of misuse among this sample, the investigator divided the sample into those who admitted to some type of misuse and those who did not report any misuse. After splitting the sample into these groups, the prevalence rates were determined by taking the number of students in the NMUPS categories individually and dividing them by the total number of respondents (DeCoster, 2006).

Motivations for prescription misuse and stimulant misuse were assessed by asking respondents to provide their primary motivation for misuse. Students who admitted to the misuse or abuse of stimulant medication were asked to provide a motivation for the behavior during their lifetime and in the 30 days prior to completing the survey. In order to provide these motivations, respondents were asked to select one of the following: (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 in class, (e) to feel less restless while studying, (f) to keep track of my 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, (l) because I ran out of my own prescription, or (m) other (DeSantis et al. 2008; McCabe et al., 2006a, 2006b). In some instances, participants mistakenly marked more than one motivation for the prescription misuse or stimulant misuse. In these cases, respondents who only identified academic motivations or nonacademic motivations were labeled as such. Those participants who reported academic and nonacademic motivations were treated as missing values. The resulting motivation frequencies are reported in Chapter IV.

Diversion. All respondents, regardless of prescription status or NMUPS patterns, were asked if they had ever been approached by another student to sell or give away a prescription stimulant. Students who indicated in the affirmative were then asked to provide the number of

times they complied with these requests during their lifetime on a scale from (a) none, (b) 1-2 occasions, (c) 3-5 occasions, (d) 6-9 occasions, (e) 20-39 occasions, and (f) 40 or more occasions (Johnston et al. 2009; McCabe et al., 2006a, 2006b). Those who indicated occasions of giving away or selling stimulant medication during their lifetime were then prompted to see if incidences of this behavior had occurred during the 30 days prior to survey completion.

For statistical analyses, only those who reported having a current prescription or those engaging in NMUPS were considered for diversion. Although several participants without a history of NMUPS or a prescription reported diversion, the source of the medication could not be verified and the respondents were therefore omitted from analysis. After excluding those participants, I identified prevalence rates and conducted bivariate analyses using methods consistent with those used in the analysis of NMUPS and previous research on diversion (Garnier et al., 2010; McCabe et al., 2006a).

Motivations for giving away and selling stimulant medication were assessed separately in the survey. Participants who admitted to giving away their medication were asked: What was your primary reason for giving away your prescription stimulant medication during . . . (a) your lifetime or (b) the last 30 days. The following response alternatives were given for these questions: (a) to help during a time of high academic stress, (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) didn’t ask, (g) to help a person lose weight, and (h) other (DeSantis et al., 2008; McCabe et al., 2006a, 2006b). In some instances, participants mistakenly marked more than one motivation for giving away their medication. In these cases, respondents who only identified academic motivations or nonacademic motivations

were labeled as such. Those participants who reported multiple academic and nonacademic motivations were treated as missing data an excluded from further statistical analyses.

Persons who admitted to selling their medication were asked: What was your primary reason for selling your prescription stimulant medication during . . . (a) your lifetime or (b) the last 30 days. The following response items were given for these questions: (a) to cover the cost of the medicine, (b) to make extra money, (c) to help pay bills, (d) because people offered me money, (e) to support myself financially, and (f) other (DeSantis et al., 2008; McCabe et al., 2006a, 2006b). The frequencies of responses for both giving away and selling prescription medication are reported in Chapter IV.

Research Question #3

Are constructs of the Theory of Planned Behavior related to the nonmedical use of prescription stimulants?

Logistic regression analyses were used to determine the extent to which attitudes, subjective norms, and perceived behavior control are related to NMUPS during a person's lifetime and in the previous 30 days. These analyses were also be used to identify the relative importance for each of the TPB constructs, and identify the impact that covariates (i.e., demographics) have on NMUPS (DeCoster, 2006).

Prior to conducting any statistical analyses, variables for attitudes, social norms, and perceived behavior control had to be created. First, I examined the results of the PCA to determine how to group questions in order to form each variable. The results of this analysis suggested a six factor solution in which each construct of the model was represented with two variables. These variables were attitude toward the behavior, behavioral beliefs, normative beliefs, relevant others, influence, and control beliefs. The creation of these factors is discussed in more detail in Chapter IV. After grouping questions into variables, I scored responses from

each question on a scale from -3 (Strongly Disagree) to +3 (Strongly Agree). Respondent scores were then averaged to create a mean response for each of the aforementioned groupings to create variables for use in logistic regression analyses.

After creating the TPB construct variables, I completed a logistical regression analysis of the amount of variance each construct could explain for lifetime and current NMUPS. In each analysis, the dependent variable divided the data set into subjects who did and did not engage in NMUPS during their lifetime and in the 30 days prior to completing the survey. Analysis of lifetime NMUPS included all participants who completed the survey. With respect to the analysis of current misusers, only participants reporting some type of misuse during their lifetime were included.

In each logistic regression model, the six TPB factors were entered as independent variables in the model. In addition, I controlled for the demographic variables of gender, Panhellenic affiliation, age, class status, and ethnicity as covariates in each model. After entering all variables, respondents completing at least 70% of each factor were entered into a regressional analysis with an alpha level of .05 (DeCoster, 2006).

After completing each analysis, I examined the resulting data to identify the amounts of variance explained by each independent variable. In addition to reporting explained variances, 95% confidence intervals and odds ratios for each variable were examined. These results are reported in Chapter IV.

Research Question #4

Do the constructs of the Theory of Planned Behavior differ among participants reporting nonmedical prescription stimulant use, legal use, and those who do not report use?

To determine whether the responses to items assessing the attitudes, subjective norms, and perceived behavior control (Survey questions 14-36) differed among participants engaging

in NMUPS, participants using the medication legally, and those who did not use prescription stimulants, the researcher performed two logistic regression analyses. I completed one analysis using lifetime NMUPS as the dependent variable and the other using current misuse as the outcome. In these tests, the six TPB factors were used as independent variables while controlling gender, Panhellenic affiliation, age, class status, and ethnicity. However, each logistic model also included prescription status as one of the independent variables. Inclusion of this variable allowed the investigator to determine if possessing a prescription for a stimulant increased the odds of engaging in NMUPS during a lifetime and in the past 30 days.

As with the previous regression model, only respondents who answered more the 70% of all questions within each factor were included in these examinations. Using an alpha level of 0.05, the resulting variances, 95% confidence intervals, and odds ratios were examined for statistically significant differences. These results are reported in Chapter IV.

Research Question #5

Are constructs of the Theory of Planned Behavior related to the diversion of prescription stimulants?

To determine if attitudes, subjective norms, and perceived behavioral control (Survey questions 44-64) correlated with the diversion of prescription stimulants, logistic regression analyses were completed. The use of a logistic regression analysis allowed for the determination of diversion variance that is explained by the constructs of the Theory of Planned Behavior (TPB) among the sample (DeCoster, 2006). Additionally, the data produced by the analyses also allowed for the identification of the relative importance for each of the TPB constructs, and identified the impact that covariates (i.e., demographics) have on lifetime and current diversion (DeCoster).

To complete the regression analyses, I first established mean response variables based on responses to questions 44-64. As with Research Question #3, the set of theoretical questions was subjected to a PCA. In this case, the PCA suggested a five factor solution that only included one perceived behavioral control variable. The theoretical variables of behavioral beliefs, subjective norms, relevant others, perceived behavior control, and attitude toward diversion were created and entered into logistic models as independent variables. Then, prescription status was entered as an independent variable. Finally, I controlled for gender, Panhellenic affiliation, age, class status, and ethnicity as covariates in the model.

The data resulting from the examination of lifetime and current diversion were then examined. Using an alpha level of .05, the investigator determined the amount of NMUPS variance by the TPB constructs as well as prescription status. In addition to variances, the odds ratios and 95% confidence intervals for each variable are reported in Chapter IV.

CHAPTER IV

RESULTS

The purpose of the present study was two-fold. First, this study aimed to establish the reliability of a survey designed to examine the nonmedical use of prescription stimulants (NMUPS) and diversion behaviors using the TPB among undergraduate students aged 18-24. Second, this study examined the utility of the Theory of Planned Behavior (TPB) in explaining NMUPS and diversion behaviors.

Sample Demographics

Table 1 shows the demographic makeup of the sample. A total of 329 males (32.2%), 694 females (67.6%), and 3 individuals who did not report their gender comprised this sample (n=1,026) of 18- to 24-year old (mean=19.61, SD=1.373) undergraduate students at a large university in the southeastern United States. Ethnically, this sample contained 82.7% Caucasian, 13.1% African-American, 1.1% Multi-Ethnic, 1% Hispanic, 0.9% Asian, 0.4% Pacific Islander, and 0.3% who did not report an association. With respect to a student's grade classification, the sample consisted of 26.5% freshmen, 36.5% sophomores, 19.7% juniors, and 17.1% seniors. Finally, the sample used in this study contained 31.9% participants who reported an affiliation with a Panhellenic organization.

Students were recruited from three divisions at a large university in the southeastern United States. Instructors of record from classes within these divisions were contacted by email about the possibility of providing class time to complete the survey. Of the 41 instructors contacted, 20 agreed to volunteer class time to allow for data collection. The time volunteered

resulted in the collection of 1,200 surveys. However, 174 were excluded from final analysis because the students within the 18- to 24-year old age range were not undergraduate students, or their surveys were not completed. The removal of those participants resulted in a final sample of 1,026 usable surveys.

Table 1

Demographic Characteristics of the Sample

Characteristic	n=1,026	%
Gender		
Male	329	32.2
Female	694	67.8
Ethnicity		
Caucasian	849	82.9
African-American	134	13.1
Asian	9	0.9
Pacific Islander	4	0.4
Hispanic	10	1.0
Multi-Ethnic	11	1.1
Missing	3	0.3
Age		
18	226	22.0
19	352	34.4
20	193	18.8
21	143	14.0
22	74	7.2
23	26	2.5
24	10	1.0
Year in school		
Freshman	272	26.5
Sophomore	374	36.6
Junior	202	19.7
Senior	175	17.1
Missing	3	0.3
Panhellenic		
Greek	327	31.9
Not Affiliated	695	67.7
Missing	4	0.4

In addition to basic demographic information, students were asked to provide information about a diagnosis of Attention Deficit/Hyperactivity Disorder (ADHD), prescription stimulant status, and the timeframe in which an initial prescription stimulant was obtained. Within the sample, 17.3% (n=178; Table 2) reported being diagnosed with ADHD during their lifetime and 14.7% (n=151; Table 2) had a current prescription for a stimulant medication. The majority of the participants with a current prescription had initially obtained that prescription during high school or college (58.1%; Table 2).

Table 2

Demographics of ADHD Diagnosis and Current Prescription Status

Characteristic	n=1,026	%
Diagnosed with ADHD		
Yes	178	17.3
No	848	82.7
Current Prescription		
Yes	151	14.7
No	873	85.1
Missing	2	0.2
Obtained Prescription		
Kindergarten- 4th Grade	27	17.6
5th – 8th Grade	35	22.9
9th-12th Grade	49	32.0
College	40	26.1
Missing	2	0.2

Research Questions

Research Question #1

Is the survey valid and reliable in measuring the nonmedical use and diversion of prescription stimulants?

This question was addressed by conducting principal component factor analyses. Since NMUPS and diversion are separate behaviors, responses from theoretical questions examining

each behavior were entered into separate Principal Component Analyses (PCA). Each of these statistical tests was completed with several predetermined thresholds. First, only factors displaying eigenvalues greater than 1 were considered for inclusion in the final model. Second, only questions displaying factor loadings greater than 0.4 were included in the final analysis. Any questions that displayed a factor loading below this threshold or loaded on to one or more factor above 0.400 (Floyd & Widaman, 1995) was excluded from the final model. Finally, due to the theoretical basis of the questions included in the survey, each PCA included an oblique Direct Oblim rotation with a delta of 0.

Nonmedical Use Factor Analysis. Prior to analysis, the data were subjected to the Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO) and the Bartlett's test of sphericity to determine if there was an equal distribution of values and normality of the sample to ensure that a factor analysis was appropriate. Results of the KMO test revealed a distribution value of .877, which is considered meritorious. Bartlett's test identified a significance level that was less than 0.001 which indicated that the data were multivariately normal. These results suggested that the data set could be subjected to a factor analysis. After determining that a factor analysis was appropriate, an initial PCA of questions assessing the attitudes, subjective norms and perceived behavioral control associated with NMUPS (Questions 23-49; Appendix A) was completed to determine if questions met the predetermined question and factor thresholds.

Results of the initial PCA suggested a six-factor solution that explained 68.845% of the total variance. However, results found four questions that did not meet the predetermined threshold of 0.400. Based on these results, questions 27, 30, 43 and 47 were removed from the analysis. Two of the questions that were removed (Q27 and Q30) assessed their friend's beliefs

of NMUPS while the other two (Q43 and Q47) were designed to assess perceived behavioral control. After removing these four items, the PCA was repeated.

As displayed in Table 4, a second PCA with a Direct Oblim rotation was completed using response sets from 949 participants. The analysis resulted in a six-factor model with an increase in explained variance to 74.130%. Further analysis found that the final model consisted of 24 items with a Cronbach's alpha level of 0.880. These outcomes suggest that a six factor solution to the NMUPS portion of the survey results in a valid instrument with a strong reliability coefficient.

The six-factor solution indicated that the questions within the NMUPS scale separated into subscales of attitudes, subjective norms, and perceived behavioral control. Factor 1 (eigenvalues= 7.538, variance explained= 32.772%) consisted of 8 items (Q33-40) that inquired into how ethical a student felt it was to engage in NMUPS for a variety of reasons. This factor was labeled "NMUPS behavioral beliefs" because items within it investigated a person's attitude toward NMUPS toward the behavior. Items within this factor displayed a coefficient alpha of 0.911.

Factor two (2.790, 12.131%) consisted of four items (Q23-26) from the NMUPS scale. Each question in this section was designed to assess the normative beliefs of subjects by asking them to rate how socially acceptable it was to engage in NMUPS on campus. Based on the item content the factor was labeled "NMUPS Normative Beliefs." The coefficient alpha level for this factor was found to be 0.912.

The third factor (2.474, 10.755%) in this solution consisted of four questions (Q28, Q29, Q31 and Q32) that were designed to assess the relative value a subject placed on his or her peers' opinion of NMUPS and how motivated they were to comply with those beliefs. This third factor

represented a person's relevant others which is an indirect determinant of subjective norms according to TPB. Based on these items the factor was labeled "NMUPS Relevant Others" and demonstrated a coefficient alpha of 0.884.

Three questions (Q44, Q45, and Q48) loaded onto factor 4 (1.682, 7.313%) with a coefficient alpha of 0.847. Questions in this factor inquired about the extent to which participants felt they needed to misuse prescription stimulants in order to function academically. Since these questions represented the influence determinant of perceived behavioral control, the factor was labeled "NMUPS Influence".

The fifth factor (1.435, 6.241%) of the NMUPS subscale was comprised of two items (Q 41 and Q42) with a coefficient alpha of 0.868. Questions within this factor were designed to assess a person's attitude towards NMUPS. A person's attitude toward the behavior was measured by asking students to rate how common they felt stimulant misuse were on their campus. Based on these results, this factor was labeled, "NMUPS Attitude" in the data set.

Two items (Q 46 and Q49) represented the sixth (1.131, 4.919%) and final factor of the PCA from the NMUPS subscale. These questions were designed to assess the student's control beliefs in relation to NMUPS. In this factor students were asked to rate how addicted they felt they were to stimulant medications and to what extent they used the drug to socialize or relax. This factor was labeled as "PBC Control Beliefs" and carried a coefficient alpha level of 0.584.

Table 3

Factor Loadings of Retained Nonmedical Use Items

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
(#33)... to use stimulant medications for any reason.	**0.855**	-0.015	0.045	0.024	0.033	-0.039
(#34)... in excess or for purposes other than prescribed by a physician.	**0.848**	-0.025	0.049	-0.033	0.077	0.001
(#35)... to use stimulant medication for nonacademic reasons.	**0.844**	0.055	0.012	-0.223	-0.008	0.228
(#36)… to alter their prescription regimen of stimulant medication for nonacademic reasons.	**0.771**	0.07	-0.009	-0.144	-0.032	0.311
(#37)... to use stimulant medication to increase their academic abilities.	**0.752**	-0.02	0.06	0.251	-0.006	-0.213
(#38)… to alter their prescription regimen of stimulant medication to increase their academic abilities.	**0.701**	0.029	0.029	0.26	0.016	-0.212
(#39)... in excess or for purposes other than prescribed by a physician.	**0.628**	0.108	-0.031	0.089	-0.032	0.135
(#40)... to use stimulant medication, as a physician would prescribe it.	**0.527**	0.1	0.024	0.29	-0.043	-0.189
(#23)…to use stimulant medication in excess or for purposes other than prescribed by a physician.	-0.008	**0.901**	0.016	-0.045	0.04	0.019
(#24)...in excess or for purposes other than prescribed for nonacademic reasons.	0.019	**0.89**	-0.004	-0.155	-0.031	0.131
(#25)… for students without a prescription to use stimulant medications.	-0.005	**0.872**	0.014	0.105	0.019	-0.118
(#26)... in excess or for purposes other than prescribed to enhance academic abilities.	-0.019	**0.868**	0.01	0.124	0.034	-0.088
(#28)… to use the stimulant medication in excess or for purposes other than prescribed.	-0.038	0.008	**0.87**	-0.024	0.026	0.05
(#29)… to use stimulant medications in excess or for purposes other than prescribed.	0.053	0.002	**0.867**	0.004	-0.002	0.002
(#32)... for students without a prescription to use stimulant medication.	0.055	0.019	**0.865**	-0.005	-0.008	-0.012
(#31)... for students without a prescription to use stimulant medication.	-0.069	0.015	**0.843**	-0.012	-0.018	-0.015
(#44)… in order to concentrate in my classes, on tests, or while doing my homework.	-0.036	0.019	0.017	**0.897**	0.014	0.129
(#45)…. in order to catch up with assignments/homework in my classes.	0.043	0.049	0.033	**0.833**	-0.028	0.189
(#48)….stimulant medication outweighs the potential risks.	0.138	0.034	-0.004	**0.654**	0.081	0.073

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
(#41)... in excess or for purposes other than prescribed, is common on this campus.	0.008	0.013	-0.023	-0.071	**0.951**	0.08
(#42) without a prescription, is common on this campus.	0.002	0.017	0.023	0.088	**0.912**	-0.072
(#49)... addicted to a prescription stimulant.	-0.035	-0.026	0.022	0.247	-0.018	**0.738**
(#46)… to make me feel good/relax when socializing with my friends.	0.216	0.033	0.039	0.195	-0.015	**0.67**
Total Variance	32.772	12.131	10.755	7.313	6.241	4.919
Coefficient Alpha	0.911	0.912	0.847	0.847	0.868	0.584
Total Alpha= 0.880						

Diversion Factor Analysis. Prior to analysis, the data were subjected to the KMO's test of sampling adequacy and the Bartlett's test of sphericity to determine if there was an equal distribution of values and normality of the sample to ensure that a factor analysis was appropriate. Results of the KMO test revealed a distribution value of .862, which is considered meritorious. Bartlett's test identified a significance level that was less than 0.001 which indicated that the data were multivariately normal. These results suggested that the data set could be subjected to a factor analysis. After determining that a factor analysis was appropriate, an initial PCA of questions assessing the attitudes, subjective norms, and perceived behavioral control associated with diversion (Questions 64-88; Appendix A) was completed to determine if questions met the predetermined question and factor thresholds.

Results of the initial PCA suggested a five-factor solution that explained 77.802% of the total variance. However, results found two questions that did not meet the predetermined threshold of 0.400. Based on these results, questions 70 and 73 were removed from analysis. These two questions both assessed their friends' beliefs about the acceptability of diversion on their campus. Interestingly, these items were also removed from the NMUPS subscale suggesting

that the questions were poorly worded or redundant. After removing these items, the PCA was repeated.

The final PCA (Table 4) was completed using response sets from 975 participants that answered all of the questions included in the analysis. Results of this statistical analysis suggested also suggested a six-factor solution, but the explained variance increased to 80.059%. The final model consisted of 23 items with a Cronbach's alpha level of 0.905. These outcomes suggested that the diversion subscale of the survey is a valid instrument with a strong reliability coefficient.

The five-factor solution indicated that the questions within the NMUPS scale separated into sub-factors of attitudes, subjective norms, and perceived behavioral control. The first factor (eigenvalue= 8.553, explained variance= 37.188%) consisted of eight items (Q76-83) that assessed the extent to which a student felt that diversion was ethical in a variety of situations. This factor was labeled "Diversion Behavioral Beliefs" and represented a subset of a person's attitude toward diversion. The items within this factor displayed a coefficient alpha of 0.943.

Table 4

Factor Loadings of Retained Diversion Items

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
(#76)… of stimulant medication for nonacademic reasons.	**0.909**	0.03	0.032	-0.091	0.152
(#77)… to help a person enhance their academic abilities.	**0.906**	-0.017	0.017	0.074	-0.03
(#78)... of stimulant medication for nonacademic reasons.	**0.899**	0.045	0.016	-0.081	0.104
(#78)... from their prescription of stimulant medication for any reason.	**0.89**	-0.01	0.046	0.022	0.006
(#79)... of stimulant medication for any reason.	**0.872**	-0.021	0.022	0.055	-0.009
(#80)… to help a person enhance their academic abilities.	**0.872**	-0.03	0.023	0.081	-0.049
(#81)… would use the medication in excess or for purposes other than prescribed by a physician.	**0.633**	-0.004	-0.007	-0.003	-0.22

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
(#82)… would use the medication as it would be prescribed by a physician.	**0.575**	0.022	-0.006	0.043	-0.288
(#65)… from their prescription of stimulant medication to another person for any reason.	0.007	**0.938**	0.011	0.037	-0.024
(#66)… from their prescription of stimulant medication for nonacademic reasons.	-0.022	**0.937**	0.016	-0.039	0.09
(#67)… from their prescription of stimulant medication to another person for any reason.	-0.004	**0.916**	0.016	0.047	-0.059
(#68)… from their prescription of stimulant medication to help a person enhance their academic abilities.	0.028	**0.915**	0.02	0.049	-0.04
(#69)… from their prescription of stimulant medication to help a person enhance their academic abilities.	0.015	**0.905**	0.019	0.055	-0.069
(#71)… to sell pill(s) from their prescription of stimulant medication.	-0.014	0.042	**0.897**	0.01	0.029
(#72)... to give away pill(s) from their prescription of stimulant medication.	-0.016	0.012	**0.895**	0.009	-0.006
(#74)... to give away pill(s) from their prescription of stimulant medication.	0.058	0.008	**0.89**	-0.035	-0.048
(#75)... to sell pill(s) from their prescription of stimulant medication.	0.063	0.003	**0.884**	-0.026	-0.043
(#84)…. are common on this campus.	0.103	0.072	-0.054	**0.909**	-0.029
(#85)… are common on this campus.	0.084	0.154	-0.047	**0.881**	-0.055
(#86)...could lead to a person's health being negatively affected.	-0.261	-0.163	0.15	**0.512**	0.164
(#87)… outweigh the potential risks.	-0.019	-0.008	0.06	0.001	**-0.953**
(#88)... outweigh the potential risks.	0.014	0.018	0.03	-0.016	**-0.933**
Total Variance	37.188	17.821	12.211	7.221	5.618
Coefficient Alpha	0.943	0.972	0.926	0.686	0.945
Total Alpha= 0.905					

The second factor (4.099, 17.821%) in the model consisted of six items (Q64-69). Each question in this section was designed to assess the normative beliefs of subjects by asking them to rate how socially acceptable it was to divert stimulants for a variety of reasons on campus. Items in this subscale were labeled as "Diversion Subjective Norms" and represented a subset of a person's subjective norms. In all, this factor displayed a coefficient alpha level of 0.972.

The third factor (2.809, 12.211%) in this solution consisted of four questions (Q71, Q72, Q74, and Q75) that were designed to assess the relative value a subject placed on their peers' opinions of diverting stimulants and how motivated they were to comply with those beliefs. Questions within this factor were labeled "Diversion Relevant Others" and represented a subset of a person's subjective norms by assessing how his or her peers' opinions played a role in their own opinion about diversion. Items within this factor exhibited a coefficient alpha level of 0.926.

Three questions (Q84-86) loaded onto factor four (1.661. 7.221%) and exhibited a coefficient alpha of 0.686. This factor was labeled "Diversion Attitude" and represented a person's attitude toward giving away and selling stimulant medication. This factor represented a determinant of attitude and was measured by asking students to rate how common they felt diversion was on their campus and how concerned they were about the behavior's affect on a person's health.

Two items (Q87 and Q88) represented the fifth factor (1.292, 5.618%) of the diversion subscale. These two questions were designed to assess the perceived behavioral control over the diversion behavior. In this factor, students were asked to rate the extent to which diverting stimulants outweighed potential consequences. This two-item factor was labeled as "Diversion PBC" and displayed a coefficient alpha level of 0.945.

Research Question #2

What are the prevalence rates, bivariate associations, and motivations associated with misuse and diversion among undergraduate students aged 18-24 during their lifetime and in the last 30 days?

Lifetime Nonmedical Use

To estimate the proportion of students who misused their own prescription and/or used a stimulant nonmedically by demographic category in their lifetime, I divided the number of users

in each category by the total number surveyed. Then, bivariate associations between demographic characteristics and misuse were tested using Chi-square analyses for categorical outcomes. Table 5 displays the results by categories, including class status, Panhellenic status, gender, and ethnicity.

The resulting data identified that 35.6% of the 1,024 students admitted to misusing a stimulant medication during their lifetime. Bivariate results did not identify a statistically significant difference in misuse between males and females (38.3% v 34.4%). However, these analyses did find significant differences in the proportions of misuse based on ethnicity (White 39.3% v Black, 10.3% v 40% other, $p<0.001$), year in school (Freshman 21.3% v Sophomore 38.9% v Junior 39.1% v Senior 46.6%, $p<0.001$), prescription status (Prescription 57.3% v No Prescription 31.6%, $p<0.001$), and Panhellenic status (Yes 51.1% v No 28.4%, $p<0.001$).

Prescription Misuse. For purposes of this study, prescription misuse was defined as the misuse of a respondent's own prescription by taking the medication in improper doses of for a reason other than why it was originally prescribed. Overall, 71 (45.5%) of the 156 subjects with a current prescription reported misusing their prescription stimulant during their lifetime. Students who admitted to misusing their own medication most commonly did so to concentrate better while studying (27.1%), concentrate better in class (25.7%), and to be able to study longer (15.7%). In fact, 85.7% of participants who reported this misuse of their own prescriptions were motivated to do so for academic reasons. All reported motivations for prescription misuse are displayed in Table 6.

Table 5

Bivariate Associations for Lifetime Nonmedical Use of a Prescription Stimulant

	Using		Not Using	
Demographic	n	%	n	%
Overall	365	35.6	659	64.2
Gender				
Male	126	38.3	203	61.7
Female	238	34.4	454	65.6
Ethnicity***				
White/Caucasian	333	39.3	514	60.7
African-American	14	10.4	120	89.6
Other	10	40	15	60.0
Year in School***				
Freshman	58	21.3	214	78.7
Sophomore	145	38.9	228	61.1
Junior	79	39.1	123	60.9
Senior	81	46.6	93	53.4
Prescription Status***				
No Prescription	275	31.6	595	68.4
Prescription	86	57.3	64	42.7
Panhellenic Status***				
No	197	28.4	496	71.6
Yes	167	51.1	160	48.9

Note. *p<.05. **p<.01. ***p<.001.

Table 6

Motivations for Prescription Misuse

Motivations	n	%
To concentrate better while studying	19	27.1
To concentrate better in class	18	25.7
To feel less tired so I could study longer	11	15.7
Academic reasons	10	14.3
Other	2	2.9
To lose weight	2	2.9
To feel less restless while studying	1	1.4
To feel less restless in class	1	1.4

Motivations	n	%
To keep track of my assignments	1	1.4
To feel better	1	1.4
Non-Academic reasons	1	1.4
Missing	4	5.6

Stimulant Misuse. For purposes of this study, stimulant misuse was defined as the use of someone else's prescription stimulant for any reason. In total, 339 (33.0%) of 1,026 participants reported misusing another person's stimulant medication during their lifetime. Students who admitted to misuse did so most commonly to be able to concentrate better while studying (45.6%), to study longer (13.5%), and for more than one academic reason (12%). In total, 87.4% of those misusing someone else's stimulant were motivated by academic concerns. Table 7 displays all motivations reported for stimulant misuse.

Table 7

Motivations for Stimulant Misuse

Motivations	n	%
To concentrate better while studying	152	45.6
To feel less tired so I could study longer	45	13.5
Academic reasons	40	12.0
To concentrate better in class	22	6.6
Because I ran out of my own prescription	11	3.3
To feel less restless while studying	8	2.4
To feel better	8	2.4
To get high	8	2.4
Prolong the effects of alcohol or other substances	4	1.2
To feel less restless in class	4	1.2
Other	7	0.7
To lose weight	2	0.6
To keep track of my assignments	1	0.3
Prevent others from having an academic advantage over me.	1	0.3
Non-Academic reasons	3	0.3
Missing	19	1.9

Current Nonmedical Use. Prevalence rates and bivariate associations of misuse in the past 30 days were explored using the 365 students who reported abuse during their lifetime. This analysis found that 33.7% (n=123) subjects with a history of misuse had engaged in current misuse of their own or someone else's prescription stimulant medication. This percentage is consistent with those reported for lifetime misuse. However, bivariate analyses of current misusers did not identify any significant differences in the proportions of student's misusing stimulants in the past 30 days based on demographic characteristics. Table 8 displays the results of all these bivariate analyses.

Table 8

Bivariate Associations with Current Nonmedical Use

	Using		Not Using	
Demographic	n	%	n	%
Overall	123	33.7	242	66.3
Gender				
Male	43	34.1	83	65.9
Female	80	33.6	158	66.4
Ethnicity				
White/Caucasian	112	33.6	221	66.4
African-American	3	21.4	11	78.6
Other	5	50	5	50
Year in School				
Freshman	20	34.5	38	65.5
Sophomore	53	36.3	228	63.7
Junior	28	35.4	51	64.6
Senior	22	27.5	58	72.5
Prescription Status				
No Prescription	89	32.5	185	67.5
Prescription	34	39.5	52	60.5
Panhellenic Status				
No	60	30.3	138	69.7
Yes	62	37.3	104	62.7

Note. *p<.05. **p<.01. ***p<.001.

Motivations for Current Prescription Misuse. Thirty respondents admitted to the misuse of their own prescription stimulant during the preceding 30 days. Of these 30 cases of misuse, the overwhelming majority of students (85.1%) were motivated to abuse the drug for academic reasons. As displayed in Table 9, the most commonly reported motivations for current misuse were to concentrate better while studying (20%), to feel less tired so I could study longer (16.7%), and multiple academic concerns (16.7%). These motivations are consistent with the percentages displayed with lifetime prescription misuse.

Table 9

Motivations for Current Prescription Misuse

Motivations	n	%
To concentrate better while studying	6	20.0
To feel less tired so I could study longer	5	16.7
Academic reasons	5	16.7
To concentrate better in class	4	13.3
To feel less restless while studying	3	10.0
To lose weight	2	6.7
Non-Academic reasons	2	3.3
Other	1	3.3
Missing	3	10.0

Motivations for Current Stimulant Misuse. As displayed in Table 10, 102 students had misused someone else's prescription stimulant in the previous 30 days. Most (85.3%) of these students were motivated to misuse a stimulant to assist them in academic pursuits. In fact, over half of the respondents (52%) used a stimulant nonmedically to concentrate better while studying. In contrast, only three participants (3%) had misused the drug primarily for non-academic reasons.

Table 10

Motivations for Current Stimulant Misuse

Motivations	n	%
To concentrate better while studying	53	52.0
To feel less tired so I could study longer	18	17.6
Academic reasons	13	12.7
Because I ran out of my own prescription	4	3.9
To concentrate better in class	1	1.0
To feel less restless while studying	1	1.0
To feel lest restless in class	1	1.0
To get high	1	1.0
To prolong the effects of alcohol or other substances	1	1.0
Non-Academic reasons	1	1.0
Other	7	6.9
Missing	1	1.0

Diversion

A total of 429 participants had access to a stimulant, with 151 (14.7%) having a current prescription, and 278 acknowledging the abuse of the drug during their lifetime. Of those students with a current prescription, 116 (76.8%) had been approached during their lifetime to give away or sell their medication. With respect to students who reported abuse without a current prescription, 50 (17.98%) were approached to divert stimulant medication. Analysis of lifetime diversion among respondents who reported being approached to divert a stimulant revealed 86 (56.7%) current prescription holders and 25 (9.5%) of those without a prescription complied with the request.

As Table 11 shows, chi-square analyses were completed on students who were approached to divert medication and had access to the drug based on demographic characteristics. Analyses revealed that students associated with a Panhellenic organization were more likely to divert a stimulant when compared to those without an association (77.6% v

58.4%, p<0.01). Also, respondents with a current prescription were significantly more like to divert than those without a current prescription (73.9% v 52%, p<0.01). Further testing failed to identify any significant differences in diversion based on gender, ethnicity, history of nonmedical use and school classification.

Table 11

Bivariate Associations of Lifetime Diversion

	Diverted		Did not Divert	
Demographic	n	%	n	%
Overall	111	66.9	55	33.1
Gender				
Male	44	72.1	17	27.9
Female	67	63.8	38	36.2
Ethnicity				
White/Caucasian	102	68.0	48	32.0
Other	8	57.1	6	42.9
Year in School				
Freshman	27	64.3	15	35.7
Sophomore	41	64.1	23	35.9
Junior	22	78.6	6	21.4
Senior	21	65.6	11	34.4
Prescription Status**				
No Prescription	26	52.0	24	48.0
Prescription	85	73.9	30	26.1
Nonmedical Use				
No Misuse	23	59.0	16	41.0
Misuse	88	69.8	38	30.2
Pan-Hellenic Status**				
No	52	58.4	37	41.6
Yes	59	77.6	17	22.4

Note. *p<.05. **p<.01. ***p<.001.

Reasons for Lifetime Diversion

Giving Away Medication. One hundred and five respondents admitted to giving away their stimulant medication at least once in their lifetime. Students who gave away their

medication reported doing so for a variety of reasons (Table 12). The most common reasons for giving away medications were to help a person during times of high academic stress (62.9%) and because the person had run out of their own medication (15.2%). In addition, 7.6% of subjects who gave away their medication did not ask why the person wanted the medication.

Table 12

Motivations for Giving Away Stimulants during a Lifetime

Motivations	n	%
To help during time of high academic stress	66	62.9
The person had run out of his or her own medication	16	14.4
Did not ask	8	7.2
To help a person party longer	3	2.9
To help a person get high	1	1.0
Missing	6	5.4

Selling Medication. In all, 66 participants sold their prescription medication during their lifetime (Table 13). Of those respondents, similar numbers of respondents sold their medication to make extra money (34.8%) and because people offered them money (33.3%). In contrast to giving away stimulants, no students sold their medication in order to help a person party longer or to get high.

Table 13

Motivations for Selling Stimulants during a Lifetime

Motivations	n	%
To make extra money	23	34.8
Because people offered me money	22	33.3
To cover the cost of the medication	3	4.5
Other	5	7.6
Missing	13	19.7

Lifetime Diversion and Prescription Status

A multivariate logistic regression analysis used to determine significant correlates of the behavior revealed that the only significant variable associated with diversion was a respondent's prescription status (OR= 14.767, CI=7.178-30.380, $p<0.001$). Because of the strong effect of this variable, chi-square analyses of demographic characteristics were repeated on 150 respondents with current prescriptions for a stimulant medication. As seen in Table 14, Chi-square analyses found that respondents who reported a history of nonmedical use were more likely to divert medication during their lifetime than those who never misused (72.1 v 35.9%, x^2=19.534, $p<0.001$). In another test, Panhellenic association, which had previously been significant, was found to be insignificant when the test was repeated. Further examinations failed to reveal any other significant findings.

Current Diversion

An examination of prevalence rates revealed that 48.3% of diverters had engaged in the behavior at least once in the 30 days prior to survey completion. Bivariate analyses were completed to determine if the proportion of those engaging in current diversion differed significantly by demographic characteristics. Results found that respondents with a current prescription were more likely to divert stimulants in the last 30 days than those without a prescription (50% v 22.5%, $p<0.01$). Also, respondents who had misused a prescription stimulant in the previous 30 days were more likely to divert compared to those who had not misused (61.4 v 38.6%, x^2=11.476, $p<0.01$). Further analyses failed to identify any significant differences of current diverters based on gender, school classification, Panhellenic status, and ethnicity. Table 15 displays the results of these tests.

Table 14

Bivariate Associations of Lifetime Diversion Accounting for Prescription Status

	Diverted		Did not Divert	
Demographic	N	%	n	%
Overall	85	56.7	65	43.3
Gender				
Male	35	62.5	21	32.3
Female	50	53.2	44	46.8
Ethnicity				
White/Caucasian	81	58.7	57	41.3
Other	4	33.3	8	66.7
Year in School				
Freshman	21	55.3	17	44.7
Sophomore	31	50.0	31	50.0
Junior	19	65.5	10	34.5
Senior	14	66.7	7	33.3
Nonmedical Use***				
No Misuse	23	35.9	41	64.1
Misuse	62	72.1	24	27.9
Panhellenic Status				
No	39	52.0	36	48.0
Yes	46	62.2	28	37.8

Note. *p<.05. **p<.01. ***p<.001.

Table 15

Bivariate Associations of Current Diversion

	Diverted		Did not Divert	
Demographic	N	%	n	%
Overall	53	48.2	57	51.8
Gender				
Male	25	56.8	19	43.2
Female	28	42.4	38	57.6
Ethnicity				
White/Caucasian	49	48.5	52	51.5
Other	4	50.0	4	50.0

Demographic	Diverted N	Diverted %	Did not Divert n	Did not Divert %
Year in School				
Freshman	12	46.2	14	53.8
Sophomore	24	58.5	17	41.5
Junior	10	45.5	12	54.5
Senior	7	33.3	14	66.7
Prescription Status**				
No Prescription	9	22.5	31	77.5
Prescription	47	50.0	47	50.0
Nonmedical Use**				
No Misuse	17	32.1	36	67.9
Misuse	27	67.5	13	32.5
Panhellenic Status				
No	24	46.2	28	53.8
Yes	29	50.0	29	50.0

Note. *p<.05. **p<.01. ***p<.001.

Reasons for Current Diversion

Giving Away Stimulant Medication. From the total of 53 participants who admitted to diverting medication in the past 30 days, 50 had given away their stimulant medication at least once (Table 16). The overwhelming majority (74%) of these subjects gave away the medication in order to help someone during a time of high academic stress. In contrast to lifetime percentages (14.4%), only 6% of participants gave away their medication because someone had run out of their own. This percentage was equal to the number of respondent who did not ask the person why they wanted the drug.

Table 16

Motivations for Giving Away a Stimulant in the Past 30 Days

Motivation to Give Away	n	%
To help during time of high academic stress	37	74.0
The person had run out of his or her own medication	3	6.0
Did not ask	3	6.0
To help a person get high	2	4.0
To be socially accepted among my peers	1	2.0
Other	1	2.0
Missing	3	6.0

Selling Stimulant Medication. A total of 34 subjects sold their stimulant medication in the past 30 days (Table 17). The majority of those selling stimulants (44.1%) charged for the drug in order to make extra money. Additionally, 26.5% accepted money for a stimulant because it was offered to them. Interestingly, one participant (2.9%) admitted to selling medication in the past 30 days to support him or herself financially.

Table 17

Motivations for Selling a Stimulant in the Past 30 Days

Motivation to Sell	N	%
To make extra money	15	44.1
Because people offered me money	9	26.5
To help pay bills	2	5.9
To support myself financially	1	2.9
Other	4	11.8
Missing	3	8.8

Current Diversion and Prescription Status

As with lifetime diversion, chi-square analyses were repeated in order to examine diversion in the previous 30 days among those with a current prescription. As seen in Table 18, chi-square analyses found that respondents who reported a nonmedical use in the previous 30

days were more likely to divert medication than those who did not misuse (70 v 45.9%, x^2=3.905, p<0.05). However, the remaining examinations failed to identify any significant differences among those who diverted their medication in the past 30 days.

Table 18

Bivariate Associations of Current Diversion Accounting for Prescription Status

	Diverted		Did not Divert	
Demographic	N	%	n	%
Overall	47	50.0	47	50.0
Gender				
Male	23	60.5	15	39.5
Female	24	42.9	32	57.1
Ethnicity				
White/Caucasian	45	51.1	43	48.9
Other	2	33.3	4	66.7
Year in School				
Freshman	10	43.5	13	56.5
Sophomore	22	62.9	13	37.1
Junior	9	40.9	13	59.1
Senior	6	42.9	8	57.1
Nonmedical Use*				
No Misuse	17	45.9	20	54.1
Misuse	21	70.0	9	30.0
Panhellenic Status				
No	23	53.5	20	46.5
Yes	24	48.0	26	52.0

Note. *p<.05. **p<.01. ***p<.001.

Research Question #3

Are constructs of the Theory of Planned Behavior related to the nonmedical use of prescription stimulants?

In order to answer this research question, several logistic regression analyses were completed. In the first set of analyses, an all-inclusive, forward stepwise model was completed using a dependent variable of Lifetime nonmedical use of a prescription stimulant. In the second

regression analysis, an all-inclusive model was completed using a dependent variable of NMUPS in the 30 days preceding survey completion.

Each regression model explored the relationship between these dependent variables. The continuous variables included in the model were behavioral beliefs, normative beliefs, relevant others, perceived behavioral control (PBC) influence, attitude, and PBC control beliefs. The categorical variables entered into the model were student class, ethnicity, Panhellenic status, and gender. Each forward stepwise and all-inclusive regression model was completed using an alpha level of 0.05.

Lifetime Nonmedical Use of Prescription Stimulants

Prior to conducting a stepwise regression model, an exploratory logistic regression analysis of the demographic and theoretically based variables was entered into a model. This model (n=948) was found to be significant ($p<0.001$), with a Nagelkerke R^2 =0.482, and correctly classified 79.4% of participants. In this model gender, normative beliefs, and relevant others variables were not significantly associated with NMUPS. In the interest of non-colinearity and parsimony these variables were removed from the model.

Subsequently, a forward stepwise logistic regression analysis was conducted to determine the relative importance of the remaining variables. After removing 65 participants because of incomplete data (n=974), the analysis revealed a significant model (df= 9, x^2=395.99, $p<0.01$) with a Nagelkerke R^2= .474 and 79.3% of participants correctly classified as a misusers or nonusers. The Hosmer-Lemeshow test revealed a significance level of 0.210, indicating a properly fitting model. This analysis revealed a seven step model in which the seven variables of Panhellenic status ($p<0.05$), ethnicity ($p<0.001$), student class ($p<0.001$), attitude toward the

behavior ($p<0.05$), behavioral beliefs ($p<0.001$), PBC influence ($p<0.001$), and PBC control beliefs ($p<0.01$) all emerged as significant predictors of NMUPS based on the Wald criterion.

As seen in Table 19, the final logistical model revealed several key findings. As previously mentioned, gender was not found to be significant. However, outcomes suggested that White respondents were over four times more likely (OR=4.151, CI=2.284-7.544, $p<0.001$) to engage in NMUPS when compared to subjects who identified with another ethnicity. In addition, being associated with a Panhellenic organization increased the odds of NMUPS by 53% (OR=1.53, CI= 1.06-2.21, $p<0.05$). Finally, seniors were more than four and one-half times (OR=4.61, CI= 2.66-7.99, $p<0.001$) more likely to use a stimulant nonmedically when compared to freshmen.

In regard to the theoretical constructs included in the model, the strongest predictor of nonmedical use was the influence determinant of perceived behavioral control. This variable represented the degree to which a student felt the need to misuse a stimulant medication in order to function academically (e.g., concentrate in class, keep up with coursework). Results of the regression model suggested that a 1 point increase in stimulant influence increased the odds of NMUPS by 89.5% (OR=1.895, CI=1.681-2.138, $p<0.001$).

Findings also suggested that the amount of control a person perceived over the need to use a stimulant nonmedically is inversely related to NMUPS. In fact, a 1 point increase in the amount of control a person feels over the behavior reduced the odds of engaging in NMUPS by almost 75% (OR=0.741, CI=0.6-.916, $p<0.01$).

In addition to perceived behavioral control, a respondent's attitude toward NMUPS was significantly associated with NMUPS. A 1 point increase in a subject's behavioral beliefs (i.e., how widespread NMUPS was on campus) increased their odds of NMUPS over one and one-half

times (OR=1.66, CI= 1.423-1.957, p<0.001). Another significant result identified that a 1 point increase in a subject's attitude toward NMUPS (i.e., ethicalness of NMUPS) improved the chances of engaging in the behavior by a 16% (CI=1.02-1.32, p<0.05).

Table 19

Logistic Regression for Lifetime Nonmedical Use

	B	Wald	OR	95% C.I.	
Ethnicity***					
White	----	----	----	----	----
Other	-1.423	21.799	.241	.133	.438
Panhellenic Status*					
Non-member	----	----	----	----	----
Member	.427	5.235	1.533	1.063	2.210
Student Class					
Freshman	----	----	----	----	----
Sophomore***	1.047	19.103	2.848	1.781	4.553
Junior***	.986	13.028	2.681	1.569	4.580
Senior***	1.529	29.770	4.613	2.664	7.990
Theoretical Constructs					
Behavior Beliefs***	.512	39.688	1.669	1.423	1.957
PBC-Influence***	.639	108.678	1.895	1.681	2.138
Attitude *	.149	5.120	1.160	1.020	1.320
Control Beliefs**	-.299	7.689	.741	.600	.916

Note.
*p<.05. **p<.01. ***p<.001.
Cox & Snell R^2=0.336
Nagelkerke R^2=0.462

Current Nonmedical Use

Prior to conducting a stepwise regression analysis, an exploratory logistic regression analysis of the demographic and theoretically based variables was entered into a model with the dependent variable of nonmedical use in the 30 days prior to survey completion. After excluding 688 subjects without a history of NMUPS, this model (n=334) was found to be significant

($p<0.05$). This model displayed a Nagelkerke R^2 of 0.096 and correctly classified 72.2% of participants as a misusers or a non-user. Results of this analysis revealed a Hosmer-Lemeshow level of 0.55 indicating a good fit, but only identified the variable of PBC influence as being significantly associated with current NMUPS. This finding indicates that a 1 point increase in the perceived influence of stimulants on academics increased the odds of NMUPS in the past 30 days by 40% (OR=1.408, CI=1.171-1.693, $p<0.05$). Since this model failed to identify multiple significant variables, no further analyses were conducted.

Research Question #4

Do the constructs of the Theory of Planned Behavior differ among participants reporting nonmedical prescription stimulant use, legal use, and those who do not report use?

To answer this question, Logistic regression analyses were completed to determine if a subject's prescription status affected the ability of TPB to predict lifetime and current NMUPS. These regression analyses were conducted in the same manner as those described in Research Question 3. In order to account for groups of respondents who used their medication properly, prescription status was entered into the models. Each forward stepwise and all-inclusive method was completed using an alpha level of 0.05.

Lifetime Nonmedical Use

Prior to producing a stepwise regression model, an exploratory logistic regression analysis of the demographic and theoretically based variables was entered into a model. After excluding 74 participants with incomplete data, this model (n=948) was found to be significant ($p<0.001$). However, the addition of prescription status actually reduced the Nagelkerke R^2 from 0.482 without prescription status to 0.477 with the variable. However, the predictive ability of the new model (79.3%) was almost identical to the 79.4% of participants correctly classified in the previous model. As with the previous model, gender, normative beliefs, and relevant others

variables were not identified as being significantly associated with NMUPS. In addition, adding prescription status caused a subject's attitude toward the behavior to become non-significant. In the interest non-colinearity and parsimony, all of these variables were removed from further analysis.

Subsequently, a forward stepwise logistic regression analysis was conducted to determine the relative importance of the remaining variables. This analysis revealed a significant model (n=970, df= 87, x^2=408.48, p<0.001) with a Nagelkerke R^2= 0.473 that correctly classified 79.6% of participants into the misuse or non-use categories. These results are consistent with the Nagelkerke R^2 of 0.474 and a correct classification of 79.3% of participants identified in the model that did not include prescription status. A review of the Hosmer-Lemeshow Test revealed a significance level of 0.168, indicating a properly fitting model. The final model identified the seven variables of Panhellenic status, ethnicity, student class, prescription status, behavioral beliefs, PBC influence, and PBC control beliefs as being significant predictors (p<0.05) of NMUPS based on the Wald criterion.

As seen in Table 20, the final logistical model revealed several key findings. Outcomes of this model found that White respondents were over four times more likely (OR=4.149, CI=2.320-7.419, p<0.001) to engage in NMUPS when compared to subjects who identified with another ethnicity. These results are consistent with those reported in the model which excluded prescription status (OR=4.151, CI=2.284-7.544, p<0.001). Being associated with a Panhellenic organization increased the odds of NMUPS by 61% (OR=1.612, CI= 1.119-2.32, p<0.05). This outcome is slightly higher than the 53% (OR=1.53, CI= 1.06-2.21, p<0.05) reported in the previous model, but still found within the confidence interval of the original result. Finally, seniors were almost five times (OR=4.949, CI= 2.893-8.468, p<0.001) more likely to

nonmedically use a prescription stimulant. Again, this rate is higher than that reported in the original model (OR=4.61, CI= 2.66-7.99, p<0.001) but within the previously established confidence interval.

In the analysis, prescription status was found to be significantly associated with NMUPS. Subjects with a current prescription were more than one and one-half times more likely (OR=1.776, CI=1.051-3.001, p<0.05) than those without a prescription to engage in NMUPS. This variable was added last to the model (Step 7) and displayed a significance level of 0.36.

Theoretically, the strongest predictor of nonmedical use was still the influence determinant of perceived behavioral control. This model suggested that a 1 point increase in the stimulant influence doubled the odds of engaging in NMUPS (OR=2.055, CI=1.791-2.359, p<0.001). In line with previous findings, perceived control displayed an inverse relationship with nonmedical use. In fact, a 1 point increase in the control a person believed they had over prescription stimulants reduced their odds of the behavior by 74% (OR=0.743, CI=0.604-0.914, p<0.01). These results are similar to those reported in the previous model that excluded prescription status (OR=0.741, CI=0.6-.916, p<0.01).

In relation to a student's attitude toward NMUPS, only their behavioral beliefs were revealed to be significantly associated with NMUPS. In this model, a 1-point increase in behavioral beliefs increased the odds of nonmedical use by over one and one- half times (OR=1.622, CI= 1.381-1.905, p<0.001). Unlike previous outcomes, this analysis did not find a person's attitude toward the behavior to be significant. This lack of significance is most likely the result of the high correlation displayed between attitudes and prescription status (r=0.896).

Table 20
Logistic Regression for Lifetime NMUPS Including Prescription Status

	B	Wald	OR	95% C.I.	
Ethnicity***					
White	----	----	----	----	----
Other	-1.423	23.017	.241	.135	.431
Prescription Status*					
No Prescription	----	----	----	----	----
Prescription	.574	4.612	1.776	1.051	3.001
Panhellenic Status*					
Non-member	----	----	----	----	----
Member	.477	6.558	1.612	1.119	2.323
Student Class					
Freshman	----	----	----	----	----
Sophomore***	1.118	22.546	3.057	1.928	4.850
Junior***	1.040	15.092	2.830	1.674	4.783
Senior***	1.599	34.061	4.949	2.893	8.468
Theoretical Constructs					
Behavior Beliefs***	.512	34.692	1.622	1.381	1.905
PBC-Influence***	.720	105.088	2.055	1.791	2.359
Control Beliefs**	-.297	7.912	.743	.604	.914

Note.
*p<.05. **p<.01. ***p<.001.
Cox & Snell R^2=0.339
Nagelkerke R^2=0.467

Current Nonmedical Use

A preliminary logistic regression analysis was completed using an all-inclusive technique to identify variables significantly associated with nonmedical use in the 30 days prior to survey completion. After excluding 689 respondents who had never misused stimulant medication or had incomplete data, this model (n=333) was found to be significant (p<0.001). The final regression model displayed a Nagelkerke R^2 of 0.219, a Hosmer-Lemeshow value of 0.331, and correctly classified 71.8% of participants. Furthermore, results detected the variables of PBC

influence, PBC control beliefs, and prescription status to be significant predictors of NMUPS. Variables that were not identified as significant in the all-inclusive model were not included in further analysis in methods consistent with previous research questions.

A forward stepwise logistic regression analysis was carried out using the remaining variables. Unlike the previous analysis, the inclusion of prescription status created a significant model (n=353) after excluding 669 respondents who had not misused a stimulant medication or not completed the required percentage of questions. The one-step model displayed a Nagelkerke R^2 of 0.169, a Hosmer-Lemeshow value of 0.106, and 67.4% of subjects correctly classified. Despite the outcome's significance, only the influence of prescription stimulants (PBC Influence) was found to be a significant predictor of NMUPS during the previous 30 days. Findings indicated that a 1-point increase in the perceived influence of a stimulant over a respondent was equated with a 68% increase in the odds of engaging in NMUPS (OR=1.687, CI=1.430-1.991, $p<0.001$). The remaining variables of prescription status ($p=0.061$) and PBC control ($p=0.087$) were not found to be significant.

Research Question #5

Are constructs of the Theory of Planned Behavior related to the diversion of prescription stimulants?

In order to determine if the Theory of Planned Behavior constructs are related to the diversion of prescription stimulants during a participant's lifetime and in the 30 days prior to survey completion, several logistic regressions analyses were performed. To explore these relationships, the dependent variables divided the data between respondents who had and had not diverted a stimulant during their lifetime and in the preceding 30 days. Independent variables entered into each model represented a subject's gender, ethnicity, Panhellenic association, prescription status, attitude, perceived behavioral control, normative beliefs, relative others, and

behavioral beliefs. Additionally, the variables representing perceived behavioral control related to NMUPS were added to the models. Because diversion is a voluntary action, these variables were added to account for the potential addictive qualities of stimulant medication as it related to diversion. All-inclusive and stepwise logistic regressions analyses were performed in the same manner as those reported for nonmedical use.

Lifetime Diversion

In order to investigate variables associated with the diversion during a respondent's lifetime, all-inclusive logistic regression analyses were executed. Results of this exploration suggested a significant model (n=389) after the exclusion of participants who had not been approached to divert medication or did not complete the required percentage of questions. This model displayed a Nagelkerke R^2 value of 0.418, a Hosmer-Lemeshow value of 0.815, and 84.3% of subjects correctly classified as a diverter or non-diverter. Despite these results, the only significant variable associated with diversion was a respondent's prescription status (OR= 14.767, CI=7.178-30.380, $p<0.001$). Based on the strong effect of this variable and the fact that current literature (DeSantis et al., 2008; Garnier et al., 2010; Rabiner et al., 2010) has only considered diversion among those respondents with a prescription, the investigator split the data set to exclude those without a current prescription in the regression analyses. Upon completion of this step, the statistical tests were repeated.

A subsequent all-inclusive examination displayed a significant model ($p<0.01$) of 137 subjects after excluding 13 respondents with incomplete data. Conclusions of the analysis indicated a Nagelkerke R^2 of 0.379 a Hosmer-Lemeshow value of 0.888, and prediction percentage of 75.2%. As displayed in Table 21, this inspection only revealed two significant predictors of diversion over a lifetime. First, findings suggested that a 1-point increase in the

belief that diversion was acceptable increased the odds of diversion two times (OR=2.174, CI=1.267-3.732, p<0.01). Second, lifetime nonmedical use increased a participant's odds of diversion over three and one-half times (OR=3.779, CI=1.587-8.996, p<0.01). Since no other variables were found to be significant, further testing was not completed.

Table 21

Logistic Regression for Lifetime Diversion

	B	Wald	OR	95% C.I.	
Gender					
Female	---	---	---	---	---
Male	0.196	0.183	1.216	0.497	2.976
Ethnicity					
White	---	---	---	---	---
Other	-0.5	0.348	0.606	0.115	3.194
School Class					
Freshman	---	---	---	---	---
Sophomore	-0.801	2.073	0.449	0.151	1.336
Junior	-0.292	0.199	0.747	0.207	2.69
Senior	0.495	0.443	1.641	0.382	7.051
Panhellenic Status					
Non-member	---	---	---	---	---
Member	0.354	0.548	1.424	0.558	3.633
Nonmedical Use**					
No	---	---	---	---	---
Yes	1.329	9.023	3.779	1.587	8.996
Theoretical Constructs					
Behavioral Beliefs**	0.777	7.938	2.174	1.267	3.732
Normative Beliefs	0.057	0.184	1.058	0.816	1.372
Relative Others	-0.065	0.134	0.937	0.661	1.329
Attitude	0.014	0.007	1.014	0.742	1.386
Perceived Behavioral Control	-0.053	0.084	0.948	0.661	1.36
NMUPS-PBC Influence	0.301	3.445	1.351	0.983	1.857
NMUPS-PBC Control Beliefs	0.039	0.042	1.039	0.717	1.506

Note.

*p<.05. **p<.01. ***p<.001.
Cox & Snell R^2=0.282
Nagelkerke R^2=0.379

Current Diversion

To determine if the constructs of the Theory of Planned Behavior and demographic characteristics were associated with diversion that occurred in the preceding 30 days, an all-inclusive regression model was created first. This revealed a significant model ($n=60$, $p<0.01$) after the exclusion of 90 participants who had incomplete data or did not admit to ever diverting their medication. The final model correctly classified 81.7% of respondents with a Nagelkerke R^2 of 0.530 and a Hosmer-Lemeshow value of 0.741. Despite these outcomes, only a respondent's normative belief was found to be significantly associated with diversion in the previous 30 days. This variable measured the extent to which a student felt diversion was common and accepted on the campus. Outcomes indicated that an increase in how common a respondent perceived diversion was on campus multiplied the odds of diversion in the past 30 days by two and one-half times (OR=2.574, CI=1.256-5.276, $p<0.05$). Due to the lack of multiple significant variables, no further analyses were conducted.

CHAPTER V

DISCUSSION

Statement of Purpose

The present study had two purposes. First, this study examined the reliability of a survey designed to examine the nonmedical use of prescription stimulants (NMUPS) and diversion behaviors using the TPB among undergraduate students aged 18-24. Second, this study examined the utility of the Theory of Planned Behavior (TPB) in explaining NMUPS and diversion behaviors.

Studies of NMUPS are largely atheoretical with only a few published articles that use a theory to frame the behavior (Ford, 2009; Judson & Langdon, 2009). Currently, diversion studies using a behavioral theory to frame the behavior are lacking in the published literature (Judson & Langdon). In order to address these needs in the literature, I developed a survey based on the TPB to identify correlates of the NMUPS and diversion behaviors. After developing the survey, I administered the survey to a sample (n = 1,026) of undergraduates to test the utility of TPB in explaining diversion and nonmedical use.

In addition to the stated purposes, the current study also examined prevalence rates and demographic characteristics associated with these behaviors. Previously published literature on NMUPS among college students has expressed prevalence rates ranging from 0 to 45% (Darredeau et al., 2007; McCabe et al., 2005, 2006b; Poulin, 2007; Upadhyaya et al., 2005). The current study helped to provide updated findings on NMUPS. These results also assisted in

providing a further investigation into demographic characteristics associated with the behavior. The results, in conjunction with theoretical findings, add to the current literature and assist health promotion professionals in identifying methods of reducing these phenomena on college campuses.

Published research on the diversion of prescription stimulants among college students has also identified discrepancies in reported prevalence rates. Published outcomes suggest that diversion prevalence rates vary as widely as NMUPS prevalence (DeSantis et al., 2008; Garnier et al., 2010; McCabe et al., 2006b; Rabiner et al., 2009a;Wilens et al., 2006). Based on these large discrepancies and the lack of published studies examining diversion, further examination of the behavior was warranted.

Research Questions

Research Question #1*: Is the survey valid and reliable in measuring the nonmedical use and diversion of prescription stimulants?*

This question was addressed using qualitative and quantitative methods. Qualitatively, professors and graduate students from the university in which the research was conducted reviewed the survey to identify grammatical and contextual errors. This research revealed several grammatical errors within the questions as well improvements in response sets to help increase the ability of the question to capture the needed data. Moreover, this qualitative assessment provided several formatting improvements that increased the overall appearance of the instrument while reducing its length. In all, the changes resulting from the panel review help increase the face validity, and readability of the survey among undergraduate students.

Quantitatively, separate Principal Component Analyses (PCA) on the theoretical questions assessed the nonmedical use and diversion of prescription stimulants. In each instance,

an initial PCA was completed to identify questions with factor loadings less than 0.400. Questions with loadings under this threshold were removed and a second PCA was done.

Factor Analysis of Questions Assessing Nonmedical Use

As mentioned in Chapter III, survey questions included in this section were taken or modified from previous work completed by Judson and Langdon (2009). In this previous report, investigators measured social norms by asking students to respond to how acceptable "my friends and I" felt nonmedical use was in certain situations. However, this investigation did not include questions assessing the extent to which those respondents valued the opinion of their relevant others. According to Ajzen (1991) a person must value the opinions of their relevant others in order for those beliefs to shape their behavioral intentions. In order to assess this portion of TPB omitted by Judson and Langdon, questions were added to the current survey to assess the value a respondent placed with the opinions of their relevant others.

Findings of the initial PCA indicated that the original social norms questions developed by Judson and Langdon (2009) did not adequately load onto any one factor while several other questions failed to load onto the appropriate TPB construct. These findings are contrary to those reported by Judson and Langdon, and suggest that the original questions do not provide an accurate measure of nonmedical use subjective norms held by undergraduate students. It is possible that the disparity between the current study and previous study was the incorporation of the relevant others questions. The lack of this indirect determinant of subjective norms, in previous research, could have failed to capture the entire construct.

Elimination of the items developed by Judson and Langdon (2009) in the second PCA served to strengthen the model. Unlike the initial model, the second PCA loaded questions into a six-factor solution that mimicked the constructs of TPB. Loadings identified by the model

aligned questions as intended by the researcher into the indirect determinants of attitudes, subjective norms, and perceived behavioral control posited by Ajzen (1991). The fact that questions loaded onto the constructs of TPB as intended by the examiner lends credence to the validity of the current survey to evaluate TPB's association with NMUPS among undergraduate students.

Factor Analysis of Questions Assessing Diversion

It is worth noting that all questions included in the diversion portion of the survey had to be modified from questions originally developed by Judson and Langdon (2009) to assess the correlation between TPB and NMUPS. These alterations have the potential to change the meaning, interpretation, and factor loadings previously identified (DeCoster, 2005). Based on these changes and novelty of these questions, it is difficult to compare the results of the factor analysis to any previously published works. Despite the novelty of the questions, results of the PCAs used to evaluate questions related to the theoretical correlates of diversion were similar to those reported for the NMUPS portion of the survey. This suggests, that the alteration of these questions did not significantly change their ability to assess the constructs of TPB.

As with the NMUPS portion of the survey, questions modified from Judson and Langdon (2009) failed to load onto any one factor and displayed factor loadings of less than 0.400. The presence of these questions, as with the previous analysis, did not allow other questions to load onto the appropriate factors. Since the questions after which the items were modeled did not load onto any factors in the NMUPS portion of the survey, this result was not unexpected. Based on these results, the questions created by Judson and Langdon were removed from the survey and a second PCA was executed.

Results of the subsequent analysis suggested a five factor solution. Unlike the NMUPS factor analysis, questions assessing a respondent's perceived behavioral control (PBC) only loaded onto one factor. Since the diversion portion of the survey contained less PBC questions, this result was not surprising. The remaining questions measuring diversion aligned to the appropriate constructs as intended. This finding further indicated the validity of the survey in that all of the questions included in this section of the survey aligned with the appropriate construct.

Instrument Reliability

The majority of questions used to ascertain the correlations between the constructs of TPB and the behaviors in question were taken or modified from a previous study on nonmedical use (Judson & Langdon, 2009). However, several questions were added to further explore nonmedical use and all items assessing diversion were modified to fit the behavior. Therefore, a comparison of psychometric properties is not warranted in examining the reliability of the present instrument.

The findings of the present study suggest that the created survey is valid and reliable. Outcomes for both the NMUPS and diversion portions of the survey indicated factor solutions that mimicked the indirect constructs of attitudes, subjective norms, and perceived behavioral control posited by Ajzen (1991). These conclusions contribute the construct validity by displaying the instrument's ability to align with theoretical constructs. Additionally, the current investigation subjected the survey to a panel review by professors and graduate students. This review helped improved the face validity of the instrument by correcting grammatical errors, improved response sets, and enhanced the layout of questions.

The survey also demonstrated strong reliability. The coefficient alpha levels for most of the factors and the Cronbach's alpha levels for the theoretical subsections exhibited high

reliability coefficients. This finding implies that the theoretically based questions in the survey consistently measure constructs of the TPB. These results, in conjunction with those previously mentioned, indicate that the survey is valid and reliable in measuring nonmedical use and diversion of prescriptions stimulants among undergraduate students.

Research Question #2*: What are the prevalence rates, bivariate associations, and motivations associated with misuse and diversion among undergraduate students aged 18-24 during their lifetime and in the last 30 days?*

This question was addressed through the use of several quantitative methods. Prevalence rates were calculated by dividing the total number of subjects who reported prescription or stimulant use by the total number of qualified respondents, while demographic differences were determined through the use of Chi-square analyses. Finally, the frequency of a person's primary motivation to misuse his or her own or someone else's prescription was reported.

Lifetime Nonmedical Use

Results from these analyses support and extend previous findings on the nonmedical use of prescription stimulant medications. The lifetime prevalence rate of 35.6% identified in this examination fell within the range of 0 to 45% reported in previous investigations of the behavior (McCabe et al., 2005, 2006b; Poulin, 2007; Rabiner et al., 2009a; Teter et al., 2010). Consistent with previous research, bivariate analyses indicated that undergraduates who misused a prescription stimulant during their lifetime were more likely to be Caucasian (McCabe et al., 2006b; Rabiner et al.; Teter et al., 2003) and associated with a Panhellenic organization (DeSantis et al., 2008; McCabe et al., 2005, 2006c; Rabiner et al.). Current findings also indicated that lifetime nonmedical use did not differ significantly based on gender. This result is consistent with those reported by Herman-Stahl et al. (2007), SAMHSA (2009), and White et al. (2007). Conversely, this outcome is inconsistent with published works that identified an

increased risk of NMUPS among males (Low & Gendaszek, 2002; McCabe et al., 2005, 2006b). Overall, there is still a lack of agreement within literature as to whether gender is a risk factor for NMUPS.

Chi-square analyses also revealed significant differences in lifetime NMUPS based on a respondent's current prescription status. Findings indicated that subjects with a current prescription for a stimulant medication were significantly more likely to misuse stimulant medication that those without one. Another bivariate analysis revealed that upperclassmen were significantly more likely to engage in NMUPS during their lifetime when compared to freshman students. Both of these conclusions are in line with those reported by McCabe et al. (2006b), Teter et al. (2006), and White et al. (2006).

In this examination, motivations for misuse were divided into motivations for misusing one's own prescription and those for misusing someone else's prescription. In each case, respondents provided only their primary motivation for misuse during their lifetime. An inspection of these motivations revealed that the majority of students misused their own or someone else's medication for academic reasons. The frequencies of motivations described are higher than previous studies (Rabiner et al., 2010; Teter et al., 2005, 2006; White et al., 2006). However, the current study only asked students to report primary motivations associated with NMUPS, while previous research had subjects report frequencies for each motivation. Therefore, the higher incidences of academic motivations in this study are most likely the byproduct of the differences in those methodologies.

Current Nonmedical Use

Findings indicated that one-third of all participants with a history of nonmedical use had engaged in NMUPS during the previous 30 days. Unlike results reported for lifetime NMUPS,

Chi-square analyses failed to identify significant difference among respondents based on demographic characteristics. This outcome was surprising given that differences between groups of lifetime misusers were identified based on Panhellenic status, school year, prescription status, and ethnicity. Although the lack of significant findings based on demographics could have been the result of the small sample of current misusers in this study. Unfortunately, published research to date has only explored misuse during a respondent's lifetime and the previous 6 months. Therefore, a comparison of these results with those reported in other published studies was not possible.

Despite the lack of published research examining the behavior in the past 30 days, this type of investigation is necessary for several reasons. First, asking students to account for incidences of NMUPS over the last 30 days provides a more accurate recall than when asked about misuse over the previous 6 months. For this reason, the National Household Survey on Drug Abuse (NHSDA) set the standard of current misuse at 30 days and asked all respondents to recall drug and alcohol use over that time period (SAMHSA, 2009). Second, incidences and motivations for misuse can change over the course of the semester and academic year. Nonmedical use most likely peeks during times of high academic stress such as midterms or finals week; therefore, it is imperative to study current misuse to capture misuse at these times.

Motivations for current misuse reported were consistent with those who misused during their lifetime. Participants who had misused their own or someone else's prescription in the previous 30 days were most commonly motivated to do so for academic reasons. In fact, only 10 students reporting NMUPS during this time frame were motivated by a non-academic reason.

This finding indicates that students in this study misused a stimulant medication to help him or her succeed academically. Since stimulants are designed to help a person stay awake

longer and concentrate, these students will often get good results from misuse, which serves to reinforce the behavior. A recently published study indicated that this positive reinforcement served as justification for future misuse (DeSantis & Curtis Hane, 2010).

Lifetime Diversion

The current examination of prevalence rates and bivariate associations associated with the lifetime diversion of stimulant medications identified several key findings. First, 76.8% of all students with a current prescription had been approached to divert their medication during their lifetime. This result was considerably higher than rates previously reported in the literature (Garnier et al., 2010; McCabe et al., 2006b). The higher rates found in this study could be the result of methodological differences. Previous work on this behavior had used online surveys or face-to-face interviews to collect data which resulted in lower response rates or a lack of anonymity. Therefore, subjects who were approached to divert the medication might have been hesitant to admit it had occurred or failed to complete the survey.

Second, 56.7% of students with current prescriptions agreed to give away or sell their stimulant medication at least once during their lifetime. The percentages of respondents admitting to diversion was lower than the 61.7% identified by Garnier et al., but higher than other published research on the behavior (McCabe et al.; Rabiner et al., 2009a; Upadhyaya et al., 2005). Despite the high rates of diversion identified by the study, Chi-square analyses identified only a history of nonmedical use as significantly associated with the behavior for those with a current prescription. Finally, 25 participants acknowledged diverting a stimulant without a prescription for a medication or a history of ADHD. This result suggests that stimulants have the potential to be diverted more than once.

As presented in Chapter IV, respondents provided separate motivations for giving away and selling stimulants. In the case of giving away medication, the majority of students were motivated to do so to help someone during a time of high academic stress (e.g., finals, midterms, projects). Of note, 14.4% of respondents gave their medication to someone else because that person had run out of his or her own medication.

Respondents selling their medication were most commonly motivated to do so in order to make extra money. Almost an equal number of participants sold their medication because people offered them money for the drug. In either case, these motivations are somewhat startling in that students seem to trivialize the sale of a controlled substance, which is considered a felony (Sapienza, 2006).

Current Diversion

As with nonmedical use, it is was important to explore current diversion to ascertain whether prevalence and motivations change from lifetime to current diversion. This information could serve as the foundation of future studies to identify times during a semester or academic year that students are more likely to divert medication. This timeframe could help minimize recall biases and help create a more accurate picture of the behavior.

A review of prevalence rates revealed that 50% of students with a history of diversion and a current prescription had given away or sold their medication during the previous 30 days. Products of Chi-square analyses revealed similar findings to those reported with lifetime diversion. Participants who had misused a stimulant in the previous 30 days were more likely to divert their medication than those who did not misuse their medication. However, further testing failed to uncover any other significant associations.

Motivations to give away and sell stimulant medication during this time period were similar to those found with lifetime diverters. The overwhelming majority (74%) of students gave away their medication in order to help a person during times of high academic stress; the most commonly reported motivation for those selling their medication was to make extra money (44.1%).

Research Question #3: *Are constructs of the Theory of Planned Behavior related to the nonmedical use of prescription stimulants?*

This study addressed the current question through the application of quantitative methods. This premise of this question was to address the influence of the constructs of the Theory of Planned Behavior (TPB) for lifetime and current misusers of prescription stimulants. This question builds on previous work examining TPB's utility in predicting the behavior.

Lifetime Nonmedical Use

Logistic regression analyses used to determine the ability of demographic and theoretical variables to predict lifetime nonmedical use identified several key findings. In the final model, the influence and control beliefs determinants of perceived behavioral control were both predictors of the nonmedical use of prescription stimulants (NMUPS). In fact, a respondent's need to misuse a stimulant medication to study or complete academic assignments (PBC-Influence) was the strongest predictor of lifetime NMUPS.

Control beliefs displayed an inverse relationship with lifetime NMUPS. Students with lower perceived behavioral control were more likely to report nonmedical use. These findings are consistent with Ajzen (1991), who proposed that low perceived behavioral control is such a strong determinant of behavior that it can override a person's attitude and perceived social norms.

Attitudes held by a student were also significantly related to the misuse of stimulants. Respondents who felt that misusing their own or someone else's medication was common and ethical were an increased risk of engaging in nonmedical use. This finding is also in line with ideas proposed by Ajzen (1991) in that persons with favorable views and outcome expectancies of a behavior are more likely to perform that behavior.

Unlike previously published literature (Judson & Langdon, 2006), the current study did not identify social norms as being significantly related to lifetime nonmedical use. In fact, beliefs held by a person's relevant others and the importance of those people failed to display significance during preliminary analyses and was excluded from the final regression analysis. However, it is worth noting that social norm variables included in the analyses were associated with larger numbers of participants who were excluded from analysis due to incomplete data. This suggests that respondents in the current examination might have been unwilling to accurately portray the degree to which their friends and family members influenced their behaviors. This unwillingness to answer these questions could have been a byproduct of the close proximity of their friends in the classroom during survey completion.

Correlates of lifetime NMUPS were consistent with previous findings (DeSantis et al., 2008; McCabe et al., 2006c; Rabiner et al., 2009a). Students reporting misuse were more likely to be White (DeSantis et al.; McCabe et al., 2006c; Teter et al., 2005), associated with a Panhellenic organization (DeSantis et al.; McCabe et al., 2006c), and to be an upperclassman (Teter et al., 2006; Rabiner et al.). However, this study failed to find significant differences in misuse based on gender which is consistent with some studies (Herman-Stahl et al., 2007; White et al., 2006) but in contrast to others (Johnston et al., 2009; McCabe et al., 2005, 2006a).

Current Nonmedical Use

An all-inclusive model identified the perceived behavioral control variable of influence as a significant predictor of misuse during the previous 30 days. The final model failed to identify any other theoretical or demographic variables as being significantly related to 30 day misuse. These results indicate that TPB and the associated demographic characteristics are not related to the misuse of prescription stimulants during the 30 days prior to survey completion. Unfortunately, previous literature has used the previous 6 months as a time reference for recall (McCabe et al., 2006a; Rabiner et al., 2009a; Teter et al., 2006) making a comparison of results difficult.

Research Question #4: *Do the constructs of the Theory of Planned Behavior differ among participants reporting nonmedical prescription stimulant use, legal use, and those who do not report use?*

This question was addressed using similar quantitative methods reported in Research Question #3. The only difference in methods in the current examination was the addition of prescription status to the analyses. The addition of this variable was to determine if having a prescription increased the odds for lifetime and current NMUPS.

Lifetime Nonmedical Use

The addition of the prescription status variable yielded similar results to those identified in the previous question. In fact, the difference in explained variance between the two models was a mere one-tenth of 1%. The addition of prescription status was found to be significant and was associated with an increased risk of NMUPS by 77.6%. Consistent with previous research on students with prescriptions, upperclassmen were more likely to misuse a stimulant during their lifetime when compared to lowerclassmen (Rabiner et al., 2009a; Teter et al., 2006). In contrast to results of a study examining nonmedical use among prescription holders (Rabiner et

al.), being White and having an association with a Panhellenic organization were still significantly related to misuse. The disparity between the current research and previous work could be the result of two methodological differences. The previous study only examined students with a current prescription for ADHD medication and was completed online. Based on these differences, the current study might have captured more incidences of NMUPS by asking about all prescription stimulant medications and having students complete the survey in class.

Theoretically, the influence of stimulants continued to be the strongest predictor of lifetime misuse. Furthermore, the behavioral beliefs and control beliefs variables displayed comparable numbers to those previously described. However, a person's attitude toward NMUPS was no longer significant with the addition of prescription status to the model. This change in significance is most likely the result of strong correlation demonstrated between the two variables. This suggests that a person's attitude can be shaped by the possession of a prescription for the medication.

Current Nonmedical Use

Unlike the previous examination of current nonmedical use, the current analysis was able to identify a significant model demonstrating variables related to the behavior. The all-inclusive model identified the determinants of perceived behavioral control (i.e., influence and control beliefs) and prescription status to be significantly related to current nonmedical use. However, further scrutiny using a stepwise method identified only influence as being significantly associated with the behavior. In either case, statistical testing failed to identify significant relationships between a respondent's attitudes toward misuse, his or her perceived social norms, and current nonmedical use. These findings indicate that TPB has a limited utility in predicting current misuse among undergraduate students between the ages of 18 and 24.

Research Question #5: *Are constructs of the Theory of Planned Behavior related to the diversion of prescription stimulants?*

Regression analyses were completed using methods similar to those used to examine nonmedical use. However, statistical testing for this research question was limited to participants who identified themselves as having a current prescription for a stimulant medication. This decision was made due to the strong effect prescription status had on the original model and the fact that current diversion has only examined the behavior among these individuals (Garnier et al., 2010; Rabiner et al., 2009a). As with other research questions, these assessments were completed for both lifetime and current diversion.

Lifetime Diversion

An all-inclusive model identified a history of nonmedical use and a participant's behavioral beliefs as being significantly related to lifetime diversion. In line with previous examinations (Darredeau et al., 2007; Garnier et al., 2010; Rabiner et al., 2009), diversion was more likely to occur in participants who had a history of nonmedical use. In the current study, a history of nonmedical use increased a respondent's odds of diverting their medication over three and one-half times. Further investigation of non-theoretical variables failed to identify significant associations with lifetime diversion based on ethnicity, school class, gender, or association with a Panhellenic association. These results are not surprising in that prior investigations of diversion (Garnier et al.; McCabe et al., 2006b) also failed to identify significant differences in diversion by ethnicity, gender, or Panhellenic association. Overall, these findings suggest that the diversion of stimulant medication is a problem that exists among all subpopulations of the student body.

Theoretically, a subject's belief that diversion was common on campus was related to lifetime diversion. However, the remaining theoretical constructs included in the model failed to

reach significant associations with the behavior. This indicates that TPB is not significantly associated with lifetime diversion. Unfortunately, the current study represents the first foray into the ability of TPB to predict diversion. Therefore, these results cannot be validated or compared to previous work in the area.

Current Diversion

Multivariate statistical testing failed to identify significant associations with current diversion based on gender, ethnicity, school class, Panhellenic association, or current nonmedical use. The lack of demographic variables associated with the diversion in the 30 days prior to survey completion was not unexpected based on the results of the inspection of lifetime diversion. However, the failure to identify a relationship between current nonmedical use and diversion was surprising in light of previous studies. Regardless of time periods, the majority of published research has identified misuse as a risk factor for diversion (Darredeau et al., 2007; Garnier et al., 2010; McCabe et al., 2006b; Rabiner et al., 2009a). Although this discrepancy could be result the of the small sample of students who admitted to current diversion.

Consistent with the lifetime diversion model, a person's belief that diversion was commonplace was related to diversion in the previous 30 days. All other theoretical variables failed to reach significance. This again implies that the Theory of Planned Behavior has limited utility in predicting current diversion behavior.

Limitations

There were several limitations that should be acknowledged regarding this research. First, students self-reported their nonmedical use of prescription stimulants (NMUPS) and diversion behaviors. This is a limitation in that self-reported data have several limitations of recall bias and underreporting in relation to illegal activities (Durant et al., 2002). Since the misuse and

diversion of prescription stimulants are illegal, respondents in the current study might have been unwilling to provide an accurate account of these behaviors. In order to increase the probability that students would provide truthful responses, respondents were provided anonymity and not asked to supply any identifiable information. Although affording students with anonymity increased the likelihood of truthfulness, their responses could not be validated (Durant et al.). Despite the limitations of self-report, this method has been widely adopted by researchers in the field of NMUPS and diversion (Garnier et al., 2010; McCabe et al., 2006a; Rabiner et al., 2010; White et al., 2006).

Second, the cross-sectional nature of data collection limited inferences that could be made in relation to the NMUPS and diversion behaviors. This type of data collection is limiting because it only provides an examination of these behaviors at one point in time. Ideally, studies of these behaviors should use a time series design to identify trends over the course of a semester, academic year, or academic career. Because of the cross sectional nature of data collection, trends in use over the course of semester could not be identified. Also, data collection occurred at the beginning of the semester where the reported prevalence rates are likely lower than those that would be identified at the end of a semester or during finals week, based on findings in previous literature (DeSantis & Curtis Hane, 2010; DeSantis et al., 2008). In order to partially account for changes that occur throughout a semester or lifetime, participants were asked to report both lifetime and current incidences for each behavior. Although this type of data collection is not ideal it has been used extensively in research related to NMUPS and diversion (DeSantis et al., 2008; Garnier et al., 2010; McCabe et al., 2006a, 2006b; Rabiner et al., 2010; Teter et al., 2006; White et al., 2006).

Third, this sample consisted only of students from one university in the southeastern United States. For this reason, the findings of this investigation may not be generalizable to the total population of undergraduate students in the US between the ages of 18 and 24. Despite this limitation, rates of misuse, rates of diversion, and associated motivations fell within the spectrum of those found in the published literature (DeSantis et al., 2008; Judson & Langdon, 2009; White et al., 2006).

The fourth limitation of this study is that convenience sampling was utilized. Recruitment of subjects for this examination was limited to three colleges at the institution in which the research took place. Furthermore, the final sample had a greater representation of female students and students affiliated with a Panhellenic association than the university's makeup. Therefore, this limitation also affects the generalizability of results of the study to the greater undergraduate population. Although random sampling is preferred in comparison, convenience sampling is not uncommon for projects examining these behaviors (DeSantis et al., 2008; Judson & Langdon, 2009; McCabe et al., 2006a).

Finally, TPB has had limited application to NMUPS (Judson & Langdon, 2009) and had yet to be applied to diversion behavior. However, as discussed in Chapter II, TPB has been used to examine behaviors related behaviors such as binge drinking and illicit drugs (Huchting et al., 2008; McCabe et al., 2007; Norman et al., 2007). This limitation will eventually be addressed through the dissemination of study outcomes in published literature to substantiate the use of this theory in relation to NMUPS and diversion.

Implications

Nonmedical Use

Results of the current study in regard to nonmedical use identified several areas for best practices of college health educators, prescribing health professionals, and college administrators. First, outcomes of the study indicated that being White, associated with a Panhellenic organization, and upperclassman all increased the odds of lifetime misuse. Based on the results and their consistency with previous research (DeSantis et al., 2008; McCabe et al., 2005, 2006c; Teter et al., 2005, 2006), health professionals could develop programs aimed at raising awareness of nonmedical use among undergraduate students. Outcomes of this study could help health professionals tailor intervention messages to certain subpopulations of the student body more at risk for NMUPS. For example, interventions could be created to change positive attitudes held about misuse among freshman students who are pledging for membership with a Panhellenic organization.

Second, having a current prescription was also associated with higher rates of misuse. This finding indicates that prescribing health professionals could assist in the reduction of this behavior. Doctors and nurses working in college towns could use tougher diagnostic tests and increased monitoring of symptoms for ADHD. Changes in these practices and development of policies limiting access to these drugs could reduce the prevalence of nonmedical use in their community.

Third, students with positive attitudes about misuse and low perceived behavioral control were associated with higher rates of misuse. Additionally, students commonly reported academic motivations for NMUPS. To address these issues health educators could develop programs

aimed at demonstrating the dangers of misuse while providing time management techniques to assist students in coping with the academic rigors of college.

Finally, findings indicated a limited utility for the use of TPB. A previous study (Judson & Langdon, 209) found that all aspects TPB were associated with NMUPS. However, the current study found that students did not value opinions held by their relevant others negating the effect of social norms on the behavior. The results of these studies imply that further research is needed to determine the ability of TPB constructs to explain the NMUPS behavior.

Diversion

The results of the current study were in line with findings of previous research (Darredeau et al., 2007; Garnier et al., 2010; McCabe et al., 2006b; Rabiner et al., 2009a) in that respondents with a history of nonmedical use were more likely to divert their own medication. This outcome suggests a need to develop strategies for prescribing health professionals to educate their patients on responsible use of prescription medication and the risks associated with diversion, while constraining the diagnostic and prescribing practices of these professionals would limit access to undergraduate students for potential diversion and misuse.

Interestingly, diversion was identified in a handful of students without a history of ADHD diagnosis, a current prescription, or accounts of misuse. This means that students are obtaining stimulant medications from sources not yet identified. This discovery implies a need to reexamine the distribution processes associated with stimulant medication. The inspection of these procedures could identify a weak link in the chain where stimulants are entering a black market of prescription medications.

Finally, research indicated that TPB did not provide an adequate explanation of the diversion behavior. Based on these results, the creation of TPB interventions is not warranted.

However, there is a need for health educators to continue to examine this behavior through theoretical lenses to discover a better theoretical fit.

Overall Implications

The present examination of nonmedical use and diversion suggests these behaviors share similarities but also have some differences. Results of the present study showed that specific subsections of the student body are more at risk to engage in nonmedical use and that TPB has utility in explaining the behavior. However, an examination of diversion failed to identify significant subpopulations at risk for the behavior and almost no utility in TPB's ability to predict the behavior.

However, the investigation of lifetime diverters did indicate that students who had misused a stimulant during their lifetime were more likely to divert their medication, while both inspections found that positive attitudes toward the respective behaviors were associated with an increased risk of both NMUPS and diversion. These findings suggest that diversion and NMUPS behaviors are interrelated. This suggests that a successful health intervention for both behaviors must address the other and attempt to change the positive attitudes of the students. Health interventions need to be implemented on college campuses to change these attitudes by educating undergraduate students to the dangers and penalties associated with these behaviors.

Based on an extensive literature review and results reported in Chapter IV, it is evident that these behaviors are growing in popularity among undergraduate students. If actions are not taken to curb these behaviors, their prevalence will most certainly continue to grow, placing students at risk for health, abuse, and dependence issues.

Future Research

There are several areas where future research is needed in relation to the nonmedical use of prescription stimulants and diversion. First, the current study represents the initial attempt to establish the validity and reliability of the survey. Alterations to the instrument were made based on further analysis of the survey and a Principal Components Analysis. Therefore, a second iteration of this examination is warranted. The data set produced from this second investigation should be used to further the validity of the instrument by conducting a confirmatory factor analysis.

Second, future research into the theoretical constructs related to NMUPS and diversion is necessary. The present investigation was in slight discordance with previous research using the Theory of Planned behavior to explain NMUPS and the first to use the theory to examine diversion. Consequently, a replication of this study would aid in determining the theory's usefulness in relation to these behaviors. Additionally, research of these behaviors should also include other behavioral theories. These studies would expand knowledge of the impetus behind these behaviors and provide other avenues to reduce their prevalence on college campuses.

Third, the majority of current literature has examined the nonmedical use and diversion behaviors using cross-sectional data collection. In these studies, undergraduate students involved in studies have consistently identified academic reasons for misusing and diverting stimulant medication. Therefore, future research investigating these behaviors using a time series or longitudinal design is necessary. Application of these research designs would highlight peak times during the academic year that students engage in these behaviors. Results of these studies would allow for the development of health promotion programs and policies aimed at reducing these activities.

Fourth, a handful of respondents in the present study admitted to the diversion of a prescription stimulant without a current prescription for a stimulant medication or a history of ADHD diagnosis. In order to mitigate the flow of stimulant medications to other undergraduate students, a future examination of the behavior should concentrate on identifying sources of diversion that includes students without prescriptions for the medication. Based on the growing trend of prescription drug misuse as a whole, research is likely to identify a black market in which these medications are bought, sold, or traded.

Finally, research has yet to explore specific subgroups of the student body that might be at an increased risk for NMUPS. In this examination, students often reported the need to study longer and complete academic assignments as motivations to misuse stimulants. Therefore, studies examining subpopulations with increased time demands outside the academic realm such as student-athletes might identify undergraduates more prone to NMUPS.

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APPENDIX A

Original Version of the Survey

Please Tell Us About Yourself

1. How old are you? (Please Circle One)
   17 18 19 20 21 22 23 24 25+

2. What gender are you? (Please Circle One)
   Male Female

3. With which race do you identify? (Please Check One)
   - [ ] White/Caucasian
   - [ ] Black/ African-American
   - [ ] Asian
   - [ ] Native American
   - [ ] Pacific Islander
   - [ ] Hispanic
   - [ ] Multi-Ethnic
   - [ ] Other

4. Are you currently an active member of a social fraternity or sorority?

   Yes No

5. What year in college are you? (Please Circle One)

   Freshman Sophomore Junior Senior Graduate Student Other:

Section 1

6. Have you ever been diagnosed with Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD)?
   Yes No

7. Do you have a current prescription for a stimulant medication such as *Ritalin, Adderall, Concerta, Metadate, Methylin, Desoxyn, Cyclert or Dexedrine?*
   Yes No (Skip to Question #16)

8. Based on a doctor's prescription, when did you first start using a prescription stimulant (*such as Ritalin, Adderall, Concerta, or Dexedrine)*? (Please Check One)
   - [ ] Kindergarten- 4th Grade
   - [ ] 5th-8th Grade
   - [ ] 9th-12th Grade
   - [ ] College

9. 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*?
   Yes No (Skip to Question #16)

10. What was your primary reason for using your prescription stimulant *in excess or for a reason other than what the medication was prescribed for* **in your lifetime**? (Please Check One)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Other:

11. 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* **in your lifetime**? (Please Check All That Apply)

- [ ] I did not have another reason
- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Other:

12. On how many occasions **in your lifetime** have you used your prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for*? (Please Check One)

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

13. **In the past 30 days** have you taken your prescription stimulant medication (*such as Ritalin, Adderall, Concerta, or Dexedrine excess) in excess or for reasons other than the medication was prescribed*?

Yes No (Skip to Question #16)

14. What was your primary reason for using your prescription stimulant *in excess or for reasons other than what the medication was prescribed for* **in the past 30 days**? (Please Check One)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Other:

15. On how many occasions **in the past 30 days** have you used your prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for*?

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

16. **In your lifetime**, have you taken a prescription stimulant (*such as Ritalin, Adderall, Concerta, or Dexedrine) without a prescription for the medication?*

A. Yes B. No (Skip to Question #23)

17. What was the primary reason for *using someone else's prescription stimulant medication* **during your lifetime**? (Please Check One)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Because I ran out of my own prescription
- [ ] Other:

18. What were other reasons you had for *using someone else's prescription stimulant medication* **during your lifetime**? (Please Check All That Apply)

- [ ] I did not have another reason
- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Because I ran out of my own prescription
- [ ] Other:

19. On how many occasions **in your lifetime**, have you used *someone else's prescription stimulant medication*?

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

20. **In the past 30 days**, have you taken a prescription stimulant *without a prescription for the medication*?

Yes No (Skip to Question #23)

21. What was the primary reason for using *someone else's prescription stimulant medication* during **the last 30 days**? (Please Check One)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Because I ran out of my own prescription
- [ ] Other:

22. On how many occasions during **the last 30 days**, have you used *someone else's prescription stimulant medication*?

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Please rate the extent to which you agree or disagree with each of the following questions (Choose one): strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree. **Please check your answer in the boxes provided.**

23. It is socially acceptable at this university for students *without* a prescription to use stimulant medications.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

24. It is socially acceptable at this university for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed* by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

25. It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *to enhance academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

26. It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

27. My friends believe that it is ok for students *without* a prescription to use stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

28. I value my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

29. I am motivated to comply with my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

30. My friends believe it is ok for students *with* a prescription to use the stimulant medication in excess or for purposes other than prescribed.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

31. I value my friends' opinion on whether or not it is ok for students *with* a prescription to use the stimulant medication in excess or for purposes other than prescribed.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

32. I am motivated to comply with my friends' opinion on whether or not it is ok for students *with* a prescription to use stimulant medications in excess or for purposes other than prescribed.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

33. It is ethical for students *without* a prescription to use stimulant medications for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

34. It is ethical for students *with* a prescription to use his or her stimulant medication in excess or for purposes other than prescribed by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

35. It is ethical for students *without* a prescription to use stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

36. It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.)*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

37. It is ethical for students *without* a prescription to use stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

38. It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

39. I believe it is safe for students *without* a prescription to use stimulant medication, *as a physician would prescribe it*.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

40. I believe it is safe for students to use stimulant medication in *excess or for purposes other* than prescribed by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

41. I believe the use of stimulant medication by students *without* a prescription, is common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

42. I believe the use of stimulant medication (by students with prescriptions for stimulant medication) *in excess or for purposes other* than prescribed, is common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

43. I am concerned that taking stimulant medication in excess or for purposes other than prescribed by a physician will negatively affect one's health.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

44. I feel I need to use stimulant medication in order *to concentrate* in my classes, on tests, or while doing my homework.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

45. I feel I need to use stimulant medication in order to *catch up* with assignments/homework in my classes.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

46. I feel I need stimulant medication *to make me feel good/relax* when socializing with my friends.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

47. I feel I do not need stimulant medication *to control any other aspect of my life*.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

48. I feel the *benefits* of using stimulant medication *outweigh* the potential *risks.*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

49. I feel I am addicted to a prescription stimulant.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Section 2

50. Have you ever been asked by another student to sell or give him or her a prescription stimulant medication? (Please Circle One)

Yes No (Skip to Question #64)

51. **In your lifetime**, how many times have you *given away* your prescription stimulant medication?

Never (Skip to Question #56)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

52. What was your primary reason *for giving away* your prescription stimulant medication during **your lifetime**? (Please Check One)
    - ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
    - ☐ The person had run out of his or her own prescription medication
    - ☐ To be socially accepted among my peers
    - ☐ To help a person party longer
    - ☐ To help a person get high
    - ☐ To help a person lose weight
    - ☐ Did not ask
    - ☐ Other:

53. What were other reasons you had *for giving away* your prescription stimulant medication **during your lifetime**? (Please Check All that Apply)
    - ☐ I did not have another reason
    - ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
    - ☐ The person had run out of his or her own prescription medication
    - ☐ To be socially accepted among my peers
    - ☐ To help a person party longer
    - ☐ To help a person get high
    - ☐ To help a person lose weight
    - ☐ Did not ask
    - ☐ Other:

54. In the **past 30 days**, how many times have you *given away* your prescription stimulant medication?

Never (Skip to Question #56)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

55. What was your primary reason *for giving away* your prescription stimulant medication in the **past 30 days**?
    - ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
    - ☐ The person had run out of his or her own prescription medication
    - ☐ To be socially accepted among my peers
    - ☐ To help a person party longer
    - ☐ To help a person get high
    - ☐ To help a person lose weight
    - ☐ Did not ask
    - ☐ Other:

56. In **your lifetime**, how many times have you *sold* your prescription stimulant medication?

Never (Skip to Question #64)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

57. What was your primary reason *for selling* your prescription stimulant medication **over your lifetime**? (Please Check One)
- ☐ To cover the cost of the medicine
- ☐ To make extra money
- ☐ To help pay bills (i.e. rent, utility bills, credit cards, etc.)
- ☐ Because people offered me money
- ☐ To support myself financially
- ☐ Other:

58. What were other reasons you had for selling your prescription stimulant medication **over your lifetime**? (Check All That Apply)
- ☐ I did not have another reason
- ☐ To cover the cost of the medicine
- ☐ To make extra money
- ☐ To help pay bills (i.e. rent, utility bills, credit cards, etc.)
- ☐ Because people offered me money
- ☐ To support myself financially
- ☐ Other:

59. What was the primary reason people *wanted to buy* your prescription stimulant medication **over your lifetime**? (Please Check One)
- ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
- ☐ The person had run out of his or her own prescription medication
- ☐ To be socially accepted among my peers
- ☐ To help a person party longer
- ☐ To help a person get high
- ☐ To help a person lose weight
- ☐ Did not ask
- ☐ Other:

60. In the **last 30 days**, how many times have you *sold* your prescription stimulant medication?

Never (Skip to Question #64)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

61. In the **last 30 days**, what was your primary reason *for selling* your prescription stimulant medication?
- ☐ To cover the cost of the medicine
- ☐ To make extra money
- ☐ To help pay bills (i.e. rent, utility bills, credit cards, etc.)
- ☐ Because people offered me money
- ☐ To support myself financially
- ☐ Other:

62. In the **last 30 days**, what was the primary reason people *wanted to buy* your prescription stimulant medication? (Please Check One)

- [ ] To help during a time of high academic stress (i.e. finals, midterms, projects)
- [ ] The person had run out of his or her own prescription medication
- [ ] To be socially accepted among my peers
- [ ] To help a person party longer
- [ ] To help a person get high
- [ ] To help a person lose weight
- [ ] Did not ask
- [ ] Other:

63. What was the average price you charged for each pill from your prescription of stimulant medication? (Please Check One)

- [ ] 1-2 dollars
- [ ] 3-4 dollars
- [ ] 5-6 dollars
- [ ] 7+ dollars
- [ ] Depended on the dosage of the pill
- [ ] Other:

Please rate the extent to which you agree or disagree with each of the following questions (Choose one): strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree. **Please check your answer in the boxes provided.**

64. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to another person for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

65. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to another person for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

66. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

67. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

68. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

69. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

70. My friends believe it is ok for students *to give away* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

71. I value my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

72. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

73. My friends believe it is ok for students *to sell* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

74. I value my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

75. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

76. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

77. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

78. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

79. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

80. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

81. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

82. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication *as it would be prescribed* by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

83. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication in *excess or for purposes other* than prescribed by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

84. I believe students that *give away* their prescription stimulant medication are common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

85. I believe students that *sell* their prescription stimulant medication are common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

86. I am concerned that *giving away or selling* prescription stimulant medication could lead to a person's health being negatively affected.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

87. I feel the *benefits* of *giving away* stimulant medication *outweigh* the potential *risks.*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

88. I feel the *benefits* of *selling* stimulant medication *outweigh* the potential *risks.*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

APPENDIX B

Question Sources and Modifications

Question	Source	Question Label
1. 1. How old are you? (17, 18, 19, 20, 21, 22, 23, 24, other)	Judson & Langdon (2009); White et al. (2007)	Age
2. What gender do you identify with?	Judson & Langdon, 2009	Gender
3. With which race do you identify?	Judson & Langdon, 2009	Race
4. Are you currently an active member of a Greek fraternity or sorority?	Based on DeSantis et al., 2008	Greek
5. What year in college are you?	Judson & Langdon, 2009; White et al., 2006	CollYr
6. Have you ever been diagnosed with ADHD?	White et al., 2006	ADHD
7. Do you have a current prescription for a stimulant medication such as *Ritalin, Adderall, Concerta, Metadate, Methylin, Desoxyn, Cyclert or Dexedrine?*	Based on Judson & Langdon, 2009; White et al., 2006	CurrPres
8. Based on a doctor's prescription, when did you first start using a prescription stimulant?	Based on DeSantis et al., 2008	PreStimInitiation
9. Have you ever taken your prescription stimulant medications (*such as Ritalin, Adderall, Concerta, or Dexedrine excess)* in excess or for reasons other than treating your ADHD?	Based on Rabiner et al., 2009a	PreMisuseLife
10. What was your primary reason for using your prescription stimulant *in excess or for a reason other than the medication was prescribed* **in your lifetime**? (Please Check One)	Based on Rabiner et al., 2009a	PREMotiveLifePrimary
11. Did you have any other reason(s) for using your prescription stimulant *in excess or for a reason other than the medication was prescribed* **in your lifetime**? (Please Check All That Apply)	Based on Rabiner et al., 2009a	PreMotiveLifeOther

12. On how many occasions **in your lifetime** have you used your prescription stimulant medication *in excess or for a purpose other than the medication was prescribed*? (Please Check One)	Modified from Judson & Langdon, 2009 to reflect all accepted uses of prescription stimulants.	PreOccLife
13. **In the past 30 days**, have you taken your prescription stimulant medications (*such as Ritalin, Adderall, Concerta, or Dexedrine excess) in excess or for reasons other than the medication was prescribed*?	Modified from Judson & Langdon, 2009 to reflect all accepted uses of prescription stimulants and use in the past 30 days	PreMisuse30days
14. What was your primary reason for using your prescription stimulant *in excess or for reasons other than the medication was prescribed* **in the past 30 days**? (Please Check One)	Based on Rabiner et al., 2009a	PreMotive30dayPrimary
15. On how many occasions **in the past 30 days** have you used your prescription stimulant medication *in excess or for a purpose other than the medication was prescribed*?	Modified from Judson & Langdon, 2009 to reflect all accepted uses of prescription stimulants and use in the past 30 days	PreMisuse30daysOcc
16. **In your lifetime**, have you taken a prescription stimulant (*such as Ritalin, Adderall, Concerta, or Dexedrine) without a prescription for the medication?*	Based on White et. 2007; Judson & Langdon, 2009	NonMedMisLife
17. What was the primary reason for *using someone else's prescription stimulant medication* **during your lifetime**?	Based on Rabiner et al., 2009a	NonMedMotPrimary
18. Did you have any other reason(s) for *using someone else's prescription stimulant medication* **during your lifetime**? (Please Check All That Apply)	Based on Rabiner et al., 2009a	NonMedMotOther
19. On how many occasions in your lifetime have you used someone else's prescription stimulant medication?	Revised from Judson & Langdon, 2009 to account for lifetime use	NonMedOccLife

20. **In the past 30 days**, have you taken a prescription stimulant *without a prescription for the medication*?	Based on White et. 2007; Judson & Langdon, 2009	NonMedMis30days
21. What was the primary reason for using *someone else's prescription stimulant medication* during **the last 30 days**? (Please Check One)	Based on Rabiner et al., 2009a	NonMedMot30dayPrim
22. On how many occasions during **the last 30 days**, have you used *someone else's prescription stimulant medication*?	Revised from Judson & Langdon, 2009 to account for past 30 day misuse	NonMedOcc30days
23. It is socially acceptable at this university for students *without* a prescription to use stimulant medication.	Revised from Judson & Langdon, 2009 by removing Bates college and replaced it with "this university". Also altered to encompass all accepted uses of the medication.	SubNormNonMed
24. It is socially acceptable at this university for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed* by a physician.	Modified from Judson & Langdon, 2009 to encompass all uses of stimulants	SubNormPreMis
25. It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *to enhance academic abilities (i.e. study longer*	Modified Judson & Langdon, 2009 to reflect all academic motives	SubNormAcaMot
26. It is socially acceptable to take stimulant medication in excess or for purposes other, than prescribed *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	Modified Judson & Langdon, 2009 to reflect nonacademic motives.	SubNormNonAcaMot
27. My friends believe that it is ok for students *without* a prescription to use stimulant medication.	Modified from Judson & Langdon, 2009 to reflect all accepted uses of stimulants	SubNormNonMed2

28. I value my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.	Based on Judson & Langdon, 2009; Ajzen, 1991	RelOtherNonMed1
29. I am motivated to comply with my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.	Based on Judson & Langdon, 2009; Ajzen, 1991	MotComplyNonMed1
30. My friends believe that it is ok for students *with* a prescription to use the medication in excess or for purposes other than prescribed.	Modified from Judson & Langdon, 2009 to reflect all accepted uses of stimulants	SubNormPreMis2
31. I value my friends' opinion on whether or not it is ok for students *with* a prescription to use the medication in excess or for purposes other than prescribed.	Based on Judson & Langdon, 2009; Ajzen, 1991	RelOtherPreMis1
32. I am motivated to comply with my friends' opinion on whether or not it is ok for students *with* a prescription to use the medication in excess or for purposes other than prescribed.	Based on Judson & Langdon, 2009; Ajzen, 1991	MotComplyPreMis1
33. It is ethical for students *without* a prescription to use stimulant medication for any reason.	Modified from Judson & Langdon, 2009 to reflect all accepted uses of stimulants	AttNonMed
34. It is ethical for students diagnosed *with* a prescription to use stimulant medication in excess or for purposes other than prescribed by a physician.	Modified from Judson & Langdon, 2009 to reflect all accepted uses of stimulants	AttPreMis
35. It is ethical for students *without* a prescription to use stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.).*	Modified from Judson & Langdon 2009 and DeSantis et al. 2008 to reflect motivations and encompass	AttNonMedAca

36. It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.)*	Modified Judson & Langdon; DeSantis et al., 2008	AttPreMisAca
37. It is ethical for students *without* a prescription to use stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	Modified Judson & Langdon; DeSantis et al., 2008	AttNonMedNonAca
38. It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*	Modified Judson & Langdon; DeSantis et al., 2008	AttPreMisNonAca
39. I believe it is safe for students *without* a prescription to use a stimulant medication, *as it would be prescribed* by a physician.	Judson & Langdon, 2009	AttSafePre
40. I believe it is safe for students to use stimulant medication in *excess or for purposes other* than prescribed by a physician.	Judson & Langdon, 2009	AttSafeNonMed
41. I believe the use of stimulant medication by students *without* a prescription, is common on this campus.	Modified from Judson & Langdon, 2009 to reflect all accepted uses of stimulants	AttNonMedComm
42. I believe the use of stimulant medication (by students with prescriptions for stimulant medication) *in excess or for purposes other* than prescribed, is common on this campus.	Modified from Judson & Langdon, 2009 to reflect all accepted uses of stimulants	AttPreMisComm
43. I am concerned that taking stimulant medication in excess or for purposes other than prescribed by a physician will adversely affect one's health.	Judson & Langdon, 2009	AttNonMedHea

44. I feel I need to use stimulant medication in order *to concentrate* in my classes, on tests, or while doing my homework.	Modified from Judson & Langdon, 2009 to reflect "to concentrate" as a motive	PerConAca
45. I feel I need to use stimulant medication in order to *catch up* with assignments/homework in my classes	Based on Judson & Langdon, 2009; DeSantis et al., 2008	PerConCat
46. I feel I need stimulant medication *to make me feel good/relax* when socializing with my friends.	Modified Judson & Langdon, 2009 to include "to relax" as a motive	PerConNonAca
47. I feel I do not need stimulant medication *to control any other aspect of my life*.	Modified Judson & Langdon, 2009 to include "other"	PerConOth
48. I feel that the *benefits* of using stimulant medication *outweigh* the potential *risks.*	Judson & Langdon, 2009	PerConRis
49. I feel that I am addicted to a prescription stimulant.	Based on Judson & Langdon, 2009	PerConAdd
50. Have you ever been asked by another student to sell or give them a prescription stimulant medication such as *Ritalin, Adderall, Concerta, Metadate, Methylin, Desoxyn, Cyclert or Dexedrine*?	Based on Rabiner et al.,2009a	DivAppr
51. **In your lifetime**, how many times have you *given away* your prescription stimulant medication?	Based on Rabiner et al., 2009a	DivGavPrevLife
52. What was your primary reason *for giving away* your prescription stimulant medication during **your lifetime**? (Please Check One)	Based on DeSantis et al., 2008	DivGavMotLifePrimary
53. Where there any other reason(s) *for giving away* your prescription stimulant medication **during your lifetime**? (Please Check All that Apply)	Based on DeSantis et al., 2008	DivGavMotLifeOther

54. In the **past 30 days**, how many times have you *given away* your prescription stimulant medication?	Based on Rabiner et al., 2009a	DivGavPrev30days
55. What was your primary reason *for giving away* your prescription stimulant medication in the **past 30 days**?	Based on DeSantis et al., 2008	DivGavMot30daysPrim
56. In **your lifetime**, how many times have you *sold* your prescription stimulant medication?	Based on Rabiner et al., 2009a	DivSellPrevLife
57. What was your primary reason *for charging* for your prescription stimulant medication **over your lifetime**? (Please Check One)	Based on DeSantis et al., 2008	DivSellMotLifePrim
58. Were there any other reasons you charged for you prescription stimulant medication over your lifetime? (Check All That Apply)	Based on DeSantis et al., 2008	DivSellMotLifeOther
59. What was the primary reason people *wanted to buy* your prescription stimulant medication **over your lifetime**? (Please Check One)	Based on DeSantis et al., 2008	DivBuyMotLifePrim
60. In the **last 30 days**, how many times have you *sold* your prescription stimulant medication?	Based on Rabiner et al., 2009a	DivSellPrev30days
61. In the **last 30 days**, what was your primary reason *for charging* for your prescription stimulant medication?	Based on DeSantis et al., 2008	DivSellMot30daysPrim
62. In the **last 30 days**, what was the primary reason people *wanted to buy* your prescription stimulant medication? (Please Check One)	Based on DeSantis et al., 2008	DivBuyMot30daysPrim
63. What was the average price you charged for your prescription stimulant medication?	Based on DeSantis et al., 2008	AvgPri
64. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to another person	Modified from Judson & Langdon, 2009 to assess giving away stimulants	SubNormGive

65. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to another person	Modified from Judson & Langdon, 2009 to assess selling stimulants	SubNormSell
66. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*	Modified from Judson & Langdon, 2009 to assess social acceptability of diverting for academic motives	SubNormGivACA
67. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	Modified from Judson & Langdon, 2009 to assess social acceptability of diverting for nonacademic motives	SubNormGivNonAca
68. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer*	Modified from Judson & Langdon, 2009 to assess social acceptability of diverting for academic motives	SubNormSellAca
69. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	Modified from Judson & Langdon, 2009 to assess social acceptability of diverting for nonacademic motives	SubNormSellNonAca
70. My friends believe that it is ok for students *to give away* pill(s) from their prescription of stimulant medication.	Modified from Judson & Langdon, 2009 to assess diversion	SubNormGive2
71. I value my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.	Based on Judson & Langdon, 2009; Ajzen, 1991	RelOtherGiveAway
72. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.	Based on Judson & Langdon, 2009; Ajzen, 1991	MotComplyGiveAway

73. My friends believe that it is ok for students *to sell* pill(s) from their prescription of stimulant medication.	Modified from Judson & Langdon, 2009 to assess diversion	SubNormSell2
74. I value my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.	Based on Judson & Langdon, 2009; Ajzen, 1991	RelOtherSell
75. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.	Based on Judson & Langdon, 2009; Ajzen, 1991	MotComplySell
76. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication for any reason.	Modified from Judson & Langdon, 2009 to assess diversion	AttGiv
77. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication for any reason.	Modified from Judson & Langdon, 2009 to assess diversion	AttSell
78. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.)*	Modified from Judson & Langdon, 2009 to assess diversion	AttGivAca
79. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*	Modified from Judson & Langdon, 2009 to assess diversion	AttSellAca
80. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	Modified from Judson & Langdon, 2009 to assess diversion	AttGivNonAca
81. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*	Modified from Judson & Langdon, 2009 to assess diversion	AttSellNonAca

82. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication *as it would be prescribed* by a physician.	Modified from Judson & Langdon, 2009 to assess diversion	AttSafeDivPre
83. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication in *excess or for purposes other* than prescribed by a physician.	Modified from Judson & Langdon, 2009 to assess diversion	AttSafeDivNonMed
84. I believe students that *give away* their prescription stimulant medication are common on this campus.	Modified from Judson & Langdon, 2009 to assess diversion	AttGivComm
85. I believe students that *sell* their prescription stimulant medication are common on this campus.	Modified from Judson & Langdon, 2009 to assess diversion	AttSellComm
86. I am concerned that *giving away or selling* prescription stimulant medication could lead to a person's health being adversely affected.	Modified from Judson & Langdon, 2009 to assess diversion	AttDivHeal
87. I feel that the *benefits* of *giving away* stimulant medication *outweigh* the potential *risks.*	Modified from Judson & Langdon, 2009 to assess diversion	PerConRisGiv
88. I feel that the *benefits* of *selling* stimulant medication *outweigh* the potential *risks.*	Modified from Judson & Langdon, 2009 to assess diversion	PerConRisSell

APPENDIX C

Panel Review Comments

Review of Proposed Prescription Stimulant Misuse and Diversion Instrument

I am asking to review the proposed survey that will be used to measure the misuse and diversion of prescription stimulant medications among undergraduate students. Please read each question in the survey and provide feedback regarding the clarity of each question (i.e. readability, reading level appropriateness, comprehension) and overall flow of the survey (i.e. skip patterns, transition between sections). Please refer to the *red sections* in this review as each provides explicit instructions on evaluating the previous or following section. If you feel a question needs revisions or deletion, please highlight one of the two options to the right of the question. If you check "Revise" or "Delete", please make suggestions for revision or reason for deletion in the "Comment" box provided directly under each question. Thank you for your time in completing this review.

This survey is the product of several different instruments and studies completed in the areas of prescription stimulant misuse and diversion (Judson & Langdon, 2009, Rabiner et al., 2009; DeSantis et al., 2008; White et al., 2007). This instrument uses the Theory of Planned Behavior to discover the attitudes, social pressures, and perceived behavioral control related to the decision to misuse or divert prescription stimulants. In addition, survey items seek to assess the motivations and prevalence associated with each behavior.

Panel Expert: Please review the Demographic and Stimulant Misuse portions of the questionnaire. Read each item and determine whether it is appropriate and clear. If you have no suggested changes please leave the space to the right blank. However if you feel a change is warranted, please highlight the appropriate choice to the right of each item indicating whether the item should be "Revised", or "Deleted". If you feel that a questions needs to be revised or deleted please also provide comments as to the reason for this suggestion in the space provided. For all other questions, please comment at the end of the section as to whether you would revise or delete the question.

Please Tell Us about Yourself

4. How old are you? (Please Circle One)
17 18 19 20 21 22 23 24 25+

5. What gender are you? (Please Circle One)
Male Female

6. With which race do you identify? (Please Check One)

	White/Caucasian
	Black/ African-American
	Asian
	Native American
	Pacific Islander
	Hispanic
	Biracial
	Other

I would use question wording and response options that are used on BRFSS or YRBS or another large national survey like that. I like the addition of the Biracial category. Some people just say, "select all that apply" instead of "check one." If you're going to keep the "check one" option, I would change Biracial to "Multi-ethnic."

4. Are you currently an active member of a social fraternity or sorority?
Yes No

89. What year in college are you? (Please Circle One)
Freshman Sophomore Junior Senior Graduate Student Other:

Section 1

6. Have you ever been diagnosed with ADD/ADHD? Yes No **Comments:**	Revise Delete
7. Do you have a current prescription for a stimulant medication such as *Ritalin, Adderall, Concerta, Metadate, Methylin, Desoxyn, Cyclert or Dexedrine?* Yes No (Skip to Question #16) **Comments:**	Revise Delete
8. Based on a doctor's prescription, when did you first start using a prescription stimulant? (Please Check One) ☐ Kindergarten- 4th Grade ☐ 5th-8th Grade ☐ 9th-12th Grade ☐ College **Comments:** Do you need to add the examples like you have in your other survey items? Is there a chance they were prescribed the medication before kindergarten?	Revise Delete

9. 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*?

Yes No (Skip to Question #16)

Comments: I know you're not supposed to end a sentence with a preposition, but another rule is that the sentence should just sound right.

Revise

Delete

10. What was your primary reason for using your prescription stimulant *in excess or for a reason other than what the medication was prescribed for* **in your lifetime**? (Please Check One)

	To be able to concentrate better in class
	To be able to concentrate better while studying
	To feel less tired so I could study longer
	To feel less restless in class
	To feel less restless while studying
	To keep track of my assignments
	To prevent others from having an academic advantage over me
	To feel better
	To get high
	To prolong the effects of alcohol or other substances
	To lose weight

Comments:

Revise

Delete

11. Did you have any other reason(s) for using your prescription stimulant *in excess or for a reason other what than the medication was prescribed for* **in your lifetime**? (Please Check All That Apply)

	To be able to concentrate better in class
	To be able to concentrate better while studying
	To feel less tired so I could study longer
	To feel less restless in class
	To feel less restless while studying
	To keep track of my assignments
	To prevent others from having an academic advantage over me
	To feel better
	To get high
	To prolong the effects of alcohol or other substances
	To lose weight

Comments: This question requires a yes/no response. You either need to make this two questions or change the wording.

Revise

Delete

12. On how many occasions **in your lifetime** have you used your prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for*? (Please Check One)

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Comments:

Revise

Delete

13. **In the past 30 days**, have you taken your prescription stimulant medications (*such as Ritalin, Adderall, Concerta, or Dexedrine excess) in excess or for reasons other than what the medication was prescribed for*?

Yes No (Skip to Question #16)

Comments:

Revise

Delete

14. What was your primary reason for using your prescription stimulant *in excess or for reasons other than what the medication was prescribed for* **in the past 30 days**? (Please Check One)

	To be able to concentrate better in class
	To be able to concentrate better while studying
	To feel less tired so I could study longer
	To feel less restless in class
	To feel less restless while studying
	To keep track of my assignments
	To prevent others from having an academic advantage over me
	To feel better
	To get high
	To prolong the effects of alcohol or other substances
	To lose weight

Comments: Is there a chance students have some other reason? If so, should you have an "other" option with a blank to fill in? (same comment would apply to other survey items like this).

Revise

Delete

15. On how many occasions **in the past 30 days** have you used your prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for*?

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Comments:

Revise

Delete

16. **In your lifetime**, have you taken a prescription stimulant (*such as Ritalin, Adderall, Concerta, or Dexedrine) without a prescription for the medication?*

A. Yes B. No (Skip to Question #23)

Comments:

Revise

Delete

17. What was the primary reason for *using someone else's prescription stimulant medication* **during your lifetime**? (Please Check One)

	To be able to concentrate better in class
	To be able to concentrate better while studying
	To feel less tired so I could study longer
	To feel less restless in class
	To feel less restless while studying
	To keep track of my assignments
	To prevent others from having an academic advantage over me
	To feel better
	To get high
	To prolong the effects of alcohol or other substances
	To lose weight

Comments: Now that you're talking about using someone else's prescription medication, is a possible response option, "because I ran out of my own?"

Revise

Delete

18. Did you have any other reason(s) for *using someone else's prescription stimulant medication* **during your lifetime**? (Please Check All That Apply)

	To be able to concentrate better in class
	To be able to concentrate better while studying
	To feel less tired so I could study longer
	To feel less restless in class
	To feel less restless while studying
	To keep track of my assignments
	To prevent others from having an academic advantage over me
	To feel better
	To get high
	To prolong the effects of alcohol or other substances
	To lose weight

Revise

Delete

Comments: This question requires a yes/no response. You either need to make this two questions or change the wording. Also, now that you're talking about using someone else's prescription medication, is a possible response option, "because I ran out of my own?"

19. On how many occasions **in your lifetime**, have you used *someone else's prescription stimulant medication*?

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Comments: Do you need to add the examples (of the prescription stimulant medications) like you have in your other survey items? Another option may be to give the examples at the beginning of the survey in the instructions so that you don't have to give examples for each question. (Same comment applies to other items below)

Revise

Delete

20. **In the past 30 days**, have you taken a prescription stimulant *without a prescription for the medication*?

Yes No (Skip to Question #23)

Comments:

Revise

Delete

21. What was the primary reason for using *someone else's prescription stimulant medication* during **the last 30 days**? (Please Check One)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight

Comments:

Revise

Delete

22. On how many occasions during **the last 30 days**, have you used *someone else's prescription stimulant medication*?

Never	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Comments:

Revise

Delete

Please rate the extent to which you agree or disagree with each of the following questions (Choose one): strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree. **Please check your answer in the boxes provided.**

23. It is socially acceptable at this university for students *without* a prescription to use stimulant medications.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

24.It is socially acceptable at this university for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed* by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

25.It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *to enhance academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

26.It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

27.My friends believe that it is ok for students *without* a prescription to use stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

28.I value my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments:							
29.I am motivated to comply with my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments:							
30. My friends believe that it is ok for students *with* a prescription to use the medication in excess or for purposes other than prescribed.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments: Do you need say "stimulant medication" instead of "the medication?" (You say stimulant in other questions (i.e., 26, 27, 28, 29, 33, 34, 35). Also, don't need the word "that.							
31.I value my friends' opinion on whether or not it is ok for students *with* a prescription to use the medication in excess or for purposes other than prescribed.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments: Same comment as #30.							
32.I am motivated to comply with my friends' opinion on whether or not it is ok for students *with* a prescription to use the medication in excess or for purposes other than prescribed.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments: Same comment as #30.							

33.It is ethical for students *without* a prescription to use stimulant medication for any reason.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments:							
34.It is ethical for students diagnosed *with* a prescription to use stimulant medication in excess or for purposes other than prescribed by a physician.							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments: The phrase "diagnosed with a prescription" might be confusing.							
35.It is ethical for students *without* a prescription to use stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.).*							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments:							
36.It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.)*							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments:							
37.It is ethical for students *without* a prescription to use stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*							Revise Delete
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	
Comments:							
38.It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*							Revise
Strongly	Moderately	Slightly	No	Slightly	Moderately	Strongly	

Disagree	Disagree	Disagree	Opinion	Agree	Agree	Agree	
							Delete
Comments:							

39.I believe that it is safe for students *without* a prescription to use stimulant medication, *as a physician would prescribe it*.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Revise
							Delete
Comments: Don't need the word "that."							

40.I believe that it is safe for students to use stimulant medication in *excess or for purposes other* than prescribed by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Revise
							Delete
Comments: Same comment as #39							

41.I believe the use of stimulant medication by students *without* a prescription, is common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Revise
							Delete
Comments:							

42.I believe the use of stimulant medication (by students with prescriptions for stimulant medication) *in excess or for purposes other* than prescribed, is common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Revise
							Delete
Comments:							

43.I am concerned that taking stimulant medication in excess or for purposes other than prescribed by a physician will adversely affect one's health.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Revise
							Delete
Comments:							

44.I feel that I need to use stimulant medication in order *to concentrate* in my classes, on tests, or while doing my

homework.							Revise
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Delete
Comments: Don't need the word "that."							
45.I feel that I need to use stimulant medication in order to *catch up* with assignments/homework in my classes.							Revise
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Delete
Comments: Same comment as #44.							
46.I feel that I need stimulant medication *to make me feel good/relax* when socializing with my friends.							Revise
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Delete
Comments: Same comment as #44.							
47.I feel that I do not need stimulant medication *to control any other aspect of my life*.							Revise
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Delete
Comments: Same comment as #44.							
48.I feel that the *benefits* of using stimulant medication *outweigh* the potential *risks*.							Revise
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Delete
Comments: Same comment as #44.							
49.I feel that I am addicted to a prescription stimulant.							Revise
Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree	Delete
Comments: Same comment as #44.							

Panel Expert: Please review the proposed items for the diversion background section of the questionnaire. Read each item and determine whether all of its elements are appropriate and clear. If you have no suggested changes please leave the space to the right blank. However if you feel a change is warranted, please highlight the appropriate choice to the right of each item indicating whether the item should be "Revised", or "Deleted". If you feel that a questions needs to be revised or deleted please also provide comments as to the reason for this suggestion in the space provided.

50. Have you ever been asked by another student to sell or give them a prescription stimulant medication? (Please Circle One) Yes No (Skip to Question #64) **Comments: "student" is singular; "them" is plural; maybe use "him/her"**	Revise Delete
51. **In your lifetime**, how many times have you *given away* your prescription stimulant medication? Never (Skip to Question #56) / 1-2 Occasions / 3-5 Occasions / 6-9 Occasions / 10-19 Occasions / 20-39 Occasions / 40+ Occasions [ ] [ ] [ ] [ ] [ ] [ ] [ ] **Comments:**	Revise Delete
52. What was your primary reason *for giving away* your prescription stimulant medication during **your lifetime**? (Please Check One) [ ] To help during a time of high academic stress (i.e. finals, midterms, projects) [ ] The person had run out of their own prescription medication [ ] To be socially accepted among my peers [ ] To help a person party longer [ ] To help a person get high [ ] To help a person lose weight [ ] Did not ask [ ] Other: **Comments: "person" is singular; "their" is plural; maybe use "his/her"**	Revise Delete

53. Were there any other reason(s) *for giving away* your prescription stimulant medication **during your lifetime**? (Please Check All that Apply)

- [ ] To help during a time of high academic stress (i.e. finals, midterms, projects)
- [ ] The person had run out of their own prescription medication
- [ ] To be socially accepted among my peers
- [ ] To help a person party longer
- [ ] To help a person get high
- [ ] To help a person lose weight
- [ ] Did not ask
- [ ] Other:

Comments: Same comment as #52.

Revise

Delete

54. In the **past 30 days**, how many times have you *given away* your prescription stimulant medication?

Never (Skip to Question #56)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Comments:

Revise

Delete

55. What was your primary reason *for giving away* your prescription stimulant medication in the **past 30 days**?

- [ ] To help during a time of high academic stress (i.e. finals, midterms, projects)
- [ ] The person had run out of their own prescription medication
- [ ] To be socially accepted among my peers
- [ ] To help a person party longer
- [ ] To help a person get high
- [ ] To help a person lose weight
- [ ] Did not ask
- [ ] Other:

Comments: Same comment as #52.

Revise

Delete

56. In **your lifetime**, how many times have you *sold* your prescription stimulant medication?

Never (Skip to Question #64)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions

Revise

Delete

Comments:	
57. What was your primary reason *for charging* for your prescription stimulant medication **over your lifetime**? (Please Check One) ☐ Because of the inconvenience it causes me ☐ To make extra money ☐ To help pay bills (i.e. rent, utility bills, credit cards, etc.) ☐ Because people offered me money ☐ To support myself financially ☐ Other: **Comments: I don't understand the first reason: "Because of the inconvenience it causes me." Do you mean that the person sells the med for money b/c too many people bothered them when they gave it away? Also, the phrase "charging" is a little awkward. Maybe just use "selling" instead.**	Revise Delete
58. Were there any other reasons you charged for you prescription stimulant medication **over your lifetime**? (Check All That Apply) ☐ Because of the inconvenience it causes me ☐ To make extra money ☐ To help pay bills (i.e. rent, utility bills, credit cards, etc.) ☐ Because people offered me money ☐ To support myself financially ☐ Other: **Comments: "you" should be "your" and same comment as #57.**	Revise Delete
59. What was the primary reason people *wanted to buy* your prescription stimulant medication **over your lifetime**? (Please Check One) ☐ To help during a time of high academic stress (i.e. finals, midterms, projects) ☐ The person had run out of their own prescription medication ☐ To be socially accepted among my peers ☐ To help a person party longer ☐ To help a person get high ☐ To help a person lose weight ☐ Did not ask ☐ Other:	Revise Delete

Comments: Second reason—"person" is singular and "their" is plural.	
60. In the **last 30 days**, how many times have you *sold* your prescription stimulant medication? Never (Skip to Question #64) / 1-2 Occasions / 3-5 Occasions / 6-9 Occasions / 10-19 Occasions / 20-39 Occasions / 40+ Occasions [ ] [ ] [ ] [ ] [ ] [ ] [ ] **Comments:**	Revise Delete
61. In the **last 30 days**, what was your primary reason *for charging* for your prescription stimulant medication? [ ] Because of the inconvenience it causes me [ ] To make extra money [ ] To help pay bills (i.e. rent, utility bills, credit cards, etc.) [ ] Because people offered me money [ ] To support myself financially [ ] Other:	Revise Delete
62. In the **last 30 days**, what was the primary reason people *wanted to buy* your prescription stimulant medication? (Please Check One) [ ] To help during a time of high academic stress (i.e. finals, midterms, projects) [ ] The person had run out of their own prescription medication [ ] To be socially accepted among my peers [ ] To help a person party longer [ ] To help a person get high [ ] To help a person lose weight [ ] Did not ask [ ] Other: **Comments: In second item, change "their" to his/her.**	Revise Delete
63. What is the average price you charged for each pill from your prescription of stimulant medication? (Please Check One) [ ] 1-2 dollars [ ] 3-4 dollars [ ] 5-6 dollars [ ] 7+ dollars [ ] Depended on the milligrams of the pill [ ] Other: **Comments: Item 5: pill dosage, maybe?**	Revise Delete

COMMENTS ON THE PRESCRIPTION MISUSE SECTION

* **What items do you recommend *adding?***
* **Additional comments about this section.**

Panel Expert: Please review the proposed items for the Theory-Based Diversion Section of the questionnaire. Read each item and determine whether it is appropriate and clear, providing a comment (as needed) after each item. If you have no suggested changes please leave the space to the right blank. However if you feel a change is warranted, please highlight the appropriate choice to the right of each item indicating whether the item should be "Revised", or "Deleted". If you feel that a questions needs to be revised or deleted please also provide comments as to the reason for this suggestion in the space provided.

Please rate the extent to which you agree or disagree with each of the following questions (Choose one): strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree. **Please check your answer in the boxes provided.**

64.. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to another person for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

65. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to another person for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

66. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: Change their to his or her.

Revise

Delete

67. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

68. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: Their → his/her

Revise

Delete

69. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

70. My friends believe that it is ok for students *to give away* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

71. I value my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

72. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: Maybe lower readability level: Comply-→ abide by?

Revise

Delete

73. My friends believe that it is ok for students *to sell* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

74. I value my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

75. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: Comply

Revise

Delete

76. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: This is probably ok…but are you distinguishing between "ethical" and "socially acceptable" used in the previous section? If so, will the students comprehend ethical?

Revise

Delete

77. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication for any reason.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

78. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: Again…Pronoun agreement: Their→ his or her

Revise

Delete

79. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: their→ his/her

Revise

Delete

80. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

81. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

82. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication *as it would be prescribed* by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

83. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication in *excess or for purposes other* than prescribed by a physician.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

84. I believe students that *give away* their prescription stimulant medication are common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

85. I believe students that *sell* their prescription stimulant medication are common on this campus.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

86. I am concerned that *giving away or selling* prescription stimulant medication could lead to a person's health being adversely affected.

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments: Maybe change adversely to negatively

Revise

Delete

87.. I feel that the *benefits* of *giving away* stimulant medication *outweigh* the potential *risks.*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

88. I feel that the *benefits* of *selling* stimulant medication *outweigh* the potential *risks.*

Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree

Comments:

Revise

Delete

APPENDIX D

Final Version of the Survey

Please Tell Us about Yourself

1. How old are you?

○17 ○18 ○19 ○20 ○21 ○22 ○23 ○24 ○25+

2. What gender are you?

○Male ○Female

3. With which race do you identify? (**Please Check One**)

- [ ] White/Caucasian
- [ ] Black/ African-American
- [ ] Asian
- [ ] Native American
- [ ] Pacific Islander
- [ ] Hispanic
- [ ] Multi-Ethnic
- [ ] Other

4. Are you currently an active member of a social fraternity or sorority?

○Yes ○No

5. What year in college are you?

○Freshman ○Sophomore ○ Junior ○Senior ○Graduate Student ○Other:

Section 1

6. Have you ever been diagnosed with Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD)?

○Yes ○ No

7. Do you have a current prescription for a stimulant medication such as *Ritalin, Adderall, Concerta, Metadate, Methylin, Desoxyn, Cyclert or Dexedrine?*

○Yes ○No **(Skip to Question #16)**

8. Based on a doctor's prescription, when did you first start using a prescription stimulant (*such as Ritalin, Adderall, Concerta, or Dexedrine)*? (**Please Check One**)

- [ ] Kindergarten- 4th Grade
- [ ] 5th-8th Grade
- [ ] 9th-12th Grade
- [ ] College

9. 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*?

○ Yes ○ No **(Skip to Question #16)**

10. What was your primary reason for using your prescription stimulant *in excess or for a reason other than what the medication was prescribed for* **in your lifetime**? (**Please Check One**)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Other:

11. 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* **in your lifetime**? (Please Check All That Apply)

- [ ] I did not have another reason
- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Other:

12. On how many occasions **in your lifetime** have you used your prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for*? (**Please Check One**)

None	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

13. **In the past 30 days** have you taken your prescription stimulant medication (*such as Ritalin, Adderall, Concerta, or Dexedrine excess) in excess or for reasons other than the medication was prescribed*?

○ Yes ○ No **(Skip to Question #16)**

14. What was your primary reason for using your prescription stimulant *in excess or for reasons other than what the medication was prescribed for* **in the past 30 days**? (**Please Check One**)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Other:

15. On how many occasions **in the past 30 days** have you used your prescription stimulant medication *in excess or for a purpose other than what the medication was prescribed for*? (**Please Check One**)

None	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

16. **In your lifetime**, have you taken a prescription stimulant (*such as Ritalin, Adderall, Concerta, or Dexedrine) without a prescription for the medication?*

○ Yes ○ No **(Skip to Question #23)**

17. What was the primary reason for *using someone else's prescription stimulant medication* **during your lifetime**? (**Please Check One**)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Because I ran out of my own prescription
- [ ] Other:

18. What were other reasons you had for *using someone else's prescription stimulant medication* **during your lifetime**? (Please Check All That Apply)

- [ ] I did not have another reason
- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Because I ran out of my own prescription
- [ ] Other:

19. On how many occasions **in your lifetime**, have you used *someone else's prescription stimulant medication*? (**Please Check One**)

None	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

20. **In the past 30 days**, have you taken a prescription stimulant *without a prescription for the medication*?

○ Yes ○ No **(Skip to Question #23)**

21. What was the primary reason for using *someone else's prescription stimulant medication* during **the last 30 days**? (**Please Check One**)

- [ ] To be able to concentrate better in class
- [ ] To be able to concentrate better while studying
- [ ] To feel less tired so I could study longer
- [ ] To feel less restless in class
- [ ] To feel less restless while studying
- [ ] To keep track of my assignments
- [ ] To prevent others from having an academic advantage over me
- [ ] To feel better
- [ ] To get high
- [ ] To prolong the effects of alcohol or other substances
- [ ] To lose weight
- [ ] Because I ran out of my own prescription
- [ ] Other:

22. On how many occasions during **the last 30 days**, have you used *someone else's prescription stimulant medication*?

None	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

Please rate the extent to which you agree or disagree with each of the following questions (Choose one): strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree. **Please check your answer in the boxes provided.**

	Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree
23. It is socially acceptable at this university for students without a prescription to use stimulant medications.	○	○	○	○	○	○	○
24. It is socially acceptable at this university for students *with* a prescription to use stimulant medication *in excess or for purposes other than prescribed* by a physician.	○	○	○	○	○	○	○
25. It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *to enhance academic abilities (i.e. study longer, help concentrate, etc.).*	○	○	○	○	○	○	○
26. It is socially acceptable to take stimulant medication in excess or for purposes other than prescribed *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	○	○	○	○	○	○	○
27. My friends believe that it is ok for students *without* a prescription to use stimulant medication.	○	○	○	○	○	○	○

28. I value my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.	○	○	○	○	○	○	○
29. I am motivated to comply with my friends' opinion on whether or not it is ok for students *without* a prescription to use stimulant medication.	○	○	○	○	○	○	○
30. My friends believe it is ok for students *with* a prescription to use the stimulant medication in excess or for purposes other than prescribed.	○	○	○	○	○	○	○
31. I value my friends' opinion on whether or not it is ok for students *with* a prescription to use the stimulant medication in excess or for purposes other than prescribed.	○	○	○	○	○	○	○
32. I am motivated to comply with my friends' opinion on whether or not it is ok for students *with* a prescription to use stimulant medications in excess or for purposes other than prescribed.	○	○	○	○	○	○	○
33. It is ethical for students *without* a prescription to use stimulant medications for any reason.	○	○	○	○	○	○	○
34. It is ethical for students *with* a prescription to use his or her stimulant medication in excess or for purposes other than prescribed by a physician.	○	○	○	○	○	○	○

35. It is ethical for students *without* a prescription to use stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.).*	○	○	○	○	○	○	○
36. It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *to increase their academic abilities (i.e. study longer, help concentrate, etc.)*	○	○	○	○	○	○	○
37. It is ethical for students *without* a prescription to use stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	○	○	○	○	○	○	○
38. It is ethical for students *with* a prescription for stimulant medication to alter their prescription regimen (i.e. increase dosage) of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*	○	○	○	○	○	○	○
39. I believe it is safe for students *without* a prescription to use stimulant medication, *as a physician would prescribe it*.	○	○	○	○	○	○	○
40. I believe it is safe for students to use stimulant medication in *excess or for purposes other* than prescribed by a physician.	○	○	○	○	○	○	○

41. I believe the use of stimulant medication by students *without* a prescription, is common on this campus.	○	○	○	○	○	○	○
42. I believe the use of stimulant medication (by students with prescriptions for stimulant medication) *in excess or for purposes other* than prescribed, is common on this campus.	○	○	○	○	○	○	○
43. I am concerned that taking stimulant medication in excess or for purposes other than prescribed by a physician will negatively affect one's health.	○	○	○	○	○	○	○
44. I feel I need to use stimulant medication in order *to concentrate* in my classes, on tests, or while doing my homework.	○	○	○	○	○	○	○
45. I feel I need to use stimulant medication in order to *catch up* with assignments/homework in my classes.	○	○	○	○	○	○	○
46. I feel I need stimulant medication *to make me feel good/relax* when socializing with my friends.	○	○	○	○	○	○	○
47. I feel I do not need stimulant medication *to control any other aspect of my life*.	○	○	○	○	○	○	○
48. I feel the *benefits* of using stimulant medication *outweigh* the potential *risks.*	○	○	○	○	○	○	○
49. I feel I am addicted to a prescription stimulant.	○	○	○	○	○	○	○

Section 2

50. Have you ever been asked by another student to sell or give him or her a prescription stimulant medication?

○ Yes ○ No **(Skip to Question #64)**

51. **In your lifetime**, how many times have you *given away* your prescription stimulant medication?

None (**Skip to Question #56**)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

52. What was your primary reason *for giving away* your prescription stimulant medication during **your lifetime**? **(Please Check One)**

- ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
- ☐ The person had run out of his or her own prescription medication
- ☐ To be socially accepted among my peers
- ☐ To help a person party longer
- ☐ To help a person get high
- ☐ To help a person lose weight
- ☐ Did not ask
- ☐ Other:

53. What were other reasons you had *for giving away* your prescription stimulant medication **during your lifetime**? (Please Check All that Apply)

- ☐ I did not have another reason
- ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
- ☐ The person had run out of his or her own prescription medication
- ☐ To be socially accepted among my peers
- ☐ To help a person party longer
- ☐ To help a person get high
- ☐ To help a person lose weight
- ☐ Did not ask
- ☐ Other:

54. In the **past 30 days**, how many times have you *given away* your prescription stimulant medication? **(Please Check One)**

None (**Skip to Question #56**)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

55. What was your primary reason *for giving away* your prescription stimulant medication in the **past 30 days**? **(Please Check One)**

- [ ] To help during a time of high academic stress (i.e. finals, midterms, projects)
- [ ] The person had run out of his or her own prescription medication
- [ ] To be socially accepted among my peers
- [ ] To help a person party longer
- [ ] To help a person get high
- [ ] To help a person lose weight
- [ ] Did not ask
- [ ] Other:

56. In **your lifetime**, how many times have you *sold* your prescription stimulant medication? **(Please Check One)**

None (**Skip to Question #64**)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

57. What was your primary reason *for selling* your prescription stimulant medication **over your lifetime**? (**Please Check One**)

- [ ] To cover the cost of the medicine
- [ ] To make extra money
- [ ] To help pay bills (i.e. rent, utility bills, credit cards, etc.)
- [ ] Because people offered me money
- [ ] To support myself financially
- [ ] Other:

58. What were other reasons you had for selling your prescription stimulant medication **over your lifetime**? (Check All That Apply)

- [ ] I did not have another reason
- [ ] To cover the cost of the medicine
- [ ] To make extra money
- [ ] To help pay bills (i.e. rent, utility bills, credit cards, etc.)
- [ ] Because people offered me money
- [ ] To support myself financially
- [ ] Other:

59. What was the primary reason people *wanted to buy* your prescription stimulant medication **over your lifetime**? (**Please Check One**)

- [ ] To help during a time of high academic stress (i.e. finals, midterms, projects)
- [ ] The person had run out of his or her own prescription medication
- [ ] To be socially accepted among my peers
- [ ] To help a person party longer
- [ ] To help a person get high
- [ ] To help a person lose weight
- [ ] Did not ask
- [ ] Other:

60. In the **last 30 days**, how many times have you *sold* your prescription stimulant medication? (**Please Check One**)

None (**Skip to Question #64**)	1-2 Occasions	3-5 Occasions	6-9 Occasions	10-19 Occasions	20-39 Occasions	40+ Occasions
○	○	○	○	○	○	○

61. In the **last 30 days**, what was your primary reason *for selling* your prescription stimulant medication? (**Please Check One**)

- ☐ To cover the cost of the medicine
- ☐ To make extra money
- ☐ To help pay bills (i.e. rent, utility bills, credit cards, etc.)
- ☐ Because people offered me money
- ☐ To support myself financially
- ☐ Other:

62. In the **last 30 days**, what was the primary reason people *wanted to buy* your prescription stimulant medication? (**Please Check One**)

- ☐ To help during a time of high academic stress (i.e. finals, midterms, projects)
- ☐ The person had run out of his or her own prescription medication
- ☐ To be socially accepted among my peers
- ☐ To help a person party longer
- ☐ To help a person get high
- ☐ To help a person lose weight
- ☐ Did not ask
- ☐ Other:

63. What was the average price you charged for each pill from your prescription of stimulant medication? (**Please Check One**)

- ☐ 1-2 dollars
- ☐ 3-4 dollars
- ☐ 5-6 dollars
- ☐ 7+ dollars
- ☐ Depended on the dosage of the pill
- ☐ Other:

Please rate the extent to which you agree or disagree with each of the following questions (Choose one): strongly disagree, moderately disagree, slightly disagree, no opinion, slightly agree, moderately agree, and strongly agree. **Please check your answer in the boxes provided.**

	Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree
64. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to another person for any reason.	○	○	○	○	○	○	○

	Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree
65. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to another person for any reason.	○	○	○	○	○	○	○
66. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*	○	○	○	○	○	○	○
67. It is socially acceptable at this university for students *to give* away pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	○	○	○	○	○	○	○
68. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*	○	○	○	○	○	○	○
69. It is socially acceptable at this university for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	○	○	○	○	○	○	○
70. My friends believe it is ok for students *to give away* pill(s) from their prescription of stimulant medication	○	○	○	○	○	○	○
71. I value my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.	○	○	○	○	○	○	○
72. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to give away* pill(s) from their prescription of stimulant medication.	○	○	○	○	○	○	○
73. My friends believe it is ok for students *to sell* pill(s) from their prescription of stimulant medication.	○	○	○	○	○	○	○
74. I value my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their	○	○	○	○	○	○	○

	Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree
prescription of stimulant medication.							
75. I am motivated to comply with my friends' opinions on whether or not it is ok for students *to sell* pill(s) from their prescription of stimulant medication.	○	○	○	○	○	○	○
76. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication for any reason.	○	○	○	○	○	○	○
77. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication for any reason.	○	○	○	○	○	○	○
78. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*	○	○	○	○	○	○	○
79. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication to help a person *enhance their academic abilities (i.e. study longer, help concentrate, etc.).*	○	○	○	○	○	○	○
80. It is ethical for students *to give away* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc).*	○	○	○	○	○	○	○
81. It is ethical for students *to sell* pill(s) from their prescription of stimulant medication *for nonacademic reasons (i.e. party longer, to get high, suppress appetite, etc.)*	○	○	○	○	○	○	○
82. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it uses the medication *as it would be prescribed* by a physician.	○	○	○	○	○	○	○
83. I believe it is safe for students *to give away or sell* pills from their prescription of stimulant medication, if the person receiving it would use the medication in *excess or for purposes other* than prescribed by a physician.	○	○	○	○	○	○	○

	Strongly Disagree	Moderately Disagree	Slightly Disagree	No Opinion	Slightly Agree	Moderately Agree	Strongly Agree
84. I believe students that *give away* their prescription stimulant medication are common on this campus.	○	○	○	○	○	○	○
85. I believe students that *sell* their prescription stimulant medication are common on this campus.	○	○	○	○	○	○	○
86. I am concerned that *giving away or selling* prescription stimulant medication could lead to a person's health being negatively affected.	○	○	○	○	○	○	○
87. I feel the *benefits* of *giving away* stimulant medication *outweigh* the potential *risks.*	○	○	○	○	○	○	○
88. I feel the *benefits* of *selling* stimulant medication *outweigh* the potential *risks.*	○	○	○	○	○	○	○

APPENDIX E

IRB Approval

Office for Research

Institutional Review Board for the
Protection of Human Subjects

THE UNIVERSITY OF
ALABAMA
RESEARCH

August 4, 2010

Andrew Gallucci
Department of Health Science
College of Human Environmental Sciences
Box 870311

Re: IRB Protocol # 10-011 "An Examination of the Nonmedical Use and Diversion of Prescription Stimulant Medications among College Students Using the Theory of Planned Behavior"

Dear Mr. Gallucci:

The University of Alabama IRB has received the revisions requested by the full board on 7/16/10. The board has reviewed the revisions and your protocol is now approved for a one-year period. Please be advised that your protocol will expire one year from the date of approval, 7/16/10.

If your research will continue beyond this date, complete the renewal portions of the Continuing Review and Closure Form. If you need to modify the study, please submit the Modification of An Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Continuing Review and Closure Form.

Should you need to submit any further correspondence regarding this proposal, please include the assigned IRB application number. Please use reproductions of the IRB approved stamped information sheets to obtain consent/assent from your participants.

Good luck with your research.

Sincerely,

Carpantato T. Myles, MSM, CIM
Director & Research Compliance Officer
Office of Research Compliance
The University of Alabama

152 Rose Administration Building
Box 870117
Tuscaloosa, Alabama 35487-0117
(205) 348-8461
FAX (205) 348-8882
TOLL FREE (877) 820-3066