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The Role of Psychosocial Factors in the Non-Medical Use of Prescription Stimulants Among Undergraduate Greek-life Members

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THE ROLE OF PSYCHOSOCIAL FACTORS IN THE NON-MEDICAL USE OF
PRESCRIPTION STIMULANTS AMONG UNDERGRADUATE GREEK-LIFE MEMBERS

by

KATHLEEN MAY

(Under the direction of Jessica Brooks)

ABSTRACT

The non-medical use of prescription stimulants (NMUPS) is a growing concern across U.S. college campuses. Amphetamine misuse increased from 7.7% to 11.1% among undergraduate students over the past decade. Research has identified Greek-life members are twice as likely to report NMUPS in comparison to non-Greek-life members; however, little is known about social and psychological factors contributing to this discrepancy. While researchers have identified specific personality characteristics significantly correlated with higher levels of reported NMUPS, including sensation seeking and internal restlessness, currently little is known about social factors related to NMUPS. It is important to examine psychosocial variables motivating NMUPS in college students, and specifically Greek-life members, given the social nature of these at-risk groups. This study sought to fill these gaps by examining the role of resistance to peer influence on college students reported engagement in NMUPS (without prescription) within an identified model of use involving internal restlessness and sensation seeking. A total of 613 undergraduate participants (Women: $n = 418$; Greek-life affiliates: $n = 116$) from a southeastern university were included in final analyses. A majority of the participants were 19 years of age. The results supported previous research whereby internal restlessness and sensation seeking traits predicted NMUPS (without prescription), however, resistance to peer influence failed to add predictive validity to this model. Moreover, participants from rural geographic regions were at significantly greater risk of lifetime use of NMUPS (without prescription) than participants from suburban/urban geographic regions. The findings suggest that identifying alternative and adaptive techniques to substitute NMUPS, rather than focusing on the influence of the peer group, could be an effective treatment strategy for undergraduate students.

KEY WORDS: Prescription stimulants, Misuse, Peer influence, Sensation seeking, Internal restlessness, Greek-life members

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B.S., Georgia College & State University, 2013

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Fulfillment of the Requirements for the Degree

DOCTOR OF PSYCHOLOGY

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DEDICATION

This dissertation is dedicated to my parents and my two brothers. Momma and Daddy thank you for instilling in me the importance of being a hard worker and doing what you love. Thank you for your constant encouragement, for never doubting me and never letting me doubt myself.

Derek and Patrick, I look up to you both so much. Thank you for setting the bar high and showing me what hard work and dedication looks like. I can't tell you how much all of your support has meant to me throughout this process. May family, I couldn't have done it without you.

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Chapter 1

INTRODUCTION

The non-medical use of prescription stimulants (NMUPS) is a growing problem among U.S. undergraduate students. The non-medical use of prescription medications among college students is second to marijuana as the most common form of illicit drug use (SAMHSAa, 2013). Specifically, painkillers, tranquilizers, and stimulants are three of the most widely misused prescription medications by college students. Data from a national survey conducted in 2012 suggest that, while opioid and tranquilizer misuse among college students has declined, there has been growth in stimulant use (SAMHSAb, 2013). Throughout the United States, college students are increasingly turning to prescription stimulant medication, often as a means to improve their grade point average (McCabe et al., 2007).

Stimulant medications, including amphetamines (e.g., Adderall), methylphenidate (e.g., Ritalin, Concerta), and Lisdexamfetamine (e.g., Vyvanse), are most commonly used to treat Attention-Deficit/Hyperactivity Disorder (ADHD). These medications work by increasing attentiveness and alertness while decreasing distractibility and, as a result, improving academic performance and classroom behaviors (Shier, Reichenbacher, Ghuman, & Ghuman, 2013). On college campuses across the United States, these pills are often referred to as “study drugs” (McCabe et al., 2007). Undergraduate students are using these medications as academic performance enhancers by taking them without having a prescription. Research findings indicate as many as 45% of college students have reported misusing stimulant medication at least once in their lifetime (Advokat, Guildry, & Martino, 2008). In 2012, 9% of college students reported nonmedical use of Adderall, making it the most frequently misused prescription medication among college students (SAMSHAb, 2013). Amphetamine misuse among college students rose

from 5.7% in 2008 to 11.1% in 2012 (Johnston, O'Malley, Bachman, & Schulenberg, 2013). Given the steady rise in NMUPS over recent years, researchers have identified how students obtain these medications.

A review of the literature indicates the primary reported method of obtaining prescription stimulants without a prescription is through peers. In a 2008 survey of college students who reported NMUPS, 91% indicated that they obtained stimulants from friends or significant others (DeSantis, Webb, & Noar, 2008). Students are most likely to obtain stimulant medication from peers who have a written prescription (DuPont, Coleman, Bucher, & Wilford, 2008; Lakhan & Kirchgessner, 2012; White, Becker-Blease, & Grace-Bishop, 2006). A survey of college students revealed that 61.7% of students who reported having a stimulant prescription also reported sharing or selling their medication at least once in their lifetime (Garnier et al., 2010). Among college students, stimulants are the most misused class of prescription medications. This is especially problematic considering the rate of prescriptions for stimulant medication is on the rise. Between 2002 and 2010, the number of stimulant medication prescriptions written for youth under the age of 18 increased by 46% (Chai et al., 2012). The prevalence of misuse among college students is expected to increase as the number of prescriptions written for stimulant medication increases.

As the frequency of stimulant misuse has increased so have the number of related physical and mental issues. For instance, stimulant misuse has been linked to cardiac and blood vessel problems. Stimulant use can also increase blood pressure, respiration, and heart rate. Stimulants taken in large quantities can result in irregular heartbeat, and it increases the risk for seizures and heart failure (NIDA Report, 2005). In the past decade, the number of emergency room visits involving prescription stimulant medication among individuals aged 18 to 25 has

increased dramatically from 2,131 visits in 2005 to 8,148 visits in 2010 (SAMHSAa, 2013). Moreover, frequent stimulant misuse can result in a number of psychological symptoms, including paranoid ideation, feelings of hostility, suppressed appetite and sleep deprivation. Withdrawing from stimulants can involve fatigue, symptoms of depression, and irregular sleep cycles (NIDA Report, 2005).

Stimulant misuse increases the risk of drug abuse and dependence (Lakhan & Kirchgessner, 2012). A national survey of college students showed that 90% of college students who reported nonmedical use of Adderall also reported binge drinking, and over half reported heavy alcohol use (SAMHSA, 2009). Students who misuse Adderall were three times as likely to report marijuana use in the past year in comparison to those who used Adderall as prescribed. Moreover, students who misused Adderall were also eight times more likely to report cocaine use and non-medicinal use of tranquilizers, and five times more likely to have reported non-medical use of prescription pain relievers (SAMHSA, 2009). The combination of stimulant use with other drugs is of particular concern because of the increased risk it poses. For instance, combining alcohol and stimulants can significantly increase the risk of alcohol poisoning or other alcohol-related injuries (Egan, Reboussin, Blocker, Wolfson, & Sutfin, 2012).

As the frequency of NMUPS continues to rise, it becomes increasingly important to identify specific factors contributing to this trend in substance misuse. A body of literature indicates that differences in prevalence rates exist based on demographic variables and group affiliation among college students. NMUPS has shown to be higher among men, European Americans, and Greek-life members (i.e., those affiliated with a sorority or a fraternity). While research suggests men are two times more likely than women to report NMUPS (Bogle & Smith, 2009; Hall et al., 2005; Harung, et al., 2013), McCabe and colleagues (2005) found regardless of

gender differences in prevalence rates, other risk factors for NMUPS, such as race and Greek-life status, similarly affected men and women. European Americans are more likely than any other ethnicity to endorse NMUPS (McCabe, Knight, Teter & Wechsler, 2005), and Greek-life members are twice as likely to report NMUPS in comparison to non-Greek-life members (DeSantis et al., 2008; McCabe, 2008; McCabe et al., 2005). These results suggest individual differences (e.g., group membership) play a significant role in NMUPS; however, these relationships and their underlying mechanisms are not well understood.

A growing body of research is dedicated to examining the relationship of psychological variables and NMUPS. Weyandt and colleagues (2009) identified a model of NMUPS involving internal restlessness and sensation seeking. The model suggests that students who endorse high levels of internal restlessness and sensation seeking are at greater risk for NMUPS (Weyandt et al., 2009). A follow up study examined this model in relation to Greek-life members compared to non-Greek-life members and found students affiliated with Greek-life organizations were significantly more likely to engage in NMUPS. Moreover, the previously identified model of NMUPS involving internal restlessness and sensations seeking was validated within this subgroup (Dussault & Weyandt, 2011). Given the social nature of the identified at-risk subgroup, it may be helpful to look deeper into the psychosocial variables behind NMUPS. To date, no studies have examined the role of peer influence in undergraduate prescription stimulant misuse. The current study seeks to examine the extent to which peer influence contributes to NMUPS among undergraduate students, specifically in those involved in Greek-life. Ultimately, the current study seeks to add to an existing model of NMUPS in order to develop a more comprehensive understanding of this behavior by measuring resistance to peer influence in relation to NMUPS.

Purpose of Current Study

Given significant prevalence of NMUPS among college students and the potentially serious health risks associated with stimulant misuse, there is a pressing need to understand and essentially reduce NMUPS among undergraduate students. Currently, researchers have largely focused on understanding NMUPS in the context of motivational factors associated with stimulant use, namely to improve academic performance, increase concentration during class, and maintain focus during late night study sessions and “all-nighters” (McCabe et al., 2007). Only a limited amount of research exists regarding the psychological variables that may predict NMUPS, thus the current study seeks to provide a greater understanding of how and what psychosocial variables may serve as predictive factors for prescription stimulant misuse.

The first aim of this study is to determine what psychosocial factors best predict NMUPS among undergraduate students, which will then lend itself to the development of an inclusive model of NMUPS. The second aim of this study seeks to determine if resistance to peer pressure adds predictive validity to a model of NMUPS that already includes internal restlessness and sensation seeking (Dussault & Weyandt, 2011). Previous studies have identified students affiliated with Greek life as an at-risk group for NMUPS, thus the third aim of this study is to determine how, if at all, the status of Greek-life affiliate versus non-Greek life affects the peer influence-NMUPS relationship. The fourth aim of the study is to explore the likelihood of engaging in NMUPS based on demographic variables outside of Greek status, including gender and rurality.

Statement of Significance

The current study has the capacity to provide better insight into the underlying mechanisms of NMUPS in undergraduate students. Evidence supporting the relationship between peer influence and NMUPS would inform future research, as well as prevention programming and intervention strategies. This study has the potential to provide a more comprehensive understanding of the social factors surrounding substance misuse. Data from the current study may be integrated into university outreach programs in order to develop better NMUPS prevention and relapse programs. Furthermore, this study has the potential to provide information that will inform the development of more poignant screeners for an at-risk population. Lastly, information from this study may provide psychologists, psychiatrists, and physicians in university settings with a more comprehensive understanding of NMUPS in order to better educate students about the risks of stimulant misuse. Furthermore, professionals with prescribing capabilities may take this information into consideration with thinking about the appropriateness of prescribing stimulants to college students.

Important Terms

Greek-life. Greek life refers to the group of undergraduate students affiliated with a social fraternity or sorority. The name “Greek” refers to the two or three letters of the Greek alphabet for which each organization is named.

Internal Restlessness. Internal restlessness refers to the cognitive or mental restlessness symptoms common in adults with ADHD (Conners, 1999; Weyandt et al., 2003).

Non-medical Use of Prescription Medication. Non-medical use of prescription medication (NMUPS) is defined as an individual taking a drug without a legitimate prescription.

In this case, the drug could be obtained in a variety of ways, including receiving the drug free or by purchase (Arria & Wise, 2006).

Resistance to Peer Influence. Resistance to peer influence refers to the degree to which adolescents act autonomously in interactions with their peer group (Steinberg & Monahan, 2007)

Sensation-seeking. Sensation seeking is a personality trait with a biological basis defined by the "seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman, 1994, p. 27).

Chapter 2

THE ROLE OF PSYCHOSOCIAL FACTORS IN THE NON-MEDICAL USE OF PRESCRIPTION STIMULANTS AMONG UNDERGRADUATE GREEK-LIFE MEMBERS

The need to understand and reduce NMUPS becomes increasingly essential as the rates of prescription misuse continue to grow across college campuses. Preliminary research has identified social and personality factors associated with NMUPS, as well as subgroups at greater risk for stimulant misuse. However, because stimulant misuse is a relatively new area of interest, more research needs to be conducted to support these findings. In addition, current research does not address how these factors compare amongst subgroups of undergraduate students. The current study seeks to answer these gaps in the literature by measuring various social and personality variables between an at-risk subgroup (Greek-life members) and the general undergraduate student population.

Theories of Substance Use

The following section provides a comprehensive overview of well-established social and psychological models and theories related to substance use.

Social Theories of Substance Use

Social learning theory. Bandura (1977) developed a theory of social learning that explains how human behaviors are learned through constant interaction between our cognitions, behaviors, and environment. Bandura's social learning theory is an extension of behaviorism and has been referred to as the link between behaviorist and cognitive learning theories. Social learning theory emphasizes the influence other people have over an individual's learned behaviors. Bandura posits even without direct reinforcement, most individuals learn through observation and imitation of other people. According to Bandura, learning occurs by observing

the actions of other people and the consequences they receive as a result. Through the process of observation, an individual's positive perception of substance use results in the person modeling these behaviors and engaging in substance use.

The concept of modeling is at the center of Bandura's social learning theory. Bandura suggested observing a behavior has as much of an impact on learning as directly experiencing the behavior. Modeling refers to the process of an individual observing others and copying their behaviors. According to Bandura, four conditions are necessary for effective modeling: attention, retention, reproduction, and motivation. The individual must maintain their *attention* on the model in order to observe what action is occurring and the consequence of the action. Many things can impact the level of attention paid, such as attractiveness and distinctiveness of the model. *Retention*, which includes processes such as symbolic coding and cognitive organization, refers to an individual's ability to remember the action in which attention was paid. *Reproduction* refers to the individual's physical abilities to reproduce the action, and *motivation* refers to an individual having enough reason to imitate the behavior (Bandura, 1977). Social learning theory has been used to explain substance use with the idea that people develop positive attitudes towards substances by observing positive consequences of others engaging in substance use. In other words, through the process of observation, an individual's positive perception of another's substance use results in imitation of similar behavior.

Akers' (1985) theory of social learning is based on Bandura's social learning theory and focuses specifically on the development of deviant behaviors. Akers' social learning theory maintains that individuals are socialized and learn behaviors through close relationships with others. Akers' social learning theory consists of four main concepts: differential reinforcement, imitation, definitions, and differential association. The theory posits that deviant behavior is

more likely to result when one associates with other individuals who engage in and support deviant behaviors (i.e., *differential association*). This pattern of association results in an individual being surrounded by a greater number of deviant role models (i.e., *imitation*), greater exposure to attitudes (i.e., *definitions*) that justify and encourage deviant behavior, and greater reinforcement of deviant behavior by significant others (i.e., *differential reinforcement*). Deviant behaviors are more likely to develop when the behavior is normalized and reinforced by others close to the individual (Akers, 1985). Akers's social learning theory is one of the most widely accepted theories of deviance. It has explained illicit drug use, alcohol abuse, sexual deviance, and more recently NMUPS (Ford, 2008; Ford & Ong, 2014; Peralta & Steele, 2010). Specifically, Akers's model of social learning theory has been applied to the development of substance use among peer groups. Therefore, Akers's model could provide insight into the increase in NMUPS across college campuses over the past decade.

Personality Theories of Substance Use

The investigation of personality traits is a long-standing area of interest in the empirical study of substance use (Cloninger, 1987; Sher & Trull, 1994; Sher, Trull, Bartholow, & Vieth, 1999; Tarter, 1988). Existing personality theories provide a foundation for the understanding of susceptibility and development of substance use behaviors. Three of the most prominent personality theories of substance use include Eysenck's three-factor model (Eysenck, 1947), Cloninger's three-factor model (Cloninger, 1987), and Zuckerman's alternative five-factor model (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993).

Eysenck (1947) posited personality traits are hereditary and personality develops through the interaction of genetic predisposition and environment. Eysenck developed a model of personality largely rooted in biology and suggested individuals are born with specific

temperaments, or combinations of specific personality traits. According to Eysenck, three main dimensions of personality exist: Extroversion, Neuroticism, and Psychoticism. *Extroversion* refers to individuals with a strong nervous system that is quick to react and inhibit excessive stimulation. Individuals high in Extroversion typically crave stimulation and often exhibit stimulating-seeking behaviors (Eysenck & Eysenck, 1985). These individuals also experience lower cortisol levels and, as a result, require more stimulation to maintain optimal levels of arousal. Eysenck suggested that as a result of their need for greater stimulation extraversion is typically characterized by impulsivity and sensation-seeking behaviors. The *Neuroticism* dimension stems from increased sensitivity of the limbic autonomic system. The limbic autonomic system determines how and to what extent individuals react to external stimuli. Individuals high in Neuroticism typically are emotionally labile, easily startled, and nervous, particularly in times of stress. Eysenck described individuals who are high in *Psychoticism* as prone to taking risks, impulsive, and likely to engage in anti-social behavior.

Eysenck's theory identifies some of the biological mechanisms believed to underlie personality traits deemed risk factors for substance use. Specifically, Eysenck's theory posited that those higher in extraversion are under-aroused and regularly seek out external stimuli to bring them up to their optimal level of performance causing them to act impulsively. These sensation-seeking, impulsive behaviors put extroverts at greater risk for substance use (Eysenck & Eysenck, 1985). Therefore, it is important to measure sensation seeking when researching substance use.

Eysenck's theory of personality provided the foundation for many other models of personality, including Cloninger's (1987) tridimensional model of personality. Cloninger's tridimensional personality theory poses that three fundamental dimensions—Novelty Seeking,

Harm Avoidance, and Reward Dependence—play a direct role in an individual’s susceptibility to substance abuse (Cloninger, 1987). To measure these personality dimensions, Cloninger developed the Tridimensional Personality Questionnaire (Cloninger, 1987). Cloninger proposed specific patterns of scores on each of the three dimensions, combined with genetic predispositions, and environmental factors, result in predictable behavior related to substance use.

Novelty seeking in relation to substance abuse is a commonly identified trait across models of personality; however, variations in terminology across theories create confusion. For instance, in Zuckerman’s Alternative to the Big Five theory of personality, novelty seeking is referred to as sensation seeking. Zuckerman (1994) defined *sensation seeking* as an individual’s tendency to seek out “varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience” (p. 27). Zuckerman (1979) suggested sensation seeking is inherent and an individual’s preference for greater stimulation is based on their biological composition. Individuals higher in sensation seeking will seek out activities that provide greater arousal and experience less anxiety engaging in these activities than individuals with lower levels of sensation seeking, indicating that perception of risk varies from their peers. As a result, sensation seeking has been associated with higher levels of engagement in risky activities including drug use, driving under the influence, and heavy drinking (Horvath & Zuckerman, 1993; Zuckerman, 1979). Sensation- or novelty-seeking traits are theorized to contribute to problematic substance use across a range of personality models. Typically, individuals who possess higher levels of sensation seeking traits are at greater risk for substance use and abuse. It is therefore important to measure sensation seeking when examining patterns of substance use.

Motivational Theories of Substance Use

Identifying and understanding motivation behind substance use is important in predicting and preventing these patterns of behavior (Prendergast, 1994). Motivational models of substance use postulate substance use is largely motivated by specific benefits and expected outcomes of the substance, and these motives provide the framework for which an individual decides to engage in substance use. Cox and Klinger's (1988) motivational model of substance use posits an individual chooses to use a substance based on the anticipated positive affective consequence, and whether or not it outweighs the consequences of not using the substance. An increase in positive feelings or decrease in negative feelings is thought to be the primary motivation for engaging in substance use. Cox and Klinger suggest these affective expectations refer to both direct (pharmacological) and indirect (primarily social) effects. Indirect effects refer to the expectation that drinking will improve social interactions (e.g., receiving approval from a friend). This motivational model suggests that an individual will decide whether or not to engage in substance based on their pharmacological and social expectations (Cox & Klinger, 1988).

Motivational models of alcohol use have expanded to substance use more broadly. McCabe and colleagues (2009) identified three subtypes of individuals who engage in NMUPS based on their reported motivations in previous studies. A *recreational user* is defined as someone who engages in NMUPS for reasons that do not coincide with the drug's intended medical effects (e.g., "I use a pain reliever to get high"). A *self-treatment user* is considered an individual who engage in NMUPS for a reason that is generally in line with the medicinally intended reason for use (e.g., "I take stimulants to help me concentrate"), but without a prescription. A *mixed motives individual* typically endorses components of both recreational and self-treatment motives.

Motivational models of substance use and ADHD. Because self-treatment has been identified as one of the subtypes of NMUPS users, it is useful to review the symptoms ADHD medications target to determine what symptoms these individuals are self-treating (Gallucci, 2011). Research suggests the hyperactivity component of ADHD seen in childhood typically subsides by adulthood and then manifests itself in the form of internal restlessness (Barkley, 1998; Biederman, Mick, & Faraone, 2000; Weiss & Hechtman, 1993). *Internal restlessness* refers to the cognitive or mental restlessness symptom, which is common in adults with ADHD (Conners, 1999; Weyandt et al., 2003). The Diagnostic and Statistical Manual, Fifth Edition (DSM-5; American Psychiatric Association, 2013) states “in adults, hyperactivity may manifest as extreme restlessness or wearing others out with their activity” (p. 61).

In reference to substance use, it is important to recognize the differences between internal restlessness as a symptom of ADHD and restlessness as a symptom of anxiety. According to the DSM-5 (APA, 2013), “restlessness, feeling keyed up or on edge” is a symptom specific to the diagnosis of Generalized Anxiety Disorder (p. 222). In this case, restlessness refers to the physical sensation of not being able to sit still or feel calm. Internal restlessness associated with ADHD, however, reflects problems with cognitive disinhibition (Weyandt et al., 2003). Individuals who experience internal restlessness are likely to endorse difficulties falling asleep due to racing thoughts, difficulty putting thoughts to rest, feeling internally restless, or difficulty maintaining attention on the task at hand due to internal distractions, such as daydreaming or intrusive thoughts (Nadeau, 1995; Shaw & Giambra; 1993; Weyandt et al., 2003). Given the fact that prescription stimulants are used to treat symptoms of ADHD, it is essential to understand internal restlessness when looking at the role of self-medication with regards to NMUPS.

Literature Review on NMUPS

This section will provide an overview of the existing literature of social and psychological variables associated with NMUPS, including psychological risk factors of substance use and those correlated with NMUPS specifically, and social facets including peer involvement in NMUPS. In addition, a review of the literature on Greek-life individuals in relation to substance use will be provided. Overall, this section will cover the gaps in the literature, and how the current study proposes to address these gaps.

Psychological Risk Factors of NMUPS

A large body of literature yields support for the role of personality and motivational factors in the development of substance use behaviors. A number of psychological variables have been linked with NMUPS, including depression (Rabiner, Anastopoulos, Costello, Hoyle, & Swartzwelder, 2009; Teter, Falone, Cranford, Boyd, & McCabe, 2010), anxiety (Dussault & Weyandt, 2011; Verdi, Weyandt, & Zavras, 2014), sensation seeking (Low & Gendaszek, 2002; Weyandt et al., 2009), and internal restlessness (Dussault & Weyandt, 2011; Weyandt et al., 2009; Verdi et al., 2014). Initial epidemiological studies identified a relationship between depressed mood and NMUPS (Huang et al., 2006; SAMHSA, 2007) and laid the foundation for current research interest in depressed mood as a correlate of prescription stimulant misuse. Teter and colleagues (2010) found frequent users and individuals who engaged in non-oral routes of administration were more than two times as likely to endorse depressed mood compared less frequent users. Moreover, researchers also found anxiety and general psychological distress to be significantly correlated with NMUPS among undergraduate students (Dussault & Weyandt, 2011; Weyandt et al., 2009) and graduate students (Verdi et al., 2014).

The role of sensation seeking in NMUPS. Sensation seeking has long been recognized as a predictor for high-risk behaviors such as substance use (Herman-Stahl, Krebs, Kroutil, & Heller, 2007; Palmgreen, Donohew, Lorch, & Rogus, 1991; Reyna & Farley, 2006; Zuckerman, 1994; Zuckerman, Neary, & Brustman, 1970). The link between sensation seeking and substance use was first established in the 1970s. Studies explored sensation seeking and college students' drug use including marijuana, hashish, amphetamines, LSD, and barbiturates. Early results suggested individuals high in sensation seeking were significantly more likely to engage in drug use than those low in sensation seeking (Zuckerman et al., 1970).

Different personality assessments have been validated to measure sensation seeking as a predictor of substance use. The Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) has been empirically validated as a measure of susceptibility to substance abuse. High scores on the Psychoticism and Neuroticism scales to be positively linked with alcohol and other substance abuse in the literature (Kilbey, Downey, & Breslau, 1998; Eysenck, 1997; Zuckerman et al., 1993). Moreover, using the Cloninger's Tridimensional Personality Questionnaire, a large number of studies have identified high levels of Novelty Seeking as the leading predictor of substance abuse. Novelty Seeking was also found to distinguish alcoholics from non-alcoholics, as well as smokers from non-smokers, with and without anti social personality disorder. In addition, high levels of Novelty Seeking predicts early onset of alcohol abuse and criminality (Battaglia, Pryzbeck, Bellodi, & Cloninger, 1996; Galen, Henderson, & Whitman, 1997; Sher, Wood, Crews, & Vandiver, 1995). The *Alcohol and Drug Research Survey* (Jaffe & Archer, 1987) explored the ability of self-report personality measures, including the Sensation Seeking Scale, in predicting undergraduate students' drug use. Twelve categories of drug use were examined (e.g., amphetamines, tranquilizers), and analyses revealed sensation seeking was the

primary predictor of drug use among undergraduates. The results also identified the Sensation Seeking Scale as the most powerful predictor of substance use and abuse across assessments. While many personality assessments are available, the Sensation Seeking Scale is among the most valued assessment used to measure sensation seeking in relation to substance use.

A number of studies have identified the role of sensation seeking in predicting drug use among adolescence and emerging adults (Arnett, 1998; Bates, Labouvie, & White, 1986; Zuckerman, 1994). Specifically, Newcomb and McGee (1991) explored sensation seeking over time among adolescents as they developed into young adulthood. Participants were assessed for sensation seeking and general deviance three times over the course of a 5-year study. The results indicated a majority of individuals endorsing sensation seeking also reported use of illicit drugs. This literature highlights the important role of sensation seeking in the engagement of problematic substance use and serves as the foundation for which researchers of NMUPS have built their research.

Relevant to the current study, the increase in undergraduate involvement in the misuse of prescription stimulants has led to examination of the relationship between sensation seeking and NMUPS. For instance, Herman-Stahl and colleagues (2007) explored demographic, psychosocial, and behavioral correlates of past year NMUPS and methamphetamine use between ages 18 to 25. Findings revealed psychological distress, sensation seeking, binge drinking, and college enrollment were risk factors of NMUPS. When looking at individual differences, Low and Gendaszek (2002) found students who scored higher on the Sensation Seeking Scale were more likely to endorse NMUPS, but perfectionism was not significantly associated with NMUPS. A wide range of studies provide support for sensation seeking as a predictor of

substance use; however, only a few have linked sensation seeking to NMUPS; therefore, further research is needed to explore sensation seeking in relation to NMUPS.

The role of internal restlessness in NMUPS. In addition to sensation seeking, previous research suggests that internal restlessness is related to NMUPS (Dussault & Weyandt, 2011; Rabiner et al., 2009; Teter et al., 2010; Weyandt et al., 2009). Expanding on the work of Low and Gendaszek (2002), Weyandt and colleagues (2009) explored the relation of internal restlessness, sensation seeking, and psychological distress to NMUPS. The results revealed that students who reported higher rates of NMUPS endorsed statistically significant higher levels of internal restlessness. In addition, the data indicated a relationship between higher rates of NMUPS and higher levels of sensation seeking, lending support to psychological models of NMUPS. Moreover, Verdi and colleagues (2014) found similar patterns of behavior among graduate students engaging in NMUPS. Verdi and colleagues assessed for levels of anxiety, depression, stress, and internal restlessness. In line with the results of previous studies, self-reported NMUPS was significantly correlated with anxiety, stress, and internal restlessness. Specifically, the outcome data revealed individuals who experienced significant levels of internal restlessness, distractibility, impulsivity, or disorganization were at increased risk for NMUPS. Unfortunately only a limited amount of research has explored internal restlessness in relation to NMUPS; thus, more research is needed to determine how and to what extent internal restlessness is linked with NMUPS.

Social Risk Factors of NMUPS

The influence of peer involvement on NMUPS. Based on what is known about social learning and how behaviors develop, it is important to consider the influence of different peer groups on NMUPS. Researchers have begun to focus on social facets of stimulant use in an

attempt to better understand the patterns of NMUPS among undergraduate students (e.g., McCabe & Boyd, 2012; Rabiner et al., 2009; Weyandt et al., 2009). Like many other forms of substance use, NMUPS develops and mostly occurs in a social context. The majority of students misusing prescription stimulants reportedly know other students who also engage in NMUPS (Carroll, McLaughlin, & Blake, 2006; Weyandt et al., 2009). In addition, the majority of students are not obtaining these medications on the street or from drug dealers, but from their peers (Barrett, Darredeau, Bordy, & Pihl, 2005; McCabe & Boyd, 2005). For example, Weyandt et al. (2009) reported 9.8% of college students bought prescription stimulants from other students and 21% were offered to purchase prescription stimulants from their peers. The consistent evidence of peer involvement in NMUPS strengthens the link between these factors and further supports social learning theory.

A growing body of research provides support for the application of Aker's model of social learning theory to understanding NMUPS. Ford and Ong (2014) examined the extent to which key concepts of Akers' social learning theory relate to NMUPS for academic purposes among undergraduate students. The Differential Association measure assessed the level of the participant's friends stimulant use; the Definitions measure assessed the participant's perceived level of acceptability of stimulant misuse among college students; and the Differential Reinforcement measure assessed the effectiveness of prescription stimulants as an effective study aid. Participants also reported personal frequency of NMUPS for academic reasons in the past year. In addition, all three social learning measures were significantly correlated with NMUPS. Participants who reported more of their friends engaging in NMUPS were at greater risk of engaging in this behavior. The differential association facet of social learning theory presumes that a behavior is normalized within a social group when the majority of the peers

engage in the behavior. Specifically, Akers' theory suggests that close relationships are particularly influential in developing deviant behaviors. From this information it can be inferred that peer influence may play a role in students' willingness to engage in NMUPS.

A large number of studies have identified the role of peer influence in predicting substance use among adolescents and young adults (e.g., Allen, Chango, Szvedo, Schad, & Marston, 2012; Audrain-McGovern, Rodriguez, & Kassel, 2009; Harden, Hill, Turkheimer, & Emery, 2008). For instance, Allen and colleagues (2006) investigated adolescents' susceptibility to peer influence as a predictor of difficulties developing autonomy and susceptibility to peer influence in a longitudinal study. Researchers found susceptibility to peer influence with a close friend predicted susceptibility to negative peer pressure (e.g., pressure to use substances). Moreover, the data indicated susceptibility to peer influence was significantly linked to higher levels of substance use, externalizing behaviors, and sexual activity among adolescents. Additionally, Varela and Pritchard (2011) explored the impact of peer influence on undergraduates risk taking behaviors in the form of alcohol, tobacco, and prescription medication use. Participants disclosed their drug use history and with whom they were most likely to engage in these behaviors. The results indicated participants were significantly more likely to engage in substance use in the presence of at least one other person, particularly their friends. Outcome data suggests that peer influence is predicative of adolescent and young adult substance use.

Preliminary research has also identified other social and demographic factors that serve as risk factors for NMUPS. Undergraduates who are European-American and are affiliated with a Greek-life organization (sorority or fraternity) are at greater risk for engaging in NMUPS (Arria & DuPont, 2010; Rabiner et al., 2009). Gender as a risk factor has varied across studies. For instance some studies indicate that men reported significantly more use than women (Low et

al., 2002; McCabe et al., 2005; Teter et al., 2006). Other studies have identified no significant differences in use between men and women (Carroll et al., 2006; Hall et al., 2005; Kroutil et al., 2006; Sharp & Rosen, 2007; SAMHSAa, 2009). Continued research on these variables is necessary to determine to what extent these variables influence NMUPS. More specifically, a significant need for research on peer influence in relation to NMUPS exists. To date no studies have examined the effect of peer influence on NMUPS.

Greek-life affiliation and NMUPS. Given the social nature of Greek-life organizations, the increasing prevalence rates of NMUPS among this subgroup, and the social context surrounding NMUPS, significant consideration should be given to social factors that may be contributing to these behaviors.

Previous findings indicate undergraduate students affiliated with Greek-life organizations consistently report higher rates of NMUPS than non-Greek-life members (DeSantis & Hane, 2010; Rabiner et al., 2009; Shillington, Reed, Lange, Clapp, & Henry, 2006; Teter et al., 2006; Weyandt et al., 2009). For instance, Galluci, Usdan, Martin, and Bolland (2014) examined prevalence, motivations, and risk factors associated with NMUPS. Additionally, these researchers compared gender, ethnicity, class status (e.g., freshman, sophomore), Greek affiliation, and ADHD diagnosis as predictors of lifetime and current NMUPS. Greek-life members were almost two and a half times more likely to report lifetime NMUPS than non-Greek-life members. Similarly, Greek-life members were more than twice as likely to report current NMUPS when compared to non-Greek-life members (Galluci et al., 2014). Overall, Greek-life affiliation was found to be the strongest predictor of NMUPS above and beyond demographic factors, such as ethnicity and gender. In addition, Shillington and colleagues (2006)

revealed that students affiliated with a sorority or fraternity with six times more likely to report NMUPS in the past month than non-Greek-life members.

Research shows widespread misuse of prescription stimulants on campus may impact perceptions of accessibility and safety of stimulant use (e.g., Kilmer, Geisner, Gasser, & Lindgren, 2014; Park, Sher, Wood, & Krull, 2009). In particular, Desantis and colleagues (2008) indicated that 48% of Greek-life population reported NMUPS. Qualitative data revealed an overarching belief that stimulants are easily obtainable from peers. For instance, one student stated, “you know which of your friends have it; people aren’t really discrete that they have it. They become famous.” Furthermore, the interviews indicated that it is easier for Greek-life members to obtain prescription stimulants than non-Greek-life members. In reference to living in a sorority house one student reported, “you are always there, so you just ask somebody, at dinner or just walking around the rooms. If you can’t find any, there is always somebody around that knows somebody, in a fraternity or somewhere” (Desantis et al., 2008, p. 320).

Dussault and Weyandt (2011) conducted the first study looking at NMUPS among Greek-life members in relation to psychological variables. Participants completed a battery of self-report measures pertaining to prescription stimulant use, perceptions of NMUPS prevalence among peers, perceptions of safety using prescription stimulants, internal restlessness, and stress and anxiety. When controlling Greek-life affiliation and gender, results indicated internal restlessness and internal impulsivity significantly predicted reported NMUPS. Items corresponding to internal restlessness included: “Mental restlessness prevents me from sleeping, I am always thinking; I have difficulty putting my thoughts to rest, I have difficulty relaxing because of reoccurring thoughts, and I feel internally restless.” Items corresponding with the internal impulsivity scale included: “I am told that I interrupt people, I feel compelled to

interrupt others during conversation, and I lose my train of thought conversing with others” (Weyandt et al., 2003, p. 385). The results revealed individuals who endorse higher internal restlessness and internal impulsivity factors were more likely to engage in problematic stimulant use.

A review of the literature highlights apparent differences in usage of stimulants between Greek-life members and non-Greek-life members; however, research is lacking when it comes to understanding the more nuanced social and psychological influences on NMUPS in this at-risk group.

Purpose of Current Study

The first aim of this study was to examine the relationship between psychosocial factors and NMUPS. The variables of interest include resistance to peer influence and those previously identified by substance use researchers in relation to NMUPS, including internal restlessness and sensation seeking. Based on Zuckerman’s personality theory, Aker’s social learning theory, motivational models of NMUPS and preliminary research, we predict significant positive correlations would be revealed among all psychosocial variables and frequency of NMUPS (lifetime and across 30 days).

The second aim of this study was to determine what psychosocial factors best predict NMUPS among undergraduate students, which would then lend itself to the development of an inclusive model of NMUPS. Specifically, we sought to determine if resistance to peer pressure adds predictive validity to a model of NMUPS that already includes internal restlessness and sensation seeking (Dussault & Weyandt, 2011). A body of literature has linked sensation seeking and internal restlessness to NMUPS. Therefore, it was expected that individuals who endorse higher levels of sensation seeking and internal restlessness would have increased incidences of

NMUPS. Furthermore, based on Aker's social learning theory and previous research, it was expected that resistance to peer influence would add predictive validity to the current model of NMUPS that includes internal restlessness and sensation seeking.

The third aim was to investigate differences in stimulant use between groups of college students. Previous studies have identified students affiliated with Greek life as an at-risk group for NMUPS (Arria & DuPont, 2010; DeSantis et al., 2008; McCabe, 2008; Rabiner et al., 2009); therefore, this study sought to determine how, if at all, the status of Greek-life affiliate versus non-Greek life affects the peer influence-NMUPS relationship. Based on previous research, we hypothesized Greek-life affiliation would moderate the peer influence-NMUPS relationship such that it will strengthen the relationship of peer influence and NMUPS.

The fourth aim of the study was to explore the likelihood of engaging in NMUPS based on demographic variables outside of Greek status, including gender and rurality. Currently no studies account for rurality when considering demographic differences among use. This study seeks to provide greater insight to the patterns of use by exploring the aspect of geographic location and gender.

Chapter 3

METHODS

This chapter provides an overview of the current study regarding participants, research design, instruments used, data collection methods, and statistical analysis plan.

Participants

Participants were undergraduate students at a mid-sized Southern eastern university. Participants were recruited through SONA, an online system that allows students to sign up for and participate in research studies to earn research credits required for their Psychology classes. Students had the option to participate in alternative assignments, given by their individual professors, to meet this requirement if they were not interested in or felt uncomfortable with participating in research. To minimize confounds and eliminate researcher bias, the study was advertised to all students, regardless of Greek-life affiliation, throughout the entirety of data collection. For this reason, in order to have an adequate comparison of Greek-life to non-Greek-life students, data was collected until the necessary number of Greek-life participants was obtained for sufficient statistical power (i.e., a representative of the sample population was drawn). Data from the Fraternity & Sorority Life Organization Report for Fall Semester 2016 at Georgia Southern University indicated that 16% ($n = 2,861$) of all undergraduate students were active members of a Greek-life organization, with 60% women ($n = 1,687$) and 40% men ($n = 1,174$) (Office of Fraternity and Sorority Life at Georgia Southern University, 2016). The general representation of Greek-life in the current study was consistent with the rates of the university (18.9%; $n = 116$); however, male participants affiliated with Greek-life (16%; $n = 19$) were significantly underrepresented with a majority of Greek-life affiliates identifying as female (80%; $n = 196$).

Initially, 801 responses were recorded; however, 188 responses were eliminated as the result of various validity concerns. For instance, those individuals who answered incorrectly to at least one of three validity check items placed randomly throughout the battery, as well as those individuals who did not complete at least 97% of the questions of the survey, were removed from final analysis. A total of 613 participants were included in the final analyses (Women: $n = 418$; Men: $n = 189$; Transgender: $n = 1$; other: $n = 2$; did not answer: $n = 3$).

Participants represented all levels of undergraduate students (Freshman: $n = 229$, 37.4%; Sophomore: $n = 208$, 33.9%; Junior: $n = 114$, 18.6%; Senior: $n = 62$, 10.1%) from a university in a Southeastern region of the United States. Participants ranged in age from 17 to 25 years or older (17 years: $n = 1$; 18 years: $n = 169$; 19 years: $n = 212$, 20 years: $n = 125$; 21 years: $n = 58$; 22 years: $n = 30$; 23 years: $n = 7$; 24 years: $n = 4$; 25+ years: $n = 7$). Self-reported race/ethnicity of the sample consisted of European American ($n = 398$; 64.9%), African American ($n = 164$; 26.8%), Hispanic ($n = 27$; 4.4%), Multi-ethnic ($n = 15$, 2.4%), Asian ($n = 5$; .8%), Native America ($n = 1$; .2%), Other ($n = 1$; .2%), and 2 participants did not answer the question on race. Regarding geographic region, 49.9% ($n = 306$) of participants reported being from suburban areas, 35.9% ($n = 220$) from rural areas, and 14.2% ($n = 87$) from urban areas.

Related to history of ADHD and medical and non-medical use of prescription stimulants, 16.5% ($n = 101$) of participants reported having a diagnosis of ADHD and 11.4% ($n = 70$) of all participants reported holding a current prescription for a stimulant medication. Of the participants who reported having a current prescription to a stimulant medication, 3.15% ($n = 19$) reported having engaged in using it in excess or for a reason other than what it is prescribed for. Reportedly, the primary reasons for such misuse included “to better concentrate in class” ($n = 9$), to better concentrate while studying ($n = 6$) and “to track assignments” ($n = 2$).

Of the participants (83.0 %; $n = 509$) without a diagnosis of ADHD, 22.2% ($n = 136$) reported having engaged in NMUPS in their lifetime and 21.2% ($n = 29$) reported having engaged in NMUPS within the past 30 days. Reportedly, the primary reasons for NMUPS across lifetime were “to better concentrate while studying” (44.1%, $n = 60$), “to better concentrate in class” (22.8%, $n = 31$) and “to feel less tired” (10.3%, $n = 14$).

Design

The current study proposed a cross-sectional, non-experimental design conducted entirely online which provided anonymity of the participants and eliminated the potential for interviewer bias. In addition, a non-experimental design eliminates the threat of context effects given the fact that all participants completed a standardized survey. Using a cross-sectional design removes the threat of maturation, attrition, and history effects due to the fact that the study was completed in one phase and each participant completed the survey in one sitting.

The predictor variables of interest included peer influence, sensation-seeking, and internal restlessness. The outcome variable is NMUPS, lifetime and 30-day use. Following the completion of data collection, participants were split into two groups based on their self-reported involvement in Greek life. Using involvement in Greek life as a moderating variable, the current study explored the relationship between peer influence and NMUPS in an identified at risk group.

Instruments

Demographics. A demographic survey developed for the purpose of this study assessed participants’ age, gender, ethnicity, sexual orientation, undergraduate class status, and childhood geographical status (rural vs. non-rural). In addition, participants indicated their affiliation Greek-life organizations (i.e., sorority or fraternity member vs. nonmember).

Resistance to Peer Influence. Participants' resistance to peer influence was assessed using the Resistance to Peer Influence scale (RPI; Steinberg & Monahan, 2007). The RPI presents participants with a series of 10 pairs of statements. For each pair, the participant was asked to choose the statement that best describes them (e.g., "Some people think it's more important to be an individual than to fit in with the crowd." BUT "Some people think it is more important to fit in with the crowd than to stand out as a individual."). After choosing the best descriptor, participants were asked to indicate if the statement is "Really True" or "Sort of True." The 10-item scores are averaged, and higher scores indicate greater resistance to peer influence. The RPI demonstrated good internal reliability (Cronbach's α of .80) (Steinberg & Monahan, 2007).

Non-medical Use of Prescription Stimulants. A modified version of the Non-medical Use of Prescription Stimulants Questionnaire (NMUPSQ; Gallucci, 2011) assessed participants' history of use, both short-term use and lifetime use. The short-term portion of the questionnaire assessed reported use over the past 30 days. Original factor analysis of the NMUPSQ revealed a 6-factor structure consisting of behavioral beliefs, normative beliefs, relevant others, influence, attitudes, and control beliefs. Analysis of influence demonstrated good internal consistency ($\alpha = .79$) (Gallucci, 2011).

Illicit Drug Use History. History of drug use was measured using a modified version of questions from the College Alcohol Study (Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002). Participants were asked: "How often, if ever, have you used any of the drugs listed below? Do not include anything you used under a doctor's orders." Drug items include marijuana, crack cocaine, other forms of cocaine, ecstasy (i.e., MDMA), opiate-type prescription medication (e.g., codeine, morphine, Demerol, Percodan, Vicodin), and prescription anxiety medication (e.g.,

Valium, Klonopin, Xanax, Ativan). Participants reported their usage of each drug on a 4-point Likert-type scale ranging from “never used” (1) to “used in the past 60 days” (4).

Sensation-seeking. A modified version of the Sensation Seeking Scale-V (SSS-V; Zuckerman, Eysenck, & Eysenck, 1978) was used to measure the amount of stimulation an individual desires by assessing their tendency to seek out various novel and intense stimuli. The modified measure consists of 13 items. Each of the items contains two choices (e.g., A. “I sometimes like to do things that are a little frightening.” Or B. “A sensible person avoids activities that are dangerous.”) and the participant is forced to choose which of the two best describes how the individual feels. The score for the measure is a summation of all of the “high” sensation seeking behaviors endorsed. Higher scores indicate greater sensation seeking. This measure demonstrated poor internal consistency ($\alpha = .58$) Due to a coding error only certain items from the original Sensation Seeking Scale V were included in the measure. These included items 5, 11 and 23 (London & Exner, 1980).

Internal Restlessness. The Internal Restlessness Scale (IRS; Weyandt et al., 2003) is a 24-item self-report survey of internal or mental restlessness. The items are scored on a 7-point Likert scale ranging from “none of the time” (1) to “all of the time” (7). Original factor analysis of the IRS revealed a 4-factor structure consisting of internal distractibility, internal restlessness, internal impulsivity, and internal disorganization. The test-retest reliability of the IRS is 0.80 and concurrent validity is adequate (Weyandt, Hays, & Schepman, 2005). In the current study, the IRS exhibited adequate internal consistency ($\alpha = 0.74$).

Data Collection

This study was conducted entirely online and data were collected in the form of self-report measures. Measures were administered to participants through Qualtrics, a web-based

software that allows easy distribution of surveys and for data to be collected remotely and stored electronically. Data were stored in Qualtrics until 801 participants were included to meet power ideals. The data were removed from Qualtrics and transferred to an encrypted hard drive where it will be stored in the Alcohol, Mental, and Physical (AMP) Health Lab located in Brannen Hall at Georgia Southern University for up to 7 years. A notable strength of using Qualtrics is that it was accessible to a broader range of students given the fact that they could participate in the study from a personal computer.

Procedure

This study was conducted in one phase of data collection. Students had the opportunity to sign up for the study via the SONA system. Once a participant signed up for the study they were directed to a link where they could access the survey on Qualtrics. When a student opened the study they first received a document of informed consent. The nature of the study was not revealed until after the participant completed the survey. Once the participant provided consent they were prompted to complete a series of self-report measures. The surveys were counterbalanced and items within each measure were administered in a randomized order to account for potential ordering effects. After the participant finished completing the self-report measures they received a debriefing document explaining the nature of the study, and they were asked not to share this information with others who would potentially participate in this study. Participation took approximately 30 minutes and one-half point of research credit was automatically granted once the participant completed the survey.

Statistical Analysis Plan

Preliminary descriptive analyses were conducted to determine key characteristics of the sample including age, gender, ethnicity, sexual orientation, undergraduate class status, and

geographic upbringing (urban/metropolitan vs. rural). In addition, participants were asked to indicate whether or not they are affiliated with a sorority or fraternity determined their group assignment following the completion of data collection.

The first aim of this study sought to determine what psychosocial factors best predict NMUPS among undergraduate students. Correlational analyses were conducted for key variables of interest: resistance to peer influence, sensation seeking, internal restlessness, and NMUPS. The second aim of this study sought to determine if resistance to peer influence add predictive validity to a model of NMUPS that already includes internal restlessness and sensation seeking (Dussault & Weyandt, 2011). A series of hierarchical multiple regressions were used to determine if resistance to peer influence adds predictive validity to a model of NMUPS that already includes sensation seeking and internal restlessness. Two separate models were analyzed: a model for the prediction of lifetime stimulant use and a model for the prediction of short-term stimulant use over the past 30 days.

The third aim of the study sought to determine how, if at all, the status of Greek-life affiliate versus non-Greek-life affiliate effects the strength of the peer influence-NMUPS relationship. A moderation analysis via multiple regression was used to measure this effect. An interaction term between Greek-life affiliation and the RPI measure was created and entered into the model to determine the presence of moderation.

The fourth aim of the study was an exploratory analysis of demographic variable outside of Greek status, including gender and rurality. Three odds-ratio analyses determined the probability of risk of engaging in NMUPS based on gender and childhood geographical status, respectively.

Chapter 4

RESULTS

Preliminary Analyses

Preliminary analyses yielded information regarding the relationships among the variables and subscales used in the current study. Correlational analyses investigated the relationship between the self-report measures of Sensation Seeking (SSS), Resistance to Peer Influence (RPI), and all factors of the Internal Restlessness Scale (IRS): Distractibility, Restlessness, Impulsivity, and Disorganization for the sample. Significant positive correlations were found among all subscales of the Internal Restlessness Scale and Sensation Seeking. Specifically, Sensation Seeking was related to Internal Restlessness: *Distractibility* ($r = .15, p < .001$), *Restlessness* ($r = .13, p = .002$), *Impulsivity* ($r = .10, p = .01$), and *Disorganization* ($r = .16, p < .001$). Furthermore, subscales of the Internal Restlessness scale produced small to moderate correlations amongst each other: *Distractibility* was positively related to *Disorganization* ($r = .32, p < .001$), *Restlessness* ($r = .71, p < .001$), and *Impulsivity* ($r = .64, p < .001$). Moreover, *Restlessness* was positively related to *Disorganization* ($r = .26, p < .001$) and *Impulsivity* ($r = .52, p < .001$). Lastly, *Impulsivity* was positively related to *Disorganization* ($r = .31, p < .001$). Resistance to Peer Influence was not correlated with Sensation Seeking or any subscale of Internal Restlessness. See Table 1 for full correlational analysis.

Independent samples *t*-tests compared the differences in sensation seeking, resistance to peer influence, and internal restlessness endorsed by those affiliated with Greek-life ($n = 116$) to non-Greek-life ($n = 487$) participants. Greek-life members reported significantly less resistance to peer influence ($M = 22.91, SD = 5.26$) in comparison to non-Greek-life members ($M = 24.67, SD = 6.29$), $t(601) = -2.78, p = .006, d = 0.23$ (small effect size).

No significant differences were found between Greek and non-Greek-life members with regard to traits of Internal Restlessness. Although Greek-life members reported greater levels of Restlessness ($M = 19.27, SD = 6.59$) in comparison to non-Greek-life members ($M = 18.86, SD = 7.07$), these differences were not significant, $t(595) = -.56, p = 0.58$. Greek-life members reported similar levels of Impulsivity ($M = 8.79, SD = 3.29$) in comparison to non-Greek-life members ($M = 8.47, SD = 3.75$), $t(603) = .81, p = .42$, as well as similar levels of Disorganization ($M = 10.22, SD = 3.24$) in comparison to non-Greek-life members ($M = 10.02, SD = 3.33$), $t(603) = .57, p = .57$. Moreover, non-Greek-life members ($M = 34.32, SD = 9.78$) reported similar levels of Distractibility as Greek-life members ($M = 34.09, SD = 9.86$), $t(591) = -.22, p = .822$. See summaries of scores for each group in Table 2.

Psychosocial Variables and NMUPS

Correlational analyses tested the hypothesis that NMUPS (excessive use of own prescription, and misuse of stimulants without prescription both 30-day and lifetime use) would have significant positive relationships with all psychosocial variables of interest in this study (Sensation Seeking (SSS), Resistance to Peer Influence (RPI) and all factors of the Internal Restlessness Scale (IRS): Distractibility, Restlessness, Impulsivity, and Disorganization). No significant correlations were found between NMUPS (excess with prescription) and the psychosocial variables; however, significant positive correlations were found between NMUPS (without prescription) and a number of the psychosocial variables. Specifically, lifetime NMUPS (without prescription) was significantly positively correlated with Sensation Seeking ($r = .16, p < .001$), Internal Restlessness: *Disorganization* ($r = .14, p < .001$) and *Impulsivity* ($r = .13, p = .001$). Additionally, 30-day NMUPS (without prescription) was significantly positively

correlated with Sensation Seeking ($r = .14, p < .001$), Internal Restlessness: *Disorganization* ($r = .17, p < .001$) and *Impulsivity* ($r = .11, p = .009$). See Table 1 for full correlational analysis.

Predicting General NMUPS

To test the hypotheses that peer influence can account for a significant proportion of the variance in NMUPS (without prescription), beyond that already accounted for by sensation seeking and internal restlessness traits, a series of hierarchical multiple regression analyses (HMR) were performed: one model for the prediction of lifetime NMUPS (without prescription) and one model for the prediction of short-term NMUPS (without prescription) over the past 30 days, respectively. For each model, the predictor variables entered into step 1 of the HMR included Sensation Seeking and the four subscales of Internal Restlessness Scale (Disorganization, Restlessness, Distractibility, and Impulsivity). In step 2, Resistance to Peer Influence was added to each regression equation.

Prior to interpreting the results of 30-day NMUPS (without prescription) HMR, several assumptions were evaluated. First, stem-and-leaf plots and box plots indicated that each variable in the regression was normally distributed and free from univariate extreme outliers. Second, inspection of the normal probability plot of standardized predicted values indicated that the assumptions of normality, linearity and homoscedasticity of residuals were met. Third, Mahalanobis distance did not exceed the critical value χ^2 for $df = 6$ ($\alpha = .001$) of 22.46 for any cases in the data file, indicating that multivariate outliers were not of concern. Fourth, relatively high tolerances for both predictors in the regression model indicated that multicollinearity would not interfere with our ability to interpret the outcome of the HRA.

In step 1 of the HRA, sensation seeking and subscales of internal restlessness accounted for a significant 5.4% of variance in 30-day NMUPS (without prescription), ($R^2 = .05$,

adjusted $R^2 = .05$, $F(5, 548) = 6.25$, $p < .001$). On step 2, the Resistance to Peer influence scale was entered into the regression equation and accounted no additional variance, $\Delta R^2 = .00$, $\Delta F(1, 547) = .12$, $p = .73$). In total, the six predictor variables accounted for 5.4% of the variance, $R^2 = .05$, adjusted $R^2 = .04$, $F(6, 547) = 5.22$, $p < .001$. The unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), for the full model are reported in Table 3. Specifically, three of the predictor variables significantly contributed to the capturing of variance above and beyond other variables in the model, including: Sensation Seeking ($p = .003$), Impulsivity ($p = .02$) and Disorganization ($p = .001$).

Prior to interpreting the results of lifetime NMUPS (without prescription) HMR, several assumptions were evaluated. First, stem-and-leaf plots and box plots indicated that each variable in the regression was normally distributed and free from univariate extreme outliers. Second, inspection of the normal probability plot of standardized predicted values indicated that the assumptions of normality, linearity and homoscedasticity of residuals were met. Third, Mahalanobis distance did not exceed the critical value χ^2 for $df = 6$ ($\alpha = .001$) of 22.46 for any cases in the data file, indicating that multivariate outliers were not of concern. Fourth, relatively high tolerances for both predictors in the regression model indicated that multicollinearity would not interfere with our ability to interpret the outcome of the HRA.

In step 1 of the HRA, sensation seeking and subscales of internal restlessness accounted for a significant 5.3% of variance in lifetime NMUPS (without prescription), ($R^2 = .05$, adjusted $R^2 = .05$), $F(5, 548) = 6.16$, $p < .001$). On step 2, the Resistance to Peer influence scale was entered into the regression equation and accounted for no additional variance, $\Delta R^2 = .00$, $\Delta F(1, 547) = .005$, $p = .96$). In total, the six predictor variables accounted for 5.3% of the variance, $R^2 = .05$, adjusted $R^2 = .04$, $F(6, 547) = 5.12$, $p < .001$. The unstandardized regression

coefficients (B) and intercept, the standardized regression coefficients (β), for the full model are reported in Table 4. Specifically, three of the predictor variables contribute significantly contribute to predicting variance above and beyond other predictor variables in the model including: Sensation Seeking ($p = .001$), Impulsivity ($p = .02$) and Disorganization ($p = .02$).

Greek life, Peer Influence, and NMUPS

A series of moderation analyses examined the extent to which Greek-life affiliation affects the strength of the resistance to peer influence-NMUPS (without prescription) relationship, 30-day and lifetime use, respectively.

The first moderation analysis tested the prediction that Greek-life affiliation would strengthen the relationship between RPI and NMUPS (without prescription) across lifetime. In the first step, two variables were included: RPI and Greek-life affiliation. These variables accounted for a non-significant amount of variance in frequency of lifetime NMUPS (without prescription), $R^2 = .002$, $F(2, 132) = .14$, $p = .87$. To address multicollinearity concerns, the RPI and Greek-life variables were centered, and an interaction term between RPI and Greek life was created using the PROCESSv3.0 macro created by Hayes in SPSS.

In step two, the RPI and Greek life interaction term was added to the regression model, which accounted for a non-significant proportion of the variance in frequency of lifetime NMUPS (without prescription), $\Delta R^2 = .01$, $\Delta F(1, 131) = 1.09$, $p = .30$, $b = .38$, $t(131) = 1.04$, $p = .30$. These results indicate that resistance to peer influence is not related to the frequency of NMUPS (without prescription) across lifetime, and Greek-life affiliation is not a moderator of these two variables.

The second moderation analysis tested the prediction that Greek-life affiliation would strengthen the relationship between RPI and NMUPS (without prescription) across 30 days. In

the first step, two variables were included: RPI and Greek-life affiliation. These variables accounted for a non-significant amount of variance in frequency of 30-day NMUPS (without prescription), $R^2 = .12$, $F(2, 25) = 1.67$, $p = .21$. To address multicollinearity concerns, RPI and Greek-life variables were centered, and an interaction term between RPI and Greek life was created using the PROCESS v3.0 macro created by Hayes in SPSS.

In step two, the RPI and Greek life interaction term was added to the regression model, which accounted for a non-significant proportion of the variance in frequency of 30-day NMUPS (without prescription), $\Delta R^2 = .00$, $\Delta F(1, 24) = .01$, $p = .93$, $b = .07$, $t(24) = .09$, $p = .93$. These results indicate that resistance to peer influence is not related to the frequency of NMUPS (without prescription) across 30 days, and Greek-life affiliation is not a moderator of these two variables.

Assessing Risk of NMUPS

A series of odds ratio (risk) analyses were used to determine the probability of an individual endorsing NMUPS (without prescription) based on gender and childhood geographic region. First analyzed was the association between childhood geographic region and reported NMUPS (without prescription) over the past 30 days. See full summary of odds ratio analyses in Table 5. While the odds ratio for NMUPS (without prescription) produced a value above 1 (OR = 1.06), suggesting significance, the 95% confidence interval (.46, 2.41) failed to support a significant strength in probability at $\alpha = .05$. Therefore, while results suggest individuals who are from rural areas are more likely to report NMUPS (without prescription) over the past 30 days in comparison to those from non-rural areas, because of the lower level confidence interval being below 1, this association cannot be said with confidence.

The second odds ratio analysis examined the association between childhood geographic region and reported NMUPS (without prescription) across lifetime. See full summary of odds ratio analyses in Table 6. The odds ratio for NMUPS (without prescription) produced a value of 1.51 with a 95% confidence interval (1.03, 2.32), indicating that individuals from rural areas are significantly more likely to report lifetime NMUPS (without prescription) than those from non-rural areas. In other words, the odds of engaging in NMUPS (without prescription) in one's lifetime is 1.51 times greater for those raised in rural regions than those raised in suburban or urban regions.

The third and fourth odds ratio analyses examined the association between gender and NMUPS (without prescription). The third odds ratio analyzed the association between gender and reported NMUPS (without prescription) over the last 30 days. See full summary of odds ratio analyses in Table 7. While the odds ratio for NMUPS (without prescription) produced a value above 1 (OR = 1.93), the 95% confidence interval (.83, 4.47) failed to support a significant strength in the probability of risk at $\alpha = .05$. In other words, the results suggest a trend for males being more likely to report NMUPS (without prescription) over the past 30 days than women; however, the strength of the association cannot be said with confidence.

The fourth odds ratio analyzes the association between gender and NMUPS (without prescription) across lifetime. See full summary of odds ratio analyses in Table 8. Again, while the odds ratio for NMUPS (without prescription) produced a value above 1 (OR = 1.12), the 95% confidence interval (.74, 1.68) failed to support a significant strength in probability at $\alpha = .05$. In other words, the results suggest a trend for males being more likely to report NMUPS (without prescription) across lifetime than women, yet the strength of the association cannot be said with confidence.

Chapter 5

DISCUSSION

The current study sought to provide a greater understanding of how psychosocial variables may serve as predictive factors for NMUPS among undergraduate students. Currently, researchers have largely focused on understanding NMUPS in the context of motivational factors associated with stimulant use, namely to improve academic performance, increase concentration during class, and maintain focus during late night study sessions (McCabe et al., 2007). However, a growing body of research exists regarding the psychological variables linked with NMUPS, including internal restlessness and sensation seeking as predictors of NMUPS (without prescription). Furthermore, Greek-life students have been identified as an at-risk subgroup for the misuse of stimulant medications (DeSantis & Hane, 2010; Rabiner et al., 2009; Shillington, Reed, Lange, Clapp, & Henry, 2006; Teter et al., 2006; Weyandt et al., 2009); thus this study sought to measure various social and psychological variables between Greek-life members and the general undergraduate student population.

Preliminary research has identified a model of NMUPS (without prescription) involving internal restlessness and sensation seeking, such that students who endorse high levels of internal restlessness and sensation seeking engage more frequently in NMUPS (without prescription) (Weyandt et al., 2009). This study assessed the additional role of resistance to peer influence in a pre-existing model of NMUPS (without prescription). Moreover, this study explored the extent to which Greek-life affiliation moderates the strength in the relationship between resistance to peer influence and NMUPS (without prescription). Lastly, no previous studies have measured rurality as a demographic variable of interest when looking at NMUPS (without prescription). In efforts to further understand the role of rurality in NMUPS (without prescription), this study

investigated the extent to which rurality is a risk factor for engagement in NMUPS (without prescription) among undergraduate students.

Understanding Psychosocial Factors in NMUPS

The main focus of this study was to determine the role of social factors (i.e., peer influence) and psychological factors (i.e., internal restlessness, sensation seeking traits) in the rate of reported NMUPS among undergraduate students, specifically, looking at the differences between Greek-life and non-Greek-life students. In this study a number of the hypotheses were supported. Overall, the results revealed replication of the psychological model of NMUPS (without prescription) identified by Weyandt and colleagues (2009).

Preliminary analyses revealed positive and significant relationships among sensation seeking and all subscales of internal restlessness, suggesting higher levels of sensation seeking typically are accompanied by higher levels of impulsivity, disorganization, restlessness, and distractibility. Additionally, we found sensation seeking and internal restlessness, specifically aspects of impulsivity and disorganization, were linked with NMUPS (without prescription) and, when taken together, predicted greater frequency of NMUPS (without prescription) in an undergraduate student sample. In other words, college students who endorsed higher levels of sensation seeking, impulsive tendencies, and disorganization were more likely to engage in NMUPS (without prescription) both short- and long-term. These findings are consistent with a growing body of research which has established links among sensation seeking, internal restlessness, and NMUPS (without prescription) (e.g., Bavarian, Flay, Ketcham, Smith, 2013; Haratung et al, 2014; Ponnet, Wouters, Walrave, Heirman, & Van Hal, 2015). Ultimately these findings reinforce the importance of investigating psychological risk factors of NMUPS, specifically those characterized by risk taking and action without forethought.

Preliminary analyses revealed Greek-life members reported significantly less resistance to peer influence in comparison to non-Greek-life members. While RPI was not linked with NMUPS, Greek-life students appear to be generally less resistant to social influence than non-Greek-life students. Prior research has found that socialization processes within Greek-life organizations contribute to greater instances of risk behaviors (e.g., problematic alcohol use, drug use) (Read et al., 2005; Scott-Sheldon, Carey, & Carey, 2008). In contrast, some evidence also suggests positive outcomes as the result of social involvement in Greek-life organizations, including greater cognitive gains among Greek-life students compared to non Greek-life students (Pike, 2003). The discrepancies in this research highlight the importance of investigating the underlying social factors of risky behaviors, specifically NMUPS, among Greek-life students in order to develop group-specific treatment modalities.

Our main hypothesis, that a measure of resistance to peer influence would add predictive validity to an established model of NMUPS (without prescription), was not supported. Specifically, resistance to peer influence was not significantly related to NMUPS (without prescription), thus Greek-life affiliation did not serve as a moderator. To our knowledge, this was the first time the Resistance to Peer Influence scale was used to measure social influences in NMUPS (without prescription). One plausible explanation for the non-significant results could be this measure failed to capture the type of peer influence most salient among undergraduate students.

While the RPI measures the degree to which individuals report acting autonomously in interactions with their peers, it does not include information on perceptions of peers' behaviors or reports of their own behavior. The theory of Normative Social Behavior (Rimal & Real, 2005), which has been used to explain substance use behaviors and social influences among

users, proposes descriptive norms (perception of what others do) and injunctive norms (perception of outcomes of the behavior) influence one's decision to engage in substance use behaviors. Literature on alcohol use supports the notion that perception of social norms is significantly and positively associated with more frequent alcohol use. For instance, Cashin, Presley and Meilman (1998) found that heavy drinking norms established by Greek-life leadership was the biggest predictor of greater alcohol when comparing Greek-life members to non-Greek-life members. Similarly, when comparing social norms, demographics, drinking motives and alcohol expectancies, Neighbors and colleagues (2007) found social norms to be the best predictor of heavier alcohol consumption among undergraduate students. Furthermore, Wood, Read, Palfai, and Stevenson (2011) found passive social influence, including social modeling and perceived norms, was significantly and more positively associated with alcohol use and related problems than active social influence (i.e., offers to drink alcohol).

It is also possible that social influences, other than peer influence, could be at play for college students engaging in NMUPS. Cooper (1994) proposed two distinct social motivational factors of alcohol use: enhancement (drinking to improve social interactions) and conformity (drinking due to social pressure to fit in). Resistance to peer influence falls within the conformity type of social influence, therefore, it could be possible that the undergraduate population is more likely to engage in NMUPS to enhance a social experience (i.e., taking stimulants to stay up longer with their friends). Similarly, research has shown stronger endorsement of social enhancement motivation is associated with higher frequency and quantity of drinking whereas stronger endorsement of conformity motives were associated with lower levels of drinking (Kuntsche et al., 2005; Littlefield et al., 2010). It is possible the results were insignificant due to

the fact Greek-life members' engaging in NMUPS is better explained by motivation to improve social interactions as opposed to feeling pressured by their peers to use.

It is also possible peer influence does not play a significant role in NMUPS in the college population. The top two reasons for using NMUPS reported by participants in the current study were "to better concentrate in class" and "to better concentrate while studying." This is consistent with the previous literature which has identified improving academic performance and increasing concentration while studying and in class as the primary motivations behind undergraduate NMUPS (e.g., McCabe et al., 2007; Teter et al., 2010; Rabiner et al., 2009).

Assessing NMUPS Risk

To date, no studies have explored geographic status in relation to stimulant misuse among undergraduate students. Exploratory analyses revealed rurality status as a significant risk factor for NMUPS (without prescription) across lifetime. Specifically, students from rural areas were significantly more likely to misuse prescription stimulants in comparison to suburban and urban counterparts. These results are consistent with the previous literature on research on substance use among rural populations. For instance, problematic alcohol use tends to be more frequent and more severe among rural populations (Brody et al., 1997; Lambert et al., 2008), and lifetime nonmedical prescription drug use is significantly greater among rural youths than urban populations (Ford, 2009; Havens et al., 2007; MCAuley et al., 2009). In particular, Havens et al. (2007) found that, when controlling for sociodemographics, health, and other lifetime drug use, living in a rural area was independently significantly linked with greater instances of NMUPS (without prescription).

The current finding is notable given the importance of identifying risk factors when developing effective intervention and prevention techniques for substance use. The greater

number of risk factors an individual is exposed to the more likely they are to engage in problematic substance use. Therefore, by identifying rurality as a risk factor, we are adding to a more inclusive list of NMUPS risk factors, which clinicians can then use to more accurately assess, and individual's risk for use. Additionally, rural areas are considered underserved population regarding mental health care. Data collected by the Department of Health and Human Services calls attention to 2,000 rural counties which are considered mental health professional shortage areas (HRSA, 2012). Within these rural counties, 60% of people are impacted by shortages of mental health professionals resulting in unmet treatment needs. It is possible that unmet treatment needs and limited access to mental health care could contribute to self-medicating with prescription stimulants once the individual is placed in an environment where these medications are more readily available (i.e., college campuses).

Limitations and Future Directions

Although this study is one of the first to explore psychosocial factors associated with NMUPS use in a college population, with an emphasis on Greek-life affiliation, it is not without its limitations. Peer influence as a construct has proven difficult to accurately assess through the use of self-report measures. The RPI as a self-report measure only accounts for the individual's perception of their own ability to resist peer influence; it does not assess actual behavior in comparison to the behaviors of their peers. Moreover, the need to appear socially desirable may have biased the results. Specifically, King and Brunner (2000) found that answering in a socially desirable manner is most likely to occur when measures consist of socially sensitive content. Furthermore, researchers of peer influence have found that when using self-report measures, participants' own reports regarding their level of resistance to peer influence may be undermined by their own lack of awareness (Hoza, Pelham, Dobbs, Owens, & Pillow, 2002; Prinstein &

Wang, 2005). Social desirability and lack of self-awareness could have contributed to the manner of responding in the current sample, which may have impacted the results. To address this limitation in future research, it would be useful to include a measure of social desirability to determine whether or not a participant's response style is undermining the validity of the self-report measures included within the study.

The sample composition of the current study may have also impacted the power of the current findings. Although the sample size was a relative strength ($N = 618$), the representativeness of Greek-life fraternity members was disproportionately low; with only 16% ($n = 19$) of the males in the current sample affiliating with Greek-life organizations. In this study, participants consisted of undergraduate psychology students who volunteered to participate for extra credit in their classes. Future research should focus on ways to acquire a representative number of students from sororities and fraternities on campus. One way to address this underrepresentation of fraternity members could be to reach out to each of the university's fraternities and sororities to provide equal opportunity for all organizations to participate.

The cross-sectional design of the current study could also be considered a limitation. While no causal inferences can be made from the results, the current findings were consistent with the previously identified model of NMUPS (without prescription). It would be beneficial for future research to use experimental designs to gain a more specific understanding of the underlying psychological mechanisms of NMUPS (without prescription). Specifically, instead of using a self-report measure to assess peer influence, future studies could utilize an experimental social component. This component would measure intent to engage in a behavior in an environment where the target behavior is either endorsed or not endorsed.

Going forward with NMUPS research, given what we know about social influences on alcohol and other types of substance use, it will be important to focus on identifying specifically what facets of peer influence and other social factors predict NMUPS. Furthermore, future studies should include geographic region as a demographic variable of interest when studying NMUPS.

Conclusion

In conclusion, the results provided support for an already identified model of NMUPS (without prescription) that includes Internal Restlessness and Sensation Seeking. Although this was not the primary focus of this study, it provides support for existing literature and theory. Additionally, the results identified information that could prove useful in developing interventions and prevention techniques. Identifying other arousing and novel experiences to replace prescription stimulant misuse could be an effective intervention for individuals high in sensation seeking. In addition, results indicate that it would be a beneficial treatment approach to help students who engage in NMUPS (without prescription) with their time management and organizational skills to help them be more effective and efficient while studying and decrease their perceived need to use stimulants.

Furthermore, the results of the study found that students from rural areas are more likely to engage in greater instances of NMUPS (without prescription) across lifetime than students from urban or suburban areas. This is clinically relevant because it provides support for the importance of integrating cultural components into conceptualization and treatment of this population. Overall, the main hypothesis was not supported, no relationship was found between RPI and NMUPS (without prescription). Although RPI was not linked with NMUPS (without prescription), Greek-life students reported significantly less resistance to peer influence than

non-Greek-life students. Determining which social influences are linked with NMUPS (without prescription) among undergraduate students will be important in helping universities to develop prevention and intervention techniques based on at risk subgroups.

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TABLE 1

Table 1. *Intercorrelations between NMUPS and Psychosocial Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. NMUPS (excess with prescription)	--								
2. NMUPS (lifetime without prescription)	.33	--							
3. NMUP (30 day without prescription)	.36	.52**	--						
4. IRS_Distractibility	-.32	.06	.05	--					
5. IRS_Restlessness	-.20	.04	.03	.71**	--				
6. IRS_Impulsivity	-.09	.13**	.11**	.64**	.52**	--			
7. IRS_Disorganization	.41	.14**	.17**	.32**	.26**	.31**	--		
8. SSS	.14	.16**	.14**	.15**	.13**	.10*	.16**	--	
9. RPI	.16	-.01	.01	-.04	.01	-.08	-.06	-.04	--

Note: NMUPS = Nonmedical Use of Prescription Stimulants; IRS = Internal Restlessness; SSS = Sensation Seeking; RPI = Resistance to Peer Influence

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

TABLE 2

Table 2. *Summary scores of measures between Greek life members and Non Greek-life members*

	Greek Status	N	Mean	SD
RPI Total	Greek	116	22.91	5.26
	Non Greek	487	24.67	6.29
SSS Total	Greek	113	19.06	2.63
	Non Greek	485	18.89	2.42
IRS_Distractibility	Greek	111	34.09	9.86
	Non Greek	482	34.32	9.78
IRS_Restlessness	Greek	113	19.27	6.59
	Non Greek	484	18.86	7.07
IRS_Impulsivity	Greek	112	8.79	3.29
	Non Greek	493	8.48	3.75
IRS_Disorganization	Greek	115	10.22	3.24
	Non Greek	490	10.02	3.33

Note: IRS = Internal Restlessness; SSS = Sensation Seeking; RPI = Resistance to Peer Influence

TABLE 3

Table 3. *Unstandardized regression coefficients, Intercept, and Standardized Regression Coefficients for 30-day NMUPS (without prescription)*

Variable	<i>B</i> (95% CI)	β	Sr^2
IRS (Distractibility)	-.003(-.012, .006)	-.046	-.029
IRS (Restlessness)	-.006 (-.017, .005)	-.061	-.043
IRS (Impulsivity)	.023(.003, .043)	.125	.097*
IRS (Disorganization)	.030 (.012, .047)	.146	.139**
SSS	.034 (.012, .056)	.126	.126**
RPI	.002 (-.007, .011)	.015	.015

Note: IRS = Internal Restlessness; SSS = Sensation Seeking; RPI = Resistance to Peer Influence

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

TABLE 4

Table 4. *Unstandardized regression coefficients, Intercept, and Standardized Regression Coefficients for lifetime NMUPS(without prescription)*

Variable	B (95% CI)	β	Sr^2
IRS (Distractibility)	-.001 (-.022, .021)	-.004	-.003
IRS (Restlessness)	-.018 (-.045, .009)	.014	-.055
IRS (Impulsivity)	.055 (.008, .102)	.125	.097*
IRS (Disorganization)	.053 (.010, .095)	.109	.104*
SSS	.09 (.041, .148)	.146	.146**
RPI	-.001 (-.022, .0021)	-.003	-.003

Note: IRS = Internal Restlessness; SSS = Sensation Seeking; RPI = Resistance to Peer Influence

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

TABLE 5

Table 5. *Participant endorsement of 30-day NMUPS (without prescription) and Childhood Geographic Region*

NUMPS	Rural	Suburban/Urban	Total
Yes	13	16	29
No	47	61	108
Total	60	77	137

Note: NMUPS = Nonmedical Use of Prescription Stimulants

TABLE 6

Table 6. *Participant endorsement of lifetime NMUPS (without prescription) and childhood geographic region*

NUMPS	Rural	Suburban	Urban	Total
Yes	59	77		136
No	160	316		476
Total	219	393		612

Note: NMUPS = Nonmedical Use of Prescription Stimulants

TABLE 7

Table 7. *Participant endorsement of 30-day NMUPS (without prescription) and gender*

Preference	Man	Woman	Total
Non-Alcohol	13	16	29
Alcohol	32	76	108
Total	45	92	137

Note: NMUPS = Nonmedical Use of Prescription Stimulants

TABLE 8

Table 8. *Participant endorsement of lifetime NMUPS (without prescription) and gender*

Preference	Man	Woman	Total
Non-Alcohol	45	91	136
Alcohol	144	326	470
Total	189	417	606

Note: NMUPS = Nonmedical Use of Prescription Stimulants