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I, Oladunni A. Oluwoye, hereby submit this original work as part of the requirements for the degree of Doctor of Philosophy in Health Education.

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The Nonmedical Use of Prescription Drugs and Other Substance Use among College Students

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Nonmedical Use of Prescription Drugs and Other Substance Use among College Students

A dissertation submitted to the Graduate School
of the University of Cincinnati in partial fulfillment of the requirements for the degree of

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by

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Abstract

AN ABSTRACT OF THE DISSERTATION FOR THE DOCTOR OF PHILOSOPHY DEGREE IN HEALTH PROMOTION AND EDUCATION, PRESENTED ON THE 16TH MARCH, 2016 AT THE UNIVERSITY OF CINCINNATI, CINCINNATI, OH

TITLE: Nonmedical Use of Prescription Drugs and Other Substance Use among College Students.

DOCTORAL COMMITTEE MEMBERS: Dr. Laura A. Nabors (chair), Dr. Ashley L. Merianos, and Dr. Rebecca A. Vidourek.

For this dissertation, two studies were conducted. The first part of the abstract addresses study one and the second part reviews study two. Study one examined nonmedical use of prescription drugs and potential risk factors associated with misuse among college students. Study two examined the nonmedical use of prescription stimulants and other types of substance use among college students.

Study One Abstract

Over 1.5 million young adults aged 18 to 25 years have engaged in the nonmedical use of prescription drugs (NMUPD) in the United States. This study examined self-reported NMUPD (i.e., depressants, opioids, and stimulants) and demographic factors potentially associated with misuse. Four hundred and seventeen undergraduate students from a large Midwestern university completed a survey on the NMUPD. Results indicated that since entering college, 2.8% of undergraduate students reported the nonmedical use of depressants, 9.6% reported opioid misuse, followed by 28.5% for the nonmedical use of stimulants. The majority of the students (77%) reported residing off-campus. Of the entire sample, approximately 15.2% engaged in collegiate sports and 10.1% were involved in a Greek organization. Logistic regression analyses revealed
undergraduate students who resided off-campus were three times more likely to engage in the nonmedical use of prescription stimulants. Findings for the nonmedical use of prescription depressants and opioids among college students were not significant. These findings have important implications in the development of prevention programming on college campuses aimed at decreasing the NMUPD among students.

Study Two Abstract

The purpose of this study was to further investigate the nonmedical use of prescription stimulants and other drugs among college students. A total of 417 undergraduate college students completed a survey in Fall 2015 (same sample as for Study 1). Approximately 28.5% of students indicated they had engaged in the nonmedical use of prescription stimulants since entering college. Eighty-eight percent reported consuming alcohol, 56.4% had used marijuana, 9.1% had used cocaine, and 11.8% had used hallucinogens. Findings revealed that nonmedical use of prescription stimulants was a significant predictor of alcohol, marijuana, cocaine, and hallucinogen use among college students. Results also found that males were more likely to use hallucinogens compared to females and Whites were more likely to consume alcohol and use cocaine compared to other racial/ethnic groups. College students’ attitudes and knowledge of associated risk factors is essential for creating appropriate programs. Increasing university programs that emphasize educating students about the dangers of NMUPD and improving knowledge about prescription drugs and the legal ramifications of misuse can potentially decrease misuse among college students.
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Study One: Nonmedical Use of Depressants, Opioids, and Stimulants among College Students
INTRODUCTION

According to the National Institute on Drug Abuse (NIDA), prescription drugs such as stimulants, opioids, and depressants are the most commonly misused classes of prescription drugs (NIDA, 2014). The National Survey on Drug Use and Health (NSDUH) has defined the nonmedical use of prescription drugs (NMUPD) as the use of a prescription drug without a prescription acquired by that specific individual or use of prescription drugs to experience the feeling of that drug (Substance Abuse and Mental Health Services Administration, 2015). In 2013, an estimated 2.4 million Americans engaged in NMUPD for the first time (Substance Abuse and Mental Health Services Administration, 2014). Recent studies revealed that young adults who are enrolled as undergraduate students have a higher rate of NMUPD than young adults of the same age range not enrolled in a university (Herman-Stahl, Krebs, Kroutil, & Heller, 2007; Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015). Several studies have also found that males are more likely than women to report NMUPD (Garnier-Dykstra, Caldeira, Vincent, O'Grady, & Arria, 2012; McCabe, Teter, & Boyd, 2006). Further research is needed within this area and specifically among college students, a high risk group for misuse of prescription medications.

Current research suggests that there has been an increase in NMUPD over the past decade among young adults, placing this population at increased risk for addiction (McCabe, West, Teter, & Boyd, 2014; Weiss et al., 2010). Further, young adults between the ages of 18 to 25 years have the highest rate of NMUPD such as use of pain relievers, tranquilizers, and stimulants compared to adolescents (12 to 17 years) and older adults (26 years and older) (Substance Abuse and Mental Health Services Administration, 2015). Additionally research investigating, NMUPD among college students is needed to determine who misuses these drugs and specific factors that
influence use in order to inform education and prevention programs (DeAndrea, Troost, & Anthony, 2013).

**Rates of NMUPD among Undergraduate Students**

A study conducted among college students examining NMUPD found that 2.9% of students engaged in the nonmedical use of prescription depressants (Rozenbroek & Rothstein, 2011). Previous studies have investigated the prevalence of misuse of various prescription drug classes. Prior research examining NMUPD found the following: 26% of students engaged in the nonmedical use of stimulants, 13% misused depressants, and 27% misused opioids (Peralta & Steele, 2010). Nonmedical use of opioids or pain relievers is common for college students (Lord et al., 2009; Vidourek, King, & Knopf, 2010). Recent survey data from the NSDUH (2015) revealed that approximately, 2.8% of young adults reported misusing pain relievers in the past month. More specifically, one study reported that 18% of young adults misused prescription opioids in their lifetime and of those 91% misused opioids in the past year (Lord, Brevard, & Budman, 2011).

Although the previously mentioned studies found opioids to be the most commonly misused prescription drug, other studies have indicated that stimulants are the most widely misused prescription drugs (Bavarian, Flay, Ketcham, & Smit, 2013; McCabe, Knight, Teter, & Wechsler, 2005; McCabe et al., 2006; Rozenbroek & Rothstein, 2011). One study indicated that 25% of undergraduates reported nonmedical use of stimulants (Bavarian et al., 2013). Results from the Monitoring the Future (MTF) study indicated that 11.2% of undergraduate students have reported nonmedical use of stimulants, such as Adderall and Ritalin, in the past year (Johnston et al., 2015). Regarding lifetime and past year misuse of stimulants, research has found
that 8.1% of undergraduate students reported misuse over the years and 5.4% reported misuse in the past year (McCabe et al., 2006).

**Initiation of NMUPD**

Understanding the first time initiation of the NMUPD among students is important when developing prevention programming which can be used to target crucial points in development and use (DeAndrea et al., 2013). Previous research suggests that first time NMUPD generally occurs during high school years (Austic, 2015; Kecojevic et al., 2012; Mui, Sales, & Murphy, 2014). A study that included 120 college students reported the mean age of 16 years for when they began misusing prescription stimulants (Mui et al., 2014). Another study reported the age at which young adults first engaged in opioid misuse was 14.9 years, tranquilizer misuse occurred at 15.6 years, and stimulant misuse occurred at 11.5 years (Kecojevic et al., 2012).

**Undergraduate Students’ Sources for Prescription Drugs**

Concerning sources of NMUPD, there is a large of body literature examining how students obtain prescription drugs for nonmedical purposes (McCabe & Boyd, 2005; McCabe, Cranford, Boyd, & Teter, 2007; Vrecko, 2015). Research indicates that the diversion of prescription drugs among college students occurs primarily among friends and family members (Atkins, 2011; Bavarian et al., 2013; Brandt, Taverna, & Hallock, 2014; Garnier-Dykstra et al., 2012). A longitudinal study consisting of 1,253 college students found that the most common source of prescription drugs for nonmedical use came from a friend with a prescription (73.9% - 78.3%), followed by a roughly 14.9% to 21.3% from a friend without a prescription (Garnier-Dykstra et al., 2012). Another study found that 30.4% of college students obtained prescription drugs for misuse from acquaintances and 11.9% obtained prescriptions from family members (Bavarian et al., 2013).
Extracurricular Activities and the NMUPD among Undergraduate Students

The literature suggests that extracurricular activities serve as protective factors against risky behaviors (i.e., substance use) during adolescence (Moilanen, Markstrom, & Jones, 2014). However, as adolescents reach their young adult years, research has shown that extracurricular activities, such as sports and clubs, paradoxically can become a predictor for increased risk for substance use (Eitle, Turner, & Eitle, 2003; Peck, Vida, & Eccles, 2008). Previous studies have suggested that students involved in collegiate sports are isolated from the student population and only tend to intermingle with other athletes (Harvey, 1999). There has been much comparison and similarities to belonging to a fraternity or sorority to involvement in collegiate sports (Hutching, Hummer, & LaBrie, 2011). Thus, students within these groups who are vulnerable to the misuse of medications may gain access to sources to buy and obtain drugs through others involved in the same extracurricular activities. Consequently, it not surprising that previous studies have indicated that students’ involvement in fraternity and sorority organizations and athletic involvement are risk factors for substance use (McCabe et al., 2006).

The National College Health Assessment revealed that members of fraternities and sororities have increased prevalence rates of use compared to nonmembers (American College Health Association, 2014). Other research has also shown that students engaged in fraternity and sorority organizations are at an increased risk for substance use (Bavarian, Flay, & Smit, 2014; DeSantis, Webb, & Noar, 2008; Maggs, Williams, & Lee, 2011; McCabe et al., 2005; Scott-Sheldon, Carey, & Carey, 2008). Interestingly, undergraduates participating in fraternities and sororities are two times more likely to misuse prescription stimulants (Gomes, Song, Godwin, & Toriello, 2011; McCabe et al., 2005). One study found that roughly 10% of students are members of a fraternity or sorority (Sidani, Shensa, & Primack, 2013); thus, quite a few students
are involved in these organizations and are at risk for increased exposure to prescription drug misuse.

Previous studies have found that participation in sports is a risk factor for substance use among college student athletes (Martens, Dams-O'Connor, & Beck, 2006; Yusko, Buckman, White, & Pandina, 2008). Specifically, some have reported that undergraduate student athletes are more likely to report the nonmedical use of prescription stimulants and opioids than undergraduate students not involved in sports (Ford, 2008; Veliz, Epstein-Ngo, Austic, Boyd, & McCabe, 2015). Conversely, one study examined the differences in past year nonmedical use of stimulants between athletes and non-athletes; findings indicated that athletes were significantly less likely to engage in past year use compared to non-athletes (Gallucci & Martin, 2015).

**Living Arrangements and Substance Use among Undergraduate Students**

Literature has generally categorized living arrangements among college students into on-campus (i.e., residential halls, fraternity/sorority housing) and off-campus (i.e., living with parents, apartments) housing (Bozick, 2007; Ward & Gryczynski, 2009). According to the 2014 National College Health Assessment, 40.1% of students lived in on-campus housing, 38.6% lived in off-campus housing (separated from family members), and 9.7% lived at home with a parent or guardian (American College Health Association, 2014). Several studies have examined the association between college students’ living arrangements and substance use (Roemer & Walsh, 2014; Sidani et al., 2013). Much of this research has focused on the association between living arrangements and alcohol and marijuana use (Fromme, Corbin, & Kruse, 2008; Gold & Nguyen, 2009; Ward & Gryczynski, 2009). For instance, researchers found that students living on campus reported higher levels of drinking compared to students living off-campus (Wechsler,
Lee, Gledhill-Hoyt, & Nelson, 2001). Information is needed on college students’ NMUPD and associated factors; the current study contributes to knowledge in this area.

**Study Purpose**

Addressing the impact of college related factors on NMUPD among students contributes to the existing body of literature and can possibly inform prevention programming and policies on campuses. The purpose of this study was to examine NMUPD among college students based on sex, living arrangements, and involvement in two types of extracurricular activities. For the purpose of this study, NMUPD was defined as using prescription drugs in a way that was, “not prescribed to you by a doctor or medical professional or used in another way other than prescribed.” Specifically, the following research questions were examined:

1. What percentage of college students engaged in the recent (past 30 days) and past year nonmedical use of depressants, opioids, and stimulants?
2. What grade were college students in the first time they engaged in the nonmedical use of depressants, opioids, and stimulants?
3. Where do college students report obtaining prescription depressants, opioids, and stimulants for nonmedical use?
4. Do living arrangements and extracurricular activities influence the use of depressants, opioids, and stimulants among college students?

**METHODS**

**Participants**

Four hundred and seventeen undergraduate students between the ages of 18-44 years enrolled at a large Midwestern university in the United States completed surveys. Students were recruited from undergraduate courses offered in the fall semester of 2015. Participation in the
study was voluntary and a university-based institutional review board approved all study materials (see Appendix A).

**Instrument**

Questions were developed to determine participants’ misuse of prescription drugs (i.e., depressants, opioids, stimulants) and reasons for using prescription drugs (Oluwoye, 2016; see Appendix B). NMUPD was defined as using prescription drugs in a way that was, “not prescribed to you by a doctor or medical professional or used in another way other than prescribed.” In addition, alternate names for depressants, opioids, and stimulants were provided to make it easier to recognize the drugs being discussed. Questions were developed after an extensive review of existing literature. Moreover, content validity was established by distributing the survey to three experts in the area of substance use research and they contributed to the questions developed for each section over a series of meetings. Further, questions were similarly structured to questions from national surveys (e.g., NSDUH, ACHA).

**Nonmedical Use of Prescription Drugs**

NMUPD was examined in three sections dedicated to three types of prescription drugs (i.e., depressants, opioids, stimulants). Participants responded “yes” or “no” to the three questions: since entering college, had participants ever engaged in the nonmedical use of depressants, had participants ever engaged in the nonmedical use of opioids, and had participants ever engaged in the nonmedical use of stimulants. Participants were then asked to state the first time they used each type of prescription drug (i.e., depressants, opioids, stimulants) for nonmedical purposes by selecting from the following options: 9th grade or earlier; 10th grade; 11th grade; 12th grade; freshman year; sophomore year; junior year; or senior year. Participants also recorded whom they obtained the prescription from via a list of options (i.e., parent; sibling;
other relative; friend; acquaintance; internet; acquired from a doctor or medical professional for a valid reason but used not as prescribed; other) for each drug. Participants responded “yes” or “no” to questions about past year (12 months) and recent use (past 30 days) for the three drugs.

Demographics

Demographic information was collected for the following areas: age, sex, student classification (i.e., freshman, sophomore, junior, senior), living arrangements, extracurricular activities, and, race/ethnicity.

Procedures

During the course of the fall 2015 academic semester, a total of 417 undergraduate students provided consent and completed the survey. A Research Information Sheet (RIS; see Appendix C) provided information about consent, describing the study purpose, eligibility requirements, that the survey was anonymous (and that no identifying data was to be recorded on the survey), that participation was voluntary, and that the survey would take approximately 10-15 minutes to complete. The RIS stated that returning the survey was consenting to participate in the study. Surveys were collected from undergraduate classes and participants were provided an overview of the study purpose and instructed not to place any identifying information on the survey. Students returned surveys in envelopes. In order to examine test-retest reliability, a separate sample of the students ($n = 27$) completed the survey at a two-week interval, after reading a Research Information Sheet (RIS; this form is presented in Appendix D) developed to describe test-retest methods. Students were informed that participation was voluntary and responses were anonymous. Further, students were asked to provide a unique identifier at the top of the survey and surveys were collected in an envelope once completed. One week later, students were presented with an identical survey and were informed to use the same unique
identifier that they used the first time they completed the survey. Surveys were collected in envelope and later matched using the unique identifiers located at the top of survey with surveys from the initial test.

**Data Analysis**

The Statistical Package for the Social Sciences (SPSS) (Version 22.0) was used to examine the test-retest agreement on responses for items on the survey. SPSS was used to perform frequencies on demographic characteristics and recent and past year misuse of depressants, opioids, and stimulants. Bivariate logistic regression models were conducted to examine the association between living arrangements, sex, and extracurricular activities and student report of nonmedical use of depressants, opioids, and stimulants. Preliminary data indicated that race/ethnicity and age were not related to study variables; these variables were not included in the final model. Extracurricular activities were combined, such that belonging to a fraternity/sorority and involvement in intercollegiate sports indicated extracurricular involvement. Thus, involvement in these two types of activities was compared to non-involvement. Living arrangements were classified as being on-campus versus off-campus.

**RESULTS**

**Reliability of Survey Items**

Twenty-seven undergraduate participants completed surveys at both times. The percentage of students indicating yes and no responses for surveys questions at both times were calculated. Results indicated 100% agreement for study reports for Time 1 and Time 2 for the misuse of opioids and a strong agreement (96.3%) for the answers to the questions on the misuse of depressants and stimulants. Results revealed a statistically significant and perfect agreement for living arrangements $k = 1.000, p < .001$ and a statistically significant finding for extra-
curricular activities $k = .907, p < .001$, indicating an almost perfect agreement. Cohen’s $k$ above .60, suggests adequate agreement and confidence in the findings resulting from the items in the survey (McHugh, 2012).

**Participants’ Demographics**

Undergraduate participants’ characteristics are presented in Table 1.

| Insert Table 1 here |

Overall, 59.1% of the participants were male ($n = 248$) and the majority of participants were white (76.4%). Ages ranged from 18 to 44 years with the mean age of 20 years ($M = 20.58, SD = 2.27$). In regards to living arrangements, 77.1% of participants resided off-campus ($n = 322$) and 22.4% participants resided on-campus ($n = 93$). In terms of student classification, over two-thirds were seniors ($n = 147$). Of the entire sample approximately 15.2% was a member of a fraternity or sorority ($n = 63$) and 10.1% reported engaging in intercollegiate sports ($n = 42$). Overall, since entering college a total of 8.4% ($n = 35$) of participants reported nonmedical use of depressants, 9.6% ($n = 40$) reported nonmedical use of opioids, and 28.5% ($n = 119$) reported nonmedical use of stimulants.

**Recent and Past Year Nonmedical Use of Depressants, Opioids, and Stimulants**

From the sample ($n = 35$) of students who indicated the misuse of depressants, 28.6% ($n = 10$) indicated that they had misused in the past 30 days and 65.7% ($n = 23$) reported misusing depressants in the past 12 months. Forty of the students reported nonmedical use of opioids. Of those 15% ($n = 6$) had misused opioids in past 30 days and 19 (47.5%) had misused opioids in the past 12 months. Overall, from participants who reported engaging in the nonmedical use of stimulants ($n = 119$), 50 (42.2%) reported the nonmedical use of stimulants in the past 30 days and 87 (73.7%) in the past 12 months (Table 2).
First Time Initiation and Source for the Nonmedical Use of Depressants, Opioids, and Stimulants

Findings revealed that of those who indicated the misuse of depressants ($n = 35$), 54.3% ($n = 19$) reported that they first engaged in nonmedical use of depressants while attending college and 45.6% ($n = 16$) indicated first use occurred in high school. Sixty percent ($n = 21$) of participants that reported the misuse of depressants had obtained prescription depressants from a friend (Table 2). Of those who reported nonmedical use of opioids since entering college ($n = 40$), 22 participants (55%) revealed that the first time they engaged in nonmedical use of opioids was while attending college and 18 participants (45%) engaged in misuse of opioids in high school. Twenty-three (57.5%) reported obtaining opioids from a friend. Eighty-two (70.1%) of the participants who reported nonmedical use of stimulants ($n = 119$) indicated that the first time they engaged in the misuse of stimulants was while attending college compared to 29.9% ($n = 35$) indicating that they misused stimulants for the first time in high school. Regarding how participants obtained prescription stimulants, 92 (77.3%) students reported they obtained stimulants for nonmedical use from a friend and the next most common answer was that they obtained the prescription from their doctor, but used it other than as prescribed ($n = 11$; Table 2).

Nonmedical Use of Depressants, Opioids, and Stimulants based on Demographics

Three logistic regression models were used to examine the impact of three predictors: sex, living arrangements, and involvement in extracurricular activities on the NMUPD (i.e., depressants, opioids, and stimulants).
The models for misuse of opioids and depressants were not significant. The logistic regression model for the nonmedical use of stimulants was statistically significant ($\chi^2 = 17.74, df = 3, p < .001$). The final model accounted for 6% of the variance in the dependent variable for the nonmedical use of stimulants. Table 3 presents the results of the logistic regression model for stimulant misuse. Participants living arrangements was a significant predictor; however, sex and involvement in extracurricular activities were not significant. Specifically, students residing off-campus were three times more likely to misuse stimulants compared to those living on-campus. The two and three-way interaction terms were not statistically significant and did not add to the predictive power of the model; thus, they were not included in the final model.

**DISCUSSION**

The present study examined the association between sex, living arrangements and extracurricular activities (i.e., fraternities/sororities, collegiate sports) on the three classes of prescription drugs misused by college students. Results indicated that a subgroup of students were misusing the aforementioned drugs, demonstrating that NMUPD remains a persisting problem among college students. Misuse of these medications places undergraduate students at an increased risk for future substance use (McCabe et al., 2014). Results indicated that living arrangements (i.e., off-campus, on-campus) was related to the nonmedical use of prescription stimulants. Specifically, living off-campus was a risk factor for the misuse of stimulant medications. The current study contributes to existing literature by identifying living situation as a risk factor for misuse of stimulant medications. Programming for those residing off-campus may be an important factor in prevention efforts on college campuses.
**Nonmedical Use of Depressants among College Students**

Annual prevalence rates indicate that 3.1% of college students misuse sedatives and 0.7% misused these drugs within the past 30 days (Johnston et al., 2015). The findings from this study revealed that, since entering college 8.4% of undergraduate students engaged in the nonmedical use of depressants. This is a fairly high rate of misuse, indicating continued need for prevention and intervention programming. Previous research suggested that depressants such as tranquilizers are commonly used to aid relaxation, feel good (Rozenbroek & Rothstein, 2011), and to increase or off-set the effects of another substance that was used (Brandt et al., 2014). Hence, prevention programming will need to address these types of reasons for misuse, risks of using friends’ medications, and present alternative ideas for relaxation, such as playing sports or engaging in activities considered “fun”.

**Nonmedical Use of Opioids among College Students**

Unlike several studies that have indicated the nonmedical use of opioids (e.g., pain relievers) as being very common and the most commonly misused drug (Lord et al., 2009; Vidourek et al., 2010), findings of this study revealed that opioid misuse was the second most frequently misused prescription drug. The sample from this study revealed that 9.6% of undergraduate students misused opioids since starting college. In regards to how students obtained prescription opioids, the majority reported their friends as sources, but several reported misusing their own medications. A possible reason for opioid misuse has been for recreational purposes or to self-medicate (Brandt et al., 2014). Vidourek et al. (2010) suggested that students would rather self-medicate and obtain prescription opioids from friends and family members than be treated by a medical professional. Thus, students need to learn about the high risk of addiction when misusing prescription opioids. Future prevention and intervention programs may
need to address the risk factors associated with self-medicating using prescription opioids, since students tend to self-medicate by misusing opioids. Further, potential barriers that contribute to the lack of students seeking medical assistance for pain and other medical problems related to opioid use, need to be identified, especially since many students have student health care facilities on campus where they could go to seek help.

**Nonmedical Use of Stimulants among College Students**

The present study indicated that 28% of students engaged in the nonmedical use of stimulants. Findings were consistent with recent studies that revealed 25-26% of students engaged in the misuse of stimulants (Bavarian et al., 2013; Peralta & Steele, 2010). Nationally, 11% of undergraduate students reported misusing stimulants in the past year (Johnston et al., 2015). Similar to the findings for depressants and opioids, the most common source for obtaining these drugs was a friend. These results support previous research that revealed that a friend was the source of drugs for 78% of the students who reported stimulant misuse (Brandt et al., 2014). Previous studies have suggested that students misuse prescription stimulants to for academic purposes (e.g., improve focus, stay awake) (Aikins, 2011). A possible explanation for the increase in prescription stimulant misuse may be due to stimulants being more easily assessable as opposed to prescription opioids (i.e., Vicodin, OxyContin, codeine). Additional screening for prescription stimulants are needed to limit the availability of the drug, potentially decreasing diversion among friends and misuse rates among college students.

**First Time Use of Prescription Drugs**

Researchers have generally found that NMUPD begins during the four years of high school (Austic, 2015; Kecojevic et al., 2012; Mui et al., 2014). A meta-analysis based on data from the 2004 – 2012 NSDUH examined the peak age of onset among individuals between the
ages of 12 to 21 years, found an increased risk of first-time stimulant misuse among high school students compared to college students (Austic, 2015). Inconsistent with the aforementioned study, findings from this study revealed that roughly 70% of students who reported stimulant use, engaged in misuse for the first time while attending college. Findings also revealed that the majority of students engaged in the misuse of depressants and opioids during college as opposed to high school. An emphasis should be placed on educating incoming college students to reduce initiation rates.

**College-Related Factors and the Nonmedical Use of Depressants, Opioids, and Stimulants**

Prior studies have found that students involved in Greek life (Bavarian et al., 2014; Gomes et al., 2011) and those who participate in sports (Ford, 2008; Veliz et al., 2015) (Ford, 2008; Veliz, Epstein-Ngo, Austic, Boyd, & McCabe, 2015) are at an increased risk of NMUPD. In future studies, information about how drugs are obtained in these settings, may provide useful information for the field. Results from this study were not significant for extracurricular activities, perhaps because use was higher in students who were residing off-campus and thus not as involved in Greek life or sports. On the other hand, previous research has suggested that students residing in on-campus housing were more likely to engage in substance use (Fromme et al., 2008). Several studies have provided possible explanations for increased substance use among students residing on-campus and attribute it to limited adult supervision, increased availability of drugs, social pressure, availability at social events, or increased acceptance of drug use related to the college setting and atmosphere (Fromme et al., 2008; Roemer & Walsh, 2014). However, findings from this study revealed that students residing off-campus were three times more likely to engage in the nonmedical use of prescription stimulants. In future studies, assessment of why students who reside off-campus are misusing drugs will provide valuable
information to inform prevention messages and activities at the university where this study was conducted.

**Limitations**

Limitations should be noted concerning this study. Generalization of findings should be done cautiously, as the sample was taken from one university in the Midwest and information was based on self-reported data. Students completed the survey and could have potentially underestimated various types of drug use, although the survey was voluntary and anonymous. Due to the design of the survey, students may have not answered questions about when they had used drugs (i.e., in the past 30 days or 12 months). If the survey were to be used again, several survey questions should be re-evaluated and survey design should be improved. Instructions should emphasize the importance of answering all questions on the survey. In regards to the involvement in extra-curricular activities, this study could have benefitted from attaining information concerning the type of sport and level of involvement. For example, inquiring about the type of colligate sport (i.e., football, tennis, soccer) students engaged in, whether they engaged in intramural sports, and about their level of involvement would be important. Also, inquiring about involvement in other type of activities (e.g., clubs) and involvement in off-campus activities and jobs will be important. According to the literature, living arrangements are generally categorized as off-campus housing, on-campus housing (i.e., dorms), and living with parents. For the purpose of this study living arrangements was measured as off-campus and on-campus. Greater insight might have been gained by examining living with parents independently and not combining it with living off-campus, and making this distinction for off-campus housing remains a goal for future studies.
Conclusions

Findings from this study indicated that the NMUPD, specifically stimulants, among college students remains an area of concern. These findings are important considering there is a need for additional research to influence practice at the university level. Health educators, substance abuse counselors, and university administrators have the potential to bridge the gap between research and prevention practices. However, the key predictors for this study were not responsible for a large percentage of the variance in nonmedical use of the prescription drugs. Examining other reasons for use of NMUPD and gathering more detail on how drugs were obtained will reveal critical information to inform prevention programming. Thus, while the findings from this study add to existing literature, additional research development, and evaluations of prevention programs are needed for college campuses.
REFERENCES


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<td>Opioids</td>
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<td>Stimulants</td>
<td>28.5% (119)</td>
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*Note: N = 417. Percent based on valid percent. Missing values excluded.*
Table 2. Participant Characteristics based on Nonmedical Use of Depressants, Opioids, and Stimulants

<table>
<thead>
<tr>
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<tr>
<td><strong>Nonmedical Use of Depressants (n = 35)</strong></td>
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<tr>
<td><strong>Percentage of Students Indicating Recent Use of Depressants (past 30 days)</strong></td>
<td></td>
</tr>
<tr>
<td>Have Used</td>
<td>28.6% (10)</td>
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<tr>
<td>Have Not Used</td>
<td>71.4% (25)</td>
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<td>Have Used</td>
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</tr>
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<tr>
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<td>Friend</td>
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</tr>
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<td>Other</td>
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<td><strong>Percentage of Students Indicating Recent Use of Opioids (past 30 days)</strong></td>
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<tr>
<td>Have Used</td>
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<tr>
<td>Have Not Used</td>
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<td><strong>Percentage of Students Indicating Past Year Use of Opioids</strong></td>
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<td>Have Used</td>
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<td>Friend</td>
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<td><strong>Nonmedical Use of Stimulants (n = 119)</strong></td>
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</tr>
<tr>
<td><strong>Percentage of Students Indicating Recent Use of Stimulants (past 30 days)</strong></td>
<td></td>
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<td>Have Used</td>
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<td>Have Not Used</td>
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*Note: N = 417. Percent based on valid percent. Missing values excluded.*
Table 3. Logistic Regression Analysis Predicting the Nonmedical Use of Depressants, Opioids, and Stimulants (n=417)

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Study Two: Nonmedical Use of Prescription Stimulants and Other Substances among University Students
INTRODUCTION

According to the National Survey Drug Use and Health ([NSDUH]; Substance Abuse and Mental Health Services Administration, 2014) considerable use of marijuana, cocaine, prescription stimulants, and hallucinogens (i.e., LSD) occurs during young adulthood, specifically the college-aged years (18-22 years old). Moreover, young adults between the ages of 18 to 25 have had the highest rates of use of alcohol, marijuana, nonmedical use of prescription drugs (NMUPD), cocaine, and hallucinogens compared to all other age groups over the past decade (Substance Abuse and Mental Health Services Administration, 2014). College-aged students are susceptible to increased substance use due to their current stage in the developmental process, which typically involves finding their identities and experimentation (Stone, Becker, Huber, & Catalano, 2012). Over the years, a considerable amount of research has addressed the nonmedical use of prescription stimulants (NMUPS), marijuana, alcohol, and other substances (Pilkinton & Cannatella, 2012; Vrecko, 2015). However, there continues to be a need to examine the polysubstance use between NMUPS and other substances, in order to create effective prevention programs at the university level (Arria & DuPont, 2010; Bavarian, Flay, Ketcham, & Smit, 2013; Donaldson, Nakawaki, & Crano, 2015; Johnson & Newcorn, 2015).

Nonmedical Use of Prescription Stimulants among College Students

Stimulants are the most prevalent prescription drug used among college students compared to other age cohorts (Ford & Arrastia, 2008). A recent study utilizing cross-sectional samples from 2003 – 2013 found an increase in lifetime (8.1% - 12.7%) and past year (5.4% - 9.3%) NMUPS (McCabe, West, Teter, & Boyd, 2014). Parallel to the increase in NMUPS, research indicates an increase in the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) among high school and college students (Arria et al., 2008; Fortuna, Robbins, Caiola,
Joynt, & Halterman, 2010; Lee Booksh, Pella, Singh, & Drew Gouvier, 2010; Setlik, Bond, & Ho, 2009). The increase in prescriptions has been linked to increased diversion of prescription drugs and an increase in prevalence rates of prescription drug use for nonmedical purposes.

The two most highly misused stimulants are amphetamines (i.e., Adderall) and methylphenidates (i.e., Ritalin) (DeSantis, Webb, & Noar, 2008). Students who report NMUPS typically report misusing Adderall. For example, one study found that of those who reported NMUPS, 20.9% reported misusing Adderall and 11.2% reported misusing Ritalin (Peralta & Steele, 2010). Several studies have been conducted on sex and racial/ethnic differences in the misuse of stimulants. NMUPS is more frequent among male college students than female college students (American College Health Association, 2014; Garnier-Dykstra, Caldeira, Vincent, O’Grady, & Arria, 2012; McCabe et al., 2014; Pilkinton & Cannatella, 2012). Studies also suggest that among college students, White students are more likely to misuse prescription stimulants than African American, Hispanic, and Asian students (Johnston, O’Malley, Bachman, Schulenberg, & Miech, 2015; McCabe, Knight, Teter, & Wechsler, 2005; Peralta & Steele, 2010). One study provided a possible explanation—Whites are possibly more likely to be prescribed prescription drugs compared to minorities, leading to higher prevalence rates of misuse among Whites (Peralta & Steele, 2010). As with other substance use, the NMUPS increases the risk of negative health outcomes (Young, Glover, & Havens, 2012). Studies have shown an increase of 98.4% in emergency room visits (Coben et al., 2010; Owens, Mutter, & Stocks, 2010) and an increase in fatalities caused by NMUPD and polysubstance use (Cabriales, Cooper, & Taylor, 2013).
Attitudes toward NMUPS

One study found that students who engaged in NMUPS were more likely to report positive attitudes toward faking symptoms of ADHD to obtain prescription medications from a medical professional or ask a friend to sell their medications for their own personal use, than students who did not engage in NMUPS (Stone & Merlo, 2012). Previous studies have suggested that undergraduate students view NMUPS as being less harmful than the misuse of other types of substances (Brandt, Taverna, & Hallock, 2014). Similarly, data from a recent national survey revealed that young adults perceived the misuse of amphetamines to be less risky than using other illicit substances (Johnston et al., 2015). For example, 30-37% of young adults perceived greater risk with misusing amphetamines compared to 47-51% perceived risks associated with cocaine use and 66-72% for heroin use (Johnston et al., 2015). Furthermore, younger adults between 18 to 22 years tend to perceive amphetamines as less harmful than older adults between 23 to 26 years (Johnston et al., 2015). A qualitative study conducted among 52 college students indicated that many of the participants viewed the use of prescription drugs as more socially acceptable and less addictive than other substances (Quintero, Peterson, & Young, 2006).

Alcohol, Marijuana, and Other Illicit Substance Use

For well over two decades, alcohol has been the most frequently used substance among young adults. Young adults between the ages of 21 to 25 years have the highest rates alcohol use (63.9%), binge drinking (43.3%) and heavy alcohol use (13.1%) compared to every other age group (Substance Abuse and Mental Health Services Administration, 2014). Additionally, data from the same national survey revealed that males and Whites are more likely consume alcohol than females and those in other racial/ethnic groups. The rate of marijuana use among young adults between the ages of 18 to 25 years has continued to rise throughout the years. For
instance, in 2006 approximately 16.3% of young adults used marijuana in the past month compared to 2014 results indicating that 19.6% of young adults used marijuana in the past month (Substance Abuse and Mental Health Services Administration, 2015). Results also found that individuals of the same age group have the highest rate of hallucinogen use compared to other age groups. In regards to cocaine, national trends have revealed an increase in cocaine use from 2012 (1.1%) to 2014 (1.4%) among young adults (Substance Abuse and Mental Health Services Administration, 2015). Further, it has been suggested that female college students are at an increased risk for cocaine use compared to male college students (Kasperski et al., 2011).

To date, several studies have examined the association between NMUPS and alcohol (Arria et al., 2013; Barrett, Darredeau, & Pihl, 2006; Lookatch, Dunne, & Katz, 2012; McCabe, Teter, Boyd, 2006; Steele, Peralta, & Elman, 2011). For instance, one study found that 88% of students who misused prescription stimulants also engaged in binge drinking behavior compared to only 49% of students who had not misused prescription stimulants. These results illustrate the additional health risks for students who engage in NMUPS along with use of alcohol and binge drinking. Further, several studies have examined the NMUPS and the use of marijuana among college students (Arria et al., 2013; Barrett, Darredeau, & Pihl, 2006; Garnier-Dykstra et al., 2012; McCabe et al., 2006; Primack et al., 2012; Rabiner et al., 2009; Sweeney, Sembower, Ertischek, Shiffman, & Schnoll, 2013). Research has found that individuals who use marijuana are at an increased risk of using other substances, such as alcohol, tobacco, and prescription drugs (Primack et al., 2012). Students who engage in NMUPS are more likely to meet the criteria of alcohol and marijuana use disorders compared to students who have not engaged in NMUPS (Arria et al., 2013).

Other researchers have found an association between the use of other of types of drugs,
such as hallucinogens or cocaine, and NMUPS (Castaldelli-Maia et al., 2014; Sweeney et al., 2013). In fact, NMUPS may be a gateway to the misuse of other drugs. For example, prior research indicated that college students were more likely to transition from the misuse of amphetamines to the use of hallucinogens and ecstasy (Castaldelli-Maia et al., 2014). However, students did not typically transition from amphetamines to marijuana use or from using cocaine to using amphetamines. Interestingly, one study found that females between the ages of 18 to 25 years are more likely to engage in polysubstance use involving NMUPS (Chiauzzi, DasMahapatra, & Black, 2013). This study will seek to fill a gap in the literature by examining the influences of NMUPS on the use of other substances and by investigating the interaction of NMUPS, sex, and race/ethnicity and the use of other substances. Moreover, new information on NMUPS and knowledge of the risks of mixing substances and acceptance of polysubstance use is also presented.

**Study Purpose**

The purpose of this study was to determine the association between NMUPS and knowledge of risks of use and acceptance of use among college students. This research also provides information about polysubstance use among college students that will inform those in college health services and those developing prevention messages. Four key research questions were examined:

1. What percentage of college students engaged in the nonmedical use of prescription stimulants?
2. What are the most frequently reported misused stimulants among college students?
3. Since entering college, what percentage of students have used:
   a) Alcohol,
b) Marijuana,
c) Cocaine, and
d) Hallucinogens?

4. Are demographic variables (i.e., age, sex, race/ethnicity) and the misuse of prescription stimulants associated with use of alcohol, marijuana, cocaine, and hallucinogens among college students?

In addition, the researcher wished to explore how knowledge of risk and acceptance might be related to misuse to inform future research; thus, two exploratory research questions were developed:

5. Does knowledge of risks related to polysubstance use differ between students who engage in nonmedical use of prescription stimulants versus those who do not report misuse?

6. Does acceptance of prescription drugs differ between students who engage in nonmedical use of prescription stimulants versus those who do not report misuse?

METHODS

Participants

This study included undergraduate students between the ages of 18 to 44 years (n = 417) enrolled at a large Midwestern university in the United States. In the fall semester 2015, students were recruited from undergraduate courses and invited to participate by completing a survey (the same sample and survey used for Study One). Participation in the study was voluntary and was approved by a university-based institutional review board (see Appendix A).
**Instrument**

The student NMUPD survey (Oluwoye, 2016; see Appendix B) was administered and assessed the NMUPD among college students since entering college. Questions were created to examine participants’ use of prescription drugs (i.e., depressants, opioids, stimulants) and reasons for using prescription drugs as well as to assess their use of other drugs, such as alcohol, marijuana, and cocaine. Students also provided information about their knowledge of risks and acceptance of substance use.

**Nonmedical use of Prescription Stimulants**

For the purpose of this survey, NMUPS was defined as students who used prescription stimulants that were, “not prescribed to you by a doctor or medical professional or used in another way other than prescribed.” Common names of stimulant drugs were provided so participants would be able to recognize different names for stimulant medications.

Participants were asked, since entering university had they ever engaged in the NMUPS. If the answer was “yes,” then participants were asked to name the stimulant and continue on to the next question in the same section. If participants answered “no,” then they were asked to skip the remaining questions pertaining to the misuse of stimulants and move on to the next section, which is described in further detail in another study.

**Other Substance Use**

Participants were asked to indicate “yes” or “no” as to whether they used the following substances since entering college: alcohol, marijuana, cocaine, and hallucinogens.

**Attitudes and Perceptions toward Prescription Drugs**

Participants’ knowledge of risk and acceptance were assessed using a five-point Likert-type scale (1 = strongly disagree; 5 = strongly agree). Participants were asked to rate the
following statements: “Do you know the risks involved with mixing prescription drugs with other substances?” and “Do you think prescription drugs more socially acceptable than other drugs?”

**Demographics**

Participants were asked to provide information about their age, sex, student classification (i.e., freshman, sophomore, junior, senior), living arrangements, extracurricular activities, if they had ever been diagnosed with a mental health disorder (i.e., yes or no), sexual orientation, religion, and race/ethnicity.

**Procedures**

Content validity was established by distributing the survey to three experts in the area of substance use research. They contributed to the development of questions for each section over a series of meetings. Further, questions were similarly structured to questions from national surveys (e.g., NSDUH, ACHA) and the author conducted an extensive literature review prior to developing questions on the survey.

During the course of the fall 2015 academic semester, a total of 417 undergraduate students provided consent and completed the survey (this was the same sample used for Study One). Students read a Research Information Sheet (RIS) (see Appendix C) which stated the study purpose, eligibility requirements, that the survey was anonymous (and that no identifying data was to be recorded on the survey), participation was voluntary, and that the survey would take approximately 10-15 minutes to complete. The RIS served as the consent document, informing students that returning their survey indicated their consent to participate in the study. Data were collected in classrooms (during regularly scheduled class meetings) and participants were verbally informed about the study and were informed not to place any identifying information on
the survey. Students returned surveys in envelopes. A small sample of college students completed the survey two times and a specialized test-retest RIS was developed for these students (see Appendix D; same test-retest sample as used for Study One). Students within this sample were provided a test-retest RIS and verbally informed that participation was voluntary and anonymous. Students were instructed to write a unique identifier at the top of the survey that would be used two separate times. Surveys were collected in an envelope located at the front of class. One week after initially completing the survey, students were presented with an identical survey. Surveys were collected in envelope and later matched using the unique identifiers.

**Data Analysis**

Frequencies were performed on demographic characteristics, such as the use of alcohol, marijuana, cocaine, hallucinogens, and stimulants using Statistical Package for the Social Sciences (SPSS, version 22.0). Due to the sample size of race/ethnic groups (i.e., small sample for some groups, such as Pacific Islanders), race/ethnicity was dichotomized into White and “Other.” The Other category was comprised of African Americans, Asians, Hispanics, Pacific Islanders, and other racial groups. A multivariate analysis of covariance (MANCOVA) was conducted to examine the influence of NMUPS, sex, and race/ethnicity on the use of alcohol, marijuana, cocaine, and hallucinogens. Age was a covariate. In terms of the exploratory research questions, two analyses of covariance (ANCOVAs) were performed to explore the differences between NMUPS, sex, race/ethnicity and students’ knowledge of the risks involved with mixing substances and their views of whether using prescription drugs was socially acceptable. Age was a covariate in these analyses.
RESULTS

Survey Items’ Reliability

To examine the reliability of the study instrument by assessing the agreement between responses at both time periods, Cohen’s k, and Pearson’s correlations ($r$) were utilized. Kappas were used to assess agreement at both times for questions requiring “yes” or “no” answers. Cohen’s $k$’s above .60 indicated adequate agreement and confidence in study results (McHugh, 2012). Results indicated a substantial agreement for responses for the alcohol use $k = .710, p < .001$, almost perfect agreement for marijuana use $k = .914, p < .001$, perfect agreement for cocaine use $k = 1.000, p < .001$, and a perfect agreement for the use of hallucinogens $k = 1.000, p < .001$. Pearson’s $r$ was performed to determine the relationship among Likert-type scale questions to examine attitude variables (e.g., knowledge of risk and acceptance). Results indicated statistically significant correlations for responses for socially acceptable use of drugs at the test and retest assessments ($r = .475, n = 27, p = .012$). However, the correlations between knowledge about mixing substances at the test and retest assessments was not significant.

Demographic Characteristics of Participants

A total of 417 undergraduate students completed the survey (the sample for Study One was used for Study Two). Ages ranged from 18 to 44 years with the mean age of 20 years ($M = 20.57, SD = 2.27$). Overall, 59.1% of the participants were male ($n = 248$) and 40.1% were female participants ($n = 168$). More than two-thirds (76.4%) of participants were White ($n = 316$) and 23.9% reported “Other” ($n = 99$). Regarding the NMUPS, 28.5% of participants ($n = 119$) indicated they had misused stimulants since entering college. Of those 83.9% of participants reported using Adderall (see Table 1).

Insert Table 1
For other substance use, 88% of participants \((n = 367)\) reported they had used alcohol since entering college, 56.4% of participants \((n = 235)\) reported using marijuana, 9.1% of participants \((n = 38)\) reported using cocaine, and 11.8% \((n = 49)\) reported using hallucinogens since entering college (Table 1).

**NMUPS, Alcohol, Marijuana, Cocaine, and Hallucinogen Use Based on Demographic Characteristics**

Table 2 provides a summary of the means and standard deviations for the predictor variables and the \(p\) values for the MANCOVA analyses. Results from the MANCOVA with age as the covariate revealed a statistically significant main effect for NMUPS since entering college, Wilks’ \(\Lambda = .824\), \(F(4, 417) = 21.304, p < .001\), \(\eta^2_p = .176\), and race/ethnicity Wilks’ \(\Lambda = .969\), \(F(4, 417) = 3.170, p < .01\), \(\eta^2_p = .031\). The multivariate analysis for differences based on sex was not significant. Age was not significant as a covariate. Univariate \(F\)-tests revealed that NMUPS differed significantly based on the use of other substances. Specifically, NMUPS among college students was greater if the participants had used alcohol, \(F(1,403) = 12.36, p < .001\), marijuana, \(F(1,403) = 48.32, p < .001\), cocaine, \(F(1,403) = 16.86, p < .001\), or hallucinogens \(F(1,403) = 49.15, p < .001\). Although the Wilks’ Lambda, omnibus analysis was not significant, one univariate follow-up analysis revealed statistically significant sex differences based on the use of hallucinogens, \(F(1,403) = 3.97, p = .047\). Regarding race/ethnicity, the univariate follow-up analyses were statistically significant for alcohol use, \(F(1,403) = 8.75, p = .003\), and cocaine use, \(F(1,403) = 4.01, p = .046\), but not for the use of marijuana and hallucinogens. The means and standard deviations for NMUPS, sex, and race/ethnicity are presented in Table 2.

Insert Table 2 here
Results revealed that the participants who engaged in NMUPS were at greater risk for alcohol, marijuana, cocaine, and hallucinogen use. Males were more likely to report using hallucinogens than females. Whites were more likely to use cocaine and drink alcohol than other racial/ethnic groups.

**Exploratory Analyses: Knowledge of Risk and Acceptance**

An ANCOVA was used to examine the influence of NMUPS, sex, and race/ethnicity on the risks involved with mixing prescription drugs with other substances. Sex was statistically significant, $F(1, 400) = 6.302, p = .012$. NMUPS and race/ethnicity were not significant and none of the interaction terms were statistically significant. The covariate, age, was not significant. Table 3 presents the means and standard deviations for the influence of NMUPS, sex, and race/ethnicity on college students’ knowledge of the risks of mixing prescription drugs with other substances. More specifically, females ($M = 4.29, SD = .99$) scored a higher mean than males ($M = 4.05, SD = 1.10$; See Table 3). A separate ANCOVA revealed no association between social acceptance of prescription drugs and the NMUPS, age, sex, and race/ethnicity. Table 4 presents the means and standard deviations for acceptance.

Insert Tables 3 and 4 here

**DISCUSSION**

The purpose of this study was to examine NMUPS and expand existing literature about the misuse of stimulant medications and the use of other substances among undergraduate students. The current study provides additional evidence to improve the understanding of college students’ knowledge about polysubstance use and their views on the risks and acceptability of using prescription drugs. Previous research has identified the association or possible progression from the misuse of prescription stimulants to other drug use, indicating that NMUPS can be a
gateway to misusing other drugs (Arria et al., 2008; Barrett et al., 2006; Sweeney et al., 2013). Results from this study suggest that college students who engage in NMUPS are also more likely to report that they drink alcohol and use other illicit drugs (i.e., marijuana, cocaine, hallucinogens). The results from this study can aid those developing prevention strategies by confirming that programs should address polysubstance use and the health risks associated with such use. Programs need to educate young adults on the NMUPS and the misuse of other substances, such as cocaine, beyond alcohol and marijuana.

Findings revealed that roughly one in four undergraduate students had engaged in NMUPS since entering college. Of those who reported NMUPS, the most frequently reported drug that was misused was Adderall (83.9%), followed by Vyvanse (8%), Ritalin (3.6%), and Concerta (2%). Similarly, prior research has found the most frequently misused substance among college students has been Adderall (Peralta & Steele, 2010). Interestingly, the peak in NMUPS has been simultaneous with the increased number of adolescents and young adults who are being diagnosed with ADHD (Fortuna et al., 2010; Setlik et al., 2009). This may indicate that some students misrepresent or over-exaggerate symptoms known to ADHD in order to obtain medications to distribute to their peers (Lee Booksh et al., 2010; Stone & Merlo, 2012). Moreover, doctors prescribing stimulants need to engage in education about their misuse. To decrease the rate of NMUPS and diversion of these drugs among students, health care professionals need to increase efforts in providing extra screening for individuals seeking ADHD medication (e.g., Adderall, Ritalin, Concerta, and Vyvanse). As mentioned above, students need to be educated about the laws and consequences surrounding the diversion of prescription medications.
**NMUPS and Alcohol and other Illicit Substance Use**

The findings from this study are similar to those of previous research indicating a relationship between NMUPS and alcohol and marijuana use (Arria et al., 2013; Barrett et al., 2006; Sweeney et al., 2013), and use of hallucinogens (Castaldelli-Maia et al., 2014). This study suggests that undergraduate students who have misused stimulants are more likely to consume alcohol, marijuana, cocaine, and hallucinogens than undergraduate students who have not engaged in NMUPS. This study is unique, in that it adds to existing literature on the association between NMUPS and the use of other substances, such as cocaine. Undergraduate students need more information and awareness of the risks to physical and mental health related to NMUPS and misuse of other drugs (Brandt et al., 2014).

Results for sex and ethnic/racial group differences were interesting. Past studies have suggested that males are more likely to engage in NMUPS than females (American College Health Association, 2014; Garnier-Dykstra et al., 2012; Pilkinton & Cannatella, 2012). This study revealed that males were more likely to have used hallucinogens since entering college than females, although sex differences were not significant for using other types of drugs. However, although the results for sex differences for all other substances (i.e., alcohol, marijuana, cocaine) were not significantly different, inspection of the mean scores for alcohol and marijuana revealed that males reported slightly higher means of use than females. In regards to racial and ethnic differences, results were consistent with the most recent NSDUH (2015), Whites were more likely to report drinking alcohol and using cocaine since starting college compared to other racial/ethnic groups. Future studies are needed to further examine racial/ethnic differences in cocaine use among college students.
**Exploratory Analyses: Knowledge of Risks and Acceptance**

There were significant sex differences for knowledge of risks of polysubstance use; female students reported higher knowledge of risks compared to males. Since females are more knowledgeable about risks they may engage in less misuse, and this may provide even more justification for prevention programming for males. Although there were differences, males and females within this sample were generally knowledgeable about risk factors (this was exemplified by high ratings for knowledge of risk by both males and females). The present study is the first, to the author’s knowledge, to examine the perceived level of knowledge about the risks of polysubstance use among college students, and future research is warranted to identify areas where students lack information.

Previous studies have indicated that students who engage in polysubstance use or the use of multiple substances are at an increased risk of substance use disorders (Arria et al., 2013). Thus, prevention specialists and health educators should address polysubstance use in prevention and intervention programs that focus on reducing alcohol consumption and the use of other drugs by college students. Inspection of the means for acceptance of misuse of drugs indicated acceptance of misuse was low. It may be that discussions of acceptance are a good starting point for providing information about risks associated with misuse of prescription stimulants and other drugs. If students indicate low acceptance, they may be more open to learning about risks. Low acceptance rates can also be considered when developing messaging, such as commercials and other educational materials. Educating college students about the risk factors associated with mixing substances may heighten awareness of dangers, leading to decreases emergency room visits and other negative health consequences.
Limitations

In terms of limitations, this study was conducted with a sample from only one Midwestern university and information was based on self-report data. Therefore, generalization of the findings should be done cautiously. Sample size (i.e., small samples of those using drugs) may have limited certain options for analyses. Although a small number of those who misused substances were identified, the sample was representative of the university population. For example, the university (with about 43,000 students) from which the sample was drawn is comprised of 72.8% of students who identify as White and 21.4% who report as a minority, compared to this study participants were 76.1% White and 23.4% “Other.” Moreover, students who completed the survey could have under-reported or over-reported use, based on a social desirability bias. To limit potential social desirability bias, survey participation was voluntary and anonymous. Answers for knowledge and attitude items could have been influenced by students wanting to finish the survey quickly. The principal investigator did note that some students rushed when completing the last part of the survey. Having different forms of the survey, where the order of items are counterbalanced, would allow for examination of the aforementioned problem. Questions may not have covered or examined some key issues for college students. Hence, conducting interviews may be beneficial in future studies to gain more information about reasons for misuse and reasons for mixing different drugs.

Conclusions

In light of the previously mentioned limitations, the present study provides evidence that NMUPS remains an area of concern among college students. Study findings may further inform prevention programming on college campuses. It will be important to improve knowledge about risks of co-using substances, such as NMUPS and alcohol and marijuana. Campus health
services and other health professionals should increase student knowledge about monitoring prescription drug use and dispense refills cautiously to decrease diversion and NMUPS rates. Health providers should be educated about risks of NMUPS for college students and they should provide key information about the risks of mixing substances when prescribing medications.
REFERENCES


Table 1. Participant Characteristics based on NMUPS and other Substance Use

<table>
<thead>
<tr>
<th>Item</th>
<th>Sample % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nonmedical Use Prescription Simulants</strong></td>
<td></td>
</tr>
<tr>
<td>Have Not Used</td>
<td>71.5% (298)</td>
</tr>
<tr>
<td>Have Used</td>
<td>28.5% (119)</td>
</tr>
<tr>
<td><strong>Type of Prescription Stimulant Misused</strong></td>
<td></td>
</tr>
<tr>
<td>Adderall</td>
<td>83.9% (94)</td>
</tr>
<tr>
<td>Ritalin</td>
<td>3.6% (4)</td>
</tr>
<tr>
<td>Vyvanse</td>
<td>8.0% (9)</td>
</tr>
<tr>
<td>Concerta</td>
<td>1.8% (2)</td>
</tr>
<tr>
<td>Other</td>
<td>2.7% (3)</td>
</tr>
<tr>
<td><strong>Used Alcohol Since Entering College</strong></td>
<td></td>
</tr>
<tr>
<td>Have Not Used</td>
<td>12.0% (50)</td>
</tr>
<tr>
<td>Have Used</td>
<td>88.0% (367)</td>
</tr>
<tr>
<td><strong>Used Marijuana Since Entering College</strong></td>
<td></td>
</tr>
<tr>
<td>Have Not Used</td>
<td>43.6% (182)</td>
</tr>
<tr>
<td>Have Used</td>
<td>56.4% (235)</td>
</tr>
<tr>
<td><strong>Used Cocaine Since Entering College</strong></td>
<td></td>
</tr>
<tr>
<td>Have Not Used</td>
<td>90.9% (379)</td>
</tr>
<tr>
<td>Have Used</td>
<td>9.1% (38)</td>
</tr>
<tr>
<td><strong>Used Hallucinogen Since Entering College</strong></td>
<td></td>
</tr>
<tr>
<td>Have Not Used</td>
<td>88.2% (368)</td>
</tr>
<tr>
<td>Have Used</td>
<td>11.8% (49)</td>
</tr>
</tbody>
</table>

*Note. N = 417. Percent based on valid percent. Missing values excluded.*
Table 2. Means and Standard Deviations for Sex, Race/Ethnicity, and NMUPS for other Substance Use

### Alcohol Use Since Entering College

<table>
<thead>
<tr>
<th>Item</th>
<th>Non-users</th>
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<th>p Value</th>
</tr>
</thead>
<tbody>
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<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Male</td>
<td>.846</td>
<td>.362</td>
<td>.987</td>
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<td>Female</td>
<td>.823</td>
<td>.384</td>
<td>.976</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td>&lt; .005</td>
</tr>
<tr>
<td>White</td>
<td>.873</td>
<td>.334</td>
<td>1.000</td>
</tr>
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<td>Other</td>
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<td>.917</td>
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<tr>
<td>NMUPS Since College</td>
<td></td>
<td></td>
<td>&lt; .001</td>
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<td>Never Used</td>
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<td>.837</td>
</tr>
<tr>
<td>Have Used</td>
<td>.837</td>
<td>.369</td>
<td>.983</td>
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</table>

### Marijuana Use Since Entering College

<table>
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<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
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<tr>
<td>Male</td>
<td>.479</td>
<td>.501</td>
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<td>.483</td>
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<td>.496</td>
<td>.433</td>
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<tr>
<td>Have Used</td>
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<td>.891</td>
</tr>
<tr>
<td>Item</td>
<td>Cocaine Use Since Entering College</td>
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<td></td>
</tr>
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<td>------------------------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>Non-users</td>
<td>Have Used</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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<tr>
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<table>
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<th>Hallucinogen Use Since Entering College</th>
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<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Non-users</td>
<td>Have Used</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Female</td>
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<td>.001</td>
<td>.244</td>
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<td>Race/Ethnicity</td>
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<td>.182</td>
<td>.037</td>
</tr>
<tr>
<td>Have Used</td>
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<td>.319</td>
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Table 3. Knowledge of Associated Risks with Polysubstance Use

Risks Involved with Mixing Prescription Drugs with Alcohol

<table>
<thead>
<tr>
<th>Item</th>
<th>$M$</th>
<th>SD</th>
<th>$p$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Male</td>
<td>4.05</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4.29</td>
<td>.99</td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
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<td>NS</td>
</tr>
<tr>
<td>White</td>
<td>4.21</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td>Other</td>
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<td></td>
</tr>
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<td>NMUPS Since College</td>
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<td></td>
<td>NS</td>
</tr>
<tr>
<td>Never Used</td>
<td>4.14</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Have Used</td>
<td>4.16</td>
<td>.91</td>
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</table>
Table 4: Acceptance: Is Use of Prescription Drugs Socially Acceptable than other Drugs

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>F Statistic</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescription Drugs are more Socially Acceptable than other Drugs</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2.19</td>
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<td>3.33</td>
<td>NS</td>
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<tr>
<td>Female</td>
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<td></td>
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<td>Race/Ethnicity</td>
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<td></td>
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<tr>
<td>White</td>
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<tr>
<td>Other</td>
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<td>NMUPS Since College</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Never Used</td>
<td>2.16</td>
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<td>3.36</td>
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<tr>
<td>Have Used</td>
<td>2.44</td>
<td>1.11</td>
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APPENDIX A
Approval from the Institutional Review Board at the University of Cincinnati

Institutional Review Board - Federalwide Assurance #00003152
University of Cincinnati

Date: 9/8/2015
From: UC IRB
To: Principal Investigator: Oladunni Oluwoye
       A&S Physics Students
Re: Study ID: 2014-2016
Study Title: Students' Perception of Prescription Medication Use and the Use of Other Substances.

This study expires on: 6/6/2016.

An amendment to the above referenced protocol was reviewed and APPROVED using an EXPEDITED review procedure as set forth in 45 CFR 46.110(b) on 9/8/2015.

The following was reviewed:

Revised Study Documents
IRB Protocol Phase 1 and 2.doc
Nabors COI.pdf
Recruitment Script to Test Survey
Student Recruitment Script for Survey.doc
Student Survey PDs.docx
Survey Reliability Script for Survey.doc
Survey Research Information Sheet.doc
Survey Test Research Information Sheet.doc

Study staff added:

Laura Nabors

Revise Protocol, add phase 2 Information sheet, Add phase 2 Survey, Script for survey, Script for testing, Increase enrollment add 430, new total = 460, Add Laura Nabors to study staff.
Please note the following requirements:

Consent Requirements: Per 45 CFR 46.117 (21 CFR 56.109) the IRB has waived the requirement to obtain DOCUMENTATION of informed consent for all adult participants.

OTHER APPROVALS: Principal investigators are responsible for maintaining approval from other applicable review committees and performance sites. This includes, but is not limited to, Divisional Scientific Review committee, General Clinical Research Center (GCRC), Radiation Safety, Institutional Biosafety Committee (IBC), Conflict of Interest (COI) Committee, and any sites (i.e. schools, hospitals) where the research may be conducted. Principal investigators are also responsible for maintaining approval from the FDA and a valid contract between the sponsor and this institution, as applicable. If any of these entities require changes to the IRB-approved protocol and/or informed consent/assent document(s), the changes must be submitted to and approved by the IRB prior to implementation.

AMENDMENTS: The principal investigator is responsible for notifying the IRB of any changes in the protocol, participating investigators, procedures, recruitment, consent forms, FDA status, or conflicts of interest. Approval is based on the information as submitted. New procedures cannot be initiated until IRB approval has been given. If you wish to change any aspect of this study, please submit an Amendment via ePAS to the IRB, providing a justification for each requested change.

CONTINUING REVIEW: The investigator is responsible for submitting a Continuing Review via ePAS to the IRB at least 30 days prior to the expiration date listed above. Please note that study procedures may only continue into the next cycle if the IRB has reviewed and granted re-approval prior to the expiration date.

UNANTICIPATED PROBLEMS: The investigator is responsible for reporting unanticipated problems promptly to the IRB via ePAS according to current CCHMC reporting policy found on CenterLink.

STUDY COMPLETION: The investigator is responsible for notifying the IRB by submitting a Request to Close via ePAS when the research, including data analysis, has completed.

Statement regarding the International Conference on Harmonization and Good Clinical Practices: The Institutional Review Board is duly constituted (fulfilling FDA requirements for diversity), has written procedures for initial and continuing review of clinical trials; prepares written minutes of convened meetings, and retains records pertaining to the review and approval process; all in compliance with requirements defined in 21 CFR Parts 50, 56 and 312 Code of Federal Regulations. This institution is in compliance with the ICH GCP as adopted by FDA/DHHS.

Thank you for your cooperation during the review process.

§46.110. Expedited review procedures for certain kinds of research involving no more than
STUDENT SURVEY

Thank you for participating in this research study! Participation in this study is completely voluntary. Survey responses will be kept anonymous. By completing this survey, you are giving your consent to participate in this study.

Section 1: Prescription Drug Use: Depressants

1. Since entering college have you ever used any prescription DEPRESSANTS, which were not prescribed to you by a doctor or medical professional or used in another way other than prescribed? Depressant drugs are commonly used to treat anxiety and sleep disorders. These include benzodiazepines (Valium, Xanax, Ativan, Limbitrol, Downers, Sleeping Pills), non-benzodiazepines (Ambien, Rohypnol, Lunesta, Sonata, Roofies, Roofinal), and barbiturates.
   - Yes: Please name the prescription drug(s): __________________________
   - No

If yes, please continue to question 2. If no, please continue to section 2.

2. When did you first use prescription DEPRESSANTS that were not prescribed to you? (check one)
   - 9th Grade or earlier
   - 10th Grade
   - 11th Grade
   - 12th Grade

3. How did obtain the prescription drug(s) the last time you used?
   - Parent
   - Friend
   - Sibling
   - Acquaintance
   - Other Relative
   - Internet
   - Acquired from a doctor or medical professional for a valid reason but used not as prescribed
   - Other (please list): __________________________

4. Please check mark Yes or No to the following statements.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the past 12 months have you used the prescription DEPRESSANTS you named above?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days have you used the prescription DEPRESSANTS you named above?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days many times have you used the prescription DEPRESSANTS you named above?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please specify: ____________________________________________

Section 2: Prescription Drug Use: Opioids

5. Since entering college have you ever used any prescription OPIOIDS, which were not prescribed to you by a doctor or medical professional? Opioids are commonly used to treat moderate to severe pain Drugs included in this category include codeine (lean), oxycodone (Percocet, Percodan, OxyContin, Oxy, Percs), hydrocodone (Vicodin, Lortab, Lorct, Vike).
   - Yes: Please name the prescription drug(s): __________________________
   - No

If yes, please continue to question 6. If no, please continue to section 3.

6. When did you first use prescription OPIOIDS that were not prescribed to you? (check one)
   - 9th Grade or earlier
   - 10th Grade
   - 11th Grade
   - 12th Grade

7. How did acquire the prescription drug(s) the last time you used?
   - Parent
   - Friend
   - Sibling
   - Acquaintance
   - Other Relative
   - Internet
   - Acquired from a doctor or medical professional for a valid reason but used not as prescribed
   - Other (please list): __________________________
8. Please check mark Yes or No to the following statements

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the past 12 months have you used the prescription OPIOIDS you named above?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days have you used the prescription OPIOIDS you named above?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days many times have you used the prescription OPIOIDS you named above?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please specify: ____________________________

---

### Section 3: Prescription Drug Use: Stimulants

9. Since entering college have you ever used any prescription STIMULANTS, which were not prescribed to you by a doctor or medical professional? Stimulants are commonly used to treat the sleep disorder narcolepsy, Attention Deficit Hyperactivity Disorder (ADHD), obesity, and depression. These include amphetamine (Adderall, Benzedrine, Uppers, Speed) and methylphenidate (Concerta, Ritalin, R-ball, Skippy).

- Yes: Please name the prescription drug(s): ____________________________
- No

If yes, please continue to question 10. If no, please continue to section 4.

10. When did you first use prescription STIMULANTS that were not prescribed to you? (check one)

- 9th Grade or earlier
- 10th Grade
- 11th Grade
- 12th Grade

- Freshman year
- Sophomore year
- Junior year
- Senior year

11. How did obtain the prescription drug(s) the last time you used?

- Parent
- Friend
- Sibling
- Acquaintance
- Other Relative
- Internet
- Acquired from a doctor or medical professional for a valid reason but used not as prescribed
- Other (please list): ____________________________

12. Please check mark Yes or No to the following statements

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the past 12 months have you used the prescription STIMULANTS you named above?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days have you used the prescription STIMULANTS you named above?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days many times have you used the prescription STIMULANTS you named above?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please specify: ____________________________

---

### Section 4: Reasons for Use

13. For the following section, please place a check mark in the box that best represents the reason you engaged in the nonmedical use of prescription drugs.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational use at a party</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For fun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To help me study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To improve academic performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To help manage/ improve sleep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To fit into social group/ make friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To escape from reality/ take a break from real problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To feel high</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 5: Other Substance Use

14. The next section asks you about the use of other drugs and substance use, such as alcohol, marijuana, etc.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marijuana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hallucinogens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecstasy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you know of any other drugs students are using for the purpose of getting high? (please list: ____________________________)

Thinking about last month the following questions ask about how many times you have intentionally or unintentionally combined prescriptions drugs and alcohol.

15. During the past 30 days how often have you used DEPRESANTS while drinking ALCOHOL or within a few hours of drinking:  
   Please specify: ____________________________

16. During the past 30 days how often have you used OPIOIDS while drinking ALCOHOL or within a few hours of drinking:  
   Please specify: ____________________________

17. During the past 30 days how often have you used STIMULANTS while drinking ALCOHOL or within a few hours of drinking:  
   Please specify: ____________________________

Section 6: Perceptions and Attitudes

18. On a scale of 1-5, 1= strongly disagree and 5= strongly agree; please circle the value that best represents the following statements.

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is acceptable to share prescription drugs with friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>It is acceptable to share prescription drugs with family members</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I saved unused prescription drugs for a later date</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Prescription drugs are more socially acceptable to use than other drugs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I do not include prescription drugs when thinking about street drugs (i.e., marijuana and cocaine)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I know the risks involved with mixing prescription drugs with alcohol or other drugs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I know what to do if someone passes out from drinking too much</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I know what to do if someone has a bad reaction to drugs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The university does a good job addressing the use of prescription drugs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>There are places on campus where I can go to talk to someone about drug use or get information about drugs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 7: Demographics

19. What is your age? __________ years

20. What is your sex? (check one)
   ☐ Male
   ☐ Female

21. What is your class at the University of Cincinnati? (check one)
   ☐ Freshman
   ☐ Sophomore
   ☐ Junior
   ☐ Senior
   ☐ Graduate Student

22. What are your living arrangements? (check one)
   ☐ On-campus
   ☐ Off-campus

23. Are you involved in any of the following extracurricular activities? (check one)
   ☐ Fraternity
   ☐ Sorority
   ☐ Intercollegiate athlete
   ☐ N/A

24. Have you ever been diagnosed with a mental health disorder? (check one)
   ☐ Yes    If yes, please specify: ______________________________
   ☐ No

25. What is your sexual orientation? (Please circle)

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusively heterosexual</td>
<td>Equally heterosexual</td>
<td>Exclusively homosexual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. What is your religion? (check one)
   ☐ Christian
   ☐ Muslim
   ☐ Buddhist
   ☐ Jewish
   ☐ Atheist
   ☐ Other (please specify) _______

27. What is your race/ethnicity? (check one)
   ☐ American Indian or Alaska Native
   ☐ Native Hawaiian or Other Pacific Islander
   ☐ Asian
   ☐ White
   ☐ Black or African American
   ☐ Multiracial
   ☐ Hispanic or Latino

THANK YOU FOR YOUR PARTICIPATION! 😊
APPENDIX C
Research Information Sheet
University of Cincinnati
Health Promotion and Education Program
Oladunni Oluwoye, M.S.
oluwoyoi@mail.uc.edu
(256) 520-2248
Laura Nabors, Ph.D.
naborsla@ucmail.uc.edu

Title of Study: Students’ Perceptions of Prescription Medication Use and the Use of Other Substances

Introduction:
You are being asked to take part in a research study. Please read this paper carefully and you may ask questions about anything that you do not understand.

Who is doing this research study?
The person in charge of this research study is Oladunni Oluwoye a doctoral student in the Health Promotion and Education Program at the University of Cincinnati. She is being guided in this research by her faculty advisors Laura Nabors, PhD, Ashley Merianos, PhD, and Rebecca Vidourek, PhD in the Health Promotion and Education Program at the University of Cincinnati. There may be other research assistants on the research team helping at different times during the study that will be trained and supervised by the PI.

What is the purpose of this research study?
The purpose of this study is to examine college students’ use of prescription drugs and the use of other substances.

Who will be in this research study?
Approximately 400 students at the University of Cincinnati will be participants. You may participate in this study if you are 18 years and older and are able to read and understand the survey for this study. Participants must also be classified as an undergraduate or graduate student.

What will you be asked to do in this research study, and how long will it take?
You will be asked to complete a survey. Questions on the survey will address your use of prescription drugs and other substances. It is anticipated that it will take about 15 minutes to complete the survey.

Are there any risks to being in this research study? This study has been designated as involving minimal risk. If a question makes you uncomfortable you do NOT need to answer it. If you become uncomfortable while completing the survey at any time you may stop. Please contact Oladunni Oluwoye if any issues may arise. If you need a referral you can go to or contact Counseling and Psychological Services at (513) 556-0648, or contact the Lindner Student Health Clinic at (513) 556-2564 or Holmes Clinic at (513) 584-4457, or contact the Mental Health
Access Point at (513) 558-8888 (in Cincinnati), or contact the Substance Abuse and Mental Health Services Administration’s national 24-hour treatment referral help line: (800) 662-HELP (800-662-4357); http://www.samhsa.gov/treatment/

**Are there any benefits from being in this research study?** You will probably not get any benefit because you are an active participant in the study. The answers you provide may help others or positively influence scientific knowledge.

**Do you have choices about taking part in this research study?**
If you do not want to take part in this research study you do not have to. You may also stop answering questions on the survey at any time. You can skip or decide not to answer questions. You can also decide not to turn in the survey. Not taking this survey or deciding not to complete this survey will not hurt your class grade in any way.

**How will your research information be kept confidential?**
No identifying information about you will be collected as this survey is anonymous. It is important to know that there will be no information such as your name, address, or birth date on the survey. Your data will be identified by a number.

All information will be managed by the Principal Investigator. ID numbers will be stored in a locked file cabinet in the PIs locked office. Data from this research study may be published; but you will not be identified by name.

Agents of the University of Cincinnati may inspect study records for audit or quality assurance purposes.

**What are your legal rights in this research study?**
Nothing in this information form, which is your consent form, waives any legal rights you may have. This information form also does not release the investigator, the institution, or its agents from liability for negligence.

**What if you have questions about this research study?**
If you have any questions or concerns about this research study, you should contact Oladunni Oluwoye at (256) 520-2248 or email oluwoyoi@mail.uc.edu or you may contact Dr. Laura Nabors by email at naborsla@ucmail.uc.edu.

The UC Institutional Review Board reviews all research projects that involve human participants to be sure the rights and welfare of participants are protected.

If you have questions about your rights as a participant, complaints and/or suggestions about the study, you may contact the UC IRB at (513) 558-5259. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.

**Do you HAVE to take part in this research study?**
No one has to be in this research study. Refusing to take part will NOT cause any penalty or loss of benefits that you would otherwise have. Not participating will not change your progress in a course you may be taking, which means not participating will not negatively affect your grade in the course in any way.

BY COMPLETING THE SURVEY YOU INDICATE YOUR CONSENT TO REVIEW THE SURVEY. BY TURNING IN THE SURVEY YOU ARE INDICATING THAT YOUR ANSWERS MAY BE USED IN THIS RESEARCH STUDY.

PLEASE KEEP THIS INFORMATION SHEET FOR YOUR REFERENCE
Appendix D
Research Information Sheet – Test-Retest
University of Cincinnati
Health Promotion and Education Program
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oluwoyoi@mail.uc.edu
(256) 520-2248
Laura Nabors, Ph.D.
naborsla@ucmail.uc.edu

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What is the purpose of this research study?
The purpose of this study is to examine college students’ use of prescription drugs and the use of other substances. This part of the research study will test the survey to see if it is reliable.

Who will be in this research study?
Approximately 30 students at the University of Cincinnati will be participants. You may participate in this study if you are 18 years and older and are able to read and understand the survey for this study. Participants must also be classified as an undergraduate or graduate student.

What will you be asked to do in this research study, and how long will it take?
You will be asked to complete a survey. Questions on the survey will address your use of prescription drugs and other substances. It is anticipated that it will take about 15 minutes to complete the survey. You will then be asked to complete the survey for a second time, 7 to 10 days later. Completing the survey the first and/or second time is voluntary and you may choose not to participate at any time.

Are there any risks to being in this research study? This study has been designated as involving minimal risk. If a question makes you uncomfortable you do NOT need to answer it. If you become uncomfortable while completing the survey at any time you may stop. Please contact Oladunni Oluwoye if any issues may arise. If you need a referral you can go to or contact
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