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College Prescription Opioid Misuse: An Exploration of Social Learning, Social Control, and Strain Theories

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COLLEGE PRESCRIPTION OPIOID MISUSE: AN EXPLORATION OF SOCIAL LEARNING, SOCIAL CONTROL, AND STRAIN THEORIES

by

Julie Murray

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ABSTRACT

College Prescription Opioid Misuse: An Exploration of Social Learning, Social Control, and Strain Theories

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Prescription opioids, when used as medically intended, can be effective in pain management. However, the consequences and costs of widespread misuse of prescription opioids in the United States are cause for concern. Prescription opioids are related to increased morbidity and mortality. Young adults, between the ages of 18 and 25 have the highest rates of misuse nationally and within this age group, college students may be particularly at risk. Relatively few studies have examined prescription opioid misuse in this population, and even fewer have done so through a theoretical lens. In order to effectively curb the growing misuse of prescription opioids within college populations, we must have a better understanding of the factors that potentially lead to misuse.

The purpose of the present study was to examine whether predictors from social learning, social control, or strain theory could explain prescription opioid misuse within a national sample of undergraduate students from four year universities in the United States and to examine which of the three theories provides the strongest explanation of prescription opioid misuse within this population. A sample of 616 undergraduates

nationally completed a web-based survey designed to assess prescription opioid misuse and identify predictors from social learning, social control, and strain theories.

Results showed that 17% of the sample had engaged in lifetime prescription opioid misuse. Logistic regression analyses showed that measures from social learning and strain theories were significant predictors of prescription opioid misuse, whereas the measures of social control theory were not. An exploratory model combining demographic variables with variables across the three theoretical models was created in order to optimize prediction success. Implications, limitations, and future directions were discussed.

(91 pages)

PUBLIC ABSTRACT

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Prescription opioids, when used as medically intended, can be effective in pain management. However, the consequences and costs of widespread misuse of prescription opioids in the United States are cause for concern. Prescription opioids are related to increased risk of death and injury. Young adults, between the ages of 18 and 25, have the highest rates of misuse nationally and within this age group, college students may be particularly at risk. In order to effectively curb the growing misuse of prescription opioids within college populations, we must have a better understanding of the factors that potentially lead to misuse.

This study used an online survey, distributed to a sample of 616 undergraduate students at four-year universities nationally to collect information about prescription opioid misuse and potential predictors of misuse. Results showed that 17% of undergraduates in the study had misused opioids at least once in their lifetime. Results also showed the being older, male, living in Greek housing, having friends that use illicit drugs or misuse prescription drugs, and experiencing moderate to severe depression were risk factors for misuse. Students who believed their parents/guardians held negative views of prescription opioid misuse were less likely to misuse. The implications of these findings as well as limitations and future directions are discussed.

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Julie Murray

CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Figures Page

CHAPTER I

INTRODUCTION

Prescription opioids, when used as medically intended, can be effective in pain management for both acute and chronic pain related conditions (Rosenblum et al., 2008). However, the consequences and costs of widespread misuse of prescription opioids in the United States are cause for concern. Prescription opioid misuse refers to use of prescription opioids "inconsistent from which it is prescribed and/or using a prescription [opioid] for which an individual does not have a legal prescription" (Kenne et al., 2017). In 2015, it is estimated that about 38.7% of adults in the United States had used prescription opioids in the prior year. Of these 91.8 million adults, 12.5% reported misuse and 16.7% reported an opioid use disorder (Han et al., 2017). Prescription opioid misuse and abuse are associated with high financial costs. Total societal costs of prescription opioid abuse in 2007 was calculated to be $55.7 billion (Birnbaum et al., 2011). More specifically, opioid misuse resulted in $25.6 billion lost workplace productivity, $25 billion in health care costs, and $5.1 billion in criminal justice costs (Birnbaum et al., 2011).

In addition to high financial costs, prescription opioid misuse presents significant health risks and is associated with elevated rates of morbidity and mortality (Compton et al., 2016; SAMHSA, 2013). Between 2004 and 2011, emergency department visits involving misuse or abuse of prescription opioids increased 153% (SAMHSA, 2013). Additionally, between the years 2000 and 2014, the rate of death from prescription opioid overdose increased from 1.5 deaths per 100,000 persons to 5.9 deaths per 100,000 persons (Compton et al., 2016). Further highlighting the dangers of prescription opioid

misuse, the CDC has recognized prescription opioid misuse as the single greatest risk factor for heroin use (Centers for Disease Control and Prevention, 2015).

Young adults, between the ages of 18 and 25, have been found to have higher rates of prescription opioid misuse than any other age group nationally, at approximately 7.3% (SAMHSA, 2017). Within this age group, research suggests that college students may be at a particularly high risk of prescription drug misuse due to the unique demands and environment of college, including academic stress, perceived social and cultural norms, separation from family and familiar social supports, increased independence, acceptability of use, and ease of accessibility of prescription drugs (McCabe et al., 2006; Schulenberg & Maggs, 2002; Zullig & Divin, 2012). Although substance use is often thought to be a normative part of the college experience, it is not without consequence (Skidmore et al., 2016). Substance use in college is associated with poorer academic performance, greater engagement in other risky behaviors, legal problems, and elevated risk of injury (Skidmore et al., 2016).

While national trends reveal a decrease in heavy alcohol use and other drug use in older college students, ages 24 and older, this trend was not observed for misuse of prescription opioids and instead rates remained consistent among younger and older college students (McCabe et al., 2005). This may suggest that prescription opioid misuse may pose a unique risk, as students may not "age out" of opioid use in the same way as with other types of substance use.

There is a large body of research on heavy alcohol use and prescription stimulant misuse within college populations, however, less work has been done regarding prescription opioid misuse in this population. The limited research in this area has largely

focused on prevalence, demographic characteristics of users, and motives for use. For instance, one study sampled over ten thousand students from 119 four-year colleges and found that approximately one in every four colleges has a prevalence rate of 10% or higher for past year prescription opioid misuse (McCabe et al., 2005). Another, more recent study found a lifetime 9.5% prevalence rate of opioid misuse among 668 students from a public Midwestern university (Kenne et al., 2017). This study further found that among students who misused opioids, motives for misuse ranged from relieving physical pain, to feeling good or getting high. Another study of 527 students at a four-year university who admitted to at least one instance of prescription opioid or stimulant misuse, found that students' main motives for opioid misuse were to relax, get high, have fun, and cope with depression (Lord et al., 2011). While this research is useful in describing the scope and some motives of misuse, it is not enough. In order to effectively curb the growing misuse of prescription opioids within college populations, we must have a better understanding of the factors that potentially lead to misuse. This knowledge is essential for the development and implementation of prevention initiatives.

One factor limiting the comprehensive understanding of opioid misuse within college populations is the lack of theory guided investigations into misuse in this population. While relatively few studies have looked at prescription opioid misuse within college populations, even fewer have attempted to apply a theoretical perspective specifically to prescription opioid misuse within this population. Several studies, however, have sought to apply criminological theories, such as social learning theory, social control theory, and strain theory, to prescription drug misuse in general in college populations. Several studies have found at least partial support for social learning theory

as an explanation for general prescription drug misuse in college populations (Peralta & Steele, 2010; Watkins, 2016). In a study of 465 undergraduate students at a Midwestern university, Peralta & Steele (2010) found that 39% of the variance in lifetime prescription drug misuse was explained by social learning variables, including differential association, imitation, and differential reinforcement. In another study of 841 undergraduate college students enrolled at a Southern university, Watkins (2016) found that, in agreement with social learning theory, greater proportions of friends that misuse prescription drugs, as well as more perceived positive experiences from misuse, increase the odds of misuse. Another study, looking specifically at prescription stimulant misuse in a sample of undergraduate students at a Midwestern university, examined the predictive ability of three separate theoretical perspectives: social learning theory, social control theory, and strain theory (Maahs et al., 2016). This study found that measures of social learning theory and social control theories were significant predictors of prescription stimulant misuse. Measures of strain theory were not found to be significant predictors of prescription stimulant misuse in this study, however, prior research has found support for strain theory as an explanation for adolescent and young adult substance use (Ford & Schroeder, 2008; Schroeder & Ford, 2012). While this research provides a solid basis for a theoretical explanation of prescription drug misuse in college populations, it is unclear how these theories will apply to prescription opioid misuse specifically, as prescription opioid misuse has been found to have a notably different course and different motives than other types of substance use (McCabe et al., 2005).

Given the alarming rates of prescription opioid misuse among 18-25 year-olds nationally, the scope of the opioid overdose epidemic, and increased risk factors specific

to the college student population, it is important to gain a better understanding of the scope and theoretical correlates for misuse in this population. The present study seeks to identify whether predictors from social learning, social control, or strain theories can explain prescription opioid misuse within a national sample of undergraduate students from four year universities in the United States and to examine which of the three theories provides the strongest explanation of prescription opioid misuse within this population.

CHAPTER II

REVIEW OF THE LITERATURE

The primary purpose of this review was to explain three existing theories of adolescent substance use. Articles related to college prescription misuse, social learning theory, social control theory, and strain theory were located using PsychINFO, PsychArticles, PubMed, and Google Scholar internet databases.

Social Learning Theory

Social learning theory builds upon the foundation of Sutherland's theory of differential association (1947) by incorporating elements of behavioral psychology, such as operant conditioning (Akers & Cochrane, 1985). This theory is composed of four key components: differential association, imitation, differential reinforcement, and definitions (Akers, 1985). According to Akers and colleagues (1979), differential associations "provide the social environments in which exposure to definitions, imitation of models, and social reinforcement for use of or abstinence from any particular substance take place." Akers further stated that definitions are shaped through imitation and social reinforcement of definitions by peer associates.

Differential association, adapted from Sutherland's theory (1947), focuses on the influence of peer associations in the learning of deviant behaviors, such as substance use. Important to such associations are priority, frequency, duration, and intensity. Associations that occur earlier in life, more frequently, for longer durations, and involve significant others will be more influential. Given the roughly four-year time frame of college and that it involves primarily new peers and environments, frequency and intensity are most relevant to college students (Watkins, 2016). In terms of college

substance use, differential association suggests that college students who associate with peers that use substances, are more likely to use substances than those that associate with non-substance using peers, a claim that has been supported through various studies (Maahs et al., 2016; Schroeder & Ford, 2012).

The second component, imitation, refers to the modeling of others' behavior. Behavior is more likely to be imitated if it is modeled by a salient associate, such as a parent, peer, or romantic partner. Further, behavior is more likely to be imitated if the modeled behavior receives a positive outcome. While imitation interacts with definitions and reinforcement to establish an initial behavior, it becomes "less important while the effects of definitions should continue" (Akers, 1979). Thus, this component suggests that college students who see their peers as having positive outcomes related to substance use will be more likely to imitate the behavior and engage in substance use.

Differential reinforcement refers to the operant conditioning element of learning. Deviant behavior, such as substance use, is more likely to occur when behavior is rewarded via positive or negative reinforcement. Accordingly, a college student who experiences or anticipates positive outcomes from substance use is more likely to engage in substance use than a student who experiences or anticipates negative outcomes.

The final component of social learning theory, definitions, refers to the meanings one attaches to various behaviors. Social learning theory posits that behavior can be predicted by the balance of favorable to unfavorable definitions. That is, if a college student holds more favorable definitions of substance use than unfavorable definitions, the student is more likely to engage in substance use behaviors.

Taken together, social learning theory uses these four components to predict and explain deviant behavior, such as substance use. In their first test of social learning theory, Akers and colleagues (1979) found support for social learning theory as a predictor of illicit drug use among adolescents. In line with this research, further studies have extended this theory to predict and explain other types of substance use among college students, such as prescription misuse (Peralta & Steele, 2010; Watkins, 2016).

Social Control Theory

Social control theory emphasizes the role of social bonds in deterring deviant behaviors, such as substance use. Hirschi (1969) theorized that four elements, attachment, commitment, involvement, and beliefs, serve to create bonds between the individual and society that promote prosocial behavior. Deviant behavior, then, is a result of broken or weakened bonds.

The first element, attachment, refers to the affective attachment an individual feels towards their parents, peers, school and others. Hirschi (1969) hypothesized that lack of parental attachment contributes to deviancy, a claim that has been repeatedly supported (Wiatrowski et al., 1981; Marcos et al., 1986; Gault-Sherman, 2012). Hirschi further hypothesized an inverse relationship between peer attachment and deviancy that he later modified to consider the type of peers involved (1969). Echoing the concept of differential association, Hirschi modified his model to include that having peer attachments to those who engage in delinquent behavior will have a deviance-producing effect, rather than a controlling effect (Hirschi, 1969; Krohn & Massey, 1980). Accordingly, college students with strong parental attachment and attachment to non-substance using peers, would be less likely to engage in substance use behaviors.

The second element, commitment to conventional lines of activity, refers to the costs of engaging in deviant behavior. This element reflects the extent to which an individual is invested in conventional norms, such as academic and occupational goals, and the cost of deviant behavior on these endeavors (Hirschi, 1969; Krohn & Massey, 1980). Thus, this suggests the more vested a college student is in his/her academics and career goals, the less likely he/she would be to engage in behaviors, such as substance use, for fear of jeopardizing these aspirations.

Involvement refers to engagement in conventional activities, such as school or athletics, that due to constraints of time, energy, or general incompatibility, inhibit deviant behavior. Hirschi (1969) hypothesized that involvement in conventional activities would deter deviance because the individual simply would be too busy with their activities. This hypothesis has been supported in adolescents, as time spent on homework, athletics, and after-school activities have been found to be negatively correlated with substance use behaviors (Elder et al., 2000; Borden et al., 2001; Barnes et al., 2006).

The final element, belief, refers to an individual's belief in conventional values and norms. Hirschi believed that an individual is less likely to engage in deviant behavior when he/she believes in and respects societal rules, laws, and norms (1969).

There is a large body of research that lends support for social control theory as an explanation or predictor of substance use in adolescents and college students. For instance, Marcos, Bahr, and Johnson (1986) found that affective attachment to parents, religion, education, and conventional values were predictive of adolescent marijuana use. Similarly, Maahs, Weidner, and Smith (2016) found measures of social control theory to be predictive of non-medical prescription stimulant use among college students.

Strain Theory

Strain theory posits that delinquency is a means for alleviating strain caused by negative relationships or situations (Agnew, 1992). This theory states that when adolescents face relationships or situations which cause strain, it leads to a negative affective state. These negative affective states then put pressure on adolescents to engage in corrective actions, such as turning to "illegitimate channels" for goal attainment, attacking or escaping from the negative relationship/situation, or management of negative affect through the use of substances (Agnew, 1992). In his revised Strain theory (1992), Agnew details three major types of strain. The first type of strain detailed by Agnew (1992) is when a relationship or situation causes a disjunction between the adolescent's expected goals and actual achievement of those goals. The second type of strain occurs when a relationship or situation threatens to remove or removes positively valued stimuli that the adolescent possesses. The third type of strain detailed by Agnew (1992) occurs when a relationship or situation presents an adolescent with noxious or negatively valued stimuli.

Previous research on college prescription drug misuse has found that motives for misuse include pain relief, weight loss, improved scholastic performance, and increasing concentration (Ford & Schroeder, 2009; McCabe et al., 2007; Schroeder & Ford, 2012). These motives may be indicative of adolescent's engaging in corrective actions by turning to "illegitimate channels" for goal attainment. Further, Schroeder & Ford (2012) found that strain, as measured by a cumulative measure of negative life events, is a significant predictor of adolescent marijuana and prescription drug use.

Conclusions from the Literature Review

Research has supported social learning theory, social control theory, and strain theory, individually and collectively, as predictive of several types of substance use/misuse among adolescents, including marijuana use, alcohol use, and prescription drug misuse (Akers 1985; Akers & Lee, 1999; Ford, 2008; Maahs et al., 2016; Peralta & Steele, 2010; Schroeder & Ford, 2012; Watkins, 2016). While these three theories have been studied as predictors of different types of substance use and misuse among adolescents, there has not, to date, been a study looking exclusively into their associations and ability to predict prescription opioid misuse within a college population. The present study seeks to address the gap in this area.

Research Purpose and Study Objectives

The primary purpose of the present study is to examine the theoretical correlates of prescription opioid misuse within an undergraduate population. The purpose of this study is realized through three main objectives. The first objective is to assess prescription opioid misuse in undergraduate populations. The second objective is to determine theoretical correlates of prescription opioid misuse within an undergraduate population. The third objective is to create a predictive multivariate model of opioid misuse in undergraduate college students.

Research Questions

This study addresses the following research questions related to objective 1.

1. Determine the prevalence of prescription opioid misuse in an undergraduate population.

2. Describe the demographic characteristics of undergraduates who misuse prescription opioids.

This study addresses the following research questions related to objective 2.

1. Examine the relationship between predictors from social learning theory and undergraduate prescription opioid misuse.
2. Examine the relationship between predictors from social control theory and undergraduate prescription opioid misuse.
3. Examine the relationship between predictors from strain theory and undergraduate prescription opioid misuse.
4. Determine which of the three theories, social learning theory, social control theory, or strain theory, provides the strongest explanation of prescription opioid misuse within the undergraduate population.

This study addressed the following research question related to objective 3.

1. Create a multivariate model that will optimize prediction of opioid misuse among undergraduate college students.

CHAPTER III

METHODS

This study employed a web-based survey, designed to assess prescription opioid misuse and identify predictors from social learning, social control, and strain theories among a national sample of undergraduate students. Survey respondents were obtained via Qualtrics Panel. Qualtrics panel uses traditional actively managed market research panels in order to aggregate samples that meet the inclusion and exclusion criteria provided by the researcher. Respondents that were likely to meet inclusion/exclusion criteria, based on their Qualtrics profiles, were invited via email to take part in the survey. Participants who met the criteria and completed the survey were incentivized based on the length of survey, their specific panelist profile, and difficulty of sample acquisition for the survey. Incentives were given in various forms including cash, airline miles, gift cards, and redeemable points and vouchers. Meta-analyses comparing the internal reliability estimates and effect sizes from online panel data, such as Qualtrics panel, to estimates from conventionally sourced data have found the two types of data to have similar psychometrics properties, thus lending support for the validity of this type of data collection (Walter et al., 2018).

Population and Sample

Undergraduate students enrolled full-time (i.e., enrolled in at least twelve credits) at four-year universities in the United States of America who were at least 18 years of age were eligible to participate in this study. Students were recruited and the survey was administered using Qualtrics Panel. To protect the anonymity of the survey respondents,

participants were provided a letter of information and required to mark it as “read” before completing the survey. This letter of information is provided in appendix A.

Data and Instrumentation

The measures described below were chosen to gather information relevant to substance use behaviors and the central concepts of Social Learning Theory, Social Control Theory, Strain Theory. Table 1 summarizes the study variables included in this study. The survey was administered through Qualtrics Survey Research Suite, a web-based tool available for use through Utah State University. The survey in its entirety is located in appendix B.

Demographics Information

A demographic questionnaire was used to collect demographic information, including biological sex, relationship status, ethnic identity, college year, and residency type.

Substance Use Behaviors

Prescription opioid misuse (POM) was assessed by presenting respondents with a list of the most common names of opioid medications, acquired from the National Institute on Drug Abuse, and two items asking the respondents to indicate which opioid medication had ever been misused and how often the medication has been misused. Misuse was defined for the respondents as “taking medicine in a way or dose other than prescribed, taking someone else’s prescription, or taking medicine for the effect it causes or to get high” (NIDA, 2018). The response scale is (1) never used; (2) used, but not in the past 12 months; (3) used, but not in the past 30 days; and (4) used in the past 30 days.

Frequency and motive for first misuse was assessed in respondents who endorse POM. Frequency was assessed with one question asking how many times the respondent has misused prescription opioids. The response scale ranges from (1) none to (6) 10 or more times. Source of misused medication was assessed with one item in which respondents are asked to indicate where they obtained the medication the first time they misused. Response items include a) from a doctor's prescription, b) leftover from an old prescription, c) wrote a fake prescription, d) stole from a doctor's office/clinic/pharmacy, e) got from a friend or relative for free, f) bought from a friend or relative, g) took from a friend or relative without asking, h) bought from a drug dealer or stranger, i) bought from the internet, or j) other. These response items were adapted from previous research on source of diversion in prescription misuse (Ford & Lacerenza, 2011). Motive was assessed with up to two items. Respondents were first asked to indicate the primary motive for their first time engaging in POM. Respondents that endorsed first engaging in POM to relieve physical or emotional pain were further prompted with an item asking them to indicate why they chose POM instead of seeking treatment for their problem Response options for these two items were based on prior research on motives for POM in college students (Kenne et al., 2017).

Prescription stimulant misuse was assessed in the same way as prescription opioid misuse. Response items for misuse motive questions were based on prior research on motives for prescription stimulant misuse in college students (Teter et al., 2006).

Alcohol use, binge drinking, tobacco use, marijuana use, and other illicit drug use were also assessed, as previous research has found prescription misuse to be highly associated with other substance use behaviors (McCabe et al., 2005; Schroeder & Ford,

2012; Teter et al., 2003). Binge drinking is defined as five or more drinks in one sitting. Use of these substances were assessed in nine items in which respondents were asked to indicate if they have used/misused each substance and the frequency of use/misuse.

Social Learning Theory

In accordance with prior research on various forms of substance use and social learning theory, the social learning theory measures in the present study assessed peer substance use behaviors (differential association), perceived risk of POM and perceived POM attitudes of peers and parents (differential reinforcement), and the respondent's attitude towards POM (definitions).

Differential association was measured using three items adapted from previous research investigating the connection between various forms of substance use and social learning theory (Akers et al., 1979; Peralta & Steele, 2010; Watkins, 2016). These items ask how many of the respondents close friends engage in substance use behaviors, such as binge drinking, using marijuana/other illicit drugs, and misusing prescription drugs. The response scale for each item is: (1) none of my friends; (2) a few of my friends; and (3) some of my friends; (4) most of my friends; (5) all of my friends. Higher scores on this index indicates that the respondent differentially associates with peers who engage in substance use.

Differential reinforcement was measured with three items adapted from Watkins (2016). The first item asks respondents about the perceived risk college students face when misusing prescription opioids (physically or otherwise), with responses ranging from (1) not risky to (4) very risky. The second and third items ask about the attitudes the

respondent feels their peers and parents would hold toward POM, with responses ranging from (1) very negative to (5) very positive.

Definitions were measured with one item adapted from Watkins (2016) that asks respondents to what degree they feel POM is acceptable, with responses ranging from (1) not acceptable to (5) very acceptable.

Social Control Theory

Consistent with the main tenants of social control theory and prior research on various forms of substance use and social control theory, the social control theory measures in the present study assessed commitment and involvement related to parents, religion, and school.

Parental bonds were assessed with two items that measure the frequency of communication between the respondent and his/her parents/guardians and the importance of the parent's/guardian's opinion.

The Religious Commitment Inventory-10 (RCI-10) is a 10-item questionnaire that assesses the extent to which an individual adheres to his/her religious beliefs, practices, and values. The RCI-10 is comprised of two subscales, *interpersonal religious commitment and intrapersonal religious commitment,* that can be combined for an overall measure of religious commitment. This study used the full-scale measure of religious commitment, as the interpersonal and intrapersonal religious commitment subscales are highly correlated, $r(154) = .72$, $p < .001$, and both are relevant to overall religious bonds. The RCI-10 full-scale has strong internal consistency (Chronbach's alpha = .96) and test-retest reliability (.84 over a five-month period; Worthington et al., 2003).

School bonds were measured by the respondent's self-reported grade point average (GPA).

Strain Theory

Strain theory posits that delinquency occurs as a means for alleviating strain caused by negative relationships or situations. Consistent with this theory, the measures of strain theory in the present study assessed for stress, depression, anxiety, and coping strategies.

The Perceived Stress Scale (PSS) is a ten-item measure of perceived stress (Cohen et al., 1983). This measure has high reliability ($\alpha = 0.85$ for two-day retest and 0.55 for 6-week re-test; Cohen et al., 1983).

The Patient Health Questionnaire Depression Scale (PHQ-9) is a nine item self-report screener of depression severity based on the DSM-IV criteria for depressive disorders (Kroenke et al., 2001). This measure has high internal reliability ($\alpha = 0.89$) and test-retest reliability ($\alpha = 0.84$) (Kroenke et al., 2001). Scores on this measure range from 0-27, with higher scores indicating more severe depression.

The Generalized Anxiety Disorder 7-Item (GAD-7) is a brief self-report screener of anxiety (Spitzer et al., 2006). Scores on this item range from 0 to 21 with cut points at 5, 10, and 15 to represent mild, moderate, and severe anxiety. Using a score of 10 as the cut-point, the GAD-7 has sensitivity of 89% and specificity of 82% for generalized anxiety disorder. This measure is also moderately good at screening for other anxiety and trauma-related disorders including panic disorder, social anxiety disorder, and post-traumatic stress disorder (Williams, 2014).

The Ways of Coping Checklist-Revised (WOC) is a 66-item self-report inventory designed to assess cognitions and behaviors people use in dealing with stressful life events or situations (Folkman & Lazarus, 1988). The WOC is comprised of eight subscales: confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem solving, and positive reappraisal. The coefficient alphas for these subscales range from .60 to .75 (Rexrode et al., 2008). The *confrontive coping* subscale describes aggression and risk-taking to alter the stressful situation (e.g., "I stood my ground and fought for what I wanted"). The *distancing subscale* describes an effort to mentally detach from or create a positive outlook on the situation (e.g., "I didn't let it get to me; I refused to think too much about it"). The *self-controlling* subscale describes attempts to control one's feelings and actions related to the stressful situation (e.g., "I tried to keep my feelings to myself"). The *seeking social support* subscale describes efforts to seek advice and emotional support from others (e.g., "I asked advice from a relative or friend I respected"). The *accepting responsibility* subscale describes acknowledging responsibility and attempts to rectify the stressful situation (e.g., "I criticized or lectured myself"; "I apologized or did something to make up"). The *planful problem solving* subscale describes problem-focused efforts to resolve the situation (e.g., "I made a plan of action and followed it"). The *positive reappraisal* subscale describes efforts to focus on positive growth in stressful situations (e.g., "I came out of the experience better than I went in"). The present study focused on the *escape-avoidance* subscale, which describes wishful thinking and behavioral efforts, including substance use, to avoid or escape a stressful situation (e.g., "tried to make

myself feel better by eating, drinking, smoking, using drugs, or medication, etc."; "I wished the situation would go away or somehow be over with").

Selection of Variables

Each of the three theories investigated in the present study are comprised of several individual components. Social learning theory is comprised of the four components: differential association, imitation, differential reinforcement, and definitions. Social control theory is comprised of the four components: attachment, commitment, involvement, and beliefs. Strain theory involves negative relationships or situations, negative affective states, and corrective action. While the individual components of each theory are important, the current study balances sufficiently measuring each theory with participant burden of responding to survey items. The selection of variables included in this study to represent the central tendencies of social learning theory, social control theory, and strain theory were adapted from previous investigations into the relationship between these theories and various forms of substance use in adolescents (Akers et al., 1979; Maahs et al., 2016; Peralta & Steele, 2010; Watkins, 2016).

Table 1

Study Variables

STUDY VARIABLES	MEASURES
Demographic Variables	(Demographic Questionnaire)
Age	Date of birth
Biological Sex	Male/Female
Relationship Status	Single, Married, Separated/Divorced/Widowed, In a committed relationship
Ethnicity	Ethnic background
Student Classification	Years in college
Residency Type	Current living arrangement
Substance Use Behaviors	
Prescription Opioid Misuse	Prescription opioid misuse, frequency, age of first misuse, source, and motives
Prescription Stimulant Misuse	Prescription stimulant misuse, frequency, age of first misuse, source, and motives
Tobacco	Tobacco use, frequency, and age of first use
Alcohol	Alcohol use, frequency, age of first use, and binge drinking
Marijuana Use	Marijuana use, frequency, and age of first use
Other Illicit Drug Use	Other illicit drug use, frequency, and age of first use
Social Learning Theory	
Differential Association	Amount of friends who engage in substance use
Differential Reinforcement	Perceived risk and perceived peer and parent attitudes towards prescription opioid misuse
Definitions	Personal attitude towards prescription opioid misuse
Social Control Theory	
School Bonds	GPA
Parental Bonds	Frequency of contact and importance of parent opinion
Religiosity	RCI-10 (full scale)
Strain Theory	
Stress	Perceived Stress Scale
Depression	Patient Health Questionnaire (PHQ-9)
Anxiety	Generalized Anxiety Disorder 7-Item (GAD-7)
Coping	Ways of Coping Checklist- Escape-Avoidance Subscale.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences version 26 (SPSS 26.0). The first research objective was to assess the prevalence and characteristics of undergraduate prescription misuse. In order to address this research objective, descriptive statistics, including frequencies, means, and standard deviations, were used to describe the sample according to study variables. The second research objective was to determine theoretical correlates of prescription opioid misuse. In order to address the second research objective, bivariate correlations were first calculated to explore associations between each individual theory-related variable and prescription opioid misuse. Additionally, logistic regressions were conducted to determine the predictive value of each of the three sets of theory-related variables on the dichotomous outcome variable, lifetime prescription opioid misuse. The third research objective was to combine select predictors across all three theories, Social Learning Theory, Social Control Theory, and Strain Theory, to create a multivariate model that optimized prediction of opioid misuse among undergraduate college students. In order to address this objective, select variables from all three theoretical models were combined with select demographic models into one logistic regression model to determine the best-fit multivariate model for prediction of lifetime prescription opioid misuse.

CHAPTER IV

RESULTS

Introductory Statement

Survey data were collected in June 2019 and were analyzed using SPSS during the summer semester. Data were cleaned and assessed for missing data after completion of data collection. Results of the study are organized as follows: (a) description of sample demographics, (b) description of prescription opioid misuse, prevalence, and demographic correlates, (c) relationship between prescription opioid misuse and social learning variables, (d) relationship between prescription opioid misuse and social control variables, (e) relationship between prescription opioid misuse and strain variables, and (f) relationship between prescription opioid misuse and select demographic and theoretical variables.

Response Rates and Treatment of Missing Data

Over 1600 people responded to the Qualtrics invitation to participate in the survey (n = 1601). Of these responders, 1,327 read the letter of information and indicated consent to participate. Of those who consented, 754 were screened out due to not meeting inclusion criteria (enrolled full-time at a four year university in the US), 172 were terminated after screening due to the quota already having been met, and 59 were excluded due to quick or "lazy" responses. This left a total of 616 survey completers. Of the 616 study completers, 12 respondents did not disclose their grade point average and 16 respondents did not complete the Ways of Coping Scale. It should be noted that there was no overlap between those who did not report their GPA and those that did not complete the Ways of Coping Scale. No statistically significant differences in age,

biological sex, race, relationship status, or residency type were found between participants who had missing data on either the GPA or Ways of Coping variables and participants with complete data (see Table 2). There was, however, a significant difference in college year, such that freshman were the most likely to be missing data (see figure 1). The missing data account for less than 5% of the sample for each variable and thus the biases and loss of power resulting from deletion are likely to be inconsequential (Graham, 2009).

Table 2

Analysis of between group differences on demographic variables

Variable	Test statistic and df	*p* value
Age	t (27.920) =.84	.41
Biological sex	X^2 (1, n = 616) = .61	.43
Race (white/nonwhite)	X^2 (1, n = 616) = .91	.34
Relationship Status (single/involved)	X^2 (1, n = 616) = .93	.34
Student Classification	X^2 (3, n = 616) = 8.63	.04*
Residency Type	X^2 (3, n = 616) = 5.61	.133

* Significant at the .05 level

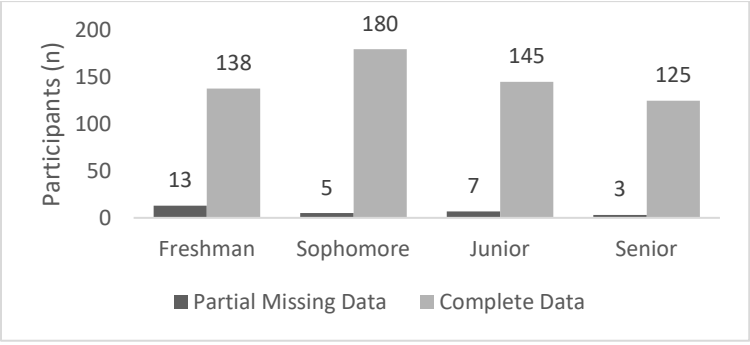

Figure 1. Data completion by college year.

Sample Demographics

Of the 616 survey respondents, the majority identified as single (62%), non-white (54%), female (87%), and lived outside of their parents'/guardians' home (63.5%). Survey respondents reported attending four-year universities in 45 of the fifty US states and in Puerto Rico. The means and frequencies of survey respondent demographics are included in Table 3.

Table 3

Survey Respondent Demographics

Demographic variable	*n*	Proportion (%) or mean (SD)
Age		21.87 (5.51)
Biological sex		
Female	536	87
Male	80	13
Race/ethnicity		
American Indian or Alaskan Native	20	3.2
Asian	50	8.1
Black or African American	149	24.2
Hispanic or Latinx	109	17.7
Native Hawaiian or Pacific Islander	5	.8
White	274	44.5
Other	9	1.5
Relationship status		
Single (not involved)	382	62
In a committed romantic relationship	192	31.2
Married	37	6
Divorced	4	.6
Separated	1	.2
Residency type		
Residence hall/on-campus housing	191	31
Greek housing	46	7.5
Parent/guardian's home	225	36.5
Other off-campus housing	154	25
College year		
Freshman	151	24.5
Sophomore	185	30
Junior	152	24.7
Senior	128	20.8

Prescription Opioid Misuse

The first research objective of this study was to describe the prevalence of prescription opioid misuse in an undergraduate college sample and to describe the demographic characteristics of undergraduates who misuse prescription opioid medication. To address this measure, participants were asked to indicate which prescription opioid medication, from a list of the most common opioid medications, per the National Institute on Drug Abuse, if any they had misused, with the option to write-in

"other opioid medications." Participants were also asked to indicate how often and how many times they had misused prescription opioid medication.

Seventeen percent of survey respondents indicated prescription opioid misuse at least once in their lifetime, 6.7% endorsed past year prescription opioid misuse, and 1.5% endorsed past month misuse. Among the 105 survey respondents that indicated lifetime prescription opioid misuse, oxycodone (e.g., OxyContin & Percocet) was the most reported misused drug (42.9%), followed by hydrocodone (e.g. Vicodin; 41%). Table 4 shows frequencies and percentages of recency, frequency, and type of prescription opioid misused within the sample and within the subsample of respondents that indicated lifetime prescription opioid misuse.

Table 4

Frequencies of prescription opioid misuse

	n	Lifetime POM subsample (*n* = 105)	Percentage of total sample (*n* = 616)
Never misused	511	0	83.0
Lifetime misuse	105	100	17.0
Past year misuse	41	39.1	6.7
Last 30 day misuse	9	8.6	1.5
Misused once	27	25.7	4.4
Misused 2-5 times	45	42.9	7.3
Misused 6-9 times	12	11.4	1.9
Misused more than 10 times	17	16.2	2.8
Hydrocodone (Vicodin)	43	41.0	7.0
OxyCodone (OxyContin/Percocet)	45	42.9	7.3
Oxymorphone (Opana)	12	11.4	1.9
Morphine (Kadian/ Avinza)	17	16.2	2.8
Codeine (Tylenol 3)	37	35.2	6
Fentanyl	9	8.6	1.5
Other prescription opioid misuse	2	1.9	.3

Chi-square tests of independence were performed to examine the relationships between lifetime prescription opioid misuse and the categorical demographic variables, including biological sex, race/ethnicity, relationship status, residency type, and student classification. In order to determine the strength of association, Phi was calculated for variables with two levels and Cramer's V was calculated for variables with more than two levels.

Chi-square tests of independence assume mutually exclusive and exhaustive categories, independence of observations, and that no more than 20% of expected frequencies are less than five. These assumptions were met for sex, residency type, and student classification. Both the relationship status and ethnicity variables violated the expected frequency assumption with more than 20% of cells having expected frequencies of less than 5. In order to meet this assumption, ethnicity was recoded into a dichotomous variable, white and non-white, and relationship status was recoded into a dichotomous variable, single/uninvolved and in a romantic relationship.

An independent samples *t*-test was performed to determine if lifetime prescription opioid misuse varied by age. Independent *t*-tests assume independence of observations, normal distribution of the dependent variable, and homogeneity of the standard deviation of the dependent variable in both populations. An effect size, Cohen's *d*, was calculated to determine the magnitude of the difference in age between groups.

The sample met the assumptions of independence and normality, however, Levene's test for equal variances was significant, $F(1, 614) = 10.79$, $p = .001$, and thus the assumption of homogeneity was violated. Because of this violation, a *t*-test not assuming homogeneous variances was calculated.

Chi-square statistics revealed that lifetime prescription opioid misuse was significantly related to sex, X^2 (1, n = 616) = 7.11, p = .008, and residency type, X^2 (1, n = 616) = 15.68, p = .001. About 28% of males and 16% of females reported lifetime prescription opioid misuse. Frequencies of reported lifetime misuse by sex are illustrated in Figure 2. Thirty seven percent of participants living in Greek housing endorsed lifetime prescription opioid misuse, as compared to 16.8% living on campus, 12.9% living with their parent or guardian, and 17% living in other off-campus housing. Frequencies of reported lifetime misuse by residency type are illustrated in figure 3. The effect sizes for these findings, Phi for sex and Cramer's V for residency type, were small, (φ = .107 and Cramer's V = .160, respectively).

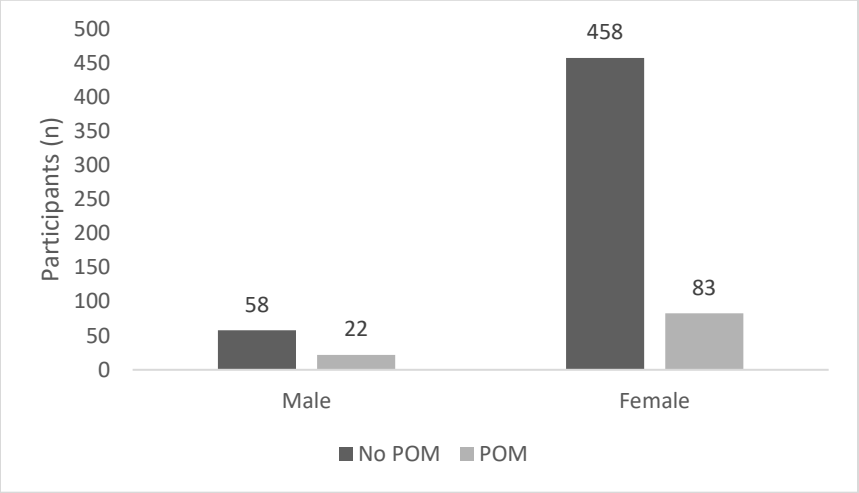

Figure 2. Observed reports of lifetime prescription opioid misuse by biological sex.

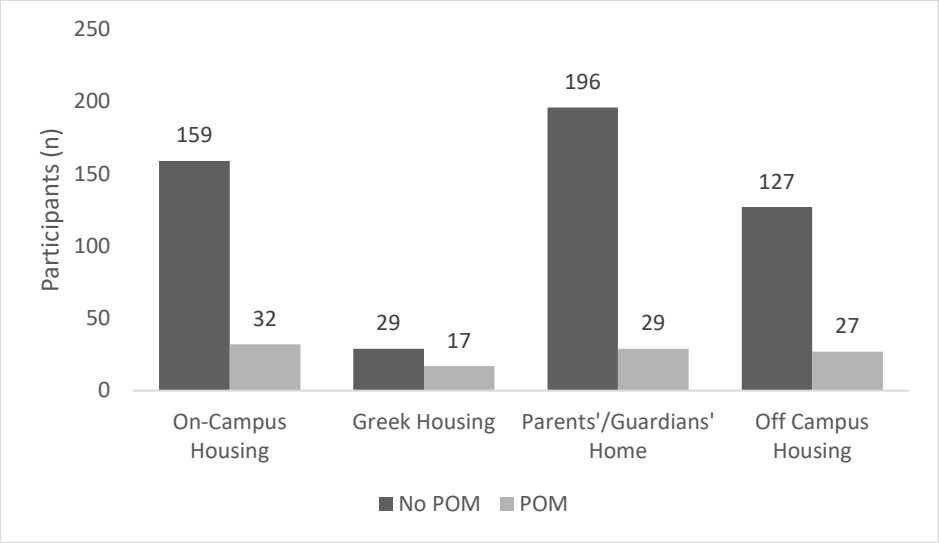

Figure 3. Observed reports of lifetime prescription opioid misuse by residency type.

An independent samples t-test revealed that there was a significant difference in age observed between participant's who endorsed lifetime prescription opioids misuse and those who did not, t (138.7) = -2.49, p = .014. These results suggest that participants that endorsed lifetime prescription opioid misuse (M = 23.11, SD = 6.03) were on average 1.58 years older than those who denied lifetime prescription opioid misuse (M = 21.53, SD = 5.29). The size of this effect (d = .28), was considered to be small.

Social Learning Theory and Prescription Opioid Misuse

Regarding the social learning variables representing differential association, 31.5% of participants indicated that at least a few of their friends misused prescription drugs. For differential reinforcement items, the majority of participants felt that using prescription opioids is very risky (65.3%). More than half of participants (61.9%) indicated that their friends hold negative attitudes towards misusing prescription medication and 80% of participants indicated that their parents hold negative attitudes

towards misusing prescription medication. When looking at the items related to definitions, only 8.1% of participants indicated that they felt misusing prescription medication is somewhat or very acceptable, 12.3% of participants felt misusing prescription medication is neither acceptable nor acceptable, and 79.5% of participants felt it is not acceptable or somewhat unacceptable. Table 5 shows bivariate correlations between the social learning variables and lifetime prescription opioid misuse. Lifetime prescription opioid misuse showed small to moderate correlations with each of the social learning variables.

Table 5

Correlations of prescription opioid misuse and social learning variables

	1	2	3	4	5	6	7
1. POM							
2. Friends binge drinking[a]	.19**						
3. Friends marijuana/ illicit drug use[a]	.31**	.55**					
4. Friends prescription misuse[a]	.41**	.42**	.52**				
5. Perceived risk[b]	.12**	.08*	.08*	-.08			
6. Perceived peer attitudes[b]	.24**	.30**	.34**	.42**	-.05		.
7. Perceived parent attitudes[b]	.24**	.05	.08*	.24**	-.23**	.49**	
8. Personal attitudes towards prescription misuse[c]	.30**	.22**	.30**	.45**	-.30**	.47**	.48**

[a] Differential association variable
[b] Differential reinforcement variable
[c] Definitions variable
* indicates $p < .05$, ** indicates $p < .01$

A regression analysis was conducted to predict lifetime prescription opioid misuse using the seven social learning variables. Because lifetime prescription opioid misuse is a

dichotomous variable (yes/no), logistic regression was the most suitable analysis to determine the importance of the predictors in the model. Logistic regression requires a binomial distribution of scores for the dependent variable and does not assume linearity between the dependent variable and independent predictors.

A test of the full model versus an intercept only model was statistically significant, X^2 (7) = 113.516, $p < .001$. The sensitivity and specificity of this model were 27.6% and 96.3%, respectively. Overall prediction success was 84.6%, showing only a 1.6% increase from the 83% prediction success of the intercept only model. Table 6 lists the logistic regression coefficient, Wald test, odds ratio, and confidence intervals for each of the predictors. As seen in Table 6, three of the social learning variables, amount of friends who use marijuana/illicit drugs, amount of friends who misuse prescription medication, and perceived parent attitudes towards prescription misuse, were significant predictors of prescription opioid misuse, with odds ratios of 1.51, 1.98, and 1.35, respectively.

Table 6

Logistic regression predicting lifetime opioid misuse from social learning variables

Predictor	β	Wald X^2	Exp β	95% Confidence intervals
Friends binge drinking[a]	-.05	.12	.95	(.72-1.25)
Friends marijuana/ illicit drug use[a]	.41	10.19**	1.51	(1.17-1.95)
Friends prescription misuse[a]	.68	17.87**	1.98	(1.44-2.71)
Perceived risk[b]	-.20	2.35	.82	(.63-1.06)
Perceived peer attitudes[b]	.03	.06	1.03	(.80-1.33)
Perceived parent attitudes[b]	.30	5.91*	1.35	(1.06-1.72)
Personal attitudes towards prescription misuse[c]	.11	.72	1.12	(.86-1.45)

Note. Cox & Snell R Square = .168, Nagelkerke R Square = .281
* indicates $p < .05$, ** indicates $p < .01$
[a] Differential association variable
[b] Differential reinforcement variable
[c] Definitions variable

Social Control Theory and Prescription Opioid Misuse

Social control variables included frequency of communication with parents/guardians, importance of parental/guardian opinion on lifestyle and life choices, religious bonds, as measured by the Religious Commitment Index-10 (RCI-10), and grade point average. The majority of participants indicated that they are in communication with their parents/guardians daily or weekly, (68.5% and 23.9%, respectively). Only 3.4% of participants endorsed less than monthly communication with parents/guardians. Regarding the importance of parental/guardian approval of lifestyle and life choices, the majority of participants indicated that their parents'/guardians' approval of their lifestyle and life choices was at least moderately important, with 20.6% indicating extremely important, 26.0% indicating very important, and 32.6% indicating moderately important.

RCI-10 scores ranged from the minimum score of 10 to the maximum score of 50, the mean for this sample was 22.13 (SD = 11.94). This mean score is consistent with norms of college students found in other studies (Worthington et al., 2003), and thus those with a score over 38 are considered to be "highly religious." In this sample, only 13.6% of participants fell within the "highly religious" range.

GPA responses ranged from .37 to 4.70. GPA values above 4.0 were presumed to be measured on a 5.0 scale, and were converted to a 4.0 scale value. One hundred and twenty five participants responded they had not yet established a GPA, and thus were excluded from the analyses. Eleven participants chose not to disclose their GPA, these participants were also excluded from the analyses. After converting all GPA values to a 4.0 scale, the mean GPA was 3.38 (*SD* = .50, *n* = 480). As illustrated in Table 7, none of the social control variables were significantly associated with prescription opioid misuse, however importance of parental/guardian approval was significantly related to frequency of communication with parents/guardians. Additionally, religious bonds were significantly related to parental/guardian approval.

Table 7

Correlations of prescription opioid misuse and social control variables

	1	2	3	4
1. POM				
2. Parental/guardian communication	.08			
3. Parental/guardian approval	.06	.32**		
4. Religious bonds	.01	.00	.23**	
5. GPA	.04	.07	.06	.06

** indicates $p < .01$

A logistic regression was conducted to predict lifetime prescription opioid misuse using the four social control variables. A test of the full model versus an intercept only model was not statistically significant, X^2 (4) = 6.34, p = .18. Table 8 shows the logistic regression coefficient, Wald test, odds ratio, and confidence intervals for each of the predictors.

Table 8

Logistic regression predicting lifetime opioid misuse from social control variables

Predictor	β	Wald X^2	Exp β	95% Confidence intervals
Parental/guardian communication	-.04	.07	.96	(.73-1.27)
Parental/guardian approval	-.26	4.41*	.77	(.60-.98)
Religious bonds	.01	.44	1.01	(.99-1.03)
GPA	.26	.88	1.30	(.75-2.24)

Note. Cox & Snell R Square = .013, Nagelkerke R Square = .024
* indicates $p < .05$

Strain Theory and Prescription Opioid Misuse

Strain theory variables included perceived stress, as measured by Cohen's Perceived Stress Scale (PSS), depression, as measured by the Patient Health Questionnaire Depression Scale (PHQ-9), anxiety, as measured by the Generalized Anxiety Disorder 7-Item (GAD-7), and relative coping scores for the Ways of Coping Questionnaire- Escape Avoidance subscale. The Ways of Coping- Escape Avoidance subscale describes wishful thinking and behavioral efforts, including substance use, to avoid or escape a stressful situation. Because it is the only Ways of Coping subscale directly related to the central premise of strain theory, the escape-avoidance subscale was

the only subscale included in the regression analysis for the strain theory variables. However, for exploratory purposes, all coping subscales were collected and examined in bivariate correlation analyses. For the Ways of Coping Scale, sixteen participants were missing data, and thus were excluded from the analysis.

The average PSS score was 19.55 (SD = 6.01). On this measure, scores of around 13 are considered "average stress" and scores of 20 or above are considered "high stress." The average PHQ-9 score was 10.33 (SD = 7.13). About half of the sample, 50.8%, had scores that fell in the minimal or mild depression range (scores below 10). The average GAD-7 score was 9.13 (SD = 6.12). A slight majority of the sample, 54.4%, had scores that fell within the minimal or mild anxiety range. As illustrated in Table 9, lifetime prescription opioid misuse was significantly associated with perceived stress, depression, anxiety, ways of coping- seeking social support, ways of coping- escape avoidance, and ways of coping planful problem solving.

Table 9

Correlations of prescription opioid misuse and strain theory variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. POM											
2. PSS	.16**										
3. PHQ-9	.25**	.62**									
4. GAD-7	.21**	.65**	.79**								
5. WOC-CC	.07	.02	.04	.01							
6. WOC-D	-.02	-.08*	-.06	-.07	-.24**						
7. WOC-SC	.08	.11**	.06	.11**	-.26**	.038					
8. WOC-SSS	-.09*	-.14**	-.11**	-.08*	-.00	-.33**	-.27**				
9. WOC-AR	.04	.21**	.16**	.15**	-.19**	-.14**	.017	-.16**			
10. WOC-EA	.12**	.45**	.35**	.32**	-.15**	-.06	.25**	-.31**	.069		
11. WOC-PPS	-.12**	-.25**	-.22**	-.19**	-.14**	-.18**	-.30**	-.02	-.31**	-.37**	
12. WOC-PR	-.05	-.26**	-.15**	-.19**	-.12**	-.20**	-.24**	.09*	-.11**	-.33**	.04

Note. 1 = Lifetime prescription opioid misuse, 2 = Perceived Stress Scale total score, 3 =PHQ-9 total score, 4 = GAD-7 total score, 5 = WOC confrontive coping subscale, 6 = WOC- distancing subscale, WOC- self controlling subscale, 7 = WOC-self controlling subscale, 8 = WOC- seeking social support subscale, 9 = WOC- accepting responsibility subscale, 10 = WOC-escape avoidance subscale, 11 = WOC- planful problem solving subscale, 12 = WOC- positive reappraisal subscale

* indicates $p < .05$, ** indicates $p < .01$

A logistic regression was conducted to predict lifetime prescription opioid misuse using the four strain variables. A test of the full model versus an intercept only model was statistically significant, X^2 (4) = 39.06, $p < .001$. The sensitivity and specificity of this model were 1.0 and 99.8, respectively. Overall prediction success was 83%. Table 10 lists the logistic regression coefficient, Wald test, odds ratio, and confidence intervals for each of the predictors. As seen in Table 10, only depression was a significant predictors of prescription opioid misuse, with an odds ratios of 1.09.

Table 10

Logistic regression predicting lifetime opioid misuse from strain theory variables

Predictor	β	Wald X^2	Exp β	95% Confidence intervals
PSS	-.01	.07	.99	(.94-1.05)
PHQ-9	.08	10.68**	1.09	(1.03-1.14)
GAD-7	.02	.23	1.02	(.96-1.08)
WOC-EA	1.64	.63	5.15	(.09-296.78)

Note. Cox & Snell R Square = .062, Nagelkerke R Square = .103
** indicates $p < .01$

Combined Multivariate Model

The third research objective was to select demographic predictors and predictors from all three theories (social learning, social control, and strain theories) to create a multivariate model that would allow better prediction of opioid misuse among undergraduate college students. In order to do this, first univariate analyses were conducted and examined for all variables. These univariate analyses identified fifteen variables that were individually predictive of lifetime prescription opioid misuse. Next, intercorrelations were examined between all variables that were significantly related to

the outcome variable, lifetime prescription opioid misuse, in univariate analyses (Table 11).

Table 11

Intercorrelations of variables significantly predictive of prescription opioid misuse in univariate analysis

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
2.	.11**														
3.	.11**	-.001													
4.	.19**	-.004	-.043												
5.	.31**	-.063	-.031	.55**											
6.	.41**	.034	.025	.42**	.52**										
7.	-.12**	-.028	-.089*	.082*	.082*	-.077									
8.	.24**	-.050	.010	.30**	.34**	.42**	-.045								
9.	.24**	.15**	.095*	.047	.082*	.24**	.23**	.49**							
10.	.30**	.040	.062	.22**	.30**	.45**	-.30**	.47**	.48**						
11.	.16**	.049	-.13**	.15**	.25**	.16**	.097*	.17**	-.015	.051					
12.	.26**	-.044	.016	.098*	.21**	.23**	-.082*	.18**	.18**	.19**	.49**				
13.	.20**	-.002	-.092*	.15**	.19**	.21**	-.010	.15**	.11**	.15**	.53**	.63**			
14.	-.10**	-.055	-.034	-.020	-.077	-.036	.018	-.069	-.038	-.072	-.14**	-.072	-.060		
15.	.11**	.036	-.040	.078	.12**	.047	.021	.11**	-.025	.042	.45**	.31**	.27**	-.34**	
16.	-.13**	.058	.031	-.061	-.065	-.084*	.060	-.095*	-.034	-.066	-.28**	-.23**	-.20**	.010	-.40**

Note. 1 = Lifetime prescription opioid misuse, 2 = Age, 3 = Biological Sex, 4 = Friends binge drinking, 5 = Friends marijuana/ illicit drug use, 6 = Friends prescription misuse, 7 = Perceived risk, 8 = Perceived peer attitude, 9 = Perceived parent attitudes, 10 = Personal attitude, 11 = Perceived Stress Scale Total Score, 12 = Depression (minimal to mild/moderate to severe), 13 = Anxiety (minimal to mild/ moderate to severe), 14 = WOC-seeking social support subscale, 15 = WOC- escape avoidance subscale, 16 = WOC- planful problem solving subscale

** Correlation is significant at the .01 level

* Correlation is significant at the .05 level

Variable selection for the best-fit model was conducted in an iterative manner, beginning by creating a preliminary multivariate logistic regression model based on the results from univariate analyses. Per recommendations by Peng and So (2002), alternative models were then derived from the preliminary model by exploring potential interactions, removing theoretically redundant or statistically insignificant predictors, and exploring the inclusion of theoretically important variables. Alternative models were compared with the preliminary multivariate model in terms of goodness of fit, statistical significance of each predictor, predictive power, and accuracy of prediction in order to determine the best-fit model (Peng & So, 2002).

The final model consisted of seven predictors: age, biological sex, Greek housing (yes/no), friends marijuana/illicit drug use, friends prescription misuse, parent/guardian attitudes towards prescription misuse, and depression coded as a dichotomous variable (minimal to mild or moderate to severe). A test of the full model versus an intercept only model was statistically significant, X^2 (7) = 145.03, $p < .001$. The sensitivity and specificity of this model were 36.2% and 96.9%, respectively. Overall prediction success was 86.5%. Table 12 lists the logistic regression coefficient, Wald test, odds ratio, and confidence intervals for each of the predictors. As seen in Table 12, all predictors were statistically significant in the model.

Table 12

Logistic regression model predicting prescription opioid misuse from demographic and select theoretical variables

Predictor	β	Wald X^2	Exp β	95% Confidence intervals
Age	.06	8.20**	1.06	(1.02-1.10)
Biological Sex[a]	.80	5.60*	2.23	(1.15-4.32)
Greek Housing[b]	1.03	6.44**	2.80	(1.26-6.20)
Friends Marijuana/Illicit Drug Use	.44	12.79**	1.55	(1.22-1.97)
Friends Prescription Misuse	.62	17.23**	1.86	(1.39-2.49)
Perceived Parent Attitudes	.27	6.10**	1.31	(1.06-1.62)
Depression[c]	.58	16.68**	3.17	(1.82-5.51)

Note. Cox & Snell R Square = .021, Nagelkerke R Square = .035
* indicates $p < .05$, ** indicates $p < .01$
a Biological Sex (0 = female, 1 = male)
[b] Greek Housing (0 = non-Greek housing, 1 = Greek housing)
[c] Depression (0 = minimal to mild depression, 1 = moderate to severe depression)

CHAPTER V

DISCUSSION

Summary of Outcomes

This study aimed to examine the theoretical correlates of prescription opioid misuse within an undergraduate sample. The purpose of this study was realized through three main objectives: (1) to assess prescription opioid misuse in undergraduate populations (2) to determine theoretical correlates of prescription opioid misuse within an undergraduate population (3) to create a predictive multivariate model of opioid misuse in undergraduate college students.

Prevalence and Demographic Characteristics of Misuse in Undergraduates

Of the 616 undergraduate college student respondents for the present survey, 17% reported misusing prescription opioids at least once in their lifetime. This finding is substantially higher than those found by McCabe and colleagues (2005) and Kenne and colleagues (2017), 12% and 9.5%, respectively. However, this increased rate corresponds with the increase in prescription opioid related emergency room visits and overdose deaths since the collection of data in the aforementioned studies (SAMHSA, 2013; Compton et al., 2016). Interestingly, despite the elevated prevalence rate for lifetime prescription opioid misuse found in this study, rates of past year and past month prescription opioid misuse were comparable to those found in previous studies. In this study, past year prevalence was 6.7%, as compared with the 7% found by McCabe et al. (2005). Additionally in this study, past month prevalence was 1.5%, as compared with the 3% found by McCabe et al. (2005).

Previous studies have had no clear consensus on sex differences for general prescription misuse or prescription opioid misuse. While some studies have found higher rates of misuse in females (Schroeder & Ford, 2012), others have found no relationship between biological sex and misuse (McCabe et al., 2005; Watkins, 2016). The present study, however, found a significant relationship between sex and prescription opioid misuse, such that males are more likely to misuse than females. The present findings also differed from previous research in that no relationship was found between race and prescription opioid misuse in the present study (McCabe et al., 2005). This finding is notable, because the sample in the present study is more racially diverse than in prior studies. Only 44.5% of the present study sample identified as white, as compared with 75.2% (McCabe et al., 2005) and 82.4% (Kenne et al., 2017).

The findings of the present study paralleled previous literature in that rates of misuse were higher among students living in Greek house and students older in age (McCabe et al., 2005; Kenne et al., 2017; Watkins, 2016). Findings related to age are particularly important because they lend support to a trend observed in prescription opioid misuse that differs from other types of substance use. While it appears that students tend to "age out" of other types of substance use, this does not appear to be the case for prescription opioid misuse, suggesting that prescription opioid misuse may post a unique risk for older college students.

Social Learning Theory and Prescription Opioid Misuse

While only one previous study has looked at the relationships between social learning variables and prescription opioid misuse in college students (Watkins, 2016), several studies have looked at the relationship between social learning theory and general

prescription misuse in college students and adolescents (Ford, 2008; Peralta & Steele, 2010; Schroeder & Ford, 2012; Watkins, 2016). Results of the present study are congruent with these previous studies in that it lends support for social learning theory. The present study examined seven variables related to three of the main tenants of social learning theory: differential association, differential reinforcement, and definitions. All social learning variables were significantly associated with prescription opioid misuse. Further, the logistic regression model comprised of social learning variables was statistically significant, and within this model variables related to differential association and differential reinforcement were significant predictors of prescription opioid misuse.

Differential association variables (e.g. those related to peer substance use), were the most robust significant predictors of prescription opioid misuse in the model, with odds ratios of 1.98 and 1.51 for friends prescription misuse and friends marijuana/illicit drug use, respectively. These findings parallel previous findings that having more friends that engage in substance use is predictive of a variety of types of substance use including binge drinking, illicit drug use, and prescription misuse (Ford, 2008; Maahs et al., 2016; Peralta & Steele, 2010; Schroeder & Ford, 2012; Watkins, 2016).

In addition to differential association, one differential reinforcement item, parental attitudes towards prescription misuse, was found to be a significant predictor of prescription opioid misuse (OR = 1.35) in the present study. This finding varies from Schroeder's and Ford's (2012) finding that only the student's own attitude towards prescription misuse was a significant predictor of prescription misuse. It is interesting to note that perceived peer attitudes towards prescription misuse was not significantly predictive of prescription misuse in the present or previous studies (Schroeder & Ford,

2012; Watkins, 2016). This is surprising given the typically observed weight of peer influence in adolescents.

Social Control Theory and Prescription Opioid Misuse

The present study examined four variables related to two of the central tenants of social control theory, commitment and involvement. While there have been no prior studies that have looked at social control theory in relationship to prescription opioid misuse specifically, several studies have found evidence for a relationship between social control theory and general prescription misuse and other types of substance use, including marijuana and prescription stimulants, in adolescents. The present findings can be compared to findings from these studies in order to consider potential differences between different types of prescription misuse and methodologies (Maahs et al., 2016; Marcos & Bahr, 1988; Schroeder & Ford, 2012).

In the present study no significant relationships were found between any of the four social control variables, parental/guardian communication, parental/guardian approval, religious bonds, and GPA, and prescription opioid misuse. These findings are in contrast with Schroeder and Ford's (2012) findings that parental bonds are significant predictors of general prescription misuse in adolescents. One explanation for this finding may be that Schroeder and Ford (2012) were examining parental bonds in a population of adolescents with an average age of 14.60, whereas the current study examines a population of college students with an average age of 21.87. It is possible that in the present study, the older age of the population, as well as the majority of the present sample living outside of the parents' home influences the importance of parental bonds on substance use/misuse behaviors. The present study also found no significant

relationship between GPA and prescription opioid misuse. This finding differs from McCabe and colleagues' (2005) finding that college students with a B+ or lower average were almost two times more likely to misuse prescription opioids. One reason for this discrepancy may be the unit of measurement. McCabe and Colleagues (2005) measured GPA as a dichotomous categorical variable, above or below a B+ average, whereas the present study measured GPA as a continuous measure on a 4.0 scale. Another consideration is that in the time since McCabe and colleagues (2005) study, rates of prescription opioid misuse nationally have increased and the United States Department of Health and Human Services has declared a the opioid epidemic a public health emergency (U.S. Department of Health and Human Services [HHS], 2017). The increased prevalence and governmental concern over the opioid epidemic may be indicative of changing trends in opioid misuse, including characteristics of people that misuse.

Strain Theory and Prescription Opioid Misuse

Three forms of strain, depression, anxiety, and perceived stress, and eight ways of coping were examined in order to explore the relationship between strain theory and prescription opioid misuse. All three measures of strain were found to be significantly related to prescription opioid misuse. Additionally, three ways of coping, escape avoidance, seeking social support, and planful problem solving, were significantly related to prescription opioid misuse. Escape avoidance coping describes wishful or behavioral efforts, including substance use, to avoid or escape stressful situations. Unsurprisingly, this way of coping was positively related to prescription opioid misuse. Seeking social support describes efforts to seek advice and emotional support from others and planful

problem solving describes problem-focused efforts for problem resolution. It is also not surprising that these two ways of coping were negatively associated with prescription opioid misuse.

Because strain theory suggests delinquency as a means to alleviating strain, the Ways of Coping Escape Avoidance subscale was included with the three strain measures in the regression model. The logistic regression model comprised of strain theory variables was statistically significant, and within this model depression was a significant predictor of prescription opioid misuse.

While no studies have looked specifically at strain theory in relationship to prescription opioid misuse, previous studies have looked at strain theory and general prescription misuse in adolescents (Schroeder & Ford, 2012) and strain theory and prescription stimulant misuse in college students (Maahs et al., 2016). The findings of the present study are congruent with Schroeder and Ford's (2012) finding that strain theory significantly predicts prescription misuse in adolescents. However, while Schroeder and Ford's study only uses a composite measure of negative life events to measure strain, the present study utilizes three measures of different types of strain and a coping measure. The findings from Maahs and colleagues' (2016) study indicate that strain, as measured by academic strain, is not predictive of prescription stimulant misuse. The discrepancy in these findings may suggest that strain is predictive of prescription opioid misuse, but not stimulant misuse, or it may suggest that a more robust measure of strain, rather than just academic strain, better predicts prescription misuse.

Depression was the only significant predictor in the model. This finding is consistent with findings from prior studies of college students that linked prescription misuse with depression and suicidality (Zullig & Divin, 2012).

Combined Model and Prescription Opioid Misuse

The present study found support for both social learning theory and strain theory as predictive of prescription opioid misuse in college students. However, with the goal of optimizing prediction of prescription opioid misuse, the social learning theory model was superior to the strain theory model. Despite their success in predicting prescription opioid misuse, both theories have limitations. Social learning theory considers the social context and beliefs of a college student, but fails to consider demographic or psychological factors. Strain theory considers psychological factors, such as stress and coping, but fails to consider demographic factors or the social context. Because of this, the present study attempted to build a model that considered variables across the theories, combined with demographic variables, in order to optimize prediction of prescription opioid misuse.

The seven variables included in the model included age, biological sex, Greek housing (yes/no), friends marijuana/illicit drug use, friends prescription misuse, parent/guardian attitudes towards prescription misuse, and depression. This model had 86.5% prediction success. While this is only a 1.9% and 3.5% increase in prediction success from the social learning theory model and strain theory model, respectively, the sensitivity of the model increased substantially. Given the elevated risks of morbidity and mortality (Compton et al., 2016; SAMHSA 2013) associated with prescription opioid misuse, it is especially important for prevention efforts to correctly identify those who may be at risk for misuse. The combined model was able to correctly identify 36.2% of

those who misuse prescription opioids, in comparison to 27.6% and 1.0% in the social learning and strain theory models, respectively.

Within the combined model, all seven predictors were statistically significant. Depression, Greek housing, and biological sex were the most robust predictors of lifetime prescription opioid misuse in the model. The identification of depression as a significant predictor in college populations is valuable in that it provides insight into potential avenues for prevention, such as assessing for and providing psychoeducation about prescription opioid misuse in college students being treated for depression. Additionally, the identification of parent/guardian attitudes towards prescription misuse as a predictor of prescription opioid misuse provides insight into another potential avenue for prevention efforts, through parental education about the risks of misuse.

Limitations

As compared to other types of substance use and misuse, relatively few studies have looked at prescription opioid misuse in college populations and even fewer have attempted to apply a theoretical perspective to prescription opioid misuse in this population. The present study contributes to the literature by addressing this gap and providing a theory-guided investigation into predictors of prescription opioid misuse in undergraduate college students. There are, however, limitations in the current study. First, the sample in the present study was majority female (87%). As of 2017, the national center for education statistics reported that 56.7% of undergraduates enrolled in college were female (U.S. Department of Education, 2017). Because the proportion of females in the study is substantially higher than the proportion of female undergraduates nationally, gender bias in the present study may limit generalizability. Second, the present study did

not examine the type of university (public, private, HBCU, etc.) that participants attended, and thus it is unclear whether differences in college characteristics effect trends and predictors of prescription opioid misuse. And lastly, the study attempted to balance capturing central premises of each theory with participant burden in terms of survey length, thus it was not able to capture all aspects of each theory.

Future Directions

Future research may consider how these three theories (social learning, social control, and strain) fit or differ based on college characteristics, such as type of school, school rigor, etc. Additionally, there is a lack of consistency in the literature about the best ways to measure social learning, social control, and strain theories. Future investigations may consider using more robust measures of each theory. It may also be useful for future work to focus on developing instruments or guidelines for more consistent measurement of these theories within a college population.

Conclusion

The current study explored theoretical correlates and predictors of prescription opioid misuse in college students. Participants were 616 undergraduate students enrolled full-time in four-year universities in the United States. Seventeen percent of the sample reported lifetime prescription opioid misuse. Predictors from social learning and strain theories were significantly predictive of prescription opioid misuse. Further, an exploratory model using demographics predictors from and predictors from social learning and strain theories allowed for improved prediction of lifetime misuse. Being older, male, depressed, living in Greek housing, and having friends who use illicit drugs or misuse prescription drugs were found to be risk factors for prescription opioid misuse.

Additionally, having parents/guardians who hold negative views towards prescription misuse was a protective factor.

In order to effectively curb the growing misuse of prescription opioids within college populations, a better understanding of the factors that potentially lead to misuse is needed. Identification of predictors and protective factors can help to inform the development and implementation of prevention efforts. Future studies can continue to work to identify predictors and to develop and test interventions for prevention.

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APPENDICES

Appendix A:

Letter of Information

This research study is conducted by Dr. M. Scott DeBerard, Ph.D. and Julie Murray, B.A. in the Department of Psychology at Utah State University. The purpose of this research is to better understand the prevalence and predictors of substance use among college students. Your participation is entirely voluntary.

This form includes detailed information on the research to help you decide whether to participate. Please read it carefully before you agree to participate.

Procedures

Your participation will involve the completion of a 20-minute anonymous survey. We anticipate that 600 people will participate in this research study.

Risks

This is a minimal risk research study. That means that the risks of participating are no more likely or serious than those you encounter in everyday activities. The foreseeable risks or discomforts include You could possibly feel mild discomfort from answering some of the questions. You are welcome to stop being part of the study at any time. There are no penalties for stopping or choosing to not do any part of the study. There is a possibility that data could be lost or revealed to others; however, every effort has been made to protect your privacy and maintain your confidentiality.

Benefits

Although you will not directly benefit from this study, it has been designed to learn more about substance use in college students.

Confidentiality

The researchers will make every effort to ensure that the information you provide as part of this study remains confidential. Identifiable information will not be collected and thus your identity will not be revealed in any publications, presentations, or reports resulting from this research study. We will collect your information through Qualtrics. Online activities always carry a risk of a data breach, but we will use systems and processes that minimize breach opportunities. This data will be securely stored in an encrypted, cloud-based storage system.

Voluntary Participation & Withdrawal

Your participation in this research is completely voluntary. If you agree to participate now and change your mind later, you may withdraw at any time during the survey, by exiting the survey. Because participation is anonymous, you will not be able to withdrawal from the study after the survey is completed, as we will be unable to determine whose data is whose.

IRB Review

The Institutional Review Board (IRB) for the protection of human research participants at Utah State University has reviewed and approved this study. If you have questions about the research study itself, please contact the Principal Investigator at [435-797-1462]. If you have questions about your rights or would simply like to speak with someone *other* than the research team about questions or concerns, please contact the IRB Director at (435) 797-0567 or irb@usu.edu.

Appendix B:

Survey Instrument

Demographics Questionnaire

1. In what state is your University located?
   a. _____

2. What is your biological sex?
   a. Male
   b. Female

3. What is your age in years?
   a. _____

4. Relationship Status
   a. Single (not involved)
   b. Married
   c. Divorced
   d. Separated
   e. In a committed romantic relationship

5. Ethnic background
   a. African American
   b. Asian American
   c. Caucasian
   d. Hispanic
   e. Native American
   f. Other: _____

6. Year in college
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. Other: _____

7. Current living arrangement
   a. Residence hall/on-campus housing
   b. Living in fraternity/sorority housing
   c. Parent/guardian's home
   d. Other off-campus housing: _____

8. What is your current grade point average?
   a. _____
   b. I have not yet established a grade point average

9. What is your major area of study?
   a. _____

b. I have not yet established a major

10. How important are school/grades to you?
    a. Not important at all
    b. A little important
    c. Somewhat important
    d. Very important

11. On average, how often are you in contact with your parents?
    a. Multiple times per day
    b. Daily
    c. Weekly
    d. Monthly
    e. Less than monthly

12. How important is it to you to have your parent's/guardian's approval of your lifestyle and life choices?
    a. Not important at all
    b. A little important
    c. Somewhat important
    d. Very important

Items 12-22 will ask about prescription misuse**.** **Misuse** refers to taking medicine in a way or dose other than prescribed, taking someone else's prescription, or taking medicine for the effect it causes or to get high.

13. Please indicate which, if any, of the following medications you have **misused**
    a. _____ hydrocodone (Vicodin)
    b. _____ oxycodone (OxyContin, Percocet)
    c. _____ oxymorphone (Opana)
    d. _____ morphine (Kadian, Avinza)
    e. _____ codeine (Tylenol 3)
    f. _____ fentanyl

14. How often, if ever, have you **misused** any of the medications listed above?
    a. Never misused
    b. Misused, but not in the past 12 months
    c. Misused, but not in the past 30 days
    d. Misused in the past 30 days

15. How many times in your life, if ever, have you **misused** any of the medications listed above?
    a. None
    b. Once
    c. Twice
    d. 3-5 times
    e. 6-9 times

f. 10 or more times

16. If you have ever **misused** any of the medications listed above, please indicate how old you were when you misused it for the first time.
    a. _____ years old

17. If you have ever **misused** any of the medications listed above, please indicate where you obtained the medication when you **misused it for the first time**.
    a. From a doctor's prescription
    b. Leftover from an old prescription I obtained legally
    c. Wrote a fake prescription
    d. Stole from a doctor's office/clinic/pharmacy
    e. Got from a friend or relative for free
    f. Bought from a friend or relative
    g. Took from a friend or relative without asking
    h. Bought from a drug dealer or stranger
    i. Bought from the internet
    j. Other: _____

18. If you have ever **misused** any of the medications listed above, please indicate the primary reason for **misusing** the medication for the first time.
    a. To relieve physical pain (e.g., backache, tooth pain, etc.)
    b. To relieve emotional pain (e.g., depressed, nervous, sad, etc.)
    c. To feel good/get high
    d. To experiment
    e. Other: _____

19. If you indicated that your primary reason for **misusing** one or more of the above medications was to relieve physical or emotional pain, please indicate why you chose to misuse the medication, rather than seek treatment for the physical/emotional pain. Select all that apply.
    a. _____ I needed immediate relief/could not wait for a doctor's appointment
    b. _____ I could not afford treatment
    c. _____ The pain was temporary and I thought it would go away
    d. _____ I had no health insurance
    e. _____ I was too embarrassed or did not want others to know about my pain
    f. _____ I did not think the doctor/hospital would help the problem
    g. _____ Other:_____

20. Please indicate which, if any, of the following medications you have **misused**
    a. _____ dextroamphetamine (Dexedrine)
    b. _____ dextroamphetamine/amphetamine combination product (Adderall)
    c. _____ methylphenidate (Ritalin, Concerta)
    d. _____ lisdexamfetamine (Vyvanse)

21. How often, if ever, have you **misused** any of the medications listed in item 18?
    a. Never misused
    b. Misused, but not in the past 12 months
    c. Misused, but not in the past 30 days
    d. Misused in the past 30 days

22. How many times, if ever, have you **misused** any of the medications listed in item 18?
    a. None
    b. Once
    c. Twice
    d. 3-5 times
    e. 6-9 times
    f. 10 or more times

23. If you have ever **misused** any of the medications listed above, please indicate how old you were when you misused it for the first time.
    a. _____ years old

24. If you have ever **misused** any of the medications listed in item 18, please indicate where you obtained the medication when you **misused it for the first time**.
    a. From a doctor's prescription
    b. Leftover from an old prescription I obtained legally
    c. Wrote a fake prescription
    d. Stole from a doctor's office/clinic/pharmacy
    e. Got from a friend or relative for free
    f. Bought from a friend or relative
    g. Took from a friend or relative without asking
    h. Bought from a drug dealer or stranger
    i. Bought from the internet
    j. Other: _____

25. If you have ever **misused** any of the medications listed in item 19, please indicate the primary reason for **misusing** the medication for the first time.
    a. To help me concentrate
    b. To help me study
    c. To increase my alertness
    d. To get high
    e. To lose weight
    f. To counteract the effects of other drugs
    g. Other: _____

Items 25-44 will ask about different types of substance use behaviors and opinions about substance use/misuse. Use refers to any consumption of the specified substance.

26. How often, if ever, have you used tobacco?
    a. Never used
    b. Used, but not in the past 12 months
    c. Used, but not in the past 30 days
    d. Used in the past 30 days

27. If you use tobacco, (i.e., smoke or oral use), how many servings* do you consume throughout one day? (One serving = 1 cigarette or that equivalent of oral tobacco product).
    a. None
    b. One
    c. Less than 6
    d. 7-19 servings
    e. 20 or more servings (one pack or more)

28. If you use tobacco, please indicate how old you were when you used a tobacco product for the first time.
    a. _____ years old

29. How often, if ever, have you consumed alcohol?
    a. Never used
    b. Used, but not in the past 12 months
    c. Used, but not in the past 30 days
    d. Used in the past 30 days

30. If you have consumed alcohol, please indicate how old you were when you consumed alcohol for the first time.
    a. _____ years old

31. Think back over the last month. How many times have you had five or more drinks* at one sitting? (A drink is a bottle of beer, a glass of wine, a wine cooler, a shot glass of liquor, or a mixed drink).
    a. None
    b. Once
    c. Twice
    d. 3-5 times
    e. 6-9 times
    f. 10 or more times

32. How often, if ever, have you used marijuana?
    a. Never used
    b. Used, but not in the past 12 months
    c. Used, but not in the past 30 days
    d. Used in the past 30 days

33. If you have ever used marijuana, please indicate how old you were when you used marijuana for the first time.
    a. _____ years old

34. If you indicated you have used marijuana in the past 30 days, how many times in a typical week do you use marijuana?
    a. None
    b. Once
    c. Twice
    d. 3-5 times
    e. 6-9 times
    f. 10 or more times

35. Please indicate which of the following drugs, if any, you have used in your lifetime.
    a. _____ cocaine
    b. _____ ecstasy/ MDMA
    c. _____ heroin
    d. _____ hallucinogens (LSD, mushrooms, salvia)
    e. _____ other: _____

36. If you have ever used any of the drugs listed in item 34, please indicate how old you were when you misused it for the first time.
    a. _____ years old

37. How often, if ever, have you each drug indicated in item 26?
    e. Never used
    f. Used, but not in the past 12 months
    g. Used, but not in the past 30 days
    h. Used in the past 30 days

38. How many times, if ever, have you used each drug indicated in item 26?
    a. None
    b. Once
    c. Twice
    d. 3-5 times
    e. 6-9 times
    f. 10 or more times

39. Think about the friends you spend the most time with. How many of these friends engage in binge drinking (5 or more drinks in one sitting)?
    a. None of my friends
    b. A few of my friends
    c. Some of my friends
    d. Most of my friends

e. All of my friends

40. How many of your friends smoke marijuana or other illegal drugs?
    a. None of my friends
    b. A few of my friends
    c. Some of my friends
    d. Most of my friends
    e. All of my friends

41. How many of your friends use prescription drugs in a way or dose other than prescribed, taking someone else's prescription, or taking medicine for the effect it causes or to get high?
    a. None of my friends
    b. A few of my friends
    c. Some of my friends
    d. Most of my friends
    e. All of my friends

42. How risky (physically, legally, etc.) is it to use prescription drugs in a way or dose other than prescribed, take someone else's prescription, or take medicine for the effect it causes or to get high?
    a. Not risky
    b. A little risky
    c. Somewhat risky
    d. Very risky

43. What kind of attitudes do your friends have towards using prescription drugs in a way or dose other than prescribed, taking someone else's prescription, or taking medicine for the effect it causes or to get high?
    a. Very negative
    b. Somewhat negative
    c. Neither positive or negative
    d. Somewhat positive
    e. Very positive

44. What kind of attitudes do your parents have towards using prescription drugs in a way or dose other than prescribed, taking someone else's prescription, or taking medicine for the effect it causes or to get high?
    a. Very negative
    b. Somewhat negative
    c. Neither positive or negative
    d. Somewhat positive
    e. Very positive

45. To what degree do you feel using prescription drugs in a way or dose other than prescribed, taking someone else's prescription, or taking medicine for the effect it causes or to get high is acceptable?
    a. Not acceptable
    b. Somewhat unacceptable
    c. Neither unacceptable or acceptable
    d. Somewhat acceptable
    e. Very acceptable

RCI-10

Instructions: Read each of the following statements. Using the scale to the right, choose the response that best describes how true each statement is for you.

	Not at all true of me 1	**Somewhat** true of me 2	**Moderately** true of me 3	**Mostly** true of me 4	**Totally** true of me 5
1. I often read books and magazines about my faith.	1	2	3	4	5
2. I make financial contributions to my religious organization.	1	2	3	4	5
3. I spend time trying to grow in understanding of my faith.	1	2	3	4	5
4. Religion is especially important to me because it answers many questions about the meaning of life.	1	2	3	4	5
5. My religious beliefs lie behind my whole approach to life.	1	2	3	4	5
6. I enjoy spending time with others of my religious affiliation.	1	2	3	4	5
7. Religious beliefs influence all my dealings in life.	1	2	3	4	5
8. It is important to me to spend periods of time in private religious thought and reflection.	1	2	3	4	5

9. I enjoy working in the activities of my religious affiliation.	1	2	3	4	5
10. I keep well informed about my local religious group and have some influence in its decisions.	1	2	3	4	5

PSS

Instructions: The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate HOW OFTEN you felt or thought a certain way.

	Never	**Almost Never**	**Some-times**	**Fairly Often**	**Very Often**
1. In the past month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the past month, how often have you felt unable to control the important things in your life?	0	1	2	3	4
3. In the past month, how often have you felt nervous or stressed?	0	1	2	3	4
4. In the past month, how often have you felt confident about your ability to handle personal problems?	0	1	2	3	4
5. In the past month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the past month, how often have you found that you could not cope with all the things you had to do?	0	1	2	3	4
7. In the past month, how often have you been able to control irritations in your life?	0	1	2	3	4

	Never	Almost Never	Some-times	Fairly Often	Very Often
8. In the past month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the past month, how often have you been angry because of things that happened that were outside of your control?	0	1	2	3	4
10. In the past month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

PHQ-9

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all 0	**Several Days 1**	**More than half of the days 2**	**Nearly everyday 3**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself- or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite- being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

a. Not difficult at all
b. Somewhat difficult
c. Very difficult
d. Extremely difficult

GAD-7

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all 0	**Several Days 1**	**More than half of the days 2**	**Nearly everyday 3**
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it's hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

e. Not difficult at all
f. Somewhat difficult
g. Very difficult
h. Extremely difficult

Ways of Coping Questionnaire

Instructions: To respond to the statements in this questionnaire, you must have a specific stressful situation in mind. Take a few moments and think about the most stressful situation that you have experiences in the past week. As you respond to each of the statements, please keep this stressful situation in mind. Read each statement carefully and indicate, by selecting 0, 1, 2, or 3, to what extent you used it in the situation.

	Does not apply or not used 0	**Used somewhat** 1	**Used quite a bit** 2	**Used a great deal** 3
1. I just concentrated on what I had to do next	0	1	2	3
2. I tried to analyze the problem in order to understand it better	0	1	2	3
3. I turned to work or another activity to take my mind off things	0	1	2	3
4. I felt that time would have made a difference- the only thing was to wait	0	1	2	3
5. I bargained or compromised to get something positive from the situation	0	1	2	3
6. I did something that I didn't think would work, but at least I was doing something	0	1	2	3
7. I tried to get the person responsible to change his or her mind	0	1	2	3
8. I talked to someone to find out more about the situation	0	1	2	3
9. I criticized or lectured myself	0	1	2	3
10. I tried not to burn my bridges, but leave things open somewhat	0	1	2	3
11. I hoped for a miracle	0	1	2	3
12. I went along with fate; sometimes I just have bad luck	0	1	2	3

	Does not apply or not used 0	**Used somewhat** 1	**Used quite a bit** 2	**Used a great deal** 3	
13. I went on as if nothing had happened	0	1	2	3	
14. I tried to keep my feelings to myself	0	1	2	3	
15. I looked for the silver lining, so to speak; I tried to look on the bright side of things	0	1	2	3	
16. I slept more than usual	0	1	2	3	
17. I expressed anger to the person(s) who caused the problem	0	1	2	3	
18. I accepted sympathy and understanding from someone	0	1	2	3	
19. I told myself things that helped me feel better	0	1	2	3	
20. I was inspired to do something creative about the problem	0	1	2	3	
21. I tried to forget the whole thing	0	1	2	3	
22. I got professional help	0	1	2	3	
23. I changed or grew as a person	0	1	2	3	
24. I waited to see what would happen before doing anything	0	1	2	3	
25. I apologized or did something to make up	0	1	2	3	
26. I made a plan of action and followed it	0	1	2	3	
27. I accepted the next best thing to what I wanted	0	1	2	3	
28. I let my feelings out somehow	0	1	2	3	
29. I realized that I had brought the problem on myself	0	1	2	3	
30. I came out of the experience better than when I went in	0	1	2	3	
31. I talked to someone who could do something concrete about the problem	0	1	2	3	
32. I tried to get away from it for a while by resting or taking a vacation	0	1	2	3	

	Does not apply or not used 0	**Used somewhat** 1	**Used quite a bit** 2	**Used a great deal** 3
33. I tried to make myself feel better by eating, drinking, smoking, using drugs, or medications, etc.	0	1	2	3
34. I took a big chance or did something very risky to solve the problem	0	1	2	3
35. I tried not to act too hastily or follow my first hunch	0	1	2	3
36. I found new faith	0	1	2	3
37. I maintained my pride and kept a stiff upper lip	0	1	2	3
38. I rediscovered what is important in life	0	1	2	3
39. I changed something so things would turn out all right	0	1	2	3
40. I generally avoided being with people	0	1	2	3
41. I didn't let it get to me: I refused to think too much about it	0	1	2	3
42. I asked advice from a relative or friends I respected	0	1	2	3
43. I kept others from knowing how bad things were	0	1	2	3
44. I made light of the situation; I refused to get too serious about it	0	1	2	3
45. I talked to someone about how I was feeling	0	1	2	3
46. I stood my ground and fought for what I wanted	0	1	2	3
47. I took it out on other people	0	1	2	3
48. I drew on my past experiences; I was in a similar situation before	0	1	2	3
49. I knew what had to be done, so I doubled my efforts to make things work	0	1	2	3
50. I refused to believe that it had happened	0	1	2	3
51. I promised myself that things would be different next time	0	1	2	3

	Does not apply or not used 0	**Used somewhat** 1	**Used quite a bit** 2	**Used a great deal** 3
52. I came up with a couple of different solutions to the problem	0	1	2	3
53. I accepted the situation, since nothing could be done	0	1	2	3
54. I tried to keep my feeling about the problem from interfering with other things	0	1	2	3
55. I wished that I could change what had happened or how I felt	0	1	2	3
56. I changed something about myself	0	1	2	3
57. I daydreamed or imagined a better time or place than the one I was in	0	1	2	3
58. I wished that the situation would go away or somehow be over with	0	1	2	3
59. I had fantasies or wishes about how things might turn out	0	1	2	3
60. I prayed	0	1	2	3
61. I prepared myself for the worst	0	1	2	3
62. I went over in my mind what I would say or do	0	1	2	3
63. I thought about how a person I admire would handle this situation and used that as a model	0	1	2	3
64. I tried to see things from the other person's point of view	0	1	2	3
65. I reminded myself how much worse things could be	0	1	2	3
66. I jogged or exercised	0	1	2	3