

**Attitude and Intention to Abuse Controlled Prescription Drugs:
A Conditional Indirect Effects Model**

by

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Dedication

To My Beloved Wife and Parents

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Abstract

Background: Over 6 million people misuse prescription opioids yearly in the U.S. resulting in adverse events and deaths. Little is known about why people turn to opioid misuse.

Objectives: This study objective was to examine the influence of moderators (when) and mediators (how) on pain level, drug seeking, and misuse (misuse scenario) to predict intention to misuse prescription opioids. Two theoretical models: Protection Motivation Theory (PMT) and the Theory of Planned Behavior (TPB) were integrated serving as the study framework. Risk of addiction and self-efficacy were the moderators, while attitude, perceived severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, and subjective norms were the mediators.

Methods: The web-administered instrument included PMT and TPB items. It underwent pretest (5 subjects) and qualitative testing (13 subjects) to assess readability/sensibility and face validity. An additional 160 patients participated in the survey. Subjects were patients of the University of Michigan Health System Spine Clinic, age 18 years or older, diagnosed with chronic pain, taking an opioid for over a month, outpatient only, and without cancer-related pain. Subjects were randomized into one of two controlled vignettes created to standardize experimental misuse scenario conditions.

Analysis: Qualitative responses were grouped by question and response similarity. Moderator and mediator association with intention to misuse prescription opioids was assessed using chi-square, t-tests, and regression analysis.

Results: The interviews revealed that the vignettes, survey questions, and response options were understandable. Changes were suggested to perceived severity and extrinsic rewards questions to

enhance realism. Risk of addiction and self-efficacy were significant moderating variables. Attitude, perceived vulnerability, and intrinsic rewards were significant mediating variables.

Discussion/Conclusion: Risk of addiction and self-efficacy predicted “when” perceived vulnerability, severity, intrinsic rewards, and attitude would describe “how” misuse scenario influenced intention to misuse prescription drugs. This theory-based study was among the first examining the effects of moderators and mediators on intention to misuse opioids. The perceived behavioral control factors and full model need to be tested. This study is a first step towards the development of instruments and interventions to measure individual predictors of opioid misuse by chronic pain patients and target prevention, detection, and treatment of opioid use disorders.

Chapter 1

Introduction, Objectives and Significance

Introduction

Over 6 million people in the U.S. are non-medical users of prescription-type drugs with over 4.5 million specifically misusing prescription pain relievers.¹ Estimates of societal costs related to opioid misuse and abuse show yearly costs over \$55 billion in work place, health care, and criminal justice.² Related to these costs, hospital emergency departments (ED) have experienced significantly more admissions for unintentional overdose involving misuse and abuse of prescription opioids. Specifically, ED visits increased 175%, from 144,644 in 2004 to 397,160 in 2009.³ Overdose deaths from prescription opioids have reached nearly 17,000 deaths annually since 2012.⁴ The increasing yearly number of prescriptions for opioids has been a primary driver for these statistics. Specifically, prescriptions for opioid painkillers more than doubled between 1991 with 76 million prescribed and 2013 with 207 million prescribed.⁵

Use of prescription opioids may lead to physical dependence when taking them on a regular schedule, especially with the strong doses that chronic pain patients may be prescribed, even when following the doctor's directions exactly.⁶ Physical dependence on the opioid does not constitute misuse; however, it is a strong sign that a person may be developing a tolerance, need to use more medication to achieve the same effect, and/or be in danger of proceeding down the path of misuse and abuse. Prescription opioid misuse can be described as using the medication in any way other than prescribed. While misuse and addiction are commonly used terms they are not considered diagnostic. The Diagnostic and Statistical Manual of Mental

Disorders, Fifth Edition (DSM-V) uses the terms substance use disorder and opioid use disorder to describe when a person is misusing a substance(s) and/or experiencing deleterious behavior associated with the use of a substance(s). There are three levels of severity for opioid use disorder classified based upon number of diagnostic symptoms: mild (2-3), moderate (4-5), severe (6 or more). The following list details the DSM-V diagnostic criteria:

1. Opioids are often taken in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful efforts to cut down or control opioid use.
3. A great deal of time is spent in activities to obtain, use, or recover from opioid effects.
4. Craving, or a strong desire or urge to use opioids.
5. Opioid use resulting in failure to fulfill major role obligations at work, school, or home.
6. Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids.
7. Important interpersonal activities are given up or reduced because of opioid use.
8. Recurrent opioid use in situations in which it is physically hazardous.
9. Continued opioid use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. Tolerance, as defined by either of the following:
 - a. A need for markedly increased amounts of opioids to achieve intoxication or desired effect.
 - b. A markedly diminished effect with continued use of the same amount of an opioid.

Note: Taking opioids solely under appropriate medical supervision discounts tolerance.

11. Withdrawal, as manifested by either of the following:

- a. The characteristic opioid withdrawal syndrome.
- b. Opioids (or related substance) are taken to relieve or avoid withdrawal symptoms.

Note: Taking opioids solely under appropriate medical supervision discounts withdrawal.

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While the DSM-V criteria are important for diagnosing opioid-related disorder, their use is seen after a person has already developed a problem. Likewise, the majority of the instruments that clinicians have for addressing potential and/or current substance use issues with their patients are more reactive than proactive. Many of these instruments require the prescriber to have more advanced knowledge of addiction-related behavior and/or access to information that is not always easy to find in the medical records, such as the D.I.R.E.⁷ Many of the other instruments rely on self-reports of specific substance use, misuse-related behavior and other psychosocially determinate indications of aberrant drug-related behaviors (ADRB).⁸ While some of these instruments are useful for determining likelihood that opioid misuse is occurring or will occur, the predictive power relies heavily on detecting ADRBs with very little, if any, focus on individualized thoughts, beliefs and attitudes that may help to predict a patient's intention to misuse their prescription opioids. Intention, in this context, being the conscious plan, decision or self-instruction of a person to actually perform a particular behavior.⁹

Qualitative assessment techniques often include focus groups and interviews and are an important part of helping to understand whether a survey or other instrument is accurately capturing the thoughts and opinions of the target population. Most often the qualitative pilot-testing is performed before the instrument is used in a study. However, there are cases where

qualitative studies were conducted while the instrument was in the field in order to gain insight into future changes and developments for the instrument.^{10,11}

The survey developed for this research project was based on questions used in substance use based research, but with different subject populations. Likewise, vignettes, used as an experimental manipulation, have not been utilized when studying substance abuse before or for the purposes of determining factors predictive of a patient's intention to misuse prescription drugs. A small pre-test of the survey was conducted to test and modify the instructions, questions, and response options within the survey for understandability and readability in an effort to maximize face validity and to reduce issues that may hinder the administration. The pre-test was conducted with a small group of people of which only one was potentially from the target population.

The qualitative findings from the pilot-test interviews were beneficial in explaining certain findings obtained in the second phase of the study, and will be beneficial in future research that will include assessment of the remaining perceived behavioral control-based (PBC) survey to complete the overall assessment of the behavioral.

Many substance misuse treatment programs focus on individualized thoughts, beliefs and attitudes in an attempt to identify successful strategies to keep patients from continuing to misuse their substance of choice or relapse. Many treatment programs use cognitive behavioral therapy (CBT) often coupled with motivational interviewing (MI) in an attempt to identify different situations, thoughts, and other factors that may lead to substance use. Being able to identify key factors that help to identify when, how and why a person decides to misuse a substance is important in designing tools and interventions that will help to successfully prevent, detect and treat substance use disorders.

The long-term goal of this investigator is to discover significant theory-based predictors of when and how a patient will misuse their prescription drugs. He then intends to utilize those predictors to adapt and/or develop instruments and interventions to detect, prevent, and treat substance use disorders.

Objectives

The overall objective of this study is to discover theory-based behavioral factors that are predictors of intention of chronic pain patients to misuse their controlled prescription drugs. The central hypothesis of the study is that conditional indirect effects models will reveal moderators (when) and mediators (how) that are predictive of intention of patients to misuse controlled prescription drugs. Testing the central hypothesis is dependent upon quantitative testing utilizing a theory-based survey to determine which predictive factors (mediators and moderators) exhibit the most influence on intentions of patients to misuse controlled prescription drugs. Two specific aims encompass the qualitative and quantitative research performed in this study:

Aim 1: To assess the readability, sensibility, and face-validity of the study survey instrument using qualitative techniques. The thoughts and opinions of a group of patients who have chronic pain were assessed using semi-structured interviews of individual patients.

Aim 2: To determine which, if any, theory-based factors identified and operationalized from the combined study model utilizing the Protection Motivation Theory and Theory of Planned Behavior are predictive of intention to misuse controlled prescription drugs, utilizing a vignette manipulation of the conditions associated with pain level, drug seeking level, and misuse level (misuse scenario).

With regard to these aims, the following study questions and hypotheses were examined:

1. Will the patients in the pilot-test qualitative study understand and identify with the vignettes and types of misuse examined thereby confirming the instrument has face-validity?
2. Will the pilot-test qualitative study patients identify survey questions that require revision and clarification on future survey instruments?
3. The level of pain, drug seeking behavior, and drug misuse behavior (vignette) and a moderator (risk of addiction or self-efficacy) will interact to exert a conditional indirect effect on intention through a mediator (attitude, perceived severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, and subjective norms)
4. The moderators risk of addiction and self-efficacy, will be revealed as significant factors predicting when a particular mediator will influence intention to misuse controlled prescription drugs.
 - a. Specifically, high risk of addiction should indicate that a mediator is likely to increase intention/likelihood to misuse and low risk of addiction should predict a decrease.
 - b. High self-efficacy should indicate that a mediator is likely to decrease intention/likelihood to misuse and low self-efficacy should predict an increase.
5. The mediators which include attitude, perceived severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, and subjective norms, will be revealed as significant factors predicting how a particular moderator will interact with vignette to influence intention to misuse controlled prescription drugs.
 - a. Perceived severity and perceived vulnerability are adaptive behaviors that if significant should function to reduce intention/likelihood to misuse.

- b. Intrinsic rewards and extrinsic rewards are maladaptive behaviors that if significant should function to increase intention/likelihood to misuse.
- c. Attitude will be bi-directional. One of the other mediators will likely influence an increase/decrease in attitude which will influence increase/decrease in intention/likelihood to misuse.
- d. Subjective norms are expected to decrease intention/likelihood to misuse.

Significance

Deaths due to overdoses of controlled prescription drugs have eclipsed those of heroin and cocaine combined.¹² In addition to the overdoses, adverse medical events, and draining law enforcement resources, diversion of controlled prescription drugs has contributed to an average yearly increase in illicit use of controlled prescription drugs of 1.9 million persons per year since 2002.¹

Most of the efforts at curbing prescription drug abuse have been aimed at the illicit non-medical use of opioids by adults and children. However, chronic pain patients are at greater risk for abusing prescription drugs and a primary source for diverting opioids for non-medical use. In order to design better interventions to prevent drug abuse it's necessary to understand the many moderators and mediators that influence the intentions of prescription painkiller users.

This contribution is significant because it is the first step in establishing a framework to understand how the various moderators and mediators in the behavioral model influence intention to misuse prescription drugs. This contribution is significant because it is a major step in developing tools and intervention strategies tailored to the perceptions, attitudes, beliefs and risk-taking for controlled prescription drug users. The major impact of this study will be contributions to the production of instruments and interventions designed to enable clinicians to

identify chronic pain patients who are susceptible to misuse of opioids. By identifying subjects, interventions could be introduced that would encourage the responsible use of controlled prescription drugs that minimize the risk of misuse and diversion. These programs would then result in reductions of overdoses, adverse medical events, and significant medical and law enforcement cost savings.

Innovation

The proposed study is among the first to integrate Protection Motivation Theory with the Theory of Planned Behavior to determine the perceptions, attitudes and beliefs and the role of risk-taking and abuse potential in the use of controlled prescription drugs by patients. The protection motivation theory is useful for understanding the role of attitude and behavioral control on intention toward an observed behavior. The theory of planned behavior is useful for understanding perception, attitudes, beliefs and the contribution of modifiers like self-efficacy and risk-taking to the development of patient intentions and the consequent likelihood of those intentions leading to behavior.

The proposed research is innovative in that, it will be among the first to examine the intentions of chronic pain patients and the importance of perceived severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, subjective norms and whether self-efficacy and risk of abuse moderate these relationships in the abuse of controlled prescription drugs. Understanding how moderators and mediators affect changes in medication misuse intentions will provide researchers with information to develop instruments and interventions aimed at regulating and/or changing medication misuse behavior in order to prevent controlled prescription drug misuse.

The use of vignettes within this study is innovative because it is among the first theory-based studies to use vignettes as randomizing manipulation examining the influence on patient's intentions to misuse prescription opioids. Using the vignettes was useful for randomizing patients to different scenarios of pain level, drug seeking level, and misuse level. Drug abuse is a stigmatizing subject and asking patients to answer as a vignette patient further enhanced their anonymity by having the patient become the "paper patient" for answering the survey questions. By using the vignettes the study did not need to rely on finding patients who were actually actively misusing their prescription opioids and were then able to recruit significantly fewer patients in order to have enough in each group.

This study will inform prescribers, pharmacists and other healthcare professionals about important behavioral factors of prescription drug misuse, such as risk of addiction and perceived vulnerability, to help develop personalized treatment programs that emphasize responsible medication use and control of symptoms, while minimizing the potential for misuse.

Chapter 2

Literature Review and Theoretical Models

This chapter discusses the behavioral theories utilized to construct a new behavioral model intended to detail the specific influences on intention to misuse controlled prescription drugs. Specifically, the new behavioral model combines the factors associated with the Protection Motivation Theory and the Theory of Planned Behavior. The study utilizes conditional indirect effects models and randomizing patients to one of two vignettes, addressing pain, drug seeking, and misuse, to determine which factors are serving as key moderators and mediators in predicting prescription misuse behavior. Each section of this chapter describes the operationalization and utilization of the factors within each theory. Additionally, each section details the use of each theory in substance use disorder research. Lastly, this chapter describes how the theories work together to form a new behavioral model for predicting prescription drug misuse.

Protection Motivation Theory

Protection motivation theory (PMT) serves as a framework for understanding fear appeals and their impact. PMT focuses on how fear appeals may be used to influence attitudes and behavior. The theory has been useful in communication development and evaluation and predicting health behavior.¹³⁻¹⁶ Between the initial creation of PMT in 1975 and the subsequent revision in 1983 the focus of the theory changed from three components of a fear appeal: 1) magnitude of a particular event; 2) probability of event; and 3) protective response efficacy.¹³

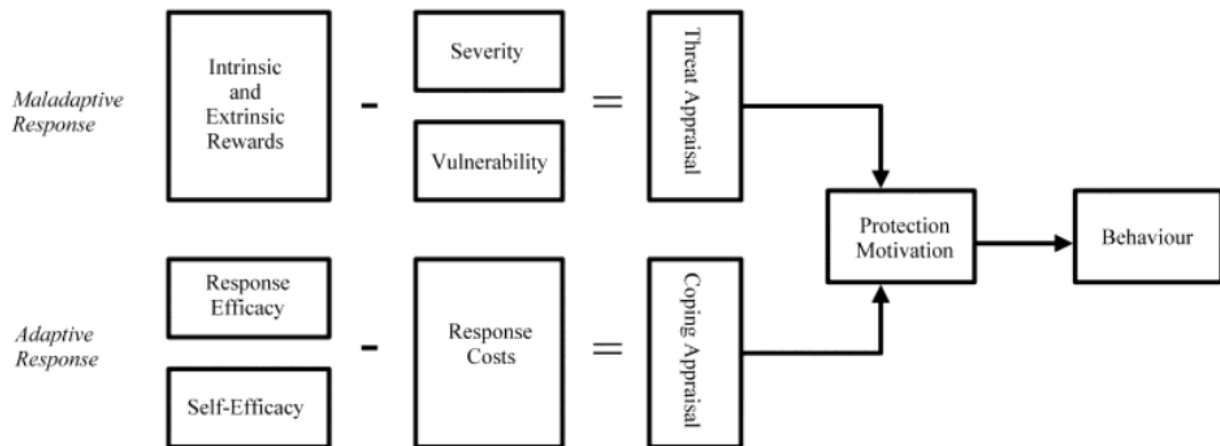
The 1983 revision, which is the current incarnation of PMT, focuses upon the convergence of maladaptive responses comprising a threat appraisal and adaptive responses comprising a coping appraisal which together influence the intentions associated with protection motivation.¹⁴⁻¹⁶ The threat appraisal is composed of intrinsic rewards and extrinsic rewards which are counterbalanced by perceived severity and perceived vulnerability. The coping appraisal is composed of response efficacy and self-efficacy which are counterbalanced by response costs.

Intrinsic rewards increase the likelihood of a maladaptive response because they are perceived benefits associated with an otherwise unhealthy or harmful behavior. An example is misusing controlled prescription drugs to “feel good”. Extrinsic rewards increase the likelihood of a maladaptive response because a person witnesses friends, family or other important people receiving a perceived benefit from an otherwise unhealthy or harmful behavior. An example is growing up in a smoking household and a person taking up the habit because they perceive that their parent(s) enjoy smoking. Perceived severity and vulnerability to a given threat can serve to inhibit maladaptive responses. Perceived severity focuses on the consequences and their seriousness associated with a particular health threat. Thus the consequences and seriousness of a patient damaging their health due to the threat associated with prescription drug misuse may help to inhibit a maladaptive response. Perceived vulnerability looks at how susceptible an individual is to a particular health threat. Another way to look at a person’s perceived vulnerability would be to examine their willpower to avoid misusing their medication. The more vulnerable a person feels the lower their willpower to avoid misusing their medication and the more likely they will experience a negative outcome. In this way perceived vulnerability can be used to inhibit a maladaptive response by attaching outcomes which the person perceives as severe enough to stop the behavior.

Response efficacy is an adaptive response part of the PMT coping appraisal that focuses on the belief that a threat will be reduced by performing a recommended behavior. For example, a person may believe that stopping their misuse of prescription drugs will make it less likely they'll have liver problems and be more likely to live longer. Self-efficacy is also an adaptive response that is the belief that a person can perform or avoid performing a specific behavior. Related to the previous example, a person with stronger self-efficacy should have an increased ability to perform behaviors beneficial to avoiding prescription drug misuse. Response costs are the adaptive responses that may serve to counterbalance response efficacy and self-efficacy in the PMT coping appraisal. Specifically, a person may believe (or know) that they will suffer withdrawal symptoms if they stop misusing their prescription drugs. In this way, the response costs may serve as barriers to performing an adaptive behavior or reinforce a maladaptive behavior.

The threat and coping appraisals interact to comprise a person's protection motivation.¹⁴⁻
¹⁶ The factors which comprise a person's protection motivation ultimately function to increase or decrease their attitude towards the target behavior which, in turn, influences their intention to perform or avoid performing a particular behavior.¹³

Figure 2.1 Protection Motivation Theory¹²



Protection Motivation Theory and Substance Use Disorders

Over the last 30 years, protection motivation theory has been used as a back bone to design a few different types of informative communication protocols and interventions aimed at alcohol and other substance use disorders.^{10,17-20} In 1993, Runge, Prentice-Dunn and Scogin developed an Alcohol Attitude Survey using protection motivation theory to examine which factors are involved with alcohol misuse problems in an elderly population.¹⁷ In this hypothesis generating study they found that increased vulnerability was associated with increased maladaptive behavior. Likewise, the factors that could potentially help prevent alcohol misuse were response efficacy, self-efficacy, response costs, and vulnerability.¹⁷

Wallerstein and Sanchez-Merki developed a program for New Mexico youth in communities at high risk of alcohol and substance misuse.¹⁰ They incorporated factors from the protection motivation theory into a Freirian praxis model of health education. The Freirian practice model of behavior change, through education, focuses upon ‘triggering’ words and images of people’s problems that are emotionally and socially relevant.²¹ The study incorporated the threat and coping appraisals from PMT into a Freirian listening-dialogue-action model. Increased vulnerability, severity, and self-efficacy were found to be related to a person’s ability to engage in dialog about a problem.¹⁰ In addition to the qualitative research, there were three follow-up questionnaires given pre, post, and at 8 months after intervention exposure. However, results of the qualitative research indicated that the experimental design of the questionnaires needed to be modified by the inclusion of additional PMT variables self-efficacy, response efficacy, other-protective efficacy and empathy.¹⁰ The research discussion indicated four primary findings: 1) the three-stage model can help create a sense of empowerment; 2) emotions play an important role in the change process; 3) social change should be fully integrated into each stage

of a program; and in order to build trust and the support structures necessary for programs to have a lasting impact, health educators need to make long-term commitments to communities.¹⁰

Ben-Ahron, White, and Phillips developed a PMT-based questionnaire in order to understand and potentially moderate high-risk drinking behavior.¹⁸ They compared the responses of higher and lower risk drinkers in order to reveal differences in coping and cognition. The questionnaire addressed PMT factors related to binge drinking. Particularly covered were perceived severity and vulnerability to binge drinking, self-efficacy to drink at safe limits, response efficacy to drink at advocated safe limits, intrinsic and extrinsic rewards associated with binge drinking, and response costs associated with safe drinking.¹⁸ Also addressed on the questionnaire were demographic variables, behavioral intentions toward safe drinking, and adaptive and non-adaptive binge drinking associated strategies: rational problem solving, avoidance, religious faith, wishful thinking, and fatalism.¹⁸ There were six variables that predicted intention towards future binge drinking accounting for 42% of the variance in intention. Specifically, people reported higher adaptive intentions (ability to drink safely) when 1) rational problem solving was higher; 2) avoidance was lower; 3) perceived protection religious faith was lower; 4) vulnerability was lower; 5) intrinsic rewards were lower; and 6) females reported higher adaptive intentions than males.¹⁸ The researchers further conducted a path analysis that points to a mediating role for perceived vulnerability, intrinsic rewards, rational problem solving, avoidance, and religious faith. This study was among the first to utilize PMT as a framework for examining binge drinking.

Preventing alcohol consumption by women who are pregnant or attempting to become pregnant is an important subject of several health communication campaigns that have used various parts of protection motivation theory. Cismaru et al reviewed 20 different social

marketing campaigns from around the world aimed at preventing fetal alcohol spectrum disorders (FASD).²⁰ The goal of the review was to show how PMT can be used to create effect and persuasive communication-based interventions. The review revealed five PMT variables that were most utilized in the existing communications: severity and vulnerability in 95% of campaigns, response efficacy in 70%, self-efficacy in 55%, and costs in 45%.²⁰ The evidence for this review is primarily anecdotal based on all of the prevention campaigns examined. The review concludes that perceived vulnerability and severity should be the primary focus of future campaigns while also providing low cost advice that emphasizes high levels of self-efficacy.²⁰ Likewise, programs should concentrate on helping pregnant women find and create alcohol-free environments. The logical follow-on to this review would be to conduct some quantitative research to attempt to discover which aspects of PMT and the existing communications are most successful in preventing FASD. More effective and targeted theory-based communications and interventions can then be developed.

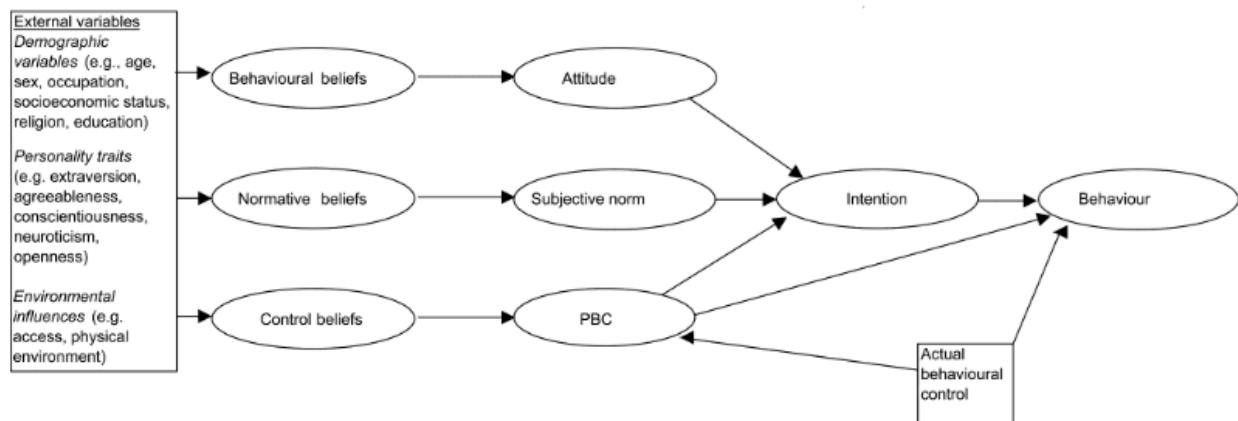
Some of the features of the protection motivation theory share features with the next behavioral intention theory, the theory of planned behavior (TPB). Particularly, the threat appraisals from PMT; perceived severity and vulnerability and intrinsic rewards directly relate to TPB attitude, and extrinsic rewards relates to TPB subjective norms. The coping appraisals from PMT; self-efficacy, response efficacy, and response costs relate to TPB perceived behavioral control. Lastly, both theories ultimately serve to predict intention towards a specific behavior.

Theory of Planned Behavior

In 1975, Fishbein and Ajzen proposed the Theory of Reasoned Action (TRA) which focused on attitudes and subjective norms as the predictors of behavioral intention.⁹ The TRA was later extended by the addition of perceived behavioral control to become the Theory of

Planned Behavior (TPB).²²⁻²⁴ To better understand the structure of the TPB, please refer to Figure 2.2. Attitude is defined as ‘a learned disposition to respond in a consistently favorable or unfavorable manner with respect to a given object.’⁹ Perceived consequences and other attributes account for the behavioral beliefs that help form a person’s attitudes. A person’s beliefs about whether friends, family or other important people approve or disapprove of a particular behavior make up their subjective norms. These normative beliefs are governed by the extent to which a person is willing to conform to the perceived expectations of others. Perceived behavioral control helps to extend the theory beyond the limitations discovered when focusing solely upon attitude and subjective norms. Perceived behavioral control consists of beliefs that a person can actually perform or avoid performing a particular behavior because they have access to the necessary resources that may be required for success.²²⁻²⁴ The factors responsible for a person’s perception of control may be external (barriers, options, reliance on others) or internal (knowledge, competence, feelings, skills). The more positive factors at a person’s disposal relative to road-blocks the higher the perceived behavioral control they are likely to report.

Figure 2.2 Theory of Planned Behavior²²



Theory of Planned Behavior and Substance Use Disorders

The theory of planned behavior has been used for at least the last 20 years to examine alcohol use disorder, mostly through predicting binge drinking and related risky drinking

behavior through understanding people's intentions.²⁵⁻²⁹ Within the last 10 years the TPB has seen use in predicting substance use behavior for a variety of substance use disorder types ranging from tobacco and marijuana to prescription stimulants, steroids, and other illicit prescription drug use.^{27,30-35} The alcohol-based studies all sought to extend the TPB by enhancing the predictive power through the addition of factors that either build upon or extend the three core factors in TPB: attitudes, subjective norms, and perceived behavioral control. Particularly, these studies focused on outcome expectancies which related to attitudes and perceived behavioral control and extended norms that related to subjective norms. One of the earlier studies in 1998 examining alcohol outcome expectancies and attitudes toward drinking found that adding gender-specific alcohol outcome expectancies improved the predictive power of the model. Specific outcome expectancies that predicted excessive consumption were based on women's perceived enhanced sociability and assertiveness and male's expectancies for sexual functioning.²⁵ Thinking back to the important factors in PMT we can ascertain that these outcome expectancies may fulfill the threat appraisal role of intrinsic rewards in increasing the likelihood of maladaptive behavior.

In 2007, a study examined the effect of anticipated regret and descriptive norms within the TPB to predict binge drinking.²⁶ Descriptive norms differ from subjective norms in that subjective norms represent what a person's significant other think they *ought* to do versus descriptive norms where a person observes what their significant other are *actually* doing. This is an interesting potential linkage between extrinsic rewards in PMT and subjective norms in TPB. Anticipated regret was defined as "perceiving that one will feel regret at not performing a behavior."²⁶ This factor could also be reasonably linked to PMT as either a threat or coping appraisal depending upon how it was approached. In the case of this study it would function in

the perceived vulnerability and severity category as it focused on the belief that binge-drinking sessions would often lead to negative health consequences. They found that both attitudes and anticipated regret predicted intention and further that intentions and previous binge-drinking behavior were predictors of current drinking behavior.

Continuing the trend of examining norms in relation to alcohol use, Kam et al looked to apply the TPB to predicting alcohol, tobacco, and marijuana among ethnically Mexican youth.²⁷ The researchers hypothesized that the norms would be multidimensional consisting of subjective norms (parental and peer injunctive), descriptive and personal substance use norms. Their second hypothesis suggested that the TPB variables attitude, personal norms, and perceived behavioral control would mediate the relationship between the multidimensional norms and intention. Lastly, they thought the model might work differently dependent upon the country of origin for each participant. Addressing their results in reverse order, they found that country of origin had no effect in the mediation model. In testing their second hypothesis, they found that positive attitudes towards alcohol, tobacco and other drugs, personal norms, and perceived behavioral control fully mediated parental and peer injunctive norms, while only partially mediating descriptive norms. Lastly, supporting the first hypothesis, they found that norms functioned in a multidimensional capacity.²⁷ The significance of norms as a predictor within the TRA and TPB has been a matter of speculation for the last 20 years. These studies that are finding the norms to be fully or at least partially predictive may be doing so because of more specifically worded questioned designed to detect nuances in the norm that more generally worded questions in other studies could potentially be missing.

This next study showed mixed results when subjective norm was one of the suspected predictors of intention to engage in risky drinking within a TPB framework.²⁸ The study

examined the theory of planned behavior as a predictor of growth in risky college drinking. This study also used self-efficacy as a predictor in addition to standard perceived behavioral control questions. Intention was examined at baseline, peak drinking (# drink consumed during peak drinking occasion during last month) and for future episodic drinking. Self-efficacy, attitudes, and subjective norms were found predictive of both baseline and future episodic drinking. However, subjective norms were not predictive of peak drinking, whereas self-efficacy and attitudes were. Their results showed that intention mediated the relationship between self-efficacy and attitudes on growth in risky drinking. Lastly, the researchers suggest that feedback on self-efficacy, attitudes, and intentions to engage in risky drinking may be useful for the development of interventions aimed at college populations.²⁸ Once again a specific factor from PMT, self-efficacy, had been incorporated into a TPB framework in order to enhance the predictive power.

One of the more recent alcohol-focused studies in 2012 examined salient beliefs of college students about binge drinking (defined as 7 or more units of alcohol in an evening) in order to better understand how those beliefs relate to the TPB and provide guidance for the development of future interventions aimed at reducing binge drinking.²⁹ Higher intention to binge drink was associated with a person's belief that their friends approved, getting "drunk" was an advantage/what they liked about binge drinking, their sports team would approve, and a celebratory environment and the associated drinking patterns made it easier to binge drink.²⁹ Conversely, inability to pay for drinks made binge drinking more difficult. This research showed that targeting perceived peer norms was important in helping to fight the social pressure to binge drink.²⁹

The rest of the papers discussed in this section focus upon non-alcohol substance use and the use of the theory of planned behavior to understand and predict related behavior. The first paper examines smoking onset among 12 to 16 year olds with and without asthma.³⁰ In addition to showing that attitude, subjective norm and perceived behavioral control were more predictive of intention towards onset of smoking in asthmatic adolescents this paper provided the questionnaire design in the appendix which proved helpful in the development of future questionnaires. There was an interesting cognitive dissonance that occurred when a previously non-smoking asthmatic would become a smoker. Previous to starting smoking, they would have negative attitudes, lower intention to smoke and higher perceived behavioral control (PBC). However, after they began smoking their cognition switched to pro-smoking.³⁰ The study found that PBC was the strongest predictor of intention to smoke in asthmatic adolescents. Likewise, the subjective norms associated with their parents were stronger than non-asthmatics. The researchers concluded that smoking among adolescents with asthma was more planned and that focus on PBC and parent-based programs to reduce smoking initiation are important goals for future interventions.³⁰ This study serves to illustrate the importance of preventing the initiation of substance use in the first place before important cognitive changes may be implemented through substance use.

The next paper examined illicit use of prescription stimulants among college students, but rather than looking to use the theory of planned behavior to predict misuse this study was more deterministic in wanting to define attitudes, beliefs, knowledge and practices that related to prescription stimulant use.³¹ They found that the primary reasons for illicit stimulant use were primarily related to academic performance on campus; improved alertness and concentration, instead of recreational use. Versus non-illicit users, illicit users had lower scores on health

concerns with use, ethics, and perceived control. Likewise, they had higher perceived positive subjective norms. This study did not directly measure intention. They conclude that the TPB is a reasonable framework for understanding illicit stimulant use and further suggest that leveraging awareness of actual adverse health effects could be used to reduce illicit use by influencing attitudes to be less positive towards illicit use.³¹ This is another example of relating PMT-related threat appraisals of perceived vulnerability and severity to a potentially TPB-framed intervention.

A cross-sectional study of 650 male high school students in Iran in 2011 used the theory of planned behavior to predict drug misuse related behaviors.³⁴ This study examined intention “not to use drugs” as determined by attitudes, subjective norms, and perceived behavioral control. Attitude and subjective norms were found to be the strongest predictors, specifically related to having drug misuse and/or smoking experience, being the child of drug users, and having drug-user friends. Determining and targeting key influential factors that may play significant roles in leading a person towards substance misuse is important for designing personalized interventions to prevent substance use and help people realize when they may need help and how to avoid future issues.

The next study also took place in Iran, but among gym users examining vulnerability and intention to use anabolic steroids to improve athletic performance.³² Two hundred fifty three male body-builders were asked about their intentions to use anabolic-androgenic steroids. Not only were they asked about the TPB components of attitude, subjective norms, perceived behavioral control, and behavioral intentions, but they were also asked about specific steroid use, self-efficacy to resist use, perceived seriousness of use, and knowledge of side effects of steroid use. Positive attitudes towards steroid use aligned with positive subjective norms and served to

increase intention. Perceived behavioral control, self-efficacy to resist steroid use, and perceived seriousness of side effects were inversely related to attitude and subjective norms and served to decrease intention to use steroids. Self-efficacy and PBC were significantly related indicating a possible combination effect to reduce intention. The researchers also found the threat of perceived severity of a side effect to be an important predictor of reduced intention to use steroids if a person believed they were susceptible to the side effects.³²

The last paper in this section addressed the potential roles of the theory of planned behavior, protection motivation theory and eight other theories of behavior change in informing interventions for addictive behaviors.¹⁹ The researchers reported that the impetus for their review was based upon the fact that an important book detailing major theories used in the field of addiction, West RJ. *“Theory of Addiction”*, did not include many of the behavior change theories from within social and health psychology.³⁶ The researchers also note that most interventions within the area of addictions do not usually report what, if any, theoretical framework is used to inform the intervention. This point and the paper’s overall suggestion for the use of theories of behavior change is the reason for inclusion of this paper in the review. While many interventions report that they are “theory-based”, there is very often little evidence of how theory influenced the development of the intervention. Michie and Prestwich developed a coding system to rate the use of theory within an intervention.³⁷ The coding system uses five categories to classify the extent to which an intervention has discussed/explained the theoretical framework: 1) Is the theory mentioned? 2) Are the theoretical constructs targeted? 3) Are the constructs measured? 4) Are mediation effects tested? 5) Is theory refined? Utilizing this system of intervention framework reporting should lead to greater transparency linking the interventions efficacy to the theoretical base and constructs. Likewise, it should guide designers in the different ways that

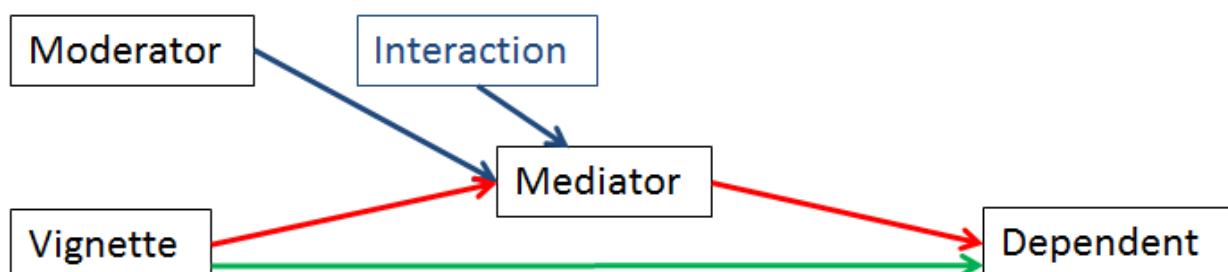
theory can be used in intervention development. Lastly, the reviewers suggest that the theories of behavior changes can inform the development of interventions in two important ways 1) identifying targets and/or 2) devising methods to influence behavior change.¹⁹

Moderation, Mediation, and Conditional Indirect Effects

Moderation, mediation and conditional indirect effects can be used to help explain the relationship between the independent variable (X) and dependent variable (Y) as explained by the variables within a given behavioral model.^{38,39} A mediator may be responsible for a causal effect between independent (X) and dependent (Y) variables. This indirect effect may also be called mediation. The effect of a moderator is to give a sense of “when” the mediator is having a causal effect between X and Y. Specifically, when a moderator interacts with the independent variable to influence the mediator, and also the mediator is found to influence the dependent variable, then the overall relationship is called a conditional indirect effect.^{38,39} The possible levels of moderator are low, moderate, high and may influence the direction, positive or negative, in which the dependent variable functions for that specific behavioral model. In other circles, conditional indirect effects may be called moderated mediation. A conditional indirect effect model is useful for testing the relationships among variables in several types of behavioral models. For an example diagram of a conditional indirect effect model see Figure 2.3.

Figure 2.3 Conditional Indirect Effects Model

Low, Mod, High



The Use of Vignettes

Substance use and addiction are stigmatizing subjects in the U.S. and around the world. Because of potentially illegal behaviors within and around substance use disorders people are often not willing to provide information about their specific behavior or otherwise participate in research for personal reasons and more often the fear of possible legal problems.⁴⁰ Likewise, people may be less inclined to share their thoughts and opinions openly on controversial topics for fear of judgement and/or societal marginalization. The development and use of vignettes, which may be considered de facto scenarios, has been a means to study examine decision-making in both target and general populations. A vignette may be thought of as specific situation, viewpoint, or an artificial patient that may be put into specific situations that a researcher would like to compare and contrast. People will then be asked to take on the viewpoint of the vignette instead of their own and then answer questions about or around that specific viewpoint.

Through the creation of two or more vignettes an effective manipulation may be created where study volunteers may be randomized to different vignettes each representing a particular viewpoint and/or set of circumstances. Xie, Bagozzi, and Grønhaug conducted a randomized controlled experiment where they examined corporate environmental responsibility utilizing a three group vignette manipulation.⁴¹ They found that participants were able to assume the roles assigned to them within the vignette and then respond to survey questions examining corporate environmental irresponsible and responsible actions.

Utilizing vignettes within the field of substance use disorder research helps to explore many of the sensitive issues that surround substance use.⁴² Likewise, substance use vignettes have been used with a general population of non-substance users to examine internal and

external responsibility attributions for addiction problems.⁴³ The use of vignettes was found to be useful for getting participants involved, especially when extra measures were taken to ensure that confidentiality was maintained. Researchers found it easier to discuss drug use and related topics especially when stigmatizing language was avoided.^{40,42,43}

Theory-based Instruments to Prevent/Treat Prescription Substance Abuse

There are over 15 instruments that have been developed over the last twenty years to help detect and potentially prevent prescription and other substance abuse.^{7,8,44-54} However, none of the instruments developed, to date, have a theory-based framework. The current instruments primarily focus on aberrant drug-related behaviors (ADRB), psychosocial mediators and norms, such as family history of substance abuse and/or physical abuse, and psychiatric comorbidities.^{8,53,54} The inclusion of these predictors of current and/or development of a substance use disorder are based upon the observations of professionals and the results from many cross-sectional trials.⁵⁵ The extent to which these instruments may be used to facilitate treatment begins with identifying that there may be a problem. Depending upon the stage at which a patient is within the cycle of a substance use disorder along with the honesty of a patient, some instruments will function better than others at detecting problems. Some instruments are self-completed, others are physician or therapist completed. The current instruments are usually focused on detecting or predicting ADRBs. A few of the instruments, such as the SOAPP-R and Opioid Risk Tool try to predict whether a patient is at risk of developing a substance use disorder in the future.^{48,49,51} Currently, a prescriber must decide whether or not to take a risk on prescribing an opioid for a potential future substance user. However, if there were an underlying theoretical framework that could identify individual risk factors for the patient, then the prescriber could help their patient understand the specific risks

they face taking the drug and refer them to educational literature and/or a theory-based educational program that can help the patient avoid future misuse by targeting their specific risk attributes.

Theory-based Interventions to Prevent/Treat Prescription Substance Abuse

There is a lack of a comprehensive theoretical foundation for drug use prevention research. Part of this is due to the majority of the currently used predictors of drug use deriving from cross-sectional studies without any theoretical framework.⁵⁵ The other primary reason for no comprehensive theoretical foundation is due to the fact that the issues that lead to or may otherwise help prevent substance use are more comprehensive than any single or integrated model has been able to encompass.⁵⁵ In reviewing 39 substance use focused interventional studies, 18 used no discernable theory, and 21 interventions utilized single or integrated (2 or more) theories from 20 different theories.⁵⁵⁻⁶⁴ Unfortunately, very few of these were specifically oriented towards prescription substance use disorders.

Of the theories that have been utilized for prescription substance use interventions the ones that see the most use within the current landscape of substance use treatment programs are cognitive-behavioral therapy (CBT), contingency management (CM) (also called motivational incentives), and 12-step facilitation therapy.⁶⁵ Cognitive-behavioral therapy is an evidence-based psychosocial intervention that targets thoughts, beliefs, attitudes, behaviors and emotional regulation in order to address problematic patterns and help patients develop coping strategies.⁶⁶ Though CBT has roots some 30 years ago in several different theories (mostly related to operant conditioning), a “theory-practice gap” has developed where the current operationalization of CBT relies more on evolving technological utility in practice, than on underlying theoretical robustness.⁶⁷ Contingency management derives from operant conditioning theories utilizing a

reward and discipline dynamic to reinforce desired behaviors and discourage undesirable behaviors.⁶⁵ Lastly, 12-step programs such as Alcoholics Anonymous and Narcotics Anonymous specifically don't have an underlying theoretical framework. Instead the 12 steps focus on three key ideas: 1) acceptance that a person has no control over the power of the substance over their life; 2) surrender to a higher power; and 3) active involvement with 12-step meetings and activities.⁶⁵ The 12-step Narcotics Anonymous program has not proven to be quite as effective at preventing relapse and maintaining abstinence among members as compared to Alcoholics Anonymous when used as a single therapeutic option. Often NA and AA membership is encouraged in tandem with CBT and CM. The principles of CBT and CM are malleable enough to be able to apply changes in the underlying behavioral theory framework intended to both expand the important predictive factors of prescription substance abuse and deepen the ability of therapists to identify the behavioral factors that are most important to treating a patient's specific substance use disorder issues.

Literature Review Discussion

This review examined protection motivation theory, the theory of planned behavior, and the use of conditional indirect effects in order to determine significant independent, dependent, mediating, and moderating behavioral factors that could predict when and how a patient might misuse their prescription painkillers. Qualitative interviews and a quantitative survey were the tools used to help reveal these relationships. Understanding which factors are most important for predicting prescription drug misuse will help in the development of instruments and interventions aimed at detecting, preventing and treating substance use disorders.

Specifically, several papers within both the PMT and TPB review sections were already deepening their analysis of factors that predict substance use intention by adding in factors from

the other theory. Combining the PMT and TPB to effectively for a protection motivation theory of planned behavior (PM-TPB) would be a logical continuation of the direction in which these research projects are headed. Likewise, one of the most logical extensions of the theories is into the realm of prescription opioid misuse, particularly with chronic pain populations which receive the highest exposure to risk of opioid addiction. Testing the relationships between the PMT and TPB within the PM-TPB will likely take some time as together they account for particularly large theory to predict illicit prescription drug use.

The use of conditional indirect effects to these theories would be a both an extension and deepening of both PMT and TPB that has never been examined. Specifically, the discovery of significant moderator(s) will broaden the picture of intention prediction to include the conditions “when” substance use is more or less likely to occur. The development of instruments and interventions that help clinicians understand how a patient specifically relates to the PM-TPB moderators and mediators will help them to direct patients to appropriate services intended to prevent the development of a substance use disorder or develop a personalized treatment plan to help a patient recover from a substance use disorder.

Proposing a New Behavioral Model – *Protection Motivation – Theory of Planned Behavior*

This study utilizes the constructs and frameworks of protection motivation theory and the theory of planned behavior to connect the attitudes, beliefs and perspectives of opioid-using chronic pain patients and their intention to misuse controlled prescription drugs.^{9,13,15,16,22-24} A working model of the conceptual framework is shown in Figure 2.4. For this study, a conditional indirect effects model is utilized to examine the effects of moderators and mediators on the relationship between misuse scenario and intention to misuse prescription drugs as shown in Figure 2.5.^{38,39} Specifically, a smaller part of the PM-TPB model is examined in order to have a

better understanding of the factors that influence prescription drug misuse decision making through intention.

Figure 2.4 Full Proposed Behavioral Model

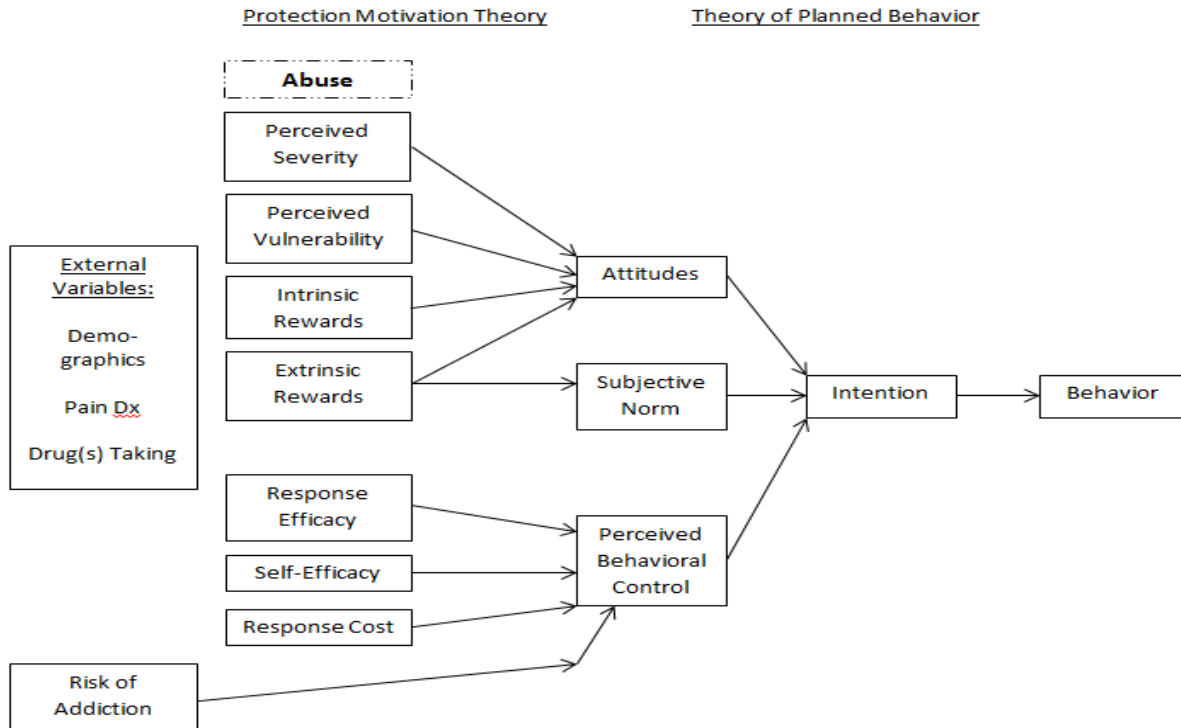
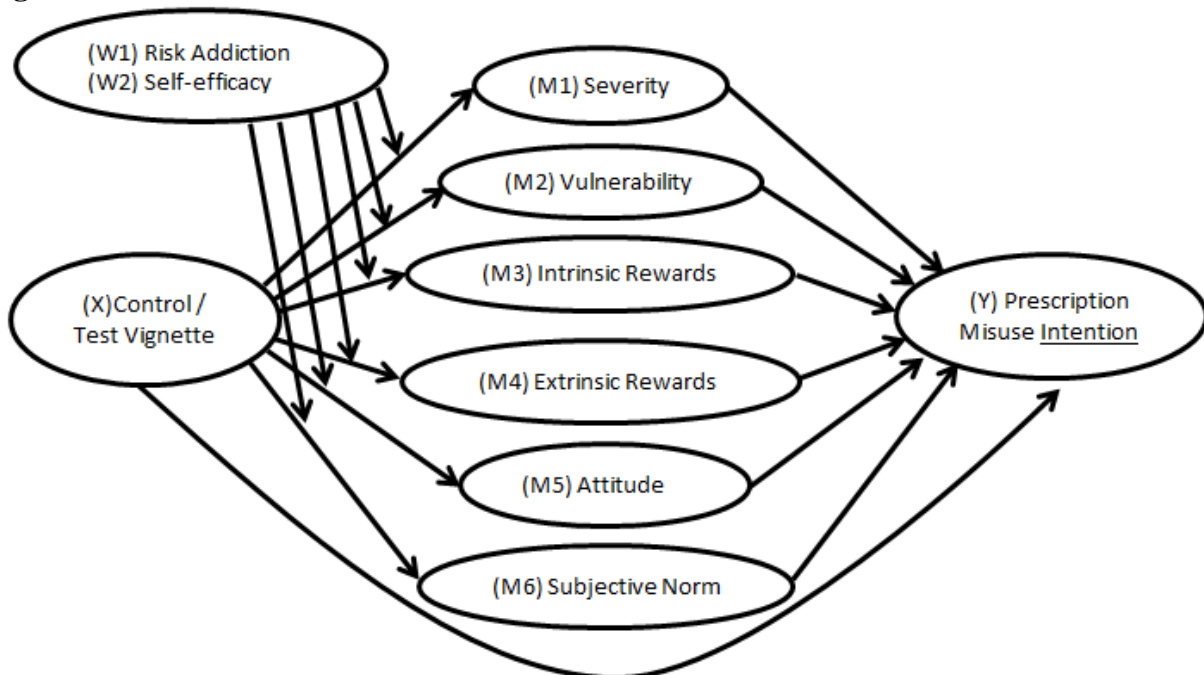


Figure 2.5 Conditional Indirect Effect Model: Intention



Protection Motivation Theory Contribution

Protection motivation theory (PMT) contributed the four threat-related appraisals: intrinsic rewards, extrinsic rewards, perceived severity, and perceived vulnerability; and the three coping-related appraisals: response efficacy, self-efficacy, and response costs to the new behavioral model. Though the PMT, when examined alone, is useful for predicting behavioral intention, Rogers and several other researchers have talked about attitude as a potential intermediate and attenuating factor between the threat appraisals and intention. Likewise, the PMT contributes extrinsic rewards as a norm-based measure of intention. As discussed in the introduction, researchers examining substance abuse have extended the PMT beyond extrinsic rewards using other behavioral norms including subjective norms as having an extended influence upon a patient's intention to misuse their substance of choice. Lastly, the coping appraisals represent more specific measures for perceived behavioral control allowing for more specific determination of how PBC may affect intention to misuse prescription opioids.

Theory of Planned Behavior Contribution

The theory of planned behavior (TPB) contributed the factors of attitude, subjective norms, and perceived behavioral control to the new behavioral model. Pairing the TPB with the PMT provided natural extension and deepening to both models. Attitude in the combined model serves to attenuate the effect of the threat appraisals: intrinsic rewards, extrinsic rewards, perceived severity, and perceived vulnerability; upon intention. Specifically, a patient may feel that each threat appeal was more bad/good; harmful/beneficial; and unfavorable/favorable. Therefore, depending upon the attitude, the magnitude of the effect of the threat on intention would change. Subjective norms logically extended the PMT's norm-based factors beyond extrinsic rewards. Extrinsic rewards focused on whether perceived benefit associated with people

important to the patient misusing their opioids influenced a patient's intention to misuse.

Understanding a patient's subjective norms concerning how family, friends, and strangers around them feel about opioid misuse should help to understand whether extrinsic rewards will result in increased or decreased intention to misuse opioids. Lastly, the coping appraisals: response efficacy, self-efficacy, and response costs; provided more specific factors to measure a patient's perceived behavioral control and their influence upon intention. All of the factors from the combined PMT and TPB model help to identify specific strengths, weaknesses, and opportunities of an individual patient when examining their likelihood of misusing prescription opioids.

Moderation, Mediation, and Conditional Indirect Effects Contribution

Moderation, mediation, and conditional indirect effects help explain the relationship between a patient's pain level, drug seeking level, and misuse level (independent variable) and their intention to misuse prescription opioids (dependent variable). Adding moderation to the PM-TPB behavioral model deepens the understanding of intention to misuse opioids by providing a framework to understand "when" a patient will be more likely to misuse their opioids. The mediators provide an understanding of "how" a patient's decides to misuse their opioids. For example, when a patient's perceived risk of addiction (moderator) is moderate and high, then perceived vulnerability (mediator) accounts for the relationship between the current pain, drug seeking, and misuse levels of a patient and their behavioral intention, resulting in an increase in that patient's intention to misuse their prescription opioids.

Anticipated contribution of this model to instrument and intervention development

Using this behavioral model, researchers, therapists, and the patient can understand the behavioral factors that are most important in influencing intention to misuse prescription drugs. Once this behavioral model has been fully developed and tested the intention is to design several

instruments and interventions that could be used in tandem to detect, prevent, and/or treat prescription-based substance use disorders. Eventually, the instruments and interventions may be adapted for alcohol, illicit drugs, and other substance use disorders.

One of the first instruments likely to be developed using the PM-TPB behavioral model would be intended for use by general practitioner and pain physicians as a screening tool at patient intake. Patients would be asked to self-complete the screening tool while waiting on their appointment with their physician. Based upon the behavioral model the screening tool would measure, before they have been prescribed a painkiller, what the patient's risk of addiction was, what intrinsic rewards might motivate the patient, and where the patient stands concerning their attitudes, norms and behavioral control. Measuring these factors will give a baseline of the patient's potential strengths and weaknesses associated with taking a painkiller. If a patient is deemed to be significantly at risk of developing a prescription opioid use disorder the physician and patient could then be more vigilant about prevention.

The first intervention likely to be developed using the PM-TPB behavioral model would be an educational intervention that works off of the strengths and weaknesses revealed from the screening tool. The educational intervention is intended to be used for primary prevention of a patient escalating to prescription opioid misuse, abuse, and addiction. Whether this intervention is active through use of therapists to work with the patient or passive through providing the patient with informational literature and/or videos remains to be determined.

The second instrument based on the PM-TPB will be developed to be administered to patients who are actively taking prescribed opioids for pain. The primary focus would be to measure the theory-based factors in order to understand the patient's current profile. Where the second instrument would differ from the first is that it would also need to be able to detect when

a patient is misusing or abusing their opioids. The instrument could act in two ways: it could serve as the baseline measurement for new patients to a service who are already prescribed opioids; the instrument could also serve to update and document any changes from baseline, whether measured by instrument one or instrument two. By providing a quick means of comparing the newest instrument results to previous and/or baseline, the physician and patient can identify any new areas of concern, but also reinforce good continuing behaviors. If an opioid use disorder is detected, then a patient could be referred to therapy which could involve a proposed second intervention.

The second intervention utilizing the PM-TPB would likely be a cognitive behavioral therapy type intervention that relies on the participation of the patient with a team of physicians and therapists. The development of this intervention is probably at least 5 years or more in the future. However, this intervention is likely to be coupled with a third version of the PM-TPB-based instrument designed to very specifically target key behavioral factors that trigger and/or prevent misuse individualized to each patient.

These instruments and interventions would be the culmination of years of research demonstrating that the PM-TPB behavioral model is useful for measuring, preventing, detecting and treating prescription opioid-related behavior, misuse, abuse, and addiction. This dissertation is intended as the first leg of that long journey establishing that the combined and moderated PM-TPB behavioral model contains a diverse group of behavioral factors capable of helping to determine when and how a patient might misuse their prescription opioids.

Chapter 3

Research Methodology

Specific Aims

Aim 1

To assess the readability, sensibility, and face-validity of the study survey instrument using qualitative techniques. The thoughts and opinions of a group of patients who have chronic pain were assessed using semi-structured interviews of individual patients.

Aim 1 Research Questions

1. Will patients in the pilot-test qualitative study understand and identify with the vignettes and types of misuse examined thereby confirming the instrument has face-validity?
2. Will the pilot-test qualitative study patients identify survey questions that require revision and clarification on future survey instruments?

Aim 2

To determine which, if any, theory-based factors identified and operationalized from the combined study model utilizing the Protection Motivation Theory and Theory of Planned Behavior are predictive of intention to misuse controlled prescription drugs, utilizing a vignette manipulation of the conditions associated with misuse scenario.

Aim 2 Hypotheses

1. The level of pain, drug seeking behavior, and drug misuse behavior and a moderator (risk of addiction or self-efficacy) will interact to exert a conditional indirect effect on

intention through a mediator (attitude, perceived severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, and subjective norms)

2. The moderators, risk of addiction and self-efficacy, will be revealed as significant factors predicting when a particular mediator will influence intention to misuse controlled prescription drugs.
 - a. Specifically, high risk of addiction should indicate that a mediator is likely to increase intention/likelihood to misuse and low risk of addiction should predict a decrease.
 - b. High self-efficacy should indicate that a mediator is likely to decrease intention/likelihood to misuse and low self-efficacy should predict an increase.
3. The mediators which include: attitude, perceived severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, and subjective norms, will be revealed as significant factors predicting how a particular moderator will interact with vignette to influence intention to misuse controlled prescription drugs.
 - a. Perceived severity and perceived vulnerability are adaptive behaviors that if significant should function to reduce intention/likelihood to misuse.
 - b. Intrinsic rewards and extrinsic rewards are maladaptive behaviors that if significant should function to increase intention/likelihood to misuse.
 - c. Attitude will be bi-directional. One of the other mediators will likely influence an increase/decrease in attitude which will influence increase/decrease in intention/likelihood to misuse.
 - a. Subjective norms are expected to decrease intention/likelihood to misuse.

Pre-test Survey

Prior to the qualitative interviews (pilot-test) and the quantitative survey a small pre-test survey of four volunteers from around the University of Michigan College of Pharmacy was conducted to detect and address any potential issues of readability, understandability, or any other identified issues prior to final on-line release of the survey to the study population. Each pre-test survey taker was asked to sit down at a computer and log in to the survey with the study P.I. watching. Their interactions with the computer and survey were noted by the P.I. and each survey taker was encouraged to talk out their thoughts and actions as they proceeded through the survey. The pre-test survey taker's responses were digitally recorded then later transcribed. Each volunteer was paid a \$10 incentive to thank them for taking the time to help. The primary contributions from the pre-test survey were the addition of vignette reminders for every question on the survey and troubleshooting some login and password related issues that were discovered. The pre-test survey subjects found it difficult to remember what the details were of the vignette that they were assigned at the beginning of the survey. This led to the creation of vignette reminders added to the top of each question on the on-line survey. With the reminders the qualitative interview patients later found it much easier to maintain their role as the vignette patient and were able to answer as the patient with confidence.

Subject Sample/Patient Screening

Patients were screened using the UMHS electronic medical record MiChart (chart review) and DataDirect (UMHS patient data warehouse) to identify qualified patients.

Inclusion criteria: The study population was composed of 18 years or older outpatients diagnosed with chronic non-cancer pain (ICD-9 338.2)⁶⁸ or the clinical equivalent of chronic non-cancer pain as determined by presence in a chart review of a combination of pain diagnosis

and pharmacological treatment for pain. Subjects were also taking at least one CR/ER (slow long acting) opioid and/or one IR (fast short acting) opioid pain medication for at least a minimum of one month prior to study enrollment. Participants needed to understand written English. Substance use related diagnoses (ICD-9: 304.**; 305.**; V61.42; V65.42)⁶⁸ were used to identify Group 2 patients for recruitment.

Exclusion criteria: Participants were excluded from the study if they were under 18 years old, had a current diagnosis of neoplasm-related (cancer) pain (ICD-9: 338.3)⁶⁸, had not been taking at least one CR/ER (slow long acting) opioid and/or one IR (fast short acting) opioid pain medication for at least a month, were a hospital inpatient at the time of interview/survey administration and/or were unable to complete the interview/survey questionnaire.

Patients for the Aim 1 individual interviews were screened for upcoming appointments at the UMHS Spine Clinic and those who completed interviews were flagged as ineligible to take the Aim 2 survey. Likewise, patient who had taken the Aim 2 survey were flagged as ineligible to be recruited for the Aim 1 individual interviews.

The approval of the University of Michigan Institutional Review Board was obtained before beginning the study and informed consent was obtained from all participating subjects.

Qualitative Study Design

Interview Recruitment

The medical director of The University of Michigan Physical Medicine & Rehabilitation Clinic granted permission to work with clinic staff to recruit patients for the study. Electronic medical records (MICHart) were examined to verify that the Spine Clinic population met the inclusion/exclusion criteria for this study. MICHart was used to identify potential subjects who visited physicians at the UMHS Physical Medicine & Rehabilitation Clinic. A preliminary letter

was sent to each patient explaining that we would like to recruit them into our study and interview them after their upcoming Physical Medicine & Rehabilitation appointment. (See Appendix A.1) Patients then received a follow-up phone call one week before their appointment to confirm that they wished to participate in the interview. Patients had several opportunities to opt-out of the interview before the appointment. The clinic staff helped to remind patients that they had agreed to individual interviews and guided them to the room set up with the interviewer after the patient had completed their appointment. Each interview lasted no longer than 90 minutes, with the majority taking 45 minutes or less. Each participant received a check for \$20 as an incentive.

Interview Design

Individual interviews were conducted with two groups of chronic pain patients from the UMHS Spine Clinic. Each individual interview group included at least 5 patients that met the inclusion/ exclusion criteria. Group 1 included patients that had no history of substance use. Group 2 included patients that had a past history of substance use (ICD-9: 304.**; 305.**; V61.42; V65.42).⁶⁸ Qualitative interviews were conducted concurrently with the web administration of the survey.

An interviewer reviewed a 60-question theory-based survey questionnaire with each patient. (See Appendix A.9) Each interview consisted of a short introduction describing the dissertation research project and its purpose. The patient was then asked to review a study consent form and sign if they agreed to participate in the research project. (See Appendix A.3) During the individual interviews the interviewer reviewed a 13-question script with the patient. (See Appendix A.4) The interviews were designed to determine how well each question and how well each question matched their personal experiences and whether the wording and situations of

the scenarios and questions were understandable, applicable and well-worded. An interview room was reserved at the Spine Clinics for same day recruitment and interviews. The patient's response to each set of questions was digitally voice recorded. The digital recordings were later transcribed verbatim into Microsoft Word documents with only the patient's study identifier and no other names or other personally identifiable information. The transcriptions were reviewed by two different reviewers who coded the responses by each individual and then met to discuss the findings and come to a consensus.

Reviewers one and two met to come to a general consensus about the statements on which they differed, and to determine the statements that determined a consensus among and between group members. Each statement's theme was considered within the context of the question that the patient answered. Isolated statements by an individual group member and not similar in theme to a member of the other group were not considered to be significant. If at least two patients within a group made statements that shared a similar theme that theme was considered significant. If at least one patient from each group made a statement that shared a similar theme, then that theme was also considered significant.

Quantitative Study Design

Survey Recruitment

A mail and e-mail-based recruitment method was used. DataDirect, a UMHS data warehouse query tool, was used to identify potential participants that met the inclusion and exclusion criteria of the study. Patients were first invited to participate in the Qualtrics-based internet survey through a mailed letter. (See Appendix A.5) Total recruitment needed to be at least 140 participants in order to have a sample size that was large enough to allow for regression

analysis and structural equation or path analysis depending upon whether any latent variables are identified. At least 70 patients needed to be recruited for each possible survey vignette.

The initial mailing contained 300 letters each with a unique web-link, username, and password to the web-based survey. After two weeks an email was sent to those patients for whom we had an email address, but had not yet responded, inviting their participation. (See Appendix A.6) At four weeks after the initial mailing a final mailing was sent to any patients who had not yet responded. (See Appendix A.7) After four weeks, if recruitment quotas were not being met another round of mailings would be started.⁶⁹ At four weeks, 200 new letters were sent. At six weeks, recruitment rates were averaging around 10%, therefore another 500 new letters were sent. At eight weeks, based upon the ongoing response rate of around 10% a final round of 500 new letters was sent.

Patients used the unique username and password that they received in their letter to log in to a web-based Qualtrics survey. Before a patient can take the survey they needed to answer a set of questions based on the five inclusion/exclusion criteria to verify that they were qualified to take the survey. Patients who qualified were then asked to read through and electronically sign the consent form. (See Appendix A.8) At this point, a patient was randomized to the control or test vignette and then presented with the 60-question survey questionnaire. (See Appendix A.9) Completion of the questionnaire was expected to take around 30 minutes. Once the survey was completed and submitted, the survey patients were offered a check for \$10 incentive.

Survey Procedure Design

This study utilized vignettes in order to randomize patients to different misuse scenarios. Drug abuse is a stigmatizing subject and asking patients to answer as a vignette patient further enhanced their anonymity by having the patient become the “paper patient” for answering the

survey questions. By using the vignettes the study did not need to rely on finding patients who were actually actively misusing their prescription opioids and were then able to recruit significantly fewer patients in order to have enough in each group. Subjects were randomized to one of the two vignettes (See Appendix A.9):

Control: controlled pain, no drug seeking, no drug misuse (70 or more patients)

Test: poorly-controlled pain, drug seeking, drug misuse (70 or more patients)

A vignette may be thought of as specific situation, viewpoint, or an artificial patient that may be put into specific situations that a researcher would like to compare and contrast. People were then asked to take on the viewpoint of the vignette instead of their own and then answer questions about or around that specific viewpoint. Vignettes were utilized in order to encourage patients to be as truthful as possible in their responses because they should be more at ease not revealing what they would consider personal information about how they use or potentially misuse their own prescription drugs. Some of the potential downsides to using vignettes occur when people do not agree with, or otherwise are not able to identify with the vignette enough to answer questions from a perspective that is not their own.

Measures and Analysis

Measures: Qualitative

Patients were asked to read through a paper version of the quantitative survey that was used in Aim 2. (See Appendix A.9) The interviewer was given a script to guide their questions and interaction with the patient. (See Appendix A.4) The interviewer would ask the patient to review the survey feature or question and answers and then ask the patient to comment on similarities and differences to how the patient might have experienced that behavioral factor.

There were 13 question sections on the interview questionnaire. The following were the general topics and question roots that each patient was asked:

1. Describe the four types of misuse related to intention to misuse controlled prescription drugs: Frequency, Dose, Withdrawal, and Feeling Good. Ask individual patients for thoughts and opinions about the types of misuse.
2. Describe the two vignettes and ask the patient to comment on similarities and differences between the scenarios and their actual experiences.
3. Review self-efficacy questions and ask patient how they experience self-efficacy.
4. Review risk of addiction questions and ask patient how they feel their risk of addiction influences their likelihood of abusing prescription drugs.
5. Review perceived vulnerability questions and ask patient how they experience perceived vulnerability.
6. Review perceived severity questions and ask patient how they experience perceived severity.
7. Review intrinsic rewards questions and ask patient how they experience intrinsic rewards.
8. Review extrinsic rewards questions and ask patient how they experience extrinsic rewards.
9. Review subjective norms questions and ask patient how they experience subjective norms.
10. Review attitude questions and ask patient to relate their attitudes towards the four types of prescription misuse.
11. Review intention questions and ask patient to relate their attitudes towards the four types of prescription misuse.
12. Review the demographic questions with the patient.
13. Review the NIDA Risk Screening questionnaire with the patient.

Analysis: Qualitative

The interview response transcripts were analyzed in a group-by-question grid where the responses were grouped under each question asked by similar discussion topics.⁷⁰ Data were coded in three ways (1) all mentions of a given code, (2) whether each individual mentioned a given code, or (3) whether the multiple interviews contained a given code.⁷⁰ This method of grouping the responses allowed for cross-group comparisons between the two different interview groups. The coding and identification of significant discussion topics in each interview was carried out by two different reviewers. Both reviewers were licensed pharmacists and Ph.D. students in Social and Administrative Sciences at the University of Michigan. The reviewers read

through each patient's interview transcript and coded responses according to the guide. At the conclusion of coding, the reviewers met to resolve any differences. The data were analyzed as a simple summation of the occurrences of each patient statement/theme.

Measures: Quantitative

The questionnaire shown in Appendix A.9 was developed based upon the PM-TPB adaptation of theoretical models to determine the association between the moderators and mediators and the dependent variables. The following subsections describe the dependent, independent, mediator and moderator variables of interest measured using the questionnaire. Particularly, the questions focus on four particular modes of prescription drug misuse: frequency – taking prescription painkillers more often than prescribed; dose – taking higher doses (more pills) of prescription painkillers than prescribed; withdrawal – taking prescription painkillers to avoid withdrawal symptoms (example: restlessness, agitation, and muscle aches); feeling good – taking prescription painkillers to “feel good” (example: a euphoric feeling of comfort and contentment).

Dependent Variables

The dependent variable of interest for this study was the intentions of patients to misuse prescription opioids. The questions are presented in Appendix A.9. The intention concept was assessed using two question roots with four 5-point bipolar Likert scales based upon the four types of misuse.^{26,28,30,71} The intention questions were located as the last theory-based questions within the instrument.

Figure 3.1 Intention Questions

I intend to take prescription painkillers:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
More often than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

It is unlikely/likely that I will actually take prescription painkillers:

	Very unlikely	Unlikely	Neither unlikely nor likely	Likely	Very likely
More often than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Independent Variables

Pain Level, Drug Seeking, and Drug Misuse Behavior

The primary independent variables (X) in the model were defined by the two vignettes (1. control, 2. test) as a constant level of pain, drug seeking level, and drug misuse level. Pain was operationalized as 1) well-controlled or 2) poorly controlled. Drug seeking was listed as 1) absent or 2) present. Likewise, drug misuse behavior was also classified as 1) absent or 2) present. Pain was used as an independent variable because it is the primary reason that patients are started on opioid painkillers. Drug seeking behavior was used as an independent variable because it is a hallmark indicator that a person's pain may be poorly controlled and/or that patient may be possibly misusing their medication or diverting their medication for use by another person. Misuse was used as an independent variable because it is also an indicator that a person may have a substance use disorder. (Refer back the DSM-V for specific substance use disorder criteria)

Patients were randomized to one of these two vignettes and asked to imagine themselves in the position of the vignette patient before answering the theory-based survey questions.

The control and test vignettes are shown in the following figures:

Figure 3.2 Vignette 1: Control Scenario
(Pain Well-controlled/No Drug Seeking/No Misuse)

(Please answer the survey questions as if YOU are experiencing the following scenario.)

You suffered a severe back injury about 2 years ago requiring the fusing of several vertebrae. Your daily pain level averages between a 1 or 2 out of 10 (with 1 = no pain and 10 = the worst pain you've ever experienced).

The medication you are prescribed in order to control your pain is as follows: Oxycontin 10 mg (brand name oxycodone), 1 tablet once a day; and Vicodin 5 mg/325 mg (brand name hydrocodone/acetaminophen), 1 tablet every six hours as needed for pain.

You take 1 tablet of Oxycontin once a day, but don't have much need for the Vicodin. Your pain doesn't interfere with your daily tasks and you are able to work your job without any indication that you are on a strong painkiller to control your back pain. With your pain well controlled you only fill your Oxycontin every month, but you haven't needed to refill your Vicodin in over a year.

Figure 3.3 Vignette 2: Test Scenario
(Pain Poorly Controlled/Drug Seeking/Misuse)

(Please answer the following questions as if YOU are experiencing the following scenario.)

You suffered a severe back injury about 2 years ago requiring the fusing of several vertebrae. Your daily pain level is between a 5 to 7 out of 10, with occasional breakthrough of around 9 to 10 (with 1 = no pain and 10 = the worst pain you've ever experienced).

The medication you are prescribed in order to control your pain is as follows: Oxycontin (brand name oxycodone) 20 mg, 1 tablet twice a day; and Vicodin 5 mg/325 mg (brand name hydrocodone/acetaminophen), 1 to 2 tablets every four to six hours as needed for pain. You take 1 Oxycontin tablet between one and four times a day, you take 1 to 4 tablets of Hydrocodone three to six times a day.

You are taking your medication mainly to avoid symptoms of withdrawal, (restlessness, agitation and some muscle aches) and to "feel good" (a euphoric feeling of comfort and contentment). Your pain makes daily tasks take longer than they should and sometimes leaves you bedridden. You are having a hard time holding a job because your pain often interferes with your concentration and results in you needing time off.

When you are not in pain you are often sleepy or dizzy which also interferes with your ability to work and perform daily tasks. You run out of Vicodin and Oxycodone early every month and are thinking about seeing another doctor to get another painkiller prescription and borrowing or buying more painkillers from friends or strangers. You want to avoid withdrawal and still be able to "feel good" when you want to.

Accompanying each question on the on-line survey there was a reminder for the patient of the pain, drug seeking and misuse features of the vignette that they were randomly assigned.

Several of the example questions shown in the questionnaire in Appendix A.9 retain these reminders.

Demographic Variables

At the end of the survey questionnaire patients were asked for the following demographic characteristics: gender, marital status, race, ethnic origin, employment, income, and education.

(See Appendix A.9)

Gender was measured as female or male.

Marital status was measured as single, married/cohabitating, divorced, or widowed. Race was measured as white/Caucasian, black/African American, American Indian, Asian or Pacific Islander, or other.

Ethnic origin was measured as Hispanic/Latino yes/no.

Employment status was measured as full time, self-employed, part time, or not employed.

Income was measured from less than \$10,000 to greater than \$100,000 in approximate \$10,000 increments.

Education was measured as less than high school, high school or GED, some college to bachelor's, professional degree, or graduate degree.

These variables are important potential modifiers, but also necessary to help understand the generalizability of the patient population to the larger public and the similarity of characteristics between the two test groups.

History of Substance Misuse Screening Variables

A patient's own past substance misuse history was addressed with the NIDA-Modified Alcohol, Smoking and Substance Involvement Screening Test (ASSIST). This data was used to determine whether patients randomly assigned to the control or test vignette were similar in their

ASSIST score distributions. The ASSIST uses questions to determine substance misuse history and specific use within the last six months in order to establish a more objective measure of the patient’s risk of misuse.^{47,50,72} A shortened version of the NIDA-modified ASSIST was used. Specifically, a series of 12 Yes/No questions was asked about a person’s lifetime use of the following substances: tobacco, alcohol, cannabis, cocaine, prescription stimulants, methamphetamine, inhalants, prescription sedatives/sleeping pills, hallucinogens, street opioids, prescription opioids, and other possible substances. Then for each of the substance use categories specific level of substance use was asked within the past 6 months: never, one or twice, monthly, weekly, daily or almost daily.

Figure 3.4 National Institute of Drug Abuse: Modified Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) - Lifetime:

In your *LIFETIME*, which of the following substance have you ever used (non-medical use only)?
 -Non-medical use refers to using a substance either not prescribe to the patient or used in ways or amounts not prescribed by their doctor.

	Yes	No
1. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	<input type="radio"/>	<input type="radio"/>
2. Alcohol (For men, 5 or more drinks a day; for women, 4 or more drinks a day)	<input type="radio"/>	<input type="radio"/>
3. Cannabis (Marijuana, pot, grass, hash, etc.)	<input type="radio"/>	<input type="radio"/>
4. Cocaine (coke, crack, etc.)	<input type="radio"/>	<input type="radio"/>
5. Prescription Stimulants (Ritalin, Concerta, Dexedrine, Adderall, diet pills, etc.)	<input type="radio"/>	<input type="radio"/>
6. Methamphetamine (speed, crystal meth, ice, etc.)	<input type="radio"/>	<input type="radio"/>
7. Inhalants (nitrous oxide, glue, gas, paint thinner, etc.)	<input type="radio"/>	<input type="radio"/>
8. Sedatives or sleeping pills (Valium, Serepax, Ativan, Xanax, Librium, Rohypnol, GHB, etc)	<input type="radio"/>	<input type="radio"/>
9. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, ecstasy, etc.)	<input type="radio"/>	<input type="radio"/>
10. Street opioids (heroin, opium, etc.)	<input type="radio"/>	<input type="radio"/>
11. Prescription opioids (fentanyl, oxycodone [OxyContin, Percocet], hydrocodone [Vicodin], methadone, buprenorphine, etc.) • Please record nonmedical use only: Non-medical use refers to using a substance either not prescribed to the patient or used in ways or amounts not prescribed by their doctor.	<input type="radio"/>	<input type="radio"/>
12. Other – specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>

Figure 3.5 National Institute of Drug Abuse: Modified Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) – Six-month:

In the ***PAST SIX MONTHS***, how often have you used the substance(s) you mentioned (first drug, second drug, etc)?

	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
1. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Alcohol (For men, 5 or more drinks a day; for women, 4 or more drinks a day)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Cannabis (Marijuana, pot, grass, hash, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Cocaine (coke, crack, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Prescription Stimulants (Ritalin, Concerta, Dexedrine, Adderall, diet pills, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Methamphetamine (speed, crystal meth, ice, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Inhalants (nitrous oxide, glue, gas, paint thinner, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Sedatives or sleeping pills (Valium, Serepax, Ativan, Xanax, Librium, Rohypnol, GHB, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, ecstasy, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Street opioids (heroin, opium, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Prescription opioids (fentanyl, oxycodone [OxyContin, Percocet], hydrocodone [Vicodin], methadone, buprenorphine, etc.) • Please record nonmedical use only: Non-medical use refers to using a substance either not prescribed to the patient or used in ways or amounts not prescribed by their doctor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Other – specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A future use for the ASSIST data will be to examine the patients who tested with a high actual risk of having a current or future substance use disorder and then examine their risk of addiction and intention scores on the survey to determine whether their responses differed from patients with low ASSIST scores, both dependent and independent of which vignette they were assigned.

Mediator Variables

The mediator variables addressed in the survey were perceived vulnerability, perceived severity, intrinsic rewards, extrinsic rewards, subjective norms and attitudes. Each mediator was assessed by a question set that addressed the specific mediator in relation to the four types of misuse. Five-point bipolar Likert scales were used for perceived vulnerability, intrinsic rewards, extrinsic rewards, and subjective norms. Five-point unipolar Likert scales were used for

perceived severity. The attitude concept was determined from four attitude questions which consisted of a question root based on one of the four types of misuse. Three 7-point bipolar Likert scales addressed the responses to each attitude.

Figure 3.6 Perceived Vulnerability Questions

How vulnerable are you to taking prescription painkillers:

	Not at all vulnerable	Somewhat vulnerable	Moderately vulnerable	Very vulnerable	Extremely vulnerable
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How strong is your willpower to avoid taking prescription painkillers:

	Very weak willpower	Weak willpower	Moderate willpower	Strong willpower	Very strong willpower
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely are you to take prescription painkillers:

	Very unlikely	Unlikely	Neither unlikely nor likely	Likely	Very likely
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 3.7 Intrinsic Rewards Questions

Taking prescription painkillers more often than I am prescribed relieves some of my problems (example: anxiety, personal, relationship).

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Taking higher doses of prescription painkillers than I am prescribed relieves some of my problems.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I will avoid withdrawal symptoms by taking prescription painkillers.

Strongly disagree Disagree Neither disagree nor agree Agree Strongly agree

I enjoy "feeling good" by taking prescription painkillers.

Strongly disagree Disagree Neither disagree nor agree Agree Strongly agree

Figure 3.8 Extrinsic Rewards Questions

Some people who are important to me take prescription painkillers:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To enjoy "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 3.9 Subjective Norms Questions

My family members would disapprove/approve of me taking prescription painkillers:

	Strongly disapprove	Disapprove	Neither disapprove nor approve	Approve	Strongly approve
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My friends would disapprove/approve of me taking prescription painkillers:

	Strongly disapprove	Disapprove	Neither disapprove nor approve	Approve	Strongly approve
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strangers would disapprove/approve of me taking prescription painkillers:

	Strongly disapprove	Disapprove	Neither disapprove nor approve	Approve	Strongly approve
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 3.10 Attitude Question: Often

For me to take more prescription painkillers than I am prescribed for pain would be:

Very bad Bad Somewhat bad Neither bad nor good Somewhat good Good Very good

Very harmful Harmful Somewhat harmful Neither harmful nor beneficial Somewhat beneficial Beneficial Very beneficial

Very unfavorable Unfavorable Somewhat unfavorable Neither unfavorable nor favorable Somewhat favorable Favorable Very favorable

Figure 3.11 Attitude Question: Dose

For me to take higher doses of prescription painkillers I am prescribed would be:

Very bad Bad Somewhat bad Neither bad nor good Somewhat good Good Very good

Very harmful Harmful Somewhat harmful Neither harmful nor beneficial Somewhat beneficial Beneficial Very beneficial



Figure 3.12 Attitude Question: Withdrawal



Figure 3.13 Attitude Question: Feel Good



Figure 3.14 Perceived Severity Questions

How severe would the consequences be (example: drowsiness, dizziness, nausea) for you taking prescription painkillers:

	Not at all severe	Somewhat severe	Moderately severe	Very severe	Extremely severe
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How serious would the situation be for you taking prescription painkillers:

	Not at all serious	Somewhat serious	Moderately serious	Very serious	Extremely serious
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The question roots for perceived vulnerability, perceived severity, intrinsic rewards, extrinsic rewards, and subjective norms were based on study instrument from previous studies conducted by Norman, Cox, Helmes, and Wu within the last 15 years on PMT-based surveys.^{16,73-75} The perceived vulnerability asked about a patient’s vulnerability to taking their prescription painkillers more often or in higher doses. A second question set asked about willpower to avoid taking the prescription painkillers more often or in higher doses. A third perceived vulnerability question set asked the patient to rate the likelihood that they would take their prescription painkiller in any of the four misuse types given their assigned vignette. Two perceived severity question sets asked about the severity and seriousness of prescription misuse. The first question set asked about how severe the physical consequences (drowsiness, dizziness, nausea) were perceived to be for each misuse type. The second question set asked how serious the situation would be associated with each misuse type. Both intrinsic rewards and extrinsic rewards consisted of one question set each addressing the four misuse types. The intrinsic

rewards questions focused on relief of problems (anxiety, personal, relationship) by taking painkillers more often or in higher doses, to avoid withdrawal, or to “feel good”. Extrinsic rewards asked if people who are important to the patient misused prescription painkillers. Lastly, subjective norms consisted of three question sets based on the perceived disapproval/approval of family, friends, or strangers. These questions omitted the withdrawal avoidance type of misuse because that type of misuse does not have a particular societal norm component.

Moderator variables

The moderators were risk of addiction and self-efficacy. There were two questions about risk of addiction. The first question used a 5-point Likert scale that asked the patient to rate their likelihood of becoming addicted to their prescription painkillers given their assigned vignette. The second risk of addiction question asked the patient to select their probability of becoming addicted on a scale from 0% to 100%. There was one question set for self-efficacy that asked the patient to express their confidence in resisting the four types of misuse on a 5-point unipolar Likert scale ranging from not at all to extremely confident.

Figure 3.15 Risk of Addiction



Figure 3.16 Self-Efficacy

I am <u>confident</u> that I can <u>resist</u>		Not at all confident	Somewhat confident	Moderately confident	Very Confident	Extremely Confident
Taking my prescription painkillers more often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking higher doses (more pills) of prescription painkillers than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking prescription painkillers to avoid withdrawal symptoms (example: restlessness, agitation, and muscle aches).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking prescription painkillers to "feel good" (example: a euphoric feeling of comfort and contentment).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Analysis: Quantitative

Descriptive statistics were used to present demographic variables, inclusion/exclusion variables, PMT and TPB variables, and modified ASSIST variables. A nonresponse bias was performed between the 160 patients that responded and 1,390 non-respondents to determine if the study population was representative of the overall target study population. Variables used for the nonresponse bias assessment included: gender, age, marital status, and race.

Comparison of the two groups of subjects based on assignment to vignette group was conducted using independent samples Student’s t-test and Chi square tests. Comparisons between vignette groups were made for each study variable and type of misuse to determine which variables and misuse type were most influenced by the vignette manipulation. Comparing each vignette was important for determining the strength of the manipulation and the accuracy of the operationalization of the variable.

Lastly, ordinary least regression using Hayes’ Process models 4 and 7³⁹ was used to examine the relationships between the variables that predict behavioral intention. The Hayes’ Process models are a series of structural models that examine the influence of mediators on the relationship between a given set of independent and dependent variables, which are further capable of including covariates, additional mediators, and moderators. Each model represents a

different configuration for the relationships which may reveal more information about how the independent variable ultimately influences the dependent within a behavioral model.

The Process model 4 was selected because it demonstrates the effect of the mediators, attitude, subjective norms, perceived vulnerability, perceived severity, intrinsic and extrinsic rewards, on the relationship between the independent variables pain level, drug seeking, and misuse level and the dependent variable of intention to misuse prescription opioids. The Process model 7 was selected because it demonstrates the conditional effect that can occur between the independent misuse scenarios and the dependent intention to misuse prescription opioids as determined by the moderators, risk of addiction and self-efficacy and the mediators, attitude, subjective norms, perceived vulnerability, perceived severity, intrinsic and extrinsic rewards.

Specifically, the mean-centered products option was selected and bootstrapping was set to 10,000 iterations. The bootstrapping specifically examined the indirect effect(s) within the model. The bootstrapping within the OLS regression models served as both a secondary confirmation that there was a significant relationship between the independent misuse scenarios and the dependent intention towards misuse. For the model 7 regressions the bootstrapping values indicate the levels of the moderator (low, moderate, high) at which there was a significant conditional indirect effect. Intention towards misuse may increase or decrease depending upon how the moderator and mediator interact with pain, drug seeking, and misuse.

The following variables and sets of equations described the relationship between the dependent variable, BI = behavioral intention, and the primary independent variables: A = attitudes, SN = subjective norms, PBC = perceived behavioral control and w = regression weights.

$$BI = w_1A + w_2SN + w_3PBC$$

Within the behavioral model for this study A, SN and PBC are further described by their related protection motivation variables: PV = perceived vulnerability, PS = perceived severity, IR = intrinsic rewards, ER = extrinsic rewards, SE = self-efficacy and RA = risk of addiction.

$$A = w_4PV + w_5PS + w_6IR + w_7ER^{\text{partial}} \quad SN = w_2SN + w_7ER^{\text{partial}} \quad PBC = w_8SE + w_9RA$$

International Business Machine's SPSS® versions 23 and 24 were used to conduct the data analysis.

Chapter 4

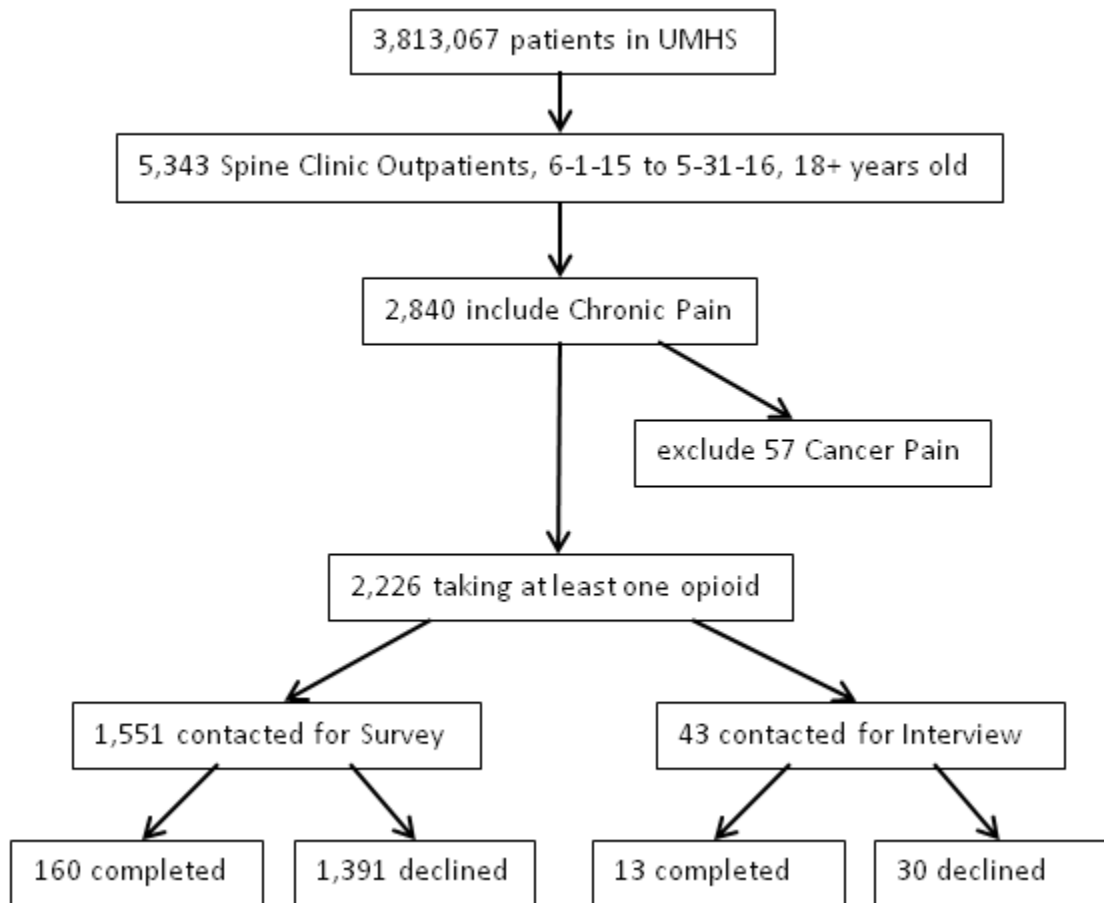
Results

Results: Qualitative

Recruitment

Six patients were successfully recruited to Group 1 and seven patients were recruited to Group 2. The recruitment rate for the individual interviews was 30% with 13 patients completing the interview out of a total of 43 patients contacted.

Figure 4.1 Study Recruitment



Demographics

The demographic characteristics did not differ between the Group 1 non-users and Group 2 past substance-users. Gender, marital status, race/ethnicity, and age did not differ between groups. The female/male distribution averaged 50:50. The marital status was nearly different between groups ($p=0.053$) with 6 of the 7 substance users being unmarried versus only 2 of 6 non-users. Likewise, race/ethnicity was nearly different between groups ($p=0.067$) with all 6 non-users reporting as Caucasian and only 4 of the 7 substance users reporting as Caucasian. The average age of the substance users interviewed was 45 years old, which with a standard deviation of 6 was closer to the average actual age. The average age of the non-users interviewed was 57 years old; however, the standard deviation was 16 because 3 of the 6 non-users were between 61 and 87 years old.

Table 4.1 Qualitative Study Subject Characteristics

	Sub user (n=7)	Non-user (n=6)	Chi-square
	Frequency (%) or Mean (s.d.)	Frequency (%) or Mean (s.d.)	
Gender			
Female	3 (42.9)	3 (50.0)	0.066 $p=0.797$
Male	4 (57.1)	3 (50.0)	
Marital Status			
Unmarried	6 (85.7)	2 (33.3)	3.745 $p=0.053$
Married	1 (14.3)	4 (66.7)	
Race/Ethnicity			
Non-caucasian	3 (42.9)	0 (0.0)	3.343 $p=0.067$
Caucasian	4 (57.1)	6 (100.0)	
Age – (years)			
45 (±6)	57 (±16)		T-test F=8.781 $p=0.099$
31 – 40	2 (28.6)	1 (16.7)	
41 – 50	4 (57.1)	2 (33.3)	
51 – 60	1 (14.3)	0 (0.0)	
61 – 87	0 (0.0)	3 (50.0)	

Interview Findings

An Interview Coding Worksheet (See Appendix A.4-2) was completed for each interview patient by each of the two reviewers while examining each respective interview transcript. The raw results from the coding worksheets may be reviewed in Appendix Tables B.1 and B.2. The statements from each patient interview that the reviewers believed to be significant are listed in Table 4.2 and Table 4.3. Differences between the coding of reviewer one and reviewer two are indicated by bolded and shadowed boxes for each response or statement. Out of 533 coding choices, the reviewers differed on 25, a difference of less than 5%, indicating 95% initial agreement. These coding differences were discussed by the reviewers and found to be related to parts of a patient's interview that one reviewer thought significant and the other reviewer did not during their appraisal. Table 4.2 lists the patient statements that reviewer one believed to be significant. Table 4.3 lists the patient statements that reviewer two believed to be significant. Reviewer one identified 70 significant patient statements with reviewer two identifying all but 7 of those same statements as significant indicating 90% initial agreement. Reviewer two identified 76 significant patient statements with reviewer one identifying all but 4 of those same statements as significant indicating 94% initial agreement.

Reviewers one and two met to come to a general consensus about the statements on which they differed, and to determine the statements that determined a consensus among and between group members. Each statement's theme was considered within the context of the question that the patient answered. Isolated statements by an individual group member and not similar in theme to a member of the other group were not considered to be significant. If at least two patients within a group made statements that shared a similar theme that theme was considered significant. If at least one patient from each group made a statement that shared a

similar theme, then that theme was also considered significant. Based upon criteria, the reviewers agreed that the 4 differing statements from reviewer two's coding and one differing statement from reviewer one's coding had no impact on the results. The reviewers examined the remaining 6 differing statements from reviewer one's appraisals and after reviewing the respective interviews, then reviewer two agreed to the inclusion of those statements.

Table 4.2 Reviewer One: Patient Responses

Question	Substance users N=7	Non-users N=6
2.3 Scenario	A01: Add third scenario in middle between where they are taking painkillers only because pain is not being well-controlled, but without drug seeking. A06: Suggests adding some information to scenarios about lifestyle A11: Suggests a possible scenario where patient has untreated pain	N13: Suggests a 3 rd scenario where patient has no pain, but is abusing drug N23: Suggests asking if person has a caregiver and whether they are doing a good job at controlling pain, etc
3.2 Risk of Addiction	A01: Suggests being specific about age of person in scenario, specifically making them 60 or older.	
5.2 Perceived Vulnerability	A01: patients may misinterpret "feel good" especially with higher pain levels A06: thinks questions may be repetitive	N18: Suggests adding a question in addition to abuse asking if taking the drug resolves the patient's pain N23: Suggests using different terminology other than vulnerability, because people might be embarrassed to be vulnerable and/or have weak willpower N26: Suggests using susceptible instead of vulnerable, because people might not want to admit to being vulnerable
5.3 Perceived Vulnerability	A06: Thinks questions appear repetitive and people are not likely to admit weak willpower A11: Thinks people might not be very good at judging their own abilities for vulnerability/willpower	N26: Thinks both questions sound similar N27: Didn't suggest changing terminology, but thought people might have a hard time admitting vulnerability or weak willpower
6.3 Perceived Severity	A01: Suggests using stronger consequences, more severe A02: Would use more severe consequences like organ damage A06: Suggests adding more consequences A07: Might add more severe consequences of getting in trouble with law or damaging body A11: Suggests using more severe consequences like death etc	N18: Suggests more severe consequences – brain and organ damage etc N19: Suggests adding more severe consequences like losing life or going to jail N23: Suggest listing some more severe consequences than used N26: List more consequences like causing a car accident, etc N27: Suggest listing more 'severe' consequences beyond physical, to include social and psychological

6.4 Perceived Severity	A01: Suggests providing example of seriousness. Ex. Law enforcement or organ damage A06: Suggests asking responses to specific consequences A11: Thinks a 'hardcore abuser' is not likely to care much about the physical consequences associated with abusing drugs	N13: Define severity and serious better N18: Suggests mentioning possibility for car accident etc under severity N19: Suggests defining 'serious' better N23: Suggests mention examples like car accidents etc for serious N26: Be specific that that serious results could be killing someone in a car accident
7.2 Intrinsic Rewards	A04: Suggests adding more potential problems that persons may relate to A06: Suggest asking people how drug abuse relieves their problems more specifically A11: Suggests letting patients select the problems that is solves and allow them to describe how	N18: Allow person to select specifically which problems the drug abuse appears to solve N19: Suggests making a list that people could check off about problems solved
7.3 Intrinsic Rewards	A11: People know their bodies well, so can tell you specifically what works and doesn't	
8.2 Extrinsic Rewards	A01: Suggest providing an example of extrinsic reward (family/friends smoking/drinking)	N18: Suggest providing a specific example
8.3 Extrinsic Rewards	A04: Not related, but suggests looking at potential for diversion in home situation	
9.2 Subjective Norms	A09: Suggest possibly adding doctors as a group	N13: Ask two questions, one each for approve and disapprove N19: Suggested adding teachers/role models N23: Suggest adding categories for church/community and coworkers N26: Might add coworkers/acquaintances to groups
10.2 Attitude		N18: Suggests defining or providing examples of the anchor terms on each end of the scales
10.3 Attitude	A01: Need to explain that attitude questions have 3 parts A11: Thinks that attitude might vary by time of day, week, month you are asking	
11.2 Intention	A01: Suggests offering a question about whether patient is concerned with controlling pain	N13: Ask two questions, one each for likely and unlikely N18: Suggests replacing unlikely/likely with a different statement without the dichotomous term
11.3 Intention	A09: Thinks patients might lie about their true intention	N19: Patients may not be honest because of not wanting to admit they're an addict
12.4 ASSIST	A02: suggests people will be more honest if they think they are responding anonymously A11: Thinks lifetime use is too general, thinks past six months is more relevant	
13.2 Demographic	A01: Suggests possibly adding Community group	N13: Add retired to possible type of employment

	A04: Suggests adding retirement to employment options A06: Suggests adding disability to employment A09: Suggests adding retired and disabled to employment	N18: Suggests adding disabled to employment status N19: Suggests adding domestic partner etc to marital status. Also suggests adding retired and disabled to employment N23: Suggests adding retired and possibly disabled to employment N26: Suggests adding retired to employment
13.3 Demographic	A02: Suggesting asking in demographics about family history of abuse	N18: Suggests adding question about household size to augment income
14.1 Feedback	A01: Reminder about making a 3 rd scenario with mild misuse issues	N23: Keep the survey questions simple and direct

*Bold and Highlighted indicates difference from Reviewer Two

Table 4.3 Reviewer Two: Patient responses

Question	Substance users N=7	Non-users N=6
2.3 Scenarios	A01: Suggests adding a case (scenario) with mild addiction issues. A06: Provide context for test group A11: Possibility of another scenario where patient is procuring medications to treat undiagnosed/untreated pain	N13: A third scenario where person has no pain but still takes medication to prevent withdrawal N23: Inquire if the responder has a family member/care giver who monitors/assists with the medication intake
3.2 Risk of Addiction	A11: Providing a scenario instead of a direct question may lead to a more honest response	
3.3 Risk of Addiction	A04: Believes that length of use of pain medication may influence patient's response	N26: Responders may remain in denial and not report their risk honestly
4.3 Self-efficacy	A04: Participants may have difficulty in judging and reporting self-efficacy	
5.2 Perceived Vulnerability	A01: Suggests that responders with high pain levels may misinterpret "feel good". Due to their pain they may not understand that it signifies euphoria. A06: the two questions may be repetitive	N18: Suggested asking if drug resolved responders pain N23: Participants may be embarrassed in accepting their vulnerability. Instead of a direct question, use an alternate method N26: Use an alternate word for vulnerable as responders may have difficulty accepting their vulnerability.
5.3 Perceived Vulnerability	A06: Responders may not admit having weak willpower A11: Responders may not be able to judge and report their vulnerabilities accurately	N13: Questions and choices can't be framed in any better way N27: Responders may have difficulty in reporting their vulnerability honestly

6.3 Perceived Severity	A01: Add more serious consequences A02: Suggested using/adding more severe consequences to the question A06: Add dire physical and legal consequences A07: Add severe consequences like damage to the body and legal issues A11: Provide examples of drastic consequences	N18: Add additional severe consequences N19: Add additional severe consequences of drug abuse N26: Provide examples of dire consequences instead of just side effects like drowsiness N27: Add social and psychological consequences as well
6.4 Perceived Severity	A01: Add examples of serious consequences A06: Inquire about responses to each consequences A11: Assess responder's knowledge of the side effects of the abused drugs	N13: Interviewee had a hard time distinguishing between "severe and serious". Suggested explaining the two in a better way. N19: Explain serious situation better through specific consequences N26: Provide specifics regarding seriousness of consequences
7.2 Intrinsic Rewards	A04: More examples of the "physical problems" should be provided A06: Provide detailed examples of problems so responders can relate better A11: Provide more examples of other potential problems drugs may be relieving	N18: Provide more examples of rewards and let responder provide a categorical (yes/no) answer N19: Provide a list of problems so that responder can choose which one's are relieved through abuse
7.3 Intrinsic Rewards	A11: People know their bodies well, so can tell you specifically what works and doesn't	
8.2 Extrinsic Rewards	A01: Define/provide an example of extrinsic rewards for better understanding	
9.2 Subjective Norm	A09: Add doctor's approval/disapproval also	N13: A binary choice (Approve/Disapprove) would be better. N19: Add teachers/role models category N23: Add community members (church members/coworkers) N26: add coworkers/acquaintances
10.2 Attitude		N18: Responders may have difficulty in discerning between multiple choices. Specific/dichotomous scale, with examples, may be better scale.
10.3 Attitude	A01: The question will be better understood if it explained that it has 3 parts— 'bad', 'harmful', or 'favorable/unfavorable.' A11: Attitude may change over time. Inquiring about the responder's attitude from their friends and family may lead to better results.	
11.2 Intention	A01: "offer another question that asks if someone is more concerned about controlling pain."	N13: "Unlikely/Likely" in one question is confusing. Suggested using separate questions instead. N18: "Unlikely/likely sentence" may be confusing
11.3 Intention	A09: Responders may not convey their intentions honestly	

12.4 ASSIST	A02: Interviewee suggested that participants will tend to be honest (in the self-report) if they are allowed to remain anonymous. A11: Use during the past six months may be more relevant to the study	
13.2 Demographic	A01: Inquire about family and community support A04: add "retired" option to question regarding employment status A06: Add "disability" option to the employment question A09: Add disabled to employment status	N13: Suggested adding transgender and retired options to the questions N18: Add "disabled" option N19: add "significant other/domestic partner" and "retired/ disabled" options to appropriate questions N23: Add retired/disabled option N26: Suggests adding retired to employment
13.3 Demographic	A02: The interviewee suggested that the demographics section should also include a question about family history of abuse	N18: Annual income may not reflect number of people the responder has to support
14.1 Feedback	A01: Suggests adding a second test group (scenario) – one with mild abuse issues	N23: Keep the survey questions simple and direct

***Bold and Highlighted** indicates difference from Reviewer One

Interview Summary Findings

The following list describes the primary summary finding(s) of the qualitative analysis of each interview question:

Question 1: Types of Misuse: Both groups agree on definitions of misuse and no comments.

Question 2: Scenarios: Both groups agree scenarios are relatable and understandable. Two past substance users and one non-user suggested adding a third scenario. One past substance user suggested adding more lifestyle information. One non-user suggested looking at people with caregivers.

Question 3: Risk of Addiction: Both groups no problems or opinions

Question 4: Self-efficacy: Both groups no problems or opinions

Question 5: Perceived Vulnerability: Both groups thought that people might be uncomfortable talking about vulnerability and admitting to weak willpower. Two non-users suggested using different terminology than vulnerability. One patient from each group thought questions were a bit repetitive initially.

Question 6: Perceived Severity: Both groups suggested using more and stronger consequences of drug misuse under severity. Examples: going to jail, causing car accident, death/injury. Both groups also suggested defining what serious is supposed to mean in the framework of the question.

Question 7: Intrinsic Rewards: Both groups suggested letting people check box which problems they believe the drug misuse is solving. Ex. Checkbox list and open text box where they can describe how problems are solved.

Question 8: Extrinsic Rewards: Most patients understood and supported the question. One individual from each group suggested providing a more detailed example of how extrinsic reward works.

Question 9: Subjective Norm: Both groups believe that Family, Friends and Strangers are appropriate. One past substance user suggested adding doctors, two non-users suggested specifying coworkers and church/community, and one non-user suggested adding role-models/teachers to subjective norms.

Question 10: Attitude: Both groups understood and supported questions.

Question 11: Intention: Both groups understood and supported questions. One individual from each group thought that patients might not be honest about their intentions, especially if they are actively abusing.

Question 12: ASSIST: Both groups understood and supported use of ASSIST. Everyone believed that most people could honestly answer, especially if they were assured that responses were anonymous.

Question 13: Demographics: 9 of all 13 people: 4 past substance users and 5 non-users suggested adding retired and/or disabled to the employment question. In the target population, chronic pain patients, a significant proportion of the examined population likely reported as unemployed because they had no other valid choice. No other issues with the other demographic questions.

Feedback: No significant thoughts or changes suggested overall.

Interview Significant Themes

The following significant themes were identified from the statements made by the interview patients:

1. Scenarios – three patients suggested adding a third scenario where pain was poorly controlled, but drug seeking and misuse were controlled (2 sub users, 1 non-user)
2. Perceived Vulnerability – two patients believed that the questions for PV were repetitive coming after questions about risk of addiction and self-efficacy (1 sub user, 1 non-user)
3. Perceived Vulnerability – five patients believed that patients may have a hard time admitting to being vulnerable and that another word should be substituted for vulnerable (2 sub users, 5 non-users)

4. Perceived Severity – eleven patients suggested using more severe consequences with more serious outcomes (5 sub users, 6 non-users)
5. Intrinsic Rewards – five patients suggested allowing patients to specifically select intrinsic rewards and leave the question open-ended for them to add more (3 sub users, 2 non-users)
6. Extrinsic Rewards – two patients suggested providing a better definition with specific examples (1 sub user, 1 non-user)
7. Subjective Norms – two patients suggested adding coworkers/acquaintances/church associates as another group (2 non-users)
8. Intention – two patients suggested asking separate questions for likely and unlikely (2 non-users)
9. Intention – two patients suggested that people who are addicted might not be honest about their intentions (1 sub user, 1 non-user)
10. Demographics – five patients suggested adding disabled as an employment option (2 sub users, 3 non-users)
11. Demographics – five patients suggested adding retired as an employment option (2 sub users, 3 non-users)

Results: Quantitative

Recruitment

80 patients were successfully recruited to both the control and test vignettes surveys. Two of the control patients did not fully complete their questionnaires, dropping the effective number of valid control patients to 78. The target recruitment numbers of 70 or more per group were met; however, the recruitment rate was poor. The recruitment rate for the survey was 10.3% with 160 patients completing the survey out of a total of 1551 patients contacted. (See Figure 4.1)

Demographics

The demographic characteristics did not differ between the control vignette group and test vignette group of chronic pain patients. Specifically, gender, age, marital status, race/ethnicity, employment, income and education did not differ between groups. Likewise, the

control and test groups did not differ on their ASSIST score distribution with an average score of 5 to 6 (moderate risk) with an equal distribution between low and moderate risk.

Table 4.4 Descriptive Data

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%) or Mean (s.d.)	Frequency (%) or Mean (s.d.)	
Gender			
Female	50 (64.9)	49 (61.3)	0.229 p=0.632
Male	27 (35.1)	31 (38.8)	
Marital Status			
Single	10 (13.0)	12 (15.2)	3.206 p=0.361
Married/Cohabiting	58 (75.3)	51 (64.6)	
Divorced	8 (10.4)	12 (15.2)	
Widowed	1 (1.3)	4 (5.1)	
Race/Ethnicity			
Non-caucasian	4 (5.2)	2 (2.5)	1.281 p=0.527
Caucasian	73 (94.8)	77 (97.5)	
Employment			
Full Time	10 (13.0)	17 (21.5)	3.008 p=0.390
Self Employed	6 (7.8)	4 (5.1)	
Part Time	7 (9.1)	4 (5.1)	
Not Employed	54 (70.1)	54 (68.4)	
Income			
<\$10k - \$29,999	31 (39.7)	32 (40.0)	12.878 p=0.075
\$30k - \$69,999	18 (23.1)	22 (27.5)	
\$70k - \$99,999	16 (20.5)	16 (20.0)	
>\$100,000	13 (16.7)	10 (12.5)	
Education			
≤ High School	5 (6.5)	13 (16.3)	4.912 p=0.178
≤ Bachelor's	41 (53.2)	36 (45.0)	
Professional	10 (13.0)	14 (17.5)	
Graduate	21 (27.3)	17 (21.3)	
	Frequency (%)	Frequency (%)	T-test
Age – (years)	57 (±14)	57 (±15)	
< 30	3 (3.8)	6 (7.5)	F=0.029 p=0.858
31 – 40	8 (10.3)	6 (7.5)	
41 – 50	13 (16.7)	6 (7.5)	
51 – 60	17 (21.8)	23 (28.7)	
61 – 87	37 (47.4)	39 (48.7)	
ASSIST Score			
Lower Risk (0 to 4)	41 (52.6)	35 (46.1)	0.801 p=0.224
Moderate Risk (5 to 24)	36 (46.2)	42 (53.8)	
High Risk (≥25)	1 (1.3)	3 (3.8)	

Nonresponse bias

Because the response rate to the survey was around 10% and also because the measurement helps to understand some study limitations, a nonresponse bias analysis was conducted. Gender and age did not significantly differ between respondents and non-respondents; however, significantly more survey-takers were Caucasian (92.5%) and possibly also married (66.3%), than those who did not take the survey. Because of these differences between the survey population and the non-respondent population the ability to generalize these findings to a larger population may be affected.

Table 4.5 Non-response Bias Data

	Survey (n=160)	Non-response (n=1391)	
	Frequency (%) or Mean (s.d.)	Frequency (%) or Mean (s.d.)	Chi-square
Gender			
Female	109 (68.1)	893 (64.2)	0.967 p=0.325
Male	51 (31.9)	498 (35.8)	
Marital Status			
Unmarried	54 (33.8)	616 (44.3)	6.490 p=0.011
Married	106 (66.3)	775 (55.7)	
Race/Ethnicity			
Non-caucasian	12 (7.5)	216 (15.5)	7.376 p=0.007
Caucasian	148 (92.5)	1175 (84.5)	
Age – (years)			
	57 (±14)	58 (±16)	T-test F=4.017 p=0.799
< 30	9 (5.6)	72 (5.2)	
31 – 40	14 (8.8)	134 (9.6)	
41 – 50	19 (11.9)	245 (17.6)	
51 – 60	42 (26.3)	329 (23.7)	
61 – 87	76 (47.5)	611 (43.9)	

Control vs Test Groups: Vignette manipulation

For each of the theory-based variables a chi-square analysis was conducted to determine whether the control and test vignette groups were significantly different in response. The chi-square results can be viewed in Tables 4.6 through 4.14. If the responses by each group were significantly different, then the vignette manipulation was assumed to be significant for that

variable. Each table represents up to four chi-square analyses, one for each of the misuse types: often, dose, withdrawal, and feel good. The hypothesis posited that the control and test groups would differ on all of the model variables. With the exceptions of perceived severity, part of extrinsic rewards, and part of subjective norms the hypothesis was supported.

Perceived severity: Perceived severity did not significantly differ between the control and test groups for each of the four types of misuse.

Perceived vulnerability: Perceived vulnerability showed significant differences between the control and test vignette groups

Intrinsic rewards: Intrinsic rewards showed significant differences between the control and test vignette groups.

Extrinsic rewards: Extrinsic rewards also showed mixed results concerning differences between the control and test vignette groups. The control and test groups significantly differed on often and dose misuse, but not on withdrawal and feel good.

Subjective norms: Subjective norms showed mixed results concerning differences between the control and test vignette groups. The control and test groups significantly differed regarding dose and feel good misuse, but not on often misuse.

Attitude: Attitude showed significant differences between the control and test vignette groups.

Intention: Intention showed significant differences between the control and test vignette groups.

Risk of addiction: Risk of Addiction showed significant differences between the control and test vignette groups.

Self-efficacy: Self-efficacy showed significant differences between the control and test vignette groups.

Table 4.6 Chi-square: Perceived Severity

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Perceived Severity – Often (scale)			
Not at all	13(17.1)	9(11.5)	1.029 p=0.905
Somewhat	16(21.1)	18(23.1)	
Moderately	19(25.0)	20(25.6)	
Very	16(21.1)	17(21.8)	
Extremely	12(15.8)	14(17.9)	
Perceived Severity – Dose (scale)			
Not at all	14(18.4)	10(12.7)	1.601 p=0.809
Somewhat	11(14.5)	14(17.7)	
Moderately	18(23.7)	21(26.6)	
Very	19(25.0)	17(21.5)	
Extremely	14(18.4)	17(21.5)	
Perceived Severity – Withdrawal (scale)			
Not at all	15(19.5)	7(8.9)	3.765 p=0.429
Somewhat	17(22.1)	19(24.1)	
Moderately	13(16.9)	17(21.5)	
Very	17(22.1)	19(24.1)	
Extremely	15(19.5)	17(21.5)	
Perceived Severity – Feel Good (scale)			
Not at all	16(20.8)	12(15.2)	1.377 p=0.848
Somewhat	13(16.9)	18(22.8)	
Moderately	14(18.2)	14(17.7)	
Very	14(18.2)	14(17.7)	
Extremely	20(26.0)	21(26.6)	

Table 4.7 Chi-square: Perceived Vulnerability

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Perceived Vulnerability – Often (scale)			
Not at all	3(3.8)	1(1.3)	42.456 p<0.001
Somewhat	72(92.3)	38(48.7)	
Moderately	3(3.8)	35(44.9)	
Very	0(0.0)	4(2.6)	
Perceived Vulnerability – Dose (scale)			
Not at all	2(2.6)	1(1.3)	41.243 p<0.001
Somewhat	74(94.9)	41(51.9)	
Moderately	2(2.6)	34(43.0)	
Very	0(0.0)	3(1.9)	
Perceived Vulnerability - Withdrawal			
Very	53(67.9)	31(38.8)	20.006 p<0.001
Unlikely	12(15.4)	15(18.8)	
Neither	9(11.5)	11(13.8)	
Likely	3(3.8)	12(15.0)	
Very	1(1.3)	11(13.8)	
Perceived Vulnerability – Feel Good			
Very	63(80.3)	38(47.5)	24.667 p<0.001
Unlikely	9(11.5)	11(13.8)	
Neither	3(3.8)	6(7.5)	
Likely	2(2.6)	18(22.5)	
Very	1(1.3)	7(8.8)	

Table 4.8 Chi-square: Intrinsic Rewards

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Intrinsic Rewards – Often			
Strongly	47(60.3)	22(27.5)	20.191 p<0.001
Disagree	17(21.8)	24(30.0)	
Neither	7(9.0)	12(15.0)	
Agree	6(7.7)	14(17.5)	
Strongly	1(1.3)	8(10.0)	
Intrinsic Rewards – Dose			
Strongly	49(62.8)	19(23.8)	27.103 p<0.001
Disagree	16(20.5)	24(30.0)	
Neither	5(6.4)	11(13.8)	
Agree	7(9.0)	19(23.8)	
Strongly	1(1.3)	7(8.8)	
Intrinsic Rewards – Withdrawal			
Strongly	41(52.6)	25(31.3)	11.795 p=0.019
Disagree	11(14.1)	21(26.3)	
Neither	13(16.7)	9(11.3)	
Agree	10(12.8)	17(21.3)	
Strongly	3(3.8)	8(10.0)	
Intrinsic Rewards – Feel Good			
Strongly	49(62.8)	28(35.0)	17.160 p=0.002
Disagree	7(9.0)	17(21.3)	
Neither	13(16.7)	11(13.8)	
Agree	7(9.0)	16(20.0)	
Strongly	2(2.6)	8(10.0)	

Table 4.9 Chi-square: Extrinsic Rewards

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Extrinsic Rewards – Often			
Strongly	41(52.6)	24(30.4)	10.228 p=0.037
Disagree	11(14.1)	13(16.5)	
Neither	16(20.5)	19(24.1)	
Agree	6(7.7)	16(20.3)	
Strongly	4(5.1)	7(8.9)	
Extrinsic Rewards – Dose			
Strongly	42(53.8)	25(31.6)	9.557 p=0.049
Disagree	11(14.1)	16(20.3)	
Neither	14(17.9)	16(20.3)	
Agree	6(7.7)	15(19.0)	
Strongly	5(6.4)	7(8.9)	
Extrinsic Rewards – Withdrawal			
Strongly	42(53.8)	28(35.0)	5.945 p=0.203
Disagree	9(11.5)	15(18.8)	
Neither	16(20.5)	22(27.5)	
Agree	8(10.3)	10(12.5)	
Strongly	3(3.8)	5(6.3)	
Extrinsic Rewards – Feel Good			
Strongly	42(54.5)	28(35.0)	6.250 p=0.181
Disagree	9(11.7)	12(15.0)	
Neither	16(20.8)	24(30.0)	
Agree	5(6.5)	9(11.3)	
Strongly	5(6.5)	7(8.8)	

Table 4.10 Chi-square: Subjective Norms

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Subjective Norm – Often (scale)			
Strongly	45(57.7)	33(41.8)	5.824 p=0.104
Disagree	25(32.1)	36(45.6)	
Neither	8(10.3)	8(10.1)	
Agree	0(0.0)	2(2.5)	
Strongly	0(0.0)	0(0.0)	
Subjective Norm – Dose (scale)			
Strongly	50(64.1)	35(45.5)	10.045 p=0.011
Disagree	20(25.6)	37(48.1)	
Neither	8(10.3)	4(5.2)	
Agree	0(0.0)	1(1.3)	
Strongly	0(0.0)	0(0.0)	
Subjective Norm – Feel Good (scale)			
Strongly	55(71.4)	36(46.8)	14.432 p=0.002
Disagree	15(19.5)	36(46.8)	
Neither	7(9.1)	4(5.2)	
Agree	0(0.0)	1(1.3)	
Strongly	0(0.0)	0(0.0)	

Table 4.11 Chi-square: Attitude

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Attitude – Often (scale)			
Very	53(69.7)	38(50.0)	12.327 p=0.025
Bad,H,Unfav	11(14.5)	21(27.6)	
Somewhat	7(9.2)	4(5.3)	
Neither	4(5.3)	5(6.6)	
Somewhat	1(1.3)	4(5.3)	
Good,Ben,Fav	0(0.0)	4(5.3)	
Very	0(0.0)	0(0.0)	
Attitude – Dose (scale)			
Very	52(70.3)	32(42.1)	15.881 p=0.006
Bad,H,Unfav	12(16.2)	23(30.3)	
Somewhat	4(5.4)	6(7.9)	
Neither	6(8.1)	8(10.5)	
Somewhat	0(0.0)	4(5.3)	
Good,Ben,Fav	0(0.0)	2(2.6)	
Very	0(0.0)	1(1.3)	
Attitude – Withdrawal (scale)			
Very	44(57.9)	27(34.6)	13.323 p=0.028
Bad,H,Unfav	14(18.4)	22(28.2)	
Somewhat	4(5.3)	13(16.7)	
Neither	11(14.5)	9(11.5)	
Somewhat	2(2.6)	3(3.8)	
Good,Ben,Fav	1(1.3)	2(2.6)	
Very	0(0.0)	2(2.6)	
Attitude – Feel Good (scale)			
Very	60(80.0)	37(48.1)	22.870 p=0.001
Bad,H,Unfav	8(10.7)	21(27.3)	
Somewhat	1(1.3)	8(10.4)	
Neither	5(6.7)	3(3.9)	
Somewhat	1(1.3)	5(6.5)	
Good,Ben,Fav	0(0.0)	2(2.6)	
Very	0(0.0)	1(1.3)	

Table 4.12 Chi-square: Intention

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Intention – Often (scale)			
Strongly	64(83.1)	40(50.6)	22.029 p<0.001
Disagree	8(10.4)	18(22.8)	
Neither	5(6.5)	10(12.7)	
Agree	0(0.0)	8(10.1)	
Strongly	0(0.0)	3(3.8)	
Intention – Dose (scale)			
Strongly	64(84.2)	40(51.3)	22.468 p<0.001
Disagree	7(9.2)	20(25.6)	
Neither	5(6.6)	8(10.3)	
Agree	0(0.0)	7(9.0)	
Strongly	0(0.0)	3(3.8)	
Intention – Withdrawal (scale)			
Strongly	60(82.2)	42(53.8)	15.482 p=0.004
Disagree	5(6.8)	16(20.5)	
Neither	5(6.8)	8(10.3)	
Agree	3(4.1)	9(11.5)	
Strongly	0(0.0)	3(3.8)	
Intention – Feel Good (scale)			
Strongly	65(84.4)	44(56.4)	15.440 p=0.004
Disagree	5(6.5)	13(16.7)	
Neither	4(5.2)	10(12.8)	
Agree	3(3.9)	8(10.3)	
Strongly	0(0.0)	3(3.8)	

Table 4.13 Chi-square: Risk of Addiction

	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Risk of Addiction (scale)			
Very unlikely	21(27.6)	7(8.9)	41.012 p<0.001
	23(30.3)	10(12.7)	
	16(21.1)	8(10.1)	
	4(5.3)	7(8.9)	
	4(5.3)	6(7.6)	
	5(6.6)	12(15.2)	
	2(2.6)	6(7.6)	
Very likely	1(1.3)	23(29.1)	

Table 4.14 Chi-square: Self-Efficacy

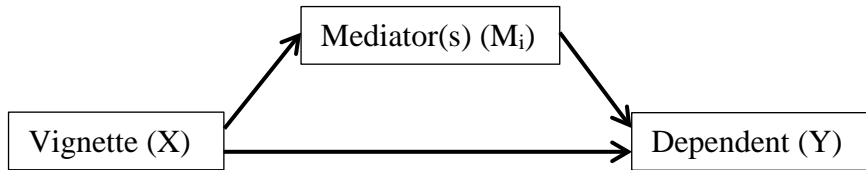
	Control (n=78)	Test (n=80)	Chi-square
	Frequency (%)	Frequency (%)	
Self-Efficacy – Often (confidence)			
Not at all	0(0.0)	19(23.8)	44.714 p<0.001
Somewhat	2(2.6)	13(16.3)	
Moderately	3(3.9)	12(15.0)	
Very	24(31.2)	14(17.5)	
Extremely	48(62.3)	22(27.5)	
Self-Efficacy – Dose			
Not at all	0(0.0)	15(19.0)	36.312 p<0.001
Somewhat	4(5.4)	15(19.0)	
Moderately	3(4.1)	12(15.2)	
Very	17(23.0)	13(16.5)	
Extremely	50(67.6)	24(30.4)	
Self-Efficacy – Withdrawal			
Not at all	1(1.4)	17(21.5)	33.887 p<0.001
Somewhat	2(2.8)	8(10.1)	
Moderately	3(4.2)	15(19.0)	
Very	21(29.2)	17(21.5)	
Extremely	45(62.5)	22(27.8)	
Self-Efficacy – Feel Good			
Not at all	3(4.0)	10(12.7)	28.649 p<0.001
Somewhat	2(2.7)	12(15.2)	
Moderately	1(1.3)	10(12.7)	
Very	13(17.3)	19(24.1)	
Extremely	56(74.7)	28(35.4)	

Hayes’ Regression Model 4 – What are the basic mediation relationships?

Exploring the basic mediation that may be occurring in the behavioral model is important before showing the final regression results that show the influence of risk of addiction and self-efficacy on the relationships. Hayes Process model 4 was used within SPSS to run ordinary least squares regression.³⁹ The Process model 4 represents basic mediation (M) where the relationship between the independent variables, pain level, drug seeking, and misuse, (vignette=X) and the dependent variable, intention to misuse prescription opioids, (intentions=Y) are described by one or more mediators, perceived vulnerability and severity, intrinsic and extrinsic rewards, attitudes, and subjective norms. There may also be a direct relationship (Direct X→Y) between the misuse scenarios and intention to misuse prescription opioids. Several covariates (gender, age, race, employment, income, and education) were run in the model. Figure

4.2 is a graphical representation of this model and a key to understanding the following abbreviated Model 4 results tables.

Figure 4.2 Process Model 4 and Key



X (vignette) = Pain, drug seeking, misuse influences Mediator (M_i), if significant.

M_i = Mediator (M_i) influences Dependent (Y), if significant.

Direct $X \rightarrow Y$ = Vignette (X) directly influences Dependent (Y), if significant.

Abbreviated regression tables and prescription misuse types

To ease interpretation, the tables are presented in a more abbreviated form that excludes the covariates. Whenever possible, significant regressions with the highest combination of mediators (up to four or six) and the most combined misuse types (up to all four), are presented. Please refer to Table 4.15 for guidance on the misuse types and possible combinations. The full table for each regression is available within Appendix B.

Table 4.15 Prescription Misuse Types and Combinations

Types of misuse:

- Taking prescription more OFTEN than prescribed.
- Taking prescription in higher DOSE than prescribed.
- Taking prescription to avoid WITHDRAWAL symptoms.
- Taking prescription to “FEEL GOOD.”

Combined misuse cases

- ALL TYPE MISUSE combines results for all four misuse types
- OFTEN and DOSE combines results for those two medication-related types of misuse.
- WITHDRAWAL and FEEL GOOD combines results for those two symptom/feeling-based types of misuse

Model 4 – Intention(Y)

Table 4.16 and Table 4.17 show model 4 where intention was the dependent variable for combined misuse types often & dose and withdrawal & feel good. There was no direct effect in either model. In the Table 4.16 often & dose model, perceived vulnerability, intrinsic rewards, and attitude showed relationships with the vignette; however only perceived vulnerability and attitude were full mediators.

Table 4.16 Model 4 Intention Full Model - Often & Dose – Abbreviated*

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (Vignette)	.09	.12	.77	.66	.09	6.95***
	$R^2=.13$			$R^2=.34$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	t	b	s.e.	t
X (Vignette)	.46	.10	4.60***	.24	.13	1.85
	$R^2=.21$			$R^2=.08$		
Model	Subjective Norm (M ₅)			Attitude (M ₆)		
	b	s.e.	t	b	s.e.	t
X (Vignette)	.08	.06	1.35	.26	.11	2.39*
	$R^2=.20$			$R^2=.14$		
Outcome variable model						
Intention (Y)						
Model	b	s.e.	t			
M ₁ (Perceived Severity)	.03	.05	.50			
M ₂ (Perceived Vuln)	.55	.07	7.85***			
M ₃ (Intrinsic Rewards)	-.01	.08	-.19			
M ₄ (Extrinsic Rewards)	.08	.05	1.57			
M ₅ (Subjective Norm)	-.14	.12	-1.24			
M ₆ (Attitude)	.26	.07	3.84***			
X (Vignette)	-.09	.07	-1.29			
	Effect	95% CI				
Direct effect X→Y	-.09	(-.23, .05)				

* p<.05, ** p<.01, *** p<.001 *Abbreviated = covariates excluded from table

In the Table 4.17 withdrawal & feel good model, perceived vulnerability, intrinsic rewards, extrinsic rewards, subjective norms, and attitude showed relationships with the vignette; however only perceived vulnerability, intrinsic rewards, and attitude were full mediators.

Table 4.17 Model 4 Intention Full Model - Withdrawal & Feel Good – Abbreviated*

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.10	.12	.88	.57	.10	5.76***
	$R^2=.12$			$R^2=.24$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.39	.10	3.70***	.22	.11	2.03*
	$R^2=.18$			$R^2=.10$		
Model	Subjective Norm (M ₅)			Attitude (M ₆)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.16	.06	3.00**	.38	.11	3.58***
	$R^2=.13$			$R^2=.13$		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Severity)	-.01	.05	-.12			
M ₂ (Perceived Vuln)	.21	.09	2.41*			
M ₃ (Intrinsic Rewards)	.27	.09	3.08**			
M ₄ (Extrinsic Rewards)	.08	.05	1.46			
M ₅ (Subjective Norm)	-.06	.11	-.58			
M ₆ (Attitude)	.25	.07	3.88***			
X (<i>Vignette</i>)	.04	.07	.61			
	$R^2=.61$					
	Effect	95% CI				
Direct effect X→Y	-.04	(-.10, .19)				

* p<.05, ** p<.01, *** p<.001

*Abbreviated = covariates excluded from table

Model 4 – Theory of Reasoned Action

Table 4.18 shows subjective norm and attitude mediating intention as would be expected in the theory of reasoned action. Both subjective norm and attitude showed relationships with the vignette; however, only attitude showed a relationship with intention looking all the combination of all misuse types. There was a direct relationship detected between vignette and intention in this model indicating that attitude only partially mediates intention.

Table 4.18 Model 4 Theory of Reasoned Action All Misuse Types – Abbreviated*

Mediator variable models						
Model	Subjective Norm (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.11	.05	2.07*	.33	.10	3.40****
$R^2=.11$			$R^2=.15$			
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Subjective Norm)	.01	.13	.11			
M ₂ (Attitude)	.39	.07	5.46****			
X (<i>Vignette</i>)	.18	.07	2.52*			
$R^2=.36$						
		Effect	95% CI			
Direct effect X→Y		.18*	(.04, .33)			

* $p < .05$, ** $p < .01$, **** $p < .001$

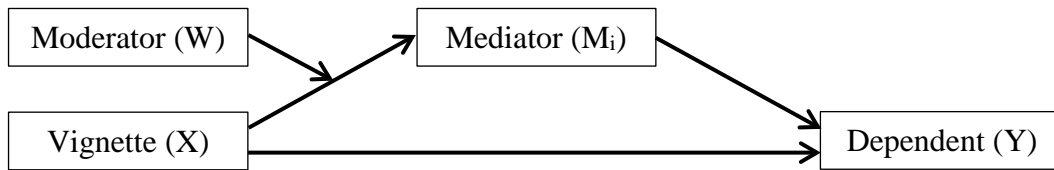
*Abbreviated = covariates excluded from table

Hayes' Regression Model 7 – Demonstrating conditional indirect effects

The Process Model 7 represents a conditional indirect effect that could also be called moderated mediation with one moderator (W) that may interact (X*W) with the independent variable (vignette=X) to influence one or more mediators (M_i). Each mediator (M_i) may also have a relationship with the dependent variable. Only when the interaction (X*W) and mediator to dependent variable (M_i) relationships are both significant does a conditional indirect occur. There may also be a direct relationship (Direct X→Y) between the independent and dependent variables. When there is a significant conditional indirect effect the confidence intervals listed at the bottom of the tables represent bootstrapping performed upon the original results for each mediator in the model. They represent the conditions of when the moderator generates the conditional indirect effect. The possible levels of moderator are low, moderate, high and may influence the direction, positive or negative, in which the dependent variable functions for that specific behavioral model. More specifically, at the mean value for the moderator the level is moderate, at minus one standard deviation the moderation level is low, and conversely at plus

one standard deviation the moderation level is high. Several covariates (gender, age, race, employment, income, and education) were run in the model. In the case of these specific model 7 analyses each of the protection motivation variables: perceived severity, perceived vulnerability, intrinsic rewards, and extrinsic rewards were run as the mediator with attitude or intention as the dependent variable. In a few cases, perceived vulnerability and intrinsic rewards, attitude was run as an additional mediator with intention as the dependent variable. Figure 4.3 is a graphical representation of this model and a key to understanding the following abbreviated model 7 results tables.

Figure 4.3 Process Model 7 and Abbreviated Key



X*W = Moderator (W) interacts with Vignette (X) to influence Mediator (M_i), if significant.

M_i = Mediator (M_i) influences Dependent (Y), if significant.

Direct X→Y = Vignette (X) directly influences Dependent (Y), if significant.

W = -1SD = When perceived Moderator (W) is at a LOW level it influences the conditional indirect effect of Vignette (X) on Dependent (Y) as mediated by Mediator (M_i), if significant.

W = 0 = When perceived Moderator (W) is at a MODERATE level it influences the conditional indirect effect of Vignette (X) on Dependent (Y) as mediated by Mediator (M_i), if significant.

W = 1SD = When perceived Moderator (W) is at a HIGH level it influences the conditional indirect effect of Vignette (X) on Dependent (Y) as mediated by Mediator (M_i), if significant.

Model 7 – Perceived vulnerability

Table 4.19, Table 4.20, and Table 4.21 represent models where perceived vulnerability was the mediator variable, risk of addiction was the moderating variable, and intention was the

dependent variable in Table 4.19 and Table 4.20. In Table 4.21 attitude was an added mediator variable. Table 4.19 was an often & dose model, whereas Table 4.20 and Table 4.21 were withdrawal & feel good models. There was no direct effect in any of the models. All three models demonstrated significant conditional indirect effects.

Model 7 – Perceived vulnerability – Intention with often & dose misuse and risk of addiction

For Table 4.19, when risk of addiction was perceived to be moderate and high, then perceived vulnerability to taking prescription drugs more often and in higher doses than prescribed mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived moderate and high risk of addiction perceived vulnerability increased intention towards often and dose misuse increasing the likelihood of often and dose misuse.

Table 4.19 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M) → Intention(Y) Often & Dose Misuse – Abbreviated*

Mediator variable models			
Perceived Vulnerability (M ₁)			
Model	b	s.e.	t
X*W	.18	.04	4.98***
$R^2=.63$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Perceived Vuln)	.53	.06	8.27***
$R^2=.50$			
Direct	Effect	95% CI	
Direct X→Y	-.01	(-.16, .15)	
Conditional Indirect	Perceived Vulnerability		
W = -1SD(-2.47)	-.04	(-.15, .04)	
W = 0	.19	(.10, .31)	
W = 1SD(2.47)	.43	(.24, .65)	

* p<.05, ** p<.01, *** p<.001

*Abbreviated = covariates excluded from table

Model 7 – Perceived vulnerability – Intention with withdrawal and feel good misuse and risk of addiction

For Table 4.20, when risk of addiction was perceived to be moderate and high, then perceived vulnerability to taking prescription drugs to avoid withdrawal and to feel good mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived moderate and high risk of addiction perceived vulnerability increased intention towards withdrawal and feel good misuse increasing the likelihood of withdrawal and feel good misuse.

Table 4.20 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M) → Intention(Y) Withdrawal & Feel Good – Abbreviated*

Mediator variable models			
Perceived Vulnerability (M ₁)			
Model	b	s.e.	t
X*W	.15	.04	3.67***
$R^2=.51$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Perceived Vuln)	.54	.06	8.84***
$R^2=.45$			
Direct	Effect	95% CI	
Direct X→Y	.02	(-.13, .18)	
Conditional Indirect	Perceived Vulnerability		
W = -1SD(-2.47)	-.06	(-.17, .02)	
W = 0	.14	(.03, .25)	
W = 1SD(2.47)	.34	(.12, .55)	
* p<.05, ** p<.01, *** p<.001		*Abbreviated = covariates excluded from table	

Model 7 – Perceived vulnerability and Attitude –Intention with withdrawal and feel good misuse and risk of addiction

For Table 4.21, when risk of addiction was perceived to be moderate and high, then perceived vulnerability and attitude toward taking prescription drugs to avoid withdrawal and to

feel good mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived moderate and high risk of addiction perceived vulnerability and attitude increased intention towards withdrawal and feel good misuse increasing the likelihood of withdrawal and feel good misuse.

Table 4.21 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M1) and Attitude(M2) → Intention(Y) Withdrawal & Feel Good – Abbreviated*

Mediator variable models						
Model	Perceived Vulnerability (M ₁)			Attitude(M ₂)		
	b	s.e.	t	b	s.e.	t
X*W	.18	.04	4.62***	.14	.05	2.65**
	$R^2=.56$			$R^2=.21$		
Outcome variable models						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Vuln)	.40	.06	6.57***			
M ₂ (Attitude)	.33	.06	5.74***			
	$R^2=.56$					
Direct	Effect	95% CI				
Direct X→Y	-.01	(-.15, .13)				
Conditional Indirect	Perceived Vulnerability			Attitude		
W = -1SD(-2.45)	-.06	(-.16, .0)		W = -1SD(-2.45)	-.01	(-.10, .07)
W = 0	.12	(.06, .22)		W = 0	.10	(.04, .20)
W = 1SD(2.45)	.30	(.15, .49)		W = 1SD(2.45)	.21	(.10, .38)

* $p < .05$, ** $p < .01$, *** $p < .001$

*Abbreviated = covariates excluded from table

Model 7 – Perceived severity – Intention with withdrawal misuse and self-efficacy

For Table 4.22, when self-efficacy was perceived to be low and moderate, then perceived severity to taking prescription drugs to avoid withdrawal partially mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived low and moderate self-efficacy a negative perceived severity partially increased intention towards withdrawal misuse increasing the likelihood of withdrawal misuse.

**Table 4.22 Model 7 Self-Efficacy(W) with Perceived Severity(M) → Intention(Y)
Withdrawal Misuse – Abbreviated***

Mediator variable models			
Perceived Severity (M ₁)			
Model	b	s.e.	t
X*W	-0.25	.12	-2.01*
$R^2=.12$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Perceived Severity)	-0.14	.07	-2.00*
$R^2=.16$			
Direct	Effect	95% CI	
Direct X→Y	.35	(.17, .53)	
Conditional Indirect	Perceived Severity		
W = -1SD(-1.41)	-0.09	(-.24, -.01)	
W = 0	-0.05	(-.13, -.00)	
W = 1SD(1.19)	-0.00	(-.07, .04)	

* p<.05, ** p<.01, *** p<.001 *Abbreviated = covariates excluded from table

Model 7 – Intrinsic rewards – Intention with often and dose misuse and self-efficacy

For Table 4.23, when self-efficacy was perceived to be high, then intrinsic rewards related to taking prescription drugs more often and in higher doses than prescribed partially mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived high self-efficacy intrinsic rewards was partially responsible increased intention towards often and dose misuse increasing the likelihood of often and dose misuse.

Table 4.23 Model 7 Self-Efficacy(W) with Intrinsic Rewards(M) → Intention(Y) Often and Dose Misuse – Abbreviated*

Mediator variable models			
Intrinsic Rewards (M ₁)			
Model	b	s.e.	t
X*W	.27	.11	2.55*
$R^2=.27$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Intrinsic Rewards)	.33	.06	5.09***
$R^2=.33$			
Direct	Effect	95% CI	
Direct X→Y	.23	(.07, .38)	
Conditional Indirect	Intrinsic Rewards		
W = -1SD(-1.36)	-.06	(-.29, .10)	
W = 0	.06	(-.02, .17)	
W = 1SD(1.15)	.16	(.07, .31)	

* p<.05, ** p<.01, *** p<.001

*Abbreviated = covariates excluded from table

Model 7 – Intrinsic rewards – Intention with withdrawal and feel good misuse and risk of addiction

For Table 4.24, risk of addiction did not indicate a particular directionality in the bootstrapping section. The intrinsic rewards related to avoiding withdrawal and feeling good mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. However, that was the extent of the relationship able to be discerned from this model.

Table 4.24 Model 7 Risk of Addiction(W) with Intrinsic Rewards(M) → Intention(Y) Withdrawal and Feel Good Misuse – Abbreviated*

Mediator variable models			
Intrinsic Rewards (M ₁)			
Model	b	s.e.	t
X*W	.10	.05	2.12*
$R^2=.35$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Intrinsic Rewards)	.58	.05	10.55***
$R^2=.53$			
Direct	Effect	95% CI	
Direct X→Y	.10	(-.03, .24)	
Conditional Indirect	Intrinsic Rewards		
W = -1SD(-2.42)	-.09	(-.22, .03)	
W = 0	.05	(-.07, .17)	
W = 1SD(2.42)	.19	(-.03, .41)	

* p<.05, ** p<.01, *** p<.001 *Abbreviated = covariates excluded from table

Model 7 – Intrinsic rewards and Attitude – Intention with all type misuse and risk of addiction

For Table 4.25 when risk of addiction was perceived to be moderate and high, then intrinsic rewards and attitude toward all type misuse mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived moderate and high risk of addiction intrinsic rewards and attitude increased intention towards all type misuse increasing the likelihood of all type misuse.

Table 4.25 Model 7 Risk of Addiction(W) with Intrinsic Rewards(M1) and Attitude(M2) → Intention(Y) All Type Misuse – Abbreviated*

Mediator variable models						
Model	Intrinsic Rewards (M ₁)			Attitude(M ₂)		
	b	s.e.	t	b	s.e.	t
X*W	.09	.04	2.21*	.11	.05	2.20*
$\underline{R^2}=.34$			$\underline{R^2}=.20$			
Outcome variable models						
Intention (Y)						
Model	b	s.e.	t			
M ₁ (Intrinsic Rewards)	.41	.07	6.06***			
M ₂ (Attitude)	.22	.06	3.44***			
$\underline{R^2}=.51$						
Direct	Effect	95% CI				
Direct X → Y	.06	(-.07, .19)				
Conditional Indirect	Intrinsic Rewards			Attitude		
W = -1SD(-2.47)	-.00	(-.09, .08)		W = -1SD(-2.47)	-.00	(-.07, .06)
W = 0	.09	(.02, .21)		W = 0	.06	(.01, .15)
W = 1SD(2.47)	.19	(.07, .39)		W = 1SD(2.47)	.12	(.01, .28)

* $p < .05$, ** $p < .01$, *** $p < .001$

*Abbreviated = covariates excluded from table

Model 7 – Full mediation – Intention with all type misuse

For Table 4.26, intrinsic rewards and attitude were the only mediators which were influenced by an interaction between risk of addiction and vignette. Perceived vulnerability, intrinsic rewards, and attitudes all showed relationships with intention, but without a significant influencing interaction (X*W) perceived vulnerability was not responsible for mediating a conditional indirect effect. The bootstrapping also confirmed that perceived vulnerability was not a significant factor in this model.

When risk of addiction was perceived to be moderate and high, then intrinsic rewards and attitudes toward all type misuse mediated the conditional indirect effect between vignette (pain, drug seeking, and misuse) and intention to misuse. At perceived moderate and high risk of addiction intrinsic rewards and attitudes increased intention towards all type misuse increasing the likelihood of all type misuse.

Table 4.26 Model 7 Risk of Addiction(W) with All Mediators and Intention(Y) All Misuse Types - Abbreviated*

Process Model 7 Regression findings for Full Model Intention (Y) x Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), Extrinsic Rewards (M₄), Subjective Norm (M₅), and Attitude (M₆) x Risk of Addiction(W) all misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X*W	-0.08	.05	-1.55	-0.02	.03	-.60
	$R^2=.13$			$R^2=.25$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	t	b	s.e.	t
X*W	.09	.04	2.38*	-.03	.06	-.50
	$R^2=.36$			$R^2=.10$		
Model	Subjective Norm (M ₅)			Attitude (M ₆)		
	b	s.e.	t	b	s.e.	t
X*W	-.04	.03	-1.30	.10	.04	2.60**
	$R^2=.15$			$R^2=.22$		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Severity)	-.37	.19	-1.94			
M ₂ (Perceived Vuln)	.81	.33	2.42*			
M ₃ (Intrinsic Rewards)	.26	.12	2.29*			
M ₄ (Extrinsic Rewards)	.04	.05	.70			
M ₅ (Subjective Norm)	-.07	.16	-.40			
M ₆ (Attitude)	.28	.14	1.97*			
	$R^2=.60$					
	Effect	95% CI				
Direct effect X→Y	-.03	(-.14, .08)				
Conditional Indirect	Perceived Severity			Perceived Vulnerability		
W = -1SD(-2.52)	-.07	(-.30, .04)		W = -1SD(-2.52)	.09	(-.04, .32)
W = 0	.01	(-.08, .15)		W = 0	.06	(-.03, .22)
W = 1SD(2.52)	.09	(-.03, .33)		W = 1SD(2.52)	.02	(-.11, .22)
Conditional Indirect	Intrinsic Rewards			Extrinsic Rewards		
W = -1SD(-2.52)	-.01	(-.07, .05)		W = -1SD(-2.52)	.01	(-.01, .07)
W = 0	.05	(.01, .15)		W = 0	.01	(-.01, .05)
W = 1SD(2.52)	.12	(.02, .28)		W = 1SD(2.52)	.00	(-.01, .05)
Conditional Indirect	Subjective Norm			Attitude		
W = -1SD(-2.52)	-.01	(-.08, .02)		W = -1SD(-2.52)	.00	(-.08, .08)
W = 0	-.00	(-.04, .01)		W = 0	.08	(.01, .20)
W = 1SD(2.52)	.00	(-.02, .08)		W = 1SD(2.52)	.15	(.02, .36)

* p<.05, ** p<.01, *** p<.001

*Abbreviated = covariates excluded from table

Chapter 5

Discussion

Main Findings of Overall Study

Neither the protection motivation theory nor the theory of planned behavior have been leveraged, to date, as theoretical frameworks for predicting prescription opioid misuse and misuse. Several of the substance use related papers that used a protection motivation theory framework to examine the threat and coping appraisals associated with predicting intention were beginning to extend into the areas of the attitudes, subjective norms, and perceived behavioral control aspects of the theory of planned behavior.^{18,20} Many of the papers that use the theory of planned behavior to examine substance use intention have also made extensions to incorporate PMT-based factors such as self-efficacy, perceived vulnerability, perceived severity and occasional use of intrinsic and extrinsic rewards.^{25-28,31,32} Some of these studies have examined mediation between their key study variables and intention, the mediation alone only accounted for a proximal cause for the behavior. In order to develop a fuller picture of the situations that are likely to lead to substance misuse and have a better understanding of the conditions that lead to substance use the addition of a moderator or moderators either from inside or outside the existing theoretical framework will help to explain when misuse is more likely to occur, or be avoided.

Qualitative Theme Interpretations

Scenarios

The survey questions were overall well understood and supported. Several suggestions made by the patients reflected decisions that had already been made during the survey creation

process. Though three patients suggested incorporating a third intermediate scenario, this possibility was discussed during the instrument development stage. At one point there were two intermediate scenarios, one where pain was poorly controlled and there was no drug seeking or misuse, as the patients had suggested, and another where pain was well-controlled, but there was also drug seeking and misuse. These other two scenarios would have required recruiting twice as many patients and might not have been significantly different from the control or test groups.

Perceived Vulnerability

For several people, asking them to talk about their “vulnerability” made them feel uneasy as they felt admitting vulnerability was a topic of embarrassment and they may have a hard time admitting vulnerability and weak willpower. They had no issues with operationalizing vulnerability as will power, but suggested changing vulnerability to susceptibility or another term that they were less likely to find embarrassing. A few people thought the questions about perceived vulnerability were repetitive because they were placed after the questions on the instrument asking about risk of addiction and self-efficacy. Though the question roots and answers are different for each set of questions, it is understandable that they sound similar in nature.

Perceived Severity

Nearly all of the patients stated that the situation for the perceived severity questions was not severe enough. The survey instrument asked them to consider the consequences associated with taking too many tablets or capsules of a painkiller, which were nausea, vomiting, dizziness, possible respiratory depression. The patients understood why the questionnaire designers used the physical symptoms associated with misusing prescription opioids; however, they felt that the consequences and severity were not significant enough to make a patient reconsidering misuse of

their medication. Eleven of the thirteen patients interviewed suggested that an example or examples of consequences associated with drug misuse needed to have more serious and severe consequences to affect a person's perceived severity. Some of the more salient examples included causing an accident that kills themselves and/or others, that a person may ruin their health severely, especially ruining their liver, or the possibility of trouble with law enforcement.

Intrinsic Rewards

Though most of the patients found the intrinsic rewards listed to be adequate, several patients from both groups suggested allowing survey respondents to be more specific about which intrinsic rewards applied to their situation. The patients suggested checkboxes for each of the possible intrinsic rewards and an additional ability to free-text any other perceived intrinsic rewards a patient believed to be important. Patients wanted to list intrinsic rewards that were not listed, but they still believed were important to predicting desire to misuse their prescription painkillers.

Extrinsic Rewards

Defining extrinsic rewards with an easier to understand description and an example was mentioned by one patient from each group. A definition with a more understandable example may yield a different result with future instruments. A more specific example would be a person beginning smoking because they grew up in a household where smoking seemed to be acceptable.

Subjective Norms

Overall, patients found the subjective norms of family, friends, and strangers to be acceptable. However, five patients had expressed interest in seeing more subjective norms. Specifically, those of roles models, authority figures, or people that they feel may not be family,

friend, or stranger, such as co-workers or fellow church members. Coworkers/acquaintances/church associates would effectively fall into an area that is in between strangers and friends. However, coworkers and church associates would both require a conditional situation that a person is working and/or going to church. This may be appropriate for some specific populations, but not likely for a general population. The inclusion of subjective norms beyond the primary three is not supported in the literature.

Intention

A few patients indicated that they might have problems being honest about their intentions to ultimately misuse their painkillers. Randomizing patients to vignettes and ensuring their complete anonymity of response were at least two different methods utilized in this instrument to encourage honest answers. Operationalizing unlikely and likely into two different questions would likely result in the same answer, just reverse coded.

Demographics

Nearly every patient felt that the types of the employment within the demographics section should include retired and/or disabled. Patients who are suffering from chronic pain are largely made up of more people who are disabled and/or retired. The employment options on the instrument forces most of these patients to answer as unemployed. The income and education variables might be able to reveal that there is more to a patient than unemployment, but this may be a case where a specific population warrants some more specific measurements, especially if the employment covariate were found to have any significant impact. For future surveys targeting chronic pain patients including those two extra employment categories may help to clarify the role of that covariate in the regression model.

Significance of the Vignette Manipulation

Perceived Severity: Overall similarity between groups

Perceived severity was the only mediator where the control and test groups did not significantly differ from each other for all four types of misuse. These results seem to confirm the qualitative interview findings that patients believed that the operationalization of perceived severity within the survey was not strong enough to elicit a fear-based response.

Perceived Vulnerability: Significant differences between groups

Perceived vulnerability showed differences between the control and test vignette groups. Often and dose misuse were similar in their response patterns. Withdrawal and feel good misuse types were also similar in response patterns. The test vignette patients indicated that they felt more vulnerable and less willpower towards often and dose misuse. The test vignette patients were also more vulnerable to taking their prescription painkillers to avoid withdrawal and feel good. The similarity in responses between often and dose misuse and likewise withdrawal and feel good misuse may help to indicate that for future surveys and analyses often and dose misuse could be combined as dose-based misuse and withdrawal and feel good misuse could be combined as symptom-based misuse. These significant differences between groups also seemed to be indicative that perceived vulnerability might be a significant factor helping predict how misuse scenario influences intention to misuse prescription opioids for all misuse types. This prediction was proved to be accurate through the regression analysis in the next discussion section.

Intrinsic Rewards: Significant differences between groups

Intrinsic rewards showed significant differences between the control and test vignette groups. The intrinsic rewards results distribution did not demonstrate any differential patterns

between the dose-based and symptom-based misuse types. The significant differences between the control and test groups also seems to be indicative that intrinsic rewards might also be a significant factor helping predict how misuse scenario influences intention to misuse prescription opioids for all misuse types. This prediction was proved to be accurate through the regression analysis in the next discussion section.

Extrinsic Rewards: Mixed results between groups

The extrinsic rewards control and test groups significantly differed on often and dose misuse, but not on withdrawal and feel good misuse. The extrinsic rewards results distribution also did not demonstrate any differential patterns between the dose-based and symptom-based misuse types. The significant differences between the dose-based misuse control and test groups seemed like it could be indicative that extrinsic rewards might also be a significant factor helping predict how misuse scenario influences intention to misuse prescription opioids for the dose-based misuse types. This prediction was not proved to be accurate. There were no regressions where extrinsic rewards were responsible for a significant conditional indirect effect.

Subjective Norms: Mixed results between groups

The subjective norms control and test groups significantly differed regarding dose and feel good misuse, but not on often misuse. The subjective norms results distribution also did not demonstrate any differential patterns between the dose-based and symptom-based misuse types. Likewise, the fact that dose misuse was significantly different and often misuse was not seems to argue against including both in an overall dose-based misuse category. Withdrawal misuse was not examined for subjective norms due to practically issues of withdrawal not functioning to generate societal norms. There were also no significant regression models for subjective norms.

Attitude: Significant differences between groups

Attitude showed significant differences between the control and test vignette groups. However, the attitude results distribution did not demonstrate any differential patterns between the dose-based and symptom-based misuse types. The significant differences between the control and test groups also seems to be indicative that attitude might also be a significant factor helping predict how misuse scenario influences intention to misuse prescription opioids for all misuse types. This prediction was proved to be accurate through the regression analysis in the next discussion section.

Intention: Significant differences between groups

Intention showed significant differences between the control and test vignette groups. The misuse types showed no apparent similarities within groups. Intention was the dependent variable in all of the regressions. Differences between the intention to misuse prescription opioids were expected between the two misuse scenarios.

Risk of Addiction: Significant differences between groups

Risk of Addiction showed significant differences between the control and test vignette groups. However, the risk of addiction results distribution did not demonstrate any differential patterns between the dose-based and symptom-based misuse types. The significant differences between the control and test groups seems to be indicative that risk of addiction might be a significant factor helping predict when misuse scenario influences intention to misuse prescription opioids.

Self-Efficacy: Significant differences between groups

Self-efficacy showed significant differences between the control and test vignette groups. The misuse types showed no apparent similarities within groups. The significant differences

between the control and test groups seem to be indicative that self-efficacy might also be a significant factor helping predict when misuse scenario influences intention to misuse prescription opioids.

Significance of Regression Findings

Perceived Vulnerability and Risk of Addiction:

Two model 7 regressions showed significant conditional indirect effects between misuse scenarios and increasing intention toward both dose-based and symptom-based misuse of prescription opioids as predicted by moderate to high levels of risk of addiction and the influence of perceived vulnerability.

1. At perceived moderate and high risk of addiction, perceived vulnerability increased intention towards often and dose misuse increasing the likelihood of often and dose misuse.
2. At perceived moderate and high risk of addiction, perceived vulnerability increased intention towards withdrawal and feel good misuse increasing the likelihood of withdrawal and feel good misuse.

The results of these regressions indicate that perceived vulnerability plays a significant role in whether a patient is likely to misuse their prescription opioids in the future. Specifically, perceived vulnerability interacts with perceived risk of addiction to indicate how intention to misuse prescription opioids is likely to be influenced. The regression models indicate that as perceived vulnerability increases, that is the person becomes more vulnerable, so does the likelihood of misuse. Likewise, moderate and high levels of perceived risk of addiction were also indicative of higher levels of perceived vulnerability.

Perceived Vulnerability with Attitude and Risk of Addiction:

One model 7 regression showed significant conditional indirect effects between misuse scenarios and increasing intention towards symptom-based misuse of prescription opioids as

predicted by moderate to high levels of risk of addiction and the influence of perceived vulnerability and attitude.

1. At perceived moderate and high risk of addiction, perceived vulnerability and attitude increased intention towards withdrawal and feel good misuse increasing the likelihood of withdrawal and feel good misuse.

The results of this regression indicate that attitude, along with perceived vulnerability, plays a significant role in whether a patient is likely to misuse their prescription opioids in the future. Specifically, attitude interacts with perceived risk of addiction and provides an additional source of mediation along with perceived vulnerability to give an indication of how intention is likely to be influenced. The regression models indicate that as perceived vulnerability and attitude increases, the person becomes more vulnerable and attitude shifts towards favoring misuse, so does the likelihood of misuse. Likewise, moderate and high levels of perceived risk of addiction were also indicative of higher levels of perceived vulnerability and attitude.

Perceived Severity and Self-Efficacy:

One model 7 regression showed significant conditional indirect effects between misuse scenarios and increasing intention towards withdrawal-only based misuse of prescription opioids as predicted by the level of self-efficacy and the influence of perceived severity.

1. At perceived low and moderate self-efficacy a negative perceived severity partially increased intention towards withdrawal misuse increasing the likelihood of withdrawal misuse.

The results of this regression indicate that perceived severity plays a significant role in whether a patient is likely to misuse their prescription opioids in the future. Specifically, perceived severity partially interacts with perceived risk of addiction to indicate how intention to avoid withdrawal is likely to be influenced. Because there is also a direct effect of the misuse scenario on intention toward withdrawal misuse, perceived severity can only exert a partial effect

within the model. The regression model indicates that as perceived severity decreases, the person perceives the consequences associated with withdrawal misuse as less of a threat, then the likelihood of misuse to avoid withdrawal increases. Likewise, low and moderate levels of perceived self-efficacy were also indicative of lower levels of perceived severity. Depending upon how avoid withdrawal is framed it may not be considered a form of misuse. The test misuse scenario sets up avoiding withdrawal as a form of misuse because the patient is misusing their opioids primarily for feel good misuse and secondarily for avoiding withdrawal. Likewise, because a patient could perceive avoiding withdrawal as a positive outcome and perceived severity was operationalized in the study in a way that did not evoke a fear response, then as perceived severity decreases the increase in intention to misuse opioids to avoid withdrawal makes sense.

Intrinsic Rewards and Self-Efficacy:

One model 7 regression showed significant conditional indirect effects between misuse scenarios and increasing intention towards dose-based misuse of prescription opioids as predicted by the high level of self-efficacy and the influence of intrinsic rewards.

1. At perceived high self-efficacy intrinsic rewards partially increased intention towards often and dose misuse increasing the likelihood of often and dose misuse.

The results of this regression indicate that intrinsic rewards plays a significant role in whether a patient is likely to misuse their prescription opioids in the future. Specifically, intrinsic rewards partially interacts with perceived self-efficacy to indicate how intention to take prescription opioids in higher doses and more often is likely to be influenced. Because there is also a direct effect of the misuse scenario on intention toward dose-based misuse, intrinsic rewards can only exert a partial effect within this model. The regression model indicates that as the value of intrinsic rewards increases, the person perceives that their self-efficacy also

increases, then the likelihood of dose-based misuse increases. Likewise, high levels of perceived self-efficacy were also indicative of high levels of intrinsic rewards.

According to theory, high self-efficacy should be associated with helping to avoid misuse. A person with high self-efficacy should have an increased ability to avoid performing a negative behavior. However, in this case there are two other possible explanations: the influence of the intrinsic rewards may be so strong as to overwhelm the expected effect of self-efficacy, and/or a person may associate their self-efficacy with better self-control over how they take their prescription opioids in which case they feel that the intrinsic rewards can provide them with a perceived good, but under their control. Likewise, because there was a significant direct effect of the misuse scenario on intention, then the influence of self-efficacy may have been affected as well.

Intrinsic Rewards and Risk of Addiction:

One model 7 regression showed significant conditional indirect effects between misuse scenarios and increasing intention towards symptom-based misuse of prescription opioids as predicted by risk of addiction and the influence of intrinsic rewards. Though risk of addiction and intrinsic rewards produced a conditional indirect effect the bootstrapping section of the regression did not indicate a particular level or levels of operation.

1. Though level of risk of addiction is uncertain, intrinsic rewards increased intention towards withdrawal and feel good misuse increasing the likelihood of withdrawal and feel good misuse.

The symptom-based misuse types of taking opioids avoiding withdrawal and to feel good could be considered intrinsic rewards by themselves. This relationship may account for why there is no specific level of risk of addiction that is responsible for helping to predict when intrinsic rewards influences an increase in prescription opioid misuse. The results for the next

model examined indicate that operating levels of risk of addiction are likely moderate and high when interacting with intrinsic rewards.

Intrinsic Rewards with Attitude and Risk of Addiction:

The last model 7 regression showed significant conditional indirect effects between misuse scenarios and increasing intention towards all four types of misuse of prescription opioids as predicted by risk of addiction and the influence of intrinsic rewards and attitude.

1. At perceived moderate and high risk of addiction intrinsic rewards and attitude increased intention towards all type misuse increasing the likelihood of all type misuse.

The results of this regression indicate that intrinsic rewards play a significant role in whether a patient is likely to misuse their prescription opioids in the future. Specifically, intrinsic rewards interact with perceived risk of addiction to indicate how intention toward both dose-based and symptom-based misuse of prescription opioids is likely to be influenced. The regression models indicate that as intrinsic rewards and attitude increases, the influence of the potential positive outcomes associated with intrinsic rewards increases and attitude shifts towards favoring misuse, so does the likelihood of misuse. Likewise, moderate and high levels of perceived risk of addiction were also indicative of higher levels of perceived vulnerability and attitude.

Test of the Theoretical Model

The proposed study is among the first to integrate Protection Motivation Theory^{13,15} with the Theory of Planned Behavior^{9,22,23} to determine the perceptions, attitudes, beliefs, and the role of risk-taking and misuse potential in the use of controlled prescription drugs by patients.⁷⁶

The proposed research is innovative, because it will be among the first to examine the prescription opioid misuse intentions of chronic pain patients and the importance of perceived

severity, perceived vulnerability, intrinsic rewards, extrinsic rewards, subjective norms for describing “how” these relationships occur and whether self-efficacy and risk of addiction describe “when” these relationships occur.

Hypotheses predictions

Though the literature review did not find any PMT or TPB studies that specifically examined prescription opioid misuse, several studies were found where one of the mediating variables, perceived vulnerability, intrinsic rewards, perceived severity, extrinsic rewards, subjective norms, and attitudes, as well as the moderator self-efficacy served as one or more predictors of intention to misuse alcohol or illicit drugs.

Perceived Vulnerability

The finding that perceived vulnerability was a significant predictor of substance use intention was consistent with several of the PMT and TPB.^{17,18,20,26,31,32} In particular, perceived vulnerability served as a predictor variable when examining binge drinking, other alcohol use disorders, and illicit drug use. Understanding which behavioral intentions were being examined was important to understand how perceived vulnerability functioned to influence intention. If the intention was towards increased maladaptive behavior such as binge drinking or increased illicit drug use, then perceived vulnerability increased.^{17,20,26,31,32} The findings in literature were consistent with the finding in this study that increasing perceived vulnerability leads to increased prescription opioid misuse. Another study found that when the intention was to avoid alcohol use, a protective behavior, then perceived vulnerability and intrinsic rewards associated with drug taking or alcohol use decreased.¹⁸ This finding is also consistent with the theory and the result that should be expected if the behavioral intention that was examined would be intention to avoid misusing prescription opioids.

Intrinsic Rewards

Intrinsic rewards was a significant mediator in one of the PMT studies and an implied predictive factor in one TPB study both of which examined alcohol use intention.^{18,25} This study, in which intrinsic rewards was a significant mediator, showed the influence decreasing if the intention was towards an adaptive behavior such as avoiding alcohol use. However, in the TPB study intrinsic rewards, such as perceived enhanced sociability, assertiveness, and sexual function expectancy, served to increase the likelihood of maladaptive behavior, which was binge drinking.²⁵

Perceived Severity

Perceived severity, though shown to be a significant predictor in one regression, was expected to play a larger role in this model than was observed based upon the role it played in several of the reviewed studies.^{18,20,26,31,32} Perceived severity increased and intention towards drinking or illicit drug use decreased. The PM-TPB model demonstrated the reverse relationship. When self-efficacy was low and moderate, then decreasing perceived severity was associated with increasing intention to misuse prescription opioid. This is likely due to the fact that the specific situation and/or consequences used in the survey did not generate strong feelings of being threatened among the survey takers. This is a hypothesized reason for these finding, but with a basis in the qualitative study findings that perceived severity, as operationalized within the survey by adverse effects associated with taking too many opioids, were found by the interviewed patients to be insufficient to evoke a fear response. Future iterations of the survey will incorporate the patient's suggestions to make the consequences of drug misuse operationalized for perceived severity much more serious and severe, such as killing another person because of impaired driving.

Extrinsic rewards

Extrinsic rewards associated with binge drinking in one PMT and one TPB study. Specifically, when people observed people important to them, such as friends or significant others enjoying themselves due to binge drinking, that person's intention to binge drink was also increased.^{18,26} Though the PM-TPB study did not show any significant regressions for extrinsic rewards the findings that a maladaptive response would occur in relation to increasing extrinsic rewards is consistent with the theory predictions. Extrinsic rewards are expected to be better defined and operationalized on future survey in an effort to determine if there could be a significant conditional indirect effect. Several patients in the qualitative analysis indicated that they would have preferred a better definition for extrinsic rewards along with an example. When included on future surveys extrinsic rewards will be better defined and an example that should be relatable to a chronic pain population will be used.

Attitude

Attitude is a primary predictor of intention within the TPB and implied, but not often used within PMT studies. The literature review revealed a study where an "Alcohol Attitude Survey" was developed using PMT intended to discover factors associated with preventing alcohol misuse.¹⁷ Attitude served as a co-dependent variable within the study to describe how each factor influenced the patient's perspective on drinking. Six of the TPB studies specifically utilized attitude to predict intention towards drinking, drug use, and smoking.^{26-28,30,31,34} Within the PM-TPB study results analyses attitude was found be associated with increases in to misuse prescription opioids. Specifically, when perceived risk of addiction was moderate and high, then both perceived vulnerability and intrinsic rewards functioned along with attitude to increase intention. Attitude is likely to play the role of modifying the effect of the other mediating

variable on intention. For example, if a patient has a positive attitude towards misuse believing it to be good, beneficial, and favorable, then the effect of another mediator such as intrinsic rewards could be magnified to increase the patient's intention to misuse. Conversely, a patient may believe misuse to be bad, harmful, and unfavorable. This should serve to reduce their intention to misuse, yet if the value of their intrinsic rewards is very high, their perceived vulnerability is also high and the patient desperately wants to avoid withdrawal and/or feel good, they may still reluctantly misuse their prescription opioids.

Subjective Norms

Though subjective norms are examined at an implied level through extrinsic rewards, none of the PMT-based studies examined for the literature review utilized subjective norms as a potential predictor of substance use intention. This was expected because subjective norms have never been a specific part of the PMT. On the other hand, subjective norms were a key predictor, if not the solitary predictor, in all of the substance use-related studies examined for the TPB.^{25-32,34} There were no significant conditional indirect effects that included subjective norm as a variable within this research study. Though the chi-square showed that the control and test groups differed on their responses to two of the types of misuse, this difference did not translate to the regression analyses. This could be due to subjective norm not being effectively operationalized within the vignettes. Patients were left to determine their subjective norms based upon either what they thought they should be for each vignette or what they might actually be for the person answering the questions. Though, in several other studies of the TRA and TPB, subjective norms have not been a significant predictor of intention.⁷⁷⁻⁷⁹

Self-efficacy

Self-efficacy was a significant predictor of substance use intention in many PMT and TPB studies.^{10,17,18,20,28,32,34} Self-efficacy worked as a protective factor within these studies working to reduce intention to reduce substance use. Self-efficacy exhibited two different functions within the regressions, when used to describe when perceived severity would influence intention, self-efficacy operated as low and moderate levels with decreasing levels of perceived severity to increase intention to misuse. This would be consistent with self-efficacy working as a protective factor, but failing because it is not operating at a strong enough level to avoid performing a maladaptive behavior. For the other case, self-efficacy operated at a high level to increase intrinsic rewards resulting in increased intention to misuse. A possible explanation for this outcome would be patients that believe they have control over whether or not they succumb to intrinsic rewards. However, because the result is still increased intention to misuse, the high self-efficacy is likely overconfidence that the patient can regulate their own drug use.

Understanding that self-efficacy has an influence on multiple aspects of the behavioral model makes it a potent target for behavior change. Also important, is understanding how self-efficacy functions for a patient. Do they use their self-efficacy to work towards avoiding misuse? Or do they incorrectly believe that self-efficacy means they have power over the drug? When a clinician can understand a patient's perception of self-efficacy and where it intersects with other parts of the behavioral model, then the clinician can devise personalized treatment plans to help a patient recognize their strengths, but also recognize and work on weaknesses.

Risk of Addiction

Based upon the regression results from the PM-TPB study, when perceived risk of addiction is moderate or high, then perceived vulnerability, intrinsic rewards, and/or attitude are

likely to result in an increasing intention to misuse prescription opioids. Risk of addiction was not a variable considered in any of the PMT or TPB studies, and had not previously been examined as a theory-based influence on intention to misuse prescription opioids. Many different instruments have been developed to measure a patient's potential for developing a substance use disorder in the future. Operationalizing risk of addiction within a theoretical framework seemed like a logical next step towards developing a new behavioral model that more completely explained important personal factors that predict when and how a person might intend to misuse their prescription opioids.

Understanding that perceived risk of addiction has an influence on multiple aspects of the behavioral model makes it a potent target for behavior change. Risk of addiction is likely to play a larger role in identifying new opioid patients that may require educational interventions to prevent them from misusing their prescription opioids in the future. Because risk of addiction influences perceived vulnerability, intrinsic rewards, and attitudes, the reasonable assumption is that changes the patient is able to make to those variables would in turn change their perceived risk of addiction. By helping a patient understand how they relate to their predictors of prescription drug misuse, then avoiding problems in the first place should become easier, as well as, helping patients to realize they may have a problem that need treatment.

Health Policy and Clinical Implications

This study will inform prescribers, pharmacists and other healthcare professionals about the role of risk of addiction, self-efficacy, perceived vulnerability, intrinsic rewards, and attitude in behavioral models of prescription drug misuse to help develop personalized treatment programs that emphasize responsible medication use and control of symptoms, while minimizing the potential for misuse. Though still in its nascent stages of testing, PM-TPB-based instruments

and interventions could very well serve an important role in becoming the next-generation of theory-based substance-use prevention and treatment.

Policy Implications

If the instruments and interventions to be developed in the future prove to be adept at detecting, preventing, and treating not only prescription opioid misuse, but other forms of substance use and addiction, then their use could become an important part of policy for many different types of clinics and organizations. Depending upon which instruments and/or interventions prove to be most successful, that would drive which stakeholders would be looking to adopt them into their environment. The first steps would be to work with physician and psychologist groups that are looking for solid theory-based instruments and interventions that can be personalized to their patient population. Demonstrated success in frontline venues such as doctor's offices, pain clinics, and substance treatment programs would begin to provide a base of support for the dissemination of the information to larger networks.

Treatment policy would be the most impacted area. Theory-based instruments could be used for risk-assessment pre-treatment and concurrent with treatment to provide information to prescribers and therapists about a patient's personal strengths, weaknesses, and risk factors. Knowledge of those factors can then be used to help determine whether a patient might be appropriate for treatment, need education to avoid problems, or identify how to treat current problems.

At the highest policy levels, use of the instruments and interventions could be written into guideline for treatment and reimbursement by insurance companies and/or government health care agencies like Medicare and Medicaid. Likewise, national organization like NIDA and

NAIAA could advocate for the PM-TPB materials as a preferred means of helping to fight substance use disorders within the U.S. and potentially elsewhere.

Clinical Implications

Patients

Patients are often afraid to take prescription opioids to treat their pain for a myriad of reasons, but particularly because they are afraid of becoming addicted. Likewise, patients who may have developed a substance use disorder may not be able to recognize changes in themselves that are directly attributable to the disorder and may not realize they need help. Through the development of instruments and interventions that work together patients can receive personally tailored interventions to provide education about themselves and responsible medication use, prevention of the development of a substance use disorder, recognizing that they have a problem that needs to be addressed, and resolving their substance use disorder and maintaining sobriety.

Prescribers/Clinicians

Currently, a prescriber must decide whether or not to take a risk on prescribing an opioid for a potential future substance user. However, if there were an underlying theoretical framework that could identify individual risk factors for the patient, then the prescriber could help their patient understand the specific risks they face taking the drug and refer them to educational literature and/or a theory-based educational program that can help the patient avoid future misuse by targeting their specific risk attributes.

Prescribers and clinicians will be offered instruments and interventions which work together through a shared theoretical framework. The instruments will be designed to seamlessly

to inform the implementation of the intervention using personalized information characterizing a patient's relative strengths, weaknesses, opportunities, and threats.

Study Limitations and Alternative Strategies

Generalizability

This study had some limitations. The primary limitation was the generalizability of the results from UMHS chronic pain patients to the general population of patients using controlled opioid medications across the United States in more diverse communities. This was likely exacerbated by the fact that the recruitment will be a convenience sample recruited from the Burlington Physical Medicine and Rehabilitation Spine Clinic. Within UMHS over 6000 patients that conformed to the inclusion/exclusion criteria. Out of 1550 patients contacted only 160 patients responded as qualified for the survey, and only 158 completed the full questionnaire. Offering a check for \$10 for each completed survey was only sufficient to produce a response rate of around 10%.

Language and cultural barriers

Instrument characteristics

The instrument used in this study was written only in English and administered only through a web-based interface. Because of these two study features patients who did not read and write in English were likely unable to complete the questionnaire. People who do not have personal internet access, are unwilling to use public resources such as from a library, or who find web-administered instrument too technologically challenging were also likely missed. In different parts of the U.S. where reading and writing in Spanish and other languages account for a large portion of the population, different language versions of the instrument may be created. Likewise, a small study of preference to complete the instrument between electronic versus paper

may lead to allowing patients to indicate a choice to complete a questionnaire on paper instead of over the internet.

Respondent characteristics

Racial and cultural differences often lead to different attitudes, beliefs, and perceptions among people. These differences often influence how or whether people approach learning a new language, adopting a new technology, how they approach medical issue, how they interact with medical professionals, and think about issues surrounding substance use. Treatment Improvement Protocol #59 “Improving Cultural Competence” from the Center for Substance Abuse Treatment within the Substance Abuse and Mental Health Services Administration has been produced as a valuable tool to help counselors and behavioral health organizations work towards cultural competence.⁸⁰ Cultural competence is defined as “A set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals and enable the system, agency, or professionals to work effectively in cross-cultural situations.”⁸⁰ Utilizing the recommendations of TIP #59 will guide the development of future iterations of this instrument and related interventions incorporating features within the formatting that maintain cultural sensitivity.

Perceived behavioral control still to be tested

This survey is the first part of a larger project aimed at developing instruments and interventions designed to detect, prevent, and treat prescription drug misuse and potentially other substance use disorders. Before that point is reached; though, the remaining perceived behavioral control portion of the behavioral model needs to be examined. Because this study examined only the attitude and subjective norm-related factors within the overall behavioral model it may not

have the complete picture of which factors provide the most predictive power of future opioid misuse.

Substance of choice

Instrument characteristics

Because this instrument is focused on prescription opioid misuse it may not be immediately useful for testing patient populations with other potential substance use disorders such as alcohol or heroin. Adapting the terminology of the instrument to address specific substances, then testing the instrument with “at risk” and recovering users of the substance of interest may give a sense of whether the PM-TPB model will be useful for substances other than opioids.

Patient characteristics

Beliefs about and traditions involving substance use can vary significantly between cultural communities and ethnicities. For example, in African American communities alcohol and drug abuse may be a socially unacceptable sign of weakness, whereas in some Asian communities alcohol use is imbued with beneficial, ceremonial, and curative properties, yet illicit substance use is unacceptable and not easy to discuss.⁸⁰ Understanding that these differences occur within different cultural and ethnic communities are important for tailoring instruments and interventions to achieve maximum effectiveness.

Recall bias and social desirability

There may also be some recall bias and inherent social desirability bias because this study collected cross-sectional data using self-reported measures. Whether or not a person is going to misuse their prescription opioids is a volatile dependent variable. This was likely the primary reason for the study response rate being so low. There might also be issues of how comfortable a person was talking about their tendencies towards drug misuse and how well they understood

their own tendencies towards different aspects around that behavior. The study design attempted to control for a patient's honesty regarding their specific drug use by randomizing them into a vignette and asking them to assume the role of that patient when answering the theory-based questions in the instrument. The data collected on the questionnaires was kept completely confidential and patients were informed that the information they shared would not be communicated to anyone or otherwise used outside of this study. This was another strategy to encourage patients to answer each question as truthfully as possible.

Type I error

A large part of this study was a model building exercise. Because of the large number of models generated over the course of testing the relationships between variables within the behavioral model, there is a chance that several false positives could have been detected indicating a presence of Type I error. The study currently attempts to control for Type I error using basic Multiple Comparison Procedures (MCP). For this simple version of the MCP, the more models that demonstrate that a particular moderator and mediator are responsible for a conditional indirect effect the stronger the evidence that the null hypothesis is being correctly rejected for that model. Another way to examine the Type I error potential, within this study, would be to examine the familywise error rate (FWER), using a sequential Bonferonni-type procedure which can control the false-discovery rate for the independent tests statistics increasing the power.⁸¹ Though the MCP is implied within the study, if deemed necessary, the FWER could be used to assuage reviewer's concerns about the false-discovery rate.

Future Research

Future changes to study instruments

On future instruments perceived vulnerability questions will likely be reworded so as to not embarrass or stigmatize the patient. Likewise, they will be moved at least one or two questions away from other look-alike sound-alike questions. Perceived severity will be operationalized with examples of outcomes related to misuse that have consequences which are very serious and very severe, such as the loss of life and limb. Intrinsic rewards will be addressed in a more open-ended manner allowing patients to be much more specific about what their specific rewards and triggers for misuse are within the intrinsic reward framework. Extrinsic rewards will be prefaced by a better definition with easily relatable examples. With intention being the primary dependent variable of interest on this instrument and future instrument, encouraging people to be as honest as possible about their answers whether they are answering as themselves or a paper patient is one of the most important goals. Questions should not stigmatize patients while allowing them to answer anonymously and honestly. Future instruments administered to chronic pain patient populations will likely include employment options for disabled and retired.

Future research suggestions and directions

Prescription drug misuse is a contentious study subject. Planning for future subject recruitment might consider an increase in the incentive payment, use of an optional paper survey, expansion to include several potentially qualified chronic pain populations. Future versions of the survey and related extensions should be administered to several different patient populations around the U.S. in order to get a better idea of how generalizable the results are between different population centers.

The vignette manipulation was useful for randomizing patients into a specific independent variable set intended to inform their answers on the survey. When developing the questions for the coping appraisal and perceived behavioral control side of the overall behavioral model it will be important to make sure that the questions allow the vignette to inform the patient's decision. Future versions of the survey might simplify the types of misuse to one or two types, likely medication taking related and symptom-related. A survey that covers all of the constructs in the behavioral model might be able to be administered instead of needing to break it into sections to prevent fatigue. A shorter survey may also be able to be given in a crossover format where patients are randomized to one vignette at the beginning, but then asked to assume the other vignette and complete the questionnaire again from the opposite perspective. With a patient as their own control it might be easier to determine the effect that patient's own sense of self and experience with prescription drug misuse inform their decisions.

Finding compatible instruments and interventions aimed at detection, prevention, and treatment of substance use disorders should focus on perceived risk of addiction, self-efficacy, perceived vulnerability, perceived severity, intrinsic rewards, and attitudes as predictors of behavioral intention. Ideally, some of the PM-TPB variables are already in use on existing instruments and interventions. Hopefully, development of modified instruments and intervention would go faster. The current state of cognitive behavioral therapy (CBT) instruments and interventions may lend themselves to adaptation using the PM-TPB. Many experts in the field are lamenting the loss of cohesion that an underlying theoretical model could provide for CBT. Currently, a "theory-practice gap" has developed between the original theory of CBT and the current operationalization based more on technological utility.⁶⁵⁻⁶⁷

Conclusion

Despite the limitations, this study was among the first to examine the effects of mediators and moderators on intention to misuse of controlled prescription opioids. Understanding whether the proposed behavioral model is accurate and what mediators and moderators are most predictive of intention to misuse prescription painkillers is an important first step towards developing interventions for chronic pain patients that target key good behaviors to support and bad behaviors to prevent misuse. This is especially important for chronic pain patients who have a consistent need for pain analgesia, thus a constant struggle to avoid misuse, yet maintain personal comfort and functional status.

Misuse of controlled prescription opioids and the larger realm of substance use disorders have reached the epidemic level of disruption to nearly aspect of society in the United States. Development of a strong theory-based set of instruments and interventions designed to help detect, prevent, and treat prescription drug misuse is the long-term goal of this research and primary investigator. Finding strong results from a field study without removing any of the six covariates in all of the regressions is encouraging. This study which was hopefully the first of many to come not only expanded protection motivation theory and the theory of planned behavior into the prediction of prescription opioid misuse intention, but significantly deepened that field through the addition of conditional indirect effects to help explain the when, why, and how behind prescription drug use within a theory-based framework. Understanding whether the proposed behavioral model is accurate and what mediators and moderators are most predictive of intention to misuse prescription painkillers is an important first step towards developing interventions for chronic pain patients that target key good behaviors to support and bad behaviors to prevent misuse. This is especially important for chronic pain patients who have a

consistent need for pain analgesia, thus a constant struggle to avoid misuse, yet maintain personal comfort and functional status.

Appendices

Appendix A: Documents

A.1 Interview Mailing

First Name, Last Name

Date

Address

City, State Zip Code

Dear First Name, Last Name:

Hello, my name is David Malewski. I am a graduate student at the University of Michigan. You have been identified from your medical record as a patient at the University of Michigan Health System Physical Medicine & Rehabilitation clinic in the Burlington building qualified for a research study. According to the database you are at least 18 years old, have chronic non-cancer pain, and have been taking at least one long-acting and/or one short-acting painkiller for more than a month. This data may not be accurate, if so, or if you would otherwise want to opt-out of this study please see the information at the end of this letter.

I am recruiting patients with chronic pain to participate in individual interviews. We are conducting research looking at the decisions that patients make about taking their prescription painkillers. We want to know how those decisions affect whether people will misuse prescription painkillers.

Participation in this interview is completely voluntary and anonymous. Should you decide to participate in this study none of the information you share on the will be shared with anyone other than study personnel. Your name or any other personally identifying information will not be associated with any information from your interview.

Should you decide that you would like to participate I would like to talk with you just after your next doctor's appointment currently scheduled on [Appointment Date at Appointment Time] at The University of Michigan Physical Medicine & Rehabilitation clinic in the Burlington building. Your participant code will be: [Participant #]

Interview participation will consist of reviewing a 60 question survey questionnaire. The interviewer will ask you 13 questions about how the survey questions compare to your experience and opinions about how you take your painkillers. The interview is expected to take up to 90 minutes.

As an incentive we offer you a \$20 check for completion of the interview. Your name and address will only be collected for reimbursement purposes, but the university will not have a specific reason other than “study participation” because they require that information for their records.

We hope that you will participate in our study.

We will call you one week before your appointment to confirm that you want to do the interview after your doctor’s appointment. However, if you do not want to participate in this study or be contacted again please either send an e-mail to malewski@umich.edu with the subject “Decline Study Participation – [Participant #]” or call 314-482-5695 and leave a brief message.

Thank you for your consideration.
Sincerely,

David Malewski M.S., Pharm.D.

A.2 Interview In-Person Screening

Hello, my name is Dave Malewski. I am a Graduate student at the University of Michigan. I previously sent you a letter explaining that I would like to recruit you to participate in an individual interview. We are conducting research looking at the decisions that patients make about taking their prescription painkillers.

If you still wish to participate in our study I would like to ask you a few preliminary screening questions to make sure that you meet all of the qualifications to participate in the study:

Participant _____

1. What is your current age? _____ (patient needs to be at least 18 years or older)
2. Do you have a current diagnosis of chronic pain, or the equivalent diagnosis of chronic pain such as consistent low back pain treated over the course several months to years?

3. Are you taking at least one long acting and/or one short acting painkiller for at least the last month? (ex. Oxycontin and Percocet) _____
4. Do you have cancer-related pain? _____
5. *(Group 2 subjects only) Do you have a past history of substance misuse? _____ (Ex. Alcohol, illicit drugs, NOT tobacco)

Participation in the interview will consist of a 90 minute session with an interviewer. There are TWO alternatives for the interviews:

1. If you have time right now we will conduct the interview in a private office today.
2. Otherwise, we will schedule to interview you at a time that is more convenient. You will meet with the interviewer at a location at or near the College of Pharmacy on the main University of Michigan campus where your privacy for the interview can be assured. You will receive a parking pass. In order to send you a reminder just before your interview appointment we would like your e-mail and/or phone number.

You will be sent a \$20 check as an incentive for participation after completion of the interview. Your name and address will only be collected for reimbursement purposes, but the university will not have a specific reason other than “study participation” because they require that information for their records.

A.3 Interview Consent Document

UNIVERSITY OF MICHIGAN

CONSENT TO BE PART OF A RESEARCH STUDY

INFORMATION ABOUT THIS FORM

You may take part in a research study. This form tells you about the study. It describes the study purpose, risks, and possible benefits.

Please review this information carefully. The study researchers will answer any questions you may have. You might also talk to your friends, family, or doctors about your participation in this study.

If you decide to take part in the study, you will be asked to sign this form.

Before you sign this form, be sure you understand what the study is about, including the risks and possible benefits to you.

1. GENERAL INFORMATION ABOUT THIS STUDY AND THE RESEARCHERS

1.1 Study title:

PDAlIS, Prescription drug misuse independent interview

1.2 Company or agency sponsoring the study:

The University of Michigan College of Pharmacy, Blue Cross Blue Shield of Michigan Foundation

1.3 Names, degrees, and affiliations of the researchers conducting the study:

David Malewski, M.S. Pharm.D., Ph.D. Candidate, the University of Michigan
Steve Erickson, Pharm.D., Associate Professor of Pharmacy, the University of Michigan
Karen Farris, Ph.D., Professor of Pharmacy, the University of Michigan
Richard Bagozzi, Ph.D., Professor of Marketing, the University of Michigan
Mark Ilgen, Ph.D., Associate Professor of Psychiatry, the University of Michigan
Rajesh Balkrishnan, Ph.D., Professor of Public Health Services, the University of Virginia
Peter Batra, M.S., Research Analyst, the University of Michigan

2. PURPOSE OF THIS STUDY

2.1 Study purpose:

We want to learn more about chronic pain patients' attitudes regarding pain, drug seeking, and prescription drug misuse. During a recorded interview, study subjects will give their opinions about the questions on a study survey and how well the survey relates to their own experience.

3. INFORMATION ABOUT STUDY PARTICIPANTS (SUBJECTS)

You may STOP the interview at any time. Taking part in this study is **voluntary**. If you leave the study, there will be no penalty, and you will not lose any incentive.

3.1 Who can take part in this study?

You have been identified from your medical record for recruitment from The University of Michigan Health System Spine Center at the Burlington Building.

You may be able to take part in this study if you

- Are at least 18 years old
- Have chronic pain that is not caused by cancer
- Have been taking one long-acting and/or one short-acting painkiller for more than one month
- Are receiving outpatient care (not staying overnight in the hospital)

We're looking for two groups of subject. Some subjects will have no history of substance misuse. Other subjects will have a history of substance misuse, not counting tobacco use.

3.2 How many people (subjects) are expected to take part in this study?

We are recruiting up to 20 people.

4. INFORMATION ABOUT STUDY PARTICIPATION

4.1 What will happen to you in this study?

1. Interviewer will identify self and describe the purpose of the interview.
 - a. You will review a survey questionnaire.
2. You will get a copy of the survey to read through.
 - a. The scenario describes fictional scenarios and then asks the respondent to assume one of the scenarios and answer questions about prescription drug misuse.
3. Audio recording will begin.
4. Interviewer will ask you questions about the survey.
 - a. We will review the survey with you section by section asking you to tell us your opinions about the questions and how they relate to your own experiences.
5. Audio recording will end.

4.2 Audio recording of interview

The interview will be audio recorded on two digital voice recorders and later written down. We will not collect personal information from you. If you accidentally mention personal information during the interview we will delete it from the written record. The audio recording will be deleted after it has been written down.

4.3 How much of your time will be needed to take part in this study?

Up to 90 minutes

4.4 When will your participation in the study be over?

Your study participation will be over at the completion of the interview.

5. INFORMATION ABOUT RISKS AND BENEFITS

5.1 What risks will you face by taking part in the study? What will the researchers do to protect you against these risks?

Some survey questions are about drug misuse and may cause stress. You may skip any question during the interview at any time.

There is a very small risk that people other than the researchers may see your study data. To help prevent this from happening, the research records will be kept in password-protected computer files that only the study team has access to. Also, we will keep any information that might identify you, such as your name and address, in a restricted computer file that is password-protected. When we transfer data from the University of Michigan Health System, we will use specialized computer transfer programs and servers that protect your confidential and health information.

As with any research study, there may be additional risks that are unknown or unexpected.

5.2 What happens if you get hurt, become sick, or have other problems as a result of this research?

The researchers have taken steps to minimize the risks of this study. Please contact any of the researchers listed in Section 10 about any injuries, side effects, or other problems that you have during this study. You should also tell your regular doctors.

5.3 If you take part in this study, can you also participate in other studies?

Being in more than one research study at the same time may increase the risks to you. It may also affect the results of the studies. You should not take part in more than one study at a time without approval from the researchers involved in each study.

Additionally, participating in the interview portion of this study disqualifies you from participating in the later survey portion of this overall study.

5.4 How could you benefit if you take part in this study? How could others benefit?

You might not receive any personal benefits from being in this study. You may learn something about different forms of prescription drug misuse. You may become more aware of your feelings about how you take your painkillers. This study will help us gain important information about how to help other patients manage their use of prescription painkillers.

6. OTHER OPTIONS

6.1 If you decide not to take part in this study, what other options do you have?

It is up to you whether you choose to participate in this study. You are free to leave the study even after agreeing to participate.

7. ENDING THE STUDY

7.1 If you want to stop participating in the study, what should you do?

You have the right to stop at any point. If you want to stop, or are unsure about continuing with the interview, please inform your interviewer.

7.2 Could there be any harm to you if you decide to leave the study before it is finished?

Leaving the study early should not result in any harm.

7.3 Could the researchers take you out of the study even if you want to continue to participate?

Yes. Some examples of reasons a researcher may end your participation are:

- ✓ The researcher believes that it is not in your best interest to stay in the study.
- ✓ You become ineligible to participate.
- ✓ You do not follow instructions from the researchers.
- ✓ The study is suspended or canceled.

8. FINANCIAL INFORMATION

8.1 Who will pay for the costs of the study?

All study-related costs are paid by the study administrator.

8.2 Will you be paid or given anything for taking part in this study?

You will receive a check for \$20 in the mail after you complete the interview.

8.3 Who could profit or financially benefit from the study results?

No one will profit or financially benefit from the study results.

9. CONFIDENTIALITY OF SUBJECT RECORDS

The information below describes how your privacy and the confidentiality of your research records will be protected in this study.

9.1 How will the researchers protect your privacy?

Interview privacy

1. Password protected computer file, program and servers to transfer data about you from the University of Michigan Health System.
 - a. Identifying information will only be used to identify you for recruiting and incentive payments.
2. No name or other identifying information on the audio recording or written record.
3. We will keep your research record confidential, to the extent provided by federal, state, and local law.
4. We will not allow anyone to see your record, other than people who have a right to see it.
5. After the study is completed, all information that could link your identity to your survey information will be destroyed.

Incentive payment privacy

1. In a separate password-protected file your name and address will be entered.
 - a. No other information will be collected.
2. Once you have received your incentive payment for study participation your name and address will be deleted from our study records.

9.2 What information about you could be seen by the researchers or by other people? Why? Who might see it?

Signing this form gives the researchers your permission to obtain, use, and share information about you for this study, and is required in order for you to take part in the study. Information about you may be obtained from University of Michigan Health System, including:

- Hospital/doctor's office records (chronic pain diagnosis, substance misuse diagnosis, medication prescriptions)
- Medication fill and refill records
- Demographic information
- Personal identifiers

There are many reasons why information about you may be used or seen by the researchers or others during or after this study. Examples include:

- The researchers may need the information to make sure you can take part in the study.

- University, Food and Drug Administration (FDA), and/or other government officials may need the information to make sure that the study is done in a safe and proper manner.
- Study sponsors or funders, or safety monitors or committees, may need the information to:
 - Make sure the study is done safely and properly
 - Learn more about side effects
 - Analyze the results of the study
- If you receive any payments for taking part in this study, the University of Michigan accounting department may need your name and address for tax reporting purposes.
- Federal or State law may require the study team to give information to government agencies. For example, to prevent harm to you or others, or for public health reasons.

The results of this study could be published in an article, but would not include any information that would let others know who you are.

9.3 What happens to information about you after the study is over or if you cancel your permission?

Researchers will not continue to use information about you, but will keep it secure until it is destroyed. We will destroy it 7 years after the last report has been created. Sometimes, it may be necessary for information about you to continue to be used or disclosed, even after you have canceled your permission or the study is over. Examples of reasons for this include:

- To avoid losing study results that have already included your information
- To help University and government officials make sure that the study was conducted properly

9.4 When does your permission expire?

Your permission expires at the end of the study, unless you cancel it sooner. You may cancel your permission at any time by contacting the researchers listed in Section 10 "Contact Information" (below).

10. CONTACT INFORMATION

10.1 Who can you contact about this study?

Please contact the researcher listed below to:

- Obtain more information about the study
- Ask a question about the study procedures or equipment

- Talk about study-related costs to you or your health plan
- Report an illness, injury, or other problem (you may also need to tell your regular doctor)
- Leave the study before it is finished
- Express a concern about the study

Principal Investigator:
 David Malewski M.S., Pharm.D., Ph.D. Candidate
 University of Michigan College of Pharmacy
 428 Church Street, Ann Arbor, MI 48109
 Telephone: 314-482-5695
 e-mail: malewski@umich.edu

You may also express a concern about the study by contacting the Institutional Review Board listed below, or by calling the University of Michigan Compliance Help Line at 1-866-990-0111.

University of Michigan Medical School Institutional Review Board (IRBMED)
2800 Plymouth Road
Building 520, Room 3214
Ann Arbor, MI 48109-2800
 Telephone: 734-763-4768
 Fax: 734-615-1622
 e-mail: irbmed@umich.edu

If you are concerned about a possible violation of your privacy, contact the University of Michigan Health System Privacy Officer at 1-888-296-2481.

When you call or write about a concern, please provide as much information as possible, including the name of the researcher, the IRBMED number (at the bottom of this form), and details about the problem. This will help University officials to look into your concern. When reporting a concern, you do not have to give your name unless you want to.

11. RECORD OF INFORMATION PROVIDED

11.1 What documents will be given to me?

Your signature in the next section means that you have received copies of all of the following documents:

- This "Consent to be Part of a Research Study" document. *(Note: In addition to the copy you receive, copies of this document will be stored in a separate confidential research file and may be entered into your regular University of Michigan medical record.)*

12. SIGNATURES

Research Subject:

I understand the information printed on this form. I have discussed this study, its risks and potential benefits, and my other choices with _____. My questions so far have been answered. I understand that if I have more questions or concerns about the study or my participation as a research subject, I may contact one of the people listed in Section 10 (above). I understand that I will receive a copy of this form at the time I sign it and later upon request. I understand that if my ability to consent for myself changes, either I or my legal representative may be asked to re-consent prior to my continued participation in this study.

Signature of Subject: _____ Date: _____

Name (Print legal name): _____

Date of Birth: _____

Principal Investigator (or Designee):

I have given this research subject (or his/her legally authorized representative, if applicable) information about this study that I believe is accurate and complete. The subject has indicated that he or she understands the nature of the study and the risks and benefits of participating.

Name: _____ Title: _____

Signature: _____ Date of Signature: _____

A.4-1 Interview Questionnaire

Qualitative Interview Questions:

1. Describe the four types of misuse related to intention to misuse controlled prescription drugs: Frequency, Dose, Withdrawal, and Feeling Good.
 - a. Script **“We are looking at four different types of prescription drug misuse, 1. Taking them more often than prescribed, 2. Taking them in higher doses (more pills) than prescribed, 3. Taking them to avoid the symptoms of withdrawal (restlessness, agitation, muscle aches), 4. Taking them to “feel good.”**
 - b. Script **“How are these definitions of prescription drug misuse similar or different from what you think?”**
 - c. Allow up to 2 minutes before next question.
2. Describe the two vignettes and ask the patient to comment on similarities and differences between the scenarios and their actual experiences. (Page 1)
 - a. Script **“Instead of asking people to tell us directly about their use and/or potential misuse of prescription drugs, we are asking them to put themselves in the shoes of one of two made up patients. The first one possibility is Scenario 1. (Show scenario 1)”**
 - b. Script **“The second possibility is Scenario 2. (Show scenario 2.)”**
 - c. Script **“We are using these two different scenarios to get an idea of whether people’s pain, drug seeking and drug use are likely to affect their decision making.”**
 - d. Script **“What are your thoughts and opinions about the use of these scenarios to examine decision making? What would you do similarly or differently?”**

- e. Allow up to 2 minutes before next question.
3. Review risk of addiction questions and ask patient how they feel their risk of addiction influences their likelihood of abusing prescription drugs. (Page 2)
 - a. Script **“The risk of addiction questions ask the patient to consider their situation and then make a determination of how likely or unlikely it is that they would become addicted to their prescription painkillers.”**
 - b. Script **“What are your thoughts and opinions about asking patients about their risk of addiction?”**
 - c. Allow up to 3 minutes before next question.
4. Review self-efficacy questions and ask patient how they experience self-efficacy. (Page 2)
 - a. Script **“The self-efficacy questions ask about the patient’s confidence in being able to resist each of four potential types of drug misuse.”**
 - b. Script **“What are your thoughts and opinions about asking patients about their confidence in resisting abusing their prescription drugs?”**
 - c. Allow up to 3-4 minutes before next question
5. Review perceived vulnerability questions and ask patient how they experience perceived vulnerability. (Page 3)
 - a. Script **“The perceived vulnerability questions ask about the patient’s vulnerability to abusing their painkillers. The less vulnerable they feel, the less likely they are to misuse their drugs.”**
 - b. Script **“What are your thoughts and opinions about asking patients about their perceived vulnerability to prescription drug misuse?”**

- c. Allow up to 3-4 minutes before next question.
6. Review perceived severity questions and ask patient how they experience perceived severity. (Page 4)
 - a. Script **“The perceived severity questions ask patients about how severe and serious the consequences would be of abusing drugs. The more serious and severe the less likely they are to misuse their drugs.”**
 - b. Script **“What are your thoughts and opinions about asking patients about their perceived severity of prescription drug misuse?”**
 - c. Allow up to 3-4 minutes before next question.
7. Review intrinsic rewards questions and ask patient how they experience intrinsic rewards. (Page 5)
 - a. Script **“The intrinsic rewards questions ask patients about some potentially positive aspects or avoidance of negative aspects associated with abusing drugs. With more positives and/or negatives avoided they are more likely to misuse their drugs.”**
 - b. Script **“What are your thoughts and opinions about asking patients about the intrinsic rewards of prescription drug misuse?”**
 - c. Allow up to 3-4 minutes before next question.
8. Review extrinsic rewards questions and ask patient how they experience extrinsic rewards. (Page 5)
 - a. Script **“The extrinsic rewards questions ask patients about social approval associated with abusing drugs. The more there are people around them who**

are neutral or approve of their drug misuse the more likely they are to misuse their drugs.”

- b. Script **“What are your thoughts and opinions about asking patients about the extrinsic rewards of prescription drug misuse?”**
 - c. Allow up to 3-4 minutes before next question.
9. Review subjective norms questions and ask patient how they experience subjective norms. (Page 6)
- a. Script **“The subjective norms questions ask patients about the approval/disapproval and potential influence of other people (family, friends, strangers) on abusing drugs. The approval/disapproval may increase/decrease the likelihood of drug misuse”**
 - b. Script **“What are your thoughts and opinions about the influence of subjective norms on prescription drug misuse?”**
 - c. Allow up to 3-4 minutes before next question.
10. Review attitude questions and ask patient to relate their attitudes towards the four types of prescription misuse. (Pages 7-8)
- a. Script **“The attitude questions assess whether patients are thinking about prescription drug misuse in a more positive or negative manner. The more positive the more likely they are to misuse their drugs and vice versa.”**
 - b. Script **“What are your thoughts and opinions about asking patients about their attitudes towards prescription drug misuse?”**
 - c. Allow up to 3-4 minutes before next question.

11. Review intention questions and ask patient to relate their attitudes towards the four types of prescription misuse. (Page 9)

- a. Script **“The intention questions ask patients about the actual likelihood of abusing drugs. The stronger the patient’s intention the more likely they are to misuse their drugs.”**
- b. Script **“What are your thoughts and opinions about asking patients about their intention to misuse their prescription drugs?”**
- c. Allow up to 3-4 minutes before next question.

12. Review the NIDA Risk Screening questionnaire with the patient. (Page 10)

- a. Script **“The NIDA-modified ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) is included as a brief and minimally invasive way to ask patients about their past substance use. The more substances used and the more often they are used relate the future risk of addiction for a patient.”**
- b. Script **“What are your thoughts and opinions about using the NIDA-ASSIST?”**
- c. Allow up to 2 minutes before next question.

13. Review the demographic questions with the patient. (Pages 11-12)

- a. Script **“The demographic questions ask patients about their background in order to how many other people the findings of this study may apply to.”**
- b. Script **“What are your thoughts and opinions about the demographic questions we ask?”**
- c. Allow up to 2 minutes.

14. Feedback and final comments

- a. Script **“We are now done with the interview.”**
- b. Script **“Do you have any final questions or comments about the survey or anything else we discussed during this interview?”**

A.4-2 Interview Coding Worksheet

Interview ID:

Question block 1: Types of Abuse

1.1 Are definitions similar or different from patient experience? Similar / Different

1.2 If different, what reason(s) for being different? Yes / No

Comment: _____

1.3 Any other thoughts, suggestions or changes about types of abuse? Yes / No

Comment: _____

Question block 2: Scenarios

2.1 Are scenarios relatable? Yes / No

2.2 Are scenarios understandable? Yes / No

2.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 3: Risk of Addiction

3.1 Thought and opinion about RA? Yes / No

3.2 If changes suggested what are they? Yes / No

Comment: _____

3.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 4: Self-efficacy

4.1 Thought and opinion about SE? Yes / No

4.2 If changes suggested what are they? Yes / No

Comment: _____

4.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 5: Perceived Vulnerability

5.1 Thought and opinion about PV? Yes / No

5.2 If changes suggested what are they? Yes / No

Comment: _____

5.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 6: Perceived Severity

6.1 Thought and opinion about severity? Yes / No

6.2 Thought and opinion about serious? Yes / No

6.3 Suggested changes/modification to consequences? Yes / No

Comment: _____

6.4 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 7: Intrinsic Rewards

7.1 Thought and opinion about IR? Yes / No

7.2 If changes suggested what are they? Yes / No

Comment: _____

7.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 8: Extrinsic Rewards

8.1 Thought and opinion about ER? Yes / No

8.2 If changes suggested what are they? Yes / No

Comment: _____

8.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 9: Subjective Norms

9.1 Thought and opinion about SN? Yes / No

9.2 If changes suggested what are they? Yes / No

Comment: _____

9.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 10: Attitude

10.1 Thought and opinion about Att? Yes / No

10.2 If changes suggested what are they? Yes / No

Comment: _____

10.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 11: Intention

11.1 Thought and opinion about Int? Yes / No

11.2 If changes suggested what are they? Yes / No

Comment: _____

11.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 12: ASSIST

12.1 Thought and opinion about ASSIST? Yes / No

12.2 If changes suggested what are they? Yes / No

Comment: _____

12.3 Will people be able to fill out honestly? Yes / No

12.4 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 13: Demographics

13.1 Thought and opinion about demographics? Yes / No

13.2 If changes suggested what are they? Yes / No

Comment: _____

13.3 Any other thoughts, suggestions or changes? Yes / No

Comment: _____

Question block 14: Feedback and Final Comments

14.1 Any final suggestions? Yes / No

Comment: _____

A.5 Survey Mailing

First Name, Last Name
Address
City, State Zip Code

Date

Dear First Name, Last Name:

Hello, my name is David Malewski. I am a graduate student at the University of Michigan. You have been identified from a large database of University of Michigan Health System patients as qualified for my research study. According to the database you are at least 18 years old, have chronic non-cancer pain, and have been taking at least one long-acting and/or one short-acting painkiller for more than a month. This data may not be accurate, if so, or if you would otherwise want to opt-out of this study please see the information at the end of this letter.

I am recruiting patients with chronic pain to participate in a survey. We are conducting research looking at the decisions that patients make about taking their prescription painkillers. We want to know how those decisions affect whether people will misuse prescription painkillers.

Participation in this survey is completely voluntary and anonymous. Should you decide to participate in this study none of the information you share on the will be shared with anyone other than study personnel. Your name or any other personally identifying information will not be associated with any information from your survey questionnaire.

Participation will consist of a 60 question online survey and should take between 20 and 30 minutes to complete.

As an incentive we offer you a \$10 check for completion of the survey. Your name and address will only be collected for reimbursement purposes.

If you wish to participate in this research study please open up a web browser (such as Internet Explorer, Google Chrome, or Apple Safari) and enter the complete following web address in the address bar:

<http://tinyurl.com/pdaiis> Username: [Participant #] Password: [password]

You will be prompted to answer a few preliminary questions to make sure that you meet the full requirements of the study. If you qualify, you will then be asked to consent to participate in the study, after which you will be presented the survey questions. All of these questions are answered anonymously with no personally identifiable information linked.

After you complete the survey you will have the option of providing your name and an address to which will be sent a \$10 check. This information is entered into a completely different system and will not be associated in any way with the study information.

We hope that you will participate in our study. However, if you do not want to be contacted again about participation in this study please either send an e-mail to malewski@umich.edu with

the subject “Decline Study Participation – [Participant #]” or call 314-482-5695 and leave a brief message.

Thank you for your consideration.
Sincerely,

David Malewski M.S., Pharm.D.

A.6 Survey E-mail Reminder

Hello, my name is David Malewski. I am a graduate student at the University of Michigan. You were identified as a qualified patient within The University of Michigan Health System to participate in our research survey. Two weeks ago I sent you a mailing. I wanted to send you a reminder about possible participation in my research study.

I am recruiting patients with chronic pain to participate in a survey. We are conducting research looking at the decisions that patients make about taking their prescription painkillers. We want to know how those decisions affect whether people will misuse prescription painkillers. We would appreciate your participation in this study to contribute towards the future development of ways to help chronic pain patients avoid abusing their painkillers, while still responsibly managing their pain.

Participation in this individual interview is completely voluntary and anonymous. Should you decide to participate in this study none of the information you share on the will be shared with anyone other than study personnel. Your name or any other personally identifying information will not be associated with any information from your survey questionnaire.

Participation in the survey will consist of online completion of a 60 question survey questionnaire. The amount of time needed to complete the questionnaire is between 20 and 30 minutes.

As an incentive we offer you a \$10 Visa Gift Card for completion of the survey. Your name and address will only be collected for reimbursement purposes, but the university will not have a specific reason other than “study participation” because they require that information for their records.

If you wish to participate in this research study please open up a web browser (such as Internet Explorer, Google Chrome, or Apple Safari) and enter the complete following web address in the search bar or just click on the following link and it should take you directly to the survey:

https://example_unique_survey_invitation

You will be prompted to answer a few preliminary questions to make sure that you meet the full requirements of the study. If you qualify, you will then be asked to consent to participate in the study, after which you will be presented the survey questions. All of these questions are answered anonymously with no personally identifiable information linked.

After you complete the survey you will have the option of providing your name and an address to which will be sent a \$10 Visa Gift Card. This information is entered into a completely different system and will not be associated in any way with the study information.

We hope that you will participate in our study.

Thank you for your consideration.

Sincerely,

David Malewski M.S., Pharm.D.

A.7 Survey Mail Reminder

Hello, my name is David Malewski. I am a graduate student at the University of Michigan. Four weeks ago I sent you a mailing. I wanted to send you a reminder about possible participation in my research study. You have been identified from a large database of University of Michigan Health System patients as qualified for my research study. According to the database you are at least 18 years old, have chronic non-cancer pain, and have been taking at least one long-acting and/or one short-acting painkiller for more than a month. This data may not be accurate, if so, or if you would otherwise want to opt-out of this study please see the information at the end of this e-mail.

I am recruiting patients with chronic pain to participate in a survey. We are conducting research looking at the decisions that patients make about taking their prescription painkillers. We want to know how those decisions affect whether people will misuse prescription painkillers.

Participation in this survey is completely voluntary and anonymous. Should you decide to participate in this study none of the information you share will be shared with anyone other than study personnel. Your name or any other personally identifying information will not be associated with any information from your survey questionnaire.

Participation will consist of a 60 question online survey and should take between 20 and 30 minutes to complete.

As an incentive we offer you a \$10 check for completion of the survey. Your name and address will only be collected for reimbursement purposes.

If you wish to participate in this research study please open up a web browser (such as Internet Explorer, Google Chrome, or Apple Safari) and enter the complete following web address in the search bar:

<http://tinyurl.com/pdaiis>

Username:

Password:

You will be prompted to answer a few preliminary questions to make sure that you meet the full requirements of the study. If you qualify, you will then be asked to consent to participate in the study, after which you will be presented the survey questions. All of these questions are answered anonymously with no personally identifiable information linked.

After you complete the survey you will have the option of providing your name and an address to which will be sent a \$10 check. This information is entered into a completely different system and will not be associated in any way with the study information.

We hope that you will participate in our study. However, if you do not want to be contacted again about participation in this study please either send an e-mail to Malewski@umich.edu with the subject "Decline Study Participation" or call 314-482-5695 and leave a brief message.

We hope that you will participate in our study.

Thank you for your consideration.
Sincerely,
David Malewski M.S., Pharm.D.

University of Michigan
Consent To Be Part Of A Research Study

NAME OF STUDY AND RESEARCHERS

Title of Project: Attitude and intention to misuse controlled prescription drugs: a conditional indirect effects model

Principal Investigator: David Malewski, MS PharmD

Co-Investigators: Steven Erickson, PharmD; Karen Farris, PhD; Richard Bagozzi, PhD; Rajesh Balkrishnan, PhD; Mark Ilgen, PhD; Peter Batra, MS

GENERAL INFORMATION

We're doing a study to learn more about prescription drug misuse. To get information we'd like at least 140 people to answer a survey. We expect it to take about 20 to 30 minutes to complete the survey.

You may STOP taking the survey at any point. Answering this survey is voluntary. You don't have to answer it if you'd rather not. You can skip any questions that you don't want to answer, whatever the reason, and you don't have to tell us why. Choosing not to answer our survey won't affect the medical care you might receive at the University of Michigan Health System.

It's possible that some of the questions may make you feel uncomfortable. If a question makes you uncomfortable, you can just skip it and go to the next question.

To keep your information confidential, we will:

Label your survey with a code, rather than your name or any other details that someone could use to identify you. Although we'll keep a list of all the people who answered our survey, no one outside our study team will be able to figure out who answered the survey or which people gave which answers. We plan to publish what we learn from this study, but we won't include any personal information that could reveal who answered the survey.

Your survey responses will be completely anonymous. There will be no code key to match a survey code to a specific name. No one, including members of our study team, will know which subjects gave which answers.

Answering our survey won't benefit you directly. We hope what we learn will help other people in the future.

We have prepared two different surveys for this study, although each subject will complete only one survey. We will use a random method (like flipping a coin) to determine which survey you receive

- Survey 1 describes a scenario in which your pain is well-controlled and doesn't require you to seek more prescription painkillers.
- Survey 2 describes a scenario in which your pain is not well-controlled and you have reason to seek more prescription painkillers.

You will answer the survey questions as if you are the individual in the scenario.

At the end of the survey form, you'll answer questions about your:

- gender
- marital status
- race-ethnicity
- employment status and income
- education

Finally, the survey form contains a two-question alcohol, smoking and substance use screening test

To thank you for taking part in our study, we'll send you a check for \$10 after you take the survey. Recorded separate from your survey responses, the University of Michigan accounting department may need your name, address, Social Security number, payment amount, and related information for tax reporting purposes.

The results of this study could be published in an article, but would not include any information that would let others know who you are.

As a rule, the researchers will continue to use information about you until the study is over and will keep it secure until it is destroyed. Limited information about you may continue to be used after the study is over, for other research, education, or other activities. But use of this information would not reveal your identity.

Principal Investigator:

David Malewski M.S., Pharm.D.
University of Michigan College of Pharmacy
428 Church Street, Ann Arbor, MI 48109
Telephone: 314-482-5695
e-mail: malewski@umich.edu

You may also express a concern about the study by contacting the Institutional Review Board :

University of Michigan Medical School Institutional Review Board (IRBMED)
2800 Plymouth Road
Building 520, Room 3214
Ann Arbor, MI 48109-2800
Telephone: 734-763-4768
e-mail: irbmed@umich.edu

If you are concerned about a possible violation of your privacy or concerned about a study, you may contact the University of Michigan Health System Compliance Help Line at 1-866-990-0111.

Do you wish to participate in this study?

- Yes, I would like to take part
- No, I don't want to take part

IRB: IRBMED IRB Number: HUM00100936 Document Approved On: xx/xx/xxxx

A.9 Survey Questionnaire

Vignette 1 (Control – Pain Well-controlled/No Drug Seeking/No Misuse):

(Please answer the survey questions as if YOU are experiencing the following scenario.)

You suffered a severe back injury about 2 years ago requiring the fusing of several vertebrae. Your daily pain level averages between a 1 or 2 out of 10 (with 1 = no pain and 10 = the worst pain you've ever experienced).

The medication you are prescribed in order to control your pain is as follows: Oxycontin 10 mg (brand name oxycodone), 1 tablet once a day; and Vicodin 5 mg/325 mg (brand name hydrocodone/acetaminophen), 1 tablet every six hours as needed for pain.

You take 1 tablet of Oxycontin once a day, but don't have much need for the Vicodin. Your pain doesn't interfere with your daily tasks and you are able to work your job without any indication that you are on a strong painkiller to control your back pain. With your pain well controlled you only fill your Oxycontin every month, but you haven't needed to refill your Vicodin in over a year.

Vignette 2 (Test - Pain Poorly Controlled/Drug Seeking/Misuse):

(Please answer the following questions as if YOU are experiencing the following scenario.)

You suffered a severe back injury about 2 years ago requiring the fusing of several vertebrae. Your daily pain level is between a 5 to 7 out of 10, with occasional breakthrough of around 9 to 10 (with 1 = no pain and 10 = the worst pain you've ever experienced).

The medication you are prescribed in order to control your pain is as follows: Oxycontin (brand name oxycodone) 20 mg, 1 tablet twice a day; and Vicodin 5 mg/325 mg (brand name hydrocodone/acetaminophen), 1 to 2 tablets every four to six hours as needed for pain. You take 1 Oxycontin tablet between one and four times a day, you take 1 to 4 tablets of Hydrocodone three to six times a day.

You are taking your medication mainly to avoid symptoms of withdrawal, (restlessness, agitation and some muscle aches) and to "feel good" (a euphoric feeling of comfort and contentment). Your pain makes daily tasks take longer than they should and sometimes leaves you bedridden. You are having a hard time holding a job because your pain often interferes with your concentration and results in you needing time off.

When you are not in pain you are often sleepy or dizzy which also interferes with your ability to work and perform daily tasks. You run out of Vicodin and Oxycodone early every month and are thinking about seeing another doctor to get another painkiller prescription and borrowing or buying more painkillers from friends or strangers. You want to avoid withdrawal and still be able to "feel good" when you want to.

Risk of Addiction:

(Scenario reminder - please answer the survey questions as if YOU are in the described situation.)

Your daily pain is 5 to 7 out of 10. Your pain, withdrawal, and desire to "feel good" make it hard for you to work and do daily life activities. You are using and seeking more painkillers than you are prescribed in order to avoid withdrawal and "feel good."

(Start of Survey)

How likely is it that you would become addicted to prescription painkillers?

Very unlikely Unlikely Neither unlikely nor likely Likely Very Likely

Please express the probability of your becoming addicted to prescription painkillers:

	No Chance		50/50						Certain		
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Self-Efficacy:

(Scenario reminder - please answer the survey questions as if YOU are in the described situation.)

Your daily pain is 1 or 2 out of 10. Your pain does not interfere with life or job activities. You have no need to take any more painkillers than you are prescribed.

I am confident that I can **resist**:

	Not at all confident	Somewhat confident	Moderately confident	Very Confident	Extremely Confident
Taking my prescription painkillers more often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking higher doses (more pills) of prescription painkillers than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking prescription painkillers to avoid withdrawal symptoms (example: restlessness, agitation, and muscle aches).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking prescription painkillers to "feel good" (example: a euphoric feeling of comfort and contentment).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Perceived Vulnerability:

(Scenario reminder - please answer the survey questions as if YOU are in the described situation.)

Your daily pain is 5 to 7 out of 10. Your pain, withdrawal, and desire to "feel good" make it hard for you to work and do daily life activities. You are using and seeking more painkillers than you are prescribed in order to avoid withdrawal and "feel good."

How vulnerable are you to taking prescription painkillers:

	Not at all vulnerable	Somewhat vulnerable	Moderately vulnerable	Very vulnerable	Extremely vulnerable
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How strong is your willpower to avoid taking prescription painkillers:

	Very weak willpower	Weak willpower	Moderate willpower	Strong willpower	Very strong willpower
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Scenario reminder - please answer the survey questions as if YOU are in the described situation.)

Your daily pain is 5 to 7 out of 10. Your pain, withdrawal, and desire to "feel good" make it hard for you to work and do daily life activities. You are using and seeking more painkillers than you are prescribed in order to avoid withdrawal and "feel good."

How likely are you to take prescription painkillers:

	Very unlikely	Unlikely	Neither unlikely nor likely	Likely	Very likely
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Perceived Severity:

(Scenario reminder - please answer the survey questions as if YOU are in the described situation.)

Your daily pain is 5 to 7 out of 10. Your pain, withdrawal, and desire to "feel good" make it hard for you to work and do daily life activities. You are using and seeking more painkillers than you are prescribed in order to avoid withdrawal and "feel good."

(Survey 1/2 Completed)

How severe would the consequences be (example: drowsiness, dizziness, nausea) for you taking prescription painkillers:

	Not at all severe	Somewhat severe	Moderately severe	Very severe	Extremely severe
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How serious would the situation be for you taking prescription painkillers:

	Not at all serious	Somewhat serious	Moderately serious	Very serious	Extremely serious
More often than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Intrinsic Rewards:

(Scenario reminder - please answer the survey questions as if YOU are in the described situation.)

Your daily pain is 5 to 7 out of 10. Your pain, withdrawal, and desire to "feel good" make it hard for you to work and do daily life activities. You are using and seeking more painkillers than you are prescribed in order to avoid withdrawal and "feel good."

Taking prescription painkillers more often than I am prescribed relieves some of my problems (example: anxiety, personal, relationship).

Strongly disagree Disagree Neither disagree nor agree Agree Strongly agree

Taking higher doses of prescription painkillers than I am prescribed relieves some of my problems.

Strongly disagree Disagree Neither disagree nor agree Agree Strongly agree

I will avoid withdrawal symptoms by taking prescription painkillers.

Strongly disagree Disagree Neither disagree nor agree Agree Strongly agree

I enjoy "feeling good" by taking prescription painkillers.

Strongly disagree Disagree Neither disagree nor agree Agree Strongly agree

Extrinsic Rewards:

Some people who are important to me take prescription painkillers:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To enjoy "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Subjective Norms:

My family members would disapprove/approve of me taking prescription painkillers:

	Strongly disapprove	Disapprove	Neither disapprove nor approve	Approve	Strongly approve
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My friends would disapprove/approve of me taking prescription painkillers:

	Strongly disapprove	Disapprove	Neither disapprove nor approve	Approve	Strongly approve
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strangers would disapprove/approve of me taking prescription painkillers:

	Strongly disapprove	Disapprove	Neither disapprove nor approve	Approve	Strongly approve
More often than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feeling good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attitude:

For me to take more prescription painkillers than I am prescribed for pain would be:

Very bad	Bad	Somewhat bad	Neither bad nor good	Somewhat good	Good	Very good
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For me to take higher doses of prescription painkillers I am prescribed would be:

Very harmful	Harmful	Somewhat harmful	Neither harmful nor beneficial	Somewhat beneficial	Beneficial	Very beneficial
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very unfavorable	Unfavorable	Somewhat unfavorable	Neither unfavorable nor favorable	Somewhat favorable	Favorable	Very favorable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For me to take higher doses of prescription painkillers I am prescribed would be:

Very bad	Bad	Somewhat bad	Neither bad nor good	Somewhat good	Good	Very good
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very harmful	Harmful	Somewhat harmful	Neither harmful nor beneficial	Somewhat beneficial	Beneficial	Very beneficial
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very unfavorable	Unfavorable	Somewhat unfavorable	Neither unfavorable nor favorable	Somewhat favorable	Favorable	Very favorable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attitude (continued):

My attitude toward taking prescription painkillers to avoid withdrawal symptoms would be that it is:

Very bad	Bad	Somewhat bad	Neither bad nor good	Somewhat good	Good	Very good
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very harmful Harmful Somewhat harmful Neither harmful nor beneficial Somewhat beneficial Beneficial Very beneficial

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Very unfavorable Unfavorable Somewhat unfavorable Neither unfavorable nor favorable Somewhat favorable Favorable Very favorable

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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For me to take prescription painkillers to "feel good" would be:

Very bad	Bad	Somewhat bad	Neither bad nor good	Somewhat good	Good	Very good
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very harmful Harmful Somewhat harmful Neither harmful nor beneficial Somewhat beneficial Beneficial Very beneficial

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Very unfavorable Unfavorable Somewhat unfavorable Neither unfavorable nor favorable Somewhat favorable Favorable Very favorable

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Intention:

I intend to take prescription painkillers:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
More often than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

It is unlikely/likely that I will actually take prescription painkillers:

	Very unlikely	Unlikely	Neither unlikely nor likely	Likely	Very likely
More often than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In higher doses than I am prescribed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To avoid withdrawal symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To "feel good."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Those are all of the questions we would like you to answer as the Scenario Person.

Please answer the rest of the survey questions about yourself and your experiences.

For the following questions we would like you to talk about non-medical prescription and substance use in your lifetime and the last six months.

NIDA – modified Alcohol, Smoking and Substance Involvement Screening Test (ASSIST):

In your *LIFETIME*, which of the following substance have you ever used (non-medical use only)?

-Non-medical use refers to using a substance either not prescribe to the patient or used in ways or amounts not prescribed by their doctor.

	Yes	No
1. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	<input type="radio"/>	<input type="radio"/>
2. Alcohol (For men, 5 or more drinks a day; for women, 4 or more drinks a day)	<input type="radio"/>	<input type="radio"/>
3. Cannabis (Marijuana, pot, grass, hash, etc.)	<input type="radio"/>	<input type="radio"/>
4. Cocaine (coke, crack, etc.)	<input type="radio"/>	<input type="radio"/>
5. Prescription Stimulants (Ritalin, Concerta, Dexedrine, Adderall, diet pills, etc.)	<input type="radio"/>	<input type="radio"/>
6. Methamphetamine (speed, crystal meth, ice, etc.)	<input type="radio"/>	<input type="radio"/>
7. Inhalants (nitrous oxide, glue, gas, paint thinner, etc.)	<input type="radio"/>	<input type="radio"/>
8. Sedatives or sleeping pills (Valium, Serepax, Ativan, Xanax, Librium, Rohypnol, GHB, etc)	<input type="radio"/>	<input type="radio"/>
9. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, ecstasy, etc.)	<input type="radio"/>	<input type="radio"/>
10. Street opioids (heroin, opium, etc.)	<input type="radio"/>	<input type="radio"/>
11. Prescription opioids (fentanyl, oxycodone [OxyContin, Percocet], hydrocodone [Vicodin], methadone, buprenorphine, etc.) • Please record nonmedical use only: Non-medical use refers to using a substance either not prescribed to the patient or used in ways or amounts not prescribed by their doctor.	<input type="radio"/>	<input type="radio"/>
12. Other – specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>

In the *PAST SIX MONTHS*, how often have you used the substance(s) you mentioned (first drug, second drug, etc)?

	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
1. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Alcohol (For men, 5 or more drinks a day; for women, 4 or more drinks a day)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Cannabis (Marijuana, pot, grass, hash, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Cocaine (coke, crack, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Prescription Stimulants (Ritalin, Concerta, Dexedrine, Adderall, diet pills, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Methamphetamine (speed, crystal meth, ice, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Inhalants (nitrous oxide, glue, gas, paint thinner, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Sedatives or sleeping pills (Valium, Serepax, Ativan, Xanax, Librium, Rohypnol, GHB, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, ecstasy, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Street opioids (heroin, opium, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Prescription opioids (fentanyl, oxycodone [OxyContin, Percocet], hydrocodone [Vicodin], methadone, buprenorphine, etc.) • Please record nonmedical use only: Non-medical use refers to using a substance either not prescribed to the patient or used in ways or amounts not prescribed by their doctor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Other – specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demographics:

And lastly we have demographic questions for classification purposes.

What do you consider your gender?

- Male
- Female

What is your marital status?

- Single
- Married/Cohabiting
- Divorced
- Widowed

What do you consider your race?

- White/Caucasian
- Black/African American
- American Indian
- Asian or Pacific Islander
- Other (Please specify)
- I do not wish to answer

Are you of Hispanic or Latino origin?

- Yes
- No

What is your current employment status?

- Full Time
- Self Employed
- Part Time
- Not Employed

What is your current yearly income?

- less than \$10,000
- \$10,001 to \$20,000
- \$20,001 to \$30,000
- \$30,001 to \$50,000
- \$50,001 to \$70,000
- \$70,001 to \$90,000
- \$90,001 to \$100,000
- greater than \$100,001

(Last Survey Question!)

What is your current level of education?

- less than High School
- High School or Equivalent (GED)
- Some College to Bachelor's Degree
- Professional Degree
- Graduate Degree

Appendix B: Coding Grids and Process Models

Table B.1 Reviewer One: Interview coding

Question	Substance User							Non-User					
	A01	A02	A04	A06	A07	A09	A11	N13	N18	N19	N23	N26	N27
1.1	S	S	S	S	S	S	S	S	S	S	S	S	S
1.2	N	N	N	N	N	N	N	N	N	N	N	N	N
1.3	N	N	N	N	N	N	N	N	N	N	N	N	N
2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2.3	Y	N	N	Y	N	N	Y	Y	N	N	Y	N	N
3.1	Y	N	N	N	N	N	N	N	N	N	N	N	N
3.2	Y	N	N	N	N	N	N	N	N	N	N	N	N
3.3	N	N	N	N	N	N	N	N	N	N	N	N	N
4.1	N	N	N	N	N	N	N	N	N	N	N	N	N
4.2	N	N	N	N	N	N	N	N	N	N	N	N	N
4.3	N	N	N	N	N	N	N	N	N	N	N	N	N
5.1	N	N	N	N	N	N	N	N	Y	N	Y	Y	N
5.2	N	N	N	N	N	N	N	N	Y	N	Y	Y	N
5.3	Y	N	N	Y	N	N	Y	N	N	N	N	Y	Y
6.1	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
6.2	Y	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
6.3	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y
6.4	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	N
7.1	N	N	Y	Y	N	N	Y	N	Y	Y	N	N	N
7.2	N	N	Y	Y	N	N	Y	N	Y	Y	N	N	N
7.3	N	N	N	N	N	N	Y	N	N	N	N	N	N
8.1	Y	N	N	N	N	N	N	N	Y	N	N	N	N
8.2	Y	N	N	N	N	N	N	N	Y	N	N	N	N
8.3	Y	N	N	N	N	N	N	N	N	N	N	N	N
9.1	N	N	N	N	N	Y	N	Y	N	Y	Y	Y	N
9.2	N	N	N	N	N	Y	N	N	N	Y	Y	Y	N
9.3	N	N	N	N	N	N	N	Y	N	N	N	N	N
10.1	N	N	N	N	N	N	N	N	Y	N	N	N	N
10.2	N	N	N	N	N	N	N	N	Y	N	N	N	N
10.3	Y	N	N	N	N	N	Y	N	N	N	N	N	N
11.1	Y	N	N	N	N	N	N	Y	Y	N	N	N	N
11.2	Y	N	N	N	N	N	N	Y	Y	N	N	N	N
11.3	N	N	N	N	N	Y	N	N	N	Y	N	N	N

12.1	N	N	N	N	N	N	N	N	N	N	N	N	N
12.2	N	N	N	N	N	N	N	N	N	N	N	N	N
12.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12.4	N	Y	N	N	N	N	Y	N	N	N	N	N	N
13.1	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N
13.2	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N
13.3	N	N	N	N	N	N	N	N	Y	N	N	N	N
14.1	Y	N	N	N	N	N	N	N	N	N	Y	N	N

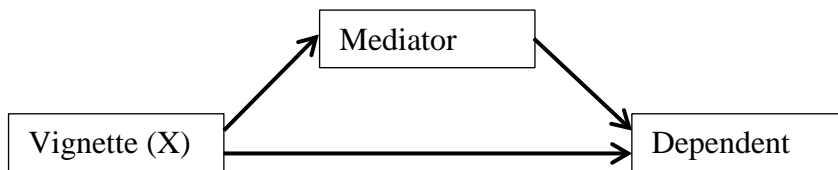
Table B.2 Reviewer Two: Interview coding

Question	Substance User							Non-User						
	A01	A02	A04	A06	A07	A09	A11	N13	N18	N19	N23	N26	N27	
1.1	S	S	S	S	S	S	S	S	S	S	S	S	S	
1.2	N	N	N	N	N	N	N	N	N	N	N	N	N	
1.3	N	N	N	N	N	N	N	N	N	N	N	N	N	
2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2.3	Y	N	N	Y	N	N	Y	Y	N	N	Y	N	N	
3.1	Y	N	N	N	N	N	Y	N	N	N	N	N	N	
3.2	N	N	N	N	N	N	Y	N	N	N	N	N	N	
3.3	Y	N	N	N	N	N	N	N	N	N	N	Y	N	
4.1	N	N	N	N	N	N	N	N	N	N	N	N	N	
4.2	N	N	N	N	N	N	N	N	N	N	N	N	N	
4.3	N	N	Y	N	N	N	N	N	N	N	N	N	N	
5.1	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	
5.2	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	
5.3	N	N	N	Y	N	N	Y	Y	N	N	N	N	Y	
6.1	Y	N	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	
6.2	Y	N	N	Y	N	N	Y	Y	Y	Y	N	Y	Y	
6.3	Y	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	
6.4	Y	N	N	Y	N	N	Y	Y	N	Y	N	Y	N	
7.1	N	N	Y	Y	N	N	Y	N	Y	Y	N	N	N	
7.2	N	N	Y	Y	N	N	Y	N	Y	Y	N	N	N	
7.3	N	N	N	N	N	N	Y	N	N	N	N	N	N	
8.1	Y	N	N	N	N	N	N	N	N	N	N	N	N	
8.2	Y	N	N	N	N	N	N	N	N	N	N	N	N	
8.3	N	N	N	N	N	N	N	N	N	N	N	N	N	
9.1	N	N	N	N	N	Y	N	Y	N	Y	Y	Y	N	
9.2	N	N	N	N	N	Y	N	Y	N	Y	Y	Y	N	
9.3	N	N	N	N	N	N	N	N	N	N	N	N	N	
10.1	N	N	N	N	N	N	N	N	Y	N	N	N	N	

10.2	N	N	N	N	N	N	N	N	Y	N	N	N	N
10.3	Y	N	N	N	N	N	Y	N	N	N	N	N	N
11.1	Y	N	N	N	N	N	N	Y	Y	N	N	N	N
11.2	Y	N	N	N	N	N	N	Y	Y	N	N	N	N
11.3	N	N	N	N	N	Y	N	N	N	N	N	N	N
12.1	N	N	N	N	N	N	N	N	N	N	N	N	N
12.2	N	N	N	N	N	N	N	N	N	N	N	N	N
12.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12.4	N	Y	N	N	N	N	Y	N	N	N	N	N	N
13.1	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N
13.2	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N
13.3	N	Y	N	N	N	N	N	N	Y	N	N	N	N
14.1	Y	N	N	N	N	N	N	N	N	N	Y	N	N

*Bold and Highlighted indicates difference from Reviewer One

Figure B.1 Process Model 4 and Key



X (vignette) = Pain, drug seeking, misuse influences Mediator (M_i), if significant.

M_i = Mediator (M_i) influences Dependent (Y), if significant.

Direct X→Y = Vignette (X) directly influences Dependent (Y), if significant.

Types of misuse:

- Taking prescription more OFTEN than prescribed.
- Taking prescription in higher DOSE than prescribed.
- Taking prescription to avoid WITHDRAWAL symptoms.
- Taking prescription to “FEEL GOOD.”

Combined misuse cases

- ALL TYPE MISUSE combines results for all four misuse types
- OFTEN and DOSE combines results for those two medication-related types of misuse.
- WITHDRAWAL and FEEL GOOD combines results for those two symptom/feeling-based types of misuse

Table B.3 Model 4 Attitude Full Model - Often & Dose

Process Model 4 Regression findings for Full Model Attitude (Y) by Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), and Extrinsic Rewards (M₄) OFTEN and DOSE misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	<u>t</u>	b	s.e.	<u>t</u>
X (<i>Vignette</i>)	.12	.12	1.03	.66	.09	7.10***
Age	-.01	.01	-1.41	-.01	.01	-1.67
Gender	.29	.25	1.16	-.12	.20	-.61
Marital	-.23	.23	-.99	.19	.18	1.06
Race	-.90	.57	-1.57	-.33	.45	-.72
Employ	.08	.11	.77	.10	.09	1.13
Income	.01	.06	.23	.08	.05	1.72
Education	.37	.13	2.81**	.08	.10	.80
	<u>R²=.14</u>			<u>R²=.34</u>		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	<u>T</u>	b	s.e.	<u>t</u>
X (<i>Vignette</i>)	.46	.10	4.65***	.25	.13	2.01*
Age	.00	.01	.57	-.00	.01	-.38
Gender	-.31	.21	-1.46	.15	.27	.58
Marital	-.05	.20	-.23	.18	.25	.74
Race	.08	.49	.15	-.64	.61	-1.05
Employ	-.09	.09	-.96	.06	.12	.51
Income	-.09	.05	-1.72	-.06	.06	-.87
Education	.03	.11	.30	-.09	.14	-.61
	<u>R²=.21</u>			<u>R²=.09</u>		
Outcome variable model						
Attitude (Y)						
Model	b	s.e.	<u>t</u>			
M ₁ (Perceived Severity)	-.16	.08	-1.96			
M ₂ (Perceived Vuln)	.07	.11	.68			
M ₃ (Intrinsic Rewards)	.48	.11	4.49***			
M ₄ (Extrinsic Rewards)	-.03	.07	-.49			
X (<i>Vignette</i>)	.00	.11	.03			
Age	.00	.01	.12			
Gender	-.36	.20	-1.83			
Marital	.28	.18	1.52			
Race	-.03	.45	-.07			
Employ	-.06	.09	-.64			
Income	-.01	.05	-.14			
Education	.09	.11	.88			

	$R^2=.41$	
	Effect	95% CI
Direct effect X→Y	.00	(-.22, .23)

* $p<.05$, ** $p<.01$, *** $p<.001$

Description: Pain, drug seeking, and misuse (vignette) influence mediators Perceived Vulnerability, Intrinsic Rewards, and Extrinsic Rewards. Intrinsic Rewards influences Attitude for OFTEN and DOSE misuse. There was no direct effect of vignette on Attitude. There was a significant conditional indirect effect of vignette on Attitude towards OFTEN and DOSE misuse as mediates by Intrinsic Rewards.

Table B.4 Model 4 Attitude Full Model - Withdraw & Feel Good

Process Model 4 Regression findings for Full Model Attitude (Y) by Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), and Extrinsic Rewards (M₄)
 WITHDRAWAL and FEEL GOOD misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.11	.11	.98	.54	.10	5.59***
Age	-.01	.01	-1.50	-.02	.01	-2.30*
Gender	.39	.24	1.61	-.23	.21	-1.10
Marital	-.24	.22	-1.12	.08	.19	.42
Race	-.71	.60	-1.18	.03	.52	.06
Employ	.07	.10	.67	.11	.09	1.17
Income	.06	.06	1.04	.02	.05	.44
Education	.33	.12	2.67**	.19	.11	1.81
	$R^2=.13$			$R^2=.22$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	T	b	s.e.	t
X (<i>Vignette</i>)	.37	.10	3.70***	.21	.10	2.06*
Age	-.01	.01	-1.63	-.01	.01	-1.10
Gender	-.23	.22	-1.09	.13	.23	.60
Marital	.15	.19	.81	.05	.20	.24
Race	.19	.54	.36	-.55	.56	-.97
Employ	.05	.09	.55	.03	.10	.29
Income	.00	.05	.07	-.06	.05	-1.14
Education	.14	.11	1.31	-.03	.11	-.24
	$R^2=.12$			$R^2=.09$		
Outcome variable model						
Attitude (Y)						
Model	b	s.e.	t			
M ₁ (Perceived Severity)	-.21	.07	-3.09**			
M ₂ (Perceived Vuln)	.03	.12	.22			
M ₃ (Intrinsic Rewards)	.47	.12	4.07***			
M ₄ (Extrinsic Rewards)	-.04	.07	-.57			
X (<i>Vignette</i>)	.18	.10	1.83			
Age	.00	.01	.34			
Gender	-.12	.19	-.67			
Marital	.11	.17	.66			
Race	.31	.47	.66			
Employ	-.12	.08	-1.43			
Income	-.05	.04	-1.14			
Education	.02	.10	.21			

	$R^2=.39$	
	Effect	95% CI
Direct effect X→Y	.18	(-.01, .37)

* $p<.05$, ** $p<.01$, *** $p<.001$

Description: Pain, drug seeking, and misuse (vignette) influence both mediators Perceived Vulnerability, Intrinsic Rewards, and Extrinsic Rewards. Perceived Severity and Intrinsic Rewards influences Attitude. There was no direct effect of vignette on Attitude. There was a significant conditional indirect effect of vignette on Attitude towards WITHDRAWAL and FEEL GOOD misuse as mediates by Intrinsic Rewards.

Table B.5 Model 4 Intention Full Model - Often & Dose

Process Model 4 Regression findings for Full Model Intention (Y) by Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), Extrinsic Rewards (M₄), Subjective Norm (M₅), and Attitude (M₆) OFTEN and DOSE misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.09	.12	.77	.66	.09	6.95***
Age	-.01	.01	-1.23	-.01	.01	-1.74
Gender	.22	.25	.89	-.11	.20	-.55
Marital	-.19	.23	-.81	.17	.19	.91
Race	-.95	.57	-1.67	-.32	.45	-.69
Employ	.10	.11	.95	.09	.09	1.06
Income	.02	.06	.35	.08	.05	1.76
Education	.37	.13	2.81**	.07	.11	.65
	$R^2=.13$			$R^2=.34$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.46	.10	4.60***	.24	.13	1.85
Age	.00	.01	.39	-.01	.01	-.55
Gender	-.30	.21	-1.39	.13	.27	.49
Marital	-.10	.20	-.48	.15	.25	.60
Race	.09	.48	.19	-.63	.61	-1.02
Employ	-.10	.09	-1.03	.06	.12	.48
Income	-.08	.05	-1.49	-.04	.06	-.64
Education	.00	.11	.00	-.12	.14	-.83
	$R^2=.21$			$R^2=.08$		
Model	Subjective Norm (M ₅)			Attitude (M ₆)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.08	.06	1.35	.26	.11	2.39*
Age	.01	.00	2.01*	.00	.01	.35
Gender	-.37	.12	-2.99**	-.53	.23	-2.31*
Marital	-.22	.11	-1.91	.24	.21	1.14
Race	-.05	.28	-.17	.17	.52	.33
Employ	-.08	.05	-1.43	-.12	.10	-1.17
Income	-.01	.03	-.29	-.04	.05	-.66
Education	-.08	.06	-1.31	.03	.12	.27
	$R^2=.20$			$R^2=.14$		
Outcome variable model						
Intention (Y)						
Model	b	s.e.	t			
M ₁ (Perceived Sevrity)	.03	.05	.50			
M ₂ (Perceived Vuln)	.55	.07	7.85***			

M ₃ (Intrinsic Rewards)	-.01	.08	-.19
M ₄ (Extrinsic Rewards)	.08	.05	1.57
M ₅ (Subjective Norm)	-.14	.12	-1.24
M ₆ (Attitude)	.26	.07	3.84***
X (<i>Vignette</i>)	-.09	.07	-1.29
Age	-.00	.01	-.76
Gender	-.26	.13	-1.98
Marital	.06	.12	.46
Race	.12	.29	.40
Employ	.02	.06	.35
Income	.01	.03	.46
Education	-.05	.07	-.71
		$R^2=.63$	
	Effect	95% CI	
Direct effect X→Y	-.09	(-.23, .05)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (*vignette*) influence mediators Perceived Vulnerability, Intrinsic Rewards, and Attitude. Perceived Vulnerability and Attitude influence Intention towards OFTEN and DOSE misuse. There was no direct effect of *vignette* on Intention. There was a significant conditional indirect effect of *vignette* on Intention towards OFTEN and DOSE as mediates by Perceived Vulnerability and Attitude.

Table B.6 Model 4 Intention Full Model - Withdrawal & Feel Good

Process Model 4 Regression findings for Full Model Intention (Y) by Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), Extrinsic Rewards (M₄), Subjective Norm (M₅), and Attitude (M₆) WITHDRAWAL and FEEL GOOD misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.10	.12	.88	.57	.10	5.76***
Age	-.01	.01	-1.22	-.02	.01	-2.60*
Gender	.33	.25	1.34	-.17	.21	-.79
Marital	-.22	.22	-1.03	.07	.19	.39
Race	-.46	.68	-.68	.45	.58	.77
Employ	.09	.11	.82	.13	.09	1.40
Income	.08	.06	1.39	.03	.05	.64
Education	.30	.13	2.36*	.15	.11	1.41
	$R^2=.12$			$R^2=.24$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.39	.10	3.70***	.22	.11	2.03*
Age	-.01	.01	-1.78	-.01	.01	-1.49
Gender	-.20	.22	-.91	.11	.23	.47
Marital	.14	.20	.69	.05	.20	.24
Race	.36	.61	.59	-.33	.64	-.52
Employ	.06	.10	.64	.06	.10	.58
Income	.01	.05	.17	-.05	.05	-.87
Education	.11	.11	1.00	-.08	.12	-.70
	$R^2=.18$			$R^2=.10$		
Model	Subjective Norm (M ₅)			Attitude (M ₆)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.16	.06	3.00**	.38	.11	3.58***
Age	.01	.00	1.49	-.00	.01	-.28
Gender	-.14	.12	-1.15	-.23	.23	-1.03
Marital	-.10	.10	-.94	.18	.20	.91
Race	.31	.32	.96	.79	.62	1.27
Employ	-.08	.05	-1.56	-.12	.10	-1.24
Income	-.03	.03	-1.19	-.06	.05	-1.04
Education	-.05	.06	-.86	.01	.12	.05
	$R^2=.13$			$R^2=.13$		
Outcome variable model						
Intention (Y)						
Model	b	s.e.	t			
M ₁ (Perceived Severity)	-.01	.05	-.12			
M ₂ (Perceived Vuln)	.21	.09	2.41*			

M ₃ (Intrinsic Rewards)	.27	.09	3.08**
M ₄ (Extrinsic Rewards)	.08	.05	1.46
M ₅ (Subjective Norm)	-.06	.11	-.58
M ₆ (Attitude)	.25	.07	3.88***
X (<i>Vignette</i>)	.04	.07	.61
Age	-.01	.01	-1.27
Gender	-.01	.14	-.06
Marital	.22	.12	1.85
Race	-.01	.37	-.02
Employ	.01	.06	.15
Income	.04	.03	1.32
Education	-.05	.07	-.72
		$R^2=.61$	
	Effect	95% CI	
Direct effect X→Y	-.04	(-.10, .19)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (*vignette*) influence mediators Perceived Vulnerability, Intrinsic Rewards, Extrinsic Rewards, Subjective Norm and Attitude. Perceived Vulnerability, Intrinsic Rewards, and Attitude influence Intention towards WITHDRAWAL and FEEL GOOD misuse. There was no direct effect of *vignette* on Intention. There was a significant conditional indirect effect of *vignette* on Intention towards WITHDRAWAL and FEEL GOOD misuse as mediates by Intrinsic Rewards and Attitude.

Table B.7 Model 4 Theory of Reasoned Action All Misuse Types

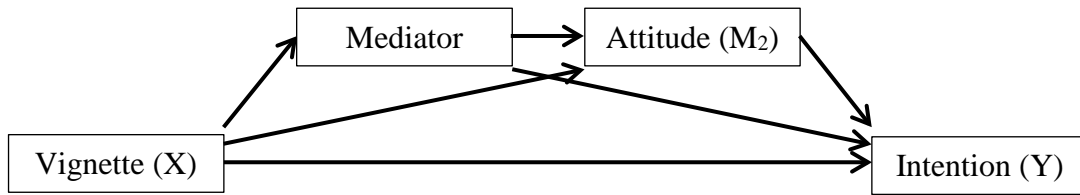
Process Model 4 Regression findings for Intention (Y) by Subjective Norm (M₁) and Attitude (M₂) all misuse types

Mediator variable models						
Model	Subjective Norm (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.11	.05	2.07*	.33	.10	3.40***
Age	.01	.00	1.94	.00	.01	.09
Gender	-.16	.11	-1.40	-.30	.21	-1.44
Marital	-.17	.10	-1.70	.21	.19	1.14
Race	.20	.30	.67	.50	.57	.87
Employ	-.05	.05	-1.10	-.14	.09	-1.51
Income	-.20	.03	-.78	-.05	.05	-.96
Education	-.05	.06	-.79	.02	.11	.16
	$R^2=.11$			$R^2=.15$		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Subjective Norm)	.01	.13	.11			
M ₂ (Attitude)	.39	.07	5.46***			
X (<i>Vignette</i>)	.18	.07	2.52*			
Age	-.01	.01	-1.72			
Gender	-.10	.15	-.67			
Marital	.19	.14	1.36			
Race	-.21	.41	-.51			
Employ	.09	.06	1.33			
Income	.03	.03	.97			
Education	.04	.08	.53			
	$R^2=.36$					
Effect		95% CI				
Direct effect X→Y	.18*	(.04, .33)				

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (*vignette*) influence both mediators Subjective Norm and Attitude. Attitude influences Intention to misuse prescriptions for all misuse types. There was a significant direct effect of *vignette* on Intention. Attitude is a significant mediator between *vignette* and Intention.

Figure B.2 Process Model 6 and Key



X (vignette) = Pain, drug seeking, misuse influences Mediator (M_i), if significant.

$M_1 \rightarrow M_2$ = Mediator (M_1) influences Mediator (M_2), if significant.

M_i = Mediator (M_i) influences Dependent (Y), if significant.

Direct $X \rightarrow Y$ = Vignette (X) directly influences Dependent (Y), if significant.

Indirect $X \rightarrow M_i \rightarrow Y$ = Vignette (X) indirectly influences Dependent (Y) through Mediator (M_i), if significant.

Indirect $X \rightarrow M_1 \rightarrow M_2 \rightarrow Y$ = Vignette (X) indirectly influences Dependent (Y) through Mediator (M_1) and Mediator (M_2), if significant.

Types of misuse:

- Taking prescription more OFTEN than prescribed.
- Taking prescription in higher DOSE than prescribed.
- Taking prescription to avoid WITHDRAWAL symptoms.
- Taking prescription to “FEEL GOOD.”

Combined misuse cases

- ALL TYPE MISUSE combines results for all four misuse types
- OFTEN and DOSE combines results for those two medication-related types of misuse.
- WITHDRAWAL and FEEL GOOD combines results for those two symptom/feeling-based types of misuse

Table B.8 Model 6 Perceived Vulnerability Often & Dose

Process Model 6 Regression findings for Intention (Y) by Perceived Vulnerability (M₁) and Attitude (M₂) OFTEN and DOSE misuse types

Mediator variable models						
Model	Perceived Vulnerability (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	.39	.11	3.63***
X (<i>Vignette</i>)	.66	.10	6.91***	.02	.13	.14
Age	-.01	.01	-1.58	.01	.01	1.19
Gender	-.08	.20	-.38	-.42	.23	-1.86
Marital	.24	.19	1.28	.24	.21	1.15
Race	-.30	.47	-.65	.29	.52	.56
Employ	.10	.09	1.08	-.15	.10	-1.47
Income	.08	.05	1.73	-.08	.05	-1.52
Education	.04	.11	.39	-.01	.12	-.13
	$R^2=.34$			$R^2=.23$		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Vuln)	.52	.06	8.29***			
M ₂ (Attitude)	.18	.05	3.30**			
X (<i>Vignette</i>)	-.06	.07	-.91			
Age	-.01	.01	-1.33			
Gender	-.26	.13	-2.03*			
Marital	.08	.12	.65			
Race	.05	.29	.17			
Employ	.03	.06	.48			
Income	.01	.03	.46			
Education	-.01	.07	-.22			
	$R^2=.60$					
Direct and Indirect	Effect	95% CI				
Direct X→Y	-.06	(-.21, .08)				
Indirect Total	.39	(.23, .60)				
Indirect1 X→PV→Y	.35	(.19, .54)				
Indirect2 X→PV→Att→Y	.05	(.00, .14)				
Indirect3 X→Att→Y	.00	(-.05, .05)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences mediator Perceived Vulnerability. Perceived Vulnerability influences Attitude. Perceived Vulnerability and Attitude influence Intention towards OFTEN and DOSE misuse. There was no direct effect of *vignette* on Intention. Perceived Vulnerability mediates the indirect effect of *vignette* on Intention towards

OFTEN and DOSE misuse. Perceived Vulnerability also mediates Attitude which in turn mediates the indirect effect of vignette on Intention towards OFTEN and DOSE misuse.

Table B.9 Model 6 Perceived Vulnerability Withdrawal & Feel Good

Process Model 6 Regression findings for Intention (Y) by Perceived Vulnerability (M₁) and Attitude (M₂) WITHDRAWAL and FEEL GOOD misuse types

Mediator variable models						
Model	Perceived Vulnerability (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	.38	.09	4.42***
X (<i>Vignette</i>)	.58	.10	6.00***	.14	.11	1.27
Age	-.01	.01	-2.21*	-.00	.01	.62
Gender	-.14	.21	-.68	-.21	.21	-1.02
Marital	.01	.18	.08	.15	.18	.83
Race	.41	.58	.71	.62	.58	1.07
Employ	.10	.09	1.07	-.16	.09	-1.76
Income	.02	.05	.33	-.06	.05	-1.28
Education	.19	.11	1.83	-.07	.11	-.64
	$R^2=.24$			$R^2=.24$		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Vuln)	.40	.06	6.49***			
M ₂ (Attitude)	.33	.06	5.67***			
X (<i>Vignette</i>)	.00	.07	.00			
Age	-.01	.01	-1.41			
Gender	-.00	.14	-.03			
Marital	.20	.12	1.69			
Race	-.13	.38	-.34			
Employ	.02	.06	.35			
Income	.03	.03	.99			
Education	-.04	.07	-.58			
	$R^2=.55$					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.00	(-.14, .14)				
Indirect Total	.35	(.22, .49)				
Indirect1 X→PV→Y	.23	(.12, .37)				
Indirect2 X→PV→Att→Y	.07	(.03, .16)				
Indirect3 X→Att→Y	.05	(-.00, .13)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influence mediator Perceived Vulnerability. Perceived Vulnerability influences Attitude. Perceived Vulnerability and Attitude both influence Intention towards WITHDRAWAL and FEEL GOOD misuse. There was no direct effect of *vignette* on Intention. Perceived Vulnerability mediates an indirect effect of *vignette* on Intention towards WITHDRAWAL and FEEL GOOD misuse. Perceived

Vulnerability mediates Attitude which in turn mediates an indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD misuse.

Table B.10 Model 6 Perceived Severity Often & Dose

Process Model 6 Regression findings for Intention (Y) by Perceived Severity (M₁) and Attitude (M₂) OFTEN and DOSE misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	-.35	.08	-4.22***
X (<i>Vignette</i>)	.04	.11	.40	.33	.10	3.38***
Age	-.01	.01	-.49	-.00	.01	-.33
Gender	.32	.23	1.42	-.38	.21	-1.78
Marital	-.29	.21	-1.39	.24	.19	1.23
Race	-.87	.56	-1.56	-.17	.52	-.33
Employ	.05	.10	.49	-.09	.09	-.95
Income	-.00	.05	-.06	-.03	.05	-.61
Education	.29	.12	2.47*	.10	.11	.91
	<u>R²=.10</u>			<u>R²=.25</u>		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Sevrity)	.05	.07	.68			
M ₂ (Attitude)	.34	.07	5.00***			
X (<i>Vignette</i>)	.26	.08	3.26**			
Age	-.01	.01	-1.66			
Gender	-.12	.15	-.68			
Marital	.20	.15	1.34			
Race	-.12	.40	-.29			
Employ	.08	.07	1.18			
Income	.03	.04	.72			
Education	.02	.09	.18			
	<u>R²=.33</u>					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.26	(.10, .41)				
Indirect Total	.14	(.03, .23)				
Indirect1 X→PS→Y	.00	(-.01, .04)				
Indirect2	-.01	(-.04, .02)				
X→PS→Att→Y						
Indirect3 X→Att→Y	.11	(.03, .24)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences mediator Attitude and Attitude influences Intention towards OFTEN and DOSE misuse. Perceived Severity influences mediator Attitude and Attitude influences Intention towards OFTEN and DOSE misuse. There was a significant direct effect of *vignette* on Intention. Attitude partially mediates an indirect effect of *vignette* on Intention OFTEN and DOSE misuse.

Table B.11 Model 6 Perceived Severity Withdrawal & Feel Good

Process Model 6 Regression findings for Intention (Y) by Perceived Severity (M₁) and Attitude (M₂) WITHDRAWAL and FEEL GOOD misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	-.27	.08	-3.50***
X (<i>Vignette</i>)	.08	.11	.71	.40	.10	4.00***
Age	-.01	.01	-1.57	-.01	.01	-.79
Gender	.35	.24	1.43	-.17	.21	-.78
Marital	-.20	.22	-.93	.13	.19	.67
Race	-.48	.68	-.72	.68	.59	1.14
Employ	.10	.10	1.00	-.09	.09	-.94
Income	.08	.06	1.48	-.03	.05	-.57
Education	.30	.12	2.41*	.07	.11	.65
	$R^2=.12$			$R^2=.21$		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Perceived Sevrity)	.00	.06	.00			
M ₂ (Attitude)	.45	.06	6.99***			
X (<i>Vignette</i>)	.20	.08	2.60*			
Age	-.02	.01	-2.63**			
Gender	-.04	.16	-.25			
Marital	.24	.14	1.74			
Race	-.01	.43	-.03			
Employ	.08	.07	1.20			
Income	.06	.04	1.58			
Education	.01	.08	.09			
	$R^2=.42$					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.20	(.05, .35)				
Indirect Total	.17	(.07, .31)				
Indirect1 X→PS→Y	.00	(-.02, .02)				
Indirect2						
X→PS→Att→Y	-.01	(-.04, .01)				
Indirect3 X→Att→Y	.18	(.08, .32)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (vignette) influences mediator Attitude. Perceived Severity influences Attitude. Attitude influences Intention towards WITHDRAWAL and FEEL GOOD misuse. There was a significant direct effect of vignette on Intention. There was also a significant partial conditional indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD misuse as mediates by Attitude.

Table B.12 Model 6 Perceived Intrinsic Rewards Often & Dose

Process Model 6 Regression findings for Intention(Y) by Intrinsic Rewards (M₁) and Attitude (M₂) OFTEN and DOSE misuse types

Mediator variable models						
Model	Intrinsic Rewards (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	.45	.09	5.25***
X (<i>Vignette</i>)	.46	.10	4.77***	.09	.10	.91
Age	-.00	.01	-.47	.00	.01	.19
Gender	-.36	.21	-1.75	-.33	.21	-1.59
Marital	-.03	.19	-.14	.32	.18	1.73
Race	.03	.51	.06	.10	.50	.20
Employ	-.04	.09	-.43	-.09	.09	-1.04
Income	-.07	.05	-1.38	-.01	.05	-.11
Education	.03	.11	.25	.01	.10	.07
	<u>R</u> ² =.19			<u>R</u> ² =.29		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Intrinsic Rewards)	.22	.07	3.10**			
M ₂ (Attitude)	.24	.07	3.56***			
X (<i>Vignette</i>)	.18	.08	2.33*			
Age	-.01	.01	-1.67			
Gender	-.07	.16	-.47			
Marital	.23	.14	1.64			
Race	-.15	.38	-.39			
Employ	.08	.07	1.22			
Income	.04	.04	1.16			
Education	.02	.08	.28			
	<u>R</u> ² =.37					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.18	(.03, .34)				
Indirect Total	.18	(.09, .29)				
Indirect1 X→IR→Y	.10	(.02, .23)				
Indirect2 X→IR→Att→Y	.05	(.01, .13)				
Indirect3 X→Att→Y	.02	(-.02, .10)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences mediator Intrinsic Rewards. Intrinsic Rewards influences Attitude. Intrinsic Rewards and Attitude both influence Intention towards OFTEN and DOSE misuse. There was a significant direct effect of *vignette* on Intention. There was a significant partial conditional indirect effect of *vignette* on Intention towards OFTEN and DOSE misuse as mediates by Intrinsic Reward. Intrinsic Rewards partially mediates

Attitude which in turn partially mediates an indirect effect of vignette on Intention towards OFTEN and DOSE misuse.

Table B.13 Model 6 Perceived Intrinsic Rewards Withdrawal & Feel Good

Process Model 6 Regression findings for Intention(Y) by Intrinsic Rewards (M₁) and Attitude (M₂) WITHDRAWAL and FEEL GOOD misuse types

Mediator variable models						
Model	Intrinsic Rewards (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	.50	.08	6.57***
X (<i>Vignette</i>)	.37	.10	3.62***	.17	.09	1.86
Age	-.01	.01	-1.35	.00	.01	.53
Gender	-.19	.22	-.86	-.17	.19	-.89
Marital	.05	.19	.28	.13	.18	.77
Race	.31	.62	.50	.62	.53	1.16
Employ	.03	.09	.35	-.14	.08	-1.66
Income	-.01	.05	-.18	-.05	.04	-1.14
Education	.16	.11	1.43	-.07	.10	-.75
	<u>R</u> ² =.11			<u>R</u> ² =.35		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Intrinsic Rewards)	.44	.06	7.35***			
M ₂ (Attitude)	.24	.06	4.03***			
X (<i>Vignette</i>)	.10	.07	1.50			
Age	-.01	.01	-1.89			
Gender	.00	.13	.01			
Marital	.20	.12	1.71			
Race	-.04	.37	-.10			
Employ	.03	.06	.59			
Income	.04	.03	1.20			
Education	-.03	.07	-.51			
	<u>R</u> ² =.58					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.10	(-.03, .23)				
Indirect Total	.25	(.13, .39)				
Indirect1 X→IR→Y	.16	(.07, .30)				
Indirect2 X→IR→Att→Y	.05	(.01, .11)				
Indirect3 X→Att→Y	.04	(.00, .12)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences mediator Intrinsic Rewards. Intrinsic Rewards influences Attitude. Intrinsic Rewards and Attitude both influence Intention towards WITHDRAWAL and FEEL GOOD misuse. There was no direct effect of *vignette* on Intention. Intrinsic Reward mediates an indirect effect of *vignette* on Intention towards WITHDRAWAL and FEEL GOOD misuse. Likewise, Intrinsic Reward mediates Attitude

which in turn mediates an indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD misuse. Though the relationship between vignette and Attitude was not significant ($p=.06$) the bootstrapped indirect effect model indicated that Attitude mediates an indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD misuse.

Table B.14 Model 6 Perceived Extrinsic Rewards Often & Dose

Process Model 6 Regression findings for Intention(Y) by Extrinsic Rewards (M₁) and Attitude (M₂) OFTEN and DOSE misuse types

Mediator variable models						
Model	Extrinsic Rewards (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	.12	.08	1.56
X (<i>Vignette</i>)	.23	.12	1.98*	.25	.10	2.51*
Age	-.01	.01	-1.28	-.00	.01	.01
Gender	.11	.25	.45	-.57	.21	-2.67**
Marital	.09	.23	.39	.19	.19	.99
Race	-.64	.62	-1.03	.17	.53	.32
Employ	.01	.11	.09	-.12	.09	-1.28
Income	-.03	.06	-.46	-.03	.05	-.60
Education	-.08	.13	-.63	.08	.11	.72
	<u>R</u> ² =.08			<u>R</u> ² =.16		
Outcome variable model						
Intention (Y)						
Model	b	s.e.	t			
M ₁ (Extrinsic Rewards)	.11	.06	1.88			
M ₂ (Attitude)	.33	.07	5.03***			
X (<i>Vignette</i>)	.24	.08	3.12**			
Age	-.01	.01	-1.51			
Gender	-.11	.16	-.65			
Marital	.21	.14	1.45			
Race	-.08	.39	-.21			
Employ	.08	.07	1.22			
Income	.03	.04	.88			
Education	.02	.08	.29			
	<u>R</u> ² =.35					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.24	(.09, .39)				
Indirect Total	.12	(.04, .23)				
Indirect1 X→ER→Y	.02	(.00, .07)				
Indirect2	.01	(-.00, .04)				
X→ER→Att→Y	.01	(-.00, .04)				
Indirect3 X→Att→Y	.08	(.02, .20)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences both mediators Extrinsic Rewards and Attitude. Attitude influences Intention towards OFTEN and DOSE misuse. There was a significant direct effect of *vignette* on Intention. Attitude partially mediates the indirect effect of *vignette* on Intention towards OFTEN and DOSE misuse. Though the relationship between Extrinsic Rewards and Intention was not significant (p=.06) the bootstrapped indirect

effect model indicated that Extrinsic Rewards partially mediates the indirect effect of vignette on Intention towards OFTEN and DOSE misuse.

Table B.15 Model 6 Perceived Extrinsic Rewards Withdrawal & Feel Good

Process Model 6 Regression findings for Intention(Y) by Extrinsic Rewards (M₁) and Attitude (M₂) WITHDRAWAL and FEEL GOOD misuse types

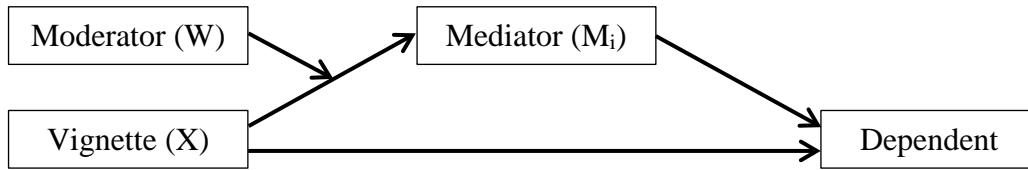
Mediator variable models						
Model	Extrinsic Rewards (M ₁)			Attitude (M ₂)		
	b	s.e.	t	b	s.e.	t
M ₁ →M ₂	-	-	-	.04	.09	.48
X (<i>Vignette</i>)	.24	.11	2.22*	.34	.11	3.29**
Age	-.01	.01	-1.35	-.00	.01	-.20
Gender	.15	.23	.67	-.27	.22	-1.22
Marital	.06	.20	.28	.16	.20	.80
Race	-.30	.64	-.47	.78	.62	1.27
Employ	.04	.10	.39	-.12	.10	-1.23
Income	-.04	.05	-.75	-.05	.05	-.98
Education	-.07	.12	-.65	.01	.11	.06
	<u>R</u> ² =.09			<u>R</u> ² =.13		
Outcome variable model						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Extrinsic Rewards)	.13	.06	2.12*			
M ₂ (Attitude)	.46	.06	7.46***			
X (<i>Vignette</i>)	.15	.08	1.98*			
Age	-.01	.01	-2.19*			
Gender	-.04	.16	-.27			
Marital	.18	.14	1.35			
Race	-.03	.43	-.08			
Employ	.07	.07	1.09			
Income	.06	.04	1.44			
Education	.04	.08	.54			
	<u>R</u> ² =.42					
Direct and Indirect	Effect	95% CI				
Direct X→Y	.15	(.00, .30)				
Indirect Total	.19	(.09, .33)				
Indirect1 X→ER→Y	.03	(.00, .08)				
Indirect2 X→ER→Att→Y	.00	(-.01, .03)				
Indirect3 X→Att→Y	.16	(.06, .30)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences both mediators Extrinsic Rewards and Attitude. Extrinsic Rewards and Attitude both influence Intention towards WITHDRAWAL and FEEL GOOD misuse. There was a significant conditional indirect effect of *vignette* on Intention towards WITHDRAWAL and FEEL GOOD misuse as mediates by Attitude. There was a significant direct effect of *vignette* on Intention. There was a significant

partial conditional indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD misuse as mediates by Extrinsic Rewards. There was also a significant partial conditional indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD misuse as mediates by Attitude.

Figure B.3 Process Model 7 and Key



X (vignette) = Pain, drug seeking, misuse influences Mediator (M_i), if significant.

W (moderator) = Moderator (W) influences Mediator (M_i), if significant.

X*W = Moderator (W) interacts with Vignette (X) to influence Mediator (M_i), if significant.

M_i = Mediator (M_i) influences Dependent (Y), if significant.

Direct X→Y = Vignette (X) directly influences Dependent (Y), if significant.

W = -1SD = When perceived Moderator (W) is at a LOW level it influences the conditional indirect effect of Vignette (X) on Dependent (Y) as mediated by Mediator (M_i), if significant.

W = 0 = When perceived Moderator (W) is at a MODERATE level it influences the conditional indirect effect of Vignette (X) on Dependent (Y) as mediated by Mediator (M_i), if significant.

W = 1SD = When perceived Moderator (W) is at a HIGH level it influences the conditional indirect effect of Vignette (X) on Dependent (Y) as mediated by Mediator (M_i), if significant.

Types of misuse:

- Taking prescription more OFTEN than prescribed.
- Taking prescription in higher DOSE than prescribed.
- Taking prescription to avoid WITHDRAWAL symptoms.
- Taking prescription to “FEEL GOOD.”

Combined misuse cases

- ALL TYPE MISUSE combines results for all four misuse types
- OFTEN and DOSE combines results for those two medication-related types of misuse.
- WITHDRAWAL and FEEL GOOD combines results for those two symptom/feeling-based types of misuse

Table B.16 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M) → Attitude(Y)
Often & Dose Misuse

Mediator variable models			
Perceived Vulnerability (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.34	.08	4.07***
W (Risk Add)	.19	.04	5.13***
X*W	.18	.04	5.00***
Age	-.00	.01	-.52
Gender	-.12	.15	-.79
Marital	.20	.14	1.49
Race	-.21	.35	-.60
Employ	.04	.07	.58
Income	.05	.04	1.51
Education	.01	.08	.14
$R^2 = .63$			
Outcome variable models			
Attitude (Y)			
Model	b	s.e.	t
M ₁ (Perceived Vuln)	.40	.11	3.75***
X (<i>Vignette</i>)	-.01	.13	-.04
Age	.01	.01	1.27
Gender	-.45	.22	-2.01*
Marital	.28	.21	1.38
Race	.27	.52	.52
Employ	-.14	.10	-1.44
Income	-.09	.05	-1.61
Education	.00	.12	.03
$R^2 = .24$			
Direct	Effect	95% CI	
Direct X → Y	-.01	(-.26, .25)	
Conditional Indirect	Perceived Vulnerability		
W = -1SD(-2.49)	-.04	(-.15, .01)	
W = 0	.14	(.04, .26)	
W = 1SD(2.49)	.31	(.08, .57)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (*vignette*) influences Perceived Vulnerability. Risk of Addiction has a moderating effect on Perceived Vulnerability. Risk of Addiction interacts with *vignette* to influence mediator Perceived Vulnerability and Perceived Vulnerability influences Attitude towards Combined Often and Dose Misuse. There was no significant direct effect of *vignette* on Attitude. There was also a significant conditional indirect effect of *vignette* on Attitude towards Combined Often and Dose Misuse as mediated by Perceived Vulnerability

and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels of Risk of Addiction then pain, drug seeking and misuse will influence the perception of Perceived Vulnerability, which, in turn, influence Attitude towards Combined Often and Dose Misuse.

Table B.17 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M) → Intention(Y)
Often & Dose Misuse

Mediator variable models			
Model	Perceived Vulnerability (M ₁)		
	b	s.e.	t
X (<i>Vignette</i>)	.36	.08	4.29***
W (Risk Add)	.20	.04	5.46***
X*W	.18	.04	4.98***
Age	-.00	.01	-.73
Gender	-.08	.16	-.55
Marital	.17	.14	1.21
Race	-.21	.36	-.58
Employ	.06	.07	.84
Income	.04	.04	1.21
Education	.04	.08	.54
$R^2 = .63$			
Outcome variable models			
Model	Intention (Y)		
	b	s.e.	t
M ₁ (Perceived Vuln)	.53	.06	8.27***
X (<i>Vignette</i>)	-.00	.08	-.06
Age	-.01	.01	-1.34
Gender	-.30	.14	-2.10*
Marital	.15	.13	1.19
Race	.09	.33	.29
Employ	-.04	.06	-.58
Income	.00	.03	.08
Education	-.04	.07	-.51
$R^2 = .50$			
Direct	Effect	95% CI	
Direct X → Y	-.01	(-.16, .15)	
Conditional Indirect	Perceived Vulnerability		
W = -1SD(-2.47)	-.04	(-.15, .04)	
W = 0	.19	(.10, .31)	
W = 1SD(2.47)	.43	(.24, .65)	

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences Perceived Vulnerability. Risk of Addiction has a moderating effect on Perceived Vulnerability. Risk of Addiction interacts with *vignette* to influence mediator Perceived Vulnerability and Perceived Vulnerability influences Intention towards Combined Often and Dose Misuse. There was no significant direct effect of *vignette* on Intention. There was also a significant conditional indirect effect of *vignette* on Intention towards Combined Often and Dose Misuse as mediated by Perceived Vulnerability

and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels of Risk of Addiction then pain, drug seeking and misuse will influence the perception of Perceived Vulnerability, which, in turn, influence Intention towards Combined Often and Dose Misuse.

Table B.18 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M) → Attitude(Y)
Withdrawal & Feel Good

Mediator variable models			
Perceived Vulnerability (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.27	.09	2.95**
W (Risk Add)	.22	.04	5.48***
X*W	.19	.04	4.71***
Age	-.01	.01	-1.29
Gender	-.22	.16	-1.38
Marital	-.02	.14	-.14
Race	.09	.41	.23
Employ	.06	.07	.81
Income	.00	.04	.11
Education	.17	.08	2.11*
$R^2=.53$			
Outcome variable models			
Attitude (Y)			
Model	b	s.e.	t
M ₁ (Perceived Vuln)	.40	.09	4.68***
X (<i>Vignette</i>)	.12	.11	1.10
Age	.01	.01	.93
Gender	-.25	.21	-1.23
Marital	.19	.18	1.05
Race	.56	.51	1.10
Employ	-.15	.09	-1.64
Income	.07	.05	-1.48
Education	-.04	.10	-.40
$R^2=.25$			
Direct	Effect	95% CI	
Direct X→Y	.12	(-.09, .32)	
Conditional Indirect	Perceived Vulnerability		
W = -1SD(-2.43)	-.08	(-.19, -.01)	
W = 0	.11	(.04, .21)	
W = 1SD(2.43)	.29	(.13, .51)	

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences Perceived Vulnerability. Risk of Addiction has a moderating effect on Perceived Vulnerability. Risk of Addiction interacts with *vignette* to influence mediator Perceived Vulnerability and Perceived Vulnerability influences Attitude towards Combined Withdrawal and Feel Good. There was no significant direct effect of *vignette* on Attitude. There was also a significant conditional indirect effect of *vignette* on Attitude towards Combined Withdrawal and Feel Good Misuse as mediated by

Perceived Vulnerability and moderated by Risk of Addiction. Specifically, at perceived low, moderate and high levels of Risk of Addiction then pain, drug seeking and misuse will exert a conditional indirect effect on Attitude towards Combined Withdrawal and Feel Good mediated by Perceived Vulnerability. At lower Risk of Addiction, Perceived Vulnerability will decrease Attitude. At moderate and high Risk of Addiction, Perceived Vulnerability will increase Attitude.

Table B.19 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M) → Intention(Y) Withdrawal & Feel Good

Mediator variable models			
Model	Perceived Vulnerability (M ₁)		
	b	s.e.	t
X (<i>Vignette</i>)	.25	.10	2.67**
W (Risk Add)	.25	.04	6.04***
X*W	.15	.04	3.67***
Age	-.01	.01	-1.27
Gender	-.06	.17	-.35
Marital	.00	.15	.02
Race	.44	.48	.92
Employ	.06	.07	.85
Income	-.00	.04	-.03
Education	.14	.09	1.67
$R^2 = .51$			
Outcome variable models			
Model	Intention (Y)		
	b	s.e.	t
M ₁ (Perceived Vuln)	.54	.06	8.84***
X (<i>Vignette</i>)	.02	.08	.29
Age	-.01	.01	-.90
Gender	-.08	.15	-.52
Marital	.22	.13	1.71
Race	.03	.42	.08
Employ	-.04	.07	-.63
Income	.01	.03	.24
Education	-.06	.08	-.81
$R^2 = .45$			
Direct	Effect	95% CI	
Direct X → Y	.02	(-.13, .18)	
Conditional Indirect	Perceived Vulnerability		
W = -1SD(-2.47)	-.06	(-.17, .02)	
W = 0	.14	(.03, .25)	
W = 1SD(2.47)	.34	(.12, .55)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (*vignette*) influences Perceived Vulnerability. Risk of Addiction has a moderating effect on Perceived Vulnerability. Risk of Addiction interacts with *vignette* to influence mediator Perceived Vulnerability and Perceived Vulnerability influences Intention towards Combined Withdrawal and Feel Good Misuse. There was no significant direct effect of *vignette* on Intention. There was also a significant conditional indirect effect of *vignette* on Intention towards Combined Withdrawal and Feel Good Misuse as

mediated by Perceived Vulnerability and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels of Risk of Addiction then vignette will exert a conditional indirect effect on Intention towards Combined Withdrawal and Feel Good mediated by Perceived Vulnerability.

Table B.20 Model 7 Risk of Addiction(W) with Perceived Vulnerability(M₁) and Attitude(M₂)
 → Intention(Y) Withdrawal & Feel Good

Mediator variable models						
Model	Perceived Vulnerability (M ₁)			Attitude(M ₂)		
	b	s.e.	t	b	s.e.	t
X (Vignette)	.31	.09	3.42***	.30	.12	2.49*
W (Risk of Addiction)	.23	.04	5.79***	.06	.05	1.16
X*W	.18	.04	4.62***	.14	.05	2.65**
Age	-.01	.01	-1.29	.00	.011	.32
Gender	-.14	.16	-.85	-.27	.21	-1.27
Marital	-.05	.14	-.36	.12	.19	.66
Race	.41	.45	.92	.70	.59	1.18
Employ	.06	.07	.84	-.14	.09	-1.49
Income	.01	.04	.17	-.06	.05	-1.22
Education	.16	.08	1.96	-.01	.11	-1.14
	$R^2=.56$			$R^2=.21$		
Outcome variable models						
Intention (Y)						
Model	b	s.e.	t			
M ₁ (Perceived Vuln)	.40	.06	6.57***			
M ₂ (Attitude)	.33	.06	5.74***			
X (Vignette)	-.01	.07	-.16			
Age	-.01	.01	-1.52			
Gender	.01	.14	.05			
Marital	.21	.12	1.74			
Race	-.14	.38	-.37			
Employ	.01	.06	.19			
Income	.03	.03	1.02			
Education	-.05	.07	-.65			
	$R^2=.56$					
Direct	Effect	95% CI				
Direct X→Y	-.01	(-.15, .13)				
Conditional Indirect		Perceived Vulnerability		Attitude		
W = -1SD(-2.45)	-.06	(-.16, .0)		W = -1SD(-2.45)	-.01 (-.10, .07)	
W = 0	.12	(.06, .22)		W = 0	.10 (.04, .20)	
W = 1SD(2.45)	.30	(.15, .49)		W = 1SD(2.45)	.21 (.10, .38)	

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (vignette) influences both Perceived Vulnerability and Attitude. Risk of Addiction has a moderating effect on Perceived Vulnerability. Risk of Addiction interacts with vignette to influence both mediators Perceived Vulnerability and Attitude Perceived Vulnerability and Attitude both influence Intention towards WITHDRAWAL and FEEL GOOD Misuse. There was no direct effect of vignette on Intention. There was a

significant conditional indirect effect of vignette on Intention towards WITHDRAWAL and FEEL GOOD Misuse as mediated by both Perceived Vulnerability and Attitude and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels of Risk of Addiction then vignette will exert a conditional indirect effect on Intention towards WITHDRAWAL and FEEL GOOD Misuse mediated by Perceived Vulnerability and Attitude.

Table B.21 Model 7 Self-Efficacy(W) with Perceived Severity(M) → Attitude(Y) Often Misuse

Mediator variable models			
Perceived Severity (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.40	.15	2.66**
W (Self-Efficacy)	.41	.14	2.99**
X*W	-.34	.14	-2.46*
Age	-.01	.01	-1.06
Gender	.30	.22	1.36
Marital	-.33	.20	-1.66
Race	-.73	.56	-1.32
Employ	.07	.10	.76
Income	-.02	.05	-.47
Education	.28	.11	2.48*
$R^2=.17$			
Outcome variable models			
Attitude (Y)			
Model	b	s.e.	t
M ₁ (Perceived Severity)	-.41	.08	-5.21***
X (<i>Vignette</i>)	.25	.09	2.60*
Age	-.01	.01	-1.06
Gender	-.30	.21	-1.46
Marital	.29	.19	1.52
Race	-.33	.52	-.65
Employ	-.08	.09	-.91
Income	-.03	.05	-.72
Education	.12	.11	1.12
$R^2=.26$			
Direct	Effect	95% CI	
Direct X → Y	.25	(.06, .43)	
Conditional Indirect	Perceived Severity		
W = -1SD(-1.41)	-.36	(-.72, -.11)	
W = 0	-.16	(-.33, -.04)	
W = 1SD(1.19)	.00	(-.12, .14)	

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences Perceived Severity. Self-Efficacy has a moderating effect on Perceived Severity. Self-Efficacy interacts with *vignette* to influence mediator Perceived Severity. Perceived Severity influences Attitude towards OFTEN Misuse. There was a significant direct effect of *vignette* on Attitude. There was a significant partial conditional indirect effect of *vignette* on Attitude towards OFTEN Misuse as mediated by Perceived Severity and moderated by Self-Efficacy. Specifically, at perceived low and moderate levels of Self-Efficacy then *vignette* will exert a partial conditional indirect effect on Attitude

towards OFTEN misuse mediated by Perceived Severity. When Self-Efficacy is LOW and MODERATE, then vignette influences Perceived Severity to raise Attitude.

Table B.22 Model 7 Self-Efficacy(W) with Perceived Severity(M) → Intention(Y) Withdrawal Misuse

Mediator variable models			
Perceived Severity (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.32	.14	2.31*
W (Self-Efficacy)	.27	.12	2.24*
X*W	-.25	.12	-2.01*
Age	-.01	.01	-1.01
Gender	.23	.24	.98
Marital	-.30	.21	-1.45
Race	-.45	.66	-.69
Employ	.07	.10	.68
Income	.05	.06	.96
Education	.24	.12	1.94
$R^2=.12$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Perceived Severity)	-.14	.07	-2.00*
X (<i>Vignette</i>)	.35	.09	3.83***
Age	-.02	.01	-2.45*
Gender	-.12	.20	-.61
Marital	.29	.18	1.63
Race	-.11	.18	1.63
Employ	.07	.08	.80
Income	.03	.05	.70
Education	.09	.10	.91
$R^2=.16$			
Direct	Effect	95% CI	
Direct X→Y	.35	(.17, .53)	
Conditional Indirect	Perceived Severity		
W = -1SD(-1.41)	-.09	(-.24, -.01)	
W = 0	-.05	(-.13, -.00)	
W = 1SD(1.19)	-.00	(-.07, .04)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (*vignette*) influences Perceived Severity. Self-Efficacy has a moderating effect on Perceived Severity. Self-Efficacy interacts with *vignette* to influence mediator Perceived Severity. Perceived Severity influences Intention towards WITHDRAWAL Misuse. There was a significant direct effect of *vignette* on Intention. There was a significant partial conditional indirect effect of *vignette* on Intention towards WITHDRAWAL Misuse as mediated by Perceived Severity and moderated by Self-Efficacy.

Specifically, at perceived low and moderate levels of Self-Efficacy then vignette will exert a partial conditional indirect effect on Intention towards WITHDRAWAL misuse mediated by Perceived Severity. When Self-Efficacy is LOW and MODERATE, then vignette influences Perceived Severity to raise Intention.

Table B.23 Model 7 Self-Efficacy(W) with Intrinsic Rewards(M) → Attitude(Y) Often and Dose Misuse

Mediator variable models			
Intrinsic Rewards (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.07	.13	.55
W (Self-Efficacy)	-.48	.12	-4.01***
X*W	.30	.12	2.52*
Age	.00	.01	.09
Gender	-.23	.20	-1.13
Marital	-.03	.18	-.17
Race	-.10	.49	-.20
Employ	-.07	.09	-.81
Income	-.08	.05	-1.63
Education	.05	.10	.48
$R^2 = .28$			
Outcome variable models			
Attitude (Y)			
Model	b	s.e.	t
M ₁ (Intrinsic Rewards)	.47	.09	5.51***
X (<i>Vignette</i>)	.06	.10	.60
Age	.00	.01	.47
Gender	-.36	.21	-1.78
Marital	.33	.18	1.83
Race	.06	.50	.12
Employ	-.09	.09	-.99
Income	-.01	.05	-.17
Education	.01	.10	.08
$R^2 = .31$			
Direct	Effect	95% CI	
Direct X → Y	.06	(-.14, .26)	
Conditional Indirect	Intrinsic Rewards		
W = -1SD(-1.37)	-.16	(-.54, .13)	
W = 0	.03	(-.12, .20)	
W = 1SD(1.16)	.20	(.07, .40)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Self-Efficacy has a moderating effect on Intrinsic Rewards. Self-Efficacy interacts with vignette to influence mediator Intrinsic Rewards and Intrinsic Rewards influences Attitude towards Combined Often and Dose Misuse. There was no significant direct effect of vignette on Attitude. There was a significant conditional indirect effect of vignette on Attitude towards Combined Often and Dose Misuse as mediated by Intrinsic Rewards and moderated by Self-Efficacy. Specifically, at perceived high levels of Self-Efficacy then vignette will exert a

conditional indirect effect on Attitude towards Combined Often and Dose Good mediated by Intrinsic Rewards.

Table B.24 Model 7 Self-Efficacy(W) with Intrinsic Rewards(M) → Intention(Y) Often and Dose Misuse

Mediator variable models			
Intrinsic Rewards (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.18	.12	1.49
W (Self-Efficacy)	-.41	.10	-3.90***
X*W	.27	.11	2.55*
Age	-.01	.01	-.76
Gender	-.17	.20	-.83
Marital	-.04	.18	-.22
Race	-.02	.51	-.03
Employ	-.06	.09	-.72
Income	-.09	.05	-1.83
Education	.06	.10	.62
$R^2 = .27$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Intrinsic Rewards)	.33	.06	5.09***
X (<i>Vignette</i>)	.23	.08	2.86**
Age	-.01	.01	-1.84
Gender	-.11	.16	-.69
Marital	.30	.14	2.20*
Race	-.11	.40	-.29
Employ	.05	.07	.74
Income	.05	.04	1.30
Education	.01	.08	.17
$R^2 = .33$			
Direct	Effect	95% CI	
Direct X → Y	.23	(.07, .38)	
Conditional Indirect	Intrinsic Rewards		
W = -1SD(-1.36)	-.06	(-.29, .10)	
W = 0	.06	(-.02, .17)	
W = 1SD(1.15)	.16	(.07, .31)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Self-Efficacy has a moderating effect on Intrinsic Rewards. Self-Efficacy interacts with vignette to influence mediator Intrinsic Rewards and Intrinsic Rewards influences Intention towards Combined Often and Dose Misuse. There was a significant direct effect of vignette on Intention. There was a significant partial conditional indirect effect of vignette on Intention towards Combined Often and Dose Misuse as mediated by Intrinsic Rewards and moderated by Self-Efficacy. Specifically, at perceived high levels of Self-Efficacy then vignette will exert a

conditional indirect effect on Intention towards Combined Often and Dose mediated by Intrinsic Rewards.

Table B.25 Model 7 Risk of Addiction(W) with Intrinsic Rewards(M) → Attitude(Y)
Withdrawal and Feel Good Misuse

Mediator variable models			
Intrinsic Rewards (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.08	.11	.74
W (Risk Add)	.22	.05	4.86***
X*W	.12	.05	2.48*
Age	-.00	.01	-.34
Gender	-.23	.19	-1.24
Marital	.03	.17	.18
Race	.28	.47	.59
Employ	.01	.08	.09
Income	-.02	.04	-.53
Education	.15	.09	1.63
$R^2 = .35$			
Outcome variable models			
Attitude (Y)			
Model	b	s.e.	t
M ₁ (Intrinsic Rewards)	.52	.08	6.77***
X (<i>Vignette</i>)	.15	.09	1.58
Age	.01	.01	.82
Gender	-.23	.19	-1.17
Marital	.16	.17	.98
Race	.49	.48	1.02
Employ	-.13	.08	-1.54
Income	-.06	.04	-1.29
Education	-.05	.10	-.53
$R^2 = .35$			
Direct	Effect	95% CI	
Direct X → Y	.15	(-.04, .33)	
Conditional Indirect Intrinsic Rewards			
W = -1SD(-2.43)	-.10	(-.25, -.01)	
W = 0	.04	(-.06, .15)	
W = 1SD(2.43)	.19	(.01, .41)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Risk of Addiction influences Intrinsic Rewards. Risk of Addiction interacts with vignette to influence Intrinsic Rewards. Intrinsic Rewards influences Attitude towards Combined Withdrawal and Feel Good Misuse. There was no significant direct effect of vignette on Attitude. There was also a significant conditional indirect effect of vignette on Attitude towards Combined Withdrawal and Feel Good Misuse as mediated by Intrinsic Rewards and moderated by Risk of Addiction. Specifically, at perceived low and high levels of Risk of Addiction then pain, drug

seeking and misuse will exert a conditional indirect effect on Attitude towards Combined Withdrawal and Feel Good mediated by Intrinsic Rewards. At lower Risk of Addiction, Intrinsic Rewards will decrease Attitude. At high Risk of Addiction, Intrinsic Rewards will increase Attitude.

Table B.26 Model 7 Risk of Addiction(W) with Intrinsic Rewards(M) → Intention(Y)
Withdrawal and Feel Good Misuse

Mediator variable models			
Intrinsic Rewards (M ₁)			
Model	b	s.e.	t
X (<i>Vignette</i>)	.08	.11	.77
W (Risk Add)	.24	.05	5.20***
X*W	.10	.05	2.12*
Age	-.00	.01	-.38
Gender	.17	.19	-.88
Marital	.04	.17	.24
Race	.40	.54	.74
Employ	.01	.08	.17
Income	-.03	.04	-.60
Education	.12	.10	1.29
$R^2 = .35$			
Outcome variable models			
Intention (Y)			
Model	b	s.e.	t
M ₁ (Intrinsic Rewards)	.58	.05	10.55***
X (<i>Vignette</i>)	.10	.07	1.52
Age	-.01	.01	-1.56
Gender	-.02	.14	-.11
Marital	.21	.12	1.68
Race	.07	.39	.17
Employ	-.01	.06	-.20
Income	.02	.03	.73
Education	-.05	.07	-.74
$R^2 = .53$			
Direct	Effect	95% CI	
Direct X → Y	.10	(-.03, .24)	
Conditional Indirect	Intrinsic Rewards		
W = -1SD(-2.42)	-.09	(-.22, .03)	
W = 0	.05	(-.07, .17)	
W = 1SD(2.42)	.19	(-.03, .41)	

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Risk of Addiction has a moderating effect on Intrinsic Rewards. Risk of Addiction interacts with vignette to influence Intrinsic Rewards. Intrinsic Rewards influences Intention towards Combined Withdrawal and Feel Good Misuse. There was no significant direct effect of vignette on Intention. There was a significant conditional indirect effect of vignette on Intention towards Combined Withdrawal and Feel Good Misuse as mediated by Intrinsic Rewards and moderated by Risk of Addiction. Specifically, with Risk of Addiction moderating then pain, drug

seeking and misuse will exert a conditional indirect effect on Intention towards Combined Withdrawal and Feel Good mediated by Intrinsic Rewards.

Table B.27 Model 7 Risk of Addiction(W) with Intrinsic Rewards(M₁) and Attitude(M₂) → Intention(Y) All Type Misuse

Mediator variable models						
Model	Intrinsic Rewards (M ₁)			Attitude(M ₂)		
	b	s.e.	t	b	s.e.	t
X (Vignette)	.23	.10	2.31*	.17	.11	2.31*
W (Risk of Addiction)	.15	.04	3.58***	.04	.05	.88
X*W	.09	.04	2.21*	.11	.05	2.20*
Age	-.00	.01	-.26	.00	.01	.36
Gender	-.28	.17	-1.61	-.31	.20	-1.54
Marital	-.05	.16	-.31	.19	.18	1.07
Race	.22	.48	.46	.45	.55	.80
Employ	-.01	.08	-.13	-.14	.09	-1.55
Income	-.05	.04	-1.14	-.04	.05	-.91
Education	.09	.09	1.05	-.02	.10	-.16
	$R^2=.34$			$R^2=.20$		
Outcome variable models						
Model	Intention (Y)					
	b	s.e.	t			
M ₁ (Intrinsic Rewards)	.41	.07	6.06***			
M ₂ (Attitude)	.22	.06	3.44***			
X (Vignette)	.06	.07	.95			
Age	-.01	.00	-1.44			
Gender	-.04	.13	-.31			
Marital	.22	.12	1.94			
Race	-.20	.35	-.55			
Employ	.06	.06	1.13			
Income	.04	.03	1.49			
Education	-.01	.07	-.17			
	$R^2=.51$					
Direct	Effect	95% CI				
Direct X→Y	.06	(-.07, .19)				
Conditional Indirect	Intrinsic Rewards					
W = -1SD(-2.47)	-.00	(-.09, .08)				
W = 0	.09	(.02, .21)				
W = 1SD(2.47)	.19	(.07, .39)				
Attitude						
W = -1SD(-2.47)	-.00	(-.07, .06)				
W = 0	.06	(.01, .15)				
W = 1SD(2.47)	.12	(.01, .28)				

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (vignette) influences both Intrinsic Rewards and Attitude. Risk of Addiction has a moderating effect on Intrinsic Rewards. Risk of Addiction interacts with vignette to influence both mediators Intrinsic Rewards and Attitude. Intrinsic Rewards and Attitude both influence Intention towards All-Type Misuse. There was no direct

effect of vignette on Intention. There was a significant conditional indirect effect of vignette on Intention towards All-Type Misuse as mediated by both Intrinsic Rewards and Attitude and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels of Risk of Addiction then vignette will exert a conditional indirect effect on Intention towards All-Type Misuse mediated by Intrinsic Rewards and Attitude.

Table B.28 Model 7 Risk of Addiction(W) Full Model Attitude(Y) All Misuse Types

Process Model 7 Regression findings for Full Model Attitude (Y) x Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), and Extrinsic Rewards (M₄) x Risk of Addiction(W) all misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	-.05	.13	-.39	.06	.07	.81
W (Risk Add)	.13	.05	2.37*	.11	.03	3.91***
X*W	-.10	.05	-1.80	-.02	.03	-.80
Age	-.01	.01	-.99	-.01	.01	-1.67
Gender	.43	.23	1.88	.19	.12	1.54
Marital	-.22	.28	-.80	-.09	.14	-.61
Race	-.57	.72	-.79	-.27	.38	-.71
Employ	.03	.09	.30	.03	.05	.54
Income	.02	.05	.33	.04	.03	1.25
Education	.29	.13	2.22*	.15	.07	2.07*
	$R^2=.16$			$R^2=.27$		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	T	b	s.e.	t
X (<i>Vignette</i>)	.21	.09	2.37*	.18	.15	1.21
W (Risk Add)	.16	.04	4.29***	.03	.06	.58
X*W	.10	.04	2.67**	-.02	.06	-.28
Age	-.00	.01	-.25	-.01	.01	-.69
Gender	-.33	.17	-1.99*	.14	.25	.58
Marital	.04	.19	.24	.06	.28	.23
Race	.19	.48	.39	-.54	.46	-1.19
Employ	-.01	.09	-.17	.03	.10	.26
Income	-.04	.04	-.81	-.06	.06	-1.14
Education	.08	.10	.87	-.04	.13	-.31
	$R^2=.35$			$R^2=.09$		
Outcome variable model						
Attitude (Y)						
Model	b	s.e.	t			
M ₁ (Perceived Sevrity)	-.41	.17	-2.50*			
M ₂ (Perceived Vuln)	.46	.29	1.60			
M ₃ (Intrinsic Rewards)	.47	.13	3.52***			
M ₄ (Extrinsic Rewards)	-.01	.07	-.13			
X (<i>Vignette</i>)	.07	.08	.75			
Age	.01	.01	.74			

Gender	-.16	.19	-.84		
Marital	.14	.19	.78		
Race	.12	.52	.23		
Employ	-.14	.09	-1.61		
Income	-.05	.04	-1.23		
Education	.08	.09	.86		
		$R^2=.45$			
	Effect	95% CI			
Direct effect X→Y	.06	(-.10, .23)			
Conditional Indirect				Perceived Vulnerability	
W = -1SD(-2.50)	-.08	(-.30, .05)	W = -1SD(-2.50)	.05	(-.02, .25)
W = 0	.02	(-.08, .16)	W = 0	.03	(-.02, .16)
W = 1SD(2.50)	.03	(-.01, .36)	W = 1SD(2.50)	.00	(-.10, .13)
Conditional Indirect				Intrinsic Rewards	Extrinsic Rewards
W = -1SD(-2.50)	-.02	(-.12, .07)	W = -1SD(-2.50)	-.00	(-.05, .03)
W = 0	.10	(.03, .21)	W = 0	-.00	(-.04, .02)
W = 1SD(2.50)	.21	(.07, .41)	W = 1SD(2.50)	-.00	(-.04, .02)

* $p < .05$, ** $p < .01$, *** $p < .001$

Description: Pain, drug seeking, and misuse (vignette) influences Intrinsic Rewards. Risk of Addiction shows a moderating effect on Perceived Severity, Perceived Vulnerability and Intrinsic Reward. However, Risk of Addiction only interacts with pain, drug seeking, and misuse (vignette) to influence Intrinsic Rewards which in turn influences Attitude. There was a significant conditional indirect effect of vignette on Attitude towards all type misuse as mediated by Intrinsic Rewards and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels of Risk of Addiction interacts with pain, drug seeking and misuse to influence the perception of Intrinsic Rewards, which, in turn, influence Attitude towards all types of drug misuse.

Table B.29 Model 7 Risk of Addiction(W) Full Model Intention(Y) All Misuse Types

Process Model 7 Regression findings for Full Model Intention (Y) x Perceived Severity (M₁), Perceived Vulnerability (M₂), Intrinsic Rewards (M₃), Extrinsic Rewards (M₄), Subjective Norm (M₅), and Attitude (M₆) x Risk of Addiction(W) all misuse types

Mediator variable models						
Model	Perceived Severity (M ₁)			Perceived Vulnerability (M ₂)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	-.03	.13	-.23	.07	.07	1.00
W (Risk Add)	.12	.05	2.10*	.10	.03	3.61***
X*W	-.08	.05	-1.55	-.02	.03	-.60
Age	-.01	.01	-.72	-.01	.01	-1.50
Gender	.39	.23	1.65	.18	.13	1.38
Marital	-.19	.28	-.68	-.08	.15	-.56
Race	-.22	.74	-.30	-.06	.38	-.17
Employ	.05	.09	.54	.04	.05	.69
Income	.04	.05	.67	.05	.03	1.62
Education	.26	.14	1.89	.13	.08	1.68
	<u>R²=.13</u>			<u>R²=.25</u>		
Model	Intrinsic Rewards (M ₃)			Extrinsic Rewards (M ₄)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.21	.09	2.25*	.16	.15	1.07
W (Risk Add)	.17	.04	4.26***	.04	.06	.71
X*W	.09	.04	2.38*	-.03	.06	-.50
Age	-.00	.02	-.42	-.01	.01	-1.16
Gender	-.32	.18	-1.80	.10	.25	.41
Marital	.02	.19	.12	.08	.28	.27
Race	.26	.63	.41	-.29	.48	-.60
Employ	-.01	.09	-.06	.07	.10	.63
Income	-.03	.05	-.66	-.05	.06	-.85
Education	.06	.10	.54	-.11	.13	-.81
	<u>R²=.36</u>			<u>R²=.10</u>		
Model	Subjective Norm (M ₅)			Attitude (M ₆)		
	b	s.e.	t	b	s.e.	t
X (<i>Vignette</i>)	.04	.07	.54	.27	.09	2.99**
W (Risk Add)	.07	.03	2.23*	.05	.04	1.15
X*W	-.04	.03	-1.30	.10	.04	2.60**
Age	.01	.00	1.82	.00	.01	.41
Gender	-.15	.13	-1.17	-.33	.21	-1.53
Marital	-.14	.11	-1.25	.17	.20	.81
Race	.29	.52	.56	.43	.99	.43
Employ	-.04	.05	-.76	-.16	.11	-1.52
Income	-.02	.03	-.73	-.05	.05	-1.13
Education	-.05	.06	-.79	.05	.11	.40
	<u>R²=.15</u>			<u>R²=.22</u>		
Outcome variable model						

Model	Intention (Y)		
	b	s.e.	t
M ₁ (Perceived Severity)	-.37	.19	-1.94
M ₂ (Perceived Vuln)	.81	.33	2.42*
M ₃ (Intrinsic Rewards)	.26	.12	2.29*
M ₄ (Extrinsic Rewards)	.04	.05	.70
M ₅ (Subjective Norm)	-.07	.16	-.40
M ₆ (Attitude)	.28	.14	1.97*
X (<i>Vignette</i>)	-.03	.06	-.54
Age	-.00	.01	-.70
Gender	-.10	.14	-.73
Marital	.14	.12	1.24
Race	-.18	.18	-1.01
Employ	.06	.05	1.05
Income	.04	.03	1.11
Education	-.04	.07	-.55
$R^2 = .60$			
	Effect	95% CI	
Direct effect X→Y	-.03	(-.14, .08)	
Conditional Indirect		Perceived Severity	Perceived Vulnerability
W = -1SD(-2.52)	-.07	(-.30, .04)	W = -1SD(-2.52) .09 (-.04, .32)
W = 0	.01	(-.08, .15)	W = 0 .06 (-.03, .22)
W = 1SD(2.52)	.09	(-.03, .33)	W = 1SD(2.52) .02 (-.11, .22)
Conditional Indirect		Intrinsic Rewards	Extrinsic Rewards
W = -1SD(-2.52)	-.01	(-.07, .05)	W = -1SD(-2.52) .01 (-.01, .07)
W = 0	.05	(.01, .15)	W = 0 .01 (-.01, .05)
W = 1SD(2.52)	.12	(.02, .28)	W = 1SD(2.52) .00 (-.01, .05)
Conditional Indirect		Subjective Norm	Attitude
W = -1SD(-2.52)	-.01	(-.08, .02)	W = -1SD(-2.52) .00 (-.08, .08)
W = 0	-.00	(-.04, .01)	W = 0 .08 (.01, .20)
W = 1SD(2.52)	.00	(-.02, .08)	W = 1SD(2.52) .15 (.02, .36)

* p<.05, ** p<.01, *** p<.001

Description: Pain, drug seeking, and misuse (*vignette*) influences Intrinsic Rewards and Attitude. Risk of Addiction shows a moderating effect on Perceived Severity, Perceived Vulnerability, Intrinsic Rewards, and Subjective Norms. However, Risk of Addiction only interacts with pain, drug seeking, and misuse (*vignette*) to influence Intrinsic Rewards and Attitude. Perceived Vulnerability and Intrinsic Rewards both influence Intention. There was a significant conditional indirect effect of *vignette* on Intention towards all type misuse as mediated by Intrinsic Rewards and moderated by Risk of Addiction. Specifically, at perceived moderate and high levels Risk of

Addiction interacts with vignette to influence the perception of Intrinsic Rewards, which, in turn, influence Intention towards all types of drug misuse.

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