1-1-2011

Emotional risk factors for substance abuse in a chronic pain population: Developing a predictive model and testing methods for assessing stigmatized behaviors

Lindsay Margaret-Sander Oberleitner
Wayne State University,

EMOTIONAL RISK FACTORS FOR SUBSTANCE ABUSE IN A CHRONIC PAIN POPULATION: DEVELOPING A PREDICTIVE MODEL AND TESTING METHODS FOR ASSESSING STIGMATIZED BEHAVIORS

by

LINDSAY M.S. OBERLEITNER

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2011

MAJOR: PSYCHOLOGY (Clinical)

Approved by:

_____

Advisor Date

_____

Advisor Date

_____

_____

_____

ACKNOWLEDGEMENTS

I would like to thank my research advisor, Mark Lumley, Ph.D., for his guidance in the development and implementation of this project, as well as his support and guidance throughout all of graduate school. I would also like to thank Emily Grekin, Ph.D. for serving as my dissertation co-advisor and for all of the time she spent assisting in study design and reading dissertation drafts. Additional thanks to my committee members, Leslie Lundahl, Ph.D., Todd Lininger, M.D. and Marla Bartoi, Ph.D. for their time and additional guidance in the development of this study. I would especially like to thank Dr. Lininger for his assistance getting the project started at the chronic pain clinic and all of the staff at the clinic whom this project could not have been completed without. Kathryn Zumberg and Amy Loree were especially instrumental in the completion of this study as they dedicated many hours to conducting study sessions and I will be forever grateful for the time they gave to me and this project. I'm also thankful for the many phone calls, time spent scheduling participants and interviewers, and jumping in and assisting with running participant sessions by Jen Carty, Deb Valentino, and Nancy Lockhart. I'm grateful for the many undergraduates involved in recruiting participants from the chronic pain clinic and entering data. Finally, I would like to thank my husband, David Oberleitner, and my parents, Paul and Julia Sander, for their love, support, and patience. I know I would not have made it this far without my family, supporting me every step of the way. This research was funded by the Blue Cross Blue Shield of Michigan Student Award Program.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

STUDY OVERVIEW

Chronic pain and substance abuse/dependence both cause substantial individual suffering and societal costs. Brooner (2008) states that “substance use disorders and chronic pain produce an impressive and strikingly similar range and number of negative effects on humans and society, and cause notable concerns and dilemmas…across the entire health care treatment system” (p. 485). Although effective interventions for each of these conditions have been developed, chronic pain and substance misuse are often co-morbid. Unfortunately, the field currently lacks guidelines for identifying chronic pain patients who are at high risk for prescription misuse and/or substance abuse, and there is a need for research to help clinicians understand who is most likely to misuse their prescriptions or other substances while receiving treatment for chronic pain (Turk, Swanson, & Gatchel, 2008). Identifying patients most at risk for developing prescription or substance use problems can lead to better targeting of substance abuse prevention and treatment among people with chronic pain. However, research is limited on substance abuse, particularly prescription opioid misuse, within chronic pain populations.

Notably, similar factors, such as trauma history and low social support, have been implicated in the development and maintenance of both chronic pain and substance abuse. The shared risk factors for the development of chronic pain and substance abuse highlight the need for further research into the relationship of chronic pain and substance abuse. The limited predictive factors applied to prescription opioid abuse in chronic pain patients is surprising given the breadth of personal, cognitive, and

emotional factors explored in the separate literatures on chronic pain and substance abuse. Prior research has examined, without conclusive results, the predictive factors of previous substance abuse, age, gender, and prior history of psychiatric diagnoses (Michna et al., 2004).

Physicians treating chronic pain patients are in the difficult position of identifying any signs of prescription drug abuse and preventing abuse of other substances, yet they lack evidence-based guidelines to inform their decisions. Daily, physicians who treat chronic pain patients are forced to make decisions about whether medication is needed, whether the medication is effective, and whether there are any harmful effects of use. There are currently few factors guiding physicians' decisions as to whether an individual patient may need additional regulation of pain medications because of risks. One study showed that people who are regularly prescribed opioids for the treatment of pain had increased rates of opioid and other substance abuse problems (Edlund, Sullivan, Steffick, Harris, & Wells 2007), and did not have improved pain relief, quality of life, or functional ability as compared to other pain patients not receiving medication (Eriksen et al., 2006). These findings suggest that there are serious risks associated with chronic prescription opioid use, and further research is needed.

Research on prescription misuse and substance use in chronic pain patients has been limited in scope, likely due in part to researchers' difficulties in defining prescription misuse and inaccuracy in self-report. As many of the previous research studies have been conducted using medical record review or conducted by individuals closely tied to the patients' treatment, reporting of prescription misuse and substance use has likely been compromised. In clinical settings, gathering accurate information

about personal history, prescription misuse, and substance abuse can be critical to providing effective care. In research settings, gathering accurate information from participants is critical to the fidelity of a study and the usefulness of interpretations. Paper-and-pencil methods and clinician interviews—of varying skill and effectiveness—are the most common methods of assessing this information, but the method used appears to influence outcomes. For example, Gerbert et al. (1999) found that primary care patients who completed a computerized form reported significantly more drug and alcohol risk behaviors than those in a standard interview condition. The method by which information is gathered from participants is known to significantly change the outcome of studies. Literature specific to methods by which information about stigmatized behaviors is gathered is still in its developmental phase, but much of the work has focused on the use of computerized programs for eliciting sensitive information (e.g., Newman et al., 2002) which may not be feasible to implement in direct patient care. Doctor-patient interactions are the most likely time to collect information about the risky behaviors of chronic pain patients in ongoing care, and these interactions are nearly always face-to-face. There is a need to develop and test methods to assess substance abuse and other stigmatized behaviors that can be easily employed in clinical settings.

In this dissertation project, two major areas that have been inadequately studied within the chronic pain literature were examined. First, although research has identified several demographic and social factors that are implicated in the development and maintenance of both chronic pain and substance abuse, little research has been done on emotional risk factors, including a history of traumatic experiences and how one

regulates one's emotions. Although many people have hypothesized that emotional factors contribute to both chronic pain and substance misuse, this needs to be tested in patients who are co-morbid for both. The second area that was studied is the method by which sensitive information, such as prescription misuse, substance abuse, and trauma history, is gathered. There is a need to experimentally test clinically feasible methods of enhancing patients' reports of such stigmatized behaviors, and interviews using enhanced communication techniques may accomplish this goal.

Overall, this study had several aims of substantial theoretical and practical importance to the fields of medicine and psychology. The first goal was to determine which demographic, pain-related, cognitive/social, and stress/emotional factors predict the abuse of prescription or other substances among patients in treatment for chronic pain. The second goal was to test whether knowledge of factors related to stress and emotion regulation (low emotional awareness and expression, high experience and impact of lifetime trauma) predict prescription and substance misuse beyond more routinely assessed and established factors. The third goal was to compare different methods of eliciting disclosure of stigmatized information (misuse of prescription medication, use of alcohol/drugs, and experience of stressful events or traumas), and test whether an innovative, clinically sensitive interview protocol will enhance disclosure beyond a traditional interview and a questionnaire.

To address these aims, patients with chronic pain who were receiving opioid treatment through a local pain management clinic were recruited. Participants completed most of the predictor measures (i.e., demographic, pain, cognitive/social, and emotional measures) in paper-and-pencil format, but were randomized to provide

information about drug use and trauma history in one of three formats: a written (non face-to-face) paper-and-pencil questionnaire, standard face-to-face clinical interview, or an enhanced interview, in which the interviewer followed a scripted method for encouraging further disclosure (e.g., normalizing the occurrence of prescription misuse/trauma, discussing concerns of confidentiality in detail, etc.).

CHAPTER 2

LITERATURE REVIEW

Chronic pain is defined as “pain that extends beyond the period of tissue healing or with low levels of identified pathology that are insufficient to explain the presence and/or extent of pain” (Jacobsen & Mariano, 2001). Chronic pain can be initiated by a range of triggers (e.g., disease, injury), but it is maintained or aggravated by a variety of additional psychological, behavioral, and environmental factors such as coping, stress, decreased activity, and legal disability status (Visser, 2006). Chronic pain impacts the lives of over 75 million people in the United States. It has a major impact upon our health care industry, as chronic pain patients need increasing care as they try to manage this debilitating condition (Becker, Fiellin, & Desai, 1997). Chronic pain is a leading cause of disability and interference with job performance. There are limited treatment options used for chronic pain patients. Traditional treatments for chronic pain include the use of analgesic medications, but chronic pain is rarely fully controlled by analgesics (Eriksen, Sjogren, Bruera, Ekholm, & Rasmussen, 2006). A statement in the *Research Reports Series: Prescription Drugs: Abuse and Addiction* highlights the common dilemma of treatment providers in the field of chronic pain: “How to adequately relieve a patient’s suffering, while avoiding the potential for that patient to become addicted to the pain medication. (pg. 7)”

Given the evidence that chronic pain is rarely controlled fully by analgesic medications, we also know that patients may use other substances that are not prescribed to try to manage pain on their own (Brennan, Schutte, & Moos, 2005). Individuals with chronic pain have increased rates of substance abuse and psychiatric

disorders (Twillman, 2007; Weisberg & Boatwright, 2007). The elevated rates of substance abuse within chronic pain populations provides further support for the need to develop better predictive models for abuse potential within chronic pain patients.

Like chronic pain, substance abuse and dependence also have a profound impact on the lives of many people. Substance abuse and dependence are related to significant work and relationship disability, are comorbid with other psychiatric illnesses, are associated with lower quality of life, and are linked to serious health complications (Hser, Hoffman, Grella, & Anglin, 2001; Maddux & Desmond, 1992; Marmorstein, Iacono, & Malone, 2010; Research Society on Alcoholism, 2011). Much of the concern about the potential abuse of prescription opioids has been spurred by concerns over the non-medical use of prescription opioids, such as youth who have not been prescribed the medication, the street sales of prescription drugs, and so on. The non-medical use of prescription opioids has led to mounting concerns about preventing diversion of prescriptions and identifying individuals most at risk of abusing those prescriptions.

Non-Medical Use/Abuse of Prescription Opioids

Becker, Sullivan, Tetrault, Desai, and Fiellin (2008) found that non-medical use of prescription opioids was 4.5% and increasing, based on data from the 2002-2004 National Survey on Drug Use and Health. Within this 4.5%, some individuals were misusing prescriptions provided for medically-valid reasons, and some individuals were using the opioids without any medical need. Blanco et al. (2007) found similar results using data from the National Longitudinal Alcohol Epidemiologic Survey and National Epidemiologic Survey on Alcohol and Related Conditions. Blanco et al. compared data

from 1991 and 2001 and found that non-medical use of prescription opioids had increased 53% over that time period.

The fear of the significant impact that abuse of drugs has on a community, coupled with the increasing use of non-prescription opioids, has raised concern within the medical community about the appropriateness of prescribing these medications to patients with chronic pain (Erikson, 2008). Despite this recent interest in the non-medical use of prescription opioids, the long-term medical use of opioids and other substances in a chronic pain population has not received as much research attention, which is likely due, in part, to the complicated nature of defining substance misuse in the population. The difficulty in defining prescription opioid misuse in chronic pain populations is clearly illustrated in the varying estimates of the rates of misuse across studies as noted below.

Prevalence of Opioid Misuse in Chronic Pain Populations

There is inconsistent evidence of prescription drug abuse within the chronic pain population. Some studies report little to no abuse of prescription opioids (Cowan, Wilson-Barnett, Griffiths, & Allen, 2003; Dellemijn, 2001); however, other studies cite an increasing concern over misuse of prescriptions (Becker et al., 2008; Chabal, Erjavec, Jacobsen, Mariano, & Chaney, 1997). Hoffmann, Olofsson, Salen, and Wickstrom (1995) found that 23.4% of patients attending a chronic pain treatment center in Sweden met criteria for abuse and/or dependence of alcohol, opioids, or sedatives. In a review of the literature, Hojsted and Sjogren (2006) found that rates of prescription opioid misuse in chronic pain populations ranged from 0 to 50%, depending on the

definition of prescription abuse or misuse that was used and the method by which the information was collected.

The difficulty in developing a clear definition of prescription abuse has been complicated by an ethical debate about the utility and risk of pain medications in chronic pain. There are likely few problems resulting from short-term use of opioid prescriptions; however, as mentioned above, many patients with chronic pain are prescribed a long-term course of such medication. Daily use of prescription opioids leads to physiological changes such as a need for increased dosage (tolerance) and withdrawal symptoms. Sees and Clark (1993) suggested that a person who is prescribed opioids for pain could potentially meet for DSM-IIIR criteria of dependence without truly being dependent in a clinical sense. Additionally, Weissman and Haddox (1989) coined the term “pseudo-addiction” referring to time-limited and reversible abuse symptoms that are suggestive of under-treated pain, rather than actual abuse or dependence. Another argument that was proposed to encourage the liberal treatment of chronic pain patients with opioid medications is the model of pain as an antagonist (a “block”) to the addictive properties of opioids (Kanner & Foley, 1981; Portenoy & Foley, 1986). Debates as to the meaningfulness of an abuse or dependence definition for prescription opioids have left some researchers and clinicians skeptical that abuse of prescription opioids in a chronic pain population even exists. Such skepticism could lead physicians and researchers to ignore serious warning signs of addictive behaviors.

Alternatively, those on the opposite side of the debate over the meaningfulness of abuse and dependence on prescription opioids have attempted to demonstrate that all prescription opioids are dangerous. This belief could lead to under-treatment of

patients with chronic pain, thus leading to further suffering. This side of the argument has led to theoretical debates as to whether patients who present warning signs should be prescribed any opiate pain medication. For example, Cohen, Jasser, Herron, and Margolis (2002) published their own ethical dilemma as to whether a chronic pain patient with previous history of abuse of any substance should be prescribed pain medication at all.

Despite the polarization of this debate within the literature, it appears that the need to relieve chronic pain patients of some suffering must be balanced with consideration as to whether opioid prescriptions warrant increased regulation for clients who present with risk factors for abuse. As stated by Erikson (2008), we need to consider the substantial impact of drug dependence which affects nearly 100 million people as opposed to the roughly 50 million with pain and also consider the cost to society of substance abuse which has been estimated at nearly 4 times the cost of "under-medicated pain (p. 1)." There are many theoretical publications on this debate, but it is essential to consider the working definition of prescription misuse and also the existing research studies that have begun to attempt to clarify the prevalence of substance abuse and the risks associated with development of substance abuse in a chronic pain population.

Defining Prescription Misuse

It is evident that there are many risk factors that remain to be explored to help in identifying chronic pain patients most at risk for prescription misuse and substance abuse. The ability to accurately identify misuse and appropriately assess it in both clinical and research settings continues to place limits on the utility of our findings.

Finding the most effective methods for eliciting accurate information from participants with chronic pain patients is a necessary step towards better identification of risk factors.

There is inherent complication in identifying whether an individual is misusing a prescription opioid, because as described previously, many of the problematic symptoms of drug use, such as needing higher doses to get the same effect or withdrawal symptoms will likely arise even with appropriate use of pain medications. To address these complications, multiple scales have been developed to operationalize opioid prescription misuse and aid physicians in making the judgment as to whether their patients are misusing medications. Examination of a few of these scales provides a better picture of the conceptualization of prescription drug misuse that has been established thus far.

One such measure is the Pain Medication Questionnaire (PMQ) developed by Adams et al. (2004). The PMQ is a list of aberrant, prescription drug related behaviors and was developed based upon previous clinical research and feedback from clinical personnel. The PMQ lists behaviors such as “I believe I would be better with a higher dosage of my pain medication” or “At times I drink alcohol to control my pain” and patients rate these items on a visual analogue scale. All of the items from this questionnaire are based on current risk factors such as use of other substances, personal concerns about their medication use, or need for increasing medication. Another measure is the Prescription Drug Use Questionnaire (PDUQ), which explores factors such as severity of pain, relationship with their treating physician, and current prescription misuse variables (Compton, Darakjian, & Miotto, 1998). The PDUQ differs

from the PMQ because of its explicit focus on pain and prescription factors rather than assumed risk factors of family substance abuse history and other substance use. A third established measure is the Screening for Addiction in Patients with Chronic pain and "Problematic" Substance Use (SOAPP; Butler et al., 2004; Butler, Fernandez, Benoit, Budman, & Jamison, 2008; Compton, Darakjian, & Miotto, 1998). The SOAPP was established by an expert panel which identified and rated assumed risk factors for prescription opioid abuse in a pain population. This scale includes questions regarding history of substance abuse and legal problems. In summary, the primary scales used currently to assess prescription opioid abuse in a chronic pain population focus either on current substance misuse behaviors or past history of any substance abuse to make predictions as to whether an individual patient is at risk. These established tools to predict and detect misuse of prescription opioids are limited in scope, focusing only on the narrow range of "risky" behaviors identified so far (e.g., illegal actions, misuse of other substances, and/or past history of substance abuse).

Spurred by the lack of definition regarding misuse of prescription opioids, the American Pain Society (APS), the American Society of Addiction Medicine (ASAM), and the American Academy of Pain (AAP) developed a unified definition of misuse (American Pain Society, 2001). As the American Pain Society reported, prior to this definition, each medical specialty had developed its own criteria for diagnosing prescription misuse. The definition provided by APS, ASAM and AAP is as follows: "a primary, chronic, neurobiological disease, with genetic, psychosocial, and environmental factors influencing its development and manifestations." Unfortunately, this definition does not detail the thoughts, behaviors, and actions that should give

practitioners warning about an at-risk or abusing patient. Ballantyne and LaForge (2007), in a review of the literature, stated that the continued lack of a clear definition of prescription opioid misuse has caused substantial interference in the identification and treatment of chronic pain patients with an opioid addiction. Despite the efforts of APS, ASAM, and AAP, it appears that we are still lacking an operational, working definition from which to design our research questions and inform our treatment of chronic pain patients. As described above, our definition of prescription misuse has been developed in part by the working definitions used for research studies, and those studies will now be reviewed.

Review of Prescription Opioid Misuse Research

The majority of the research on prescription opioid abuse in a chronic pain population stems from large national studies such as the National Survey on Drug Use and Health (Becker et al., 2008; Blanco et al., 2007; Compton & Volkow, 2006; Dowling, Store, & Chilcoat., 2006; Edlund et al., 2007; Eriksen et al., 2006; McCabe, Teter, Boyd, Knight, & Wechsler, 2005). One such study was conducted by Edlund et al. (2007), who analyzed surveys of nearly 9,300 people to compare substance use problems between individuals who have been regularly prescribed opioids and those who have not. The study showed that people who are regularly prescribed opioids for the treatment of pain had increased rates of opioid and other substance abuse problems compared to those who were not prescribed opioids regularly. The authors reported that the increased misuse of opioids and non-opioid substances in individuals prescribed opioids for pain were likely due in part to increased rates of anxiety and depressive disorders for individuals receiving prescription opioids.

Another epidemiological study was conducted by Eriksen et al. (2006) using data from the 2000 Danish Health and Morbidity Survey. Participants completed interviews and questionnaires regarding pain, quality of life, health care utilization and satisfaction, and medication and drug use. Eriksen and colleagues found that those patients prescribed long-term opioid treatments did not have improved pain relief, quality of life, or functional ability as compared to other pain patients not receiving medication. This led the authors to question the utility of broad usage of pain medication for all chronic pain patients and suggest more selective use. The epidemiological studies reviewed here provide preliminary concern over the occurrence of prescription misuse in a chronic pain population, but the large samples needed for these studies inherently limited the number of predictive factors that could be examined.

The next set of research studies on chronic pain and substance use are point prevalence studies of prescription misuse and other substance abuse in participants recruited from chronic pain clinics (Chabal et al., 1997; Fleming, Balousek, Klessig, Mundt, & Brown, 2007; Hoffman et al., 1995; Morasco & Dobscha, 2008; Reid et al., 2002). These studies were focused on a smaller participant population, thus allowing exploration of additional concurrent and predictive factors suggestive of prescription misuse. Unfortunately, the factors explored in these studies were also limited and included: age (Fleming et al., 2007; Morasco & Dobscha, 2008), psychiatric comorbidity (Chabal et al., 1997; Fleming et al., 2007; Morasco & Dobscha, 2008), substance abuse histories (Chabal et al., 1997; Morasco & Dobscha, 2008), and concurrent abuse of other substances (Fleming et al., 2007; Hoffman et al., 1995).

Fleming et al. (2007) assessed 801 patients receiving a daily opioid treatment regimen from a primary care physician. Medical record reviews and interviews were used to examine point prevalence (9.7% any substance, 3.8% opioid) of substance use disorders within this population and it was found that those who abused their medication were younger, had a higher rate of psychiatric comorbidity, and higher rate of use of illicit substances. The authors also found that opioid use disorders were four times more likely within a chronic pain population being treated with opioids than those in the general population. Chabal et al. (1997) found that 27.6% of their clinic population at a major VA met at least three of the prescription opioid abuse symptoms determined by the researchers, such as requesting additional prescriptions or increased dose. The researchers examined previous history of alcohol or drug abuse and psychiatric history and found no differences between those who misused opioids and those who did not. As mentioned above, the concurrent factors explored in the studies described in this section were limited, but these studies do provide a model for continued exploration of additional risk factors. Prospective studies allow researchers to determine whether the factors shown to be associated with substance abuse in chronic pain (psychiatric comorbidity, age, etc.) can actually predict substance abuse or if those factors are merely an associated consequence of the substance abuse.

There has been one prospective study of prescription opioid abuse in a chronic pain population conducted. Ives and colleagues (2006) assessed patients attending a chronic pain clinic over a one-year period, following urine drug screens and medical records of requests for additional opioids. They reported age, gender, other substance misuse, and previous legal involvement as significant predictors of prescription opioid

misuse, whereas race, socio-economic status, depression and pain were not different between those who misused their medications and those who did not. The findings from the point-prevalence studies and the prospective study by Ives et al. (2006) have yielded different findings. For example, although psychiatric comorbidity was associated with higher rates of prescription misuse in point prevalence studies, depression was not related to prescription misuse in the prospective study. Although these differing results may in part be due to the nature of the methods used (e.g., psychiatric comorbidity may be shown in point prevalence studies because it is a consequence of substance abuse), there is a critical need to fully review the existing literature to determine the risk factors most commonly observed.

In a review of the literature by Turk et al. (2008), the authors call for better measurements of prescription opioid abuse and use of reliable predictive measures, stating that the only strong predictor established thus far is a personal history of using illicit drugs. In a commentary on “The Rational Approach to the Treatment of Chronic Pain,” Gourlay, Heit, and Almahrezi (2005) expressed the need for physicians to practice caution and carefully assess all patients for potential abuse, and suggested a focus on reported past and present prescription misuse behaviors (Gourlay et al., 2005). Although the sentiment of Gourlay et al. is clear, it seems as though we should be able to assess variables that actually predict misuse, prior to the occurrence of misuse.

Review of the current state of the literature provided above shows the limited extent of predictive variables explored within the chronic pain population. It remains evident that opioid treatment for pain is a necessary treatment for relieving the suffering of many of those experiencing chronic pain; however, we need more predictive tools to

identify the groups most at risk for the suffering caused by substance abuse and addiction. The independent literatures on chronic pain and substance abuse have addressed substantially more factors than those factors considered in the joint literature (e.g., expectancies, coping, and emotional factors). It is likely that misuse of prescription medications or other illicit substance use share common risk variables, such as trauma history (Logan, Walker, Cole, & Leukefeld, 2002) or emotional regulation factors (Handelsman et al., 2000; Jensen, Thomsen, & Hojsted 2005; Pinard, Negrete, Annable, & Audet, 1996) and an exploration of these factors is also necessary.

Although the need for further identification of risks of prescription misuse is apparent, two primary challenges remain. The first complication that must be addressed is what additional risk factors should be explored based upon the existing literatures on chronic pain and on substance abuse. The second complication that must be addressed is how to identify substance misuse (and particularly prescription misuse) within a chronic pain population.

Risk Factors

Next, four major areas of literature as related to both chronic pain and risk of substance abuse will be explored: traditional factors, pain factors, cognitive/social factors, and emotional factors. Although there is much research addressing each of these areas within the chronic pain literature and substance abuse literature, there have been few studies that unify the factors to apply them to substance abuse risk within a chronic pain population. Relevant studies for each area will be explored below.

Traditional factors such as age, gender, history of substance abuse, and history of psychological treatment are all factors that are readily available to a physician

working within a chronic pain population. As noted above (Becker et al., 2008; Blanco et al., 2007; Compton et al., 2006; Dowling et al., 2006; Edlund et al., 2006; Erikson et al., 2006; McCabe et al., 2005), these factors have been established as the primary variables in the exploration of prescription opioid misuse.

Age and gender are two variables often considered within substance abuse literature. Review of national surveys has found increasing rates of opioid abuse (Compton & Volkow, 2006) and higher rates of abuse within younger age groups (Dowling et al., 2006; Fleming et al., 2007; Riley & Hastie, 2008) for both medical and non-medical abuses of opioids. The National Survey on Drug Use and Health has reported the highest rates of prescription opioid use amongst adolescents and older adults (over the age of 60). Gender is another variable that is quickly assessed by physicians and researchers; however, exploration of its predictive value has been limited. Most studies have recorded and controlled for gender when exploring opioid abuse in chronic pain patients for women and men rather than exploring differences. One study that examined gender differences of substance abuse in chronic pain patients reported higher rates of abuse among men (Ives et al., 2006).

The most common factor that is quickly examined by physicians prescribing opioid medications is a patient's history of prior drug or alcohol abuse. Michna et al. (2004) reported that past history of alcohol or other substance abuse was one of the most important factors in determining whether a chronic pain patient is at risk of misuse of prescription opioids. Michna and colleagues conducted a study to assess who would abuse prescription opioids, and found those with past history of abuse were more likely to have aberrant behaviors such as lost or stolen prescriptions or other illicit drugs in

their urine screens. Additionally, reviews of the literature report personal history of substance abuse as the only strong predictor that has been reliably assessed and shown to predict prescription opioid misuse across multiple studies (Compton & Volkow, 2006; Turk et al., 2008). Despite the common use of this prior drug history in determining whether a patient is at risk of abusing their current prescription, there have been a few exceptions to this finding. For example, Chabal et al. (1997), in their study of 97 VA patients prescribed opioids for the treatment of chronic pain, found that prior history of substance abuse did not significantly differ between patients who abused their opioid prescription and those who did not abuse their prescriptions. Because of inconsistent evidence for the usefulness of prior history of substance abuse as a predictor, it is clear that we need to consider other additional factors.

Family history of substance abuse is another common variable considered in the substance abuse literature; however, research on family history of substance abuse as a predictor of prescription drug abuse is more limited. Studies that have examined family history of substance abuse or dependence have found significantly increased risk of opioid misuse for those with the most extensive family histories (Butler, Budman, Fernandez & Jamison, 2004; Hojsted & Sjogren, 2007).

History of mental health treatment and/or psychiatric diagnosis has been another area frequently explored in the literature. Michna et al. (2004) found that chronic pain patients with higher rates of depression and anxiety were significantly more likely than others to abuse prescription opioids. Multiple studies have found increased rates of psychological treatment histories in chronic pain patients who misuse their prescription opioids (Becker et al., 2008; Lake, 2008; McWilliams, Clara, Murphy, Cox, & Sareen,

2008; Potter, Shiffman, & Weiss, 2008; Wasan et al., 2007; Weitzner, Cockram, & Strickland, 2003).

Pain factors. The next area of literature is pain within the context of substance abuse risk. There is limited research regarding pain as a risk factor for substance abuse, however, both pain severity and pain coping are factors that physicians are likely already assessing in their care of chronic pain patients. It makes practical sense that increased pain severity may lead to increased prescription use. Additionally, as described previously, the under-treatment of pain, can lead to abuse-type symptoms such as requests for increased doses or stronger medications, using more of one's prescription than advised, and/or dissatisfaction with treatment without there being additional behavioral concerns of addiction or misuse (Weissman & Haddox, 1989). Thus, pain severity is a complicated but essential variable to explore when assessing risk factors in chronic pain patients.

Equally important is one's ability to cope with pain. One potential area of interest within the pain coping literature is "pain catastrophizing." Pain catastrophizing is a belief in negative, future outcomes of pain experience, and thus often leads to attempts to avoid or escape pain (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). In a 10-year follow-up of patients in a chronic pain clinic, Jensen et al. (2005) found that patients who were prescribed long-term opioid medication treatment had decreased levels of quality of life, more symptoms of depression, and increased use of the coping strategies of "catastrophizing" and "hoping and praying."

Cognitive/social factors. The third category of literature that will be explored is the category of cognitive and social predictive variables. Few prescription opioid misuse

studies have utilized these variables; yet, they are among the most commonly explored risks within alcohol literature (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Tan, Nyugen, Cardin, & Jensen, 2006). Brown, Christiansen, and Goldman (1987) defined expectancies in alcohol use through the following categories: that it leads to positive effects, that it brings pleasure, that it leads to sexual enhancement, that it enhances social abilities, that it leads to relaxation, and that it leads to aggression/strength. Scheiffer and colleagues (2005) conducted a study of medication belief in chronic pain patients using a scale the researchers created based upon patient interviews. The medication beliefs assessed were: belief the medication would relieve pain, become addicting, increase functioning, improve affect/feelings, and need for increased medication. Scheiffer et al. (2005) found that chronic pain patients who reported previous histories of substance abuse also reported higher levels of beliefs in the effectiveness of the opioid medications.

Other well-supported and commonly explored variables in the broader substance abuse literature are neuroticism and behavioral undercontrol (i.e., low conscientiousness) in alcohol research (Grekin, Sher, & Wood, 2006; Sher, Bartholow, & Wood, 2000). The construct of extraversion has been shown to have the strongest relationship with illicit drug use (Agrawal, Jacobson, Prescott, & Kendler, 2004; Gorman & Derzon, 2002), but the link between extraversion and alcohol use disorders is weaker. neuroticism and behavioral undercontrol (or low conscientiousness). There are no published studies that have explored the relationship between neuroticism, behavioral undercontrol (low conscientiousness), or extraversion and prescription misuse or other substance use in a chronic pain population.

Social support has been explored extensively as it relates to substance abuse in adolescence. Research has found that low levels of perceived and actual social support in adolescence are related to an increased risk of substance abuse in adolescence and adulthood (Chaffin, Kelleher, & Hollenberg, 1996; Myers, Brown, & Mott, 1993; Rhodes & Jason, 1990; Wills & Cleary, 1996; Wills & Vaughn, 1989). Within adult populations, most social support research has examined its relationship to substance abuse treatment outcome. Individuals with increased levels of perceived and actual social support in adulthood are more likely to engage in and complete treatment programs, have increased help seeking behavior, and maintain their recovery through follow-up (Aase, Jason, & Robinson, 2008; Oetzel, Duran, Jiang, & Lucero, 2007; Panchanadeswaran, El-Bassel, Gilbert, Wu, & Chang, 2008). Thus, research on social support has shown that low levels of support predicts substance use onset in adolescence and lower chances of recovery from substance abuse and dependence in adulthood.

Emotional factors. Emotional factors are the least explored predictive factor in the prescription opioid misuse literature. This final category of predictive factors is the most difficult to assess, but the research within the two independent fields has provided rich explanations to some of our most perplexing questions of human experience. The concept of “self-medication” within the substance abuse literature also provides reason for exploring emotional factors within the context of prescription medication misuse. The “self-medication” concept was created primarily through clinical observations of patients in treatment for substance abuse. Khantzian (1997) describes a person’s attempt at self-regulation of uncomfortable or painful experiences of affect, self-esteem, and

relationships. As the term suggests, in this model, substances are used to mask or avoid these uncomfortable or painful affective and/or relational experiences. Additionally, there is a large body of research in the alcohol literature that has examined the motive to use alcohol to manage stress and emotions (Cooper, Frone, Russell, & Mudar, 1995) that suggests that people who regulate their emotional experiences through the use of alcohol are more likely to develop abuse symptoms. There is some research to suggest that emotion regulation based motives to use nonmedical prescription drugs (e.g., nonprescribed sedatives, opioids, stimulants) are also associated with higher rates of abuse (McCabe, Boyd, & Teter, 2009). Despite the prevalence of this model within clinical practice, emotional regulation factors have been largely ignored within the literature on prescription misuse in chronic pain patients.

Experience of stressful or traumatic events has been linked to both the presence and severity of chronic pain conditions (Green, Flowe-Valencia, Rosenblum, & Tait, 2001; Finestone et al., 2000; Sachs-Ericsson, Kendall-Tackett, & Hernandez, 2007) and substance abuse and dependence (Logan et al., 2002; Wilsnack, Vogeltanz, Klassen, & Harris, 1997). Finestone and colleagues (2000) found that childhood sexual abuse is positively related to chronic pain. Research has also suggested that individuals with past traumas are more likely to abuse substances. Wilsnack and colleagues (1997) used a national survey that assessed childhood sexual abuse and use of substances and found that those women who experienced childhood abuse were significantly more likely to abuse alcohol and other illicit substances. In a review of the literature on substance abuse and trauma histories, Logan and colleagues (2002) reported a high rate of co-occurrence of trauma and substance abuse and dependence in women. The

researchers developed a complex model suggesting that the relationship between trauma and substance abuse in women can be explained by trauma and coping factors, lifestyle factors, sociological factors, and contextual factors. Uniting the chronic pain and substance literature, Green and colleagues (2001) studied women presenting for chronic pain management and found that nearly half had experienced trauma, and those with long-term abuse had higher incidence of substance abuse.

A person's general approach to coping with emotions can have a substantial impact on their psychological and physical functioning. In general, emotionally focused coping has been shown to lead to a variety of deleterious outcomes. However, one specific type of emotionally focused coping, emotional approach coping, has been shown to actually predict better outcomes in a variety of studies (Austenfeld & Stanton, 2004; Smith, Lumley, & Longo, 2002). Previous research has also shown that within a chronic pain population, emotional approach coping specifically may lead to decreased pain and depression (Smith et al., 2002). Emotional approach coping is the tendency of a person to understand and process or use emotions throughout one's daily life. Emotional approach coping is one's general approach to dealing with emotional information in their life. Because we know that emotional approach coping leads to decreased pain and depression (Smith et al., 2002), both of which we have reason to predict relate to prescription misuse and substance abuse, emotional approach coping is an important variable to explore.

Alexithymia is a widely researched emotional regulation concept which is defined as difficulty indentifying and describing feelings, externally oriented thought and limited imaginal ability (Nemiah, Freyberger, & Sifneos, 1976; Taylor, Bagby, & Parker, 1997).

Although alexithymia was originally studied in people with psychosomatic disorders, research shows it to be a risk factor for many problems, including chronic pain and substance dependence (Taylor et al., 1997). Recent research has begun to connect the experience and maintenance of chronic pain with alexithymia (Ak, Sayer, & Yontem, 2004; Burba et al., 2006; Celikel & Saatcioglu, 2006; Lumley, Neely, & Burger, 2007). There have been no published studies relating alexithymia to prescription drug misuse in chronic pain patients; however, there has been some research on the relationship of alexithymia to other drugs of abuse (Handelsman et al., 2000; Pinard et al., 1996). Pinard and colleagues (1996) examined the alexithymia scores on the Toronto Alexithymia Scale-20 (TAS-20) at baseline in a drug treatment center and found that patients attending drug treatment had significantly higher scores on the TAS-20 than non-patients. The researchers also repeated the TAS-20 at completion of treatment and found no significant differences from baseline to treatment completion, suggesting that alexithymia is relatively stable within this group and is likely not a direct effect of active substance use.

Further, emotional regulation techniques have also been linked to chronic pain and coping with pain (DeGenova, Patton, Jurich, & Macermid, 1994; Leitenberg, Greenwald, & Cado, 1992). The two primary regulation techniques that have been explored are avoidant and emotion focused coping which may lead to increased pain symptoms, emotional distress, and general negative outcomes. Although emotional regulation techniques have been suggested as a factor in substance abuse through the “self-medication” model, there have been no published studies exploring avoidant and emotion focused coping directly. Theoretically, within the “self-medication” model, it

would seem as though individuals who engage in avoidant coping techniques may be more likely to engage in substance abuse behaviors as an escape process, but there is no current literature to support this claim.

In addition to our lack of an operational definition of prescription misuse and mixed results regarding predictive factors of prescription misuse and other substance use in a chronic pain population, our understanding of this serious problem is also limited by our ability to collect accurate information in both research and clinical settings. Gathering accurate self-report of a stigmatizing behavior such as prescription misuse or other substance abuse can be challenging. The researcher or clinician must develop methods to overcome the many motivations that prevent people from sharing these behaviors (e.g., being looked down upon, decreasing their chances of receiving prescription medications, being unaware that their behavior could be problematic).

Disclosure of Stigmatized Behaviors

Disclosure of stigmatized behaviors in research, and specifically drug use, requires a balance of the researcher's need for reliable, and consistent information with a participant's comfort in sharing based on beliefs of confidentiality, trust in the researcher, and clear understanding of the questions being asked. Under-reporting in studies of drug use has been a long documented problem (Andrews, Kendler, Gillespie, & Neale, 2007; Booth-Kewley, Larson, & Miyoshi, 2007; Fendrich, Wislar, & Johnson, 2003). Of particular interest in understanding the accuracy of self-reported of misuse of prescription opioid medications, it has been found that people who face potential legal or social consequences from reporting their substance use provide less accurate reports (Golub, Liberty, & Johnson, 2005; Grekin et al. 2010). As reporting misuse

symptoms related to prescription opioids could potentially lead to the discontinuation of treatment at many clinics, the motivation to conceal use is likely high. The unreliability of self-report has led many researchers to examine physiological measures of substance use such as urine drug screens or hair tests; however, such tests can not assess the behavioral attributes of abuse or dependence symptoms (Schuckman, Hazelett, Powell, & Steer, 2008). There is a need to continue improving our methods of increasing self-report of both misuse of prescription medications and use of illicit drugs and alcohol, as the most serious consequences of use are behaviors and desires that can only be reported through the participant.

Disclosure in health care settings involves further barriers to accurate self-report of symptoms and behaviors because of the potential impact it may have on the doctor-patient relationship. Studies have examined the role of explicit discussion over confidentiality of medical information. Parrot, Duncan, and Duggan (2000) explored the literature on patient “impression management” and the impact this has on a caregiver’s ability to obtain sensitive or stigmatizing behaviors. The authors concluded that it is a delicate process that requires attention to “organizational, cultural, personal, and interactional strategies.” A patient may have concerns about requesting additional medication even when needed, because of fears of appearing as though they are misusing medications. Patients may also want to appear healthier so that a physician will reduce restrictions, continue current medical care, and in some instances avoid concerns about prescription use.

Schuckman et al. (2008) conducted a 6-year record review of patients who came to the emergency department seeking pain medications. The researchers examined the

patients' self-reported drug use and compared it to a drug screen that same day. In analyses conducted to characterize the difference between people whose self-report matched the drug screen (68%) and those whose self-report did not match the drug screen (32%), it was found that individuals with a history of chronic pain or drug abuse were significantly more likely to have inaccurate self-reports. Reinhard et al. (2007) found that individuals who were more inaccurate with their self-reported stimulant use were also less likely to report symptoms of psychopathology. Taken together, these two studies (Reinhard et al., 2007; Schuckman et al., 2008) provide evidence that self-reported use of substances is often inaccurate. These two studies also show that in chronic pain populations there may be additional reasons for concern about the accuracy of reports and that individuals who are more likely to conceal substance use may also be more likely to conceal other psychological symptoms. In clinical settings, biological drug tests may not always be convenient or cost-effective and the common inaccuracy of self-report provides further reason to improve our methods for increasing the accuracy of self-report.

Another topic that is often under-reported is the experience of trauma. Research has shown that disclosure of traumatic experiences can be increased by a participant's perceived sensitivity of the researcher and the belief in confidentiality of the disclosed information (Denov, 2003; Leibowitz, Jeffreys, Copeland, & Noel, 2008; Mueller, Moergli, & Maercker, 2008). Because the experience of traumatic or stressful experiences can have such a significant impact on one's physical and mental health, in addition to quality of life, it is essential that we continue to develop means to best identify individuals with trauma histories so that treatment and prevention efforts can be

targeted towards them. Rosenbaum and Langhinrichsen-Rohling (2006) reviewed the literature on disclosure of trauma and found the two main factors to consider in participant disclosure are “willingness to disclose” and “accuracy of disclosure,” both of which should be considered in any research study. Additionally, the authors call for all researchers assessing sensitive or stigmatizing information to work to improve research methodologies to improve internal and external validity of our studies.

There has been recent interest on how to improve self-report of stigmatized behaviors in research studies and in medical offices. Much of the research has focused on the evaluation of new technologies to improve self-report (Booth-Kewley et al., 2007; Joinson, Woodley, & Reips, 2007). Computerized measures have been created for assessing substance abuse, risky sexual behaviors, and HIV risk behaviors. Most research has shown increased rates of disclosure of stigmatized behavior using methods that provide the participant the most distance from the researcher (e.g., telephone screens, computerized measures). Additionally, some research has suggested that spoken disclosure in the presence of another individual may actually inhibit emotional expression (Newman et al., 2002), possibly making participants more self-conscious of what they are disclosing and making them feel as though they may be judged for their disclosure.

Interestingly, with all of the attempts to improve participant reports through technology, there have been limited attempts at improving the interviewer’s methodology. The therapy literature suggests that techniques such as meta-communication about relationship factors and about comfort sharing can improve alliance and ultimately increase disclosures. Recent research within the emotional

disclosure literature suggests that an active and engaging facilitator may lead to increased degrees of engagement and disclosure. However, the ability of these techniques to improve self-report of substance abuse and traumatic or stressful experiences in research settings has not been explored. Next, therapy and emotional disclosure literatures will be explored.

Social versus non-social sharing and characteristics of the participant-facilitator relationship may both have an effect on the content quality of the disclosure session. Social versus non-social sharing has been examined by comparing private writing tasks to socially disclosing to a researcher. Newman et al. (2002) compared the degree of disclosure of potentially stigmatizing events among individuals who had presented to a syringe exchange program. In this study one group was asked to type their disclosures on a computer program, whereas another group was asked to disclose in a face-to-face interview. It was found that individuals were most likely to disclose more information privately than face-to-face.

In addition to characteristics of the sharing person and his/her experience, facilitators can vary in their responses. Psychotherapy theory and practice suggests a continuum of therapist responses. On the one hand, therapists can be either supportive and non-directive, by using techniques such as active listening, reflection, and following. Alternatively, they can be more active, working to facilitate disclosure and processing by questioning, exploring, and encouraging experiential exercises. Research by Laurenceau, Barrett, and Pietromonaco (1998) suggests that in interpersonal disclosures, the responsiveness of the therapist may increase participant's feelings of intimacy in the relationship and thus lead to more disclosure. Responsiveness of a

therapist may involve both verbal (e.g., reflections, guiding questions, etc.) and nonverbal (e.g., body posture, head nods, facial expression) signs displayed by the listener, showing interest and concern to the discloser. Based on this study, it is unclear whether different methods of responsiveness by the therapist may provide the most appropriate interaction for the highest degree of disclosure and emotionality.

A recent study by Sander et al. (2008) examined four forms of disclosure (i.e., writing privately, talking privately, talking with a “passive” facilitator, and talking with an “active” facilitator) to explore which method leads to the most disclosure in a brief, 30-minute session. In all four conditions, the participants were provided with the same set of instructions regarding what they should disclose during the session. The “passive” facilitator was supportive and engaged, but did not encourage further disclosure through questioning and did not meta-communicate about the session. The “active” facilitator began the session by meta-communicating about the concerns the participant may have about disclosing, encouraged further exploration of missing emotions or facts about their experience, and normalized thoughts and feelings about the experience. The findings suggest that people can be “pushed” further by an “active” facilitator in both emotional engagement and cognitive processing, but may actually be inhibited by a “passive” facilitator. Individuals who have experienced stressful or traumatic experiences seem very capable of being pushed for more disclosure and more emotional involvement in session.

Most self-report data gathered in previous studies of the accuracy of self-report have typically used the “passive” facilitator method. The findings of Sander et al. (2008) suggest that the “passive” model may lead to inhibition and discomfort in the method.

The typical use of a “passive” facilitator in clinical interviews may explain why research has suggested that interpersonal methods have not worked as well as computerized methods for gathering information about stigmatized behaviors. The model of “active facilitation” described in Sander et al. (2008) may also lead to increased disclosure of stigmatized behaviors such as substance abuse; however, this has not been explored in the literature. As described previously, medical settings inherently create additional barriers to accurate disclosure of prescription misuse and substance abuse because of the potential impact on their care. The process of meta-communication and normalization of the worries about sharing drug use may help ease some of those concerns and increase accuracy of self-report.

Goals and Hypotheses

The current study sought to develop a model of predictive factors in which the traditional factors, pain factors, social/cognitive factors, and emotional factors each explain unique portions of variance in the misuse of prescription medication, alcohol and other substances in a chronic pain population. As most of the previous research has been conducted using convenience samples and record reviews, there have not been studies that bring together each of these key variables into a single population of patients. Patients attending a local chronic pain clinic were assessed for each of these key variables and for symptoms of prescription medication misuse and use of alcohol and illicit substances at a single evaluation session. In addition, to bring together all of the previously explored key variables in the literature, this study also sought to explore emotional factors as they relate to prescription opioid misuse in chronic pain patients.

The emotional factors of alexithymia, emotional approach coping, and the experience of trauma were explored.

This study also tested different methods of data collection that may increase the self-reported sensitive information of prescription misuse, substance abuse or dependence, and experience of stressful or traumatic experiences. Much of the previous research regarding assessment of stigmatized or sensitive information has explored computerized methods to increase distance and beliefs of confidentiality between the researcher and the participant. In the current study, a novel interviewer procedure was designed to facilitate discussions of confidentiality and meta-communication about the interviewer-participant relationship and the sensitivity of the information the participant is being asked to report. Three methods of data collection for substance use and trauma history were tested: enhanced interviewer, standard interviewer, and questionnaires.

Overall, this study had three goals: a) develop a model of predictive factors for chronic pain patients, bringing together the variety of factors that have been explored independently in previous studies; b) add emotional factors to the predictive model to assess whether these factors can explain unique variance beyond the traditionally explored variables: and c) develop and experimentally test methods by which the most sensitive information is disclosed by participants.

Concurrent Predictors of Prescription Drug Abuse

Aim 1. *Determine which demographic, pain-related, cognitive/social, and stress/emotional factors predict prescription misuse and abuse and dependence symptoms for prescription opioids among patients in treatment for chronic pain.*

Hypothesis 1. It was predicted that higher levels of prescription misuse and symptoms of abuse and dependence would be associated with younger age, lower social support, previous history of psychiatric diagnosis, high catastrophizing of pain, high expectations for the effects of the prescription, high extraversion, alexithymia, high levels of emotional ambivalence, and low levels of emotional approach coping.

Aim 1a. Test whether factors related to stress and emotion regulation (low emotional awareness and expression, high experience and impact of lifetime trauma) predicted prescription misuse beyond more routinely assessed and established factors.

Hypothesis 1a. It was hypothesized that a model building in emotional variables can increase the predictive ability of common medical belief of who might be at greater risk of showing abuse characteristics with prescription opioids and with the use of other substances. Specifically, it was predicted that higher levels of alexithymia, lower levels of emotional approach coping, and more experience of trauma and impact of trauma will explain additional variance predicting concurrent prescription misuse and abuse and dependence symptoms for prescription opioids, as measured by the PDUQ, beyond traditional, pain, and cognitive/social factors.

Aim 2. *Determine which demographic, pain-related, cognitive/social, and stress/emotional factors predicted use of alcohol and illicit substances among patients in treatment for chronic pain.*

Hypothesis 2. It was predicted that higher levels of alcohol and illicit substance use will be associated with younger age, lower social support, previous history of psychiatric diagnoses, high catastrophizing of pain, high expectations for the effects of the prescription, high extraversion, alexithymia, and low levels of emotional approach coping.

Aim 2a. Test whether knowledge of factors related to stress and emotion regulation (low emotional awareness and expression, high experience and impact of lifetime trauma) predicted alcohol and illicit substance beyond more routinely assessed and established factors.

Hypothesis 2a. It was predicted that higher current levels of alcohol and other illicit drug use would be associated with higher levels of alexithymia, lower levels of emotional approach coping, and more experience of trauma and impact of trauma, beyond traditional, pain, and cognitive/social factors.

Methods of Disclosure of Stigmatized Information

Aim 3. *Determine whether variations in assessment methods lead to differing amounts of disclosure of aberrant use of prescription drugs, use of alcohol and other drugs, and trauma history.*

Hypothesis 3. It was predicted that higher reported misuse of prescription medication, use of alcohol and illicit drugs, and experience of stressful events or traumas would occur in the following order: enhanced interview (highest), written, standard interview (lowest).

CHAPTER 2

METHODS

Participants

Participants were 100 patients with chronic pain who were receiving treatment through a local pain management clinic. All participants reported chronic pain for at least 3 months prior to study participation and were prescribed a self-administered opioid at the time of assessment. Participants were excluded from the study if they reported non-literacy in English and/or they were not actively receiving treatment through the pain management clinic at which all recruitment occurred. Participants were recruited from August 2009 through November 2010.

A total of 103 participants met criteria and came to the laboratory or the pain clinic for their study visit. Of the 103 participants who started the study, 100 (97%) completed the full session and were included in analyses. An additional 23 people met study criteria and scheduled a study visit, but did not attend their session. Approximately 20 people who called the laboratory stating that they were interested in participating did not meet study criteria, and the primary reasons were that they were not attending the pain management clinic through which the study recruited or they were not currently prescribed an opioid. In the final sample of 100 participants, 47% were male and 53% were female, and the sample had an average age of 47.57 years (*SD* = 11.57). The sample was predominantly African-American (81.0%), with other participants identifying as Caucasian (11.0%), or other (3.0%), and a small portion chose not to disclose their ethnicity (5%).

Procedure

Participants were recruited through pamphlets provided in the clinic waiting room of the pain management clinic (see Appendix A). The pamphlets included a brief description of the study and provided a phone number at which study personnel could be reached to provide further information regarding the study. Additionally, study personnel approached participants in the waiting room of the pain clinic and provided information to interested patients. The study personnel recorded phone numbers of patients who requested to be contacted for an appointment. More than half of the participants approached reported interest in receiving more information and possibly participating in the study. Of those participants who did not report interest in participating, the most common reasons were: no interest in being in any research study, limited time or transportation, and knowing that they did not meet criteria (e.g., first session at the clinic).

All potential participants were contacted via phone and provided more information about the study and protocol (See Appendix B). Patients were then scheduled for a study visit at a time convenient to them either at the laboratory or the pain management clinic. Participants were called the day prior to their scheduled study visit to remind them of the date and time of their session.

Study visits were conducted in private rooms to ensure privacy of the participant, and the physicians were not allowed access to an individual participant's data. Upon arrival to the study visit, the participant was greeted by the researcher and provided the information sheet in lieu of consent approved by the Wayne State University Human Investigation Committee (Appendix C). The researcher reviewed the information sheet

with the participant and answered any questions the participant had at that time. Upon review of the study with the Human Investigation Committee, it was determined that if participants reported misuse of their medications and the researchers were aware of the patients' names, we would be required to inform their clinicians at the pain management clinic of their misuse. Thus, the information sheet was provided as an alternative to a signed informed consent form to maintain anonymity of participants because it was believed that it would interfere with the study if disclosure of medication misuse and/or drug use would lead to potential consequences such as discharge from their pain management program. After the consent process, the participants began the non-randomized portion of the study, completing paper-and-pencil questionnaires.

The first portion of the evaluation was identical for all participants. All participants completed multiple questionnaires in paper-and-pencil format regarding demographic information, alexithymia, pain disability, mood, and emotional expression. Participants were then randomized into one of three groups. The researcher opened a sheet of paper which was stapled to the back of the participant folder to reveal the participant's group (group assignments are described below in "Experimental Groups"). Participants then engaged in one of the three, randomized, information-gathering formats for the remainder of the evaluation, which included information on trauma, prescription misuse, and alcohol and other drug use. The final measure was written, and private for all groups, which was ratings of their comfort with the method of assessment that they engaged in and the degree to which they were able to be open about their substance use and stressful life events. The entire study session lasted approximately 1.5 to 2 hours. At the completion of their visit, participants were compensated $30 for their

participation in the study and provided a list of local mental health treatment facilities, substance abuse treatment facilities, and emergency hotlines.

Experimental groups. After completing the informed consent process, participants first completed the non-randomized paper and pencil questionnaires privately. Participants were then randomized to one of the three groups to complete the measures of potentially stigmatizing information (i.e., substance use, medication misuse, and experience of trauma). The three groups were as follows: written, standard interview, and enhanced interview. Participants were randomized into one of the three conditions in blocks of 6 (resulting in equal numbers of patients in each group after multiples of six), using a random number sequence generated by a computer (randomization.com). The randomization list was stratified by patient gender and by researcher/interviewer. After the initial paper and pencil questionnaires, two of the three groups met with an interviewer, who was a graduate student in clinical psychology, while the other group was written and completed in private. The randomized portion of the evaluation lasted approximately 30 minutes. At the completion of the randomized portion of the session, the participant then completed the final session evaluation.

Written evaluation. Participants assigned to the written evaluation completed all portions of the study on paper and pencil questionnaires. After completing the predictor measures, the researcher returned to the room and collected those measures. The researcher then provided the participant the trauma and substance use forms, briefly explaining the scales used on each, and then allowed the participant to complete the forms in private. These participants completed assessments of traumatic and stressful

experiences, evaluation of current and past use of alcohol and illicit substances, and prescription misuse in written format.

Standard interview evaluation. These participants spoke to a standard interviewer. The questions were identical to those in the written format, but were read aloud to the participant by an interviewer. Participants randomized to this group completed assessments of traumatic and stressful experiences, evaluation of current and past use of alcohol and illicit substances, and prescription misuse portion of the evaluation with the interviewer. The interviewer was attentive, empathic, but passive, simply asking the structured questions and recording the participant's responses to each of the listed questions. The interviewer was able to respond to any concerns the participant may have had about specific questions, identical to the way they would have responded to concerns of participants in the written evaluation group. In this condition the interviewer was attentive to the participant but did not provide any prompts to explore further the emotions or facts, nor did the researcher meta-communicate about the session. The interviewer guidelines for this condition are in Appendix D. The structured interview questions were identical to those used in the Enhanced Interview group (described next).

Enhanced interview evaluation. The participants assigned to this group spoke to an enhanced interviewer for the assessments of traumatic and stressful experiences, evaluation of current and past use of alcohol and illicit substances, and prescription misuse. The questions for this group were again identical to the two previous groups. However, in this group the interviewer was an active part of the process of gathering information. The interviewer began this portion of the session with meta-communication

about confidentiality of the interview and normalizing the occurrence of prescription misuse and substance use and concerns that they might have about sharing personal information with someone that they do not know. In this condition, the interviewer also engaged in follow-up questions when information seemed contradictory or unclear during the interview. The interviewer also encouraged continued disclosure if the participant seemed hesitant or nervous about providing answers to specific questions. The interviewer tried to identify missing content in the participant's responses and encouraged further exploration of these areas, while also returning to meta-communication about the session and/or interviewer-participant relationship when it seemed necessary. At the beginning of this portion of the session and at specified points during the questioning, the interviewer followed a script designed to normalize the experience of these potentially stigmatizing behaviors and validate their concerns about sharing these behaviors. The interviewer expressed understanding of the concern the participant may have in sharing prescription misuse, substance abuse, or trauma, while also encouraging them to provide honest responses. The enhanced interviewer guidelines are in Appendix D. After completing either of the interviewer conditions, as a manipulation check, participants answered a brief questionnaire regarding the degree to which the interviewer encouraged them to share.

Measures

As stated previously, the purpose of this study was two-fold. The first purpose of this study was the development of a model using four main areas of interest for predicting abuse of substances, including prescription drugs. The four main areas were traditional information (e.g., sex, age, family history of abuse, psychiatric symptoms),

pain factors (e.g., severity, pain coping), social/cognitive factors (e.g., social support, expectancies, personality), and emotional factors (e.g., trauma, alexithymia, emotional coping styles). The scales used to assess each of these areas are described below. The final section of measures is the outcome measure of current misuse of prescription drugs and other substances. Measures assessing the participants' reactions to each of these three groups will also be described below.

Traditional Information

The traditional information gathered was sex, substance abuse history of any drug, parental substance abuse, length of time in treatment, and mood/anxiety symptoms. This information was collected through a paper survey developed by the researcher. These are traditional pieces of information that can be gathered on a doctor's visit which may or may not lead to a physician's perception that the individual is at risk for abusing his or her prescription pain medication.

Psychiatric symptoms. Psychiatric symptoms were assessed using the Brief Symptom Inventory (BSI; Deragotis, 1975). The BSI consists of 53 items, each of which is rated on a 0 (not at all) to 5 (extremely) scale corresponding to how much they have been distressed about each symptom over the past 7 days. There are 9 subscales and 3 global indices which assess distress over symptoms and experience of symptoms broadly: Global Severity Index (GSI), Positive Symptom Distress Index, and Positive Symptom Total. Other dimensions that can be analyzed are as follows: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic anxiety, Paranoid ideation and Psychoticism. The GSI is the most broadly used composite score and has good test-retest reliability (Deragotis, 1993) and validity

(Conoley & Kramer, 1989; Derogatis, Rickels, & Rock, 1976). Only the GSI was analyzed for the purpose of the current study. The GSI was highly reliable for this sample (α = .98).

Pain Information

The pain information that was gathered was used to assess both pain severity and pain coping.

Pain severity. Pain severity was assessed by the Brief Pain Inventory (BPI) which was developed by the Pain Research Group (Daut, Cleeland, & Flanery, 1983). It includes two scales: pain severity and pain interference. Only the pain severity total was used for analyses. All items of the BPI are rated on a 0 to 10 rating scale, and ask responders to rate how their pain is at that moment in time, and the worst, least, and average over the past week. The BPI is used widely to assess functioning across various pain problems. The BPI had an acceptably high internal reliability in this sample (α = .83).

Pain coping. Pain coping was assessed by two measures. The first pain coping measure was the Pain Catastrophizing Scale (PCS; Sulllivan, Bishop, & Pivik, 1995). The PCS is a 12-item scale used to assess rumination, magnification, and helplessness from pain, with alphas of .87, .60 and .79 respectively (Sullivan, et al., 1995). Sullivan et al. (1995) found that people scoring high on this scale had higher levels of emotional distress and increased thoughts about and intensity ratings of pain. Sullivan et al. (1995) also found that the PCS significantly correlates with pain intensity, beyond measures of negative affectivity and emotional distress. The full scale of the PCS was used in this study, and it had high internal reliability (α = .93).

The second pain coping measure used was the Pain Anxiety Symptom Scale (PASS), which was originally developed by McCracken, Zayfert, and Gross (1991). The PASS has been shown to have good internal consistency and validity (McCracken, Zayfert, & Gross, 1992). The internal consistency was found to be high in this sample (α = .94). The Pain Anxiety Symptom Scale-Revised (PASS-R; McWilliams & Asmundson, 1998) was used in this study. The PASS-R consists of the following subscales: Interference, Approach Behaviors, Catastrophic Thoughts, Monitoring and Prevention, and Physiological Arousal. The PASS-R Total score (PASS-TOT) was analyzed for this study.

Cognitive/Social Factors

For this domain, social support, expectancies, and personality were assessed.

Social support. Social support was assessed using the Social Provisions Scale (SPS; Cutrona & Russell, 1987). The SPS consists of 12 items and can be divided into the following six subscales (four items each): Attachment, Social Integration, Reassurance of Worth, Reliable Alliance, Guidance, and Opportunity for Nurturance. The SPS can also produce a Global Social Support score. The SPS has been used widely as a measure of support in stressful or emotionally challenging events such as dealing with an illness, taking care of sick relatives, and even for stressful employment experiences. The Global Social Support score was used for the purpose of our analyses, and it was found to have an acceptably high internal reliability for a research measure (α = .74).

Beliefs. Pain medication beliefs were assessed using an opioid medication beliefs scale developed by Schieffer et al. (2005). As the scale was designed for

descriptive purposes, one item from the scale was chosen to represent pain medication beliefs. The item used was a rating of how much medication the participant felt they needed compared to other pain patients: none at all, a little, about the same, a little more, or much more.

Personality. Personality factors were assessed using the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003) which assesses Openness, Conscientiousness, Agreeableness, Emotional Stability (reverse of Neuroticism), and Extraversion. As the name suggests, the TIPI consists of 10-items rated on a scale of 1(strongly disagree) to 7(strongly agree), regarding how much they believe that the statement applies to him or her. Each subscale consists of two items.

Emotional Factors

Emotional factors that were examined for this study were stress symptoms and emotional regulation measures.

Stress symptoms. The Impact of Events Scale was originally developed by Horowitz, Wilner, and Alvarez (1979) to assess subjective distress as a result of traumatic experiences. The Impact of Events Scale includes subscales for Avoidance, Intrusions, and a Total score. The Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1996) was used for the purpose of this study which includes the additional scale of Hyperarousal. The IES-R contains 22-items which are based upon the DSM-IV symptoms of PTSD. Each item is rated on a 0 (not at all) to 5 (extremely) scale regarding how bothered they have been by each symptom over the past 7 days. Because the participants who were recruited into the study had not all experienced a traumatic event as defined by the DSM-IV, the introduction to this scale was modified to

include a broader conception of stressful experiences. The IES Total Score was highly reliable in this sample (α = .95).

Alexithymia. The Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994) assesses global alexithymia, and three additional facets of alexithymia: difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. The scale has good reliability and is the most extensively validated measure of alexithymia (Bagby, Taylor, & Parker, 1994). Because the three subscales of the TAS-20 appear to have differential validity and tap different aspects of emotional regulation, the subscales were analyzed as well as the total score (α = .80) for this study.

Emotional ambivalence. To assess the experience of desiring to express emotions and conscious inhibition of expression, the Ambivalence Over Emotional Expression Questionnaire (AEQ; King & Emmons, 1990) was used. The AEQ has high reliability and also predicts negative mood and physical symptoms better than measures assessing the frequency of expressing emotion (King & Emmons, 1990). This study used a 14-item short version of the scale, which had high internal reliability for the AEQ total score (AEQ-TOT; α = .90).

Tendency to seek emotional support. The 8-item Emotional Approach Coping scale (EAC; Stanton, Danoff-Burg, Cameron, & Ellis, 1994) assesses emotion-oriented coping. The EAC contains two subscales: emotional processing (seeking to understand and identify emotions) and emotional expression (expressing adaptive emotions). This scale has good internal consistency and validity (Stanton, Kirk, Cameron, & Danoff-Burg, 2000; current sample: α = .85).

Outcome and Potentially Stigmatizing Measures

There were two outcomes for this study, which coincide with the two primary goals. The first goal of this study was to develop predictors for concurrent substance abuse and specifically abuse of prescription opioids. The area of outcome for this goal was the substance use measures that are described in this section. The second goal of this study was to test whether participants shared different levels of stigmatized information as a function of the group to which they were assigned (private, traditional interview, enhanced interview). The areas of outcome for this goal were again the substance use measures and disclosure of stressful life events.

Stressful life events. The Life Stressor Checklist-Revised (LSC-R; Wolfe, Kimerling, & Brown, 1993; Wolfe, Kimerling, Brown, Chresman & Levin, 1996) consists of 30 items assessing DSM-IV-TR criteria events for PTSD, in addition to non-DSM stressful life experiences. The items that describe PTSD life events include questions about the participant's perception of harm or lethality, the intensity of their emotional reaction, and how much the event has affected them during the past year. The non-PTSD questions ask about how much the stressful experience has affected the person over the past year. The LSC-R has demonstrated criterion-related validity for PTSD individuals with comorbid substance abuse and other psychological disorders (McHugo et al., 2005; Wolfe & Kimmerling, 1997). The number of PTSD life events and the degree of distress participants continue to feel from these events was analyzed from this measure. Total number of events was calculated based on the number of the 30 possible events that the participant endorsed as having experienced. Level of distress was calculated by averaging the current distress felt for each event (0- none at all to 5 –

extreme) across the events he or she experienced. This measure was part of the experimental portion of this study in that one-third of the participants filled this form out in the traditional written format. The other two-thirds of the participants were interviewed using this measure (a non-traditional method for use of this measure).

Substance use, abuse and dependence. Use, abuse, and dependence on alcohol, prescription opioids, and other drugs were assessed using the Structured Clinical Interview for the DSM-IV-TR (SCID; First, Spitzer, Gibbon, & Williams, 2002; DSM-IV-TR: Diagnostic and Statistical Manual, version IV, text revision). Participants were randomized into one of the three groups to complete these measures.

Prescription misuse. Prescription misuse was assessed using the Prescription Drug Use Questionnaire (PDUQ; Compton, Darakjian, & Miotto, 1998) as it provided the most comprehensive list of misuse symptoms and also has been developed to be used in either an interview or written format. The PDUQ consists of 31 items which address prescription misuse behaviors such as use of the medication to treat non-medically prescribed symptoms, doctor's refusal to prescribe medication, disagreements with significant others over their prescription use, etc. The PDUQ has shown good test-retest reliability and criterion and predictive validity in chronic pain populations. The PDUQ has been shown to predict patients who later violate clinic policies related to prescription use and are forced to leave their treatment centers because of these violations (Compton, Wu, Schieffer, Pham, & Naliboff, 2008). The internal reliability of this measure for this sample was acceptably high for research purposes (α = .71).

Evaluation of session. Participants were asked to rate items on a 1 to 7 scale, regarding their evaluation of their comfort sharing, the degree to which they withheld

sensitive information about trauma or substance use, and comfort with their interviewer (if they were in the standard or enhanced interview conditions).

Data Analyses

The data were checked for accuracy and frequency distributions of all items, and scored variables were examined for outlier values. Key missing data points were replaced through regressions using available measures. Skewed and outlier variables were transformed. The GSI was positively skewed and a log transformation successfully reduced the skewness. The SPS was skewed negatively and had a single low outlier. Inverse and log transformations were unsuccessful and thus the outlier was changed to the next lowest value in the dataset which successfully reduced the skewness. Finally, the BPI had a single high outlier and log transformations and square root transformations were unsuccessful in reducing it, the highest value was changed to the next highest value. The data was rechecked for skewness and kurtosis after all transformations and changes to the dataset. Internal consistency was assessed for all scales and reported in the description of each measure. Finally, the data was assessed for multicollinearity and the highest correlation between predictors was r = .65 (TAS-TOT and AEQ-TOT), which is below the r = .70 cut-off suggested by Tabachnick and Fidell (2001) for multicollinearity in multivariate statistics (see Tables 4 and 5).

Hypothesis 1. Hierarchical regressions were run to determine if higher levels of prescription misuse was associated with higher levels of alexithymia, higher emotional ambivalence, lower emotional approach coping, and more experience/impact of trauma, beyond traditional, pain, and cognitive/social factors. Prescription misuse is characterized by aberrant medication related behaviors that suggest risky decisions or

behaviors which may not meet the level of DSM-IV-TR symptomology. Prescription opioid misuse was operationalized as the total score on the Prescription Drug Use Questionnaire (PDUQ), which consisted of items such as requesting refills before a prescription should have run out, reporting that family members are worried about their prescription use, feeling as though their doctor does not give them enough medication, etc. Symptoms of abuse and dependence are characterized as meeting clinical criteria for problematic use. Total number of symptoms of abuse and dependence on prescription opioids was operationalized as the number of abuse and dependence symptoms reported on the SCID, which assesses DSM-IV-TR substance use disorder symptoms. Abuse is characterized by a single DSM-IV-TR abuse symptom during the past 12 months (abuse diagnosis is excluded if dependence criteria are met at any point in one's lifetime) and dependence is characterized by any 3 DSM-IV-TR dependence symptoms occurring during the same 12-month period.

These outcomes were zero-order correlated with each predictor measure, and to reduce the number of variables entered into the model, only those variables that were marginally or significantly correlated with prescription misuse and symptoms of abuse and dependence were entered into the regression.

A hierarchical regression by blocks was conducted to determine whether emotion regulation measures increase predictive validity, in the following order (including only those variables from each block which were significantly zero-order correlated): assessment method group (as a control variable) demographic information/use history, pain variables, social/personality variables, and emotional variables. Personal history of substance use problems was excluded from all regressions because it was determined

that this characteristic: a) has strong research evidence that it is predictive of misuse and this study sought to determine additional factors that might predict for an individual who has never had misuse problems; b) it was determined that this characteristic likely inherently included the primary outcome of interest in that participants would respond positively to having a history of substance use problems if they believed they currently had a problem with their prescriptions.

Additionally, hierarchical regressions were repeated using the same selected variables for demographic/traditional factors, pain, and social/personality, with each individual emotional variable (Toronto Alexithymia Scale, Ambivalence Over Emotional Expression, Emotional Approach Coping, and Impact of Events Scale). The purpose of these additional analyses was to explore the role of each emotional factor without controlling for the role of the other emotional factors.

Personal history of substance use problems was excluded from the regression analyses for three reasons. First, the primary goal of the current study was to add to the theoretical understanding of what personal characteristics may increase the risk of engaging in prescription opioid misuse. Although personal history of substance use is likely pragmatically useful in identifying who should not be prescribed opioids, it does not add to the theoretical understanding of what personal characteristics make someone at higher risk of developing prescription misuse problems. There are hypothetically also instances in which participants may not have abused drugs prior to being prescribed an opioid, but understanding the personal characteristics that may put them at higher risk and engaging in prevention efforts may be valuable. There may also be instances in which patients are unlikely to admit to prior substance use history and

having an understanding of the other factors that may put those individuals in a higher risk category is essential. Second, there were measurement issues in the current study which made it difficult to determine whether prescription opioid misuse was treated as separate from prior substance use history in participants' responses. Unfortunately, the wording of the question left open the possibility that some participants may have included ongoing prescription misuse in their answer of "yes" meaning that we would be controlling for the outcome we were trying to predict. Third, despite the strong prior evidence that prior history of substance use is related to prescription misuse, it only provides evidence that a past behavior predicts similar future behavior and for some participants it actually was opioids that they reported having problems with at some previous time and thus those participants were already experiencing problems controlling their behavior related to the same drug they are being medically provided. Of note, regressions were run controlling for personal history of substance use and it was found that none of the pain, social/cognitive, or emotional variables were significant, although emotional ambivalence had a marginal relationship with total number of prescription opioid abuse and dependence symptoms.

Hypothesis 2. Hierarchical and logistic regressions were run to determine if higher levels of alcohol/illicit drug use were associated with higher levels of alexithymia, lower levels of emotional approach coping, and more experience/impact of trauma, beyond traditional, pain, and cognitive/social factors. Alcohol use was operationalized as the number of days out of the past 30 that participants reported drinking. Alcohol use was zero-order correlated with each predictor measure, and to reduce the number of variables entered into the model, only those variables that were marginally or

significantly correlated were included in the regression. As with prescription misuse, personal history of substance use was excluded from the regression model. A hierarchical regression by blocks was conducted to determine whether emotion regulation measures increase predictive validity, in the following order (including only those variables from each block which were significantly zero-order correlated): assessment method group (as a control variable), demographic information/use history, pain variables, social/personality variables, and emotional variables. Personal history of substance use problems was excluded from all regression models.

Because fewer participants reported cannabis use than alcohol use, participants were dichotomously coded as users (1 or more days of use in the past 30 days) or non-users (no use of cannabis in the past 30 days; see Table 5). Variables entered into the model were selected in the same way as days of alcohol use. A logistic regression was run to predict cannabis users and non-users. It should be noted that all other drug categories had too few active users to run a regression.

Additionally, hierarchical and logistic regressions were repeated using the same selected variables for demographic/traditional factors, pain, and social/personality, with each individual emotional variable (Toronto Alexithymia Scale, Ambivalence Over Emotional Expression, Emotional Approach Coping, and Impact of Events Scale). The purpose of these additional analyses was to explore the role of each emotional factor without controlling for the role of the other emotional factors.

Hypothesis 3. To determine if the three different conditions led to differing amounts of disclosure of aberrant use of prescription drugs, a 3-group ANOVA followed by Scheffe post-hoc tests was used to examine differences among disclosure methods

on the number of symptoms reported on the PDUQ, LSC-R, and number of symptoms of abuse/dependence on prescription opioids, alcohol, and all other drugs.

CHAPTER 3

RESULTS

Detailed Description of Pain and Substance History

Pain condition. Most participants (*n* = 67; 67%) reported that a specific event such as a car accident, work related accident, or a fall led to at least one of their self-reported pain conditions. The most common diagnoses were as follows: 70 with chronic back pain (70%), 25 with knee and leg pain (25%), 20 with arthritis (20%), 14 with degenerative disorders and neuropathy (14%),13 with head and neck pain (13%), 8 with abdominal pain (8%), 6 with fibromyalgia (6%), 6 with shoulder injuries (6%), and 5 with pinched nerves (5%). Note that the total is over 100 because many participants reported more than one pain condition. Participants had been experiencing their pain symptoms for an average of 12.93 years (*SD* = 11.09)

Prescription use. The most common prescription medications were Vicodin (69 participants; 69%), Tylenol 3 and Tylenol 4 (11 participants; 11%), and Oral Morphine (11 participants). Other medications included Dilaudid, Darvocet, Loritab, Methadone, Norco, and Oxycodone. Nearly half of the participants were prescribed more than one opioid pain medication (e.g., methadone and a shorter acting medication, oral pain prescription and a Fentanyl patch, etc.). Regarding the pain relief that participants reported experiencing from their medications, 79.2% of patients rated the pain relief as “5” or more on a scale of 1 to 10 (“1 no pain relief” to “10 complete pain relief”), but only 10 participants reported that their medication was capable of removing their pain completely. The majority of the participants reported that they take their prescription daily (*n* = 83; 83%). A quarter (n = 25; 25%) of the participants had been taking their

current prescription for one year or less, and only 26 participants had been taking their current prescription for more than 5 years.

Pain management. Participants reported a variety of treatments other than medication since their diagnosis: 82 participants reported trying physical therapy, 11 reported engaging in psychological interventions for pain including individual treatment sessions and relaxation training, 10 reported having surgeries or nerve blocks, and 6 reported getting massages or going to a chiropractor.

Psychiatric and substance abuse history. Over half of the participants reported that they had been in psychiatric treatment at some point during their lives (*n* = 55; outpatient therapy, inpatient treatment, etc.), and 53 participants reported that they had been prescribed a psychiatric medication (53%). Regarding family history, 35 participants reported that one or more of their immediate family members had received psychiatric treatment (35%).

Nearly a quarter of the participants reported that they had previously been in a substance abuse treatment program (*n* = 23). Nearly half of the participants reported that they believed they had a problem with drugs at some point in their life (*n* = 41) and 21 participants reported a problem with alcohol. The most common drugs that participants reported having a past problem with were: cocaine (*n* = 11), heroin (*n* = 12), and marijuana (*n* = 11; see Table 3 for rates of past and current symptoms of abuse and dependence on alcohol and other drugs). Past research has shown that having a parent with a substance use problem can lead to a greater risk of substance use problems in their offspring. Many participants in this sample reported familial problems with alcohol or drugs: 11% father had problems with drugs (*n* = 11), 39% father had problems with

alcohol (*n* = 39), 12% mothers had problems with drugs (*n* = 12), 21% mother had problems with alcohol (*n* = 21), and 36% had a family member who had been in substance use treatment (*n* = 36).

For all predictor and outcome measures used, see Table 1 and 2 below for mean and standard deviation values.

Table 1 Means and Standard Deviations of Predictor Measures

	Mean	Standard Deviation
Basic		
Age	47.57	11.57
BSI.GSI	1.25	0.86
Pain		
BPI	6.55	1.72
PCS-TOT	30.87	13.06
PASS-TOT	53.67	23.99
Social/Cognitive		
SPS-TOT	3.03	0.48
EXPECT	2.68	0.86
TIPI-EXTRAV	4.14	1.62
TIPI-OPEN	5.07	1.36
TIPI-AGREE	5.16	1.33
TIPI-CONSC	5.51	1.39
TIPI-STABLE	4.61	1.52
Emotional		
TAS-TOT	52.29	13.30
AEQ-TOT	3.02	0.95
IES-TOT	5.46	3.22
EAC-TOT	2.61	0.73

Note: Definitions of variable names – BSI.GSI (Global Severity Index of the Brief Symptom Inventory), BPI (Brief Pain Inventory, Severity Score), PCS-TOT (Total Score of the Pain Catastrophizing Scale), PASS-TOT (Total Score of the Pain Anxiety Symptom Scale), SPS-TOT (Total Score of the Social Provisions Scale), EXPECT (Belief that more medication is needed than other individuals from the Medication Beliefs Scale), TIPI-EXTRAV (Extraversion), TIPI-OPEN (Openness), TIPI-AGREE (Agreeableness), TIPI-CONSC (Conscientiousness), TIPI-STABLE (Emotional stability which is the inverse of neuroticism), TAS-TOT (Total Score of the Toronto Alexithymia Scale), AEQ-TOT (Total Score of the Ambivalence Over Emotional Expression Scale), IES-TOT (Total Score of the Impact of Events Scale), and EAC-TOT (Total Score of the Emotional Approach Coping Scale). Additional measures referred to throughout the study are: AODHx (personal history of alcohol or drug problems), ParentHx (parent history of alcohol or drug treatment)

Table 2 Means and standard deviations *M* (*SD*) of continuous outcome measures and numbers and percentage n (%) of dichotomous variables

	Mean/#	Standard Deviation/ %
Prescription Opioid Outcomes		
Prescription Drug Use Questionnaire	9.46	4.18
Symptoms of prescription abuse	0.23	0.57
Symptoms of prescription dependence	1.36	1.44
Total number of abuse and dependence symptoms	1.59	1.74
# of participants reporting any abuse or dependence symptoms	*67*	*67%*
Alcohol Outcome		
Days of alcohol use out of past 30 days	3.17	6.94
Alcohol user (any use in the past 30 days)	*41*	*41%*
Cannabis Outcome		
Cannabis user (any use in the past 30 days)	*25*	*25%*
Trauma Outcomes		
Life Stressors Checklist # of Events	10.97	5.37
Life Stressors Checklist average level of distress	2.64	0.99

Note: Categorical values which are displayed as n and percentage are italicized; continuous variables displayed as mean and standard deviations are not italicized.

Table 3 Diagnosis of abuse and/or dependence for all drugs assessed *n* (%)

	Current abuse*	Lifetime history of abuse*	Current dependence	Lifetime history of dependence	Current diagnosis of use disorder	Any use during the past 30 days
Prescription Opioids	8 (8%)	8 (8%)	18 (18%)	18 (18%)	26 (26%)	100 (100%)
Alcohol	2 (2%)	21 (21%)	12 (12%)	24 (24%)	14 (14%)	41 (41%)
Cannabis	5 (5%)	13 (13%)	12 (12%)	22 (22%)	17 (17%)	25 (25%)
Cocaine	0 (0%)	0 (0%)	5 (5%)	18 (18%)	5 (5%)	7 (7%)
Opioids (not including current prescription)	0 (0%)	2 (2%)	3 (3%)	13 (13%)	3 (3%)	5 (5%)
Sedatives	1 (1%)	4 (4%)	2 (2%)	7 (7%)	3 (3%)	23 (23%)**
Hallucinogens	0 (0%)	4 (4%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Stimulants	0 (0%)	2 (2%)	0 (0%)	4 (4%)	0 (0%)	1 (1%)

Note: *Participants who met criteria for both abuse and a lifetime history of dependence were included only in the dependence category, because a substance dependence diagnosis supersedes a substance abuse diagnosis. Additionally participants who met criteria currently were also included in lifetime history of a given diagnosis.
**All of the participants reporting use of sedatives in the past 30 days reported that they were currently receiving a prescription for their use.

Table 4 Correlations among predictor measures (basic and pain categories)

	Age	Sex	AODHx	ParentHx	BSI.GSI	BPI	PCS-TOT	PASS-TOT
Basic	-	-	-	-	-	-	-	-
Age	1							
Sex	.05	1						
AODHx	.25*	-.01	1					
ParentHx	-.06	-.05	.14	1				
BSI.GSI	-.29**	-.07	.26**	.15	1			
Pain	-	-	-	-	-	-	-	-
BPI	-.11	.15	.18	.02	.35**	1		
PCS-TOT	-.11	-.12	.16	.02	.57**	.38**	1	
PASS-TOT	-.11	-.01	.18	.08	.62**	.39**	.77**	1
Social/Cognitive	-	-	-	-	-	-	-	-
SPS-TOT	.18	.17	-.03	.01	-.44**	-.19	-.41**	-.35**
EXPECT	.03	-.12	-.02	.01	.25*	.29**	.24*	.12
TIPI-EXT	.07	.04	-.08	.06	-.22*	-.11	-.20	-.17
TIPI-AGREE	.11	.04	-.13	.02	-.28**	-.23*	-.04	-.04
TIPI-CONSC	.31**	.14	-.01	-.06	-.40**	-.31**	-.26**	-.31**
TIPI-STABLE	.23*	-.05	-.10	-.10	-.50**	-.41**	-.39**	-.40**
TIPI-OPEN	.11	.09	-.01	.14	-.34**	-.19	-.21*	-.24*
Emotional	-	-	-	-	-	-	-	-
TAS-TOT	-.21*	-.10	.02	.07	.64**	.37**	.57**	.57**
AEQ-TOT	-.08	-.20*	.04	.15	.55**	.29**	.57**	.51**
IES-TOT	-.29**	-.11	-.01	.07	.51**	.30**	.51**	.51**
EAC-TOT	.16	.03	.02	.01	-.19	-.08	.01	-.05

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level; see Table 1 for variable definitions.

Table 5 Correlations among predictor measures, cont. (social/cognitive and emotional categories)

	SPS-TOT	EXPECT	TIPI-EXT	TIPI-AGREE	TIPI-CONSC	TIPI-STABLE	TIPI-OPEN	TAS-TOT	AEQ-TOT	IES-TOT	EAC-TOT
Basic	-	-	-	-	-	-	-	-	-	-	-
Age											
Sex											
TxLength											
AODHx											
ParentHx											
BSI.GSI											
Pain	-	-	-	-	-	-	-	-	-	-	-
BPI											
PCS-TOT											
PASS-TOT											
Social/Cognitive	-	-	-	-	-	-	-	-	-	-	-
SPS-TOT	1	.12	.32**	.28**	.49**	.32**	.31**	-.38**	-.35**	-.18	.20
EXPECT		1	.02	-.06	-.13	-.13	-.13	.23*	.20	.05	-.11
TIPI-EXT			1	.04	.33**	.03	.20	-.25*	-.11	-.04	.36**
TIPI-AGREE				1	.45**	.48**	.40**	-.29**	-.26**	-.17	.11
TIPI-CONSC					1	.46**	.59**	-.39**	-.31**	-.20	.20
TIPI-STABLE						1	.46**	-.43**	-.36**	-.42**	.08
TIPI-OPEN							1	-.36**	-.26**	-.22*	.20
Emotional	-	-	-	-	-	-	-	-	-	-	-
TAS-TOT								1	.65**	.47**	-.25*
AEQ-TOT									1	.52**	-.05
IES-TOT										1	.09
EAC-TOT											1

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level; see Table 1 for variable definitions.

Hypothesis 1

Hypothesis 1 tested whether stress/emotional factors could predict prescription misuse (as measured by the total score of the Prescription Drug Use Questionnaire) and symptoms of prescription opioid abuse and dependence (as quantified by both number of DSM-IV-TR symptoms of abuse and dependence and the qualitative diagnosis of dependence) beyond the more routinely assessed predictive factors (demographic, pain-related, and cognitive/social). Assessment method group assignment was controlled for by entering it into the first block of all regression analyses.

Overview of Hypothesis 1. Zero-order correlations were run to first understand the relationship of all predictor measures to the Prescription Drug Use Questionnaire and prescription opioid abuse and dependence symptoms. Second, based upon the significant zero-order correlations, partial correlations were run controlling for any significant traditional and/or pain predictors to determine if the correlations between Prescription Drug Use Questionnaire and the number of abuse and dependence symptoms on current prescription opioid medication to emotional variables remained once the effect of demographic and pain variables were parceled out. Partial correlations were run controlling for a) any significant traditional variables and/or pain variables; b) controlling for each of those traditional factors individually. Third, to reduce the number of variables entered into the regression models, regressions were run using only those variables that had at least a marginally significant relationship with the Prescription Drug Use Questionnaire total score, the number of prescription opioid symptoms of abuse and dependence, and the categorical definition of being dependent

on their prescription opioid. An exception to this process was that all emotional variables (Toronto Alexitymia Scale, Ambivalence Over Emotional Expression Scale, Impact of Events Scale, and Emotional Approach Coping Scale) were included in the models regardless of their zero-order correlations with the outcome because these variables were of primary interest. Hierarchical regressions were run for the total score of the Prescription Drug Use Questionnaire and the total number of abuse and dependence symptoms and a logistic regression was run for diagnosis of dependence. Finally, regressions were repeated individually for each emotional predictor so that the effect of each emotional variable could be examined without controlling for the other emotional variables.

Predicting scores on the Prescription Drug Use Questionnaire. Participants reported a mean score of 9.46 (*SD* = 4.18) on the Prescription Drug Use Questionnaire total score. Only 7 participants reported that they had used their prescription medication to “feel high” (7%). Forty-nine (49%) of participants had scores at or higher than the cut-off (i.e., a score of 10 or higher) established for probable problematic use of prescription medication (Compton et al., 2008).

Zero-order correlations of predictors with the Prescription Drug Use Questionnaire. Correlations between the predictors and total score of the Prescription Drug Use Questionnaire can be seen in Table 6. Personal history of alcohol or drug use problems, parental history of alcohol or drug use treatment, increased symptoms as measured by the Global Severity Index of the Brief Symptom Inventory, higher total scores on the Toronto Alexithymia Scale, and higher total scores on the Ambivalence Over Emotional Expression Scale were significantly correlated with higher total scores

on the Prescription Drug Use Questionnaire. Additionally, there was a trend suggesting that lower levels of extraversion were related to higher reports of prescription misuse. It is important to note that none of the pain variables were significantly correlated with the Prescription Drug Use Questionnaire (see Table 6).

Partial correlations of predictors with the Prescription Drug Use Questionnaire. Variables that were significantly zero-order correlated with prescription misuse (parental history of alcohol or drug use treatment, Global Severity Index of the Brief Symptom Inventory/psychiatric symptoms) were entered as control variables in partial correlations of all social/cognitive and emotional factors with the Prescription Drug Use Questionnaire (see Table 7). None of the social/cognitive or emotional variables remained significant after controlling for these variables all at once or when parental history of alcohol or drug use treatment and Global Severity Index of the Brief Symptom Inventory were controlled for separately.

Hierarchical regression predicting the Prescription Drug Use Questionnaire with all emotional variables. A hierarchical regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (parental history of alcohol or drug use treatment and psychiatric symptoms), social/cognitive factors (extraversion), and emotional factors (because these variables were of specific interest, all were included in the model). The regression was significantly predictive of the Prescription Drug Use Questionnaire total score, (R^2 = .24, $F(8, 91) = 3.65$, $p < .01$; see Table 8). However, emotional variables did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone ($p = .34$). Having a family history of substance use problems significantly

predicted increased prescription misuse as measured by the Prescription Drug Use Questionnaire, β = .35, $t(91) = 3.73$, $p < .001$. Additionally, there was a trend for higher total scores on the Ambivalence Over Emotional Expression Scale as predictive of increased prescription misuse, β = .23, $t(91) = 1.79$, $p = .08$.

Hierarchical regression predicting the Prescription Drug Use Questionnaire with each emotional variable independently. A hierarchical regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (parental history of alcohol or drug use treatment and psychiatric symptoms), social/cognitive (extraversion) and each emotional factor individually.

Toronto Alexithymia Scale total score. The regression was significantly predictive of the Prescription Drug Use Questionnaire total score, ($R^2 = .21$, $F(5, 94) = 5.05$, $p < .01$; see Table 8). However, alexithymia did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone ($p = .37$), even without controlling for other emotional characteristics.

Ambivalence Over Emotional Expression total score. The regression was significantly predictive of the Prescription Drug Use Questionnaire total score, ($R^2 = .24$, $F(5, 94) = 5.84$, $p < .01$; see Table 8), and the addition Ambivalence Over Emotional Expression explained a significant increase in variance from the control, traditional, and social/cognitive factors alone ($\Delta R^2 = .03$, $p < .05$). Higher total scores on the Ambivalence Over Emotional Expression Scale were related to increased scores on the Prescription Drug Use Questionnaire, β = .22, $t(94) = 1.99$, $p < .05$. Thus, once removing the other emotional variables from the regression, higher levels of

Ambivalence Over Emotional Expression became a significant predictor for prescription misuse.

Impact of Events Scale total score. The regression was significantly predictive of the Prescription Drug Use Questionnaire total score, (R^2 = .21, F(5, 94) = 4.89, p < .01; see Table 8). However, the Impact of Events Scale did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone (p = .66), even without controlling for other emotional variables.

Emotional Approach Coping total score. The regression was significantly predictive of the Prescription Drug Use Questionnaire total score, (R^2 = .21, F(5, 94) = 4.97, p < .01; see Table 8). However, the Emotional Approach Coping total score did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone (p = .47), even without controlling for other emotional characteristics.

In summary, for prescription misuse as measured by the Prescription Drug Use Questionnaire, Hypothesis 1 was only partially supported. Higher scores on the Ambivalence Over Emotional Expression scale were significantly predictive of increased prescription misuse; however, no relationship existed between alexithymia, trauma, or the Emotional Approach Coping Scale and prescription misuse after controlling for assessment method group assignment, family history of substance use treatment, psychiatric symptoms and extraversion.

Table 6 Correlations of predictors and prescription drug misuse and symptoms of abuse and dependence

	Prescription Drug Use Questionnaire	Abuse and Dependence Symptoms	Current Dependence on Prescription (Y/N)
Basic			
Age	.04	.18	.11
Sex	-.08	-.05	-.08
AODHx	.47**	.27**	.27**
ParentHx	.35**	.21*	.19†
BSI.GSI	.26**	.05	.09
Pain			
BPI	-.01	.08	.15
PCS-TOT	.12	.14	.13
PASS-TOT	.17	.16	.21*
Social/Cognitive			
SPS-TOT	-.10	-.02	-.08
EXPECT	.15	-.01	-.01
TIPI-EXTRAV	-.17†	.02	-.07
TIPI-OPEN	-.13	-.17†	-.06
TIPI-AGREE	-.14	-.15	-.03
TIPI-CONSC	-.16	-.09	-.10
TIPI-STABLE (N)	-.03	-.21*	-.20*
Emotional			
TAS-TOT	.21*	.12	.18†
AEQ-TOT	.31**	.29**	.18†
IES-TOT	.16	.14	.21*
EAC-TOT	-.12	-.01	.04

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. See Table 1 for variable definitions. Current dependence was coded as 1 = current dependence diagnosis; 0 = no current dependence diagnosis.

Table 7 Partial correlations of predictors and prescription drug misuse and symptoms of abuse and dependence after controlling for traditional and pain variables significantly correlated with each outcome measure*

	Prescription Drug Use Questionnaire	Abuse and Dependence Symptoms	Current Dependence on Prescription (Y/N)
Social/Cognitive			
SPS-TOT	.18	-.03	-.02
EXPECT	.11	-.01	-.04
TIPI-EXTRAV	-.24	.01	-.06
TIPI-OPEN	.29	-.21**	-.04
TIPI-AGREE	-.09	-.16	-.03
TIPI-CONSC	.08	-.08	-.04
TIPI-STABLE (N)	.13	-.19	-.12
Emotional			
TAS-TOT	-.14	.11	.07
AEQ-TOT	-.05	.27**	.06
IES-TOT	-.17	.13	.11
EAC-TOT	-.05	-.01	.04

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. See Table 1 for variable definitions. Current dependence was coded as 1 = current dependence diagnosis; 0 = no current dependence diagnosis. See Table 1 for variable definitions. *Partials for the Prescription Drug Use Questionnaire were controlled for by family history of alcohol or drug treatment and psychiatric symptoms. Abuse and dependence symptoms were controlled for by family history of drug or alcohol treatment only. Current dependence on prescription opioids was controlled for by family history of drug or alcohol treatment and the Pain Anxiety Symptom Scale.

Table 8 Predictors of prescription misuse (total score of the Prescription Drug Use Questionnaire)

	All Emotional Variables		*Each Emotional Variable Entered Separately*	
	ΔR^2	β	ΔR^2	β
Step 1	.01			
Group (control)		-.14		
Step 2 (Basic)	.17**			
ParentHx		.35**		
BSI.GSI		.04		
Step 3 (Cog)	.03†			
TIPI-Extrav		-.15		
Step 5 (Emo)	.03			
TAS-Tot		-.03	.01	.11
AEQ-Tot		.23†	.03†	.22*
IES-Tot		.01	.01	.05
EAC-Tot		-.09	.01	-.07

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. See Table 1 for variable definitions.

Predicting symptoms of prescription opioid abuse and dependence. Regarding DSM-IV-TR criteria for abuse and dependence symptoms for their current prescription medications, the average number of symptoms was 1.59 (*SD* = 1.74), with the most common symptoms reported being: often using more than planned/prescribed (dependence symptom), repeated unsuccessful attempts to stop using (dependence symptom), withdrawal symptoms (dependence symptom), tolerance to the effects (dependence symptom), and feeling intoxicated while doing an important activity (abuse symptom; see Table 9 for number of participants reporting each symptom of abuse and dependence).

Zero-order correlations of predictors with number of prescription opioid abuse and dependence symptoms. Personal history of alcohol or drug use problems, parental history of alcohol or drug use treatment, lower scores on emotional stability (low scores on emotional stability suggest higher levels of neuroticism) as measured by the Ten Item Personality Inventory, and higher total scores on the Ambivalence Over Emotional Expression Scale were significantly correlated with total number of prescription opioid abuse and dependence symptoms. There was a trend for lower levels of openness to correlate with an increased number of symptoms. None of the pain variables were significantly correlated with the number of abuse and dependence symptoms (see Table 6).

Partial correlations of predictors with the symptoms of prescription opioid abuse and dependence. After determining the traditional (parental history of alcohol or drug use treatment) and pain factors (none) that were significantly zero-order correlated with the total number of symptoms, that variable was entered as a control variable in a

partial correlation of the total number of current abuse and dependence symptoms on prescription opioids and all social/cognitive and emotional variables. After controlling for family history, as predicted, higher scores on the Ambivalence over Emotional Expression Scale were correlated with more symptoms of abuse and dependence on prescription opioid medications. Additionally, lower levels of openness were also correlated with higher numbers of symptoms (see Table 7).

Hierarchical regression predicting the total number of symptoms of prescription opioid abuse and dependence with all emotional variables. A hierarchical regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (parental history of alcohol or drug use treatment), social/cognitive factors (emotional stability and openness), and emotional factors (because these variables were of specific interest, all were included in the model). The regression was significantly predictive of total number of symptoms of prescription opioid abuse and dependence, (R^2 = .24, F(8, 91) = 3.68, p < .01; see Table 10). However, the emotional variables did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone (p = .39). Having a family history of substance use problems was significantly predictive of a higher number of abuse and dependence symptoms, β = .26, t(91) = 2.68, p < .01. Additionally, there was a trend for higher total scores on the Ambivalence Over Emotional Expression Scale as predictive of increased prescription misuse, β = .26, t(91) = 1.97, p = .05. Thus, when all emotional variables are controlled for in the regression model, the only variable that has a marginal relationship with the number of abuse and dependence symptoms is ambivalence.

Hierarchical regression predicting the total number of prescription opioid abuse and dependence symptoms with each emotional variable independently. A hierarchical regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (parental history of alcohol or drug use treatment), social/cognitive factors (emotional stability and openness), and each emotional factor individually.

Toronto Alexithymia Scale total score. The regression was significantly predictive of total number of prescription abuse and dependence symptoms, (R^2 = .21, F(5, 94) = 5.02, p < .01; see Table 10). However, it was found that the alexithymia did not explain a significant increase in variance from the control, traditional, and social/cognitive factors (p = .71), even without controlling for other emotional characteristics.

Ambivalence Over Emotional Expression total score. The regression was significantly predictive of total number of prescription abuse and dependence symptoms, (R^2 = .24, F(5, 94) = 5.79, p < .01; see Table 10) and the addition of the emotional variable block explained a marginal increase in variance from the control, traditional, and social/cognitive factors alone (ΔR^2 = .05, p = .08). Higher total scores on the Ambivalence Over Emotional Expression Scale were marginally related to higher total number of abuse and dependence symptoms, β = .18, t(94) = 1.79, p = .08. Thus, once removing the other emotional variables from the regression, higher scores on the Ambivalence Over Emotional Expression Scale became a marginal predictor for total number of abuse and dependence symptoms.

Impact of Events Scale total score. The regression was significantly predictive of total number of prescription abuse and dependence symptoms, (R^2 = .21, F(5, 94) =

5.01, $p < .01$; see Table 10). However, trauma symptoms did not explain a significant increase in variance from the control, traditional, and social/cognitive factors ($p = .75$), even without controlling for other emotional characteristics within the model.

Emotional Approach Coping total score. The regression was significantly predictive of total number of prescription abuse and dependence symptoms, ($R^2 = .21$, $F(5, 94) = 5.01$, $p < .01$; see Table 10). However, emotional approach coping did not explain a significant increase in variance from the control, traditional, and social/cognitive factors ($p = .71$), even in the absence of controlling for the other emotional variables.

In summary, regarding the continuous measure of number of DSM-IV-TR abuse and dependence symptoms for prescription opioids, Hypothesis 1 was only partially supported. Higher scores on the Ambivalence Over Emotional Expression scale were marginally predictive of total number of prescription abuse and dependence symptoms; however, no relationship existed between alexithymia, trauma, or emotional approach coping and the total number of prescription opioid abuse and dependence symptoms after controlling for assessment method assignment, family history of substance abuse treatment, openness to experience, and emotional stability.

Table 9 Symptoms of abuse and dependence reported for prescription opioids

	Number of Participants	Percentage of Participants
Abuse		
Intoxicated during important activities	12	12%
Using during risky activities (e.g., driving)	6	6%
Legal problems related to use	3	3%
Social or interpersonal problems	5	5%
Dependence		
Tolerance	12	12%
Withdrawal	31	31%
Using more than planned	20	20%
Unsuccessful desire to quit	33	33%
Great deal of time using	4	4%
Interference with activities	8	8%
Continued use despite harm	10	10%

Note: Abuse symptoms are based on report of recurrence of each item, not a single incident; diagnosis of current abuse is determined by the occurrence of any one of the abuse symptoms during the past 12 month period without ever meeting criteria for dependence; diagnosis of current dependence is determined by the occurrence of any 3 of the dependence symptoms during the past 12 months

Table 10 Predictors of total number of current prescription opioid symptoms of abuse and dependence

	All Emotional Variables		*Emotional Variables Entered Separately*	
	ΔR^2	β	ΔR^2	β
Step 1	.08**			
Group (control)		-.32**		
Step 2 (Basic)	.07**			
ParentHx		.26*		
Step 3 (Cog)	.05*			
TIPI-Open		-.14		
TIPI-Stable		-.09		
Step 4 (Emo)	.04		.01	
TAS-Tot		-.12	.01	.04
AEQ-Tot		.26†	.03†	.18†
IES-Tot		-.03	.01	.03
EAC-Tot		-.05	.01	-.04

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. See Table 1 for variable definitions.

Predicting diagnosis of opioid dependence. Eight participants met criteria for current abuse of their prescription medication using DSM-IV-TR criteria and an additional 18 participants met criteria for current dependence of their prescription medication (see Table 3).

Zero-order correlations of predictors with diagnosis of opioid dependence. Personal history of alcohol or drug problems, parental history of alcohol or drug use treatment, higher total score on the Pain Anxiety Symptom Scale, lower levels of emotional stability (indicative of neuroticism), and higher levels of trauma symptoms (as measured by the total score from the Impact of Events Scale) were significantly correlated with increased probability of meeting diagnostic criteria for current prescription opioid dependence. Additionally, higher scores on the Toronto Alexithymia Scale and the Ambivalence Over Emotional Expression Scales were marginally predictive of meeting diagnostic criteria for prescription opioid dependence (see Table 6).

Partial correlations of predictors with diagnosis of opioid dependence. Parental history of alcohol or drug use treatment and Pain Anxiety Symptom Scale total score were entered as control variables in a partial correlation of all social/cognitive and emotional variables and whether or not each participant met criteria for prescription opioid dependence. None of the social/cognitive or emotional variables remained significant after controlling for these variables (see Table 7).

Logistic regression predicting diagnosis of opioid dependence with all emotional variables. A logistic regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors

(parental history of alcohol or drug use treatment), pain (Pain Anxiety Symptoms Scale), social/cognitive factors (emotional stability), and emotional factors (because these variables were of specific interest, all were included in the model). The full model containing all predictors was statistically significant, X^2 (7, N = 100) = 17.60, p = .02, indicating that the model was able to distinguish between participants who reported symptoms consistent with a diagnosis of prescription opioid dependence and those who did not (see Table 11). The model as a whole correctly classified 80.0% of cases who were opioid dependent. Only one of the independent variables made a unique statistically significant contribution to the model, family history of alcohol or drug treatment, with an odds ratio of 3.82, which indicated that participants who had a family history of drug treatment were almost 4 times more likely to have diagnosis of prescription opioid dependence than participants without a family history.

Logistic regression predicting diagnosis of opioid dependence with each emotional variable independently. A logistic regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (parental history of alcohol or drug use treatment), social/cognitive factors (emotional stability and openness), and each emotional factor individually. Consistent with the results of the full logistic model, family history of drug or alcohol treatment remained the only significant predictor of diagnosis of prescription opioid dependence, with participants who had a family history of drug treatment having been nearly 4 times more likely to report symptoms consistent with a diagnosis of prescription opioid dependence. See Table 11 for all values.

In summary, regarding the dichotomous measure of whether or not participants reported symptoms consistent with a diagnosis of dependence on prescription opioids, Hypothesis 1 was not supported. Only family history of drug or alcohol treatment was predictive of a diagnosis of prescription opioid dependence. None of the emotional variables explained unique variance in the model after controlling for assessment method assignment, family history of drug or alcohol treatment, Pain Anxiety Symptom Scale total score, and emotional stability.

Table 11 Predictors of current diagnosis of prescription opioid dependence

	All Emotional Variables			Emotional Variables Entered Separately		X^2 Values for Full Models of Emotional Variables Entered Separately
	B(*SE B*)	e^B	X^2	*B*(*SE B*)	e^B	X^2
Step 1						
Group (control)	-1.02 (0.42)*	0.36				
Step 2 (Basic)						
ParentHx	1.34 (0.62)*	3.82				
Step 3 (Pain)						
PASS-Tot	0.01 (0.02)	1.01				
Step 4 (Cog)						
TIPI-Stability	-0.26 (0.23)	0.77				
Step 5 (Emo)						
TAS-Tot	0.01 (0.03)	1.01		0.02 (0.03)	1.02	16.90**
AEQ-Tot	-0.15 (0.45)	0.86		0.05 (0.38)	1.06	16.63**
IES-Tot	0.11 (0.14)	1.11		0.11 (0.12)	1.11	17.40**
EAC-Tot	-0.02 (0.44)	0.98	17.60*	-0.01 (0.41)	1.00	16.61*

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. Significance of individual variables determined by the Wald's test. See Table 1 for variable definitions.

Hypothesis 2

Hypothesis 2 tested the hypothesis that stress/emotional factors could predict alcohol and other drug use beyond the more routinely assessed predictive factors (demographic, pain-related, cognitive/social, and stress/emotional factors). The two outcome categories were alcohol and cannabis as they were the most frequently reported drugs of abuse. For alcohol, both a categorical value of current user versus not a current user (any days of use during the past month) and a continuous measure of the number of days of use during the last month (to assess degree of current use) were evaluated. Because there were fewer participants reporting use of cannabis, only the categorical variable of "user" versus "non-user" was evaluated in a logistic regression. Use was operationalized as either "users" who had used 1 or more days of use in the past 30 days or "non-users" who reported no use in the past 30 days for both alcohol and cannabis.

Predicting Days of Alcohol Use. Participants reported a mean of 3.26 days (*SD* = 7.02) of drinking alcohol out of the past 30 days. Regarding DSM-IV-TR criteria for abuse and dependence symptoms for alcohol, the average number of symptoms was 0.73 (*SD* = 2.01). Twenty-one participants met criteria for abuse of alcohol using DSM-IV-TR criteria at any time in their lives (2 participants met criteria at the time of participation), and 24 participants met criteria for dependence on alcohol at any time in their lives (12 participants met criteria at the time of participation). It is important to note that a diagnosis of alcohol dependence at any time in a participant's life excludes a diagnosis of abuse, thus more than 21 participants reported symptoms of abuse but had also reported symptoms consistent with a diagnosis of dependence and were excluded

from the abuse category. Correlations between the predictors and days of alcohol use out of the past 30 days and the categorical variable of current alcohol user versus non-user are presented in Table 12.

Zero-order correlations of predictors with days of alcohol use during the past 30 days. Personal history of alcohol or drug use problems, parental history of alcohol or drug use treatment, higher levels of psychiatric symptoms (as measured by the Brief Symptom Inventory Global Severity Index), higher scores on the Pain Catastrophizing Scale, lower scores on emotional stability (low scores on emotional stability suggest higher levels of neuroticism) as measured by the Ten Item Personality Inventory, lower scores on agreeableness (as measured by the Ten Item Personality Inventory), and higher total scores on the Ambivalence Over Emotional Expression Scale (see Table 12) were correlated with total days of alcohol use out of the past 30.

Partial correlations of predictors with days of alcohol use during the past 30 days. Parental history of alcohol or drug use treatment, higher levels of psychiatric symptoms, and total score on the Pain Catastrophizing Scale were entered as control variables in a partial correlation of all social/cognitive and emotional variables with the total days drinking alcohol during the past month. Lower scores on agreeableness remained significantly correlated with more days of drinking alcohol during the past 30 days even after controlling for parental history of alcohol or drug use treatment, psychiatric symptoms, and the Pain Catastrophizing Scale (see Table 13).

Hierarchical regression predicting the days of alcohol use during the past 30 days with all emotional variables. A hierarchical regression model composed of the following blocks of variables was conducted: control (assessment method group),

traditional (parental history of alcohol or drug use treatment, higher levels of psychiatric symptoms), pain (Pain Catastrophizing Scale), social/cognitive factors (extraversion and agreeableness), and emotional factors (because these variables were of specific interest, all were included in the model).

The regression was significantly predictive of total number days of alcohol use out of the past 30 days, (R^2 = .24, F(10, 89) = 2.84, p < .01; see Table 14). As hypothesized, the emotional variables explained a significant increase in variance (ΔR^2 = .09 p= .04). Higher scores on the Ambivalence Over Emotional Expression Scale were significantly predictive of more days of alcohol use, β = .29, t(89) = 2.09, p =.04, even after controlling for all other traditional, pain, social/cognitive, and emotional factors. Lower scores on the Toronto Alexithymia Scale were significantly associated with more days of alcohol use out of the past 30 (β = -.40, t(89) = -2.72, p < .01), however, this was not in the direction hypothesized. Higher scores on the Pain Catastrophizing Scale (β = .29, t(89) = 2.13, p = .04) was predictive of more days of alcohol use. Additionally, having a family history of alcohol or drug treatment (β = .19, t(89) = 1.93, p = .06) and lower levels of agreeableness were marginally predictive of more days drinking during the past month (β = -.21, t(89) = -1.88, p = .06; see Table 14).

Hierarchical regression predicting days of alcohol use in the past 30 days with each emotional variable independently. A hierarchical regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional (parental history of alcohol or drug use treatment, higher

levels of psychiatric symptoms), pain (Pain Catastrophizing Scale), social/cognitive factors (extraversion and agreeableness), and each emotional factor individually.

Toronto Alexithymia Scale total score. The regression was significantly predictive of total number days of alcohol use out of the past 30 days, (R^2 = .19, F(7, 92) = 3.01, p < .01; see Table 12). As hypothesized, the emotional variables explained a significant increase in variance (ΔR^2 = .04 p= .04), however, it was not in the hypothesized direction. Lower scores on the Toronto Alexithymia Scale were significantly predictive of more days of drinking out of the past 30 (β = -.27, t(92) = -1.99, p < .05).

Ambivalence Over Emotional Expression total score. The regression was significantly predictive of total number days of alcohol use out of the past 30 days, (R^2 = .16, F(7, 92) = 2.45, p = .02; see Table 14). However, emotional ambivalence did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone (p = .41), in the absence of controlling for the other emotional variables.

Impact of Events Scale total score. The regression was significantly predictive of total number of days drinking alcohol out of the past 30, (R^2 = .18, F(7, 92) = 2.59, p = .02; see Table 14). However, trauma symptoms did not explain a significant increase in variance from the control, traditional, and social/cognitive factors alone (p = .17), even without controlling for other emotional characteristics within the model.

Emotional Approach Coping total score. The regression was significantly predictive of total number of days drinking alcohol out of the past 30, (R^2 = .16, F(7, 92) = 2.43, p = .03; see Table 14). However, the emotional variable block did not explain a

significant increase in variance from the control, traditional, and social/cognitive factors alone (p = .52), even in the absence of controlling for the other emotional variables.

In summary, regarding the continuous measure of number of days drinking alcohol out of the past 30, Hypothesis 2 was only partially supported. Higher scores on the Ambivalence Over Emotional Expression scale were predictive of total days drinking alcohol out of the past 30 in the full model only, in which assessment method assignment, parent history of substance use treatment, psychiatric symptoms, medication expectations, agreeableness, emotional stability, and all other emotional characteristics were controlled. Additionally, there was a significant relationship between alexithymia and days of alcohol use in the opposite direction than hypothesized in both the full model and when the other emotional variables were not controlled for in the model. No relationship existed between total number of days drinking alcohol out of the past 30 and trauma or the Emotional Approach Coping Scale.

Table 12 Correlations of predictors and use of alcohol and cannabis during the past month

	Days of alcohol use last month (0 to 30 scale)	Alcohol use during the past month (Yes/No)	Cannabis use during the past month (Yes/No)
Basic			
Age	-.04	-.24**	-.28**
Sex	-.06	-.11	.04
AODHx	.27**	.12	.01
ParentHx	.21*	.01	.01
BSI.GSI	.24**	.26**	-.03
Pain			
BPI	.09	.10	-.07
PCS-TOT	.25**	.27**	.01
PASS-TOT	.19	.17	.06
Social/Cognitive			
SPS-TOT	-.15	-.29**	.06
EXPECT	.12	.12	.05
TIPI-EXTRAV	-.05	-.11	.18†
TIPI-OPEN	-.07	-.06	.02
TIPI-AGREE	-.22*	-.18†	.12
TIPI-CONSC	-.17	-.21*	.08
TIPI-STABLE	-.22*	-.20*	-.05
Emotional			
TAS-TOT	.08	.16	-.05
AEQ-TOT	.28**	.28**	-.13
IES-TOT	.08	.21*	.03
EAC-TOT	-.09	.04	.11

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. See Table 1 for variable definitions. Alcohol use and cannabis use were coded as: 1 = use of alcohol/cannabis during the past 30 days; 0 = no use of alcohol/cannabis during the past 30 days.

Table 13 Partial correlations of predictors and use of alcohol and cannabis controlling for traditional and pain variables that significantly correlated with each outcome measure*

	Days of alcohol use last month (0 to 30 scale)	Alcohol use during the past month (Yes/No)	Cannabis use during the past month (Yes/No)
Social/Cognitive			
SPS-TOT	-.02	-.17	.12
EXPECT	.07	.07	.05
TIPI-EXTRAV	.03	-.04	.21*
TIPI-OPEN	.01	.03	.06
TIPI-AGREE	-.20*	-.14	.16
TIPI-CONSC	-.08	-.08	.18†
TIPI-STABLE	-.07	-.05	.02
Emotional			
TAS-TOT	-.17	-.07	-.11
AEQ-TOT	.10	.14	-.15
IES-TOT	-.13	.01	-.05
EAC-TOT	-.06	.09	.16

Note: *Correlations for days of alcohol use were controlled by parent history of alcohol or drug treatment, BSI.GSI, and PCS-TOT. Correlations for alcohol use were controlled for by age, BSI.GSI, and PCS-TOT. Correlations for cannabis use were controlled for by age. Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. See Table 1 for variable definitions. Alcohol use and cannabis use were coded as: 1 = use of alcohol/cannabis during the past 30 days; 0 = no use of alcohol/cannabis during the past 30 days.

Table 14 Hierarchical regression of days of use of alcohol during the past month

	All Emotional Variables		*Emotional Variables Entered Separately*	
	ΔR^2	β	ΔR^2	β
Step 1	.01			
Group (control)		.01		
Step 2 (Basic)	.10**			
ParentHx		.19†		
BSI.GSI		.13		
Step 3 (Pain)	.02			
PCS-TOT		.29*		
Step 3 (Cog)	.04			
TIPI-Agree		-.21†		
TIPI-Stable		-.04		
Step 4 (Emo)	.09*			
TAS-Tot		-.40*	.04*	-.27*
AEQ-Tot		.29*	.01	.11
IES-Tot		-.14	.01	-.15
EAC-Tot		-.11	.01	-.07

Note: † denotes marginal significance (.05 to .10), * denotes significance at the .05 level, ** denotes significance at the .01 level. See Table 1 for variable definitions.

Predicting alcohol users versus non-users. Forty-one (41%) of participants were classified as alcohol users during the past month, which was defined as one or more days drinking alcohol during the past 30 days (see Table 3).

Zero-order correlations of predictors with being a current alcohol user. *Y*ounger age, more psychiatric symptoms (as measured by the Brief Symptom Inventory Global Severity Index), higher total score on the Pain Catastrophizing Scale, lower seeking of social support (as measured by the Social Provisions Scale), lower levels of emotional stability (indicative of neuroticism), lower levels of conscientiousness, higher scores on the Ambivalence Over Emotional Expression Scale, and higher levels of trauma symptoms (as measured by the total score from the Impact of Events Scale) were significantly related to increased probability of being a current alcohol user. Additionally, lower scores on agreeableness were marginally predictive being a current alcohol user (see Table 12).

Partial correlations of predictors being a current alcohol user. Age, psychiatric symptoms, and total scores on the Pain Catastrophizing Scale were entered as control variables in a partial correlation of all social/cognitive and emotional variables and whether or not each participant was an alcohol user. None of the social/cognitive or emotional variables remained significant after controlling for the traditional/demographic and pain variables (see Table 13).

Logistic regression predicting being a current alcohol user. A logistic regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (age, psychiatric symptoms), pain (Pain Catastrophizing Scale), social/cognitive factors (Social Provisions Scale,

agreeableness, conscientiousness, emotional stability), and emotional factors (because these variables were of specific interest, all were included in the model). The full model containing all predictors was statistically significant, X^2 (12, N = 100) = 24.39, p = .02, indicating that the model was able to distinguish between participants who were current alcohol users and those who were not. The model as a whole correctly classified 72.0% of cases as current alcohol users. Only one of the independent variables made a unique statistically significant contribution to the model: younger age (see Table 15). For each year a participant was older, the odds of that participant being a current alcohol user decreased from 1 to 0.95.

Logistic regression predicting being a current alcohol user with each emotional variable independently. A logistic regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factors (age, psychiatric symptoms), pain (Pain Catastrophizing Scale), social/cognitive factors (Social Provisions Scale, agreeableness, conscientiousness, emotional stability), and each emotional factor individually. Consistent with the results of the full logistic model, younger age remained the only significant predictor of being a current alcohol user. See Table 15 for all values.

Regarding the dichotomous measure of whether or not participants were current alcohol users, Hypothesis 2 was not supported. Only younger age significantly predicted whether or not someone was a current alcohol user. None of the emotional variables explained unique variance in the model after controlling for assessment method, age, psychiatric symptoms, total score on the Pain Catastrophizing Scale, agreeableness, conscientiousness, and emotional stability.

Table 15 Logistic regression of current alcohol user versus non-user

	All Emotional Variables			Emotional Variables Entered Separately		X^2 Values for Full Models of Emotional Variables Entered Separately
	B(*SE B*)	e^B	X^2	*B*(*SE B*)	e^B	X^2
Step 1						
Group (control)	-0.37 (0.29)	0.69				
Step 2 (Basic)						
Age	-0.05 (0.02)*	0.95				
BSI.GSI	0.31 (0.43)	1.36				
Step 3 (Pain)						
PCS-Tot	0.03 (0.03)	1.03				
Step 4 (Cog)						
SPS-Tot	-0.87 (0.60)	0.42				
TIPI-AGREE	-0.23 (0.22)	0.79				
TIPI-CONSC	0.05 (0.22)	1.05				
TIPI-STABLE	0.01 (0.21)	1.01				
Step 5 (Emo)						
TAS-Tot	-0.03 (0.03)	0.97		-0.03 (0.02)	0.98	21.68**
AEQ-Tot	0.49 (0.36)	1.62		0.26 (0.31)	1.30	21.22**
IES-Tot	-0.42 (0.10)	0.96		-0.01 (0.10)	1.00	20.54*
EAC-Tot	0.31 (0.37)	1.37	24.39**	0.38 (0.34)	1.46	21.80**

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. Significance of individual variables determined by the Wald's test. See Table 1 for variable definitions. Alcohol use was coded as: 1 = use of alcohol during the past 30 days; 0 = no use of alcohol during the past 30 days.

Cannabis use. Participants reported a mean of 4.77 days (*SD* = 10.29) of using cannabis out of the past 30 days. Regarding DSM-IV-TR criteria for abuse and dependence symptoms for cannabis, the average number of current symptoms was 1.02 (*SD* = 2.06). Thirteen participants met criteria for abuse of cannabis using DSM-IV-TR criteria at any time in their lives (5 participants met criteria at the time of participation) and an additional 22 participants met criteria for dependence on cannabis at any time in their lives (12 participants met criteria at the time of participation; see Table 3).

Zero-order correlations of predictors with being a current cannabis user. Younger age was significantly correlated with an increased probability of being a current cannabis user. Additionally, higher scores on extraversion were marginally predictive of being a current cannabis user (see Table 12).

Partial correlations of predictors being a current cannabis user. Age was entered as a control variable in a partial correlation of all social/cognitive and emotional variables with whether or not each participant was a cannabis user. Higher levels of extraversion became significant after controlling for age (see Table 13).

Logistic regression predicting being a current cannabis user. A logistic regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factor (age), social/cognitive factor (extraversion), and emotional factors (because these variables were of specific interest, all were included in the model). The full model containing all predictors was statistically significant, X^2 (7, N = 100) = 19.00, $p < .01$, indicating that the model was able to distinguish between participants who were current cannabis users and those who were

not. The model as a whole explained correctly classified 82.0% of cases as current cannabis users. Only one of the independent variables made a unique statistically significant contribution to the model: younger age (see Table 16). For each year older a participant was, his or her odds of being a cannabis user was reduced by 0.93.

Logistic regression predicting being a current cannabis user with each emotional variable independently. A logistic regression model composed of the following blocks of variables was conducted: control (assessment method group), traditional factor (age), social/cognitive factors (extraversion), and each emotional factor individually. Consistent with the results of the full logistic model, younger age remained the only significant predictor of being a current cannabis user. See Table 16 for all values.

In summary, regarding the dichotomous measure of whether or not participants were current cannabis users, Hypothesis 2 was not supported. None of the emotional variables explained unique variance in the model after controlling for assessment method assignment, age, and extraversion.

Table 16 Logistic regression of current cannabis user versus non-user

	All Emotional Variables			Emotional Variables Entered Separately		X^2 Values for Full Models of Emotional Variables Entered Separately
	B(*SE B*)	e^B	X^2	*B*(*SE B*)	e^B	X^2
Step 1						
Group (control)	-0.55 (0.33)	0.58				
Step 2 (Basic)						
Age	-0.08 (0.03)**	0.93				
Step 3 (Cog)						
TIPI-EXTRV	0.31 (0.19) †	1.37				
Step 5 (Emo)						
TAS-Tot	0.03 (0.03)	1.03		-0.01 (0.02)	0.99	15.12**
AEQ-Tot	-0.67 (0.41)	0.51		-0.44 (0.28)	0.64	17.39**
IES-Tot	-0.04 (0.11)	0.97		-0.05 (0.08)	0.95	15.20**
EAC-Tot	0.45 (0.43)	1.57	19.00**	0.28 (0.37)	1.32	15.39**

Note: Significant correlations at the .05 level are denoted by * and by ** at the .01 level. Trends (.05 - .10) are denoted by the † symbol. Significance of individual variables determined by the Wald's test. See Table 1 for variable definitions. Cannabis use was coded as: 1 = use of cannabis during the past 30 days; 0 = no use of cannabis during the past 30 days.

Hypothesis 3

Hypothesis 3 tested the difference in outcome measures by randomized data collection method (enhanced interview, standard interview, and written format). Prior to conducting the analyses, the success of randomization to the assessment method groups and researcher adherence to assessment method group method was evaluated.

Testing the success of randomization*.* To determine whether groups were equivalent prior to randomization to the intervention (i.e., assigned assessment method group), baseline characteristics of demographics, pain severity, and medication effectiveness were conducted. The success of the randomization into assessment method groups was tested using a one-way ANOVA for continuous variables (age, BPI Total Pain, and Medication Effectiveness) and Chi-Square analyses for categorical variables (gender, ethnicity). Analyses indicated that there were no baseline differences among the experimental groups on demographic variables, level of self-reported pain, or self-reported medication effectiveness in managing pain (see Table 17), which suggests that groups were equivalent prior to randomization.

Differences based on assessment method group assignment. To explore group differences on outcome variables a one-way ANOVA with assessment method group as a fixed factor was run (see Table 2 for all means and standard deviations). Hypothesis 3 was partially supported. Regarding prescription use, the enhanced group reported significantly more symptoms of abuse and dependence on their current pain prescription than the written group, $F(2, 97) = 4.49$, $p = .01$. No significant group differences were found for prescription misuse as measured by the total score of the Prescription Drug Use Questionnaire. Regarding other substances of abuse, the

enhanced and standard groups disclosed significantly more current symptoms of cannabis abuse and dependence ($F(2, 97) = 5.55$, $p < .01$) than the written group. No significant differences among assessment method groups existed for number of alcohol related symptoms or days of cannabis and alcohol use during the past month. Regarding trauma, the written group disclosed significantly more distress symptoms of the Life Stressors Checklist than the standard group, $F(2, 97) = 5.70$, $p < .01$. Additionally, the enhanced group reported marginally more PTSD symptoms than the written group, $F(2,97) = 2.81$, $p = .07$. Assessment method groups did not significantly differ on number of traumatic life events reported on the Life Stressors Checklist (see Table 18).

Table 17 Testing the Success of Randomization

	Enhanced	Standard	Written
Age (in years)	48.00 (10.54)	48.97 (12.52)	45.89 (11.71)
Gender (*n, %*)			
Male	16 (48.5%)	15 (46.9%)	16 (45.7%)
Female	17 (51.5%)	17 (53.1%)	19 (54.3%)
Ethnicity (*n, %*)*			
European-American	5 (15.2%)	3 (10.3%)	3 (9.1%)
African-American	28 (84.8%)	26 (89.7%)	27 (81.8%)
Other	0 (0.0%)	0 (0.0%)	3 (9.1%)
BPI Total Score	6.31 (1.51)	6.46 (1.81)	6.86 (1.82)
Medication Effectiveness	6.69 (1.86)	7.42 (1.99)	6.60 (1.95)

*Note**: 5 participants did not report ethnicity and thus percentages for this category only are based on a total of 95 participants. See Table 1 for variable definitions

Table 18 Data Collection Method Differences on Outcome Measures

	Enhanced	*Standard*	*Written*	*F-value*	(*p*-value)
Prescription Misuse					
PDUQ	10.12 (3.94)	8.75 (4.56)	9.49 (4.04)	0.87	.42
Abuse/Depend Rx Symptoms	2.15 (1.75) $_{a}$	1.72 (2.05) $_{ab}$	0.94 (1.19) $_{b}$	4.49	.01
Alcohol Use					
Days Alcohol Use Month	3.15 (6.08)	3.50 (7.62)	3.14 (7.46)	0.03	.97
Abuse/Depend Alcohol Symptoms	0.76 (2.02)	0.91 (2.25)	0.54 (1.82)	0.27	.76
Other Drug Use					
Days Cannabis Use Month	5.91 (11.15)	6.09 (11.77)	2.49 (7.52)	1.34	.27
Cannabis Abuse/Depend Symptoms	1.33 (2.20) $_{a}$	1.66 (2.61) $_{a}$	0.14 (0.55) $_{b}$	5.55	.01
Trauma					
LSC Total Events	12.24 (4.52)	11.16 (5.79)	9.54 (5.57)	2.22	.11
LSC Distress	2.63 (0.95) $_{ab}$	2.26 (0.86) $_{a}$	3.05 (1.01) $_{b}$	5.70	.01
PTSDSx	7.06 (5.37)	6.69 (5.89)	4.09 (5.68)	2.81	.07

Note: Superscripts that do not match (e.g., a and b) denote groups that are significantly different from one another as determined by Scheffe post-hoc tests. See Table 1 for variable definitions.

Discussion

The present study first sought to determine which demographic, pain-related, cognitive/social, and stress/emotional factors predict and help to explain the abuse of prescription opioids among patients in treatment for chronic pain. It was hypothesized that the traditional, pain, social/cognitive, and emotional factors explored would be predictive of aberrant prescription opioid use, and that the knowledge of factors related to stress and emotion regulation would predict prescription misuse beyond more routinely assessed and established factors. Partial support was found for hypothesis 1. Personal and family histories of substance use problems were predictive of opioid use related problems and there was support for emotional ambivalence predicting above and beyond traditionally evaluated factors. There were inconsistent findings for the role of personality factors in predicting prescription opioid use problems.

Second, it was hypothesized that the traditional, pain, social/cognitive, and emotional factors would also be predictive of alcohol and other drug use in this chronic pain population and that, again, the addition of emotion regulation factors to the model would explain above and beyond the other factors. Limited support was found for this hypothesis. Personal and family histories of substance use problems were predictive of more days of alcohol use during the past month, and emotional ambivalence again predicted above and beyond traditionally evaluated factors. However, only younger age predicted whether or not a participant was a current user of alcohol or cannabis.

Third, this study sought to determine whether an innovative, clinically sensitive interview protocol would enhance disclosure beyond a traditional interview or a questionnaire by testing different methods of eliciting disclosure of stigmatized

information (misuse of prescription medication, use of alcohol/drugs, and experience of stressful events or traumas). It was predicted that participants in the enhanced group would disclose the most information regarding their prescription misuse, substance use and abuse, and trauma histories. Further, it was hypothesized that the questionnaire condition would lead to higher levels of disclosure than the standard interview group. Partial support was found for this hypothesis. The enhanced group reported more symptoms of abuse and dependence on their prescription opioids and cannabis than the written group. Participants in the enhanced group reported more experiences of trauma than the written group. Results regarding alcohol use, prescription misuse, and distress over trauma were not supportive of the role of the enhanced method in improving disclosure.

Prediction of Prescription Opioid Use Related Problems

The first hypothesis posited that knowledge of factors related to stress and emotion regulation would explain prescription misuse (as evidenced by Prescription Drug Use Questionnnaire Total scores) and/or prescription opioid abuse or dependence symptoms, beyond more routinely assessed and established factors. Hypothesis 1 was partially supported.

Describing prescription opioid use related problems in this sample. Prescription misuse is defined by risky behaviors related to one's use of a prescription. Prescription misuse does not necessarily rise to the level of an abuse or dependence diagnosis. Examples of risky behaviors included on the Prescription Drug Use Questionnaire are visiting an emergency room in the past 6 months because of pain, running out of medication before expected, and using pain medicine to help with other

symptoms such as anxiety or difficulty sleeping (Compton et al., 2008). Previous research (Compton et al., 2008) showed a cutoff score of 10 or greater on the Prescription Drug Use Questionnaire was useful in predicting future clinic-imposed discontinuation of treatment resulting from patient violations of treatment contracts. Higher scores on the Prescription Drug Use Questionnaire are indicative of current risky and problematic behaviors, as well as a likely precursor to the development of an abuse or dependence diagnoses. Even in the absence of a clinical diagnosis of abuse or dependence, prescription misuse carries with it interpersonal and health-related risks. It is interesting to note that as compared to previous research, a higher number of participants in this study, 49% (*n* = 49), were above the cutoff of 10 suggesting problematic prescription opioid use (Hojsted & Sjogren, 2007).

Regarding reported symptoms of abuse and dependence, it is essential to review the actual symptoms reported to differentiate misuse from "pseudo-addiction." "Pseudo-addiction" refers to the expected development of physical dependence to opioids with ongoing, daily usage. Physical dependence refers to both tolerance to the drug's effects (e.g., needing more medication to report feeling the same effect) and withdrawal when an individual stops using the medication (e.g., sweats, body aches, irritability, etc.; Weissman & Haddox, 1989). Symptoms of "pseudo-addiction" are inherent in chronic use of an opioid. Twelve (12%) participants noted tolerance and 31 (31%) reported withdrawal effects in the current study. However, other DSM-IV-TR symptoms of abuse and dependence are more consistent with aberrant medication use. Participants reported an average of 1.59 (*SD* = 1.74) abuse and dependence symptoms, and many participants reported symptoms other than tolerance and abuse. Eight (8%) participants

met criteria for current prescription opioid abuse, and an additional 18 (18%) met criteria for current prescription opioid dependence; neither of which participants could have met criteria for without reporting symptoms beyond tolerance and withdrawal. The number of participants meeting criteria for abuse or dependence of prescription medication has been debated in the field (Becker et al., 2008; Chabal et al., 1997; Cowan et al., 2003; Dellemijn, 2001; Hoffman et al., 2005; Hojsted & Sjogren, 2006;), and the current finding that 25% of participants attending an outpatient, chronic pain clinic met criteria for abuse or dependence on their prescription opioid medication contributes to this ongoing debate.

Predicting prescription use related problems. Given that trauma and emotional regulation styles have been implicated in both the chronic pain and substance abuse literatures, it was predicted that these variables would play an important role in understanding the risk of prescription misuse in chronic pain patients. Specifically, it was hypothesized that higher reported symptoms related to trauma (i.e., higher Impact of Events Scale Total Scores), higher levels of alexithymia (i.e., higher Toronto Alexithymia Total Scores), internal conflict over sharing emotions (i.e., higher Ambivalence Over Emotional Expression Scale Total Scores), and lower reported likelihood of trying to understand, process, and express emotions (i.e. lower Emotional Approach Coping Scale Total Scores) would be predictive of prescription opioid misuse and/or prescription opioid abuse and dependence symptoms.

Traditional factors and prescription use problems: Personal and family history of substance use problems has a big impact. Personal and family history of substance use problems were consistently linked to more problems across the three outcome

measures that assessed problematic prescription opioid use (i.e., Prescription Drug Use Questionnaire/prescription misuse, total number of abuse and dependence symptoms, and meeting criteria for opioid dependence). Given that personal history of substance use problems was the only consistent factor identified in previous research (Turk et al., 2008), it is not surprising that this variable had a strong, direct correlation with prescription misuse in this study. In fact, a reported history of substance use problems means that the participant has already exhibited aberrant drug related behaviors that we are trying to predict in this study through the use of other factors (e.g., pain, emotional ambivalence, etc.). Although prescription opioid misuse is unique in that the drug is medically administered and monitored, the psychopharmacological properties of the medication, and thus addictive properties, are no different from opioids obtained illicitly and abused. Additionally, some of the participants who reported previous problems with substance use had a problem with opioids “off the street”. Participants who have already had problems with recreational opioid use, are likely at an even higher increased risk to misuse a medically provided opioid medication.

It is also not surprising that family history of substance use problems was predictive of prescription opioid use problems. There is strong support in the literature for family history as a predictor of any substance misuse because of shared genetic factors, instability in parental relationships, chaotic environments during childhood, and shared psychological and personality risk factors (Butler et al., 2004; Hojsted & Sjogren, 2007). Genetic vulnerability for substance use related disorders is widely accepted in the literature, but much of this research has focused on the risk for alcohol related problems (Heath et al., 1997). It has been suggested that other factors examined in this

study (e.g., extraversion, psychiatric symptoms, emotional regulation, etc.) may simply be a result of the same genetic vulnerabilities. In other words, it may be that an individual is genetically predisposed for extraversion or psychiatric distress, and those characteristics then lead to substance use problems. In addition to the genetic risks resulting from family history of substance use problems, it may also be that the mere exposure to drugs from a younger age, less parental monitoring, more distress resulting from a chaotic family environment, and neglect or abuse resulting from parental use of substances leads to younger onset of drug use and thus increased risk of future substance use problems.

Despite previous evidence that psychological distress leads to increased risk of prescription misuse (Michna et al., 2004), there were mixed findings in the current study. Psychiatric distress, as measured by the Brief Symptom Inventory, was shown to predict prescription misuse, but not symptoms of abuse or dependence. Clinical impressions of depression, anxiety, or general psychological distress commonly trigger concerns of substance misuse in practice. Being “under stress” is something that most people would recognize as a warning sign for potential problematic use, resulting from a desire to escape the “stress.” Interestingly, psychiatric distress was not predictive of prescription misuse once family history of substance use problems was controlled. Although unexpected that psychiatric distress predicted misuse but not diagnostic symptoms, this may be because psychiatric distress is a temporary state (as compared to the personality or emotional variables examined in this study). As a temporary state, distress might lead only to short-term problems of misuse, and not longer-term problems more consistent with symptoms of abuse and dependence.

It is interesting to note age and gender were not associated with increased prescription use problems in this study, despite some previous research suggesting a link (Michna et al., 2004). The sample in this study was primarily middle-aged and thus the lack of findings for age may be due to range restriction, rather than a true lack of utility of age in predicting prescription misuse. Findings have suggested that individuals on the extremes of the age range (i.e., adolescents/young adults and the elderly) are most at risk for prescription misuse, and the current sample had very few individuals who were at those extremes. In regards to gender, despite previous research suggesting that men are more likely to abuse or become dependent on substances, recent evidence suggests that gender differences may not exist when examining use of prescription opioids (Jamison, Butler, Budman, Edwards, & Wasan, 2010). In fact, recent research by Jamison et al. (2010) suggests that there is likely a similar rate of prescription misuse between genders, but the way in which it is expressed likely differs. For example, Jamison et al. suggest that at the symptom level, women may report more distress related to misuse while men might report more environmental consequences of their misuse. Thus, when prescription use problems were examined at the nominal level in the current study, misuse or no misuse, any possible gender differences were likely hidden.

Pain and prescription use problems: Pain is not as important as expected. Pain did not play a substantial role in predicting prescription use related problems. The only pain related finding, was that anxiety over the experience of pain symptoms and belief of inability to cope with or reduce pain symptoms, were linked to a higher likelihood of meeting diagnostic criteria for prescription opioid dependence. It is notable that pain

anxiety was not related to prescription misuse (i.e., Prescription Drug Use Questionnaire) or total number of abuse and dependence symptoms, but this may be because those participants with pain anxiety were engaging in chronic overuse of medication consistent with a dependence diagnosis (e.g., more tolerance, inability to quit medication use, withdrawal symptoms, etc.) and not risky behaviors (i.e., prescription misuse and/or abuse symptoms). Increased helplessness over pain symptoms likely leads to increased use of medication to try and reduce pain because patients feel incapable of managing the pain through psychological (e.g., relaxation, imagery, pacing) or physical (e.g., stretching, massage, etc.) means. Despite a link between pain anxiety and a diagnosis of prescription opioid dependence, pain anxiety did not predict dependence diagnosis after accounting for family history of substance use problems.

Under-treatment of pain and higher pain severity have been noted as likely reasons for increased opioid medication use, yet there were minimal relationships found between pain variables and prescription use related problems in this sample. Weissman and Haddox (1989) opined that prescription use related problems cannot be identified in patients whose pain is not being treated adequately because aberrant behaviors result from a desire to treat the pain, rather than a desire to feel a high from the drug. It has further been speculated, without research support, that individuals who are using prescription opioids to treat pain cannot experience the “high” from the medication. Despite the widespread belief in Weissman and Haddox’s (1989) theory, Weissman and Haddox had not experimentally examined this theorized relationship of pain and prescription use related problems. Although the theory that under-controlled pain leads

to increased prescription use has continued to be widely believed, it has not been examined using standardized pain measures. The finding that pain played a minimal role in predicting prescription use related problems in the current study is unexpected, and likely suggests that under-treated pain may not play as large of a role in the prescription misuse and diagnostic symptoms as previously hypothesized. It may be that the presence of pain and not the severity or distress from pain matters most. Thus, in this sample, in which all participants were taking prescription opioids to treat some degree of pain, no differences should be expected. It may also be that because the sample of patients who participated in this study were self-selected, a biased sample of pain severity was created because those individuals with more severe and unmanaged pain are unlikely to volunteer to sit for 1.5 to 2 hours to engage in the current study.

Social/cognitive factors and prescription use problems: Inconsistent, minimal findings. Within the social/cognitive predictors, the findings were inconsistent across the categories of prescription opioid related problems (i.e., prescription misuse, total number of abuse and dependence symptoms, and dependence diagnosis). The social/cognitive differences between prescription misuse and prescription related symptoms of abuse and dependence were noteworthy. The same personality factors did not play a role in misuse, as compared to symptoms of abuse and dependence, and none of these social/cognitive variables remained significant when controlling for family history of substance use in the regression models. Cognitive factors that warrant further examination are neuroticism (i.e., lower emotional stability), openness to experience, and extraversion.

Neuroticism was predictive of total number of abuse and dependence symptoms and dependence diagnosis, but only in the absence of controlling for other factors such as family history and psychiatric distress. Although neuroticism has not previously been identified as a predictor of prescription use problems in chronic pain patients, the finding is not surprising given that neuroticism has been found to have a predictive relationship with other substances of abuse. Neuroticism is a personality trait defined by a consistent, enduring tendency to experience negative emotional states, high reactivity to stress, and difficulty delaying gratification of desires. As with psychiatric distress, higher substance use in individuals that are high in neuroticism may be due to an attempt to escape or avoid negative internal emotional states. It is not surprising that it was not predictive of prescription opioid symptoms of abuse and dependence after controlling for psychiatric distress. Although the measure of psychiatric distress in this paper was aimed at current levels of psychiatric problems, those individuals who are neurotic are likely to rate themselves as more psychiatrically distressed at all times. After accounting for psychiatric distress, the relationship of neuroticism to prescription opioid symptoms was no longer evident.

Openness to experience was linked only to a higher number of total abuse and dependence symptoms, a relationship that was not anticipated, and only existed in the absence of controlling for other predictors. Increased openness to experience may explain increased engagement in risky behaviors (e.g., driving while feeling impaired from use or going to school or work while feeling impaired by their prescription), as it is often defined as an increased need for variety and ongoing curiosity. It may be that openness is related to an increased willingness to experiment with medication use,

and/or curiosity about medication which then leads to use of higher or more frequent doses than prescribed. Given the lack of previous findings regarding openness and the limited theoretical reasons for its role in prescription misuse or use of other substances, replication to determine whether this finding is consistent across samples is necessary.

Extraversion was linked only to prescription misuse, as measured by the Prescription Drug Use Questionnaire, and only when the role of other factors was not controlled. Extraversion has not been previously studied in this population, but it is not surprising that higher levels of extraversion are correlated with increased prescription misuse, as there is evidence for the relationship of extraversion to problems with illicit drugs (Agrawal, Jacobson, Gardner, Prescott, & Kendler, 2004; Gorman & Derzon, 2002). Extraverts are typically outgoing, adventurous, and depend on external stimuli for excitement. As a result, it has been suggested that extraverts are more likely to be adventurous with their willingness to experiment with drugs. Additionally, Depue and Collins (1999) found that at a neurological level, extraverts' dopamine systems are more responsive to pleasurable stimuli. This higher reactivity of the dopamine system to pleasurable stimuli likely leads to a higher responsivity to the potential pleasurable experience of a "high" from prescription opioids, resulting in increased misuse of the medication.

Emotions and prescription use problems: Emotional ambivalence is an important, new predictor. The emotional variables were of particular interest, and emotional ambivalence was the most consistent predictor of prescription opioid use related problems. Higher levels of internal conflict over sharing one's emotions was linked to more prescription use related problems for all three outcome categories (i.e.,

prescription misuse, total number of abuse and dependence symptoms, meeting criteria for prescription opioid dependence). Even after accounting for other predictors, emotional ambivalence remained predictive of prescription misuse and total number of prescription opioid abuse and dependence symptoms. This means that even if we know whether someone has a family history of substance use problems, emotional ambivalence is able to add unique information to help us predict above and beyond the knowledge of family history.

Emotional ambivalence reflects ongoing internal conflict about the desire to hide emotions, despite external circumstances that demand disclosure, and/or regret over decisions to disclose feelings. As with psychiatric distress, it is likely that the ongoing stress resulting from emotional ambivalence motivates the individual to quell his or her internal experience further. For individuals high on emotional ambivalence, prescription opioids may provide a way to suppress his or her internal, emotional conflict as the prescription is readily available and many people experience a calming and/or euphoric effect from opioids. It is notable that the relationship between emotional ambivalence and prescription use related problems remained even after accounting for psychiatric distress. This finding suggests that the trait-like characteristic of emotional ambivalence is qualitatively different from the state-like measure of general psychiatric distress. The consistent findings, across outcomes and after controlling for other important variables like family history, found with emotional ambivalence suggests that it plays a more substantial role in the prediction of prescription misuse than general psychiatric distress.

A higher level of alexithymia was linked to both higher prescription misuse and diagnosis of opioid dependence. However, alexithymia was not predictive of either

outcome after accounting for the role of family history of substance use problems, pain variables, and social/cognitive variables. Although alexithymia might predict prescription use related problems in the absence of other variables, the utility of alexithymia is only evident in the absence of more traditionally understood predictors. It is not surprising that alexithymia was not predictive of prescription misuse after controlling for other factors because of its high correlation with general psychiatric distress (i.e., Brief Symptom Inventory Global Severity Index), which was controlled for in this study. It is likely that the link between alexithymia and psychiatric symptoms lead to alexithymia being redundant, and lacking utility, when psychiatric symptoms were present in the model.

There were limited findings regarding trauma related symptoms. Trauma symptoms were only linked to prescription opioid dependence, and only in the absence of controlling for other factors. It may be that that trauma related symptoms are predictive of more severe and chronic symptoms, as measured by meeting criteria for opioid dependence, rather than an engagement in risky behaviors, as measured by prescription misuse or total number of abuse and dependence symptoms (note: abuse symptoms are generally categorized as risky behaviors; whereas dependence is generally categorized as more chronic physical, social, and personal problems). Individuals with a family history of substance use have consistently been found to have higher rates of lifetime traumas (Maker, Kemmelmeier, & Peterson, 1998; Murphy, Jellinek, Quinn, Smith, Poitrast, & Goshko, 1991), and the lack of findings related to trauma may have resulted from controlling for family history of substance use problems. Additionally, the rate of reported trauma experiences was high in this study, and likely

reflects the unique characteristics of this sample. It may be that trauma, like pain, was affected by a restriction in range due to the uniqueness of the sample. In a sample with more varied histories of trauma, in which some participants report little to no major traumatic life events, participants with extensive trauma histories may be qualitatively different from participants who have not experienced many major stressors. Although not reported in the results, both stress related symptoms from trauma experience (i.e., Impact of Events Scale) and total number of life stressors (i.e., Life Stressors Checklist) were evaluated and resulted in similar findings.

An individual's tendency to evaluate or share emotional experiences (i.e., Emotional Approach Coping Scale) was not predictive of any of the prescription use related problems. The lack of findings related to one's tendency to share his or her emotional state, despite the substantial role of emotional ambivalence in predicting prescription use related problems, suggests that it is the conflict over expressing emotions (i.e., Ambivalence Over Emotional Expression), rather than the actual tendency or likelihood to process and share one's emotions with others (i.e., Emotional Approach Coping Scale) that leads to more emotional distress and increased prescription misuse. In other words, it is the internal conflict and not the actual choice to express emotions or seek support that matters most in predicting prescription misuse.

Summary of prescription opioid use problems. The findings clearly showed that personal and family history of substance abuse contribute a great deal to the prediction of who may be at highest risk for prescription misuse, total number of opioid abuse and dependence symptoms, and meeting criteria for dependence on prescription opioids. In a 2008 review of the literature on prescription use related problems in

chronic pain populations prescribed long-term opioids, it was found that the only clear predictor of current or future use related problems was previous history of substance use problems (Turk et al., 2008). Additionally, as noted earlier, most studies included in this literature review were based on record reviews, and thus lacked the ability to determine social or personal impacts of prescription use and/or misuse on patients' lives. The current findings that suggest parental history of substance use problems, current psychiatric symptoms (rather than psychiatric diagnoses as noted in Michna et al., 2004), higher levels of pain anxiety, higher levels of alexithymia, higher levels of extraversion, and higher emotional ambivalence may predict increased prescription opioid use problems expanded upon the previous research. These findings provide medical care providers treating chronic pain patients a wider net of risk factors that should be evaluated and monitored when prescribing long-term opioid medications. It is especially important to note that emotional ambivalence was predictive of prescription misuse above and beyond the roles of traditional, pain, and social/cognitive factors.

For prescription misuse and total number of symptoms, it was found that emotional ambivalence was the only clear emotional predictor after controlling for more basic, or previously researched variables. These findings suggest that conflict or distress over whether or not to share internal emotional experiences, and/or feelings of regret over sharing (i.e., emotional ambivalence; Ambivalence Over Emotional Expression Questionnaire), is more important than a limited understanding of one's emotions (i.e., alexithymia; Toronto Alexithymia Scale), a general tendency to choose not to share one's emotions (i.e., Emotional Approach Coping Scale), or symptoms related to trauma. Thus, identifying participants who report distress over the potential

results of sharing their feelings, do not feel capable of sharing their feelings, and/or experience regret over times that feelings have been shared are at higher risk of misusing their prescription. Emotional ambivalence has previously been related to a lower quality of life and poorer psychological well-being (Carson et al., 2007; Lu, Uysal, & Teo, 2011), and it may be that these participants have a more difficult time coping with their chronic pain condition and the effect that it has on their lives, leading to more prescription opioid misuse. It may also be that individuals high on emotional ambivalence misuse prescription opioids to distract from a distressing internal conflict regarding emotional expression. None of the emotional variables evaluated in this study have previously been shown to have a relationship with prescription opioid use related problems in chronic pain patients, despite literature suggesting they are related to the development and maintenance of chronic pain (Ak, Sayer, & Yontem, 2004; Burba et al., 2006; Celikel & Saatcioglu, 2006; DeGenova et al., 1994; Leitenberg et al., 1992; Lumley, Neely, & Burger, 2007) and increased risk of abusing other substances (Handelsman et al., 2000; Pinard et al., 1996). The finding that emotional ambivalence was predictive of prescription misuse and total number of prescription abuse and dependence symptoms, even after controlling for traditional, pain, and social/cognitive factors is novel and provides promising evidence for the role of emotions in predicting aberrant prescription use.

The current findings regarding the rate of prescription opioid use related problems in this population reinforces the fact that patients being prescribed long-term opioid treatment must be effectively and routinely screened for risk factors. It is important to note, that although the traditional factors can explain much of the variance

in this model, there are still instances in which clinicians are in the position of predicting whether someone might be at risk for developing a substance problem without ever having used previously, and/or without knowledge of their parents' substance use. Thus, absence of personal or family history of substance use problems does not imply a complete lack of risk, and the current study began to identify additional variables that could help to explain what additional characteristics make someone more at risk for developing prescription opioid misuse problems. Although past history of substance abuse can provide pragmatic information to clinicians who are prescribing and monitoring the use of prescription opioid medications, prior history of substance abuse is not theoretically descriptive, and cannot explain what characteristics have contributed to that individual being at higher risk of developing prescription misuse problems. Prior history of substance abuse may be useful in a clinical setting, in informing the decision to prescribe or not prescribe medication; however, it does not help us to understand why that person is more at risk developmentally. A theoretical understanding of the personality characteristics, and emotional styles can contribute to increased risk could help inform future prevention and treatment efforts.

Prediction of Alcohol and Cannabis Use in Chronic Pain Patients

The second hypothesis posited that traditional/demographic, pain, social/cognitive, and emotional factors would be predictive of individuals who were using alcohol and other drugs (as evidenced by self-reported days of use during the past month on the SCID). Hypothesis 2 was partially supported.

Substance use in the sample. Use of alcohol or other drugs while prescribed an opioid can lead to ineffectiveness of the medication in treating pain, and serious

health risks. Consequently, evaluation of other substance use is essential in understanding the full picture of risky prescription opioid use. At the time of study participation, the rates of meeting current criteria for abuse or dependence on the following substances were substantial: 14 (14%) on alcohol, 17 (17%) on cannabis, 5 (5%) on cocaine, 3 (3%) on opioids other than their prescription, and 3 (3%) on sedatives. Thus, it is essential to also understand what risk factors may contribute to increased likelihood of using alcohol and other drugs in a chronic pain population. Given the small number of participants using other drugs during the past month, only alcohol (41; 41% of participants) or cannabis (25; 25% of participants) use during the past month were evaluated. Hypothesis 2 was partially supported for the continuous measure of days of alcohol use; however, there was no support for hypothesis 2 when examining the dichotomous measures of being an alcohol user or cannabis user.

It is first interesting to note that there were higher rates of alcohol and other substance use in our sample than reported in previous studies (Edlund et al., 2007). This may be a result of the method used to assess substance use in the current study. Many of the previous studies reporting substance use in chronic pain patients were assessed using urine drug screens, rather than self-report. Urine drug screens are limited by the length of time which can be evaluated as many drug tests provide information only on the last 3-5 days of use, as compared to the full self-reported use history and past 30 day use report collected in this study. Additionally, the urine drug screens were often conducted by individuals directly involved in the patients' care; therefore, there were more motivating factors in previous studies to hide other drug use, because in most programs drug use could lead to expulsion from the program. Given

the confidentiality of the current study, there were fewer motivating factors to hide substance use. As a result, the current study may be a better estimate of the actual substance use in an urban, chronic pain patient population.

Days of alcohol use during the past month: History of substance use and emotional ambivalence are still important. Many of the findings for days of alcohol use during the past month were similar to those of prescription opioid use related problems. Personal and family history of substance use problems and increased psychiatric distress were associated with more days of alcohol use during the past month. Alcohol related problems have been the primary focus of previous research findings that suggest a substantial role of family history in predicting increased risk of misuse, and thus this relationship was anticipated (Heath et al., 1997). It is again likely that the genetic predisposition, in addition to environmental factors through development (e.g., early exposure to alcohol/drugs, structure and boundaries in the home, attachment, etc.), put individuals at a much higher risk of developing a multitude of substance use and psychiatric problems.

As with prescription opioid use related problems, pain and social/cognitive factors played a minimal role in predicting increased days of alcohol use during the past month. Pain catastrophizing was found to predict more days of alcohol use, but this relationship was not maintained after accounting for other factors. The link between pain and increased use was anticipated, based on the concept that substances may be used to relieve physical pain and emotional distress. As with prescription opioid use problems, it was again surprising that more consistent findings between pain and increased alcohol use were not found. It may again be that the severity of pain necessitated by being

referred to the chronic pain clinic sets a rather high minimum level of pain, while the self-selection into a study which requires sitting for 1.5 to 2 hours sets a maximum cap on severity of pain. It would be interesting to determine whether a similar study, repeated in a primary care clinic in which the minimum pain threshold for treatment is much lower, would still result in a lack of findings for pain as a predictor of alcohol use.

Regarding social/cognitive factors, it was found that less agreeableness and higher neuroticism were predictive of more days of alcohol use. Neuroticism was only linked to higher days of alcohol use in the absence of other variables. Thus, the utility of neuroticism as a predictor of days of alcohol use only exists when family history of substance use and pain catastrophizing cannot be determined. Neuroticism has long been identified as a risk factor for problematic alcohol use (Agrawal, Gardner, Prescott, & Kendler, 2005; Sher, Bartholow, & Wood, 2000; Spotts & Shonts, 1984; Spotts & Shonts, 1991), and it is surprising that neuroticism did not predict above and beyond more traditionally evaluated factors in this sample. The limited findings related to neuroticism in this sample may be due to the way that alcohol use was operationalized in this study. As opposed to previous studies which have examined problematic use behaviors and/or diagnostic criteria for abuse or dependence on alcohol, days of alcohol use during the past month might not accurately capture participants who are engaging in problematic use. Neuroticism may be linked more directly to problematic use rather than frequency of use. Lower agreeableness remained predictive of increased days of alcohol use above and beyond the role of family history of substance use problems and pain. One of the two items that was used to assess agreeableness was being “critical or quarrelsome” and it may be that individuals who are using alcohol more often,

suggestive of potential alcohol use problems, rate themselves as more quarrelsome because they are often defending their use of alcohol, rather than low agreeableness leading to increased alcohol use.

Also interesting is the finding that increased emotional ambivalence was correlated with increased days of alcohol use, as this has not previously been identified as a predictive factor for alcohol use. The finding that emotional ambivalence was linked to both prescription opioid use related problems and increased alcohol use suggests the importance of further examination of this factor as a predictor for substance use in general. The finding emotional ambivalence was able to predict increased alcohol use after controlling for family history of substance use, pain, and social/cognitive factors again suggests that it is internal conflict over emotional expression that is linked to actual substance use in a chronic pain sample. There was no support in this study for the role of alexithymia, ongoing distress related to trauma experiences, or the tendency to express emotions in predicting alcohol use. This finding lies in contrast to previous research on alcohol use which has found higher levels of alexithymia as predictive of more alcohol related problems (Handelsman et al., 2000; Pinard et al., 1996). It may again be a result of the way in which alcohol use was measured which resulted in an inaccurate picture of alcohol related problem behavior. It may also be that alexithymia does not play the same role in predicting alcohol use problems in a chronic pain sample as it does in the general population.

Predicting use of alcohol during the past month: All you need is age. Only younger age was predictive of being an alcohol user. This suggests that age, in the absence of any other potential risk factors, can give the best picture of who might be

using alcohol while receiving prescription opioids. Despite lacking participants on the extremes of the age range (i.e., no adolescent and few elderly patients), it still seems that even a few years difference in age can predict the likelihood of being a current alcohol user. In fact, knowing only age led to the correct classification of almost 3/4s of patients as current alcohol users in this study. As alcohol is often used socially, it may be that younger patients are more likely to drink at least once per month because of the increased social demands to drink often associated with younger age. Additionally, younger individuals have less occupational and family demands and are therefore more able to drink without consequences resulting from ignoring those demands.

The reason for differences between the hierarchical regression of days of alcohol use, versus the categorical decision of whether or not someone is an alcohol user, may be due in part to the fact that someone who uses alcohol one or two days per month, likely looks very different from someone who is using 15 or 30 days per month. In the categorical model of alcohol user versus non-user, participants who used alcohol one day during the last month were lumped into the same group as regular or daily users.

Predicting use of cannabis during the past month: All you need is age. Surprisingly, the only clear predictor of being a current cannabis user was being younger. This finding suggests that it is imperative to be aware of increased risk of younger chronic pain patients to be using illicit drugs, and cannabis in particular. This finding also suggests that regardless of having other characteristics that had been hypothesized as being predictive of illicit drug use, we may only need to know age to know who needs to be monitored more closely for illicit drug use while receiving long-term opioid treatment for chronic pain. Perhaps younger patients at a chronic pain clinic

are more likely to have more active social lives, which lead to more availability of illicit drugs that are not as easily accessed by older patients.

Methodology Differences in Data Collection

As this study shows, aberrant prescription use and use of alcohol and other drugs while taking prescription opioids are a substantial risk in chronic pain populations, and there is an obvious need to be able to collect accurate information about these behaviors from patients. Appropriate patient care and targeting of monitoring interventions is limited by the accuracy of information received, and there are very real and serious health risks associated with these problematic behaviors. Typical medical care relies upon a mix of patients' self-reports and clinical providers' impressions of the patients. It is especially difficult to gain accurate information regarding prescription misuse and alcohol and other drug use when there are strong motivating forces for patients to hide their use from their medical care providers. A patient's disclosure that he or she is misusing a prescription or using other substances may lead to restrictions of their opioid medications and/or being removed from the treatment program. Thus, efforts to continue to improve the methods used to improve the accuracy of patients' self-reports are necessitated.

Based on findings from a previous study conducted by Sander et al. (2008) which examined methods for improving trauma disclosure in a college population, it was predicted that the enhanced assessment method would lead to more disclosure of trauma, prescription misuse and abuse/dependence symptoms, and alcohol and other drug use than a standard interview assessment method and a written assessment method. Based on findings by Newman et al. (2002), which examined self-reported

substance use and risky HIV related behaviors and found that the more distance from the other person (e.g., computer is better than phone, phone is better than in-person), the more reported risky behaviors, it was predicted that the written assessment group would disclose more problematic behaviors than the standard interview assessment method. It is important to note that in this study it was assumed that reports of more misuse of prescription medications, higher number of abuse and dependence symptoms on prescription opioids, more frequent use of substance use, or higher number of reported traumas and trauma symptoms are considered to be more accurate information because of the usual bias for individuals to minimize these responses. Hypothesis 3 was partially supported. In contrast to hypothesis 1 and 2, hypothesis 3 was examined through an experimental design, employing random assignment to the assessment groups. The experimental design allows the interpretation that any assessment group differences found were likely due to the group assignment.

As predicted, the enhanced assessment method group reported more abuse and dependence symptoms on their prescription opioids than the written group; however, no differences were found between the standard interview assessment group and the written group. Thus, the enhanced techniques of meta-communication, further questioning of participants' responses, and normalizing problematic behaviors may have led to participants' greater likelihood to share problematic symptoms related to their prescriptions. Interestingly, no group differences existed for prescription misuse as measured by the Prescription Drug Use Questionnaire. Questions of misuse are less stigmatizing than symptoms of abuse and dependence, and it may be that no differences were found between groups because there was not as much motivation for

participants in any of the groups to minimize their responses. Future exploration of this hypothetical explanation is necessary, but if supported this may suggest that it would be more efficient to question participants on misuse behaviors than symptoms of abuse or dependence because no specialized assessment method is necessitated.

Unexpectedly, there were no differences in reported days of alcohol use or symptoms of abuse or dependence on alcohol. This finding may also be attributed to the fact that alcohol use is a relatively socially acceptable behavior and participants across all three groups may have had no motivation to minimize their use or behaviors related to alcohol. As predicted, there were group differences in regards to cannabis use, but as with prescription use, the differences were found only with self-reported symptoms of abuse and dependence on cannabis, and not the less stigmatizing report of use. Specifically, the enhanced group reported more cannabis related abuse and dependence symptoms than the written group. Surprisingly, the standard interview assessment group also reported more cannabis abuse and dependence symptoms than the written group. Thus with cannabis use, participants were more likely to report symptoms of abuse and dependence when interviewed, rather than when asked to respond to a written questionnaire. This finding is in contrast with Newman et al.'s (2002) finding that more distant methods of disclosure lead to higher reports of stigmatizing behaviors.

Finally, there were inconsistent results regarding trauma. It was found that as predicted, the enhanced group shared marginally more trauma related symptoms on the Life Stressors Checklist than the written group (no difference existed between either enhanced or written and the standard group). In contrast, the written group disclosed

higher current distress over their traumatic experiences as measured by a 1 to 5 scale than the standard group (no difference existed between the written or standard group and the enhanced group). Taken together, these findings regarding trauma symptoms and distress suggest that the enhanced group was more consistently related to higher report of trauma and importantly symptoms related to trauma, but that the addition of a written scale rating distress may be useful. It may be that the distress rating scale was better understood and conceptualized when participants could actually look at the anchors of “no distress” to “extremely distressed”. It is also worthwhile to note that the standard group was not particularly effective in gathering trauma related symptoms.

These findings are important because they stand in contrast to the standard interview techniques commonly methods in medical settings. This suggests that it is important that continued efforts are made to evaluate and improve interviewing styles, and that there is promise for engaging in meta-communication, normalizing of problematic behaviors, and persistent questioning and following of openings in patients’ responses to yes/no questions. It is also essential that efforts are made to make these methods marketable to and useful for busy chronic pain medical treatment providers. Considerations of appropriate training in these techniques would be essential to effective use of the enhanced strategies. Additionally, given the extra time needed to employ the enhanced techniques, it may be useful to target the use of these techniques to patients who are high on at least one of the predictive variables identified in hypotheses 1 and 2.

Limitations

One limitation of this study was that it was based fully on self-report. Self-report can be biased because retrospective reporting is subject to a participant's ability to remember days of use or occurrence of symptoms, as well as potential motivations to actively withhold information (e.g., stigmatizing, guilt, worries about the consequences of sharing aberrant behaviors, etc.). Given the sensitive nature of the questions asked in this study, it is likely that many participants experienced some hesitance to share accurate information about aberrant prescription opioid use, use of alcohol or other drugs, and trauma histories. Additionally, almost all of the self-report was conducted via questionnaires, which can be limited by the participants' ability to understand and accurately respond to questions and rating scales. Thus, although efforts were made to improve the validity of participants' self-reports through ensuring confidentiality, anonymity, and the researchers' presence throughout the study to answer any questions the participants had, the accuracy of the information cannot be ensured. Also, at a very basic level, study participation was based on the self-report of the participant that he or she was a current client of the pain management clinic and had been prescribed an opioid for longer than 3 months. Unfortunately, given the need for anonymity, the researchers had to base their decision on whether the individuals qualified for the study on participants' self-report and the researchers' own judgment of whether or not the potential participant was being honest.

The current study was also limited by the study design which used a point prevalence model to examine the correlations between potentially risky personal characteristics and current problematic use at a single time point. The current study

design does not exclude the possibility that problematic prescription use has some influence on personality or emotional factors and thus rather than being predictive of future misuse, the identified characteristics may simply be a signal of current problematic use. For example, it could be that current prescription misuse leads to more conflict over emotional expression rather than the reverse. Importantly, because this study was not longitudinal, interpretations of the results of this study are unable to answer the questions of whether or not an individual should or should not be prescribed opioid medications and who will abuse their medications. As a result, we were only able to identify variables that are likely descriptively useful in understanding people who might misuse prescriptions and to determine whether these factors (e.g., emotional ambivalence, personality factors) actually lead to increased misuse, a prospective study must be conducted.

Another major limitation of this study was that participants self-selected to participate. Recruiters actively tried to engage with any patient who entered the waiting room during recruitment periods and brochures were available to all patients, there may still be unique factors about those participants who were willing to participate in a study about substance use, trauma, and prescription use. It may be that the individuals who self-selected into the study were more comfortable sharing aberrant prescription use and/or substance use. It may also be that participants who had even more misuse of their prescriptions or more substance use chose not to participate because of fears over the potential consequences despite the guaranteed anonymity. Further, it may be a healthier sample that self-selected into the study, because participants with more severe pain conditions may have felt incapable of sitting in a study session for up to 2

hours. Given that medical record reviews were not conducted on the full clinic population, it is unclear how this self-selected sample might compare to the entire chronic pain management clinic.

This study was also limited by the inability to consult with the participants' treatment providers or use medical records. Unfortunately, because of the IRB issues related to maintaining the anonymity of the participants, we were unable to collect participant names to be able to match up doctors' ratings or access medical records. Having access to the medical records would have allowed verification of self-reported aberrant behaviors such as requesting another prescription before the previous one should have ended, requesting frequent dose increases, requesting shorter acting or more commonly abused opioid medications, etc. Having access to the medical records also would have allowed for exploration of the physicians' recorded concerns about patients' potential for aberrant behavior.

Finally, the results of this study likely only generalize to patients receiving long-term opioid prescriptions for chronic pain who are being treated in an urban, low-income pain management clinic. Additionally, the majority of the participants were African-American which likely contrasts from ethnic make-up of many chronic pain management clinics. It is unclear based on this single study whether the results would be consistent in a primary care treatment center, in clinics treating patients primarily of other ethnicities, or in clinics treating non-urban or middle to higher income patients. Also, given that the identification of emotional ambivalence is a novel finding, replication of this study is warranted to ensure the finding was not erroneous or sample specific.

Future Directions

Future studies should employ longer-term tracking of chronic pain patients to improve our understanding of who develops problems with aberrant prescription opioid use, symptoms related to prescription opioid use, or concurrent use of alcohol and other substances. Given the point in time strategy design of the current study, the direction of the relationships between those variables termed for study purposes as predictors and those termed as outcomes are unknown. A point in time strategy is often used in early research on a topic, but the next step is to evaluate and track the identified personal characteristics that may signal potential problematic future use beginning at the initiation of long-term opioid treatment.

The focus of most of the research in this area has examined either individuals who were receiving care through pain management clinics or those seeking treatment in an opioid management setting (e.g., methadone clinic); however, the rate of prescription misuse in individuals receiving pain medication through primary care is even less understood. Given the lower degree of monitoring due to time constraints and limited experience and training with a chronic pain population, there may be increased risk of aberrant medication related behavior in a primary care setting. It is additionally important to consider the use of opioid medications in a primary care setting as patients receiving treatment through primary care likely constitutes a large proportion of prescriptions for opioid treatment.

Future studies should also evaluate physicians' ratings of how likely they believe their patients are to be misusing their prescription medication, meeting criteria for abuse or dependence on their prescription opioid, and using alcohol and illicit substances

along with their prescription opioid would add substantially to the understanding of how decisions about patients are made in actual practice. Current practice guidelines suggest that a thorough evaluation of risk for aberrant prescription opioid use is conducted at the beginning of all patients' treatment programs (Chou, Ballantyne, Fanciullo, Fine, & Miaskowski, 2009a; Chou et al., 2009b), but given the weak evidence cited in those guidelines for any particular characteristics that define risk, it would be useful to understand how risk assessment is currently being practiced. This would allow a baseline for understanding how accurate doctors are in making decisions about who is at risk of future problematic prescription use and/or who is currently engaging in problematic use behaviors. Further, understanding where potential gaps between research evidence for risk factors and providers' knowledge could help inform needs for further dissemination of findings to physicians treating chronic pain patients with long-term opioid treatment.

Future studies should evaluate both self-report methodologies and biological markers of alcohol and drug levels. Employing both self-report and biological markers would allow a reference point for accuracy in self-reported use. Although this would strengthen the faith in the outcome measures to the predictive models, this would be especially important for improving our understanding of which methodological assessment groups produced the most accurate reports of use. In the current study, the possibility that participants in the enhanced group were exaggerating their use rather than being more comfortable sharing prescription abuse and dependence symptoms, although unlikely, is left open.

The results of this study suggest that emotional styles contribute uniquely to the prediction of prescription opioid use related problems as well as increased days of alcohol use. In particular, these findings warrant further examination of emotional ambivalence and alexithymia to determine whether the findings in this study can be replicated. The findings of this study also suggest that it is internal conflict rather than actual actions related to emotional expression that can be predictive of prescription misuse and use of alcohol while taking prescription medication. Therefore, it may be useful to further explore whether conflict over addressing problems in relationships and/or the internal experience of active attempts to avoid experiences which may elicit a need to decide whether to express oneself. The ultimate goal of identifying risk factors is to integrate assessment of those risks into clinical practice. It is imperative to develop methods that can quickly and routinely assess these emotional risk factors. Given that observational and interview techniques are the predominant method of data collection in a clinic setting, it will be essential to develop similar means for assessing emotional styles.

Most importantly, further research and development must be done on the techniques that can be employed to prevent the development of problematic prescription opioid use in chronic pain populations after identifying patients who are at-risk for problematic use. There are four main areas of intervention that have been identified recently in the literature: a) monitoring through random drug screens and continued evaluation with the treatment provider for signs of aberrant use (Bailey, Hurley, & Gold, 2010; Chou et al., 2009a; Jamison et al., 2010; Markowitz, Francis, & Gonzales-Nolas, 2010; Webster & Fine, 2010); b) medication based changes (e.g.,

changing the pharmaceutical makeup of the medication to make it tamper proof, providing only long-acting opioids to clients who are identified as higher risk, providing only scheduled dosing of medications with no “as needed” dosing; Bailey, Hurley, & Gold, 2010; Walwyn, Miotto, & Evans, 2010; Webster & Fine, 2010); c) contracting for appropriate medication use (Bailey, Hurley, & Gold, 2010; Markowitz, Francis, & Gonzales-Nolas, 2010); and d) psychological interventions, including psycho-educational and cognitive-behavioral techniques focused on the interaction of pain and addiction (Jamison et al., 2010). These forms of intervention are relatively new and not well studied in this population. In fact, as mentioned previously, the current practice guidelines suggest that although it is extremely important to monitor, track, and intervene with patients who are at-risk or actively engaging in aberrant use, a clear understanding of what “at-risk” is and how effective these intervention techniques are at preventing aberrant medication behavior is lacking. Additionally, given the identification of emotional ambivalence as an identified risk factor in the chronic pain population, further efforts should be made to develop and integrate emotionally-focused treatment approaches into the psychological interventions.

Summary

This study at the most basic level provided another sampling of the rate of problematic prescription opioid use in chronic pain patients. Previous rates of problematic prescription use have ranged from 0 to 50% (Hojsted & Sjogren, 2006). The wide ranges of previously reported rates are based on both inconsistent definitions of problematic prescription use as well as variations in study methods. Given that the current study assessed problematic prescription use using two definitions (i.e.,

prescription misuse as measured by the Prescription Drug Use Questionnaire and number of symptoms of DSM-IV-TR abuse and dependence symptoms) and found that approximately a quarter to a half of participants were displaying some form of problematic prescription opioid use is likely a better estimate of the actual problematic use in a chronic pain population prescribed long-term opioids.

It is also significant that this study replicated the findings that past history of abuse of substances and/or family history of abuse of substances are predictive of prescription misuse (Turk et al., 2008). This finding provides stronger evidence that patients receiving opioid medications need to be screened for previous substance abuse and family substance use. In addition to reinforcing and replicating the role of personal and family history of substance use problems, this study sought to explore theoretical factors that may contribute to understanding and describing the development of prescription opioid dependence. To this end, this study provided new evidence for the role of emotional ambivalence as a risk factor for prescription misuse, prescription abuse and dependence symptoms, and alcohol use. Previous research has shown a relationship between emotional ambivalence and other deleterious outcomes such as poorer psychological health, poorer coping with pain, and increases in other negative physical symptoms (King & Emmons, 1990). Therefore, ambivalence over emotional expression likely plays an important role in both predicting problematic prescription use and predicting poorer treatment outcomes for chronic pain. This study also provided new evidence for the potential role of personality factors in identifying participants with problematic prescription opioid use; however, inconsistent findings suggest a need for further research in this area.

Awareness of risk factors for prescription misuse can inform clinical practice by those medical providers involved in the treatment of a patient with a chronic pain condition. Specifically, early assessment of risk could help to identify patients who should be more closely monitored and/or provided an intervention focused on preventing problematic prescription use and use of alcohol and other drugs. Cost and time limitations make it unlikely that intensive monitoring and intervention efforts could be provided to all patients, thus honing in on the most risky personal characteristics is imperative in providing these services. There is a clear need to continue to improve our understanding of the risk factors that need to be monitored in patients receiving long-term opioid treatment for chronic pain, as well as improvement of clinical assessment methods to gain accurate reports of problematic prescription use and use of alcohol and other substances. There is also an evident need based on findings from the current study to continue to focus efforts on understanding the role of personality factors and emotional ambivalence in the development of problematic prescription opioid use in chronic pain patients. Finally, there is also evidence that further development in assessment methods, focused on understanding the role of meta-communication, normalizing of problematic behaviors, and probing unclear responses, could lead to better identification of patients already engaging in problematic prescription related behaviors. Further understanding of role of these techniques, as well as dissemination of these techniques to frontline treatment providers is suggested.

Appendix A – Recruitment Brochure

Research Study: Chronic Pain, Emotions, and Prescription Use

Evaluating Prescription and Drug Use Patterns

Who is eligible?

We are seeking:

- Adults who are attending the University Pain Clinic for management of a chronic pain disorder, such as fibromyalgia, myofascial pain, irritable bowel syndrome, low back pain, chronic pelvic pain, headaches, bladder pain, or other pain problems.
- We are looking for participants who have been taking opioid medications such as Vicodin, Tylenol 3's or 4's, or other pain killers for at least 3 months.

*H*ow the study works

The study calls for a single session evaluation of your pain, physical health, and psychological functioning. The evaluation can be completed at convenient locations on the Wayne State campus or at the Detroit Medical Center.

Participation in the single session will take approximately 1 ½ hours of your time.

The evaluation will include questionnaires and possibly an interview. You will be asked about your pain, health, stress, and your pattern of prescription use.

How do I participate?

You can find out more information about this study by contacting Lindsay Oberleitner at 313-577-2773. She can provide you with more information about the study and set up a convenient time to meet you at the Wayne State campus or at the Detroit Medical Center.

*C*ompensation

We will pay you for your time. You will be paid $30 immediately after completing the study visit.

Wayne State University

Investigator:

Mark A. Lumley, Ph.D.
Department of Psychology
Wayne State University

Todd Lininger, M.D.
University Pain Clinic

Research Personnel:

Lindsay Oberleitner
Kathryn Zumberg
Amy Loree

For more information about this study, please contact the research team:

(313) 577-2773

Or visit our website:

http://clas.wayne.edu/healthlab/

and click on the ***Current Studies*** link

Appendix B – Telephone Script

Telephone Script for Substance Abuse in Chronic Pain

Hello <*insert patient's name*>, my name is _____ and I'm calling from Wayne State University. I'm returning your call regarding interest in our chronic pain and medication use study. You said you were interested in learning more about a study that we are doing of chronic pain and medication use.

Do you mind if I ask you a few quick questions regarding your treatment? How long have you been prescribed a pain medication? What medication are you currently prescribed?
(*if they have been taking an opioid for 3mos continue with choice 1, if not follow to choice 2*)

1. We hope that you are open to meeting, learning more about the study, and possibly participating. May we set up your appointment now?
2. Thank you for your interest in our study. Unfortunately you do not meet the requirements for our study as you need to have been taking an opioid pain medication for at least 3 months. If you are still interested in <*insert time until they reach 3 months*> please give us a call and we would be happy to schedule a visit with you.

Can I tell you briefly about this project? If you are interested, we can set up an appointment to go over the details and the consent form.

This study is designed to evaluate medication use, alcohol and other substance use patterns in chronic pain patients and how a variety of factors such as severity of pain, coping with pain, ways of thinking, and ways of dealing with emotions.

If you participate, we would need to meet at the University Pain Clinic or the Simon's Building at Wayne State for about 1 ½ for an assessment of the various factors I just described to you. Most of these are questionnaires that you will complete, but we may also do an interview.

We are going to pay you for your time. We will give you $30 right when you finish the session.

Appendix C – Information Sheet

Research Information Sheet

Title of Study: Medication and Drug Use in Patients with Chronic Pain

Principal Investigator (PI): Mark A. Lumley, Ph.D.
Department of Psychology
Wayne State University
313-577-2773

Purpose

You are being asked to be in a research study of factors related to medication and substance use among people who have chronic pain. You are being asked to be in this study because you have a chronic pain condition and have been prescribed a medication for your pain for at least 3 months. This study is being conducted at Wayne State University and will enroll approximately 120 participants. **Please read this form and ask any questions you may have before agreeing to be in the study.**

In this research study, we are trying to understand patterns of prescription medication use in patients who are being treated for chronic pain. The goals of this research are to learn:

a) how frequently prescription medication is misused and other substances (for example, alcohol or marijuana) are used by people with chronic pain;
b) what characteristics of people are related to misusing medications or using substances;
c) how much people report when they complete questionnaires or are interviewed.

Study Procedures

If you agree to take part in this research study, you will be asked to complete a number of questionnaires about your pain, functioning, mood, personality, and feelings. You will then be asked either to talk with an interviewer or to complete questionnaires about possible traumatic and experiences that you may have had, your use of alcohol and other substances, and your use of your prescription medication. Which format (questionnaires or interview) you have will be determined randomly (like by a flip of a coin); you have a 2 in 3 chance of being interviewed, and a 1 in 3 chance of completing the questionnaires. Finally, you will be asked to demonstrate how you might communicate different feelings to someone, such as being assertive, or telling someone that you care. This communication exercise will be audiotaped. The entire session will take about 1 ½ hours.

Benefits

As a participant in this research study, there may be no direct benefit for you; however, information from this study may benefit other people now or in the future.

Risks

By taking part in this study, you may experience the following risks: sharing personal information about your prescription drug use, other substance use, and/or history of trauma may be briefly upsetting or uncomfortable. In addition, you risk the loss of confidentiality under any of the following conditions: If you are thought to be at risk for self-harm or harming another, then this information may be released. If at any time during the study there is a concern that child abuse or elder abuse has possibly occurred, then this information must be released to the appropriate authorities. If at any time during the study there is a disclosure of illegal criminal activities, illegal substance abuse, or violence, this information may be released to the appropriate authorities. If at any time during the study it is discovered that you have a reportable communicable disease (certain sexually transmitted diseases and/or HIV), then this information must be released to the public health department. There may also be risks involved from taking part in this study that are not known to researchers at this time.

Study Costs and Compensation

Participation in this study will be of no cost to you. For taking part in this research study, you will be paid for your time and inconvenience. You will receive $30 for completing the single session. Payment will be received in the form of cash immediately following completion of your study session.

Confidentiality

You will be identified in the research records by a code name or number. There will be no list that links your identity with this code.

Voluntary Participation /Withdrawal

Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with Wayne State University or its affiliates or other services you are entitled to receive.

Questions

If you have any questions about this study now or in the future, you may contact Mark Lumley, Ph.D. or one of his research team members at the following phone number, (313) 577-2773. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

Participation:
By completing the questionnaires, possible interview, and communication exercise you are agreeing to participate in this study.

Appendix D – Session Scripts

Script for Standard Interview

At the start of predictor portion

I am going to have you start by filling out some questionnaires about your family history, your personality, and your typical way of dealing with emotions.(FLIP THROUGH THE PACKET) As you can see, the scale will change as you go from scale to scale so please look carefully at the instructions at the top of each page. If there are any items that you have questions about, please feel free to ask me at any point or put a mark near it so that you can ask me about it later. Do you have any questions?

At the start of randomized portion

First introduce the task:

Now I am going to go through a variety of questions about difficult experiences you may have had, substance use and prescription use with you with you. We know that remembering when a symptom started and how regularly it occurred can be difficult to remember, so please just try your best to give the most accurate response you can.

Meta-Communication Script for "Enhanced Group"

At the start of predictor portion

I am going to have you start by filling out some questionnaires about your family history, your personality, and your typical way of dealing with emotions.(FLIP THROUGH THE PACKET) As you can see, the scale will change as you go from scale to scale so please look carefully at the instructions at the top of each page. If there are any items that you have questions about, please feel free to ask me at any point or put a mark near it so that you can ask me about it later. Do you have any questions?

General Approach Throughout Facilitated Portion:

- Focus on being "warm" toward the participant
- Make a conscious effort to not show shock or surprise at participant's responses
- Have a good knowledge of substances, quantities, methods of use so that the participant feels like you are knowledgeable and interested
- Use their first name and make sure they are comfortable and relaxed (make sure you appear comfortable and relaxed also by body language and voice)

At the start of randomized portion

First introduce the task:

We are going to go through a variety of questions difficult experiences you may have had, substance use and prescription use with you. We know that remembering when a symptom started and how regularly it occurred can be difficult to remember, so please just try your best to give the most accurate response you can.

Meta-communicate about comfort sharing

I know that many of these questions can be difficult to share and they might be questions that you are not normally comfortable sharing with other people in your life.

It is normal to feel somewhat uncomfortable sharing information about really difficult experiences in your life or about your use of alcohol, other substances, or about misusing your prescription medication.

How are you feeling about sharing with me today?

What are your concerns about sharing with me today?

Discuss confidentiality in detail

Do you have any concerns about confidentiality that you would like to discuss?

I know that your prescription use and substance use might be an especially sensitive topic because of concerns that other people, especially your doctor or the staff at the pain clinic might find out about your response. I wanted to let you know again that I will not be sharing any of this information with other people at the clinic or anyone else.

Normalize the experience of some of the symptoms

I also want you to know that many people have experienced some of these symptom

Discuss the importance of honest answers
I also want you to know how important accurate answers are for this project. Your answers will help us with determining who is most likely to be experiencing problems in the treatment of their chronic pain. It may also help us to understand

At the beginning of the prescription drug portion
We are about to start the portion of the interview dealing with your use of your prescription pain medication. I want you to know again that this information is confidential and also that many people have used their prescriptions in ways other than how they are prescribed, and that many people might also notice that they are having some problems or consequences from their use.

Appendix E- HIC Approval

WAYNE STATE UNIVERSITY

HUMAN INVESTIGATION COMMITTEE
101 East Alexandrine Building
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
http://hic.wayne.edu

FILE

NOTICE OF EXPEDITED APPROVAL

To: Mark Lumley
Psychology
Department of Psychology

From: Ellen Barton, Ph.D. E. Barton /G
Chairperson, Behavioral Institutional Review Board (B3)

Date: September 05, 2009

RE: HIC #: 084009B3E
Protocol Title: Medication and Drug Use in Patients with Chronic Pain
Sponsor: ° Psychology
Protocol #: 0908007411

Expiration Date: September 04, 2010

Risk Level / Category: Research not involving greater than minimal risk

---

The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review* (Category 10*) by the Chairperson/designee *for* the Wayne State University Behavioral Institutional Review Board (B3) for the period of 09/05/2009 through 09/04/2010. This approval does not replace any departmental or other approvals that may be required.

- Brochure
- Information Sheet (dated 8/18/09)

° Federal regulations require that all research be reviewed at least annually. You *may* receive a *"Continuation Renewal Reminder"* approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval ***before*** the expiration date. Data collected during a period of lapsed approval is unapproved research and can ***never*** be reported or published as research data.

° All changes or amendments to the above-referenced protocol require review and approval by the HIC **BEFORE** implementation.

° Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the HIC Policy (http://www.hic.wayne.edu/hicpol.html).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the HIC office must be contacted immediately.
2. Forms should be downloaded from the HIC website at ***each*** use.

*Based on the Expedited Review List, revised November 1998

REFERENCES

Aase, D. M., Jason, L. A., & Robinson, W. L. (2008). 12-step participation among dually-diagnosed individuals: A review of individual and contextual factors. *Clinical Psychology Review, 28(7)*, 1235-1248.

Adams, L. L., Gatchel, R. J., Robinson, R. C., Polatin, P., Gajraj, N., Deschner, M., & Noe, C. (2004). Development of an instrument for assessing potential opioid medication misuse in chronic pain patients. *Journal of Pain and Symptom Management, 27(5)*, 440-459.

Agrawal, A., Jacobson, K. C., Prescott, C. A., & Kendler, K. S. (2004). A twin study of personality and illicit drug use and abuse/dependence. *Twin Research, 7(1),* 72-81.

Ak, I., Sayer, K., & Yontem, T. (2004). Alexithymia, somatosensory amplification and counter-dependency in patients with chronic pain. *The Pain Clinic, 16(1),* 43-51.

Akbik, H., Butler, S. F., Budman, S. H., Fernandez, K., Katz, N. P., & Jamison, R. N. (2006). Validation and clinical application of the Screener for Opioid Assessment for Patients with Pain (SOAPP). *Journal of Pain and Symptom Management, 32(3)*, 287-293.

American Academy of Pain Medicine, American Pain Society & American Society of Addiction Medicine. (2001). Definitions related to the use of opioids for the treatment of pain. Consensus Statement

Andrews, P. W., Kendler, K. S., Gillespie, N. & Neale, M. C. (2007). The sensitivity of variance component estimates to underreporting: Method and application to substance abuse data. *Twin Research & Human Genetics, 10(5),* 721-728.

Armeli, S., Dehart, T., Tennen, H., Todd, M., & Affleck, G. (2007). Daily interpersonal stress and the stress-vulnerability model of alcohol use. *Journal of Social and Clinical Psychology, 26*, 896-921.

Austenfeld, J. L. & Stanton, A. L. (2004). Coping through emotional approach: A new look at emotion, coping, and health-related outcome. Journal of Personality, 72(6), 1335-1364.

Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale-I: Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research, 38(1),* 23-32.

Bagby, R. M., Taylor, G. J., & Parker, J. D. A. (1994). The twenty-item Toronto Alexithymia Scale-II: Convergent, discriminant, and concurrent validity. *Journal of Psychosomatic Research, 38(1),* 33-40.

Bailey, J. A., Hurley, R. W., & Gold, M. S. (2010). Crossroads of pain and addiction. *Pain Medicine, 11,* 1803-1818.

Ballantyne, J. C. & LaForge, K. S. (2007). Opioid dependence and addiction during opioid treatment of chronic pain. *Pain, 129,* 235-255.

Becker, W. C., Fiellin, D. A., & Desai, R. A. (2007). Non-medical use, abuse and dependence on sedatives and tranquilizers among U.S. adults: Psychiatric and socio-demographic correlates. *Drug and Alcohol Dependence, 90*, 280-287.

Becker, W. C., Sullivan, L. E., Tetrault, J. M., Desai, R. A., & Fiellin, D. A. (2008). Non-medical use, abuse and dependence on prescription opioids among U.S. adults: Psychiatric, medical and substance use correlates. *Drug and Alcohol Dependence, 94*, 38-47.

Birch, C. D., Stewart, S. H., Wiers, R. W., Klein, R. M., MacLean, A. D., & Berish, M. J. (2008). The mood-induced activation of implicit alcohol cognition in enhancement and coping motivated drinkers. *Addictive Behaviors, 33*, 565-581.

Blanco, C., Alderson, D., Ogburn, E., Grant, B. F., Nunes, E. V., Hatzenbuehler, M. L., & Hasin, D. S. (2007). Changes in the prevalence of non-medical prescription drug use and drug use disorders in the United States: 1991–1992 and 2001–2002. *Drug and Alcohol Dependence, 90*, 252-260.

Booth-Kewley, S., Larson, S. E., & Miyoshi, D. K. (2007). Social desirability effects on computerized and paper-and-pencil questionnaires. *Computers in Human Behavior, 23(1),* 463-477.

Brennan, P. L., Schutte, K. K., & Moos, R. H. (2005). Pain and use of alcohol to manage pain: prevalence and 3-year outcomes among older problem and non-problem drinkers. *Addiction, 100*, 777-786.

Brooner, R. K. (2008). Advances in treating chronic nonmalignant pain and substance use disorders. *The Canadian Journal of Psychiatry, 53(8),* 485-486.

Brown, S. A., Christiansen, B. A., & Goldman, M. S. (1987). The Alcohol Expectancy Questionnaire: An instrument for the assessment of adolescent and adult alcohol expectancies. *Journal of Studies on Alcohol, 48(5),* 483-491.

Brown, R. L., Patterson, J. J., Rounds, L. A., & Papasouliotis, O (1996). Substance abuse among patients with chronic back pain. *Journal of Family Practice, 43(2)*, 152-159.

Burba, B., Oswald, R., Grigaliunien, V., Neverauskiene, S., Jankuviene, O., & Chue, P. (2006). A controlled study of Alexithymia in adolescent patients with persistent somatoform pain disorder. *The Canadian Journal of Psychiatry, 51(7),* 468-471.

Butler, S. F., Budman, S. H., Fernandez, K. C., & Jamison, R. N. (2004). Validation of a screener and opioid assessment measure for patients with chronic pain*. Pain, 112,* 65-75.

Butler, S. F., Fernandez, K. C., Benoit, C., Budman, S. H., & Jamison, R. N. (2008). Validation of the Revised Screener and Opioid Assessment for Patients with Pain (SOAPP-R). *The Journal of Pain, 9(4),* 360-372.

Carson, J. W., Keefe, F. J., Lowry, K. P., Porter, L. S., Goli, V., & Fras, A. M. (2007). Conflict about expressing emotions and chronic low back pain: Associations with pain and anger. *The Journal of Pain, 8(5),* 405-411.

Cassin, S. E. & von Ranson, K. M. (2005). Personality and eating disorders: A decade in review. *Clinical Psychology Review, 25(7),* 895-916.

Celikel, F. C. & Saatcioglu, O. (2006). Alexithymia and anxiety in female chronic pain patients. *Annals of General Psychiatry, 5,* 13-18.

Chabal, C., Erjavec, M. K., Jacobsen, L., Mariano, A., & Chaney, E. (1997). Prescription opiate abuse in chronic pain patients: Clinical criteria, incidence, and predictors. *The Clinical Journal of Pain, 13(2),* 150-155.

Chaffin, M., Kelleher, K., & Hollenberg, J. (1996). Onset of physical abuse and neglect: Psychiatric, substance abuse, and social risk factors from prospective community data. *Child Abuse & Neglect, 20(3),* 191-203.

Chou, R., Ballantyne, J. C., Fanciullo, G. J., Fine, P. G., & Miaskowski, C. (2009a). Research gaps on use of opioids for chronic noncancer pain: Findings from a review of the evidence for an American Pain Society and American Academy of Pain Medicine clinical practice guideline. *The Journal of Pain, 10(2),* 147-159.

Chou, R., Fanciullo, G. J., Fine, P. G., Adler, J. A., Ballantyne, J. C., Davies, P., Donovan, M. I., Fishbain, D. A., Foley, K. M., Fudin, J., Gilson, A. M., Kelter, A., Mauskop, A., O'Connor, P. G., Passik, S. D., Pasternak, G. W., Portenoy, R. K., Rich, B. A., Roberts, R. G., Todd, K. H., Miaskowski, C.: American Pain Society-American Academy of Pain Medicine Opioids Guidelines Panel (2009b).Clinical guidelines for the use of chronic opioid therapy in chronic noncancer pain. *Journal of Pain, 10,* 113-130.

Cohen, M. J. M., Jasser, S., Herron, P. D., & Margolis, C. G. (2002). Ethical perspectives: Opioid treatment of chronic pain in the context of addiction. *The Clinical Journal of Pain, 18(4),* 99-107.

Compton, W. M. & Volkow, N. D. (2006). Abuse of prescription drugs and the risk of addiction. *Drug and Alcohol Dependence, 81(2),* 103-107.

Compton, W. M. & Volkow, N. D. (2006). Major increases in opioid analgesic abuse in the United States: Concerns and strategies. *Drug and Alcohol Dependence, 83(1),* 4-7.

Compton, P. A., Wu, S. M., Schieffer, B., Pham, Q., & Naliboff, B. D. (2008). Introduction of a self-report version of the Prescription Drug Use Questionnaire and relationship to medication agreement noncompliance. Journal *of Pain and Symptom Management, 36(4),* 383-395.

Compton, P. A., Darakjian, J., & Miotto, K. (1998). Screening for addiction in patients with chronic pain and “problematic” substance use evaluation of a pilot assessment tool. *Journal of Pain and Symptom Management, 16(6),* 355-363.

Conoley, J. C. & Kramer, J. J. (1989). The tenth mental measurements yearbook. University of Nebraska Press: Nebraska.

Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology, 69(5),* 990-1005.

Cooper, L., Russell, M., Skinner, J. B., Frone, M. R., & Mudar, P. (1992). Stress and Alcohol Use: Moderating Effects of Gender, Coping, and Alcohol Expectancies. *Journal of Abnormal Psychology, 101(1),* 139-152.

Cowan, D. T., Wilson-Barnett, J., Griffiths, P., & Allen, L. G. (2003). A survey of chronic noncancer pain patients prescribed opioid analgesics. *Pain Medicine, 4(4),* 340-351.

Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the Impact of Event Scale– Revised. *Behaviour Research and Therapy, 41,* 1489-1496.

Cutrona, C. E. & Russell, D. W. (1987). The provisions of social relationships and adaptation to stress. In W. H. Jones and D. Perlman (Eds.). *Advances in personal relationships,* (Vol. 1, 37-68). Greenwich, CT.: JAI Press.

Daut, R. L., Cleeland, C. S., & Flanery, R. C., (1983). Development of the Wisconsin Brief Pain Inventory to assess pain in cancer and other diseases. *Pain, 17(2),* 197-210.

DeGenova, M. K., Patton, D. M., Jurich, J. A., & Macermid, S. M. (1994). Ways of coming among HIV-infected individuals. *The Journal of Social Psychology, 134(5),* 655-663.

Dellemijn, P. L. I. (2001). Opioids in chronic non-cancer pain: A lifetime sentence? *European Journal of Pain, 5(3),* 333-339.

Denov, M. S. (2003). To a safer place? Victims of sexual abuse by females and their disclosures to professionals. *Child Abuse & Neglect, 27(1),* 47-61.

Derogotis, L. R. (1975). The SCL-90-R. Baltimore, MD: Clinical Psychometric Research.

Derogotis, L. (1993). The Brief Symptom Inventory: Administration, scoring and procedures manual (3rd ed.). Minneapolis, MN: National Computer Systems Inc.

Derogatis, L. R., Rickels, K., & Rock, A. F. (1976). The SCL-90-R and the MMPI: A step in the validation of a new self-report scale. *British Journal of Psychiatry, 128*, 280-289.

Dowling, K., Storr, C. L., & Chilcoat, H. D. (2006). Potential influences on initiation and persistence of extramedical prescription pain reliever use in the US population. *Clinical Journal of Pain, 22(9)*, 776-783.

Edlund, M. J., Sullivan, M., Steffick, D., Harris, K. M., & Wells, K. B. (2007). Do users of regularly prescribed opioids have higher rates of substance abuse problems than nonusers? *Pain Medicine, 8(8),* 647-656.

Eriksen, J., Sjøgren, P., Bruera, E., Ekholm, O., & Rasmussen, N. K. (2006). Critical issues on opioids in chronic non-cancer pain: An epidemiological study. *Pain, 125*, 172-179.

Erikson, C. K. (2008). In defense of “dependence.” *Alcoholism: Clinical and Experimental Research, 32(1),* 1-3.

Fendrich, M., Wislar, J.S., and Johnson, T.P. (2003). The utility of debriefing questions in a household survey on drug abuse. Journal of Drug Issues, 33(2), 267-284.

Fink, A. B., J. C. (2005). The problem drinking pain paradox. *Addiction, 100*, 731-732.

Finestone, H. M., Stenn, P., Davies, F., Stalker, C., Fry, R., & Koumanis, J. (2000). Chronic pain and health utilization in women with a history of childhood sexual abuse. *Child Abuse & Neglect, 24(4),* 547-556.

First, M. B., Spitzer, R. L, Gibbon, M., & Williams, J. B. W. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition. (SCID-I/P) New York: Biometrics Research, New York State Psychiatric Institute, November 2002.

Fleming, M. F., Balousek, S. L., Klessig, C. L., Mundt, M. P., & Brown, D. D. (2007). Substance use disorders in a primary care sample receiving daily opioid therapy. *The Journal of Pain, 8(7),* 573-82.

Gatchel, R. J., Peng, Y. B., Peters, M. L., Fuchs, P. N., & Turk, D. C. (2007). The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychological Bulletin, 133(4),* 581-624.

Golub, A., Liberty, H. J., & Johnson, B. D. (2005). The variation in arrestees’ disclosure of recent drug use across locations, drugs and demographic characteristics. *Journal of Drug Issues, 35,* 917–940.

Gorman, D. M., Derzon, J. H. (2002). Behavioral traits and marijuana use and abuse: a meta-analysis of longitudinal studies. *Addictive Behaviors,* 2002, *27(2)***,** 193-206.

Gourlay, D. L., Het, H. A., & Almahrezi, A. (2005). Universal precautions in pain medicine: A rational approach to the treatment of chronic pain. *Pain Medicine, 6(2),* 107-112.

Green C. R., Flowe-Valencia, H., Rosenblum, L., & Tait, A. R. (2001). The role of childhood and adulthood abuse among women presenting for chronic pain management. *Clinical Journal of Pain, 17,* 359-364.

Grekin, E. R., Svikis, D. S., Lam, P., Connors, V., LeBreton, J. M., Streiner, D. L., Smith, C., & Ondersma, S. (2010). Drug use during pregnancy: Validating the Drug Abuse Screening Test against physiological measures. *Psychology of Addictive Behaviors, 24(4),* 719-723.

Grekin, E. R., Sher, K. J., & Wood, P. K. (2006). Personality and substance dependence symptoms: Modeling substance-specific traits. *Psychology of Addictive Behaviors, 20(4),* 415-424.

Handelsman, L., Stein, J. A., Bernstein, D. P., Oppenheim, S. E., Rosenblum, A., & Magura, S. (2000). A latent variable analysis of coexisting emotional deficits in substance abusers: Alexithymia, hostility, and PTSD. *Addictive Behaviors, 25(3),* 423-428.

Heath, A. C., Bucholz, F. F., Madden, P. A. F., Dinwiddie, S. H., Slutske, W. S., Bierut, L. J., Statham, D. J., Dunne, M. P., Whitfield, J. B., & Martin, N. G. (1997). Genetic and environmental contributions to alcohol dependence risk in a national twin sample: Consistency of findings in men and women. *Psychological Medicine, 27,* 1381-1396.

Hoffmann, N. G., Olofsson, O., Salen, B., & Wickstrom, L. (1995). Prevalence of abuse and dependency in chronic pain patients. *International Journal of the Addictions, 30,* 919-927.

Hojsted, J. & Sjogren, P. (2006). Addiction to opioids in chronic pain patients: A literature review. *European Journal of Pain, 11*, 490-518.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). The Impact of Events Scale: A measure of subjective stress. *Psychosomatic Medicine, 41(3),* 209-218.

Hser, Y., Hoffman, V., Grella, C. E., & Anglin, M. D., (2001). A 33-year follow-up on narcotics addicts. *Archives of General Psychiatry, 58,* 503-508.

Ives, T.J., Chelminski, P. R., Hammett-Stabler, C. A., Malone, R. M., Perhac, J. S., Potisek, N. M., Shilliday, B. B., DeWalt, D. A., & Pignone, M. P. Predictors of opioid misuse in patients with chronic pain: a prospective cohort study. *BMC Health Services Research, 6,* 46.

Jacobsen, L. & Mariano, A. General considerations of chronic pain. In: J.D. Loeser, S.H. Butler and S.R. Chapman, Editors, *Bonica's management of pain* (3rd ed.), Lippincott Williams & Wilkins, Baltimore, MD (2001), pp. 241–254.

Jaffe, A. J. & Kilbey, M. M., (1994). The Cocaine Expectancies Questionnaire (CEQ): Construction and predictive utility. Psychological Assessment, 6(1), 18-26.

Jamison, R. N., Ross, E. L., Michna, E., Chen, L. Q., Holcomb, C., & Wasan, A. D. (2010). Substance misuse treatment for high risk chronic pain patients on opioid therapy: A randomized trial. *Pain, 150,* 390-400.

Jensen, M. K., Thomsen, A. B., & Hojsted, J. (2005). 10-year follow-up of chronic non-malignant pain patients: Opioid use, health related quality of life, and health care utilization. *European Journal of Pain, 10(5),* 423-433.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). The Big Five Inventory-Versions 4a and 54. Berkeley: University of California, Berkeley, Institute of Personality and Social Research.

Joinson, A. N., Woodley, A., & Reips, U. D. (2007). Personalization, authentication, and self-disclosure in self-administered internet surveys. *Computers in Human Behavior, 23(1),* 275-285.

Kanner, R. M. & Foley, K. M. (1981). Patterns of narcotic drug use in a cancer pain clinic. *Annals of the New York Academy of Sciences, 362,* 161-172.

Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harvard Review of Psychiatry, 4(5),* 231-244.

King, L. A. & Emmons, R. A. (1990). Conflict over emotional expression: psychological and physical correlates. *Journal of Personality and Social Psychology, 58(5),* 864-877.

Lake, A. E. (2008). Screening and behavioral management: Medication overuse headache- The complex case. *Headache, 48,* 26-31.

Larson, M. J., Paasche-Orlow, M., Cheng, D. M., Lloyd-Travaglini, C., Saitz, R., & Samet, J. H. (2007). Persistent pain is associated with substance use after detoxification: a prospective cohort analysis. *Addiction, 102*, 752-760.

Laurenceau, J. P., Barrett, L. F., & Pietromonaco, P. R. (1998). Intimacy as and interpersonal process: The importance of self-disclosure, partner disclosure, and perceived partner responsiveness in interpersonal exchanges. *Journal of Personality and Social Psychology, 74(5),* 1238-1251.

Leibowitz, R. Q., Jeffreys, M. D., Copeland, L. A., & Noel, P. H. (2008). Veterans' disclosure of trauma to healthcare providers. *General Hospital Psychiatry, 30,* 100-103.

Leitenberg, H., Greenwald, E., & Cado, S. (1992). A retrospective study of long-term methods of coping with having been sexually abused during childhood. *Child Abuse & Neglect, 16(3),* 399-407.

Logan, T. K., Walker, R., Cole, J., & Leukefeld, C. (2002) Victimization and Substance Abuse Among Women: Contributing Factors, Interventions, and Implications, *Review of General Psychology, 6(4)*, 325-397.

Lu, Q., Uysal, A., & Teo, I. (2011). Need satisfaction and catastrophizing: Explaining the relationship among emotional ambivalence, pain, and depressive symptoms. *Journal of Health Psychology*, early release online only.

Lumley, M. A., Neely, L. C., & Burger, A. J. (2007). The assessment of Alexithymia in medical settings: Implications for understanding and treating health problems. *Journal of Personality Assessment. Special Issue: Personality Assessment in Medical Settings, 89(3),* 230-246.

Maddux, J. F. & Desmond, D. P. (1992). Ten-year follow-up after admission to methadone maintenance. *American Journal of Drug and Alcohol Abuse*, 18(3), 289-303.

Maker, A. H., Kemmelmeier, M., & Peterson, C. (1998). Long-term psychological consequences in women of witnessing parental physical conflict and experiencing abuse in childhood. *Journal of Interpersonal Violence, 13(5),* 574-589.

Markowitz, J. D., Francis, E. M., & Gonzales-Nolas, C. (2010). Managing acute and chronic pain in a substance abuse treatment program for the addicted individual in early recovery: A current controversy. *Journal of Psychoactive Drugs, 42(2),* 193-198.

Marmorstein, N. R., Iacono, W. G., & Malone, S. M. (2010). Longitudinal associations between depression and substance dependence from adolescence through early adulthood. *Drug and Alcohol Dependence, 107(2-3),* 154-160.

Martell, B. A., O'Connor, P. G., Kerns, R. D., Becker, W. C., Morales, K. H., Kosten, T. R., & Fiellin, D. A. (2007). Systematic review: Opioid treatment for chronic back pain: Prevalence, efficacy, and association with addiction. *Annals of Internal Medicine, 146,* 116-127.

McCabe, S. E., Boyd, C. J., & Teter, C. J. (2009). Subtypes of nonmedical prescription drug misuse. *Drug and Alcohol Dependence, 102(1-3),* 63-70.

McCabe, S. E., Teter, C. J., Boyd, C. J., Knight, J. R., & Wechsler, H. (2005). Nonmedical use of prescription opioids among U.S. college students: Prevalence and correlates from a national survey. *Addictive Behaviors, 30,* 789-805.

McCracken, L. M., Vowles, K. E., & Eccleston, C. (2004). Acceptance of chronic pain: Component analysis and a revised assessment method. *Pain, 107(1-2),* 159-166.

McCracken, L. M., Zayfert, C., & Gross, R. T. (1992). The Pain Anxiety Symptoms Scale: Development and validation of a scale to measure fear of pain. *Pain, 50(1),* 67-73.

McHugo, G. J., Caspi, Y., Kammerer, N., Mazelis, R., Jackson, E. W., Russell, L. et al. (2005). The assessment of trauma history in women with co-occurring substance abuse and mental disorders and a history of interpersonal violence. *Journal of Behavioral Health Services & Research, 32,* 113-127.

McWilliams, L. A. & Asmundson, G. J.G. (1998). Factor structure and validity of a revised pain anxiety symptom scale. *International Journal of Rehabilitation & Health, 4(2),* 95-109.

McWilliams, L. A., Clara, I. P., Murphy, P. D. J., Cox, B. J., & Sareen, J. (2008). Associations between arthritis and a broad range of psychiatric disorders: Findings from a nationally representative sample. *The Journal of Pain, 9(1),* 37-44.

Michna, E., Ross, E. L., Hynes, WL, Nedeljkovic, SS, Soumekh, S., Janfaza, D., Palombi, D., & Jamison, R. N. (2004). Predicting Aberrant Drug Behavior in Patients Treated for Chronic Pain: Importance of Abuse History. *Journal of Pain and Symptom Management, 28(3)*, 250-258.

Morasco, B. J. & Dobscha, S. K. (2008). Prescription medication misuse and substance use disorder in VA primary care patients with chronic pain. *General Hospital Psychiatry, 30(2),* 93-99.

Mueller, J., Moergeli, H., & Maercker, A. (2008). Disclosure and social acknowledgement as predictors of recovery from posttraumatic stress: A

longitudinal study in crime victims. *The Canadian Journal of Psychiatry, 53(3),* 160-168.

Murphy, J. M., Jellinek, M., Quinn, D., Smith, G., Poitrast, F. G., & Goshko, M. (1991). Substance abuse and serious child maltreatment: prevalence, risk, and outcome in a court sample. *Child Abuse & Neglect, 15(3),* 197-211.

Myers, M. G., Brown, S. A., & Mott, M. A. (1993). Coping as a predictor of adolescent substance abuse treatment outcome. *Journal of Substance Abuse, 5(1),* 15-29.

Nemiah, J. C., Freyberger, H., & Sifneos, P. E. (1976). Alexithymia: A view of the psychosomatic process. In O. W. Hill (Ed.), *Modern trends in psychosomatic research* (Vol. 3, pp. 430-439). London: Buttersworth.

Newman, J. C., Des Jerlais, D. C., Turner, C. F., Gribble, J., Cooley, P., & Paone, D. (2002). The differential effects of face-to-face and computer interview modes. *American Journal of Public Health, 92(2)*, 294-297.

Oetzel, J., Duran, B., Jiang, Y., & Lucero, J. (2007). Social support and social undermining as correlates for alcohol, drug, and mental disorders in American Indian women presenting for primary care at an Indian health service hospital. *Journal of Health Communication, 12(2),* 187-206.

Panchanadeswaran, S., El-Bassel, N., Gilbert, L., Wu, E., & Chang, M. (2008). An examination of the perceived social support levels of women in methadone maintenance treatment programs who experience various forms of intimate partner violence. *Women's Health Issues, 18(1),* 35-43.

Parrot, R., Duncan, V., & Duggan, A. (2000). *Promoting patients' full and honest disclosure during conversations with health caregivers*. In Petronio, S. Balancing

the secrets of private disclosures. LEA's communication series. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Passik, S. D. & Kirsh, K. L. (2004). Assessing aberrant drug-taking behaviors in the patient with chronic pain. *Current Pain and Headache Reports, 8,* 289-294.

Pinard, L., Negrete, J. C., Annable, L., & Audet, N. (1996). Alexithymia in substance abusers: Persistence and correlates of variance. *The American Journal on Addictions, 5(1),* 32-39.

Portenoy, R. K. & Foley, K. M. (1986). Chronic use of opioid analgesics in non-malignant pain: Report of 38 cases. *Pain, 25(2),* 171-186.

Potter, J. S., Shiffman, S. J., & Weiss, R. D. (2008). Chronic pain severity in opioid-dependent patients. *The American Journal of Drug and Alcohol Abuse, 34(1),* 101-107.

Ray, L. C., & Sinha, R. (2006). Alexithymia and stress-induced brain activation in cocaine-dependent men and women. *Journal of Psychiatry Neuroscience, 31(2),* 115-121.

Research Society on Alcoholism. (2011). *Impact of Alcoholism and Alcohol Induced Disease on America* [White paper]. Retrieved from http://www.rsoa.org/2011-04-11RSAWhitePaper.pdf.

Reid, M. C., Engles-Horton, L. L., Weber, M. B., Kerns, R. D., Rogers, E. L., & O'Connor, P. G. (2002). Use of opioids for chronic non-cancer pain syndromes in primary care. *Journal of General Internal Medicine, 17*, 173-179.

Reinhard , M. J., Hinkin, C. H., Barclay, T. R., Levine, A. J., Marion, S., Castellon, S. A., Longshore, D., Newton, T., Durvasula, R. S., Lam, M. N., & Myers, H. (2007).

Discrepancies between self-report and objective measures for stimulant drug use in HIV: Cognitive, medication adherence, and psychological correlates. *Addictive Behaviors, 32(12),* 2727-2736.

Rhodes, J. E. & Jason, L. A. (1990). A social stress model of substance abuse. *Journal of Consulting and Clinical Psychology, 58(4),* 395-401.

Riley, J. L. & Hastie, B. A. (2008). Individual differences in opioid efficacy for chronic noncancer pain. *Clinical Journal of Pain, 24(6),* 509-520.

Rosenbaum, A. & Langhinrichsen-Rohling, J. (2006) Meta-research on violence and victims: The impact of data collection methods on findings and participants. *Violence and Victims, 21(4),* 404-409.

Ruiz, M. A., Pincus, A. L., & Schinka, J. A. (2008). Externalizing pathology and the Five-Factor Model: A meta-analysis of personality traits associated with antisocial personality disorder, substance use disorder, and their co-occurrence. *Journal of Personality Disorders, 22(4),* 365-388.

Sachs-Ericsson, N., Kendall-Tackett, K., & Hernandez, A. (2007). Childhood abuse, chronic pain, and depression in the National Comorbidity Survey. *Child Abuse & Neglect, 31(5),* 531-547.

Sander, L. M., Slavin, O. M., Cohen, J., Chan, L., Im, S., & Lumley, M. A. *Content analysis of emotional disclosure: Can active facilitation enhance the process?* Poster submitted to the 2009 American Psychosomatic Society Conference.

Savage, S. R. (2009). Management of opioid medications in patients with chronic pain and risk of substance misuse. *Current Psychiatry Reports, 11,* 377-384.

Savage, S. R., Joranson, D. E., Covington, E. C., Schnoll, S. H., Heit, H. A., & Gilson, A. M. (2003). Definitions related to the medical use of opioids: evolution towards universal agreement. *Journal of Pain and Symptom Management, 26(1)*, 655-667.

Schieffer, B. M., Pham, Q., Labus, J., Baria, A, Van Vort, W., Davis, P., Davis, F., & Naliboff, B. D. (2005). Pain medication beliefs and misuse in chronic pain. *The Journal of Pain, 6(9)*, 620-629.

Schuckman, H., Hazelett, S., Powell, C., & Steer, S. (2008). A validation of self-reported substance use with biochemical testing among patients presenting to the emergency department seeking treatment for backache, headache, and toothache. *Substance Use & Misuse, 43(5),* 589-595.

Sees, K. L. & Clark, H. W. (1993). Opioid use in the treatment of chronic pain: Assessment of addiction. *Journal of Pain and Symptom Management, 8(5),* 257-264.

Sinha, R. (2001). How does stress influence risk of drug abuse and relapse? *Psychopharmacology, 158*, 343-359.

Smith, J. A., Lumley, M. A., & Longo, D. L. (2002). Contrasting emotional approach coping with passive coping for chronic myofascial pain. Annals of Behavioral Medicine, 24(4), 326-335.

Stanton, A. L, Danoff-Burg, S., Cameron, C. L., & Ellis, A. P. (1994). Coping through emotional approach: Problems of conceptualization and confounding. *Journal of Personality & Social Psychology,* 66, 350-362.

Stanton, A. L., Kirk, S. B., Cameron, C. L., & Danoff-Burg, S. (2000). Coping through emotional approach: Scale construction and validation. *Journal of Personality & Social Psychology,* 78, 1150-1169.

Tabachnick, B. G., and Fidell, L. S. (2001). *Using Multivariate Statistics, 4th ed.* Boston: Allyn and Bacon.

Tan, G., Nguyen, Q., Cardin, S. A. & Jensen, M. P. (2006). Validating the use of two-item measures of pain beliefs and coping strategies for a veteran population. *The Journal of Pain, 7(4),* 252-260.

Taylor, G. J., Bagby, R. M., & Parker, J. D. A. (1997). Disorders of affect regulation: Alexithymia in medical and psychiatric illness. New York, NY: Cambridge University Press.

Turk, D. C., Swanson, K. S., & Gatchel, R. J. (2008). Predicting opioid misuse by chronic pain patients: A systematic review and literature synthesis. *Clinical Journal of Pain, 24(6),* 497-508.

Twillman, R. K. (2007). Mental disorders in chronic pain patients. *Journal of Pain & Palliative Care Pharmacotherapy, 21(4),* 13-19.

Vissers, K. C. P. (2006). The clinical challenge of chronic neuropathic pain. *Disability and Rehabilitation: An International, Multidisciplinary Journal. Special Issue: Defining Pain*, *28(6),* 343-349.

Walwyn, W. M., Miotto, K. A., & Evans, C. J. (2010). Opioid pharmaceuticals and addiction: The issues, and research directions seeking solutions. *Drug and Alcohol Dependence, 108,* 156-165.

Wasan, A. D., Butler, S. F., Budman, S. H., Benoit, C. , Fernandez, K., & Jamison, R. N. (2007). Psychiatric history and psychologic adjustment as risk factors for aberrant drug-related behavior among patients with chronic pain. *Clinical Journal of Pain, 23(4),* 307-315.

Watson, D. & Clark, L. A. (1994). *The PANAS-X. Manual for the Positive and Negative Affect Schedule-Expanded Form*. The University of Iowa.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality & Social Psychology,* 54, 1063-1070.

Webster, L. R. & Fine, P. G. (2010). Approaches to improve pain relief while minimizing opioid abuse liability. *The Journal of Pain, 11(7),* 602-611.

Weisberg, J. N. & Boatwright, B. A. (2007). Mood, anxiety and personality traits and states in chronic pain. *Pain, 133(1-3),* 1-2.

Weiss, D. S. & Marmar, C. R. (1997). The impact of event scale-revised. In J.P. Wilson & T.M. Keane (Eds.), *Assessing psychological trauma and PTSD: A handbook for practitioners* (pp. 399 – 411). New York: Guilford Press.

Weissman, D. E. & Haddox, J. D. (1989). Opioid pseudoaddiction: An iatrogenic syndrome. *Pain, 36(3),* 363-366.

Weitzner, M. A., Cockram, C. A., & Strickland, J. M. (2003). Depression and pain: The influence of substance abuse. *Seminars in Pain Medicine, 1(1),* 3-15.

Wills, T. A. & Cleary, S. D. (1996). How are social support effects mediated? A test with parental support and adolescent substance use. *Journal of Personality and Social Psychology, 71(5),* 937-952.

Wills, T. A. & Vaughan, R. (1989). Social support and substance abuse in early adolescence. *Journal of Behavioral Medicine, 12(4),* 321-339.

Wilsnack, S. C., Vogeltanz, N. D., Klassen, A. D., & Harris, T. R. (1997). Childhood sexual abuse and women's substance abuse: National survey findings. *Journal of Studies on Alcohol, 58(3),* 264-271.

Wolfe, K. R., & Brown, P. J. (1993). *The life stressor checklist*. Boston: National Center for PTSD, Boston VA Medical Center.

Wolfe, K. R., Brown, P. J., Chresman, K., & Levin, K. Psychometric review of the life stressor checklist-revised In: B. Stamm, Editors, *Instrumentation in stress, trauma, and adaptation*, Sidran Press, Lutherville, MD (1996), pp. 144–151.

Wolfe, J. & Kimerling, R. (1997). *Gender issues in the assessment of posttraumatic stress disorder.* In: pp. 192-238; Wilson, J. P. & Keane, T. M. [ed.]. Assessing psychological trauma and PTSD. New York: Guilford Press.

ABSTRACT

EMOTIONAL RISK FACTORS FOR SUBSTANCE ABUSE IN A CHRONIC PAIN POPULATION: DEVELOPING A PREDICTIVE MODEL AND TESTING METHODS FOR ASSESSING STIGMATIZED BEHAVIORS

by

LINDSAY MS OBERLEITNER

August 2011

Advisor: Mark A. Lumley, Ph.D.

Major: Psychology (Clinical)

Degree: Doctor of Philosophy

There are currently few factors guiding physicians' decisions as to whether an individual patient may need additional regulation of pain medications because of risks. The limited predictive factors applied to prescription opioid abuse in chronic pain patients is surprising given the breadth of personal, cognitive, and emotional factors explored in both chronic pain and substance abuse literatures broadly. The present study had two purposes. First, concurrent risk factors for prescription misuse and substance abuse in chronic pain patients were explored, specifically examining whether the addition of emotional factors to the traditionally used risk factors improves prediction of prescription and substance misuse. The present study also experimentally examined whether an enhanced interview condition would lead to increased disclosure of prescription misuse, other drug use, and traumatic events, by normalizing the experience of substance use and trauma, and engaging in a conversation about confidentiality of the information. Participants completed one session in which they were assigned to report their prescription misuse, substance use, and trauma in one of the

following formats: written/private, standard interview, enhanced interview. In the enhanced condition, the interviewer followed an initial script addressing participants' potential concerns about disclosure prior to questions regarding substance use and trauma. In addition to replicating the role of personal and family history of substance use problems, this study provided new evidence for the role of emotional ambivalence as a risk factor for prescription misuse, prescription abuse and dependence symptoms, and alcohol use. Interestingly, only younger age was predictive of cannabis use. This study also provided evidence that further development in assessment methods, focused on understanding the role of meta-communication, normalizing of problematic behaviors, and probing unclear responses, could lead to better identification of patients already engaging in problematic prescription related behaviors.

AUTOBIOGRAPHICAL STATEMENT

Lindsay Oberleitner graduated from Albion College in 2004 with a Bachelor's degree in psychology and human services and began the Clinical Psychology doctoral program in the fall of that year. Throughout graduate school Lindsay was mentored by Dr. Mark Lumley in the Stress and Health Lab through which she has been involved in treatment projects for chronic pain conditions and trauma. To pursue her interests in substance use, Lindsay worked with Dr. Emily Grekin and Dr. Leslie Lundahl. Lindsay worked with Dr. Grekin on a project examining substance use in college students who were prescribed psychotropic medication. Lindsay worked closely with Dr. Lundahl in the Substance Abuse Research Division at Wayne State University, engaging in both clinical and research activities related to substance use treatment. Lindsay will complete her clinical internship at the Yale University School of Medicine's Forensic Drug Diversion Clinic in June of 2011 and will start a postdoctoral research fellowship in substance abuse treatment at Yale University beginning in July of 2011. Lindsay's long-term academic and research objectives include pursuing a career in medical academia where she can continue her focus in the intersection of health and substance abuse treatment research.