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RUNNING HEAD: PSYCHOLOGICAL DISTRESS AND RISKY SEXUAL BEHAVIORS

An Examination of the Relationship between Psychological Distress and Risky Sexual Behaviors
among a Treatment-Seeking Opioid-Dependent Population

A Thesis

Presented to

the Faculty of the Department of Psychology

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Master of Science

By

Hayley M. Smith

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Abstract

Substance abusing populations are at an increased risk for disease transmission and have higher rates of psychological comorbidity compared to the general population (e.g., Centers for Disease Control and Prevention [CDC], 2012a; Chaudhury & Singh, 2009; Des Jarlais, Semaan, & Arasteh, 2011; Goodwin & Stein, 2013). Numerous studies have implicated the interaction of psychological distress and risky sexual behaviors in the increased risk of disease transmission, however, several studies have not found this association. It has been suggested that there may be curvilinear relationship between psychological distress and risky sexual behaviors but this theory has yet to be tested. The present study sought to examine whether a curvilinear relationship among these factors was present among an opioid dependent population. Further, the associations between polysubstance abuse and psychological distress, as well as between injection drug use, psychological distress, and risky sexual behaviors were examined. One hundred thirteen opioid-dependent individuals from an outpatient opiate treatment program (OTP) were surveyed regarding their drug use, sexual behaviors, depression, anxiety, and stress. Results did not support a curvilinear or linear model for the relationship between psychological distress and risky sexual behaviors. Further, a relationship between polysubstance abuse and psychological distress was not found to be significant. However, injection use was found to be associated with anxiety among participants. The importance of future research examining other factors related to increased disease transmission among a drug-using population is emphasized, as reasons for increased transmission are likely due to several complex and interrelated factors.

Keywords: Substance use, depression, anxiety, risky sexual behavior

An Examination of the Relationship between Psychological Distress and Risky Sexual Behaviors
among a Treatment-seeking Opioid-Dependent Population

Opioid dependence is emerging as a widespread epidemic in the United States, particularly with the surge of prescription pain medication abuse in recent years. A recent study identified the most commonly abused prescription opioids as OxyContin®, followed closely by Lortab®, Percocet®, and Vicodin® (Back, Lawson, Singleton, & Brady, 2011). The National Survey on Drug Use and Health indicated that, in 2014, the non-medical use of pain relievers was found to be the second most prevalently initiated drugs among persons 12 or older, with marijuana the first (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). While rates of nonmedical opioid use initiation have slightly declined between 2012 and 2014 (from 1.9 million to 1.4 million individuals), heroin use rates have increased between 2012 and 2014, from 156 million to 212 million individuals ages 12 and over (SAMHSA, 2015). The changes in nonmedical opioid use and heroin use in recent years are likely due to several factors, including the implementation of stricter prescribing laws, changes in drug formulations, as well as the price of heroin decreasing (Compton & Volkow, 2006).

Individuals who use illicit drugs, including opioids, have been found to be at higher risk for contracting human immunodeficiency virus (HIV), sexually transmitted infections (STIs), and Hepatitis B and C (Centers for Disease Control and Prevention [CDC], 2012a; Des Jarlais, Semaan, & Arasteh, 2011; Nelson et al., 2011). Behavioral factors such as the sharing of contaminated injection and drug-preparation equipment and having unprotected sex lead to increased risk of these diseases among illicit drug users (e.g., Havard et al., 2006; Mandell, Kim, Latkin & Suh, 1999; McHugh et al., 2012; Lollis, Strothers, Chitwood, & McGhee, 2000; Reyes et al., 2006; Tross et al., 2009; Wild et al., 2005). In addition to the high disease rates among

opioid users are high rates of comorbidity of psychological disorders and psychological distress (e.g., symptoms of depression and anxiety; e.g., Darke & Ross, 1997; Havard, Teesson, Darke, & Ross, 2006; Milby et al., 1996).

Psychological Comorbidity Within Substance Use Disorders

Psychological comorbidity has been defined as “the co-occurrence of one or more mental disorders with one or more substance use disorders during some period of time, such as, a year or a lifetime” (Hall, Degenhardt, & Teeson, 2009, p. 526). High rates of psychological comorbidity have been found among individuals who abuse substances (e.g., Darke & Ross, 1997) and high rates of substance use has been found among individuals diagnosed with a psychological disorder (e.g., Grant et al. 2006; SAMHSA, 2013). Results from a national survey conducted in 2012 found that among the adults diagnosed with a substance use disorder (SUD) within the past year, 40.7% also had a co-occurring mental illness while only 16.5% without a SUD were diagnosed with a mental illness (SAMHSA, 2013). Anxiety and depression have been the primary focus in the literature due to their high comorbidity among individuals with SUDs (Grant et al., 2006; Hall et al., 2009). Hall et al., (2009) summarized the basic findings regarding psychological comorbidity from large scale, epidemiological studies that have been conducted in the United States and other developed countries. It was reported that the majority of studies assessed documented that a third to a half of individuals diagnosed with a psychological disorder also meet criteria for another mental health or substance use disorder and that depression and anxiety have the highest rates of comorbidity among those with a substance use disorder.

A number of researchers have examined rates of comorbidity among opioid dependent individuals and have found rates of depression in as little as 9% of samples (Gros, Milanak, Brady, & Back, 2013) and in as much as 60% (Carpentier et al., 2009). Further, rates of anxiety

disorders among opioid dependent individuals have been found to range between 13% (Gros et al., 2013) and 67% (Callaly et al., 2001). Additionally, compared to the general population, those who abuse substances are at an increased risk for comorbid psychological disorders. Goodwin and Stein (2013) assessed data from a national probability sample to compare lifetime anxiety disorder rates of substance dependent populations and non-substance dependent populations. Those who were substance-dependent were found to have significantly higher prevalence rates across all anxiety disorders. For example, 6.7% of the non-substance dependent individuals were diagnosed with generalized anxiety disorder while 20.3% of individuals classified as substance-dependent received this diagnosis. Similar findings have been documented for mood disorders when comparing substance-dependent and non-substance dependent individuals. Chaudhury and Singh (2009) documented depression diagnoses in 45% of their dually-diagnosed (i.e., those who met criteria for substance abuse or dependence and one or more additional psychiatric diagnoses) inpatient sample. In comparison, they reported depression diagnoses in only 4% of individuals surveyed from the general population.

Differences have also been documented among treatment-seeking and non-treatment-seeking opioid dependent populations regarding comorbidity. In a study comparing treatment-seeking heroin users from multiple methadone maintenance treatment (MMT) programs, detoxification facilities, and residential rehabilitation centers, with non-treatment-seeking heroin users, Ross et al., (2005) found non-treatment-seeking users reported overall better mental health. Rates of major depression, previous suicide attempts, and posttraumatic stress disorder (PTSD) diagnoses were found to be significantly less among non-treatment-seeking heroin users compared to those in treatment. One possible explanation for these findings is that those with more significant mental health issues are more likely to seek, be referred or be mandated to

treatment. However, Brienza et al., (2000) found the opposite pattern with higher rates of depression among untreated injection drug users, compared to participants enrolled in a MMT. Still, other studies have found similar rates of psychological disorders, primarily mood and anxiety disorders, among treated and untreated populations (Brooner et al., 1998; Dinwiddie, Cottler, Compton & Abdallah, 1996; Kidorf et al., 2004).

Wild et al., (2005) recruited untreated heroin users across five large Canadian cities. They noted that almost half (49.3%) of their participants met criteria for Major Depressive Disorder (MDD). Similarly, Gros et al., (2013) documented that almost half (47.1%) of their prescription opioid dependent, non-treatment-seeking sample met criteria for a comorbid mood or anxiety disorder. In assessing treatment-seeking, opioid dependent participants, Milby et al., (1996) documented 58% of their sample meeting criteria for at least one affective disorder and 55% of their sample meeting criteria for at least one DSM-III anxiety disorder. Additionally, 36% of participants with at least one anxiety disorder were found to also have a coexisting affective disorder. Among heroin addicts, Darke and Ross (1997) reported over half (51%) of their sample met criteria for an anxiety disorder, with the most prevalent diagnoses being specific phobias, social phobia, and agoraphobia. In sum, the literature is inconsistent with comorbidity rates among non-treatment seeking/untreated opioid dependent populations and those who are seeking treatment. Given the voluntary nature of the majority of studies examining both treatment seeking and non-treatment seeking participants, individuals who are assessed may be more likely to report significant distress symptoms, compared to the drug using population as a whole.

Among opioid users, significant gender differences regarding psychological distress and comorbidity have also been documented. In the general population, females have been

consistently documented as having higher rates of mood disorders and anxiety disorders, while men have been shown to have significantly higher rates of substance use disorders and other externalizing disorders (e.g., Grigoriadis & Robinson, 2007; Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Seedat et al., 2009). In addition, females have been found to have an accelerated progression of opioid use as compared to men (Back et al., 2011). Similar to findings in the general population, rates of mental health diagnosis and symptoms of emotional distress have also been found to be higher among females in opioid dependent populations (Back et al., 2010; Brienza et al., 2000; Darke, Swift, & Hall, 1994; Green, Serrano, Licari, Budman, & Butler, 2009; Tetrault et al., 2007). Back et al., (2010) documented rates of psychological distress, assessed using six questions regarding common symptoms of depression and anxiety, to be significantly higher among females (14.5%) compared to men (11.2%) among those dependent on prescription opioids. Additionally, Green et al. (2009) assessed gender differences among prescription opioid abusers on a variety of variables including self-reported psychiatric problems within the past 30 days. Females endorsed significantly more recent psychiatric problems including depression, anxiety, suicidal thoughts and attempts, and violent behavior. It is been consistently documented that Females endorse more psychiatric problems and distress than men overall, which is likely to lead to other complications and risky behaviors commonly associated with these two issues.

Further complicating and worsening opiate addiction, the tendency to use other drugs is common (Back et al., 2011; Darke et al., 1994). A linear relationship between polysubstance use among opiate users and psychological distress has been found. For example, Darke and Ross (1997) found that, among heroin users, an increase in psychological diagnoses was associated with an increase in the number of substances participants reported using. Wu, Woody, Yang,

and Blazer (2010) identified four sub-types of nonmedical opioid users: opioid-marijuana users, opioid-other prescription drug users, opioid-hallucinogen users, and opioid-poly-drug users. Opioid-poly-drug users comprised almost one third of all nonmedical opioid users and had a stronger association with major depressive disorder (MDD) than the other three subtypes. Similarly, Bizzari et al., (2007) found higher rates of polysubstance abuse among the individuals with a comorbid psychological disorder, compared to individuals who met criteria for opioid dependence only. Those with a comorbid disorder reported reasons for substance use to be related to mood regulation, suggesting that increases in the amount of substances used are also attempts to decrease distress or regulate mood.

Three primary hypotheses have been put forth to explain the etiology surrounding the relationship between psychological disorders and substance use disorders: psychological disorders predate and result in substance use (i.e., self-medication hypothesis), substance use directly leads to development of a psychological disorder (i.e., precipitation hypothesis), or a third factor influences both a vulnerability to substance use and psychological disorders (i.e., shared vulnerability). The self-medication hypothesis (SMH), as proposed by Khantzian (1985), proposes that individuals with psychological disorders use the psychotropic effects that alcohol or other drugs induce to reduce negative affective states. He argues that individuals use their “drug of choice” due to the effects it has on their psychological symptoms. For example, Fulton et al., (2011) found that, among patients in MMT, those who reported more severe anxiety and affective disorders were more likely to report using non-prescribed benzodiazepines. Many studies have found that symptoms of anxiety and depression predate a substance use disorder, which is an essential component of the self-medication hypothesis (e.g., Abraham & Fava, 1999; Callaly et al., 2001; Darke & Ross, 1997). Upon interviewing 222 injection heroin users, both

treatment seeking and non-treatment seeking, about their onset of psychological symptoms, Darke and Ross (1997) found onset of anxiety disorders to precede heroin dependence in 81% of participants and onset of depression or dysthymia preceded heroin dependence in 61% of cases. Further, Callaly et al. (2001) reported that in 71% of their opioid dependent sample with a diagnosed mental illness, symptoms predated heroin use.

Additional support for the SMH is that individuals often self-report the use of drugs in response to negative affect or in hopes of alleviating negative feelings (Back et al., 2010; Bizzari et al., 2007; Griffin, Mirin, & Weiss, 1992). Griffin et al., (1992) assessed mood disorders in a sample of 494 treatment-seeking substance abusers (i.e., opiates, cocaine, and sedative/hypnotics). They found that the opioid-dependent participants who met criteria for major depression reported using drugs more often in response to feeling depressed, compared to those who were not diagnosed with major depression.

Support for a precipitation hypothesis has also been found. This model posits that substance use neurobiologically triggers psychological distress in individuals (Brady & Sinha, 2005; Schuckit, 2006). Martins, Fenton, et al., (2012) and Martins, Keyes, Storr, Zhu, and Chilcoat (2009) found support for both the self-medication and the precipitation hypotheses. Martins, Keyes, et al., (2009) utilized data on psychological disorders and nonmedical opioid use from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) collected between 2001 and 2002. The researchers discovered all the psychological disorders assessed were found to be up to three times more likely to precede nonmedical opioid use. Additionally, they noted nonmedical opioid use was also significantly associated with the subsequent onset of psychological disorders. However, although these results support the presence of general vulnerability to both psychiatric disorders and nonmedical opioid use, the

authors noted that the evidence for the self-medication model was found at a higher magnitude than the reverse ordering. Although the author's findings suggest that these models are not necessarily mutually exclusive and can vary based upon the specific cases, more support was found for the self-medication model.

A third model, the shared vulnerability model, has also been offered as a way to explain the comorbidity of substance use and psychological disorders. This model posits that a third factor, such as a genetic liability or environmental stressor, increases an individual's risk both for substance dependency and psychological disorders (Kendler, Prescott, Myers, & Neale, 2003; Martins, Keyes, et al., 2012). Carmiol et al. (2003) found support for shared genetic factors between bipolar disorder and alcohol use disorder in assessing individuals and their families who have been diagnosed with bipolar disorder. Kendler et al. (2003) also found support for shared vulnerability hypothesis in their study using twins to examine genetic and environmental risk factors for comorbidity among internalizing and externalizing disorders.

In sum, most studies find significantly higher rates of psychological disorders among substance dependent individuals, particularly among those who are dependent on opioids, compared to the general population. Differences in treatment status (i.e. those who are seeking treatment and those who are not) have been shown to be a factor regarding comorbidity among opioid dependent individuals. However, findings have been inconsistent as to whether individuals who are treatment seeking or individuals who are non-treatment seeking have increased prevalence of psychiatric disorders or diagnoses. Further, it has been well documented that females in the general population experience higher rates of anxiety, mood disorder diagnoses, and symptoms of emotional distress. This is consistent regarding opioid dependent females as well, as it has been shown that opioid dependent females experience higher rates of

psychological distress (e.g., depression, anxiety, suicidal thoughts, and violent behavior) and have faster progression of opioid use than males. A link has also been shown that suggests increases in drug use, or polysubstance use, has been found to be associated with symptoms of psychological distress. Overall, understanding the relationship between psychological distress and opioid dependence is an important factor in understanding the impact opioid use has on an individual's behavior, especially given the high rated of comorbidity. Depression, anxiety, and other symptoms of distress can significantly impact an individuals' decision making and actions. Combining these symptoms with substance use increases the potential for behaviors that can lead to negative outcomes, such as risky sexual behaviors. Risky sexual behaviors are often associated with several negative consequences (e.g., higher rates of disease, unplanned pregnancy), highlighting the importance of assessing factors that could help us better understand these associations.

Risky Sexual Behavior Among Substance Users

Rates of sexually transmitted infections (STIs), including HIV/AIDS and hepatitis, are prevalent in American society, with nearly 20 million new infections occurring each year (CDC, 2013). Furthermore, individuals who abuse substances (both alcohol and illegal drugs) have been found to be at greater risk for engaging in behaviors that lead to STIs than those who do not (e.g., Hedden, Malcolm, & Latimer, 2009; Lundberg et al., 2011; Tyndall et al., 2002). Among non-drug using populations, rates of lifetime STIs have been found to be 3.3%, which is significantly lower compared to individuals who meet criteria for cocaine dependence (8.8%) and alcohol dependence (6.4%; Hedden et al., 2009). In a multisite study of 407 individuals in substance abuse treatment facilities, Hwang et al., (2000) found 62% had markers for at least one STI, with herpes simplex virus type 2 (HSV-2; 44.4%) having the highest prevalence rate,

followed by hepatitis C virus (HCV; 35.1%) and hepatitis B virus (HBV; 29.5%).

Comparatively, in reviewing data from various national surveys of non-institutionalized, civilian adults, Satterwhite et al., (2008) documented that persons aged 15 to 49 years, 16.5% of the population was found to have HSV-2. In a study conducted with patients from four different MMT programs in Taiwan, researchers found 12% of patients were HIV positive and 93% of patients tested positive for HCV (Lee et al., 2011). Aceijas and Rhodes (2007) looked at HCV prevalence rates in 199 studies across the world. They found prevalence rates of HCV in North America to be varied between 8 – 90% among injection drug users (IDUs), with the highest rates found in a study conducted in Vancouver, Canada and the lowest rates found in a study conducted in Baltimore, Maryland (Aceijas & Rhodes, 2007). Further, it has been shown that a history of STIs was found to be a significant predictor of HIV transmission, potentially due to the presence of STIs physiologically impacting an individual's transmission susceptibility and increasing infectiousness in the infected partner (Padian, Shiboski, Glass, & Vittinghoff, 1997). Additionally, patients in a STI clinic reported significantly higher rates of illicit substance dependence or abuse (14.1%) compared to the general public (1.7%), according to a statewide survey in Michigan (Aktan, Calkin, & Johnson, 2001).

Two groups of individuals, female drug users and African-American drug users, have been found to be more at risk for contracting STIs compared to males and other racial groups that have been studied (Camacho, Bartholomew, Joe, Cloud, & Simpson, 1995; Padian et al., 1997; Plitt et al., 2005; Santibanez et al., 2006). Cavanaugh et al., (2011) surveyed females who reported using heroin and cocaine and found that 40.7% indicated being diagnosed with an STI at some point in their lives. Padian et al., (1997) hypothesized one main reason females were found to have higher STI rates was due to physiological differences that result in increased

susceptibility. They found male-to-female disease transmission to be eight times more efficient than female-to-male transmission.

In their previously mentioned study, Cavanaugh et al. (2011) discovered that almost double the percentage of African American females (46.6%) report a lifetime STI diagnosis, as compared to Caucasian females (27.6%). Further, they found that ever having a casual sex partner was the only significant risk factor for having an STI among black females, whereas trading sex for money was the only significant risk factor for having an STI among white females (Cavanaugh et al., 2011). Cavanaugh et al. (2011) explained this racial disparity by noting that one possible explanation may have to do with the difference in STI prevalence among the social networks of black and white females, as black females are more at risk for engaging in a relatively common practice (e.g., casual sex partner) and white females are more at risk engaging in a low prevalence but high risk behavior.

Sexual risk-taking or risky sexual behaviors (RSB) have been defined in many different ways throughout the literature. Cooper (2002) defined risky sexual behavior as “any behavior that increases the probability of negative consequences associated with sexual contact” (p. 101). Risky sexual behaviors are most commonly grouped into two main categories, failure to take preventative or protective action (e.g., contraceptive methods including barrier methods, hormonal methods, and implantable devices) and indiscriminate behavior (e.g., having multiple partners; having sex under the influence of drugs or alcohol; Cooper, 2002). Moreover, risky sexual behaviors have been clearly associated with substance use in both adolescent, young adult, and mature adult populations (McAloney, McCrystal, & Percy, 2010; Thompson, Kao, & Thomas, 2005).

Among substance dependent individuals, research has focused on the risky sexual practices of having unprotected sex, having sex in exchange for drugs or money, having sex with multiple partners, and having sex with an injection drug user (IDU; e.g., McHugh et al., 2012; Lollis, Strothers, Chitwood, & McGhee, 2000; Tross et al., 2009). Nadeau, Truchon, and Biron (2000) found that substance intoxication was identified by a focus group of males and females in treatment for alcohol or drug abuse as the primary contributing factor for engaging in unprotected sex. A large majority of studies have assessed specifically condom use among both drug using and non-drug using populations. Rates of unprotected sex among drug users have been found to range between 34% and 52%, while among non-drug using adults, rates of unprotected sex have been found to range between 23% and 40% (CDC, 2012b, 2012c; El-Bassel, Gilbert, Glassman, & Schilling, 1993; Leigh, Temple & Trocki, 1993; Palha & Esteves, 2002; Weinhardt, Kelly, et al., 2004). The large overlap among both drug using and non-drug using individuals in regards to condom use suggests there are other factors that contribute to higher rates of STIs, besides drug use and intoxication. Additionally, in large-scale national samples that do not specifically assess for drug use, drug users may be included in those samples, potentially impacting the prevalence rates of condom use among the two groups.

Not surprisingly, individuals who inject drugs *and* engage in sexually risky behavior are at greater risk for disease transmission, compared to individuals who engage in only one of these behaviors. In a study of IDUs, 68% reported not using condoms in the previous month (Magura, Shapiro, Siddiqi, & Lipton, 1990). In a large community sample of IDUs in Vancouver, researchers found approximately half of all participants reported not using condoms during their sexual encounters with casual partners (Tyndall et al., 2002). Trading sex for drugs or money or paying someone for sex are not uncommon among IDUs and place individuals at further risk for

disease (Cavanaugh et al., 2011; Plitt et al., 2005). Mitchell and Latimer (2009) found that IDUs typically perceived their risk of contracting HIV as higher primarily due to non-sexual factors such as the sharing of injection equipment rather than from sexual contact. As a result, disease transmission resulting from sexual contact may be largely overlooked by IDUs, thereby further increasing their risk.

The impact opioid use has on sexuality is thought to be an important factor as well. In the early stages of opioid abuse, many individuals report experiencing an improvement in their sexual functioning (Palha & Esteves, 2002). Palha and Esteves (2002) propose that this improvement may be seen as a result of the relaxation effects of opiates in females and a delay in orgasm in men. However, several studies have found that chronic opioid abuse leads to sexual dysfunction such as decreased libido and erectile dysfunction (Al-Gommer, George, Haque, Moselhy, & Saravanappa, 2007; Johnson, Phelps, & Cottler, 2004; Rawson, Washton, Domier, & Reiber, 2002). Still others have documented that the frequency of sexual intercourse among opioid users is comparable to non-drug using individuals (Palha & Esteves, 2002; Svikis et al., 1996). This highlights the fact that despite reported difficulties related to sexual functioning, opioid users are still at high risk for disease transmission.

There is evidence that the presence of polysubstance abuse among opioid dependent individuals further increases the risk of engaging in unsafe sexual behaviors. Several studies have focused on illicit drugs and their effects on risky sexual behavior. Specifically, cocaine and crack cocaine use among both treatment seeking and non-treatment seeking opiate dependent individuals have made up a large portion of this research. Compared to heroin, cocaine use has been associated with more HIV risk behaviors (Grella, Anglin, & Wugalter, 1995; Lejuez, Bornoalova, Daughters, & Curtin, 2004; Tross et al., 2009). Joe and Simpson (1995) assessed

cocaine use in 487 opiate dependent, treatment-seeking individuals. They found that the cocaine using individuals were at an increased risk of unsafe injecting behaviors, having unprotected sex in exchange for drugs or money, having sex with an IDU, and having unprotected sex while under the influence of substances. Similarly, among a MMT sample, cocaine use, either alone or mixed with heroin, was found to be a strong predictor of having unprotected sex (Bux, Lamb, & Iguchi, 1995).

MMT and its association with risky sexual behaviors has been assessed by several researchers. The majority of researchers found reductions in HIV-risk behaviors, including injection use and risky sexual behaviors, among drug users enrolled in MMT (e.g., Lollis et al., 2000; Metzger, Navaline, & Woody, 1998; Sorensen & Copeland, 1999; Zaric, Barnett, & Brandeau, 2000). For example, Lollis et al., (2000) found that among IDU who received MMT within the previous six months, compared to those who did not receive treatment, the methadone treated individuals reported less risky sexual behavior, specifically in the form of increased condom use. However, some researchers have failed to find reduced risky sexual behaviors among those enrolled in MMT (e.g., Stark, Muller, Bienzle, & Guggenmoos-Holzmann, 1996). Perhaps one factor that could contribute to this discrepancy is the continued use of opiates and the use of other substances (e.g., cocaine, amphetamines, or other stimulants) that have been shown to increase risky behaviors while in MMT. Additionally, length of treatment may also play a factor.

In sum, similarly to psychological comorbidity, risky sexual behaviors and STIs are found to be more prevalent in drug abusing populations than in non-abusing populations. Injection drug users who engage in risky sexual behavior are at an increased risk of disease transmission compared to individuals who only engage in one of those behaviors. Further,

female drug users and African American drug users (both male and female) have been found to be greater at risk, potentially due to the higher susceptibility of male-to-female transmission of STIs and due to the disparity in STI prevalence among the social networks of black compared to white females. The use of cocaine by opioid dependent individuals, as compared to individuals who use only opiates, seems to elevate the risk of individuals engaging in unsafe sexual behavior. Understanding and assessing the link between risky sexual behavior and substance use is important in developing ways to reduce disease transmission among this population. A better understanding of what leads drug-using individuals to engage in increased risky sexual behaviors is central. Several potential causal factors have been identified in the literature, although it is likely a complex combination of social, emotional, and environmental factors that contribute to the increase in disease transmission in this population. The purpose of the present study is to better understand the interaction of these factors. It is thought that psychological comorbidity contributes to the increase in risky sexual behaviors among substance dependent individuals, thus the link between psychological distress and risky sexual behavior will be reviewed next.

Psychological Distress and Risky Sexual Behavior

Previous research has found that substance dependent individuals experiencing psychological distress have an increased likelihood of engaging in behavior that puts them at risk for negative consequences, such as needle sharing (Havard et al., 2006; Malow, Corrigan, Pena, Calkins, & Bannister, 1992; Mandell, Kim, Latkin & Suh, 1999; Reyes et al., 2006; Wild et al., 2005) and criminal behavior (Havard et al., 2006). Populations such as men who have sex with men (MSM) and HIV-positive individuals have made up the bulk of investigations relating sexual behavior and psychological distress in adults. This may be due, in part, to the increased rates of disease transmission in these populations, as well as due to increased severity and

prevalence of psychosocial (e.g., social stigma) and health problems commonly found among these populations (Jie, Ciyong, Xueqing, Hui, & Lingyao, 2012; Stall et al., 2003). Research that has assessed these populations regarding psychological distress and risky sexual behaviors has also factored in the role of substance use. For example, Turrina and colleagues (2000) found higher rates of depression in HIV-positive IDUs compared to HIV-negative IDUs. In assessing the link between depression, substance use, and risky sexual behaviors among MSM, Fendrich, Avci, Johnson, and Mackesy-Amiti (2013) found that both drug use and high levels of depression, as compared to low and medium levels, increase the odds of an individual engaging in unprotected sexual intercourse with a risky partner.

Additionally, the link between psychological distress and risky sexual behaviors has been well documented among both adolescents and young adults (Brown et al., 2006; Mazzaferro et al., 2006; Morrison-Beedy, Carey, Feng, & Tu, 2008). Adolescents experiencing high levels of stress and high levels of depression have been found to have higher rates of inconsistent condom use, higher rates of STIs, and have been found to be more likely to have sex while using alcohol or drugs (Mazzaferro et al., 2006; Seth, Raiji, DiClemente, Wingood, & Rose, 2009). Ramrakha, Caspi, Dickson, Moffitt, and Paul (2000) assessed psychological distress and risky sexual behaviors in a sample taken from a birth cohort at age 21. They documented that the young adults with a psychological diagnosis were found to engage in more risky sexual behaviors when compared to young adults with no psychological diagnosis. They indicated that individuals with anxiety disorders tended to report more STIs, while individuals with depressive disorders were more likely to report engaging in unprotected sex, having increased rates of STIs, and first initiated sex at a younger age.

While a large majority of research has been conducted with adolescent and young adult populations, and individuals who are typically classified as “high risk” (MSM and HIV-positive individuals), fewer have examined these factors in a heterosexual, HIV-negative, adult population. Khan et al. (2009) documented that the presence of recent or chronic depression was associated with a higher number of sexual partners among both males and females. Zhan et al. (2012) determined that depressive symptoms were predictive of unprotected sex among Russian adults. Further, Reyes et al. (2007) documented that among injection drug users in Puerto Rico, those with more severe anxiety symptoms were more likely to engage in unprotected sex. Among a Ugandan adult population, depression and anxiety were found to be associated with an increased number of lifetime sexual partners, concurrent sexual partners, and inconsistent condom use (Lundberg et al., 2011). The majority of research conducted with adults, both in the US and in the few studies that have been conducted outside of the US, supports the notion that psychological distress is associated with increased risky sexual behaviors across cultures.

Gender appears to moderate the relationship between psychological distress and risky sexual behaviors, with stronger associations being consistently found among females. For example, Pratt, Xu, McQuillan, and Robitz (2012) found that the association between depression and the risky sexual behaviors of early age sexual initiation and increased lifetime sexual partners was significant only among females. Similarly, depression was also linked to having concurrent sexual partners among females but not men (Lundberg et al., 2011). In using a diary method, Morrison-Beedy et al. (2008) found that females ages 18 to 21 who reported more severe psychological distress were more likely to engage in unprotected sex. Further, another study documented a direct link between depressive symptoms and being diagnosed and treated for an STI among African American females (Laughon et al., 2007). Klein, Elifson, and Sterk

(2008) proposed a conceptual model that explained the relationship between depression and risky sexual behavior among females termed “at risk” (i.e., living in areas known for high rates of drug abuse, being impoverished, having a criminal history, etc.). They found support for their hypothesis that depression has both a direct, as well as an indirect effect on their risky sexual behaviors, by influencing female’s attitudes towards condoms. More specifically, Klein et al. (2008) documented that opposition toward condom use mediates the relationship between depression and risky sexual behavior.

While several variables have been shown to impact the relationship between substance use, psychological distress and risky sexual behaviors, this relationship can perhaps be better understood through a more theoretical framework. Social cognitive theory (Bandura, 1994), as applied to high risk behaviors, proposes that an individuals’ influence over their own behavior and social environment is the primary solution to the prevention of HIV and other STIs. Bandura (1994) proposed that behavior that puts individuals at risk for disease transmission is primarily due to a lack of self-regulative skills and an inability to exercise control over one’s own activities. Drug use inhibits an individual’s self-protective behavior by affecting their ability to make rational and logical decisions and increasing impulsivity, subsequently putting them at risk for decisions to engage in risky sexual behavior (Bandura, 1994; de Wit, 2009). Additionally, the social cognitive theory also indicates that the role of perceived self-efficacy is important in reducing risk behaviors. In individuals with psychological distress, their perceived self-efficacy and self-esteem may be reduced, subsequently increasing risk behaviors (Bandura, 1994).

Despite several studies demonstrating that negative affect is associated with risky sexual behavior, this is not a consistent finding. Crepez and Marks (2001) did not find evidence for the

link in their meta-analysis of 34 studies that examined this association, including studies that assessed populations such as MSM and substance users. In fact, they found that among the sample of substance users, the strength of the association between risky sexual behaviors and negative affect was the lowest compared to other samples and populations. In discussing their results, Crepaz and Marks (2001) emphasized the importance of methodological issues contributing to their findings. For example, poor temporal association between RSB and affective states (e.g., assessing negative affect within the past two weeks and sexual behavior within the past month) may have weakened the association between the two factors in many studies. For example, Kalichman (1999) found no evidence to support the link between negative affect states and risky sexual behavior. However, they assessed emotional distress within the past week and sexual risk within the past six months. In their discussion, Crepaz and Marks (2001) proposed that the relationship between these two factors could be better explained by an “inverted U-shape relationship”, rather than by a linear relationship. They explained that risky sexual behavior may be the highest among individuals with moderate depressive symptoms and lowest among those with severe or mild symptoms. Further, they argue that individuals with high levels of depression or clinically significant depression may experience a loss of interest in sex or decreased libido, as this is commonly associated with depression.

Conclusions and Present Study

While several studies have documented positive associations between psychological distress and risky drug use behaviors among opioid dependent individuals, the research regarding the relationship between psychological distress and risky sexual behaviors is more complicated. Crepaz and Marks (2001) found no significant association between psychological distress and risky sexual behavior among a substance using population in their meta-analysis. They suggest

that methodological factors such as the use of narrow measures to assess psychological distress and risky sexual behaviors, the temporal association of these variables, and small sample sizes of the studies assessed likely contribute to this inconsistency. The idea of a curvilinear model of psychological distress and risky sexual behavior was proposed by Crepaz and Marks (2001) given that they found no significant relationship between those two factors in their meta-analysis. The purpose of the present study is to test for a curvilinear relationship between risky sexual behavior and psychological distress in opioid dependent individuals while reducing methodological limitations commonly found in the literature. Because opioid dependence and psychological distress have been shown to reduce sexual interest and libido, it is proposed that those with higher levels of psychological distress will engage in significantly less risky sexual behavior; and those with minimal-to-no psychological distress will engage in safe sex more frequently than those with moderate psychological distress. Additionally, the present study sought to confirm previous research that indicates the presence of polysubstance abuse is associated with increased psychological distress. Further, the present study sought to confirm previous research that indicates the presence of injection use is associated with increased risky sexual behavior, increased polysubstance abuse, and increased psychological distress. For the present study, the following hypotheses are offered:

Hypothesis 1A. Among opioid dependent individuals, it was hypothesized there would be a curvilinear relationship between psychological distress and risky sexual behaviors, in that individuals who were found to have moderate levels of psychological distress would engage in more risky sexual behavior than those with low or high levels of psychological distress. Risky sexual behaviors were measured by the Sexual Risk Survey (SRS) total score. Psychological distress was measured by the Depression Anxiety Stress Scale (DASS).

Hypothesis 1B. It was also hypothesized that females with moderate levels of psychological distress would report engaging in increased risky sexual behaviors compared to females with low or high levels of psychological distress. Given the differences between males and females regarding psychological distress, separate regressions for males and females were utilized to determine if the relationship among psychological distress and risky sexual behaviors is different for the two genders. As noted previously, psychological distress was assessed using the DASS, and risky sexual behaviors was measured by the SRS total score.

Hypothesis 2. It was further hypothesized that individuals who report polysubstance use (e.g., using opioids and at least one other substance) would report increased psychological distress, as measured by the DASS, compared to those who report only opioid use.

Hypothesis 3. Compared to individuals who deny injection drug use, it was hypothesized that those who report injection use would report engaging in more risky sexual behaviors, as measured by SRS, more polysubstance abuse, and would have greater psychological distress, as measured by the DASS.

Method

Participants

Treatment-seeking clients from a methadone maintenance treatment (MMT) program located in the southeastern United States were utilized for the present study. All participants were at least 18-years-old, as that is the age requirement for admission to the treatment facility, and all met criteria for opioid dependency according to The Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000). At the time of data collection, the treatment facility served between 300 and 315 clients. Prior to data collection, it was determined that survey collection would continue until reaching

approximately 165 participants, or until the number of willing participants were exhausted.

Participants were all placed into a drawing for a chance to win one of six \$50.00 Visa gift cards.

The final sample was composed of 113 participants (50 females and 63 males), as the amount of willing participants had been exhausted. The ages of the participants ranged from 19 to 60 ($M = 33.84$, $SD = 8.39$). In regards to ethnic background, 88.5% ($n = 100$) of the participants were Caucasian, 5.3% ($n = 6$) Native American, 4.4% ($n = 5$) as Multi-Racial, and 1.8% ($n = 2$) and African-American. Furthermore, 96.5% ($n = 109$) of participants identified themselves as heterosexual, 2.7% ($n = 3$) as bisexual, and 0.9% ($n = 1$) as homosexual. The majority of participants were married (37.2%; $n = 42$), followed closely by those identifying as single (32.7%; $n = 37$) and as having a significant other or dating (15.0%; $n = 17$). With respect to education level, 11.5% ($n = 13$) of participants reported having not completing high school, 34.5% ($n = 39$) reported having a high school diploma, and 33.6% ($n = 38$) reported having completed some college. Additionally, 13.3% ($n = 15$) reported having completed an Associate's Degree, 6.2% ($n = 7$) reported having completed a Bachelor's Degree, and 0.9% ($n = 1$) reported having completed a Master's Degree. The majority of participants were employed full time (44.2%; $n = 50$); whereas 33.6% ($n = 38$) were unemployed, 13.3% ($n = 15$) were employed part-time, and 8% ($n = 9$) were disabled.

Participants being prescribed methadone consisted of 57.5% ($n = 65$) of the sample and those being prescribed Suboxone consisted of 41.6% ($n = 47$) of the sample. Time in treatment ranged from 0 months to 312 months (26 years) with the average time in treatment being 20.67 months ($SD = 38.61$).

Measures

Demographics questionnaire. A demographics questionnaire was developed by the author to ascertain demographic information relevant to the current study. Questions regarding the patients' age, gender, race, education level, employment status, marital status, sexual orientation, and length of time in treatment were included in the questionnaire (see Appendix B).

Drug use history. Patients were also administered an author-developed questionnaire assessing drug use history and current drug use patterns (see Appendix C). A questionnaire was specifically developed for the present study, as several other drug use experience measures utilize a structured interview format and are not developed for self-reporting, therefore not meeting the needs of the present study. Further, the questionnaire was developed by utilizing a similar format of drug use history portion of the psychosocial assessment used in the facility, with portions added based upon the needs of the current study (e.g., drug use frequency within the past six months). Classes of drugs included are alcohol, cannabis, benzodiazepines, amphetamines, cocaine, prescription opioids, and heroin. Additionally, patients' mode of use was assessed.

Depression Anxiety Stress Scale (DASS). The DASS (Lovibond & Lovibond, 1995b) was used to assess depression and anxiety within the past six months (see Appendix D). The DASS is a 42-item self-report measure designed to assess depression, anxiety, and tension/stress. In the original measure, participants are asked to rate each item on a four-point Likert scale of frequency or severity of their experiences over the past week. However, for the current study, the DASS instructions were altered to assess for depression, anxiety, and stress within the last six months. The primary purpose of this was to appropriately assess the psychological distress within the same temporal period as risky sexual behavior. Participants were asked to think back

to the time that they were the most depressed, anxious, or stressed within the last six months and to rate their symptom experiences within that worst period of time. In addition to the scales for depression, anxiety, and stress, a DASS Total Score (i.e. Psychological Distress Total) was utilized for the present study. Research has shown the DASS to have good internal consistency levels on the depression, anxiety, and tension/stress subscales, with alpha coefficients of 0.91, 0.84, and 0.90, respectively (Lovibond & Lovibond, 1995a). In addition, the DASS has also demonstrated to possess good convergent and discriminant validity when compared to other measures of depression and anxiety (Brown, Chorpita, Korotitsch, & Barlow, 1997). The DASS was found to have good internal consistency levels on the depression, anxiety, and stress subscales for the present study as well, with alpha coefficients of 0.96, 0.91, and 0.95, respectively.

Sexual Risk Survey (SRS). The SRS (Turchik & Garske, 2009) is a 23-item measure that was used to evaluate the frequency and type of sexual risk behaviors engaged in among participants within the past six months (see Appendix E). The measure assesses and categorizes risk into five primary factors of risky sexual behavior: sexual risk taking with an uncommitted partner (factor 1), risky sexual acts (factor 2), impulsive sexual behavior (factor 3), intent to engage in risky sexual behavior (factor 4), and risky anal sex acts (factor 5). The SRS has demonstrated good psychometric properties among college students. Turchik and Garske (2009) found the scale's internal consistency to be 0.88 and the test-retest reliability over the course of two weeks to be 0.93 when assessing college students. Internal consistency for the five primary factors of risky sexual ranged from 0.63 to 0.90 (Turchik, Walsh, & Marcus, 2014). Further, it has been shown to have adequate convergent and concurrent validity. However, the no information could be found regarding its psychometric properties among adults who are not in

college. For the present study, internal consistency was found to be 0.94 for the total score. The internal consistency for the five factors were as follows: sexual risk taking with an uncommitted partner (factor 1; 0.95), risky sexual acts (factor 2; 0.82), impulsive sexual behavior (factor 3; 0.88), intent to engage in risky sexual behavior (factor 4; 0.91), and risky anal sex (factor 5; 0.72).

Procedure

A meeting was held with clinical counselors and treatment staff to explain the purpose of the present study and describe the information that would be gathered via the self-report questionnaires. In addition to recruitment flyers (see Appendix F) that were hung in several locations around the facility, clinical counselors at the treatment center assisted by telling their clients about the study on data collection days.

Data collection was conducted in a conference room in the Clinic on the specified days (three days per week) over a three month period. Clinical counselors who had patients interested in participating sent patients to the conference room to review the consent form and complete the questionnaires if they remained interested in participating. All participants read the consent form (see Appendix A) or had it read to them if they preferred, and were provided with an opportunity to ask question regarding the study and their participation. Once the patients had agreed to participate, they were given a questionnaire packet to complete in paper-pencil format. The packet contained the following measures: the demographic questionnaire, the drug use history questionnaire, the Depression Anxiety Stress Scale (DASS), and the Sexual Risk Survey (SRS).

Completed questionnaire packets were placed in a locked file box through a slot by the participant to preserve their confidentiality. At the end of each data collection day, the questionnaire packets were removed from the file box and transferred to a locked file cabinet.

All participant responses were anonymous in that no information was collected linking the participant to their data such as name or birth date. Participants' client identification numbers were placed on index cards for the compensation drawing. Index cards were kept in a separate locked file cabinet. The drawing was completed at the end of the data collection period and the six \$50.00 Visa gift cards were distributed to the drawing winners via their clinical counselors.

Results

Data Analysis

When examining the data, it became apparent that several survey questions were frequently left unanswered by participants. On the DASS, 38% of the question items were missing one response and 21% were missing two responses. However, the primary source of missing data was question number 21 on the DASS (13 missing responses). It appears that these participants may have not seen the question as it was printed at the top of the next page. The question loaded on the depression scale and therefore the depression scale was unable to be calculated for many individuals. Additionally, all of the items on the SRS had missing data ranging from between one and nine incidents of missing items (26% of questions were missing one to two responses, 43% were missing three to four responses, 22% were missing five to six responses, and 9% were missing between seven and nine responses). Due to the significant amount of missing data, the missing value analysis in SPSS (Version 23; IBM Corp., 2015) was utilized for the DASS and the SRS. The missing values analysis assesses the pattern of missing values and inputs the missing values with estimated values using regression or expectation maximization.

While a total score of the DASS is not typically used, the authors indicated that a total score could be computed by converting the three subscale scores to z-scores via a chart in the

manual (Lovibond & Lovibond, 1995b). The z-scores were then averaged, forming the DASS total score. DASS severity ratings using z-scores can be found in Table 4.

Additionally, to test a curvilinear relationship in hypothesis 1A and 1B, a hierarchical multiple regression was utilized. For hypothesis 1A, four separate regression models were completed to assess the relationship between the SRS total score and psychological distress scores. In the hierarchical multiple regression, gender was inserted in the first block as a control, the measure of psychological distress (i.e. DASS Total Score, depression subscale score, anxiety subscale score, or stress subscale score) was inserted in the second block, and the squared value of the psychological distress measure (i.e. DASS Total Score, depression subscale score, anxiety subscale score, or stress subscale score) was inserted in the third block (How2stats, 2011). For hypothesis 1B, two separate hierarchical multiple regression analyses were completed, one for males and one for females. The measure of psychological distress was inserted in the first block and the squared value of the psychological distress measure was inserted in the second block.

Hypothesis 1A. Hypothesis one predicted a curvilinear relationship between psychological distress and risky sexual behaviors, in that individuals who were found to have moderate levels of psychological distress would report engaging in more risky sexual behavior than those with low or high levels of psychological distress. Gender contributed significantly to the regression model, $F(1,111) = 8.725$, $p = .004$, and accounted for 7.3% of the variation in risky sexual behavior. However, the DASS total score did not explain a significant proportion of variance in risky sexual behavior, $R^2 = .075$, $F(3,109) = 2.963$, $p = .844$ (see Table 6). Similarly, depression ($M = 1.75$, $SD = 1.79$; $R^2 = .096$, $F(3,109) = 3.87$, $p = .238$), anxiety ($M = 2.05$, $SD = 1.97$; $R^2 = .073$, $F(3,109) = 2.859$, $p = .935$), and stress ($M = 1.38$, $SD = 1.45$; $R^2 = .074$, $F(3,109) = 2.894$, $p = 0.965$) were not found to explain a significant proportion of variance in the

SRS total score (see Tables 7 – 9). Therefore, a curvilinear relationship was not found to be supported between psychological distress and risky sexual behaviors.

Additionally, a linear model was also not supported when assessing a relationship between risky sexual behaviors and DASS total score ($R^2 = .009$, $F(1,111) = .998$, $p = .320$), depression ($R^2 = .021$, $F(1,111) = 2.346$, $p = .128$), anxiety ($R^2 = .001$, $F(1,111) = .142$, $p = .707$), or stress ($R^2 = .008$, $F(1,111) = .914$, $p = .341$).

Hypothesis 1B. Hypothesis 1B predicted that females with moderate levels of psychological distress would report engaging in increased risky sexual behaviors compared to females with low or high levels of psychological distress, and that this pattern would not be as present with males. Results indicated that DASS total scores did not explain a significant proportion of variance in SRS total score among females ($R^2 = .018$, $F(2,47) = .442$, $p = 0.639$; see Table 10) or among males ($R^2 = .016$, $F(2,60) = .490$, $p = 0.588$; see Table 11). Among both females and males, depression (female $R^2 = .007$, $F(2,47) = .177$, $p = 0.687$; male $R^2 = .053$, $F(2,60) = 1.683$, $p = 0.235$), anxiety (female $R^2 = .063$, $F(2,47) = .1.572$, $p = 0.272$; male $R^2 = .011$, $F(2,60) = .334$, $p = 0.476$), and stress (female $R^2 = .002$, $F(2,47) = .057$, $p = 0.981$; male $R^2 = .004$, $F(2,60) = .123$, $p = 0.943$) were not found to explain a significant proportion of variance in risky sexual behaviors (see Tables 12 – 17). Overall, regardless of gender, a curvilinear relationship between psychological distress and risky sexual behaviors was not supported.

However, some gender differences were documented in the present study. Male participants reported significantly higher SRS total scores, compared to females, $t(111) = -2.954$, $p = .004$. Additionally, female participants reported significantly higher DASS total scores, compared to male participants, $t(111) = 1.988$, $p = .049$. Female participants also reported significant higher DASS stress scores, compared to male participants, $t(111) = 2.443$, $p = .016$.

However, DASS depression scores were not found to significantly vary between males and females, $t(111) = 1.595, p = .114$, nor were DASS anxiety scores, $t(111) = 1.657, p = .100$ (see Table 1 for means and standard deviations).

Hypothesis Two. Hypothesis two predicted that individuals who report polysubstance use (e.g., using opioids and at least one other substance) would report increased psychological distress. This prediction was analyzed using independent samples t -tests. Although average DASS total scores, DASS depression, DASS anxiety, and DASS stress scores were found to be higher in those who reported polysubstance use compared to those who reported using opioids only (Table 2), these differences were not found to be statistically significant [DASS total $t(111) = -1.23, p = .481$; depression $t(111) = -1.27, p = .207$; anxiety $t(111) = -.708, p = .481$; stress $t(111) = -1.613, p = .110$]. Therefore, this hypothesis was not supported - polysubstance use was not associated with significantly increased psychological distress (Figure 1).

Hypothesis Three. Hypothesis three predicted that individuals who reported injection use at any point in their lives would report increased risky sexual behaviors within the past six months, polysubstance abuse within the past six months, and psychological distress within the past six months, as compared to those who do not inject. As in hypothesis three, independent samples t -tests were utilized. Means and standard deviations can be found in Table 3. No significant differences were revealed between those who reported injection use and those who did not regarding their overall psychological distress ($t(111) = -1.716, p = .089$), depression ($t(111) = -1.218, p = .226$), and stress ($t(111) = -1.179, p = .241$). Further, no significant differences were found in risky sexual behavior among those who reported injection use and those who did not ($t(111) = -.623, p = .535$). However, individuals who reported injection use reported experiencing increased anxiety ($t(111) = -.2265, p = .025$).

Exploratory Analyses. Due to the non-significant results regarding a curvilinear relationship between psychological distress and total risky sexual behavior scores, correlational analyses were used to determine whether psychological distress was associated with sexual risk scores in the five SRS subscales. The DASS total score was found to have a negative correlation with impulsive sexual behavior, $r(111) = -.195, p = .039$, and intent to engage in risky sexual behavior, $r(111) = -.208, p = .027$. Additionally, depression was also found to have a negative correlation with impulsive sexual behavior, $r(111) = -.237, p = .011$, and intent to engage in risky sexual behavior, $r(111) = -.233, p = .013$. Finally, stress was found to have a negative correlation with impulsive sexual behavior, $r(111) = -.201, p = .032$, and intent to engage in risky sexual behavior, $r(111) = -.204, p = .031$. However, the effect sizes of these correlations are all small (Cohen, 1988). This finding indicates that individuals with increased psychological distress, depression, and stress engage in less of some types of risky sexual behavior, which is in contrast with the original hypothesis. The sexual risk subscales of sexual risk taking with an uncommitted partner, risky sexual acts, and risky anal sex acts were not found to be correlated with any of the psychological distress subscales (see Table 5 for correlations).

The correlation between length of time in treatment and risky sexual behaviors, as well as length of time in treatment and psychological distress, were examined to potentially explain the lack of significant findings for the hypotheses 1A and 1B. However, no association between time in treatment and risky sexual behaviors was found in the present study, $r(109) = -.068, p = .481$. Further, no significant correlation was found between time in treatment and DASS Total Score, $r(109) = -.006, p = .953$, depression, $r(109) = -.003, p = .974$, anxiety, $r(109) = -.017, p = .863$, or stress, $r(109) = -.046, p = .637$.

Marital status and the relationship to risky sexual behavior was also examined in order to help explain the lack of significant findings for hypothesis 1A and 1B. However, in the present study, total risky sexual behavior scores were not found to be significantly different depending on the marital status of the participant, $F(5, 107) = 1.683, p = .145$.

Discussion

The current study investigated the impact of psychological distress on risky sexual behaviors among an opioid-dependent population and a curvilinear model was proposed to explain the relationship among these variables. Crepaz and Marks (2001) did not find support for a linear model between psychological distress and risky sexual behavior in their meta-analysis, prompting their hypothesis that a curvilinear model may explain the relationship between these factors. However, results of the present study indicated that among a treatment-seeking opioid-dependent sample, a curvilinear model between psychological distress and risky sexual behavior, when controlling for gender, was not supported. Additionally, the curvilinear model was not supported when males and females were analyzed separately. Further, a linear model was also not supported when assessing a relationship between psychological distress and risky sexual behaviors.

Several factors may have contributed to the failure to support the curvilinear or linear model between risky sexual behaviors and psychological distress. When assessing psychological distress and its impact on risky sexual behavior in their meta-analysis, Crepaz and Marks (2001) found the sample of substance users to have the highest percentage of low effect sizes ($ES \leq .10$), as compared to other groups studied (e.g., MSM, HIV-positive samples, adolescents at risk for infection, etc.). Taken together with results from the present study, a curvilinear relationship

between risky sexual behaviors and psychological distress does not exist among a drug-using population but may exist among a non-drug using population. With a curvilinear model, risky sexual behaviors were proposed to be the highest among those experiencing moderate level of psychological distress, and lowest among those experiencing mild and severe levels of psychological distress. It has been well documented that individuals who abuse substances tend to have greater amounts of psychological distress compared to non-drug using populations (Chaudhury & Singh, 2009; Goodwin & Stein, 2013). In the present study, the majority of participants were in the extremely severe range of depression (33.6%) and anxiety (33.6%), and equal amounts of participants were in the normal and extremely severe range of DASS Total Scores (26.5%; Figure 3). It is possible that the variability among level of distress may be a potential reason why the curvilinear model was not found with this sample.

Secondly, the use of other substances likely has an impact on the relationship between risky sexual behavior and psychological distress. As noted previously, stimulant use, particularly cocaine use, has been associated with increased risky sexual behaviors (e.g., Bux et al., 1995; Grella et al., 1995; Joe & Simpson, 1995). Fourteen percent of participants in the present study reported cocaine use within the past six months. Further, 12% of participants reported methamphetamine use within the past six months and 13% reported other stimulant use (e.g., prescribed amphetamines). Additionally, the use of benzodiazepines has been associated with increased risky sexual behaviors (e.g., Darke, Hall, Ross, & Wodak, 1992; McCabe, 2005). In the present study, 29% of participants reported benzodiazepine use. Given the association between increased risky sexual behaviors and the use of these substances, it is possible that use of stimulants or benzodiazepines led to increased risky sexual behavior overall, regardless of level of psychological distress.

It was hypothesized that polysubstance use would be associated with increased psychological distress; although this was also found to be not supported. This is in contrast with the majority of other research that demonstrates a relationship between these two factors (e.g., Bizarri et al., 2007; Darke & Ross, 1997; Wu et al., 2010). It is possible that that the pattern and type of polysubstance use, rather than simply the presence, may impact the level of psychological distress in drug-using individuals. Morley, Lynskey, Moran, Borschmann, and Winstock (2015) identified six classes of polysubstance use: Class 1 – no polysubstance use; Class 2 – cannabis and ecstasy use, Class 3 – all illicit use; Class 4 – ecstasy and cocaine use, Class 5 – cannabis and medication (e.g., benzodiazepines, opioids, etc.), and Class 6 – all drug use. They found individuals in the cannabis and prescription medication class were more likely to report anxiety and/or depression diagnoses, compared with the other classes.

Crepaz and Marks (2001) expressed criticism regarding poor temporal associations between risky sexual behavior variables and psychological distress as potential reasons for non-significant results when examining a linear relationship. The present study attempted to correct this potential limitation by assessing drug use, psychological distress, and risky sexual behavior all within a six-month time frame. However, the use of retrospective reporting by the present study and the majority of previous research examined by Crepaz and Marks (2001) is a large limitation of the literature as a whole.

While the present study failed to find a significant relationship between length of time in treatment and an improvement in psychological distress and risky sexual behaviors, this is in contrast to much of the literature. Several studies document an association between time in treatment and the improvement of psychological distress symptoms (Conners, Grant, Crone, & Whiteside-Mansell, 2006; Qian et al., 2008). For example, Conners et al. (2006) found

significantly decreased depression symptoms and posttraumatic stress disorder symptoms among females from their intake to follow-up while in a residential substance abuse facility.

Additionally, time in treatment and a reduction of risky behaviors have been found to be linked in the literature. For example, in a literature review of numerous studies assessing the association between substance abuse treatment participation and HIV risk reduction, Metzger et al. (1998) found that those individuals who enter and remain in treatment exhibit less drug-related risk behaviors. Further, in a review of studies assessing MMT and its effect on HIV-risk behaviors among injection drug users, Sorenson and Copeland (2000) found evidence for a reduction in risky injection use behaviors, although noted that the evidence that MMT reduces risky sexual behaviors was much less robust. However, the authors did not evaluate length of time in treatment as a variable, but explained that the research is mixed on whether reduced HIV-risk behaviors in treatment are a result of being in treatment by itself, or as a result of education or interventions learned in treatment. It is possible that among a non-injection drug using population, time in treatment could be associated with decreased risky sexual behavior, as individuals who do not inject drugs may be more likely to attribute their HIV-risk behaviors to sexual behavior and therefore make more significant health-conscious changes to their sexual behavior (e.g., Mitchell & Latimer, 2009).

While the presence of injection use was not associated with DASS total score, depression, stress, or SRS total score, individuals who reported injection use reported greater anxiety. The transition from non-injection drug use to injection drug use tends to signify worsening or more severe drug use behaviors, which in turn is associated with increased psychological distress and psychosocial stress (e.g., financial difficulties, relationship difficulties, etc.; Mars, Bourgois, Karandinos, Montero, & Ciccarone, 2014; Reyes et al., 2007).

Anxiety and worry have found to be associated with injection use in previous research. Exner, Gibson, Stone, Lindquist, Cowen, and Roth (2009) identified three categories of worry that were found among individuals who report injection drug use: worry about overall personal security, worry about risks associated with injection drug use such as overdosing and veins collapsing, and worry about contracting infectious diseases. Additionally, research has also associated anxiety with increased risky injection use (e.g., sharing needles; Lundgren, Amodeo, & Chassler, 2005; Reyes et al., 2007).

Depression and stress were not found to be associated with injection drug use in the present study. This is similar to a small amount of research when comparing IDU and non-IDU (Ibanez, Purcell, Stall, Parsons, & Gomez, 2005; Semple, Strathdee, Zians, McQuaid, & Patterson, 2011). Ibanez et al. (2005) documented that IDU in their study were significantly more likely to report increased anxiety compared to non-IDU; although were not more likely to report increased depression. However, the majority of literature findings widely indicate both increased depression and anxiety symptoms are associated with injection drug use; although this is often in the absence of substance abuse treatment (Darke & Ross, 1997; Havens, Oser, & Leukefeld, 2011; Ibanez, Purcell, Stall, Parsons, & Gomez, 2005). MMT has been associated with decreased depression, potentially explaining the lack of association between depression and injection use in the current study (Brienza et al., 2000; Hesse, 2006; Schreiber, Peles, & Adelson, 2008).

Due the non-significant results when assessing the relationship between psychological distress and total risky sexual behavior scores, correlations between psychological distress and the five separate SRS subscales were analyzed. Results suggested that as total psychological distress, depression, and stress increases, impulsive sexual behavior and the intent to engage in

risky sexual behavior decreases. This may be due to the fact that both psychological distress and opioid dependency have been documented to have a negative effect on an individuals' desire to engage socially with others, as well as negatively influences libido (e.g., Al-Gommer et al., 2007; Johnson et al., 2004). However, results suggested no such relationship existed for the association between psychological distress and the other risky sexual behaviors of sexual risk taking with an uncommitted partner, risky sexual acts, and risky anal sex acts. This finding is surprising, given the plethora of research suggesting an association between psychological distress and lack of condom use (i.e. risky sexual acts; e.g., Lundberg et al., 2011; Morrison-Beedy, et al., 2008; Ramrakha et al., 2000) and between psychological distress and having sex with uncommitted or concurrent partners (e.g., Lundberg et al., 2011; Seth et al., 2009). A potential explanation for the lack of a significant relationship among these factors is that, as noted previously, individuals may be engaging in less sexual behaviors overall due to their opioid dependency, therefore reducing the likelihood of having unprotected sex or sex with an uncommitted partner. Further, a minority of individuals in the present study endorsed engaging in risky anal sex acts and while the majority of previous research examining psychological distress and risky anal sex acts have been conducted with homosexual and bisexual males, only 2.7% of participants identified as bisexual and 0.9% identified as homosexual.

While the present study failed to find evidence that risky sexual behavior is associated with the marital status of the individual, other research has found differences in sexual behavior depending on marital status. Individuals who are married or in a monogamous relationship likely have fewer sexual partners although may also engage in increased unprotected sex, while individuals who are single or dating may have more sexual partners and may engage in more impulsive sexual behaviors. For example, Johnson et al. (2001) documented higher rates of

acquisition of new partners among those not cohabitating or married. Johnson et al. (2001) also found an increase in inconsistent condom use among those who reported having two or more partners. They suggested that a larger proportion of individuals are cohabitating rather than marrying in recent years, and that cohabitation is associated with increased number of partners or partner change (Johnson et al., 2001).

It is noteworthy to mention that the demographics for the present study are similar to the demographics of the MMT program in terms of gender, age, and race at the time of data collection. Other studies assessing individuals enrolled in MMT found similar findings in terms of average age and gender makeup of the sample. For example, other studies using participants from MMT programs documented average age of participants to vary between 27 and 39 years (Callaly et al., 2001; Lollis et al., 2000; Ross et al., 2005), which is commensurate with the present study's mean age of 33-years-old. However, in the literature assessing participants from MMT programs, marital status demographics tend to vary greatly depending on the study, with some finding as little as 7% of participants being married to 73% married (e.g., Bux et al., 1995; Cacciola et al., 2001; Carpentier et al., 2009). Prevalence rates regarding marital status in the present study are significantly different when compared to the general population, as well. For example, in the United States, roughly half of adults are married, whereas in the present study, only approximately one third of participants were married (U.S. Census Bureau, 2013). Additionally, the ethnic background of participants in the present study is not representative of the general United States population, or of the geographical location of the facility (U.S. Census Bureau, 2015).

Limitations and Future Directions

Given the sensitive nature of the areas assessed in the present study, it is possible that participants may have been hesitant to report information such as sexual behavior, or information that they may have viewed to impact their treatment such as drug use behavior. This likely affected their overall disclosure of certain behaviors. Although the present study's participants were ensured that responses were anonymous, it is possible that individuals may have provided an over-estimate of socially acceptable behavior (e.g., condom use) and an under-estimate less socially acceptable behavior (e.g., multiple partners). Additionally, the present study used retrospective reporting of risky sexual behaviors, psychological distress, and substance use variables. In their review of issues surrounding retrospective reporting in sexual behaviors research, Schroder, Carey, and Venable (2003) noted accuracy of self-reports decline for time frames greater than three months. Given that the present study assessed sexual behavior, as well as psychological distress and drug use, over a period of six months, this could have impacted the accuracy of the data collected. Finally, the SRS has been found to have good psychometric properties when used with young adults and college student samples. However, the present study utilized the SRS to assess sexual risk behaviors in an adult, opioid-dependent sample. It is possible some of the SRS question items do not apply to adults as much as they do to young adults, potentially impacting the amount of sexual risk reported.

The present study has several important implications for future research. The study's lack of support for the primary hypothesis of a curvilinear relationship between risky sexual behaviors and psychological distress suggests there are other variables that may impact the relationship that should be examined. For example, given the high prevalence of polysubstance use in opioid-dependent populations, more information regarding the classes of substances used and their impact on risky sexual behavior should be examined. Additionally, other psychological

symptoms aside from depression and anxiety, or more specific symptoms of depression or anxiety (e.g., self-esteem, self-efficacy, social anxiety, etc.) should be examined for their role in risky sexual behavior among an opioid dependent population. Further, the relationship between injection use behaviors, anxiety, and risky sexual behavior should be further explored.

Additionally, future research should explore the impact of people's beliefs regarding their risk of disease transmission via sexual risk behaviors.

The primary conclusion drawn from the present study emphasizes that the relationship between risky sexual behaviors and psychological distress within a drug using population is complex and is likely a combination of several factors, including social, emotional, and environmental factors. However, it will be important that future research continue to work towards determining these individual factors that impact disease transmission in the drug using population in order to develop interventions aimed at reducing disease transmission.

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Appendix A

UNIVERSITY OF SOUTH CAROLINA AIKEN

INFORMED CONSENT

An Examination of the Relationship between Psychological Distress and Risky Sexual Behaviors among a Treatment-Seeking Opioid-Dependent Population

Jane Stafford, PhD and Hayley Smith, Graduate Student

PURPOSE AND BACKGROUND:

You are invited to participate in a research study investigating the relationship between psychological distress (i.e. depression and anxiety) and sexual behavior. This study is investigating how feelings of psychological distress may be associated with the tendency to engage in sexual behavior that is determined risky. The results of the study may be used to help researchers design interventions that could improve sexual health behaviors and reduce overall disease transmission rates. This study is being conducted by Hayley Smith to fulfill requirements for a master's degree at the University of South Carolina Aiken (USCA). Dr. Jane Stafford is the faculty supervisor for this study. Please read this form carefully and ask questions you may have before making the decision whether or not to participate.

PROCEDURES:

Your participation in this study will involve attending one session. If you agree to participate in this study, the following will happen:

1. You will be asked to complete some questionnaires/surveys about your basic demographic information, your drug use history and any current drug use, symptoms of depression, anxiety, and stress, and sexual behaviors.

DURATION:

We expect that it will take you approximately 30 minutes to complete the questionnaires.

RISKS/DISCOMFORTS:

The potential risk of loss of confidentiality is the primary risk associated with this study. However, this is mitigated by the fact that your responses are submitted anonymously.

CONFIDENTIALITY:

You will submit your responses anonymously. Your name will not be on any of the survey forms and you will be asked to turn in your survey packets into a locked file box with a slot in the top. At the end of each data collection day, the survey packets will be transferred to a locked file cabinet and only authorized study personnel will have access to them. ***Please do not write your name on any survey materials.***

BENEFITS:

While you may not experience any personal benefits from the completion of the questionnaires, it is the hope that the increase in knowledge about these issues will benefit society at large.

PAYMENT TO PARTICIPANTS:

For compensation, you will be entered into a drawing for the chance to win one of six \$50.00 Visa gift cards. If you would like to be entered into the drawing, you will be asked to write your name on a piece of paper completely separate from the survey packets. This paper will also be stored in a locked file cabinet. Approximately 165 individuals will be surveyed, making the odds winning a gift card roughly 1 in 27.

VOLUNTARY PARTICIPATION:

You are free to discontinue your participation in the study at any time. If you wish to stop, you may do so without any repercussions and still be entered to win the drawing for compensation. You may simply tell the researcher that you wish to stop. Additionally, you are free to skip any questions should you wish to not answer. ***This study is not connected to your treatment at Aiken Treatment Specialists your participation will not impact your treatment.***

CONTACTS:

If you have any questions about this study, please contact the Principle Investigator, Hayley Smith, at smith62@email.usca.edu, or her supervisor Dr. Jane Stafford at jstafford@usca.edu.

Questions about your rights as a research subject are to be directed to, Lisa Marie Johnson, IRB Manager, Office of Research Compliance, University of South Carolina, 1600 Hampton Street, Suite 414D, Columbia, SC 29208, phone: (803) 777-7095 or email: LisaJ@mailbox.sc.edu.

Appendix B
Demographics Questionnaire

Please answer the following questions.

1. Gender (circle one): Male Female

2. Date of Birth: _____

3. Ethnicity (circle one): European American (Caucasian) African American
 Hispanic American Native American
 Asian American Multi-Racial
 International

4. Sexual Orientation (circle one): Heterosexual Homosexual Bisexual

5. Marital Status (circle one): Single Significant Other/Dating Engaged
 Married Separated/Divorced Widowed
 Co-Habiting

6. Education Level (circle one): No High School Diploma High School Diploma/GED
 Some College (No degree) Associates Degree
 Bachelor's Degree Master's Degree
 Doctorate Degree

7. Employment (circle one): Unemployed Employed Part Time
 Employed Full Time Disabled

8. Time enrolled in methadone maintenance treatment: _____(months)

9. Time enrolled in Suboxone © treatment: _____ (months)

Appendix C

Drug Use History Questionnaire

Drug	Examples/Other names	Ever Used	Total Years Used	Intravenous Drug Use	Frequency of Past Use (6 months) – see below
Alcohol	N/A	Yes No		Yes No	
Cannabis	Marijuana, pot, weed	Yes No		Yes No	
Benzodiazepines	Valium, Xanax, Klonopin	Yes No		Yes No	
Amphetamines	Methamphetamine, ice, crank	Yes No		Yes No	
Other Stimulants	Ritalin, Dexedrine, Adderall	Yes No		Yes No	
Cocaine	Crack, blow	Yes No		Yes No	
Prescription Opioids	Hydrocodone, Oxycodone, Morphine, Dilaudid, Fentanyl	Yes No		Yes No	
Heroin	N/A	Yes No		Yes No	

Frequency of Use:

0 = No use

1 = Less than once per month

2 = Once per month

3 = 2-3 times per month

4 = Once per week

5 = 2-5 times per week

6 = daily

Appendix D

DASS

Name:

Date:

Think back to the period of time in which you felt the most depressed, anxious, or stressed within the last six months. Please read each statement and circle a number 0, 1, 2 or 3 that indicates how much the statement applied to you *during the worst period of time within the last six months*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found myself getting upset by quite trivial things	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I just couldn't seem to get going	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I had a feeling of shakiness (eg, legs going to give way)	0	1	2	3
8	I found it difficult to relax	0	1	2	3
9	I found myself in situations that made me so anxious I was most relieved when they ended	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting upset rather easily	0	1	2	3
12	I felt that I was using a lot of nervous energy	0	1	2	3
13	I felt sad and depressed	0	1	2	3
14	I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)	0	1	2	3
15	I had a feeling of faintness	0	1	2	3
16	I felt that I had lost interest in just about everything	0	1	2	3

17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life wasn't worthwhile	0	1	2	3

Reminder of rating scale:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

22	I found it hard to wind down	0	1	2	3
23	I had difficulty in swallowing	0	1	2	3
24	I couldn't seem to get any enjoyment out of the things I did	0	1	2	3
25	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
26	I felt down-hearted and blue	0	1	2	3
27	I found that I was very irritable	0	1	2	3
28	I felt I was close to panic	0	1	2	3
29	I found it hard to calm down after something upset me	0	1	2	3
30	I feared that I would be "thrown" by some trivial but unfamiliar task	0	1	2	3
31	I was unable to become enthusiastic about anything	0	1	2	3
32	I found it difficult to tolerate interruptions to what I was doing	0	1	2	3
33	I was in a state of nervous tension	0	1	2	3
34	I felt I was pretty worthless	0	1	2	3
35	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
36	I felt terrified	0	1	2	3
37	I could see nothing in the future to be hopeful about	0	1	2	3
38	I felt that life was meaningless	0	1	2	3

39	I found myself getting agitated	0	1	2	3
40	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
41	I experienced trembling (eg, in the hands)	0	1	2	3
42	I found it difficult to work up the initiative to do things	0	1	2	3

Appendix E

Sexual Risk Survey

Instructions: Please read the following statements and record the number that is true for you over **the past six months** for each question on the blank. If you do not know for sure how many times a behavior took place, try to estimate the number as close as you can. Thinking about the average number of times the behavior happened per week or per month might make it easier to estimate an accurate number, especially if the behavior happened fairly regularly. If you've had multiple partners, try to think about how long you were with each partner, the number of sexual encounters you had with each, and try to get an accurate estimate of the total number of each behavior. If the question does not apply to you or you have never engaged in the behavior in the question, put a "0" on the blank. Please do not leave items blank. **Remember that in the following questions "sex" includes oral, anal, and vaginal sex and that "sexual behavior" includes passionate kissing, making out, fondling, petting, oral-to-anal stimulation, and hand-to-genital stimulation.** Refer to the Glossary for any words you are unsure about. Please consider only the last six months when answering and please be honest.

1. _____ How many partners have you engaged in sexual behavior with but not had sex with?
2. _____ How many times have you left a social event with someone you just met?
3. _____ How many times have you "hooked up" but not had sex with someone you didn't know or didn't know well?
4. _____ How many times have you gone out to bars/parties/social events with the intent of "hooking up" and engaging in sexual behavior but not having sex with someone?
5. _____ How many times have you gone out to bars/parties/social events with the intent of "hooking up" and having sex with someone?
6. _____ How many times have you had an unexpected and unanticipated sexual experience?
7. _____ How many times have you had a sexual encounter you engaged in willingly but later regretted?

For the next set of questions, follow the same directions as before. However, for questions 8-23, if you have never had sex (oral, anal, or vaginal), please put a "0" on each blank.

8. _____ How many partners have you had sex with?
9. _____ How many times have you had vaginal intercourse without a latex or polyurethane condom? Note: Include times when you have used a lambskin or membrane condom.
10. _____ How many times have you had vaginal intercourse without protection against pregnancy?
11. _____ How many times have you given or received fellatio (oral sex on a man) without a condom?
12. _____ How many times have you given or received cunnilingus (oral sex on a woman) without a dental dam or "adequate protection" (please see definition of dental dam for what is considered adequate protection)?
13. _____ How many times have you engaged in anal sex without a condom?
14. _____ How many times have you or your partner engaged in anal penetration by a hand ("fisting") or other object without a latex glove or condom followed by unprotected anal sex?

15. _____ How many times have you given or received anilingus (oral stimulation of the anal region, “rimming”) without a dental dam or “adequate protection” (please see definition of dental dam for what is considered adequate protection)?
16. _____ How many people have you had sex with that you know but are not involved in any sort of relationship with (i.e., “friends with benefits,” “fuck buddies”)?
17. _____ How many times have you had sex with someone you don’t know well or just met?
18. _____ How many times have you or your partner used alcohol or drugs before or during sex?
19. _____ How many times have you had sex with a new partner before discussing sexual history, IV drug use, disease status and other current sexual partners?
20. _____ How many times (that you know of) have you had sex with someone who has had many sexual partners?
21. _____ How many partners (that you know of) have you had sex with who have been sexually active before you were with them but had not been tested for STIs/HIV?
22. _____ How many partners have you had sex with that you didn’t trust?
23. _____ How many times (that you know of) have you had sex with someone who was also engaging in sex with others during the same time period?

Glossary

Below is a list of terms used in one of the surveys. You are not required to read this, and the definitions may be offensive to some people. However, the definitions may be helpful in answering some of the questions.

Anilingus: Oral to anal stimulation, where a person stimulates another person's anal region with one's mouth/tongue (a.k.a. "rimming", "butt/ass licking")

Anal Sex: Penis to anus stimulation, where a man’s penis penetrates another person’s anus (a.k.a. "butt/ass sex")

Birth Control/Protection against pregnancy: Methods used to prevent pregnancy, such as taking birth control pills, Norplant implants, birth control patches, condoms, diaphragms, contraceptive sponges, withdrawing before ejaculation, etc. Note: Only latex and polyurethane condoms will also effectively protect against STIs

Condom: A male condom is a sheath (usually made of latex) that is placed on the outside of the penis and covers the entire shaft of the penis during sexual relations to help protect against pregnancy and STIs. A female condom is a soft flexible tube (usually made of polyurethane) that is inserted into the vagina before sex to protect against pregnancy and STIs. Note: Only latex & polyurethane condoms offer adequate protection against STIs.

Cunnilingus: Oral sex on a woman, using one’s mouth to stimulate a woman’s genitals (a.k.a. "eating a woman out", "going down on a woman")

Dental dam (or "adequate protection"): A thin piece of latex that can be placed between the mouth and the vagina during oral sex on a woman to help prevent STIs, or placed between the

mouth and anal region during oral to anal sex (analingus) to prevent STIs and bacterial infections. Although purchased dental dams are the most reliable, they can also be self-made by cutting a large square from a latex condom (people often use flavored condoms for this) or by using a square of plastic wrap as long as there are no holes in the material and the covering adequately covers the genital region. These self-made dental dams are considered "adequate protection" in this study.

Fellatio: Oral sex on a man, using one's mouth to stimulate a man's penis (a.k.a. "blow job", "giving head")

Hooking up: Engaged in sexual behavior (such as making out/fondling) or sex with someone, usually outside of a relationship

IV drugs: Intravenous drugs that are injected into the body using a needle and a syringe, drugs that you can "shoot up" such as heroin.

Oral Sex: Mouth to genital stimulation, using one's mouth to stimulate or touch the genitals of a man or a woman (a.k.a. fellatio, cunnilingus, "blow jobs", "going down on someone")

Sex: Includes oral, anal, and vaginal sex.

Sexual behavior: Includes passionate kissing, fondling, petting, oral-to-anal stimulation and hand-to genital stimulation (includes "making out", "dry sex/humping", "fingering", analingus, "rimming" "handjobs")

Sexual partner: A person with whom you have had sex (oral, anal or vaginal)

STI: Stands for a sexually transmitted infection, a disease that can be given to someone through oral, genital and/or anal sex. Some STIs may also be gotten through oral to anal contact and hand to genital contact. STIs include herpes, trichomonas, chlamydia, syphilis, gonorrhea, vaginitis, genital warts, pubic lice, hepatitis B and HIV infection which leads to AIDS.

Vaginal sex: Sexual intercourse where a man's penis penetrates a woman's vagina, this is the only type of sex that can directly result in pregnancy. (Please note that rear-entry intercourse, such as "doggy-style" sex, is considered vaginal sex as long as the penis is penetrating the vagina and not the anal region.)

Appendix F

CONFIDENTIAL

Study Examining Psychological Distress and Sexual Behavior

For opioid-dependent individuals maintained on methadone or Suboxone© treatment

- The survey study will be assessing drug use history, symptoms of depression and anxiety, and sexual relationships and behaviors.
- Information gathered will be used to complete a master's level thesis at the University of South Carolina Aiken.
- Surveys will be conducted in paper-pencil format and will take approximately 30 minutes to complete. All responses will be anonymous.
- Participants will be provided with a chance to win one of six \$50 Visa Gift cards for completion of the survey measures.

Counselors will be available for further information regarding this study.

Table 1

Mean Scores of DASS Scales and SRS Total by Gender

	Male			Female		
	Mean	Standard Deviation	<i>n</i>	Mean	Standard Deviation	<i>n</i>
Psychological Distress Total	1.45	1.52	63	2.06	1.70	50
Depression	1.52	1.76	63	2.04	1.80	50
Anxiety	1.78	1.85	63	2.39	2.10	50
Stress	1.09	1.28	63	1.74	1.57	50
Sexual Risk Total	20.18	20.38	63	11.30	6.70	50

Table 2

Mean DASS Scores by Polysubstance Drug User and Opioid Use Only Users (Hypothesis 3)

	Polysubstance Use			Opioid Use Only		
	Mean	Standard Deviation	<i>n</i>	Mean	Standard Deviation	<i>n</i>
Psychological Distress Total	1.84	1.54	81	1.43	1.80	32
Depression	1.88	1.69	81	1.41	2.02	32
Anxiety	2.13	1.91	81	1.84	2.14	32
Stress	1.51	1.39	81	1.03	1.56	32

Table 3

Mean DASS Scores and SRS Total by IV and Non-IV Drug Users (Hypothesis 4)

	IV Use			No IV Use		
	Mean	Standard Deviation	<i>n</i>	Mean	Standard Deviation	<i>n</i>
DASS Total	2.09	1.72	38	1.54	1.55	75
Depression	2.04	1.86	38	1.60	1.75	75
Anxiety	2.63	2.15	38	1.75	1.82	75
Stress	1.60	1.48	38	1.26	1.43	75
Sexual Risk Total	14.90	11.79	38	16.94	18.35	75

Table 4

DASS Severity Ratings (Lovibond & Lovibond, 1995b)

	Z score
Normal	< 0.5
Mild	0.5 – 1.0
Moderate	1.0 – 2.0
Severe	2.0 – 3.0
Extremely Severe	> 3.0

Table 5

Correlations between Psychological Distress and Risky Sexual Behavior Subscales

	F1	F2	F3	F4	F5
Total Psychological Distress	-.112	.028	-.195*	-.208*	.120
Depression	-.171	-.011	-.237*	-.233*	.133
Anxiety	-.036	.036	-.117	-.151	.094
Stress	-.115	.058	-.201*	-.204*	.110

Note: F1 = Risky Sexual Behavior with an Uncommitted Partner; F2 = Risky Sex Acts; F3 = Impulsive Sexual Behavior; F4 = Intent to Engage in Risky Sexual Behavior; F5 = Risky Anal Sex Acts; * = $p < .05$

Table 6

Hierarchical Regression Analysis Summary for Total Psychological Distress and Risky Sexual Behavior While Controlling for Gender (Hypothesis 1.A.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.073*	.073
Gender	8.879	3.006	.270		
Model 2				.075	.002
Gender	8.591	3.068	.261		
DASS Total Score	-.482	.944	-.048		
Model 3				.075	.000
Gender	8.533	3.096	.259		
DASS Total Score	-.076	2.260	-.008		
DASS Total Squared	-.112	.567	-.044		

* $p < .05$

Table 7

Hierarchical Regression Analysis Summary for Depression and Risky Sexual Behavior While Controlling for Gender (Hypothesis 1.A.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.073*	.073
Gender	8.879	3.006	.270		
Model 2				.084	.012
Gender	8.356	3.033	.254		
DASS Depression	-.997	.844	-.109		
Model 3				.096	.012
Gender	8.311	3.028	.253		
DASS Depression	1.361	2.160	.149		
DASS Depression Squared	-.643	.543	-.279		

* $p < .05$

Table 8

Hierarchical Regression Analysis Summary for Anxiety and Risky Sexual Behavior While Controlling for Gender (Hypothesis 1.A.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.073*	.073
Gender	8.879	3.006	.270		
Model 2				.073	.000
Gender	8.903	3.056	.271		
DASS Anxiety	.040	.772	.005		
Model 3				.073	.000
Gender	8.889	3.075	.270		
DASS Anxiety	.179	1.868	.021		
DASS Anxiety Squared	-.028	.348	-.018		

* $p < .05$

Table 9

Hierarchical Regression Analysis Summary for Stress and Risky Sexual Behavior While Controlling for Gender (Hypothesis 1.A.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.073*	.073
Gender	8.879	3.006	.270		
Model 2				.074	.001
Gender	8.651	3.099	.263		
DASS Stress	-.345	1.067	-.031		
Model 3				.074	.000
Gender	8.682	3.187	.264		
DASS Stress	-.432	2.229	-.038		
DASS Stress Squared	.033	.742	.009		

* $p < .05$

Table 10

Hierarchical Regression Analysis Summary for Total Psychological Distress and Risky Sexual Behavior for Females (Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.014	.014
DASS Total Score	.462	.564	.117		
Model 2				.018	.005
DASS Total Score	-.193	1.500	-.049		
DASS Total Score Squared	.168	.355	.180		

* $p < .05$

Table 11

Hierarchical Regression Analysis Summary for Total Psychological Distress and Risky Sexual Behavior for Males (Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.011	.011
DASS Total Score	-1.423	1.712	-.106		
Model 2				.016	.005
DASS Total Score	.423	3.800	.031		
DASS Total Score Squared	-.554	1.016	-.154		

* $p < .05$

Table 12

Hierarchical Regression Analysis Summary for Depression and Risky Sexual Behavior for Females (Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.004	.004
DASS Depression	.235	.535	.063		
Model 2				.007	.003
DASS Depression	.810	1.515	.218		
DASS Depression Squared	-.151	.372	-.166		

* $p < .05$

Table 13

Hierarchical Regression Analysis Summary for Depression and Risky Sexual Behavior for Males (Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.030	.030
DASS Depression	-2.016	1.458			
Model 2				.053	.023
DASS Depression	1.792	3.493	.155		
DASS Depression Squared	-1.072	.894	-.362		

* $p < .05$

Table 14

Hierarchical Regression Analysis Summary for Anxiety and Risky Sexual Behavior for Females (Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.038	.038
DASS Anxiety	.624	.453	.195		
Model 2				.063	.025
DASS Anxiety	-.606	1.194	-.189		
DASS Anxiety Squared	.225	.203	.415		

* $p < .05$

Table 15

Hierarchical Regression Analysis Summary for Anxiety and Risky Sexual Behavior for Males
(Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.003	.003
DASS Anxiety	-.555	1.413	-.050		
Model 2				.011	.006
DASS Anxiety	1.555	3.266	.141		
DASS Anxiety Squared	-.490	.684	-.212		

* $p < .05$

Table 16

Hierarchical Regression Analysis Summary for Stress and Risky Sexual Behavior for Females
(Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.002	.002
DASS Stress	.209	.615	.049		
Model 2				.002	.000
DASS Stress	.177	1.458	.042		
DASS Stress Squared	.011	.459	.008		

* $p < .05$

Table 17

Hierarchical Regression Analysis Summary for Stress and Risky Sexual Behavior for Females
(Hypothesis 1.B.)

Variable	B	SEB	β	R^2	ΔR^2
Model 1				.004	.004
DASS Stress	-1.001	2.028	-.063		
Model 2				.004	.000
DASS Stress	-.769	3.809	-.048		
DASS Stress Squared	-.099	1.368	-.017		

* $p < .05$

Figure 1

Comparison of Psychological Distress Means between Individuals Who Report Polysubstance Use and Opioid Use Only (Hypothesis 3)

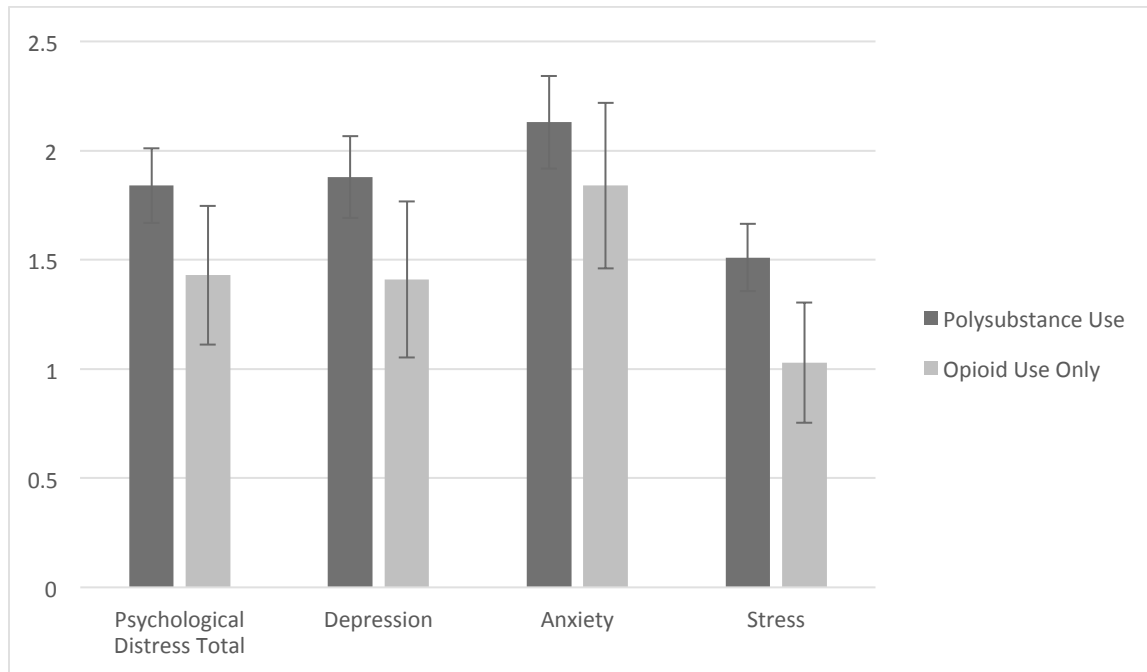


Figure 2

Comparison of Psychological Distress Means Among IV Drug Users and Non-IV Drug Users (Hypothesis 4)

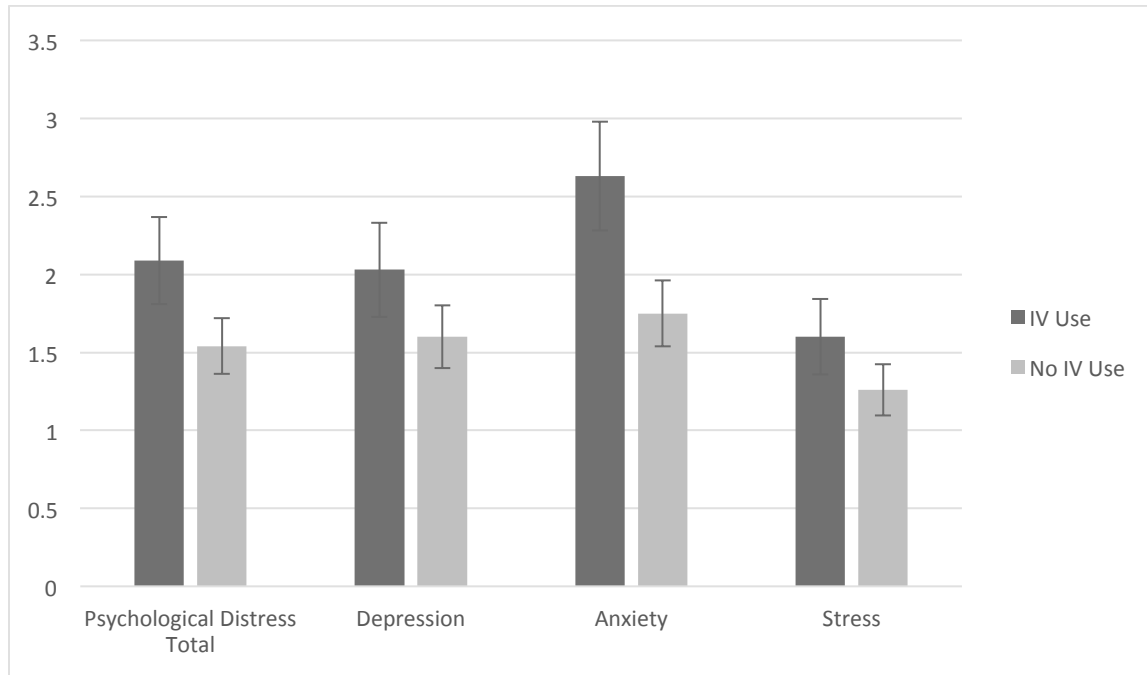


Figure 3

Comparison of Percentages of Individuals Who Reported Psychological Distress, Depression, Anxiety, and Stress in the DASS Severity Rating Categories

