DIFFERENCES IN RISK-TAKING IN A TRAUMA EXPOSED POPULATION

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ABSTRACT

Previous studies have shown that depression and posttraumatic stress disorder (PTSD) are associated with a variety of risk-taking behaviors. However fewer studies have examined how comorbidity between the two disorders can differentially affect risk-taking. This study examined the relationship between depression, PTSD, past risk-taking, and perceived benefits of risk to further determine how comorbidity affects risk behaviors. It was expected that individuals who displayed symptoms of depression and PTSD would report more past risk-taking and associate greater benefits with taking risks. Depression symptoms were found to significantly predict past drug use. This suggests that comorbid individuals who report more depressive symptoms may be more likely to abuse substances.

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CHAPTER I

INTRODUCTION

This study examined differences in risk-taking behavior in a trauma-exposed population. For purposes of the current study, risk-taking behavior was defined as illicit substance use, alcohol abuse, and sexual risk-taking. This study was undertaken to replicate and expand upon prior studies which examined depression (MDD), Posttraumatic Stress Disorder (PTSD) (*Diagnostic and Statistical Manual of Mental Disorders-IV* [DSM-IV-TR]; American Psychiatric Association [APA], 2000), and risk. Prior research regarding comorbidity and risk-taking behavior is scant, and conclusions drawn in these studies often do not corroborate one another. The current study was believed to be the first of its kind to examine MDD, PTSD, and the comorbidity of these disorders in relation to more varied types of risk behavior. The current study used a community sample. This differs from previous studies, which were chiefly interested in one type of trauma (e.g., child abuse) or a specific group of trauma survivors (e.g., intravenous drug users) (Holmes, Foa, & Sammel, 2005; Plotzker et al., 2007).

Individuals with comorbid PTSD and MDD were expected to report more risk-taking behaviors than other trauma survivors. These individuals were also expected to perceive more benefits from risk-taking. Bivariate correlations and multiple regressions were run to determine relationships between PTSD, MDD, past risk-taking behaviors, and benefits associated with risk. These findings are important because this study examined risk-taking in comorbid individuals in a more comprehensive way than previous studies by taking into account illicit substance use, alcohol abuse, and sexual risk. Using a community sample made these findings more representative than those of previous studies that examined specific types of trauma or groups of trauma survivors.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

2.1 Prevalence of Trauma

In a community survey over a third of young adults reported trauma exposure by early adulthood (Breslau et al., 1991). A different study of trauma exposure found that roughly two-thirds of participants had experienced at least one trauma, with one-fifth of participants reporting exposure within the past year (Norris, 1992). Almost 70% of women contacted via a national telephone survey had experienced a severe assault (e.g., rape, physical assault, etc.) within their lifetime (Resnick, Kilpatrick, & Dansky, 1993). In a separate study about 20% of Americans reported experiencing severe violence within their lifetime (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997). These conflicting percentages, such as 20% and 70%, are likely attributed to measuring different subsets of the population, such as a general American sample and a sample of only women.

The National Comorbidity Survey (NCS) was the first study to examine nation-wide trauma prevalence (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). In the

NCS, 60.7% of men and 51.2% of women reported at least one trauma in their lifetime. The majority of individuals reporting trauma had been exposed to multiple traumas. Witnessing a trauma, having one's life threatened, and experiencing a natural disaster were the most commonly reported traumas. The NCS used DSM-III criteria of a traumatic event, which were more restrictive as to what defined a trauma (Kessler et al., 1995).

The DSM-IV criteria of a trauma were first used to evaluate trauma prevalence in 1998 (Breslau et al.). Almost 90% engaged in the telephone survey reported at least one trauma over the course of their lifetime. The average among participants was 4.8 traumas. Among traumas reported, traumatic assault (e.g., rape, physical assault, combat) was reported by 37.7% of participants, a traumatic personal injury or shocking event (e.g., life-threatening accident or illness, natural disaster) were experienced by 59.8%, 60% experienced the sudden death of a loved one, and another 62.4% dealt with a traumatic nonfatal experience that happened to a loved one (e.g., a family member's rape or automobile accident) (Breslau et al., 1998). Although this study was extensive, only individuals who lived within the greater Detroit metropolitan area were surveyed (Breslau et al., 1998).

2.2 Risk-Taking and Trauma

Both childhood sexual abuse and childhood physical abuse have been associated with risky sexual behavior (Molitor, Ruiz, Klausner, & McFarland, 2000). HIV infected adults with childhood physical or sexual abuse histories reported more HIV-risk behavior than other HIV infected adults (e.g., greater number of partners, less condom use)

(Johnson & Harlow, 1996). Women who experience intimate partner violence report engaging in sexual risk behaviors (Campbell et al., 2008).

Five distinct trauma groups were examined to determine if type of trauma experienced in adolescence affected risky behavior in female college students (Green et al., 2005). Those who were experiencing ongoing abuse, either physical or sexual, showed the most sexual risk behaviors, high rates of suicidality, and perpetration of violence. Those who had been sexually assaulted once or experienced multiple single traumatic events also showed elevated risky sexual behaviors. Those with a history of multiple single traumatic events also showed high rates of suicidality. Those who had experienced a traumatic loss or a single physical assault showed no significantly elevated risky behaviors.

Trauma's impact on risk-taking was measured through the Youth Risk Behavior Survey, which was administered to female high school students (Silverman, Raj, Mucci, & Hathaway, 2001). Intimate partner violence was associated with sexual risk, suicidality, pregnancy, unhealthy weight control, and substance use. Participants who experienced both physical and sexual assault by a partner were more likely to engage in all of the risky behaviors. Those who were abused by partners were four to six times more likely to have been pregnant and were six to nine times more likely to display suicidality. They also reported a younger age of first intercourse and a greater number of partners (Silverman et al., 2001). While a connection between trauma and risk has been established, PTSD may mediate this relationship.

2.3 PTSD

The DSM-IV-TR defines PTSD as a type of anxiety disorder that occurs after experiencing a traumatic event, e.g., rape, physical assault, or automobile accident (APA, 2000). A traumatic event is defined as an event where the person experienced, witnessed, or was confronted with an event that involved actual or threatened death or severe injury, or a threat to the physical integrity of self or others (DSM-IV-TR; APA, 2000). In order to meet the definition, the person's response must involve intense fear, helplessness, or horror.

Following trauma, individuals often develop symptoms within the three core clusters of: 1. reexperiencing the trauma (e.g., flashbacks, nightmares, or being triggered by internal or external cues), 2. avoidance of thoughts or other stimuli associated with the event as well as numbing of emotional responsiveness, and 3. increased arousal (e.g., difficulty sleeping or concentrating, anger) and hypervigilance. While many trauma victims initially experience these symptoms, those with PTSD must retain symptoms for at least one month. Symptoms generally occur within three months following trauma (DSM-IV-TR; APA, 2000). Survivors experienced a median duration of between 3 and 5 years of PTSD symptoms associated with their most upsetting trauma (Kessler et al., 1995).

2.4 Prevalence of PTSD

Community-based studies in the DSM-IV-TR report that 8% of American adults have PTSD (APA, 2000). Among 5,877 participants, lifetime prevalence of 7.8% was reported in the National Comorbidity Survey, a nationwide epidemiologic survey

(Kessler et al., 1995). Kessler and colleagues (1995) noted that 5% of men and 10.4% of women met criteria for PTSD. A study of adolescents reported six-month PTSD prevalence rates of 3.7% for males and 6.3% for females (Kilpatrick et al., 2003).

A separate study evaluating those with trauma histories reported that the risk of obtaining PTSD from an individual's most severe trauma was 13.6%, while the PTSD risk from another experienced trauma was 9.2% (Breslau et al., 1998). This study reported 40 cases of PTSD for every 100 participants in the sample, and claimed that PTSD was concentrated within 12% of the population (Breslau et al., 1998). This 12% is believed to experience 3.3 cases of PTSD over the course of the lifetime (Breslau et al., 1998). Subsequent studies have reported different prevalence rates. A majority (79%) of trauma-exposed refugees reported PTSD (Ferrada-Noli, Asberg, Ormstad, Lundin, & Sundbom, 1998). A large percentage of trauma-exposed female prisoners (33%) reported lifetime PTSD, while 15% had an active diagnosis (Hutton et al., 2001). A majority (58%) of motor vehicle accident survivors reported PTSD (Blanchard, Buckley, Hickling, & Taylor, 1998). A majority (75%) of interpersonal violence victims met criteria for PTSD (Nixon, Resick, & Neshith, 2004). Obviously these rates are varied and are contingent on the population and type of trauma experienced.

The DSM-IV-TR states that PTSD symptoms often last over a year (APA, 2000). A separate study found that a typical PTSD episode generally lasted over 7 years (Breslau et al., 1998). The typical person reporting the average of 3.3 PTSD episodes is believed to experience over 20 years of symptomatology (Breslau et al., 1998).

2.5 Risk-Taking and PTSD

Risky behaviors are increasingly being examined in PTSD research, due to the prevalence of the risk behaviors evidenced by those with PTSD, as well as concerns regarding revictimization (Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999; Smith et al., 2004). The relationship between intimate partner violence induced PTSD, substance abuse, and high-risk sexual behaviors was explored in a sample of female abuse victims (Cavanaugh, Hansen, & Sullivan, 2010). Women with PTSD were four times more likely than other victims to engage in high-risk sexual activity (e.g., unprotected sex with a risky partner, trading sex). PTSD has previously been associated with HIV-risk behaviors such as intravenous drug use and prostitution (Stiffman et al., 1992). The relationship between PTSD and HIV-risk behaviors was examined in the behaviors of female prisoners in the five years prior to incarceration (Hutton et al., 2001). PTSD was found to be significantly associated with prostitution and receptive anal sex (Hutton et al., 2001).

The relationship between PTSD and substance abuse was explored in Vietnam veterans (Bremner, Southwick, Darnell, & Charney, 1996). Participants generally began abusing alcohol and substances when PTSD symptoms first occurred, and increased use when PTSD symptoms worsened. Participants reported use of marijuana, heroin, benzodiazepines, and alcohol to alleviate PTSD symptoms (Bremner et al., 1996). Substances are often used to reduce negative symptoms following trauma (Kilpatrick et al., 1997), and when negative symptoms increase, frequency of substance use is believed to increase (Kilpatrick et al., 2000). The relationship between trauma, PTSD, and substance abuse was further clarified in a national telephone survey of adolescents

(Kilpatrick et al., 2000). Those who had experienced physical or sexual assault, as well as those who witnessed violence, had an elevated risk of alcohol and substance abuse. PTSD also increased risk for marijuana use and abuse of hard drugs (Kilpatrick et al., 2000).

2.6 MDD

According to the DSM-IV-TR, Major Depressive Disorder (MDD) is a mood disorder that is characterized by the presence of at least one major depressive episode (APA, 2000). A major depressive episode is defined as a period of at least two weeks where prevalent depressed mood (e.g., individual makes somatic complaints or is discouraged, irritable, hopeless, or sad) or loss of interest in activities (e.g., loss of interest, loss of enjoyment, social withdrawal) is noted. Four out of seven additional symptoms must also be met. These can include changes in weight or appetite, sleeping habits, and level of activity; a lack of energy; feelings of worthlessness or excessive guilt; an inability to concentrate or make decisions; or thoughts regarding death, suicidal ideation, or suicide attempts (APA, 2000). No manic symptoms must be present to warrant a diagnosis of MDD. Symptoms should be accompanied by significant distress to the individual or impairment in vital areas of functioning. Symptoms should not result from substance use, a medical condition, or loss of a loved one.

Onset of a major depressive episode may be slow or sudden, with symptoms developing over days, weeks, or months. The duration of a major depressive episode also varies, with an untreated episode generally lasting four months or more (DSM-IV-TR; APA, 2000). In most cases (about two-thirds of the time), symptoms fully remit, and the

individual returns to their prior level of functioning. In 20 to 30% of individuals, some symptoms remain for months to years, resulting in some level of distress or impairment. However these individuals do not meet full episode criteria and are considered partially remitted. Partial remission is associated with greater risk of future episodes. A minority of individuals (5-10%) display full major depressive episode criteria for two years or longer and are considered to have chronic MDD (DSM-IV-TR; APA, 2000).

Presence of a major depressive episode is sufficient to diagnose an individual with MDD, Single Episode. However the major depressive episode must not be due to or in conjunction with Schizophrenia, Schizoaffective Disorder, Schizophreniform Disorder, Psychotic Disorder Not Otherwise Specified, or Delusional Disorder. The individual must also report no history of manic symptoms. MDD will be diagnosed as recurrent if an individual reports two or more major depressive episodes within their lifetime. For the episodes to be considered separate from one another, there must be a period of two months where the individual does not meet episode criteria.

The course of recurrent MDD also varies. Some people have episodes that are isolated from one another by several years. Others may have clusters of episodes that are closely grouped together, while others may have increased frequency of episodes as they age. The number of previous major depressive episodes is predictive of one's chance of developing a future episode. About 60% of those who have experienced one episode can expect to develop another, while 70% of those with a history of two episodes will have a third. Those with a history of three episodes will generally develop a fourth (90%). Follow-up studies reported in the DSM-IV-TR found that a year after major depressive

episode diagnosis, 40% of people still met episode criteria, 40% had recovered, and 20% were in partial remission (APA, 2000).

2.7 Prevalence of MDD

The National Comorbidity Survey Replication (NCS-R) was administered to obtain accurate information about the prevalence of disorders according to DSM-IV criteria. Kessler and colleagues (2003) examined the prevalence rates and correlates of MDD in a nationwide sample (N = 9,090). The lifetime prevalence rate of MDD was 16.2%, while 6.6% of participants had experienced MDD within the last year. This means that 32 to 35 million Americans suffer from MDD within their lifetime, while 13 to 14 million experienced MDD within the past year. The average length of a major depressive episode was four months. The majority of those suffering from MDD in the last year (59.2%) experienced severe role impairment (Kessler et al., 2003). These findings were replicated in a later study by the authors, which reported a lifetime prevalence rate of approximately 20% for American adults (Kessler, Berglund, Demler, Jin, & Walters, 2005).

Onset of MDD may take place at any age, although it often begins in the mid-20s (Kessler et al., 2005). According to community samples, lifetime prevalence rates of MDD range from 10-25% for females and 5-12% in males (DSM-IV-TR; APA, 2000). A separate community sample reported six-month MDD prevalence rates of 7.4% for adolescent males and 13.9% for adolescent females (Kilpatrick et al., 2003). In a study of undergraduate females with varying levels of trauma exposure, a lifetime MDD prevalence rate of 33% was reported (Green et al., 2005). Those who were currently

undergoing abuse and those who had been experienced to multiple individual traumas showed higher rates of MDD than other participants (Green et al., 2005). Over half (54%) of women exposed to intimate partner violence presented with MDD (Nixon et al., 2004).

2.8 Risk-Taking and MDD

The association between MDD and risky sexual behavior was examined in adolescents (Shrier, Harris, Sternberg, & Beardslee, 2001). MDD symptoms were associated with not using a condom at last intercourse for males, with intensity of MDD symptoms directly relating to frequency of condom use. MDD symptoms were related to prior sexually transmitted diseases (STDs) in females, with more severe MDD symptomatology increasing the risk of having a prior STD by two to over three times that of non-depressed peers. Males with the most severe MDD symptoms were three times as likely as peers without MDD to have an STD history (Shrier et al., 2001).

The relationship between multiple psychosocial variables (i.e., MDD, social support, stress) and risky sexual behavior was examined in a sample of young women aged 14 to 25 (Mazzaferro et al., 2006). MDD, stress, and poor social support were all associated with risky sexual behaviors (e.g., multiple partners, infrequent condom use) and past sexually transmitted infections (Mazzaferro et al., 2006). The association between MDD and HIV-related risky behaviors was also evaluated in men who have sex with men (Perdue, Hagan, Thiede, & Valleroy, 2003). MDD within this population was related to having three or more sexual partners within the previous six months, however no independent relationship between MDD and risky sexual behaviors was noted. Men

who have sex with men who engaged in risky behavior (unprotected sex within the last 12 months) were more depressed than non-risk-takers (Strathdee et al., 1998).

The relationships between MDD, suicidality, and risky behaviors (e.g., drug use, disordered eating) were examined in an adolescent population (Kandel, Raveis, & Davies, 1991). MDD symptomatology was the most significant predictor of suicidal ideation. Drug use was associated with suicidal ideation in females and attempts in both genders. MDD led to drug use in females, which then elevated suicidality. Although substances are used to alleviate MDD symptomatology, they can often exacerbate the preexisting problem. MDD has been associated with smoking cigarettes (Breslau, Davis, Andreski, & Petersen, 1991) and substance use (Kessler et al., 1995). Those with a first-degree relative with MDD have an increased risk of developing alcohol dependence (DSM-IV-TR; APA, 2000). MDD has been associated with sharing syringes in a study of injection drug users (Perdue et al., 2003). Another study found that the severity of MDD in this population was related to the frequency of sharing needles or syringes (Stein, Solomon, Herman, Anderson, & Miller, 2003).

2.9 Prevalence of Comorbidity

According to the NCS-R most with a lifetime history of MDD (72.1%) had a comorbid mental disorder, with 59.2% of these reporting an anxiety disorder (Kessler et al., 2003). Those who experienced MDD in the last 12 months (78.5%) were also likely to be comorbid (Kessler et al., 2003). The majority of those with MDD in the last year (64%) reported another disorder within the same year, with 57.5% reporting an anxiety disorder. Comorbid anxiety disorders often appeared at an earlier age than MDD onset.

MDD rarely occurred in isolation (Kessler et al., 2003). According to the original NCS 48% with PTSD reported a diagnosis of lifetime MDD, with MDD occurring after PTSD onset in 53 to 78.4% of cases (Kessler et al., 1995). While a minority (9.2%) of youth developed PTSD post-trauma, 36.6% with PTSD met criteria for comorbidity (Breslau et al., 1991).

Almost 75% of adolescents diagnosed with PTSD had an additional disorder (Kilpatrick et al., 2003). Interpersonal violence increased the risk of all diagnoses (e.g., PTSD, MDD, comorbidity), but it increased comorbidity risk more so than any disorder in isolation. Rates of PTSD cases occurring in isolation were rare (1.4%) when compared to MDD (6.5%) or substance abuse (4.9%) (Kilpatrick et al., 2003).

Individuals with PTSD were compared to those with trauma history, and those without prior trauma to see if trauma increased MDD risk (Breslau, Davis, Peterson, & Schultz, 2000). Those with PTSD had an elevated risk of MDD development, while this was not seen in other trauma victims. Those with a prior MDD diagnosis were over three times as likely to develop PTSD among those with trauma history. Risk of developing either disorder is due to a common vulnerability to both disorders in trauma victims. PTSD increases risk of MDD onset, while an active MDD diagnosis may increase an individual's risk of PTSD after trauma (Breslau, Davis, Peterson, & Schultz, 1997). Having either disorder increases susceptibility of developing the other disorder (Breslau et al., 2000).

A separate study examined MDD, PTSD, and comorbidity at 3 and 12 months post-trauma and found that most psychopathology could be characterized as a construct of traumatic stress (O'Donnell et al., 2004). Comorbidity was attributed to a common

vulnerability to both disorders. PTSD and comorbidity were indistinguishable throughout the study, while MDD was considered its own construct in the short-term, but not long-term, state. MDD symptoms were generally not considered due to a separate disorder (O'Donnell et al., 2004). Both of these studies (Breslau et al., 2000; O'Donnell et al., 2004) are in contrast to the prior finding that MDD and PTSD are correlated but distinct responses to trauma (Blanchard et al., 1998).

2.10 Symptom Severity and Comorbidity

A majority (57.9%) of motor vehicle accident victims were diagnosed with PTSD, with 53% of these meeting criteria for comorbidity (Blanchard et al., 1998). In 81.8% of cases, MDD followed the trauma. Comorbid individuals reported more distress, more functional impairment, and lower likelihood of symptom remission within six months, when compared to peers with PTSD. Those with more MDD symptomatology reported higher levels of worthlessness and suicidal ideation (Blanchard et al., 1998).

Comorbid veterans have been compared to those with MDD only within a primary care environment (Campbell et al., 2007). A significant minority (36%) of those with MDD were comorbid. Those with comorbidity reported greater MDD severity, more suicidal ideation, poorer social support, and increased outpatient care. These individuals had a poorer prognosis and delayed response to MDD treatment.

A study by Green and colleagues (2006) examined the effects of comorbidity on MDD treatment. A sizable minority of participants (33%) were comorbid. Women with comorbidity reported more exposure to assault, more severe symptoms for both disorders, and more functional impairment. While MDD treatment was effective, comorbid

individuals reported higher levels of distress and impairment throughout the yearlong study. Improvement of MDD symptomatology was comparable in both groups (Green et al., 2006). Comorbid individuals have shown a delayed response to MDD treatment when compared to peers with MDD (Hegel et al., 2005).

The rate of impairment and disability was examined in comorbid refugees (Momartin, Silove, Manicavasagar, & Steel, 2004). Those with comorbidity reported more severe PTSD symptoms and greater long-term impairment (e.g., more distress, more social and occupational impairment) when compared to those with PTSD. A majority (56%) of comorbid individuals in this study presented with the most severe symptoms, compared to 36% with PTSD (Momartin et al., 2004). Comorbid victims of intimate partner violence have reported greater levels of MDD and PTSD symptoms when compared to those with PTSD, as well as more maladaptive depressed cognitive styles than those without PTSD (Nixon et al., 2004).

2.11 Risk-Taking and Comorbidity

The relationship between childhood sexual abuse, MDD, PTSD, and risky sexual behavior was examined in men aged 18 to 49 (Holmes, Foa, & Sammel, 2005). Childhood sexual abuse was associated with both diagnoses of MDD and PTSD. Childhood sexual abuse, PTSD, MDD, and some sociodemographic variables (e.g., age, race, sexual orientation) were all associated with an individual's number of lifetime sexual partners. All two-way interactions within the model, as well as the three-way interaction of childhood sexual abuse, PTSD, and MDD, were also associated with one's number of partners. Individuals with childhood sexual abuse history and diagnostic

comorbidity had an elevated number of lifetime sexual partners when compared to others. MDD, PTSD, and the comorbidity of both conditions serve as mediators and moderators in the relationship between childhood sexual abuse and sexual risk behaviors (Holmes et al., 2005). MDD and PTSD have previously been associated with HIV-risk behavior in men without childhood sexual abuse histories (Stiffman et al., 1992).

The roles of PTSD and MDD were examined in the relationship between childhood sexual abuse and HIV-risk in a sample of injection drug users (Plotzker, Metzger, & Holmes, 2007). A minority (23%) of the sample reported MDD only, while 53% presented with comorbidity. Childhood sexual abuse history (56% of sample) was significantly associated with sex and drug-related HIV-risk behaviors, as well as comorbidity. However, when comorbidity was placed in the model, childhood sexual abuse was no longer predictive of risk behaviors, and comorbidity was associated with these behaviors. This indicates that a comorbid diagnosis mediated the relationship between childhood sexual abuse and HIV-risk in female injection drug users (Plotzker et al., 2007).

Individuals with childhood sexual abuse, MDD, and PTSD report more lifetime sexual partners (Holmes et al., 2005). However, this study was only interested in establishing a link between childhood sexual abuse and risk. Comorbidity also mediated the relationship between childhood sexual abuse and HIV-risk in a different study (Plotzker et al., 2007). This study only examined intravenous drug users and was specifically interested in establishing a relationship between childhood abuse and risk.

When examining prior studies, researchers generally did not use community samples, and the only study that does is specifically researching childhood sexual abuse

(Holmes et al., 2005). None of the examined studies are representative to all types of trauma and all types of trauma survivors.

2.12 Consequences of Risk-Taking

Risk-taking has been observed in populations with MDD, PTSD, and comorbidity. Regardless of diagnostic category, risky behaviors can complicate an individual's current treatment, prognosis, and safety. As prior trauma and PTSD both already increase the likelihood of future revictimization (Acierno et al., 1999), it is probable that risky behavior would further exacerbate this risk.

A study by Smith and colleagues looked at cognitions relating to risk behaviors in college women with or without trauma histories (2004). Those who had experienced trauma perceived risk differently than those without trauma and reported greater likelihood of engaging in risky acts. Those with adult sexual assault, childhood sexual abuse, and aggravated assault histories perceived greater benefits relating to drug use and risky sexual behaviors when compared to those without trauma. Victims of adult and childhood sexual assault perceived less risk related to drug use and risky sexual acts when compared to those without trauma history. All victims reported greater likelihood to engage in drug use and risky sex acts than those without trauma history. Adult sexual assault victims also reported more perceived benefits of drinking and greater likelihood to engage in heavy drinking (Smith et al., 2004).

Perceptions of risk and benefits were the only significant predictors for both drug use and risky sexual behaviors (Smith et al., 2004). Benefits were most predictive of future involvement for both behaviors. While cognitions were predictive of heavy

drinking, adult sexual assault itself also predicted alcohol use. Individuals' cognitions directly mediated the relationship between victimization and involvement in risky behaviors. PTSD symptoms are believed to contribute to involvement in risky behaviors (Smith et al., 2004). Trauma-related impairment in cognitions may lead an individual to improperly evaluate the risks and benefits of a situation, leading to increased involvement in risky behavior and greater revictimization risk (Smith et al., 2004).

Trauma survivors' increased likelihood to engage in risk behaviors and disparate perceptions regarding risk likely increase their chance of revictimization when compared to those without trauma histories. While Smith and colleagues established a connection between trauma, perceptions, and risk-taking, it is unclear to what extent MDD, as well as comorbidity, further exacerbates this problem (2004). The current study is pertinent to comorbid trauma survivors as this group may be disproportionately exposing themselves to risky behaviors and future revictimization. Until this relationship is clarified, treatment cannot be effectively modified for this high-risk group of individuals.

This study added to the current body of research regarding PTSD, MDD, and risk-taking. This study expanded on previous work by Holmes and colleagues (2005) in that it included participants not diagnosed with a disorder. This was a benefit over the study by Plotzker and colleagues (2007) whose research design required comorbidity to be present. This study used a community sample of trauma survivors. A review of previous literature examining comorbidity and risk found that these studies rarely used community samples, instead basing findings on war veterans or intravenous drug users (Ferrada-Noli et al., 1998, Plotzker et al., 2007). The one study that used a community sample was explicitly trying to link childhood sexual abuse to HIV-risk (Holmes et al., 2005). Prior

findings are not representative of all types of trauma or all types of trauma survivors. This study presented more representative findings of the relationship between MDD, PTSD, and risk.

Involvement in risky behaviors and potential benefits associated with these behaviors were assessed in a trauma-exposed population. Individuals were compared using diagnostic measures and a measure of risk-taking. The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbauch, 1961) and the Posttraumatic Diagnostic Scale (PDS) (Foa, Cashman, Jaycox, & Perry, 1997) were the two diagnostic measures used in this study. Comorbid individuals were expected to show more MDD and PTSD symptoms than individuals with symptoms of either disorder. Those with comorbidity were expected to engage in more risk-taking behaviors as measured by the Cognitive Appraisals of Risky Events than individuals with either MDD or PTSD symptoms (CARE-R; Fromme, Katz, & Rivet, 1997). Comorbid individuals were hypothesized to exhibit more high-risk behaviors and perceive more benefits from these behaviors than individuals with either MDD or PTSD symptoms.

CHAPTER III

METHODS

3.1 Participants

A community sample was used for this study. Participants responded to newspaper ads or flyers to join the study. In order to qualify, participants were required to have experienced or witnessed an event which involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. A participant's response must have involved intense fear, helplessness, or horror (DSM-IV-TR; APA, 2000). The sample size was 136, with 70 females (51.5%) and 66 males (48.5%). Participants had a mean age of 40.85 (SD = 17.87), and ranged in age from 18 to 69.

3.2 Measures

Demographics: A brief demographic questionnaire was given to gather information regarding gender, age, and ethnicity.

Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997): The PDS is a measure used to diagnose PTSD and trauma history. Items are written to reflect the diagnostic criteria for PTSD in the DSM-IV-TR. The presence of hyperarousal, avoidance, and/or reexperiencing symptoms is assessed, as well as the severity of noted symptoms. The participant's level of impairment due to symptoms is also measured. The measure is comprised of 17 symptom items. A Likert scale is used, with responses ranging from zero to three, or from "not at all" to "5 or more times a week." Items are summed to get a total symptom severity score, with a score of 25 or higher equating to an approximate PTSD diagnosis. Symptom severity could range from 0 to 51. The PDS has similar reliability ($\alpha = 0.78 – 0.92$) and validity ($\alpha = 0.82$) to other PTSD measures (Foa et al., 1997).

Cognitive Appraisal of Risky Events (CARE-R; Fromme**,** Katz**,** & Rivet**,** 1997**)**: The CARE-R assesses a participant's involvement in risky sexual behavior, alcohol use, and drug use within the previous six months. The CARE-R also measures the person's perceptions of risks and benefits related to each behavior. A Likert scale is used to assess benefits, with responses ranging from one to seven, or from "not at all likely" to "extremely likely." Frequency of past risk is assessed through a participant's self-report of the number of times he took part in a behavior in the past six months. Separate scores are created for the expected risks, benefits, and past frequency of each risky behavior. Nine scores are created in total. Good predictive validity has been reported (up to six months), as well as high reliability ($\alpha = 0.86$) (Fromme, Katz, & D'Amico, 1997).

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbauch, 1961): The BDI is a measure used to diagnose MDD. Items are written to reflect the diagnostic criteria for a major depressive episode in the DSM-IV-TR. The key symptom of sadness or loss of interest is noted, as well as all other major depressive episode symptoms. The participant's level of functional impairment is also noted. The measure is comprised of 21 symptom items. A Likert scale is used, with responses ranging from zero to three, with scores of three indicating more severe depressive symptoms. Items are summed to get a symptom severity score, with a score of 14 equating to a diagnosis of mild MDD. Symptom severity could range from 0 to 63. The BDI has good reliability ($\alpha = 0.81 – 0.86$) and validity ($\alpha = 0.72$) (Beck, Steer, & Carbin, 1988).

3.3 Procedure

Participants were recruited through flyers and newspaper ads. In order to take part in the study, participants were required to have experienced at least one trauma. The informed consent process was explained, and participants were made aware that involvement in the study was voluntary. Participants were given a number of self-report questionnaires. Traumatic history and current PTSD and MDD symptoms were assessed. While the questionnaires do not attempt to diagnose an individual with either MDD or PTSD, they do assess the DSM-IV-TR criteria pertaining to each disorder, thus diagnostic status could be estimated for purposes of the current study. Participants' past history and perceived risks and benefits concerning risky sexual behavior, drug use, and alcohol use were assessed. Demographic information regarding the participant was also obtained. Each individual who took part in the study received $20 as compensation.

Based on responses to the PDS and BDI, participants either displayed no psychopathology, PTSD symptoms, MDD symptoms, or symptoms of both disorders. MDD symptoms and PTSD symptoms were considered to be two separate continuous variables. MDD and PTSD symptoms were multiplied to create a continuous variable for comorbidity. These variables were then compared with regard to involvement in risky behaviors and benefits of risky behaviors.

3.4 Statistical Analyses

Approximately half of participants were expected to have PTSD, with half of these having MDD symptoms as well. A smaller group of participants was expected to have MDD symptoms only.

Multiple regressions and bivariate correlations were run to examine the relationship between PTSD, MDD, benefits of risk, and past risk-taking behaviors. Individuals were compared on past risk involvement and perceived benefits of risk. PDS scores and BDI scores were entered at the same time to determine the unique effects of each on past involvement and benefits of substance use, alcohol use, and risky sexual behaviors. PDS and BDI were multiplied to create an interaction term, which was entered into the second step of a hierarchical regression. The interaction term tells what the comorbidity contributes above and beyond the contribution of either MDD or PTSD. Six hierarchical regressions were run for each of the six dependent variables. Because of the number of analyses that were run, I chose to have a more conservative α entry level (.025), as well as a more conservative α removal level (.05).

CHAPTER IV

RESULTS

Participants were exposed to a wide range of traumas, and almost all (N = 128, 94.1%) were exposed to multiple traumas. Most commonly reported traumas were serious accident (N = 89, 65.4%), non-sexual assault by a stranger (N = 73, 53.7%), non-sexual assault by someone the participant knew (N = 72, 52.9%), sexual assault by someone they knew (N = 57, 41.9%), and sexual contact when younger than 18 with someone 5 or more years older (N = 57, 41.9%). Other traumas reported were imprisonment (N = 45, 33.1%), sexual assault by a stranger (N = 43, 31.6%), life-threatening illness (N = 27, 19.9%), natural disaster (N = 23, 16.9%), torture (N = 10, 7.4%), and being in military combat or a war zone (N = 9, 6.6%).

Participants' PDS scores ranged from 0 to 51, while BDI scores ranged from 0 to 44. Based on participants' PDS scores, 74 met diagnostic criteria for PTSD. Based on BDI scores, 85 participants met diagnostic criteria for MDD. Almost half of participants (N = 58, 42.6%) met diagnostic criteria for both disorders.

Participants' mean scores for past frequency of alcohol use (M = 1.14), drug use (M = .52), and risky sexual behaviors (M = .89) were compiled. Participants engaged in risky behaviors infrequently, and engaged in risky alcohol use about once every six months. Drug use and risky sexual behaviors were reported less frequently, as participants' reported average values of engaging less than once in the past six months. Mean scores for expected benefits of alcohol use (M = 2.05), drug use (M = 1.52), and risky sexual behaviors (M = 2.62) were also compiled. Participants reported a low likelihood of positive consequences for alcohol use and drug use. Participants reported the likelihood of positive consequences for risky sexual behaviors to be moderately likely.

4.1 Bivariate Correlations

Correlations were run to examine relationships between past risky behaviors, benefits of risk, PTSD, MDD, and the comorbidity of these disorders. Past risky sexual behaviors were significantly correlated with past drug use and alcohol use. Past drug and alcohol use were also significantly correlated with one another. Expected benefits of risky sexual behavior were significantly correlated with expected benefits of drug use and alcohol use. Expected benefits of alcohol use and drug use were also significantly correlated. Each expected benefit significantly correlated with its corresponding past use behavior.

BDI scores were significantly correlated with past drug use ($r = .229$, $p < .01$). BDI scores were nearing a significant correlation with past alcohol use ($r = .184$, $p < .05$). There was a non-significant correlation of .154 (p = n.s.) between BDI and past risky

sexual behaviors. BDI scores were not significantly correlated with expected benefits of risky sex ($r = .019$, p = n.s.), drug use ($r = -.009$, p = n.s.), or alcohol use ($r = .071$, p = n.s.).

Symptom severity of PTSD was not significantly correlated with past risky sexual behaviors ($r = .140$, p = n.s.), past drug use ($r = .101$, p = n.s.), or past alcohol use ($r = .106$, p = n.s.). Symptom severity of PTSD was not significantly correlated with expected benefits of risky sex ($r = -.107$, p = n.s.), drug use ($r = -.033$, p = n.s.), or alcohol use ($r = .055$, p = n.s.).

BDI scores and symptom severity of PTSD were significantly correlated with one another ($r = .564$, $p < .01$). However the interaction of these two items did not significantly correlate with any of the expected benefits of risk or past risk-taking behaviors.

Table 1

Bivariate correlations of expected benefits of risk, past risk behaviors, MDD, PTSD, and the interaction term

	EBAlc.	EBDrug	EBSex	PastAlc.	PastSex	PastDrug	Interact	PTSD
EBAlc.	-	.540**	.492**	.572**	.226**	.157	.082	.055
EBDrug	.540**	-	.507**	.200*	.047	.319**	.005	-.033
EBSex	.492**	.507**	-	.205*	.232**	.165	-.032	-.107
PastAlc.	.572**	.200*	.205*	-	.395**	.513**	.131	.106
PastSex	.226**	.047	.232**	.395**	-	.319**	.108	.140
PastDrug	.157	.319**	.165	.513**	.319**	-	.147	.101
Interact.	.082	.005	-.032	.131	.108	.147	-	.783**
PTSD	.055	-.033	-.107	.106	.140	.101	.783**	-
BDI	.071	-.009	.019	.184*	.154	.229**	.897**	.564**

*** Correlation is significant at the 0.01 level (2-tailed).*

** Correlation is significant at the 0.05 level (2-tailed).*

4.2 Multiple Regressions

Although the interaction term did not significantly correlate with risks or benefits, six exploratory hierarchical regressions were run to further examine the relationship. First, PTSD symptom severity and BDI scores were entered into the model to determine if they significantly predicted past total risk and expected benefits. For each analysis, the interaction term was then added in the second step to determine if it accounted for more of the variance in the relationship than PTSD and MDD had on their own.

PTSD and BDI symptom severity accounted for 2.3% of the variance in past risky sexual behaviors (R^2=.023, F(2,127)=1.463, p=n.s.). BDI score did not significantly predict past risky sex (β = .004, p = n.s.), nor did PTSD symptom severity (β = .006, p = n.s.). The addition of the interaction term accounted for 3.4% of the variance (R^2=.034, F(3,126)=1.462, p=n.s.). The BDI score (β = .021, p = n.s.), PTSD symptom severity (β = .014, p = n.s.) and interaction term did not significantly predict past risky sex (β = -.001, p = n.s.).

PTSD and BDI symptom severity accounted for 4.9% of the variance in past drug use (R^2=.049, F(2, 127)=3.245, p < .05). BDI score significantly predicted past drug use (β = .016, p < .025), while PTSD symptom severity did not (β = -.002, p = n.s.). The addition of the interaction term accounted for 6.4% of the variance (R^2=.064, F(3,126)=2.891, p < .05). This accounted for more variance and was closer to significance than the previous model. BDI score significantly predicted past drug use (β = .035, p < .025), while PTSD symptom severity (β = .007, p = n.s.) and the interaction term did not (β = -.001, p = n.s.).

PTSD and BDI symptom severity accounted for 2.8% of the variance in past alcohol use (R^2=.028, F(2,127)=1.850, p=n.s.). BDI score (β = .020, p = n.s.) and PTSD symptom severity (β = .002, p = n.s.) did not significantly predict past alcohol use. The addition of the interaction term accounted for 3.6% of the variance (R^2=.036, F(3,126)=1.559, p=n.s.). BDI score (β = .047, p = n.s.), PTSD severity (β = .014, p = n.s.), and the interaction term (β = -.001, p = n.s.) did not significantly predict past alcohol use.

PTSD and BDI symptom severity accounted for 1.7% of the variance in expected benefits of sex (R^2 = .017, F(2,127)=1.120, p=n.s.). BDI score (β = .008, p = n.s.) and PTSD symptom severity (β = -.012, p = n.s.) did not significantly predict expected benefits of sex. The addition of the interaction term accounted for 2.0% of the variance (R^2 = .020, F(3,126)=.840, p=n.s.). BDI score (β = -.002, p = n.s.), PTSD severity (β = -.016, p = n.s.), and the interaction term (β = .000, p = n.s.) did not significantly predict expected benefits of risky sexual behavior.

PTSD and BDI symptom severity accounted for 0.2% of the variance in expected benefits of drug use (R^2=.002, F(2,127)=.107, p=n.s.). BDI score (β = -.001, p = n.s.) and PTSD symptom severity (β = -.003, p = n.s.) did not significantly predict expected benefits of drug use. The addition of the interaction term accounted for 2.1% of the variance (R^2=.021, F(3,126)=.880, p=n.s.). BDI score (β = -.031, p = n.s.), PTSD severity (β = -.017, p = n.s.), and the interaction term (β = .001, p = n.s.) did not significantly predict expected benefits of drug use.

PTSD and BDI symptom severity accounted for .04% of the variance in expected benefits of alcohol use (R^2=.004, F(2,127)=.272, p=n.s.). BDI score (β = .004, p = n.s.) and PTSD symptom severity (β = .005, p = n.s.) did not significantly predict expected benefits of alcohol use. The addition of the interaction term accounted for 1.0% of the variance (R^2=.010, F(3,126)=.422, p=n.s.). BDI (β = -.021, p = n.s.), PTSD (β = -.007, p = n.s.), and the interaction term (β = .001, p = n.s.) did not significantly predict expected benefits of alcohol use.

Past risk-taking behaviors were significantly correlated with one another, as were expected benefits of risk. Expected benefits of a risk-taking behavior also correlated

significantly with the corresponding past behavior. BDI scores were significantly correlated with past drug use, and were nearing significance in the correlation with past alcohol use. PTSD symptom severity was not significantly correlated with any expected benefits or past risk behaviors. BDI and PTSD were significantly correlated with one another, however the interaction term did not significantly correlate with any past use or benefits. When examining multiple regressions, BDI score significantly predicted past drug use, both when it was entered with PTSD severity, as well as when it was entered with the interaction term. BDI and PTSD scores accounted for a percent of the variance (4.9%) in past drug use that was nearing significance, while the addition of the interaction term also contributed a percent of the variance (6.4%) in past drug use that was nearing significance.

Table 2

Hierarchical regression that compares the relationship between MDD, PTSD, the interaction term, and past drug use

Step	Predictors	R	R^2	ΔR^2	β	t	Sig.
1	BDI	.220	.049	.049	.016	2.308	.023*
	PTSD				-.002	-.410	.682
2	BDI	.254	.064	.016	.035	2.366	.019*
	PTSD				.007	.837	.404
	Interaction				-.001	-1.458	.147

Note. PTSD = total score of 17 PTSD symptomatology items (PDS), BDI = total score of 21 MDD symptomatology items (BDI), Interaction was created by multiplying the PTSD and BDI terms together.

** Correlation is significant at the 0.025 level (2-tailed).*

CHAPTER V

DISCUSSION

These research findings could have important implications for treatment of comorbid PTSD and MDD. While a new edition of the Diagnostic and Statistical Manual of Mental Disorders is going to be released, risk is still not considered to be a criterion for either PTSD or MDD. Clinicians often do not assess for risk when treating clients with these disorders. These research findings underscore the importance of properly assessing for risk behaviors when treating those with PTSD or MDD. In the current study, MDD was more predictive of past risk than PTSD. This suggests that clients with more severe MDD symptoms engage in more drug use than clients whose MDD symptoms are less severe. While comorbid clients often present similarly, this study indicates that those with more depressive symptoms may be more likely to take part in risk-taking when compared to those with more PTSD symptoms. Comorbid clients should be treated for both disorders, with the understanding that if depression is the predominant disorder, risk-taking may be elevated. This should be assessed for and attended to appropriately in treatment.

While PTSD did not correlate with other variables, there are likely multiple reasons for this. A community sample is likely to experience less distress and impairment in functioning than an inpatient sample. As these participants are functioning within their community, they may be suffering less than participants from an inpatient sample in general. This likely lead to fewer reports of past use and less associated benefits with risk for participants with PTSD. In addition, the measure used for PTSD may not have accurately recorded participants' symptoms, severity, or impairment in functioning. Furthermore, those with MDD or PTSD may be engaging in risk-taking behaviors which were not measured through the CARE-R. These individuals may exhibit a range of withdrawal behaviors, including withdrawing from their work environment, home life, or social life. Inclusion of withdrawal behaviors may have more accurately displayed the relationship between risk, benefits, and diagnosis.

In the future fewer analyses should be run, so that an α level of .05 may be observed. Increasing sample size may also make it more likely that significant effects will be found. MDD and PTSD were found to be highly correlated with one another ($r = .564$, $p < .01$), and there may have been too much multicollinearity between the two measures to accurately differentiate effects using the interaction term.

As past drug use, alcohol use, and risky sexual behavior are highly correlated with one another, it may be advantageous to simply create an aggregate measure of past risk. This could be done by converting each risk variable into a standard score and then adding the variables together to create a composite value. As expected benefits are highly correlated with one another, an aggregate measure of benefits could easily be created as well. As expected benefits are on the same scale, they could simply be summed to create

a composite expected benefits score. Creating aggregate measures would allow researchers to look at the relationship between benefits, past use, PTSD, and MDD in a simpler and cleaner way.

Given that the interaction term did not significantly predict any past use or benefits, it is probable that the relationship between MDD and PTSD is not multiplicative. Future research should be done using either MDD or PTSD as a mediator for the model between a diagnosis and expected benefits and past risk.

Future research should also examine how severity of symptoms of MDD and PTSD differentially affects benefits of risk and past risk-taking behaviors. Those with low severity symptoms should be compared to those with high severity symptoms to determine how this may affect risk. Shifting to a focus on severity will give researchers a more authentic look at this relationship. Given that MDD is more predictive of past drug use, it is likely that symptom severity impacts the relationship between diagnosis and risk-taking in a very meaningful way.

A weakness of this study was a failure to conceptualize comorbidity in multiple ways. A strength of this study was the ability to compare trauma survivors. The ability to look exclusively at a trauma-survivor population allowed this research to look at PTSD and comorbidity in a more controlled way than would be possible in a non-trauma sample.

REFERENCES

Acierno, R., Resnick, H., Kilpatrick, D. G., Saunders, B, & Best, C. L. (1999). Risk factors for rape, physical assault, and Posttraumatic Stress Disorder in women: Examination of differential multivariate relationships. *Journal of Anxiety Disorders, 13* (6), 541-563.

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed., text rev.). Washington, DC: Author.

Beck, A. T., Steer, R. A., & Carbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8* (1), 77-100.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbauch, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4* (6), 561-571.

Blanchard, E. B., Buckley, T. C., Hickling, E. J., & Taylor, A. E. (1998). Posttraumatic Stress Disorder and comorbid Major Depression: Is the correlation an illusion? *Journal of Anxiety Disorders, 12* (1), 21-37.

Bremner, J. D., Southwick, S. M., Darnell, A., & Charney, D. S. (1996). Chronic PTSD in Vietnam combat veterans: Course of illness and substance abuse. *American Journal of Psychiatry, 153*, 369-375.

Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. (1991). Traumatic events and Posttraumatic Stress Disorder in an urban population of young adults. *Archives of General Psychiatry, 48* (3), 216-222.

Breslau, N., Davis, G. C., Peterson, E. L., & Schultz, L. (1997). Psychiatric sequelae of Posttraumatic Stress Disorder in women. *Archives of General Psychiatry, 54* (1),

81-87.

Breslau, N., Davis, G. C., Peterson, E. L., & Schultz, L. R. (2000). A second look at comorbidity in victims of trauma: The Posttraumatic Stress Disorder-Major Depression connection. *Biological Psychiatry*, *48*, 902-909.

Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., Davis, G. C., & Andreski, P. (1998). Trauma and Posttraumatic Stress Disorder in the community: The 1996 Detroit area survey of trauma. *Archives of General Psychiatry*, *55* (7), 626-632.

Campbell, D. G., Felker, B. L., Liu, C., Yano, E. M., Kirchner, J. E., Chan, D., …Chaney, E. F. (2007). Prevalence of Depression-PTSD comorbidity: Implications for clinical practice guidelines and primary care-based interventions. *Journal of General Internal Medicine*, *22*, 711-718.

Campbell, J. C., Baty, M. L., Ghandour, R. M., Stockman, J. K., Francisco, L., & Wagman, J. (2008). The intersection of intimate partner violence against women and HIV/AIDS: A review. *International Journal of Injury Control and Safety Promotion, 15* (4), 221-231.

Cavanaugh, C. E., Hansen, N. B., & Sullivan, T. P. (2010). HIV sexual risk behavior among low-income women experiencing intimate partner violence: The role of Posttraumatic Stress Disorder. *Aids and Behavior*, *14* (2), 318-327.

Ferrada-Noli, M., Asberg, M., Ormstad, K., Lundin, T., & Sundbom, E. (1998). Suicidal behavior after severe trauma. Part 1: PTSD diagnoses, psychiatric comorbidity, and assessments of suicidal behavior. *Journal of Traumatic Stress*, *11* (1), 103-112.

Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report

measure of Posttraumatic Stress Disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment, 9*, 445-451.

Fromme, K., Katz, E., & D'Amico, E. (1997). Effects of alcohol intoxication on the perceived consequences of risk-taking. *Experimental and Clinical Psychopharmacology, 5* (1), 14-23.

Fromme, K., Katz, E. C., & Rivet, K. (1997). Outcome expectancies and risk-taking behavior. *Cognitive Therapy and Research, 21* (4), 421-442.

Green, B. L., Krupnick, J. L., Chung, J., Siddique, J., Krause, E. D., Revicki, D., …Miranda, J. (2006). Impact of PTSD comorbidity on one-year outcomes in a Depression trial. *Journal of Clinical Psychology, 62* (7), 815-835.

Green, B. L., Krupnick, J. L., Stockton, P., Goodman, L., Corcoran, C., & Petty, R. (2005). Effect of adolescent trauma exposure on risky behavior in college women. *Psychiatry, 68* (4), 363-378.

Hegel, M. T., Unutzer, J., Tang, L., Arean, P. A., Katon, W., Noel, P. H., …Lin, E. (2005). Impact of comorbid panic and Posttraumatic Stress Disorder on outcomes of collaborative care for late-life depression in primary care. *American Journal of Geriatric Psychiatry, 13* (1), 48-58.

Holmes, W. C., Foa, E. B., & Sammel, M. D. (2005). Men's pathways to risky sexual behavior: Role of co-occuring childhood sexual abuse, Posttraumatic Stress Disorder, and Depression histories. *Journal of Urban Health, 82* (1), i89-i99.

Hutton, H. E., Treisman, G. J., Hunt, W. R., Fishman, M., Kendig, N., Swetz, A. & Lyketsos, C. G. (2001). HIV risk behaviors and their relationship to Posttraumatic Stress Disorder among women prisoners. *Psychiatric Services, 52* (4), 508-513.

Johnson, L. W., & Harlow, L. L. (1996). Childhood sexual abuse linked with adult sexual abuse, victimization, and AIDS risk. *AIDS Education and Prevention, 8,* 44-57.

Kandel, D. B., Raveis, V. H., & Davies, M. (1991). Suicidal ideation in adolescence: Depression, substance use, and other risk factors. *Journal of Youth and Adolescence*, *20* (2), 289-309.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., …Wang, P. S. (2003). The epidemiology of Major Depressive Disorder: Results from the National Comorbidity Survey Replication. *Journal of the American Medical Association, 289* (23), 3095-3105.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62* (6), 593-602.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C., B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52* (12), 1048-1060.

Kilpatrick, D. G., Acierno, R., Resnick, H. S., Saunders, B. E., & Best, C. L. (1997). A 2-year longitudinal analysis of the relationships between violent assault and substance use in women. *Journal of Consulting and Clinical Psychology, 65,* 834-847.

Kilpatrick, D. G., Acierno, R., Saunders, B., Resnick, H. S., Best, C. L., & Schnurr, P. P. (2000). Risk factors for adolescent substance abuse and dependence: Data from a national sample. *Journal of Consulting and Clinical Psychology, 68* (1), 19-30.

Kilpatrick, D. G., Ruggiero, K. J., Acierno, R., Saunders, B. E., Resnick, H. S., & Best, C. L. (2003). Violence and risk of PTSD, Major Depression, substance abuse/dependence, and comorbidity: Results from the National Survey of Adolescents. *Journal of Consulting and Clinical Psychology*, *71* (4), 692-700.

Kosunen, E., Kaltiala-Heino, R., Rimpela, M., & Laippala, P. (2003). Risk-taking sexual behaviour and self-reported Depression in middle adolescence – a school-based survey. *Child: Care, Health and Development*, *29* (5), 337-344.

Mazzaferro, K. E., Murray, P. J., Ness, R. B., Bass, D. C., Tyus, N., & Cook, R. L. (2006). Depression, stress, and social support as predictors of high-risk sexual behaviors and STIs in young women. *Journal of Adolescent Health, 39,* 601-603.

Molitor, F., Ruiz, J. D., Klausner, J. D., & McFarland, W. (2000). History of forced sex in association with drug use and sexual HIV risk behaviors, infection with STDs, and diagnostic medical care: Results from the young women survey. *Journal of Interpersonal Violence, 15* (3), 262-278.

Momartin, S., Silove, D., Manicavasagar, V., & Steel, Z. (2004). Comorbidity of PTSD and Depression: Associations with trauma exposure, symptom severity, and functional impairment in Bosnian refugees resettled in Australia. *Journal of Affective Disorders, 80,* 231-238.

Nixon, R. D., Resick, P. A., & Nishith, P. (2004). An exploration of comorbid Depression among female victims of intimate partner violence with Posttraumatic Stress Disorder. *Journal of Affective Disorders, 82*, 315-320.

Norris, F. H. (1992). Epidemiology of trauma: Frequency and impact of different

potentially traumatic events on different demographic groups. *Journal of Consulting and Clinical Psychology, 60,* 409-418.

O'Donnell, M. L., Creamer, M., & Pattison, P. (2004). Posttraumatic Stress Disorder and Depression following trauma: Understanding comorbidity. *American Journal of Psychiatry, 161* (8), 1390-1396.

Perdue, T., Hagan, H., Thiede, H., & Valleroy, L. (2003). Depression and HIV risk behavior among Seattle-area injection drug users and young men who have sex with men. *AIDS Education and Prevention, 15* (1), 81-92.

Plotzker, R. E., Metzger, D. S., & Holmes, W. C. (2007). Childhood sexual and physical abuse histories, PTSD, Depression, and HIV risk outcomes in women injection drug users: A potential mediating pathway. *American Journal on Addictions, 16,* 431-438.

Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., Saunders, B. E., & Best, C. L. (1993). Prevalence of civilian trauma and Posttraumatic Stress Disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology, 61,* 984-991.

Risser, H. J., Hetzel-Riggin, M. D., Thomsen, C. J., & McCanne, T. R. (2006). PTSD as a mediator of sexual revictimization: The role of reexperiencing, avoidance, and arousal symptoms. *Journal of Traumatic Stress, 19* (5), 687-698.

Shrier, L. A., Harris, S. K., Sternberg, M., & Beardslee, W. R. (2001). Associations of Depression, self-esteem, and substance use with sexual risk among adolescents. *Preventative Medicine, 33,* 179-189.

Silverman, J. G., Raj, A., Mucci, L. A., & Hathaway, J. E. (2001). Dating violence

against adolescent girls and associated substance use, unhealthy weight control, sexual risk behavior, pregnancy, and suicidality. *Journal of the American Medical Association*, *286* (5), 572-579.

Smith, D. W., Davis, J. L., & Fricker-Elhai, A. E. (2004). How does trauma beget trauma? Cognitions about risk in women with abuse histories. *Child Maltreatment*, *9* (3), 292-303.

Stein, M. D., Solomon, D. A., Herman, D. S., Anderson, B. J., & Miller, I. (2003). Depression severity and drug injection HIV risk behaviors. *American Journal of Psychiatry*, *160* (9), 1659-1662.

Stiffman, A. R., Dore, P., Felton, E., & Cunningham, R. (1992). The influence of mental health problems on AIDS-related risk behaviors in young adults. *Journal of Nervous and Mental Disease*, *180* (5), 314-320.

Strathdee, S. A., Hogg, R. S., Martindale, S. L., Cornelisse, P. G., Craib, K. J., Montaner, J. S., … Schechter, M. T. (1998). Determinants of sexual risk-taking among young HIV-negative gay and bisexual men. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*, *19* (1), 61-66.