Treatment of Dual Diagnosis Post Traumatic Stress Disorder and Substance Use Disorders: A Meta-Analysis

Joshua Dolan
Marquette University

TREATMENT OF DUAL DIAGNOSIS POST TRAUMATIC STRESS DISORDER AND SUBSTANCE USE DISORDERS: A META-ANALYSIS

by

Joshua Dolan

A Dissertation submitted to the Faculty of the Graduate School,
Marquette University,
in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy

Milwaukee, Wisconsin

August 2012

ABSTRACT
TREATMENT OF DUAL DIAGNOSIS POST TRAUMATIC STRESS DISORDER AND SUBSTANCE USE DISORDERS: A META-ANALYSIS

Joshua Dolan

Marquette University

The dual diagnosis of post-traumatic stress disorder and substance use disorders affects a large number of people. Various treatments have been used for addressing these co-occurring disorders and have now been empirically tested. These treatments can be divided into two categories: sequential and integrated. The goal of this study was to meta-analytically examine the effectiveness of these treatments and compare these two categories of treatment. Secondary objectives included the exploration of potential moderator variables and the symptom interplay between the two disorders after treatment.

The results of the study suggested that treatment for the dual diagnosis of post-traumatic stress disorder and substance use disorders is generally effective. There were no major differences, however, between the two categories of treatment. There also was no evidence of symptom interplay. There were no clear moderators. There was also evidence that outcomes in this area of the research literature are being affected by the "file drawer" problem, though likely not to a degree that would greatly weaken these results.

ACKNOWLEDGMENTS

Joshua Dolan

I would like to thank everyone who helped me make it to this point. I would like to thank the instructors and faculty of the Marquette Counseling Psychology doctoral program. I would also like to thank my supervisors who have given of themselves to further my training.

I would like to thank the members of my dissertation committee: Dr. Timothy Melchert for providing feedback and support throughout the process, Dr. Mike Allen for teaching and providing mentorship regarding meta-analysis, and Dr. Lisa Edwards for agreeing to serve on the committee at such short notice.

I would also like to thank my family and friends for supporting me throughout my entire graduate career, including some who are no longer here, but would have loved to have seen me finish. I would also like to thank John and Kathy Messing for being there and for being great parents.

Most of all I would like to thank my son, Matthew. Even though he didn't realize it, he provided me with a great sense of balance throughout my program. He was also a major source of motivation for me to keep pushing on when the going was difficult.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

OVERVIEW

Post-Traumatic Stress Disorder (PTSD) and Substance Use Disorders (SUD) each involve symptoms that can be quite debilitating (American Psychological Association, 2000). Individually, each of these disorders affects a large number of people, and a large number of people are affected by the combination of the disorders occurring simultaneously (American Psychological Association, 2000; National Center for PTSD, 2008; Substance Abuse and Mental Health Services Administration, 2006). When they do occur together, the resulting syndrome can be very difficult for afflicted individuals to cope with and for health care providers to treat.

To gain a full understanding of what the dual diagnosis looks like, one needs to have a basic understanding of the presentation of each disorder alone. The Diagnostic and Statistical Manual of Mental Disorders IV-Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000) describes PTSD as a set of symptoms that arise after an individual experiences some kind of traumatic event such as injury or threat to self or witnessing such an event toward another. This event must be responded to with fear, helplessness, or horror. This event then leads to three symptom clusters: re-experiencing the event, avoidance of event stimuli, and increased arousal. Re-experiencing the event includes nightmares, flashbacks, dissociation, or intrusive thoughts. Avoiding stimuli regarding the events refers to the individual's attempts to avoid things that would remind her or him of the event itself and which can lead to avoidance of particular people, places, thoughts, or activities. The third symptom cluster, increased arousal, includes difficulty in

falling asleep, hypervigilance, exaggerated startle reflex, or increased anger and irritability.

PTSD is estimated to occur in about 8% of the United States population at some point in their lives (American Psychiatric Association, 2000; National Center for PTSD, 2008). The National Center for PTSD (2008) further estimates that about 10% of women and 5% of men can be diagnosed with PTSD in their lives. In terms of traumatic events, this study estimated that about 60% of men report at least one traumatic event in their lives while about 50% of women report the same.

For the purposes of this dissertation, SUD will be defined as either substance abuse or dependence as described by the DSM-IV-TR (American Psychiatric Association, 2000). The DSM-IV-TR defines substance abuse as a pattern of substance use that leads to physically hazardous situations, legal or social problems, and a failure to fulfill life responsibilities (i.e., work or family). Substance dependence is the more severe disorder and includes tolerance effects, withdrawal, more substance use than intended, failures to quit, a large amount of time spent in substance use activities, decrease in other activities, and continued use despite the aforementioned problems. While the DSM-IV-TR includes many different classes of substances within these categories, this review will focus solely on alcohol and illegal drugs.

It is estimated that approximately 15% of the population meets the diagnostic criteria for alcohol dependence sometime during their lifetimes (American Psychiatric Association, 2000). Estimates for the lifetime prevalence for various illegal drugs are 1.5% for amphetamines, 5% for cannabis, 2% for cocaine, 0.6% for hallucinogens, and 0.7% for opioids (APA, 2000). It is estimated that twenty-two and a half million

Americans (8.9% of the population twelve years of age and older) meet the criteria for a SUD every year (Substance Abuse and Mental Health Services Administration, 2010).

There have been a wide range of prevalence estimates for the dual diagnosis of SUD and PTSD. These estimates have ranged from 10.9% (Najavits, Runkel, et al., 2003) to 41% (Brown, Read, & Kahler, 2003) for SUD treatment samples having comorbid PTSD. More recent estimates have found 22.4% of individuals with cocaine dependence and in treatment also had PTSD (Afful, Strickland, Cottler, & Bierut, 2010). Similar rates have also been found across cultures with 25.3% of a German SUD treatment seeking sample also having co-occurring PTSD (Driessen et al., 2008). One study examining individuals in a PTSD treatment program found that 91.2% of the participants also had a lifetime SUD diagnosis (Boudewyns, Woods, Hyer, & Albrecht, 1991). However, there is reason to believe that participants of this last study had much more severe PTSD than usual. Most of the other studies found comorbidity rates between 25% and 30%. These rates seemed to hold across different age groups and countries. The highest prevalence rate was found in a study of lower socioeconomic status (SES) inner-city women with 59% of the participants experiencing both SUD and PTSD (Fullilove et al., 1993), suggesting that SES may play a role in the incidence of the comorbid syndrome. Given the high rates of comorbid PTSD and SUD found across samples, some authors have suggested that co-occurring disorders should be viewed as an expectation in the substance abusing population (Minkoff & Cline, 2004). With these high rates, it is imperative that effective treatments are found and utilized with this population.

Most studies of treatment outcomes for dual PTSD AND SUD individuals have found that individuals with the dual diagnosis have worse outcomes than individuals with

either disorder alone (Trafton, Minkel, & Humphreys, 2006). Mills, Teesson, Ross, and Darke (2007) found mixed results where individuals with dual diagnoses improved more on some measures but did worse on others. Brown, Stout, and Mueller (1996) found that women with comorbid PTSD in an inpatient substance abuse treatment facility relapsed faster after treatment then women in the same facility without PTSD. Surveys of clinicians have found that they believe that the dual diagnosis is more difficult to work with than either disorder alone (Najavits, 2002a). An early review of dual PTSD and SUD suggested that the reasons that this dual diagnosis is difficult to treat are the difficulty in assessment due to the amorphous nature of PTSD and that these individuals have a tendency to isolate, have survivor guilt, suffer from depression, and have a great deal of rage (Jelinek & Williams, 1984).

Furthermore, it appears that these individuals are not receiving the more specialized treatment that they need. In a survey of women with dual PTSD and SUD, Najavits, Sullivan, Schmitz, Weiss, and Lee (2004) found that the most utilized past treatments in this population were individual psychotherapy, psychopharmacological treatments, inpatient hospitalization, group psychotherapy, and SUD counseling. Only about half of the participants were receiving treatment for both PTSD and SUD. Chiavaroli (1992) examined the treatment files of individuals with a sexual abuse history who were in a substance abuse treatment facility and found that their trauma was rarely addressed.

Clients themselves report emotional pain, shame, and guilt as being the barriers to getting treatment (Brown, Stout, & Gannon-Rowley, 1998). In a survey of clinicians regarding difficulties surrounding treatment of this dual diagnosis, the clinicians reported

clients' self-destructiveness, case management needs, and dependency as the highest ranked difficulties (Najavits, 2002a).

Statement of Problem

Considering the scope and nature of the PTSD and SUD dual diagnosis, it is important that effective treatments be found. Up to this point, various treatment models have been proposed and empirically tested for this dual diagnosis. However, a search of the literature found no study that combined and compared these studies through meta-analysis. A number of isolated studies have been conducted on the interplay of the symptoms in these two disorders, but there has not been a quantitative integration of these studies.

Purpose

The purpose of this dissertation is to quantitatively examine the literature using a meta-analytic approach to determine the effectiveness of treatment for the PTSD and SUD dual diagnosis. Currently there is a movement toward integrated treatments for this dual diagnosis, but there is as yet no examination regarding whether or not these integrated treatments are any more effective than treatments aimed at either the PTSD or SUD individually. Therefore, this study compared the effectiveness of integrated PTSD and SUD treatments versus non-integrated treatments.

A secondary purpose was to explore the symptom interplay between the disorders to determine how they affect each other throughout treatment and recovery. There are numerous theories addressing how the different symptomologies affect one another, but no empirical examination of this question has yet been conducted. Therefore, this study

examined treatment follow-up data to compare PTSD and SUD symptoms over time to determine if and how they interact.

Research Questions

1) What is the effectiveness of treatment for individuals with the dual diagnosis of PTSD and SUD as measured by PTSD, SUD, and other psychological symptoms between pre- and post-treatment?
2) Are there differences in the effectiveness of treatments between sequential and integrated treatments for individuals with dual diagnosis PTSD and SUD?
3) Are there moderating influences on treatment outcomes for PTSD and SUD dual diagnosis?
4) How do PTSD and SUD symptoms progress over time after treatment as measured by symptom change scores at post-treatment and follow-up measurements?

A meta-analytic technique was employed to answer these questions. The primary procedure used was Hunter and Schmidt's (2004) technique for meta-analysis and correction. This procedure uses effect size data attained from individual studies and statistically corrects for systematic errors and biases that may be occurring to attempt to attain as accurate a view as possible of the true population effect size scores.

All meta-analyses are contingent upon the literature on which they are based. The literature on dual diagnosis PTSD and SUD is still a relatively new one that is also limited in size. As long as the literature base is sufficiently large, however, meta-analysis can be quite useful for providing preliminary answers to the aforementioned research questions.

Definition of Terms

Particularly relevant terms used in this document are defined as follows.

Coding: Process of converting study information into useful meta-analytical data (Stock, 1994).

Correction: Process of correcting for the various statistical and methodological artifacts that have biased individual study effect sizes (Hunter & Schmidt, 2004).

Dual diagnosis: Diagnosis of two or more mental disorders within a single individual (APA, 2000).

Integrated (or concurrent) treatments: Treatments for a dual diagnosis that treat both diagnoses simultaneously (Back, Waldrop, Brady, & Hien, 2006).

Meta-analysis: Technique by which data from multiple independent sources can be synthesized into a useful form (Hunter & Schmidt, 2004).

Moderator variable: Variable that may be causing variation in the results of an analysis (Hunter & Schmidt, 2004).

Sequential treatments: Treatments for a dual diagnosis that focuses on a single diagnosis first, before treating the second diagnosis (Back, Waldrop, Brady, & Hien, 2006).

CHAPTER II

LITERATURE REVIEW

A discussion on the dual diagnosis of PTSD and SUD can be divided into two main sections. The first of these sections examines diagnostic issues that include etiology, maintenance, and presentation of the dual diagnosis. The second section will summarize the treatment literature for dual SUD and PTSD.

Diagnostic Issues

Diagnostic issues regarding dual PTSD and SUD encompass the areas of etiology, maintenance, and presentation. Knowledge of the development of dual diagnosis PTSD and SUD can help inform the treatment of individuals with this comorbidity. For example, if one of the disorders develops first and seems to underlie the other, then treating that underlying disorder would become the primary therapeutic priority. Once both disorders develop there are a variety of ideas on how they maintain each other. Many of these theories describe a cyclical pattern in which symptoms of one disorder lead to an increase in symptoms of the other. Information on maintenance can also help inform and explain the behavioral patterns that are seen with this population. Furthermore, once the comorbidity is established, it cannot be assumed that the client's symptomology is simply the two disorders' symptomologies added together as they may combine to form a syndrome whose total is greater than the sum of its parts and is especially intractable and resistant to change. Thus, all three of these areas of etiology, maintenance, and presentation can help inform treatment decisions.

Etiology

There are a variety of theories on how the dual diagnosis develops. Some of these theories state that one disorder causes the other, while others discuss some third variable, such as genetics or some other factor, that serves as a vulnerability for both disorders. Examples of factors that have been statistically significantly implicated in the development of dual PTSD and SUD are low levels of education, high number of traumas experienced, high perception of threat to life, and low social support (Ullman, Filipas, Townsend, & Starzynski, 2006). Sociological factors such as culture, family environment and poverty may also serve as vulnerabilities (Logan, Walker, Cole, & Leukefeld, 2002).

Research has identified the psychological factor of low self-regulatory ability as a major vulnerability factor for the development of PTSD and SUD dual diagnosis (Hien, Cohen, & Campbell, 2005; Khantzian, 1997). A similar construct, coping skills, has also been suggested as a vulnerability (Simpson, Jakupcak, & Luterek, 2006; Ullman, Filipas, Townsend, & Starzynski, 2005). These findings support the viewpoint that both disorders are unhealthy ways of dealing with stressful life events.

Genetics and early family environment have also been suggested as potential third variables. A study by Dierker and Merikangas (2001) found that a family history of SUD increased the risk for PTSD by nearly four times. Xian et al. (2000) examined 3,000 twin pairs who were male Vietnam War veterans and found that PTSD and SUD shared additive genetic components as well as contributed distinct components accounting for about 25% of the variance of the disorders.

The type of trauma that underlies the diagnosis of PTSD may also serve as a vulnerability, as more severe forms of trauma significantly increase dual PTSD and SUD

rates (Stewart, Mitchell, Wright, & Loba, 2004). These more severe forms of trauma involve assaults by non-strangers, combat trauma, childhood trauma, and life threatening illnesses (Brinson & Treanor, 1989; Dragan & Lis-Turlejska, 2007; Raghavan & Kingston, 2006; Waldrop, Santa Ana, Saladin, McRae, & Brady, 2007). Stewart, Mitchell, et al. (2004) found that individuals with PTSD were statistically significantly more likely to use substances to cope following more severe traumas.

Another important question is if one disorder causes the other. Does SUD cause PTSD or is it the other way around? Research has examined the temporal order of the disorders, but the results are inconclusive with some studies finding that SUD tends to precede PTSD (Kilpatrick, Ruggiero, et al., 2003; Cottler et al., 1992) while others finding PTSD precedes SUD (Shipherd, Stafford, & Tanner, 2005; Mills, Teesson, Ross, & Peters, 2006; Reed, Anthony, & Breslau, 2007; Chilcoat & Breslau, 1998). Some neuropsychological studies suggest that stress and trauma can produce changes in the brain that place an individual at greater risk for SUD (Goeders, 2003). Gender has also been identified as a possible moderating variable that affects which disorder precedes the other (Deykin & Buka, 1997; Jaycox, Ebener, Damesek, & Becker, 2004).

Many of these etiological studies that examined which disorder preceded the other utilized large sample sizes, but the retrospective nature of these studies resulted in findings susceptible to recall bias. Only a few utilized longitudinal designs (e.g. Shipherd et al., 2005) that would not be susceptible to this type of bias. Furthermore, many utilized measures of unknown (or unreported) psychometric quality, which weakened the reliability of the results.

Maintenance

Several proposals have been offered regarding how these two disorders maintain each once they develop. Many of these proposals describe a cyclical pattern in which symptoms of one disorder lead to an increase in the other disorder (Clark, Masson, Delucchi, Hall, & Sees, 2001; Stewart & Conrod, 2003). The participants of a study of combat experienced Vietnam veterans reported that the symptoms of both PTSD and SUD increased simultaneously after the war (Bremmer, Southwick, Darnell, & Charney, 1996). A 20-year study of Vietnam veterans (Price, Risk, Haden, Lewis, & Spitznagel, 2004) found SUD appeared to exacerbate PTSD initially but as time went on the PTSD appeared to lead to continuation of the SUD. Individuals with PTSD and SUD have also reported that they believe that the symptoms of the two disorders are related to one another (Brown, Stout, & Gannon-Rowley, 1998; Reynolds et al., 2005).

These findings suggest that once the dual disorder develops, each of the components serves to maintain the other in some form of a positive feedback loop. Potential processes by which the disorders may maintain each other include SUD symptoms exacerbating and prolonging PTSD by preventing habituation to trauma, SUD withdrawal symptoms being misinterpreted as PTSD symptoms, and SUD symptoms retriggering PTSD symptoms through mechanisms such as sleep disturbances (Stewart, Pihl, Conrod, & Dongier, 1998). This cycle can also occur through automatic processes such as cue reactivity or other neurological processes (Cohen, Mannarino, Zhitova, & Capone, 2003; Conrod & Stewart, 2003).

A theory used to describe how PTSD can lead to SUD symptoms is Khantzian's (1985; 1997) self-medication hypothesis. This hypothesis states that individuals use

specific substances to self-medicate uncomfortable feelings or thoughts and alleviate suffering. Stewart (1996) stated that binge drinking is triggered by increases in PTSD symptoms because alcohol reduces tension, dampens physiological stress reactions, reduces negative mood states and alexthymia, and reduces the intrusive symptoms of PTSD. A factor analysis of PTSD found correlates with specific substances (Stewart, Conrod, Pihl, & Dongier, 1999). Alcohol was found to be associated with arousal symptoms, anxiolytics with arousal and numbing symptoms, and analgesics with arousal, intrusions, and numbing symptoms. Jacobsen, Southwick, and Kosten (2001) stated that depressants may cause arousal symptoms similar to those of PTSD.

A study of substance use relapse factors found that PTSD symptoms predicted relapse in negative interpersonal, negative physiological, and social pressure situations (Norman, Tate, Anderson, & Brown, 2007). Waldrop, Back, Verduin, and Brady (2007) also found that individuals with dual diagnosis PTSD AND SUD were more likely to use substances in negative situations such as the experience of negative emotions or physical discomfort. One mixed methods study (Condon, 2004) interviewed ten individuals with dual PTSD and SUD and found that the participants reported using substances to numb feelings and forget negative memories.

The arousal symptom cluster of PTSD in particular seems to have the most effect in maintaining SUD (Ouimette, Moos, & Brown, 2003; Stewart, Pihl, et al., 1998). Alcohol abuse may increase arousal in individuals so that they are more likely to develop and maintain PTSD (Stewart, 1996). Another study found that while all the PTSD symptoms tended to decrease with time in participants who were assaulted in the previous month, the arousal symptoms in those with alcohol use problems deceased less

(Kaysen, Simpson, et al., 2006). In contrast, another study (Kaysen, Simpson, et al., 2006) assessing women who had been assaulted in the previous month found that alcohol use predicted intrusion and avoidance symptoms but not arousal symptoms after the trauma.

Najavits, Runkel, et al. (2003) found that the arousal symptom set of PTSD was most prominent in a sample of individuals with cocaine dependence and PTSD, which is consistent with the stimulative properties of cocaine. Stewart, Mitchell, Wright, and Loba (2004) found elevated hyper arousal and re-experiencing symptoms. Brown (2000) found that the re-experiencing cluster of PTSD predicted future SUD and PTSD outcomes in 29 women who were in a non-PTSD focused multimodal treatment. Van Der kolk, Greenburg, Boyd, and Krystal (1985) state that opiates have similar withdrawal symptoms as the arousal symptoms of PTSD.

Brown, Read, and Kahler (2003) found that individuals in SUD treatment who maintained their PTSD diagnosis from baseline to a 6-month follow-up had worse substance use outcomes then those who remitted or those who did not have PTSD. The individuals who experienced unremitted PTSD maintained their greater reliance on negative coping styles while those who showed improvement had less negative coping style reliance. In a re-examination of Brown, Read and Kahler's (2003) data, Ouimette, Coolhart, Funderburk, Wade, and Brown (2007) calculated odds ratios for relapse. Participants with unremitted PTSD were 7.38 times more likely to use due to depression then those participants without PTSD. Participants with PTSD were also statistically significantly more likely to spend a lot of effort to get the substance, have more urges to use, were more than three times more likely to think about using before the actual use and

more than three times more likely to use to intoxication than those without PTSD. These individuals with PTSD were also less likely to have confidence in their ability to avoid relapse and use due to interpersonal pressures.

It appears that many factors interact with each other to maintain the dual diagnosis. Each disorder is likely to maintain the other either directly and/or indirectly through other factors. Gil-Rivas, Fiorentine, and Anglin (1996) found that while PTSD was not associated directly with relapse, it was associated with a variety of factors such as depression, self-esteem, and anxiety, all of which were correlated with relapse.

Presentation

Individuals with PTSD and SUD dual diagnosis present to treatment with a variety of symptoms, some of which are a result of the individual disorders while others result from the dual combination (Schafer & Najavits, 2007). These symptoms span the biological, psychological and social domains of functioning.

Biological. The dual diagnosis of SUD and PTSD can have a large impact on brain functioning. Some authors hypothesize that the dual diagnosis of PTSD and SUD leads to impairments in executive functioning and memory, under-reactivity to visual affective stimuli (due to PTSD numbing), and over-reactivity to trauma/drug related cues, (Samuelson, et al., 2006; Sokhadze, et al., 2007). Other reviews (Brady & Sinha, 2005) suggest that the HPA axis, extra-hypothalamic cortico-releasing factor (CRF), and the noradrenergic system are all involved in this dual diagnosis. Increased levels of CRF may enhance the addictive nature of some drugs and increase PTSD symptoms such as the arousal set of symptoms. Brady, Waldrop et al. (2006) found that participants with the

dual diagnosis experienced a neurological numbing but at the same time a subjective heightening of stress reactions.

Individuals with dual PTSD and SUD also tend to have worse health outcomes (Tate, Norman, McQuaid, & Brown, 2007; Mills, Teesson, Ross, & Peters, 2006; Brown, Recupero, & Stout, 1995; Lester, 2007; Mills, Lynskey, Teesson, Ross, & Darke, 2005; Kaysen, Pantalone et al., 2008; Peirce, Kindbom, Waesche, Yuscavage, & Brooner, 2008). Ouimette, Goodwin, and Brown (2006) found that those with SUD and PTSD self-reported more cardiovascular and neurological symptoms, as well as more chronic physical symptoms than those with SUD only. A study (Waldrop, Back, Sensenig, & Brady, 2008) examining the effects of PTSD and alcohol dependence on sleep found that participants with PTSD and alcohol dependence had worse sleep quality (i.e. daytime sleepiness or mid-sleep awakening) than participants without these disorders.

Brown, Stout, and Mueller (1999) calculated that individuals with dual PTSD and SUD incurred $4,042 in inpatient addiction services while SUD-only individuals incurred $780 during the same time period. Mills, Teesson, Ross, Darke, and Shanahan (2005) also found that dual diagnosis trended toward more costs but not in a statistically significant manner.

Psychological. Individuals with the dual diagnosis of PTSD and SUD are more prone to other mental health disorders (Kovach, 1986; Lester, 2007; Peirce et al., 2008; Brown, Stout, & Mueller, 1999; Read, Brown, & Kahler, 2004). Other studies have found that those with SUD and PTSD have worse mental health functioning than those with SUD only or those with no diagnosis (Mills, Lynskey, et al., 2005; Najavits, Harned, et al., 2007; Ouimette, Goodwin, and Brown 2006; Trafton, Minkel, & Humphreys, 2006;

Ullman, Townsend, Starzynski, Long, 2006) though Najavits, Weiss, and Shaw (1999) did not find greater psychological symptoms among dual diagnosis women versus women with PTSD only. Individuals with this dual diagnosis were more likely to use multiple classes of drugs (Dragan & Lis-Turlejska, 2007; Mills, Lynskey, et al., 2005; Peirce et al., 2008; Rotunda, O'Farrell, Murphy, & Babey, 2008) and have longer drug use histories (Read, Brown, & Kahler, 2004; Trafton, Minkel, & Humphreys, 2006).

Other psychological processes also affected by this dual diagnosis. Individuals with this dual diagnosis tend to have greater rates of suicidal ideation (Price et al., 2004; Harvey, Rawson, & Obert, 1994) and attempts (Najavits, Weiss, & Shaw, 1999) than individuals with either diagnosis alone. On measures of cognitive distortions, women with dual PTSD and SUD scored higher than a PTSD only group (Najavits, Gotthardt, Weiss, & Epstein, 2004). Najavits, Weiss, and Shaw (1999) found that women with dual diagnosis PTSD and SUD were statistically significantly less resilient, while Ouimette, Ahrens, Moos, and Finney (1998) found that individuals with dual diagnoses had lower coping abilities than individuals with single diagnoses. Jaycox et al. (2004) found that individuals with PTSD had statistically significantly more internalizing symptoms than individuals with SUD or SUD with a history of trauma.

Social. Najavits, Harned et al. (2007) found that individuals with dual diagnosis PTSD and SUD had statistically significantly more interpersonal problems than those with SUD only. These interpersonal problems included difficulties with employment (Peirce et al., 2008; Mills, Teesson, Ross, Darke, & Shanahan, 2005). Dual diagnosis individuals have been found to have statistically significantly less education and income than those with single SUD or PTSD (Riggs, Rukstalis, Volpicelli, Kalmanson, & Foa,

2003; Ullman, Townsend, et al., 2006). Adolescents with co-occurring disorders had more negative scores on measures of externalizing behaviors, arrests, and grade point averages (Kilpatrick, Ruggiero, et al. 2003).

Riggs et al. (2003) found that individuals with this dual diagnosis were statistically significantly less likely to be living with a partner then single diagnosed individuals. These individuals have also been found to have high rates of intimacy and sexuality issues (Levan, 2006). Women with dual PTSD and SUD have also reported high rates of domestic violence (both physical and psychological) directed at them as well as committed by them (Najavits, Sonn, Walsh, & Weiss, 2004; Parrott, Drobes, Saladin, Coffey, & Dansky, 2003). In a study of aggression, the arousal symptoms of PTSD were positively associated with aggression both directly as well as indirectly through the effects of alcohol (Taft et al., 2007). Zoricic, Buljan, Thaller, and Karlovic (2003) found that a group with PTSD and alcohol dependence displayed statistically significantly more verbal and physical aggression than a group with just PTSD in a sample of Croatian war veterans.

Summary

There are a variety of theories on how this dual diagnosis develops. A great deal of research has been done examining various underlying factors such as genetics or a lack of coping skills (Dierker & Merikangas, 2001; Simpson, Jakupcak, & Luterek, 2006). It is also not yet clear if one disorder tends to precede the other though gender may be a moderating variable on the temporal development of the disorders (Jaycox et al., 2004). Studies that include multiple underlying factors should be used to determine which ones best explain the development of the dual diagnosis.

Once the dual disorder develops, the symptoms of one disorder appear to increase the symptoms of the other. While a few hypotheses have been explored on how SUD affects PTSD, more research has been done on how PTSD drives SUD. The most prominent of these latter theories is the self-medication hypothesis (Khantzian, 1997). Other studies have explored how specific symptom clusters are related to substance use, though it is still not clear how these symptom clusters interact with each other or with the substance abuse. It is also possible that the disorders interact through some other third variable such as depression.

The dual diagnosis of PTSD and SUD represents a large cluster of potential symptoms. Furthermore, it has been found to have many profound effects on other areas of life functioning. Neurological studies have found changes in brain functioning associated with this dual diagnosis (Brady & Sinha, 2005). These individuals are also more prone to other physical and mental health issues (Tate et al., 2007; Brown, Stout, & Mueller, 1999), and are more likely to have interpersonal issues (Riggs et al., 2003).

Research suggests that different individuals may develop the dual diagnosis through different pathways and for different reasons. Once they have the dual disorder, it perpetuates itself in a way that makes it difficult to treat. Unfortunately, the mechanisms by which it develops and is maintained are not altogether clear. Furthermore, while a great deal of research has been done on these mechanisms, the research is not to the point that it can be clinically useful for more than broad generalizations.

Treatment

Many different treatment models have been proposed and tested to help clients and therapists treat co-occurring PTSD and SUD. Some of these treatments were

designed for treating PTSD or SUD individually and were subsequently used with individuals with dual diagnoses. Other treatments were designed specifically to treat the dual diagnosis. These later treatments integrate components that are believed to be effective for both disorders. Various researchers have described the need for these integrated treatments (Drake, Mercer-McFadden, Mueser, McHugo, & Bond, 1998; Minkoff & Cline, 2004). Back, Waldrop, Brady, and Hien (2006) noted that treatments for dual diagnoses can be divided into two categories: sequential and integrated. The following sections will review both of these treatments in turn.

Sequential Treatments

Sequential treatments initially focus on only one of the diagnoses. Some of these treatments focused on SUD as a primary diagnosis and used treatments such as 12-step or relapse prevention models for SUD (Ouimette, Humphreys, et al., 2001). Other treatments have focused on PTSD as a primary diagnosis and utilized treatments such as exposure treatment. In one of the first articles offering suggestions for the treatment of this dual diagnosis, Jelinek and Williams (1984) suggested that after a thorough assessment is done, the client should be placed in the treatment that matches her or his primary diagnosis. The subsequent sections will examine the results of these sequential treatments.

SUD Treatment. Treatments for SUD have a long established history. Models for recovery range from the Minnesota model (Anderson, McGovern, & DuPont, 1999) to cognitive-behavior models such as Marlatt's Relapse Prevention Model (Witkiewitz & Marlatt, 2004). Many of these treatments have also been empirically tested with dual diagnosis clients. Other treatments like motivational interviewing have been suggested as

helpful but have not been empirically tested to demonstrate their usefulness with this dual disorder (Feldstein & Ginsburg, 2006).

A study dealing with 12-step meeting participation and how that relates to treatment outcomes for individuals with dual PTSD and SUD found that individuals with this dual diagnosis were just as likely to attend Alcoholics Anonymous meetings as those individuals with SUD only (Ouimette, Humphreys, et al., 2001). Attending these meetings was associated with statistically significantly greater abstinence (r=.28), less distress (r=.27), and better quality of social relationships (r=.38) at a one-year follow-up.

Ouimette, Ahrens, Moos, and Finney (1998) examined data from a variety of VA hospitals that offered treatments based on both cognitive behavioral (CBT) and 12-step models for SUD but no treatments aimed specifically at PTSD. Substance abuse counseling, family counseling, and 12-step involvement were associated with lower psychological symptoms among the individuals with dual PTSD and SUD at discharge. A one-year follow-up with these individuals found treatment gains were maintained with SUD outcomes but not for outcomes of psychological symptoms, employment, coping, and use expectancy measures (Ouimette, Ahrens, Moos, & Finney, 1997). The SUD outcomes were also maintained at a two-year follow-up (Ouimette, Finney, & Moos, 1999).

A study of CBT treatment for SUD found that in a group of individuals with dual PTSD and SUD, nearly 80% of the participants showed improvement for at least one of their diagnoses, with close to half showing improvement on both (Back, Brady, Sonne, & Verduin, 2006). An examination of the process of improvement during this study showed that alcohol symptoms decreased before PTSD symptoms, though the PTSD symptoms

were assessed less regularly, which weakens this particular result. Furthermore, reduction in PTSD symptoms (mainly the arousal symptoms) was associated with lower drinking rates, but not the other way around, which the authors interpreted as meaning that PTSD symptoms mediate the SUD.

Behavioral couples therapy (BCT) has also been suggested as a possible therapy for individuals with this dual diagnosis and their partners (Rotunda et al., 2008). Male veterans with PTSD and SUD were demographically matched with 19 other veterans who did not have PTSD. Both groups attended BCT treatment. The results showed gains for all of the individuals involved in BCT on drinking (r=.63), relationship (r=.30), and psychological distress outcomes (r=.33), but with no statistically significant differences between the groups. Unfortunately, improvements in PTSD outcomes were not reported.

Najavits, Harned, et al. (2007) examined the outcomes among a group of individuals with cocaine dependence only and a group with cocaine dependence and PTSD. Participants were recruited from a variety of outpatient treatment modalities that used manualized SUD treatment: individual cognitive therapy, individual supportive-expressive therapy, psychodynamic treatment, individual 12-step drug counseling, and group 12-step drug counseling. The PTSD group displayed statistically significant improved scores in global psychological symptoms, but not in addiction or interpersonal functioning. However, this may have been due to the PTSD group's more severe global psychological symptom scores at intake. Overall, the study suggested that dual diagnosis clients begin treatment with greater symptomatology and do not show as much improvement.

A dissertation (Lester, 2007) based on data from a larger study examined the effects of contingency management versus contingency management plus day treatment on individuals that were homeless and had cocaine dependence. This study found that while the group with co-occurring PTSD was not statistically significantly different in number of weeks abstinent or in relapse rates, they did relapse sooner after treatment on average than the non-PTSD group. Individuals with the dual diagnosis in the day treatment program showed improvements on PTSD symptoms over those in the contingency management group, however improvements in PTSD symptoms were not associated with improvements in SUD outcomes.

Coffey, Schumacher, Brady, and Cotton (2007) studied how PTSD and SUD symptoms remit over a month long abstinence during SUD treatment (which was not described in the study). PTSD symptomology was found to decrease for the first two weeks but then level off, with a trend toward increasing but not at a statistically significantly level. Unfortunately, even after the leveling off, PTSD was still occurring at clinically significant levels.

Most of these studies suggested that SUD treatment has a positive effect on this dual diagnosis. Unfortunately, many of the studies did not provide treatment adherence data. Furthermore, there was rarely any control over potential outside treatments. These weaknesses make it difficult to pinpoint the cause of the outcomes with certainty. Diagnosis was also an issue as some articles only used chart review as a basis for diagnosis.

PTSD Treatment. There have been a variety of treatments that have been shown to be effective with PTSD (Adshead, 2000). Most of these treatments are exposure based

therapies as well as interventions that attempt to teach the client coping skills or to help the client find meaning in life. Exposure based treatments are the premiere therapies for PTSD and entail some kind of reprocessing of the trauma (Powers, Halpern, Ferenschak, Gillihan, & Foa, 2010). Traditionally, these exposure based treatments for the dual diagnosis of PTSD and SUD were typically discouraged, as they were believed to potentially increase chances of relapse.

A study (Coffey, Stasiewicz, Hughes, & Brimo, 2006) examining whether exposure therapy would lower subjective ratings of craving and negative affect used a sample of 43 individuals with dual PTSD and alcohol dependence randomly assigned to either a relaxation treatment or imaginal exposure treatment. The results showed a statistically significant decrease in measurements of craving and negative affect for those who were in the exposure group as opposed to the relaxation group, with very high correlation values ($r = .89$ and .94 for craving and subjective discomfort) between the two groups. The exposure group also had lower PTSD symptoms after the imaginal exposure treatment ($r=.62$) than the relaxation group. While only 50% of the participants completed the exposure treatment, there was no statistically significant difference between the groups on attrition. A reanalysis of the treatment attrition group found that negative affect, PTSD severity, alcohol craving, study condition (imaginal exposure vs. relaxation), and cocaine dependence were not associated with greater treatment drop-out rates, though higher negative affect trended toward statistical significance (Hughes, 2007).

Ouimette, Moos, and Finney (2003) provided further evidence for the efficacy of PTSD treatment on long-term SUD outcomes. The authors examined 118 individuals

who had PTSD and SUD and who had completed various types of treatment at the VA. These individuals were assessed through five years after treatment. The results showed that participants had much higher abstinence rates after PTSD treatment than with SUD treatment. These greater effects were especially pronounced during the first year after treatment, though were maintained during the entire five year follow-up.

Integrated Treatments

Drake, Mercer-McFadden, Mueser, McHugo, and Bond (1998) define integrated treatments as treatments that "simultaneously address two or more interwoven disorders" (p. 590). These authors state that the benefits of integrated treatment are fewer conflicts between treatment providers and fewer burdens on the client (i.e. transportation, financial). Integrated treatments are believed to be more effective then single treatments as they address both disorders simultaneously and thus have been suggested by a variety of authors (Boudewyns et al., 1991; Kofoed, Friedman, & Peck, 1993; Najavits, Weiss, & Shaw, 1997).

Minkoff and Cline (2004) described a model for treating co-occurring disorders which included integrated treatments as a main characteristic. This model has eight principles that should guide integrated services: dual diagnosis is an expectation, all individuals with dual diagnoses are not the same, treatment relationships are highly valued, case management is balanced with realistic expectations, both diagnoses should be considered primary, both diagnoses can be treated in the same framework, interventions should be individualized, and outcome assessment should also be individualized.

Surveys of clients' desires for treatment have found most expressing a desire for integrated treatment of their substance abuse and trauma symptomology (Back, Brady, Jaanimagi, & Jackson, 2006; Brown, Stout, & Gannon-Rowley, 1998; Levan, 2006; Najavits, Sullivan, et al., 2004). In a qualitative study by Stam (2002), women who were dually diagnosed reported the need for integrative treatment, but that treatment of the substance use should come first. This prioritization of the substance use was due to the fact that the participants stated they might not have been able to cope with the process of trauma recovery prior to abstinence.

Steindl, Young, Creamer, and Crompton (2003) found positive outcomes with Australian veterans with PTSD undergoing concurrent, primarily cognitive behavioral, treatment for PTSD and alcohol use. These participants were divided into low risk and hazardous drinking groups (based on AUDIT scores). The total sample showed decreased PTSD and drinking symptoms, though the low risk drinking group had a greater decrease in symptoms than the high risk drinking group and unfortunately it is not known how much changes the high risk group experienced. A study of VA treatments found that integrated treatments had improved psychiatric symptom, employment, abstinence rate and aftercare outcomes than non-integrated treatments (Moggi, Ouimette, Finney, & Moos, 1999).

Cocozza et al. (2005) compared the effects of nine treatment programs that offered integrated trauma informed treatment versus treatment as usual. Participants (n=2006) in both treatment and comparison sites showed statistically significant improvements on drug, alcohol, PTSD, and mental health outcomes at 6-month follow-up with participants in the treatment as usual sites showing greater improvements. Greater

integration of treatment showed more improvement than the treatment as usual sites or less integrated sites. Unfortunately, this study only provided broad treatment characteristics for the sites, which made it difficult to determine what specific kinds of treatment were the most useful.

Seeking Safety. The Seeking Safety treatment model is the first, and currently the most researched, manualized treatment for dual PTSD and SUD (Najavits, 2002b). The model was first developed as a group treatment for women and based on four research literatures: SUD, PTSD, women's treatment, and educational research (Najavits, Weiss, & Liese, 1996). The treatment is present-focused and focuses on helping clients learn to cope with current life stressors. It is designed for 25 sessions but may be longer or shorter as needed. Seeking Safety can be conducted with either gender and in either group or individual formats, and can also be integrated into other treatments (Najavits, 2002b).

Seeking Safety has been effective with a variety of populations. The treatment has mainly been used with women (Najavits, Weiss, Shaw, & Muenz, 1998; Young, Hills, et al., 2004; Gatz et al., 2007; Mcnelis-Domingos, 2004). Its use has also been researched with correctional populations (Zlotnick, Najavits, Rohsenow, & Johnson, 2003; Hamilton, 2006), lower SES individuals (Hien, Cohen, Miele, Litt, & Capstick, 2004), veterans (Weller, 2005; Desai, Harpaz-Rotem, Najavits, & Rosenheck, 2008), and adolescents (Najavits, Gallop, & Weiss, 2006). While all of these studies demonstrated Seeking Safety's effectiveness, nearly all of them were pilot studies that lacked control groups.

Seeking Safety has also been explored with a Revised Exposure Therapy component (Najavits, Schmitz, Gotthardt, & Weiss, 2005). This combined therapy was a

30-session treatment lasting five months. The five male participants demonstrated positive results: the participants displayed perfect attendance and their PTSD and SUD symptoms significantly decreased. They also reported less suicidal ideation. Furthermore, the participants reported being very satisfied with the treatments.

An unpublished meta-analysis found that Seeking Safety was effective in treating PTSD (r=.340), SUD (r=.218), and other psychological symptoms (r=.283) (Dolan, 2008). However, Seeking Safety was not statistically significantly better than a cognitive-behavioral coping skills relapse prevention therapy (Hien, Cohen, Miele et al., 2004).

Exposure-Based. Some authors suggest that exposure therapies have a place in dual PTSD and SUD treatment (Coffey, Dansky, & Brady, 2003). One such treatment that incorporates exposure is Concurrent Treatment of PTSD and Cocaine Dependence (CTPCD) (Back, Dansky, Carroll, Foa, & Brady, 2001). CTPCD is a cognitive-behavioral therapy for outpatients with PTSD and cocaine dependence. The main goals are to educate the client about the relationship between PTSD and SUD, initiate and maintain cocaine abstinence, and decrease PTSD symptomology. The main activities to accomplish these goals are psychoeducation, coping skills training, relapse prevention techniques, cognitive restructuring, and in-vivo and imaginal exposure therapy. The guidelines for the therapy note that those who have suicidal or homicidal ideation, severe depression, vulnerability to dissociative episodes, or who can't stand intense affect may not be appropriate for the exposure components of the therapy. The treatment is mainly designed for inpatient and outpatient populations, though Coffey, Schumacher, Brimo, and Brady (2005) also describe a modification for use in community mental health centers. Brady, Dansky, Back, Foa, and Carroll (2001) tested the effects of CTPCD with

39 participants and found that while the participants had a high drop-out rate, the treatment was effective in reducing PTSD and SUD symptoms for those who completed the treatment. This last finding suggests a need for more effective engagement strategies to reduce high drop-out rates.

Another treatment that incorporates exposure is the Substance-Dependence PTSD Therapy (SDPT) (Triffleman, 2003; Triffleman, Carroll, & Kellogg, 1999). SDPT is an outpatient individual therapy that is conducted twice weekly for 20 weeks. It is a combination of cognitive-behavioral coping skills treatment for SUD, stress inoculation training, and in-vivo exposure for PTSD. Exposure is conducted in a hierarchical manner to allow the client to set the pace and not become overwhelmed too quickly. The manual suggests that the treatment should be offered in conjunction with psychopharmacological interventions. Clients with psychotic disorders or who are on the extremes of homelessness are described as poor candidates for this approach "as the exigencies of daily living become paramount" (Triffleman, Carroll, & Kellogg, 1999, p.8). A pilot study of SDPT showed improvements on PTSD and SUD symptoms though SDPT was not statistically significantly more effective than Twelve Step Facilitation treatment (Triffleman, 2000).

A third treatment that includes an exposure based treatment is Transcend, which is a 12-week partial hospitalization manualized treatment protocol that utilizes group therapy to treat dual PTSD and SUD (Donovan, Padin-Rivera, & Kowaliw, 2001). The main goals of the treatment involve reduction of PTSD symptoms, abstinence from substances, mastery of impulsive behavior, diminishment of shame, and an increase in self-acceptance and self-efficacy. A study of 46 combat veterans undergoing Transcend

treatment showed statistically significant improvements on PTSD and SUD symptoms that persisted all the way to a year after treatment completion (Donovan, Padin-Rivera, & Kowaliw, 2001).

Other. There are a number of other integrated treatments that have been proposed but have yet to be empirically tested. These treatments include TARGET (Ford & Russo, 2006), ATRIUM (Miller and Guidry, 2001), and unnamed treatment models proposed by Harris (1996), Brinson and Treanor (1989), Meisler (1999), Abueg and Fairbank (1991), Den Bleyker (2000), Evans and Sullivan (1995; Sullivan & Evans, 1996), and by Seidel, Gusman, and Abueg (1994).

Other types of treatment address factors that the authors believe underlie both disorders. For example, Simpson, Kaysen, et al. (2007) examined the effects of Vipassana meditation on dual diagnosis PTSD and SUD. Vipassana meditation is a form of meditation that stresses mindfulness, which the authors believed to be an important component of recovery from the dual diagnosis. Participants who learned this meditation displayed less substance use at follow-up and there also was a statistically non-significant trend toward improvement in PTSD symptoms.

Summary

Many treatment manuals and guidelines have been developed for the treatment of dual diagnosis SUD and PTSD. Unfortunately, large numbers of rigorous empirical studies testing their effects have not been conducted. The studies that have been conducted suggest that treatment, both integrated and consecutive, is effective with this population, though it is not known which approach to treatment is more helpful. The

effect that the presence or absence of an exposure-based component has on outcomes is also a question that the literature has not yet adequately answered.

There are common factors linking the various types of treatment for dual diagnosis SUD and PTSD. Nearly all of them have both psychoeducation and coping skills components. Most also stress the importance of trust issues within the therapeutic process and social functioning in other areas of the client's life. Unfortunately, because the lack of treatment fidelity measures is such a major methodological issue in this literature, it is difficult to state for certain what those common factors are. Integrated treatments have also generally been developed more recently, and many of these studies were initial pilot studies that lacked adequate control or comparison groups.

Conclusions

The literature on individuals with co-occurring PTSD and SUD has focused on a variety of questions: (a) how does the dual diagnosis develop and maintain itself, (b) how does it present itself clinically, and (c) how best can this dual diagnosis be treated. The literature surrounding each of these areas had strengths and weaknesses. Strengths included the broad set of questions that have been addressed and the large number of different therapies that have been tested with this population. Weaknesses included questionable diagnostic procedures and lack of treatment reliability. Also, the pilot nature of many studies meant small sample sizes and lack of a control group. Other studies aggregated treatments and did not report enough details to determine the effectiveness of the specific treatments.

There were also quite a few gaps in the literature that need to be filled. Questions regarding the effectiveness of integrated treatments compared with sequential treatments

still need to be answered. The inclusion of components such as exposure therapy also needs to be evaluated more thoroughly. Unfortunately, the literature does not provide clear answers to any of these questions at this time, though the answers could be of great utility in treating individuals who seek treatment for this dual diagnosis. Therefore, further studies should be conducted to determine if different treatment factors affect outcomes and should include larger sample sizes that compare various types of treatments. Components such as exposure should also be varied to test their effects.

Future research should also focus on the longitudinal course of the dual disorder. Little is known about the etiology of the dual disorder, and more knowledge regarding the development of the disorders would be helpful for developing new treatments and possibly in treatment matching efforts. Furthermore, moderator variables, such as gender or substance used, should be taken into consideration, as a few studies have found these to be important variables (Jaycox et al., 2004; Stewart et al., 1999). The ideal study for examining all these factors would be a longitudinal study that regularly measured PTSD symptom clusters, SUD symptoms for a variety of substances, other psychological symptoms such as depression and coping skills, and also measured proposed vulnerability factors such as type of trauma. Meta-analytic techniques that combine the results in a way that allow for structural equation modeling or logistic regression may also be extremely useful.

Future research also needs to address the diagnostic weaknesses that have plagued earlier studies. Questionable diagnostic procedures could be remedied by using multiple sources of diagnostic information. For example, rather than relying on chart review, a clinical interview and/or diagnostic instrument could also be used. Psychometric data

should also be provided for the measurement instruments that were used. Treatment fidelity should also be measured and assured by training and the use of second raters. Detailed information on the treatments used should also be provided.

Finally, there is a gap in the literature regarding how symptom interplay between the two disorders affects treatment outcomes. For example, a study by Steindl, Young, Creamer, and Crompton (2003) with Australian veterans undergoing concurrent treatment of PTSD and alcohol use found that early changes in alcohol use predicted later changes in PTSD symptoms. However, the reverse was not true. Improvements on one variable may also be found to be necessary before improvements are realized on other variables, a finding that would have very important treatment implications. At this point, it is not clear how treatment affects these symptom clusters and how these symptom clusters affect each other.

Early reviews of the dual diagnosis literature called for more research (Brown & Wolfe, 1994) and this suggestion still holds true today. The main question yet to be answered in this area still revolves around the effectiveness of treatments for this dual diagnosis. In spite of the evidence that this dual diagnosis is difficult to treat as well as the many treatment models that have been proposed, there is not yet any compelling evidence that these new treatments are any more effective than the usual treatments. More outcome studies need to be conducted to determine the absolute and comparative effects of these proposed treatments.

Meta-analytic techniques could also be used to compare aggregated results of integrated versus comparative treatments. Integrated and sequential treatments could be compared on PTSD, SUD, and other psychological outcomes to determine how effective

they are. A meta-analysis could also examine other variables such as gender, type of trauma, or substance of abuse to determine whether they are affecting treatment outcomes. While meta-analytic findings would still carry the inherent weaknesses of the underlying studies, it would provide clearer answers to questions regarding the effectiveness of different approaches to treatment for these disorders.

CHAPTER III

METHODS

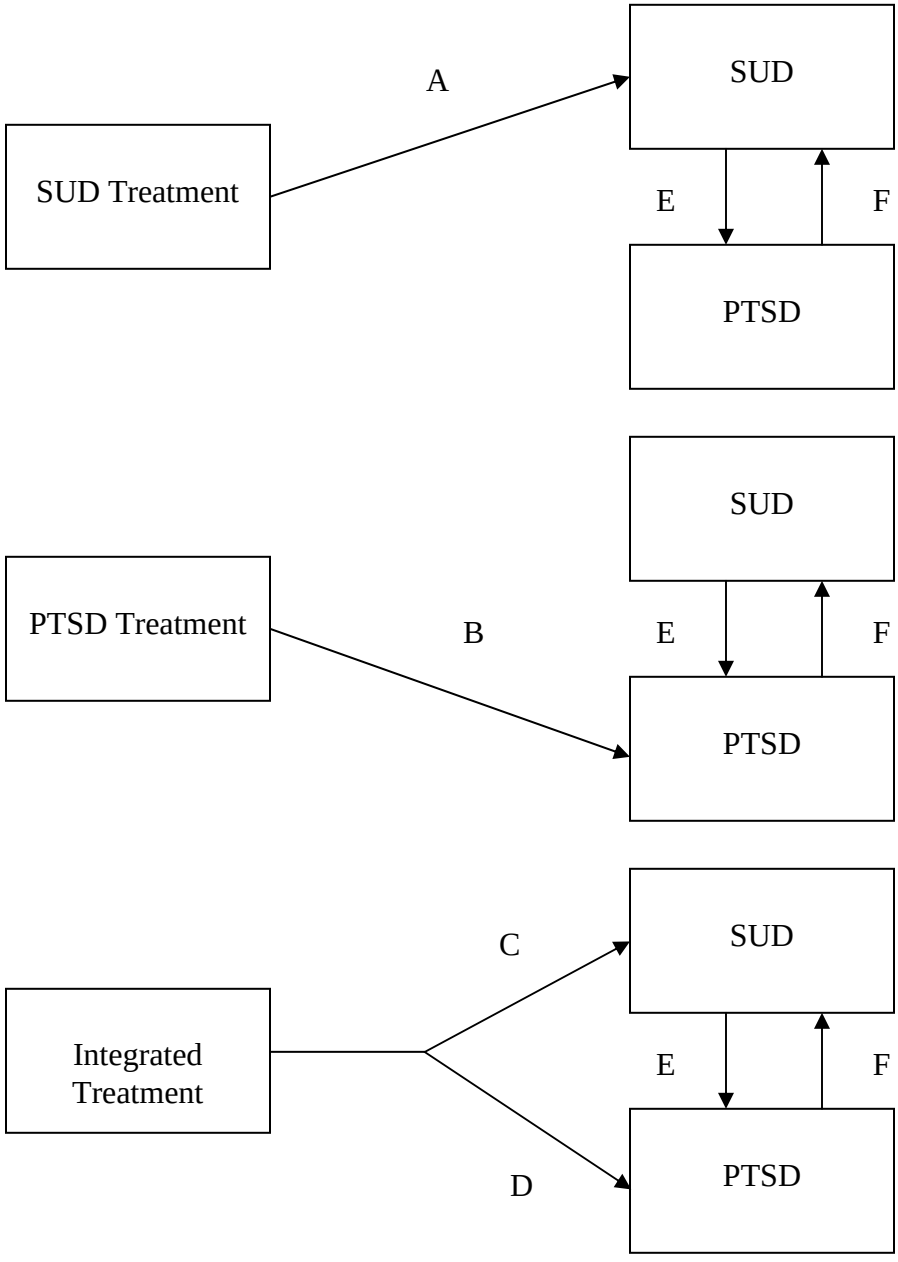
The purpose of this dissertation was to meta-analytically examine the literature on the effectiveness of treatment for dual diagnosis PTSD and SUD. To do this, the effects of integrated treatments versus non-integrated treatments were compared. An exploration of symptom interplay between the disorders was also attempted by aggregating treatment follow-up data.

"The foundation of science is the cumulation of knowledge from the results of many studies" (Hunter & Schmidt, 2004, p. xxvii). The results of a single study are rarely useful in and of themselves. The replication of results greatly increases confidence in conclusions, and so methods that combine and accumulate results across studies are extremely valuable. One method to accomplish this is to conduct a critical review of the literature like the one found in Chapter Two. A strength of such a review is its breadth and the relative ease with which it can be conducted. As Hunter and Schmidt (2004) demonstrated, however, conclusions from such a review can be based not on real differences in the data, but instead on chance variations. Meta-analysis is another form of knowledge accumulation that avoids many of the weaknesses of the literature review by combining the results in a quantitative fashion.

The National Research Council (1992) noted that the reason to combine results is that each individual study represents a "noisy reading on the underlying quality of interest, and aggregating across them tends, under many (but not all) circumstances, to average out the noise to at least some extent" (p. 32). The Council further stated that in order to combine results across studies, the information sources need to be sufficiently

similar and that the investigator is able to describe these similarities in the form of a model or framework. The model used in this study is shown in Figure 1 and illustrates the various paths of effect that treatments of this dual diagnosis are thought to take.

Figure 1: Dual Diagnosis Treatment Path Analysis



There are two main areas of interest in this path diagram. The first area of interest involves paths E and F. These paths represent the cyclical nature of the dual disorder as discussed previously. These paths theoretically have positive, significant effect sizes that represent the possibility that increases in symptoms of one disorder will lead to increases in symptoms of the other disorder (Clark et al., 2001; Stewart & Conrod, 2003).

The second area of interest concerns the effects of treatment on the disorders. These effects are hypothesized to be different depending on the type of treatment being examined. SUD treatments mainly target the SUD and are thought to be effective mainly on the SUD symptoms (path A; Back, Waldrop et al., 2006). The rationale for this treatment is that SUD symptoms first need to be lowered to a certain threshold (i.e., so that path E is sufficiently low) at which point the PTSD treatment is then safe and effective for the client to engage in (Becker, Zayfert, & Anderson, 2004).

PTSD treatment, on the other hand, is thought to have a direct impact on PTSD symptoms with a moderately large effect on reducing these symptoms (path B; Powers et al., 2010). The effect of PTSD treatment on SUD has not been investigated as thoroughly (perhaps because many clinicians are worried that PTSD treatment can lead to relapse; Becker, Zayfert, & Anderson, 2004). There is also some evidence, however, that suggests that PTSD treatment is effective in treating SUD symptoms (Ouimette, Moos, and Finney, 2003).

Integrated treatments are believed to have an effect on both disorders. In other words, the effects represented by paths C and D in Figure 1 would both be statistically significant. It is believed that this type of treatment would also begin to decrease the effects of the disorders on each other (paths E and F).

The purpose of this study was to begin to assign quantitative values to these paths. The effects of various forms of treatment (paths A – D) were the main focus of the study. However, the effects of the individual disorders on each other (paths E and F) during treatment were also secondary questions. The methodology is described in terms of the three stages in which it took place: literature search, coding, and the statistical analysis. These stages are analogous to gathering the data, transforming it into a usable form, and then analyzing it.

Literature Search

A literature search was conducted to identify published empirical outcomes studies for the treatment of dual diagnosis PTSD and SUD. The diagnosis of PTSD was first included in the 1980 version of the DSM (i.e., the DSM-III; APA, 1980) and consequently only studies from 1980 onwards were included. The treatment studied needed to be psychosocial in nature as tests of the effects of medication were beyond the scope of this study. Thus, studies that were purely exploring the effects of medication on this dual diagnosis were not included, though it was possible that participants of psychosocial treatment studies were also on medication to treat their symptoms. Due to the small number of studies that have been conducted in this area, the use of less reliable diagnostic procedures was not included as an exclusionary criterion in this study (e.g., diagnosis by chart review). The individuals needed current diagnoses for both SUD and PTSD and their symptoms had to be measured on at least two time points so that a change score correlation could be generated.

White (1994) stated that the point of a good literature search is not to track down every paper on a subject (which would likely be impossible), but to avoid missing an

important source outside of one's usual searches. Therefore, a broad array of sources was used for the current literature search including peer-reviewed journals, professional organizations (e.g. American Psychological Association), governmental sources, dissertations, and/or presentations. Five main literature search strategies were used to find these sources including footnote chasing, consultation, searches in subject indexes, browsing, and citation searches (White, 1994). Footnote chasing entailed searching through reference sections of major reviews in the area and through journal tables of content. The literature reviews consulted included those conducted by Ford, Russo, and Mallon (2007); Riggs and Foa (2008); Bernhardt (2009); and McClure (2009).

Reed and Baxter (1994) discussed the importance of a comprehensive search strategy over a broad array of databases. PsycInfo was searched using *post-traumatic stress disorder, alcoholism, drug abuse*, and *treatment* as keywords. Medline was searched with keywords *stress disorders, posttraumatic; substance related disorders* and *treatment* or *therapeutics*. Other databases searched using combinations of PTSD and SUD keywords were the alcohol studies database, PILOTS database, Evidence Based Medicine Reviews, and the Substance Abuse and Mental Health Archive. Research registers are also important to search as they may include studies that were not published or are otherwise inaccessible (Dickersin, 1994). Thus, the National Research Register Archive, Clinical Trials database, and the VA Cooperative Studies Programs were consulted. Browsing included searching through the library stacks for similarly themed books. Citation searches include the use of forward citation search engines such as Social Sciences Citation Index for major reviews in the area. Articles used for the forward citation search were Stewart (1996); Najavits (1997); Ouimette (1997); Zaslav (1994);

and Jelinek and Williams (1984). The tables of content of journals that were consulted included the *Journal of Dual Diagnosis, Journal of Substance Abuse Treatment,* and *Journal of Addictive Behaviors*. Consultation included talking with the "invisible college" which is other experts in the field (Rosenthal, 1994). Authors were contacted who had published multiple studies in the area of co-occurring PTSD and SUD treatment.

Coding

Once the studies were collected, the next step was translating these data into a useful format, a process called coding. Appendix A contains the completed coding sheets for the included studies. Appendix B contains the definitions and decision rules for this coding. Both of these appendices were heavily influenced by Stock's (1994) discussion of coding.

The first section of the coding sheet encompassed article information and was mainly used to identify the article itself. This included the type of the article and date it was published, even though there were no reasons to believe they would be meaningful moderators. The next section coded was the treatment section. This section encompassed treatment and sample information. Multiple treatments within the same study were coded using separate coding sheets. Treatment strength and dosage were coded in terms of the number of weeks of treatment and the number of hours per week of treatment. The demographic variables coded included gender, race, veteran status, primary substance, and age.

The final section coded for was the outcomes section which included the main statistics that were used in the analysis. The correlation used for this meta-analysis was the *r* statistic. The *r* statistic is generally viewed as the most useful correlation statistic to

use when variables are continuous (Rosenthal, 1994). The r^2 statistic was not used because it does not express directionality and practical magnitude is likely to be misinterpreted. The *d* statistic was not used in the initial coding as many studies in this literature were pilot studies and did not include a comparison. Appendix C contains the formulae used to convert other statistics into the *r* statistic. The majority of the conversions made were derived from means and standard deviations. Other statistical information that was coded was the name and type of each measurement instrument, as well as their reliability coefficients. Each outcome section was repeated for multiple measurement times. The quality of the study was not explicitly coded as some of the artifact corrections helped account for quality (e.g., measurement reliability) and because of the general lack of reliability in the coding of study quality (Hunter & Schmidt, 2004).

The present author was the primary coder of these data. One other individual also coded the statistical information for these studies as a reliability check. Disagreements were resolved through conferencing to arrive at consensus. These data were then entered into an Excel spreadsheet for data analysis.

Orwin (1994) listed some sources of error inherent in the coding process: deficient reporting, ambiguities in judgment process, coder bias, and coder mistakes. Missing data is also a serious issue and takes three forms: missing studies, missing data to estimate effect sizes, and missing characteristics of studies (Pigott, 1994). Missing studies, such as those that were not published or accessible, were not used in this analysis because of lack of availability. Missing data to estimate effect sizes was a minor problem as occasionally only statistically significant results were reported, though other results were measured. In these cases, the nonsignificant results were assumed to have an *r* =

0.0. This assumption leads to conservative effect and variance estimates, though there are few other options in dealing with missing effect sizes (Pigott, 1994). Similarly, a few studies reported only significant results on a few subscales of an instrument. In these cases the unreported subscale correlations were assumed to be 0.0 and the reported and unreported scales were averaged to gain a single correlation for that measure. Missing characteristics of studies were inferred and estimated where possible from information in the study or from other sources (e.g., instrument reliabilities). The coding sheet and definitions were developed to be as simple and judgment free to minimize ambiguities, bias, and mistakes.

Statistical Analysis

This analysis used the Hunter and Schmidt (2004) model of psychometric meta-analysis. This model of meta-analysis is a set of statistical techniques that combine data across studies while simultaneously correcting for various sources of error and bias within these results. This model of meta-analysis is a random effects model of meta-analysis as opposed to a fixed effects model, which means that this model does not assume homogeneity of effect sizes between studies. This type of meta-analysis has been found to be more accurate than other models (Hunter & Schmidt, 2004). Other researchers have noted that random effects models have the advantage of being viewed as representative of a sample of the universe of studies on the subject, which makes them more generalizable (Raudenbush, 1994).

There are a variety of sources of systematic error and bias that exist in studies that are correctible in a meta-analysis. Some of the more important of these sources involve sampling error, measurement error, and restrictions of range. The rationale behind

correcting for these sources of error is that the purpose of a meta-analysis is to attain as accurate of a correlation coefficient to the actual population coefficient as possible (Hunter & Schmidt, 1994). Imperfect reliability and validity both occur when a less than perfect instrument is used (which is all of the time in scientific experiments). Dichotomization occurs when the participants are divided into two groups based on a point on an otherwise continuous variable. Range restriction is only accepting a certain subgroup of the larger population. Another source of error that must be corrected is when multiple measures are used to assess the same variable (Gleser & Olkin, 1994). All of these imperfections serve to lower the estimate of the correlation.

Some attempts were made to correct the less than perfect reliability in the studies analyzed. Imperfect validity and intercorrelation between measures were not corrected due to a lack of psychometric data. Dichotomization and range restriction were not corrected for as they were not issues in this literature. The formulae used to correct for these sources of error can be found in Appendix D. It should be noted that some sources of error such as data entry cannot be corrected and remained within the effect size approximation (Hunter and Schmidt, 2004).

Appendix E contains the formulae that were used to conduct the aggregation of corrected data. The formula for the aggregated correlation coefficient was weighted by two figures. The first was the sample size and the second involved the corrections that were used for that study. These weights assigned higher priority to studies with larger sample sizes and to studies that needed less correction (i.e., they were more accurate). Shadish and Haddock (1994) provide three assumptions that need to be met when deciding if and how to weigh certain studies over others: (1) theory or evidence

suggesting that certain studies have varying degrees of accuracy, (2) the nature of this bias can be estimated, and (3) appropriate weights can be given to compensate for the bias. Hunter and Schmidt's (2004) weighting method met these assumptions.

Both the observed and expected variances of these correlations were also calculated. The observed variance was the variance of the observed correlations, while the expected variance was calculated using a sampling error formula. As the goal of a meta-analysis is to provide an accurate estimate of the correlation and variance, the expected variance attributed to the sampling error was removed from the observed variance estimate. In some cases, the expected variance was greater than or equal to the observed variance. For these cases, the corrected variances were set to 0.0.

These two variances were also compared to determine if there was some other source of variance that was unaccounted for. For most of the outcomes, there was a significant difference between the two, which indicated that there could be some uncorrected error or a moderator variable. At this point a moderator analysis was used to determine if any of the moderators that had been previously coded (e.g., treatment type, gender, race, dosage) served as a moderator variable.

Using these procedures, quantitative effect size correlations were assigned to the paths of Figure 1. The model used to make these assignments involved univariate data analysis which treated each of the paths as though they are independent of each other. This analysis was chosen, as opposed to other types of analyses (e.g. EM method or generalized least squares), due to its relative simplicity as well as the current state of the literature. Most studies in this analysis provided only select correlations between variables; as a result, the other types of analyses would be left with many omissions in

their correlation matrices. For these reasons, a univariate data analysis was deemed to be the best procedure for this model at the present time.

Effect sizes across treatments were compared to determine if integrated versus consecutive treatments are more effective. For comparison of treatments, the statistic Cohen's *d* was used. Effect sizes across time were plotted to determine if reductions in certain symptoms predicted changes in other sets of symptoms.

Clinical significance is another important consideration when attempting to address questions regarding treatment effectiveness. Clinical significance has been defined as the "extent to which therapy moves someone outside the range of the dysfunctional population or within the range of the functional population" (Hageman & Arrindell, 1999, pp. 1169-1170). The use of clinical significance allows the classification of clients undergoing treatment into those who are unchanged or deteriorated, those who are improved but not recovered, and those who have recovered. Within the context of a meta-analysis, Hageman and Arrindell (1999) suggest estimating the proportion of clients experiencing positive change versus those that did not experience positive change as a means of calculating clinical significance. To this end, a binomial effect size display was employed.

The final step was a publication bias analysis (Begg, 1994). Publication bias exists when only certain studies get published. These published studies are theorized to be the ones that have higher effect sizes, which then leads to an upward bias in meta-analytic results. One method to avoid this biased sampling frame is to include as many studies as possible. For this reason a comprehensive literature search strategy was used. To test for the presence of publication bias, a funnel graph was used. A funnel graph plots

effect size against sample size and if no publication bias is present then this graph should look like a funnel in which smaller sample size studies have a greater spread of correlations and higher sample size are more narrowly concentrated around the midpoint. Hunter and Schmidt's (2004) file drawer analysis based on effect size was used to determine how many studies averaging null results would be needed to bring the observed correlations down to a predetermined critical value.

CHAPTER IV

RESULTS

The initial literature search yielded 124 studies that discussed treatment for dual diagnosis for SUD and PTSD. After closer inspection of these studies, seventeen of these were found to meet the inclusion criteria set for this study. One report was excluded as it was a case study. Four were excluded as they were primarily medication studies. Forty-six studies were excluded because they did not include statistics necessary for this meta-analysis (e.g., no pre-post measurements). Another forty-four were excluded because the sample population did not meet the inclusion criteria of this meta-analysis (e.g., SUD and trauma, but not necessarily PTSD). Seven studies were excluded because the data reported was used in other studies that were included in this analysis. Five studies were not included as they could not be obtained by the primary author. These studies were requested through interlibrary loan and by contacting the primary authors when contact information was available, but were still not attained. Characteristics of those studies that were included in this analysis can be found in Table 1. These studies yielded 101 individual correlations that were then used in the meta-analysis.

Table 1

Study Characteristics

Study	Treatment	Outcomes Measured	*r*	*n*
Back, Jackson, Sonne, Brady, 2005	CB coping skills therapy for SUD	Post PTSD total	.64	86
		Post SUD ETOH	.50	86
Brady, Dansky, Back, Foa, Carroll, 2001	Integrated CTCPD	Post PTSD total	.49	15
		Post PTSD re-experiencing	.44	15
		Post PTSD arousal	.37	15
		Post PTSD avoidance	.45	15
		Post SUD Drug	.62	15
		Post SUD ETOH	.38	15
		Post General psych	.38	15
		6 month PTSD total	.61	7
		6 month PTSD re-experiencing	.28	7
		6 month PTSD arousal	.61	7
		6 month PTSD avoidance	.56	7
		6 month SUD Drug	.71	7
		6 month SUD ETOH	.55	7
		6 month General psych	.92	7
Brown, 2000	Inpatient SUD	6 month PTSD total	.43	29
		6 month Drug & ETOH	.62	29
Brown, Read, Kahler, 2003	Inpatient SUD	6 month PTSD total	.46	52
		6 month SUD Drug & ETOH	.56	52
		6 month General psych	.56	52
Coffey, Schumacher, Brady, Cotton, 2007	In and outpatient SUD	Post PTSD total	.19	45
		Post PTSD re-experiencing	-.01	45
		Post PTSD arousal	.13	45
		Post PTSD avoidance	.20	45
Cook, Walser, Kane, Ruzek, Woody, 2006	Integrated Seeking Safety	Post PTSD total	.52	18

Study	Treatment	Outcomes Measured	*r*	*n*
Donovan, Padin-Rivera, Kowaliw, 2001	Integrated Transcend	Post PTSD total	.32	46
		Post PTSD re-experiencing	.21	46
		Post PTSD arousal	.25	46
		Post PTSD avoidance	.30	46
		6 month PTSD total	.29	46
		6 month PTSD re-experiencing	.26	46
		6 month PTSD arousal	.21	46
		6 month PTSD avoidance	.27	46
		6 month SUD Drug	.35	46
		6 month SUD ETOH	.40	46
		1 year PTSD total	.30	46
		1 year PTSD re-experiencing	.23	46
		1 year PTSD arousal	.17	46
		1 year PTSD avoidance	.33	46
		1 year SUD Drug	.33	46
		1 year SUD ETOH	.40	46
McGovern, Lambert-Harris, Acquilano, Xie, Alterman, Weiss, 2009	Integrated CBT for PTSD	Post PTSD total	.80	11
		Post PTSD re-experiencing	.74	11
		Post PTSD arousal	.58	11
		Post PTSD avoidance	.76	11
		Post SUD Drug	.23	11
		Post SUD ETOH	.41	11
		3 month PTSD total	.86	10
		3 month PTSD re-experiencing	.77	10
		3 month PTSD arousal	.66	10
		3 month PTSD avoidance	.84	10
		3 month SUD Drug	.29	10
		3 month SUD ETOH	.27	10
Najavits, Harned, Gallop, Butler, Barber, Thase, Crits-Cristoph, 2007	Various SUD	3 month SUD Drug	.63	34
		3 month SUD ETOH	.19	34
		6 month SUD Drug	.65	34
		6 month SUD ETOH	.10	34
		3 month General psych	.09	34
		6 month General psych	.16	34
Najavits, Gallop, Weiss, 2006	Integrated Seeking Safety	Post SUD Drug & ETOH	.55	18
		Post General psych	.12	18
		3 month SUD Drug & ETOH	.17	18
		3 month General psych	-.18	18
Najavits, Gallop, Weiss, 2006 (same as previous article)	Non-integrated treatment as usual	Post SUD Drug & ETOH	.18	15
		Post General psych	.01	15
		3 month SUD Drug & ETOH	.33	15
		3 month General psych	.10	15

Study	Treatment	Outcomes Measured	*r*	*n*
Najavits, Schmitz, Gotthardt, Weiss, 2005	Integrated Seeking Safety with exposure treatment	Post PTSD total	.85	5
		POST SUD Drug	.81	5
		Post General psych	.09	5
Najavits, Weiss, Shaw, Muenz, 1998	Integrated Seeking Safety	Post PTSD Total	.00	11
		Post SUD Drug	.26	11
		Post SUD ETOH	.00	11
		Post General psych	.00	11
		3 month PTSD total	.28	11
		3 month SUD Drug	.20	11
		3 month SUD ETOH	.00	11
		3 month General psych	.00	11
Norman, Wilkins, Tapert, Lang, Najavits, n.d.	Integrated Seeking Safety	Post PTSD total	.31	9
		Post SUD ETOH	.22	9
		Post General psych	.41	9
		3 month PTSD total	.75	4
		3 month SUD ETOH	.49	4
		3 month General psych	.74	4
		6 month PTSD total	.55	4
		6 month SUD ETOH	.55	4
		6 month General psych	.19	4
Ouimette, Ahrens, Moos, Finney, 1997	Various SUD	1 year SUD Drug	.29	140
		1 year SUD ETOH	.31	140
		1 year General psych	.06	140
Ouimette, Ahrens, Moos, Finney, 1998	Inpatient SUD	Post General psych	.46	140
Ouimette, Finney, Moos, 1999	Various SUD	2 year SUD Drug	.30	135
		2 year SUD ETOH	.32	135
		2 year General psych	.09	135
Zlotnick, Najavits, Rohsenow, Johnson, 2003	Integrated Seeking Safety	Post PTSD total	.69	17
		Post SUD Drug	.00	17
		Post SUD ETOH	.00	17
		3 month PTSD total	.52	15
		3 month SUD Drug	.78	15
		3 month SUD ETOH	.81	15

These correlations were divided into seven different symptom categories: PTSD total, PTSD arousal, PTSD avoidance, PTSD re-experiencing, SUD alcohol, SUD other drugs, and other psychological symptoms. These categories were also divided into measurement time to analyze treatment effects over time. These divisions were

immediately post-treatment and three months, six months, twelve months, and twenty-four months post-treatment.

Treatment effects

The first research question dealt with the absolute effectiveness of treatment on dual diagnosis PTSD and SUD. For this question, only immediate post-treatment means were used. The mean treatment effects for PTSD total symptoms was r = .46 (*SD* = .14, 95% *CI* = .38 - .54, n = 292, N = 11), for PTSD arousal symptoms was r = .25 (*SD* = 0.0, n = 117, N = 4), for PTSD avoidance symptoms was r = .32 (*SD* = 0.0, n = 91, N = 4), for PTSD re-experiencing symptoms was r = .20 (*SD* = .14, 95% *CI* = .07 - .34, n = 117, N = 4), for SUD alcohol symptoms was r = .40 (*SD* = .09, 95% *CI* = .34 - .46, n = 211, N = 9), for SUD drug symptoms was r = .46 (*SD* = .13, 95% *CI* = .37 - .54, n = 155, N = 9), and other psychological symptoms was r = .36 (*SD* = .39, 95% *CI* = .08 - .65, n = 213, N = 7). Some corrected standard deviations were found to be 0.0, which precluded the computation of confidence intervals. As can be seen from the confidence intervals, all of these effects were statistically significant, which suggests that treatment for this dual diagnosis is effective at reducing symptoms for PTSD, SUD, and other general psychological symptoms. Stem and leaf plots for these analyses are displayed in Figure 2. Binomial effect size displays that show clinical significance can be found in Figure 3. These displays show the percentage of participants who had shown positive change after treatment.

Figure 2: Stem and leaf displays of corrected treatment effect correlations

Stem	Leaf
.9	0
.8	3
.7	1
.6	6
.5	1 5
.4	4
.3	3 3
.2	
.1	9
.0	0
-.01	

Total PTSD

Stem	Leaf
.9	
.8	
.7	
.6	
.5	8
.4	
.3	7
.2	5
.1	3
.0	
-.01	

Arousal PTSD

Stem	Leaf
.9	
.8	
.7	8
.6	
.5	
.4	7
.3	1
.2	0
.1	
.0	
-.01	

Avoidance PTSD

Stem	Leaf
.9	
.8	
.7	6
.6	
.5	
.4	6
.3	
.2	2
.1	
.0	
-.01	0

Re-experiencing PTSD

Stem	Leaf
.9	
.8	
.7	0
.6	0
.5	6
.4	1 5
.3	
.2	0 5
.1	
.0	0 0
-.01	

SUD Alcohol

Stem	Leaf
.9	
.8	3
.7	0
.6	0 4 5
.5	
.4	
.3	
.2	0 5 7
.1	
.0	0
-.01	

SUD Drug

Stem	Leaf
.9	
.8	
.7	
.6	
.5	
.4	3 7
.3	9
.2	
.1	3
.0	0 1 9
-.01	

Other

Figure 3: Percentage of participants with improvement after treatment

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	73%	27%
Post-Treatment	27%	73%

Total PTSD Symptoms

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	62.5%	37.5%
Post-Treatment	37.5%	62.5%

PTSD Arousal Symptoms

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	66%	34%
Post-Treatment	34%	66%

PTSD Avoidance Symptoms

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	60%	40%
Post-Treatment	40%	60%

PTSD Re-experiencing Symptoms

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	70%	30%
Post-Treatment	30%	70%

SUD Alcohol Symptoms

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	72.5%	27.5%
Post-Treatment	27.5%	72.5%

SUD Drug Symptoms

	More/Equal Symptoms	Less Symptoms
Pre-Treatment	68%	32%
Post-Treatment	32%	58%

Other Symptoms

Sequential vs. Integrated Treatments

The second research question dealt with the question of the difference between sequential and integrated treatments. Post-treatment means were exclusively used for this analysis (not follow-up means). Most of the treatment effect sizes were derived from integrated treatments (*N*=34) while the remaining were from SUD-focused treatments

(*N*=14). Integrated and SUD focused treatment statistics can be found in Table 2. Positive *d* statistics represent better results for SUD-focused treatments. SUD-focused treatments displayed significantly better results for SUD alcohol symptoms and non-significantly better results for PTSD total symptoms, SUD drug symptoms, and other symptoms. The only symptoms clusters that integrated treatments showed better results were PTSD arousal, PTSD avoidance symptoms, and PTSD re-experiencing symptoms, though the inability to compute confidence intervals due to variances = 0.0 precluded the ability to assess statistical significance. The symptom clusters showed better results than the PTSD total symptoms because only the least effective SUD treatment studies contributed effect sizes to the individual symptom cluster analysis. The path model with attached effect sizes can be found in Figure 4. Treatment effects for the SUD path were attained by computing the mean effect size of SUD alcohol and SUD drug symptoms. The PTSD treatment model was dropped due to the lack of studies on PTSD-only treatment with this dual diagnosis population that met the inclusion criteria.

Table 2

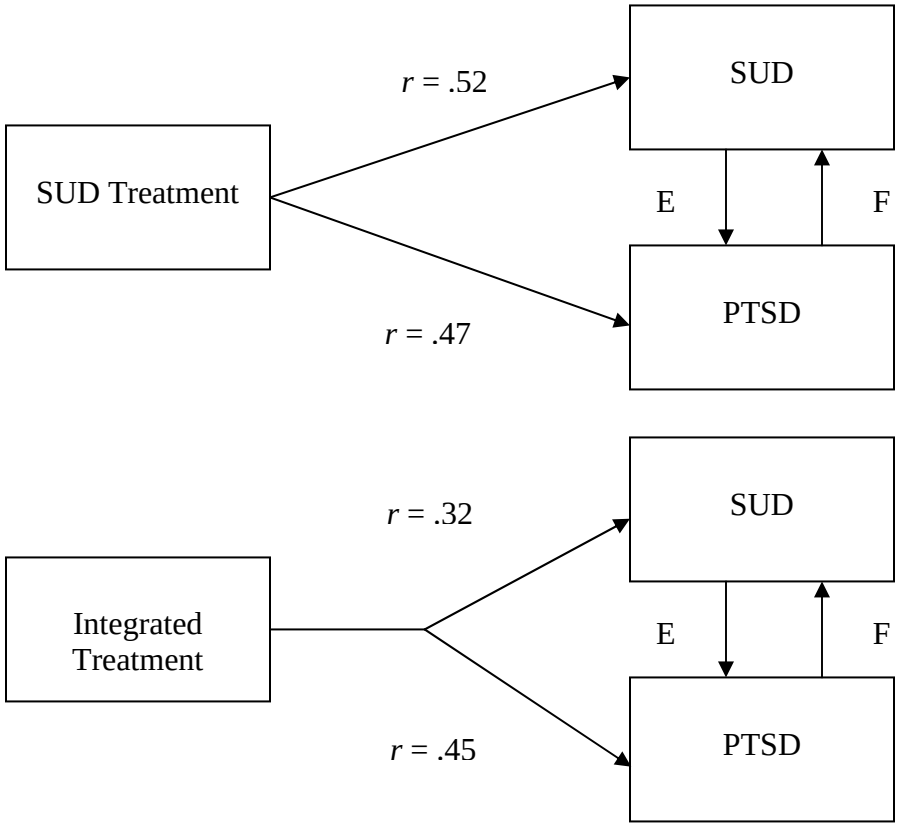
Integrated vs. SUD-focused Treatments

Symptom	Treatment	*r*	*SD*	95% *CI*	*N*	*d*
PTSD total	SUD-focused	.47	.16	.29 - .66	3	.20
	Integrated	.45	.09	.39 - .51	8	
PTSD	SUD-focused	.13	0.0	-	1	-
arousal	Integrated	.33	0.0	-	3	
PTSD	SUD-focused	.20	0.0	-	1	
avoidance	Integrated	.40	0.0	-	3	

Symptom	Treatment	*r*	*SD*	*95% CI*	*N*	*d*
PTSD re-	SUD-focused	-.01	0.0	-	1	-8.25
experiencing	Integrated	.34	.06	.27 - .40	3	
SUD	SUD-focused	.49	.04	.44 – .53	3	11.67
alcohol	Integrated	.27	0.0	-	6	
SUD drug	SUD-focused	.54	.10	.42 – .66	3	2.42
	Integrated	.37	.07	.31 - .43	6	
Other	SUD-focused	.42	.19	.16 – .68	2	.73
	Integrated	.21	.37	-.11 - .53	5	

Note. Some confidence intervals and *d* statistics could not be calculated due to *SD* = 0

Figure 4: Dual Diagnosis Treatment Path Analysis



Moderator Variables

The third research question focused on whether there were any other moderating influences on treatment outcomes. To address this question, Hunter and Schmidt's (2004) "75% rule" was used. This criterion compares the observed variance to the variance that would be expected given the average correlation and number of studies to determine how much of the variance was accounted for through artifact and sampling error. If the expected variance accounts for at least 75% of the observed variance, then it is concluded that there are no other moderating variables as the remaining variance is assumed to be due to unaccounted for artifact error. According to Hunter and Schmidt (2004), this method has better or equal power in determining if there was a moderator than other methods, a finding that applied especially when the number of studies in the meta-analysis was small, which was this case with the present analysis.

Most of the symptom clusters post-treatment failed the 75% rule suggesting that other moderating influences were involved: total PTSD symptoms (56.4% of the variance accounted for), SUD drug symptoms (68.5% of the variance accounted for), other symptoms (14.6% of the variance accounted for), and PTSD re-experiencing (62.9% of the variance accounted for). PTSD avoidance symptoms (100% of the variance accounted for), PTSD arousal symptoms (100% of the variance accounted for), SUD alcohol symptoms (79.4% of the variance accounted for) did not appear to be influenced by any moderators.

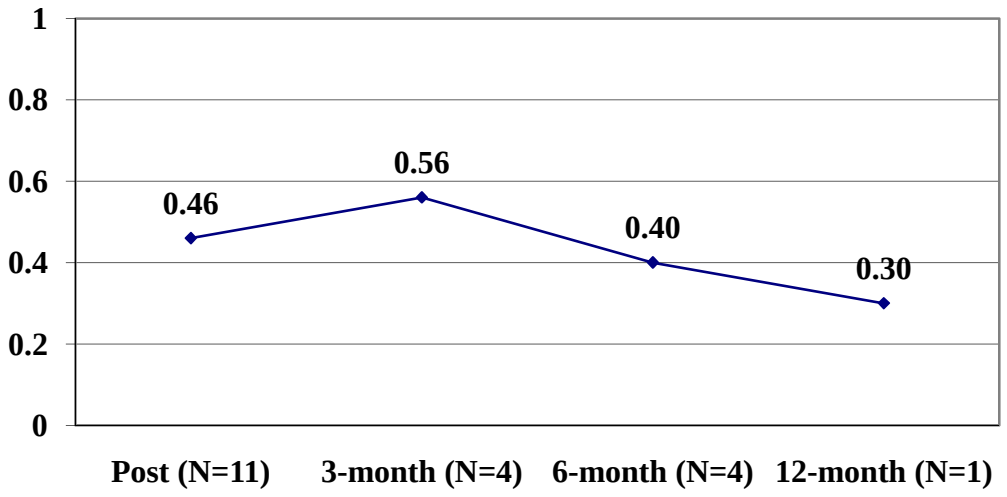
Thus, a moderator analysis was conducted using the following moderators: article date, exposure component, number of study participants, treatment dosage (measured by total treatment hours where available), age of participants, gender of participants, race of

participants, and type of substance use disorder (dependence or abuse). None of the coded variables were found to be clear moderators for PTSD total symptoms. The number of subjects in a study was found to moderate the effects on SUD drug symptoms with low *n* studies (less than 20 participants) having a mean *r* = .34 (*SD* = 0) and high *n* studies having a mean *r* = .63 (*SD*=0) and on PTSD re-experiencing symptoms with low *n* studies having a mean *r* = .57 (*SD* = 0) and high *n* studies having a mean *r* = .10 (*SD*=0). Other symptoms appeared to be moderated by the racial composition of the participants as studies with higher proportions of racial minorities (one third or more of the sample) having a mean of *r* = .06 (SD=0) and lower proportions having a mean of *r* = .45 (SD=0). Caution should be taken when interpreting these results, especially given the contradictory findings regarding how the number of participants moderates the results.

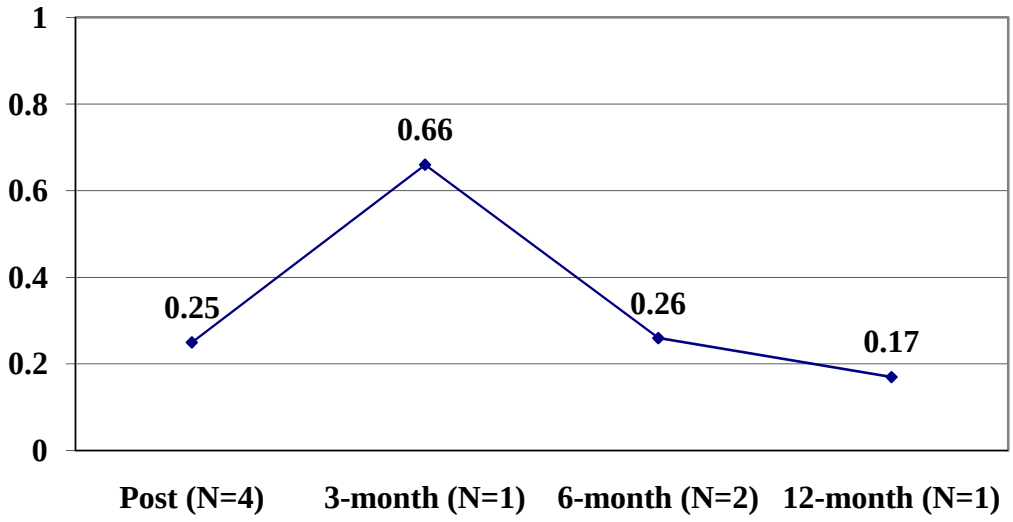
Treatment over time

The fourth research question dealt with the effectiveness of treatment over time with individuals with dual PTSD and SUD. Treatment over time effects can be found in Figure 5. Some of these follow-up data were based on studies that also presented immediate post-treatment effects (e.g. Donovan, Padin-Rivera, Kowaliw, 2001) while others presented only follow-up data (e.g. Brown, Read, Kahler, 2003). A few studies presented serial data using the same participants over time. For example, Ouimette, Ahrens, Moos, and Finney (1997) presented one-year follow-up data and Ouimette, Finney, and Moos (1999) presented two-year data for the same participants.

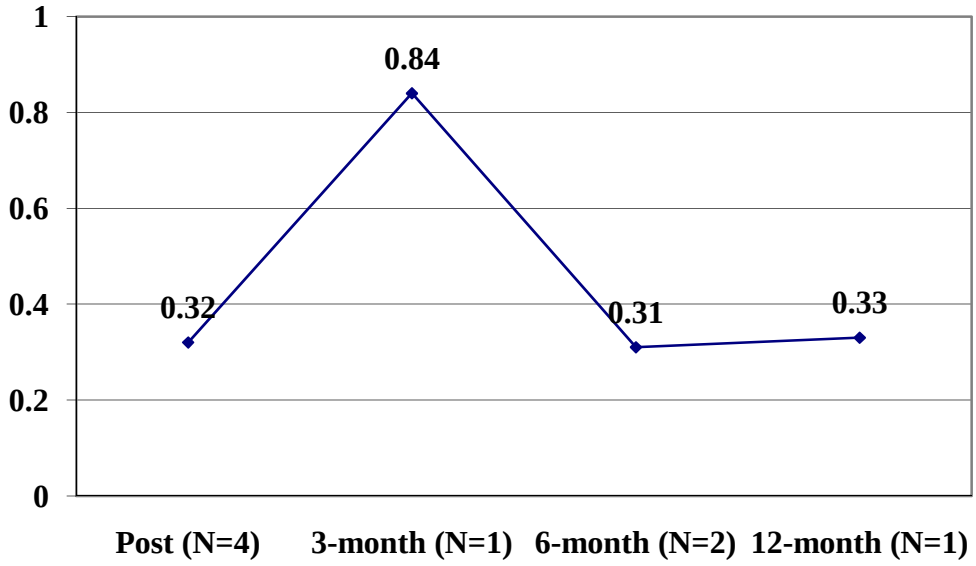
Figure 5: Treatment over time mean correlation effects



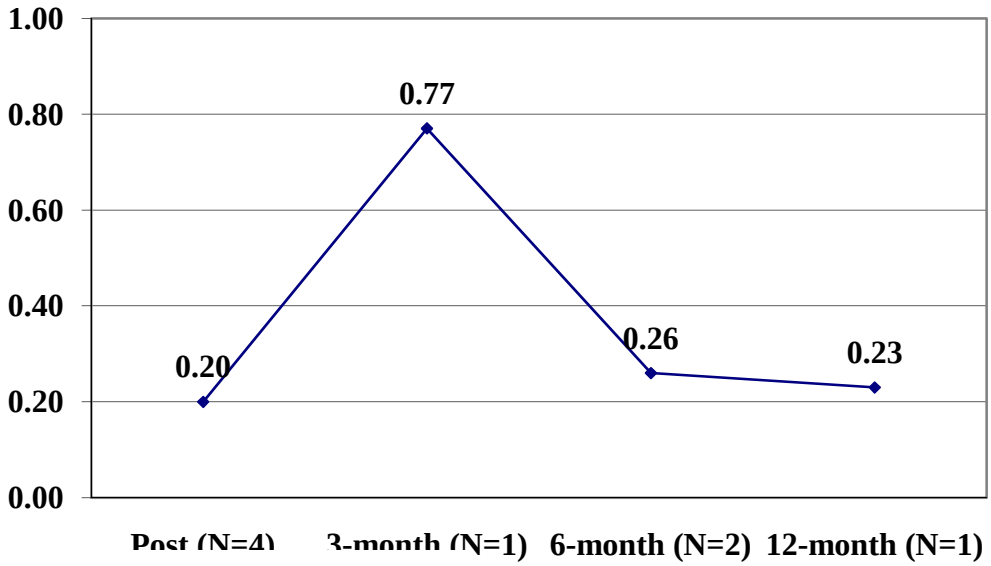
Total PTSD Symptoms



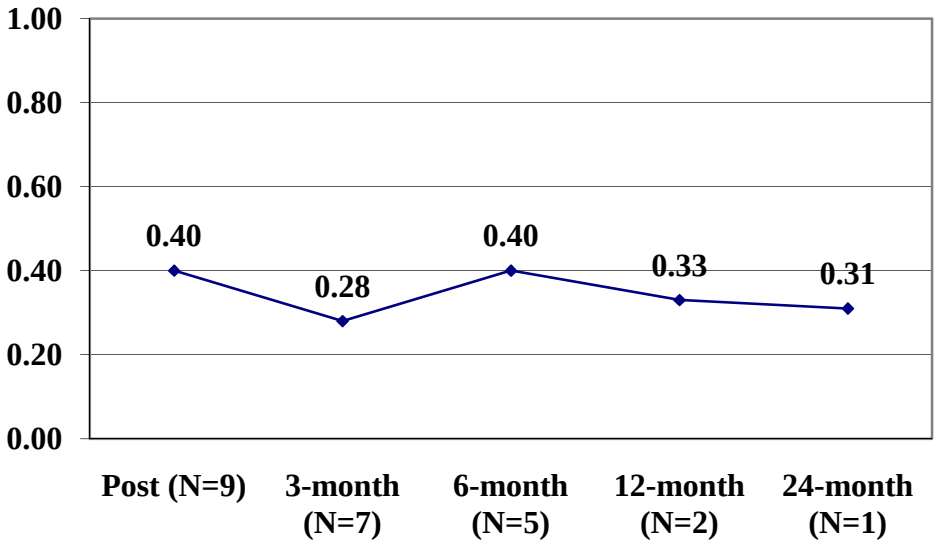
Arousal PTSD Symptoms



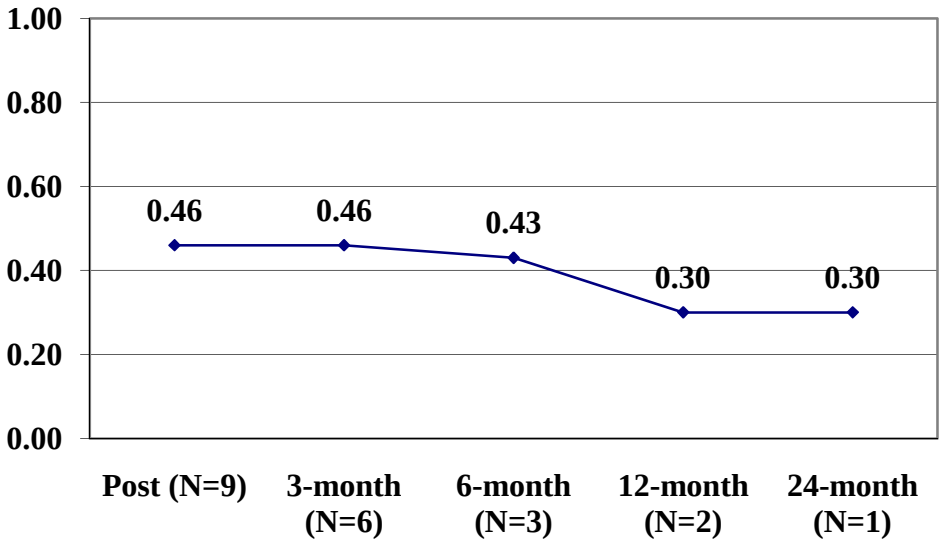
Avoidance PTSD Symptoms



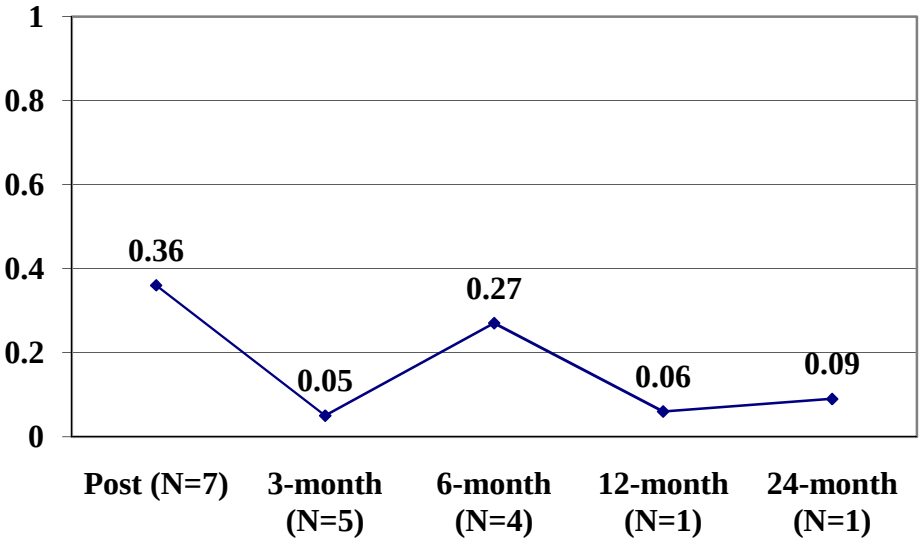
Re-experiencing PTSD Symptoms



SUD Alcohol Symptoms



SUD Drug Symptoms



Other Symptoms

Total PTSD symptoms showed a relatively large effect initially with r = .46 (*SD* = .14, 95% *CI* = .38 - .54, n = 292, N = 11) and a slow linear decrease after a year (r =.30, *SD* = 0, n = 46, N = 1). All three PTSD symptom clusters showed similar trajectories. After 3 months, each symptom cluster showed a large increase in effect size. This increase was due to the effect size coming from a single study and is thus not reflective of a true 3-month post-treatment decrease in symptoms. After this increase in effect size, each of the symptom clusters displayed a relatively consistent effect to what was seen initially post-treatment.

The SUD symptoms showed medium effect sizes initially: for alcohol symptoms, r = .40 (*SD* = .09, 95% *CI* = .34 - .46, n = 211, N = 9) and for drug symptoms, r = .46 (*SD* = .13, 95% *CI* = .37 - .54, n = 155, N = 9). These effects were relatively stable even after two years with alcohol symptoms increasing slightly (r = .31, *SD* = 0, n = 135, N = 1) and drug symptoms increasing the same amount (r = .30, *SD* = 0, n = 135, N = 1).

Other psychological symptoms were much more inconsistent. Post-treatment effect size was r = .36 (SD = .39, 95% CI = .08 - .65, n = 213, N = 7). This effect was nearly erased after three months (r = .05, SD = 0.0, n = 82, N = 5) though returned after six months (r = .27, SD = .08, 95% CI = .19 - .34, n = 97, N = 4). One year and two year measurements were then negligible: at one-year, r = .06 (SD = 0, n = 140, N = 1) and at two years, r = .09 (SD = 0, n = 135, N = 1).

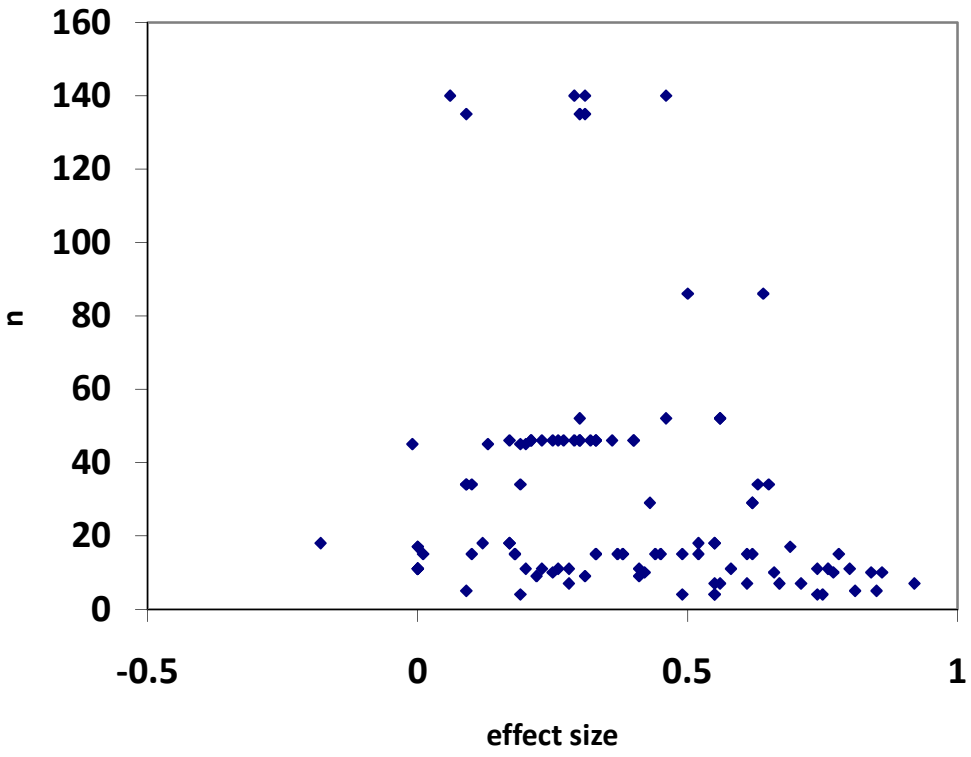
There was no evidence of interplay between the symptoms. Both PTSD and SUD symptoms showed initial gains with slow decreases over time. There were no indications from the data or graphs that either of these symptoms was affecting the other.

Publication bias

The final step of this meta-analysis entailed determining whether there was a publication bias in the studies included in the analysis. A funnel graph with all of the study correlations is found in Figure 6. A funnel plot theoretically should be symmetrical with effect sizes clustered around the true effect size. Studies with low numbers of participants should have more sampling error and thus be more spread out near the bottom of the plot, producing the shape of a funnel. As can be seen from Figure 6, there is a slight asymmetry to the right. Asymmetry is generally indicative of publication bias as it suggests that studies with smaller effect sizes are not being published. It may also be due to a third factor that relates the sample size to the size of effect. For example, smaller sample size studies may be more prone to error or have more intense treatment, leading to exaggerated effect sizes (Sutton, 2009). The results of this analysis are suggestive, but not entirely diagnostic of publication bias, and these results consequently may represent an over-estimate of the true population effect size.

As these results suggested the presence of the "file drawer problem," Hunter and Schmidt's file drawer analysis based on effect size was used to determine how many studies with null results would need to be found to bring the observed correlations down to a predetermined critical value. For this analysis, the critical value chosen was r=.10 as this value would be considered a weak result and many of the observed correlations were in the medium to strong range. The number of null result studies needed to decrease these results to a weak level for PTSD total symptoms was 40, PTSD arousal was 6, PTSD avoidance was 9, PTSD re-experiencing was 4, SUD alcohol was 27, SUD drug was 33, and other psychological symptoms was 19. Therefore, while there may be a publication bias leading to an over-estimate of effect sizes, it is likely that this bias would not greatly weaken these results as the number of studies with null results would need to be about three times the number of studies that were actually found measuring PTSD total, SUD alcohol, SUD drug, and other psychological symptoms, while there would need to be about two times the number of studies measuring the individual PTSD symptom clusters.

Figure 6. Publication bias funnel graph



CHAPTER V

DISCUSSION

Major Findings

The meta-analysis conducted in this study set out to answer four main questions. The first of these questions focused on the effectiveness of treatment for this dual diagnosis. Post-treatments effects were all statistically non-zero. Wampold (2000) reported that the best point estimate for the effectiveness of psychotherapy compared to a control group was $d = .80$, which converts to $r = .37$. The effective sizes in the present study ($r = .46$ for PTSD symptoms and SUD drug symptoms, $r = .40$ for SUD alcohol symptoms, and $r = .36$ for other psychological symptoms) are either larger or similar to Wampold's point estimate for the effectiveness of psychotherapy in general, though it should be noted that the present findings compare pre- to post-treatment changes rather than treatment to control groups. While some literature has described this population as difficult to treat, (e.g., Najavits, 2002a) these findings suggest that treatment is as effective with this population as it is with others.

The second question compared various kinds of treatment on PTSD and SUD symptoms. SUD-focused treatments were more effective than integrated treatments for treating SUD symptoms with $d = 11.67$ for alcohol use symptoms and $d = 2.42$ for drug use symptoms. SUD-focused treatments were also more effective for treating other psychological symptoms with $d = .73$ and total PTSD symptoms:$d = .20$. The only symptoms that were decreased more in integrated treatments than in SUD-focused treatments were the individual PTSD symptom clusters which appeared to result from

having only the least effective SUD treatment studies contribute effect sizes to that analysis.

These results were not expected as they contradicted the literature that suggested that integrated treatments should display greater effects than singular treatments (Boudewyns et al., 1991; Kofoed, Friedman, & Peck, 1993; Najavits, Weiss, & Shaw, 1997). While it might not be surprising that SUD-focused treatments had greater effects on SUD symptoms, it is surprising that there was little difference in PTSD effects. It is possible that this is due to SUD symptoms being the main driver of symptomology for this dual diagnosis and focusing mainly on the SUD decreases symptoms across the dual diagnosis. It is also possible that while SUD-focused treatments are ostensibly focused on SUD symptoms, PTSD symptoms are also being addressed by the therapist either explicitly or implicitly. Further research would need to be done regarding symptom interplay and treatment factors to determine if either of these possibilities apply. These findings do suggest caution, however, in embracing newer integrated treatments over more established SUD-focused therapies. Integrated treatments are not contraindicated as they showed positive effects in the present study, but more research would need to be done to show that they are more effective than singularly focused treatments.

The third research question focused on possible moderating influences on the treatment effect sizes. This analysis found that the number of participants moderated two of the symptom clusters, though the direction of moderation was inconsistent with larger numbers of participants leading to better results for SUD drug symptoms, but weaker results for PTSD re-experiencing. Hunter and Schmidt (2004) caution against the use of exploratory moderator analyses, especially with small numbers of studies, and the

inconsistency of these results suggests that they may be spurious. The moderator analysis also found that race of participants may be a moderating influence for other psychological symptoms. While there is reason to believe that treatments can have differing effects on different populations (Chambless et al., 1996), this result should be interpreted cautiously due to the aforementioned low number of studies and inconsistency of results.

The fourth research question explored treatment over time effects. The major symptom clusters of this dual diagnosis (i.e., total PTSD symptoms, drug SUD symptoms, and alcohol SUD symptoms) all displayed relatively stable effect sizes over time. These effects only decreased slightly up to two years post-treatment. The other symptom clusters showed much more variable patterns. The PTSD symptom clusters showed a sudden leap in effectiveness at three months, but this was due to the single study that contributed an effect size at that time point. The relative variability of other psychological symptoms over time was puzzling as more effect sizes were involved in that analysis, though the broad range of symptoms included in this category may have contributed to the variability. More research would need to be done measuring these symptoms with this population to achieve more stable results. The relative stability with only minor decreases over time was a positive result. Further research could be done on the effectiveness of "booster" sessions after treatment to determine if even these minor decreases could be avoided.

One of the questions that the treatment over time analysis was intended to shed light on was a question of symptom interplay. It was hoped that there might be some evidence of one symptom showing a consistent improvement prior to the other; but that

was not found to be the case. This does not necessarily preclude the possibility that one of the symptoms tends to drive the other, as is hypothesized by the self-medication hypothesis and similar theories. It is possible that this symptom interplay is still taking place, but the measurement times used in this study (e.g., at post-treatment, 3-months, etc.) were not precise enough to find it.

Generalizability of Results

This meta-analysis utilized a random-effects model of analysis, which means that inferences to similar treatments can be made. Thus, these results can be thought to apply to individuals with dual diagnosis PTSD and SUD who are undergoing either SUD-focused or integrated treatments for these issues. Only a third (three out of nine) of the integrated treatments were non-Seeking Safety treatments. Thus, the low numbers of non-Seeking Safety treatments limits the ability to generalize to those other treatments. Also, because there were no studies in the analysis that utilized PTSD-focused therapy, these results cannot be applied to individuals undergoing that type of therapy for this dual diagnosis. Only a single study examined the effects of treatment with an adolescent sample, which decreases the ability to apply these results to a non-adult population.

Limitations and Guidelines for Future Research

The small number of studies included in the meta-analysis was the most serious of the limitations of the current study. A meta-analysis depends on having a strong base of literature to provide reliable aggregated results from which reliable conclusions can be drawn. In the present analysis, 17 studies resulting in 101 effect sizes were found, which would usually be an adequate number of effect sizes, but when these studies were further subdivided by symptom and measurement time, they yielded inadequate numbers for

some of the analyses. Specifically, the moderator analyses found contradictory results, which may have been due to the lack of stability and low number of studies. This weakness will decrease as more research continues to be done on the topic. Future research publications should also include all the study results, whether significant or not. It was apparent in some articles gathered for this analysis that data had been gathered, but it was not reported due to statistical non-significance or for other unknown reasons. The missing data analysis also suggested that the "file drawer" problem in which non-significant results are not being reported appears to be an issue in this literature.

Another limitation involved the lack of information on treatment adherence on the part of treatment providers. This meta-analysis made a variety of comparisons between different types of treatment and lack of treatment adherence information sheds some doubt on the results. For example, if some of the SUD-focused treatments did include aspects of PTSD treatment, they should have been coded as integrated in the present study, which would have likely led to different results and conclusions.

Similarly, the lack of diagnostic certainty was an issue in some studies. For example, some of the studies used past diagnoses of SUD and/or PTSD as diagnostic criteria. Further information on the reliability of these past diagnoses would have been helpful in assuring that this analysis only included individuals who met the inclusion criteria.

As mentioned earlier, another weakness of this study was that it was ill-equipped to explore the interplay between SUD and PTSD symptoms. To explore this issue, future studies would need to use much more frequent outcome measurement, ideally conducted on at least a weekly basis. Unfortunately, at present there are no studies to this author's

knowledge that have used this type of frequent outcome measurement, and so this issue cannot be explored using meta-analysis, though this knowledge could be a great aid in designing treatments for this dual diagnosis.

Another weakness to this study was that portions of the analysis were conducted solely by the primary author. The effect sizes and the statistical components of the analysis were double-checked by a second individual and any differences were resolved through consensus. However, much of the work in study selection was done by a single individual and the resulting lack of "quality checks" in this phase of data collection may have possibly led to some form of systematic bias in study inclusion or exclusion. It would have been preferable to use a team of researchers to conduct all phases of the data collection and analysis in the present study.

Conclusion

The symptoms and other issues experienced by those with the dual diagnosis of PTSD and SUD have profound effects on the lives of these individuals. The present study aggregated the results from several studies that examined how best to help these individuals. While this analysis found encouraging results showing that treatment is helpful in reducing symptoms in this population, the lack of stability in those results was also disheartening. In addition, no evidence was found for any increased efficacy of the newer integrated treatments for this dual diagnosis over SUD-only focused treatments. These issues need more research examination, and more efforts are needed to develop new treatments that will be more effective with this population. Future research into these issues will be very helpful to the many individuals who suffer from SUD and PTSD dual diagnosis for finding the help that they need.

References

References marked with an asterisk indicate source studies for the meta-analysis

Abueg, F. R., & Fairbank, J. A. (1991). Behavioral treatment of posttraumatic stress disorder and co-occurring substance abuse. In P. A. Saigh (Ed.), *Posttraumatic stress disorder: A behavioral approach to assessment and treatment* (pp. 111-146). New York: Macmillan.

Adshead, G. (2000). Psychological Therapies for PTSD. *British Journal of Psychiatry, 177,* 144-148.

Afful, S., Strickland, J. R., Cottler, L., & Bierut, L. J., (2010). Exposure to trauma: A comparison of cocaine-dependent cases and a community-matched sample. *Drug and Alcohol Dependence, 112,* 46-53.

Ahn, H. & Wampold, B. E. (2001). Where of where are the specific ingredients? A meta-analysis of component studies in counseling and psychotherapy. *Journal of Counseling Psychology, 48,* 251-257.

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

Anderson, D. J., McGovern, J. P., & DuPont, R. L., (1999). The origins of the Minnesota Model of addiction treatment--A first person account. *Journal of Addictive Diseases, 18,* 107-114.

Back, S. E., Brady, K. T., Jaanimagi, U., & Jackson, J. L., (2006). Cocaine dependence and PTSD: A pilot study of symptom interplay and treatment preferences. *Addictive Behaviors, 31,* 351-354.

Back, S. E., Brady, K. T., Sonne, S. C., Verduin, M. L., (2006). Symptom Improvement in Co-Occurring PTSD and Alcohol Dependence. *Journal of Nervous and Mental Disease, 194,* 690-696.

Back, S. E., Dansky, B. S., Carroll, K. M., Foa, E. B., & Brady, K. T., (2001). Exposure therapy in the treatment of PTSD among cocaine-dependent individuals: Description of procedures. *Journal of Substance Abuse Treatment, 21,* 35-45.

Back, S. E., Jackson, J. L., Sonne, S., & Brady, K. T., (2005). Alcohol dependence and posttraumatic stress disorder: differences in clinical presentation and response to cognitive-behavioral therapy by order of onset. *Journal of Substance Abuse Treatment, 29,* 29 – 37. *

Back, S. E., Sonne, S. C., Killeen, T., Dansky, B. S., & Brady, K. T. (2003). Comparative profiles of women with PTSD and comorbid cocaine or alcohol dependence. *American Journal of Drug and Alcohol Abuse, 29,* 169-189.

Back, S. E., Waldrop, A. E., Brady, K. T., & Hien, D. E., (2006). Evidence-based time-limited treatment of co-occurring substance-use disorders and civilian-related posttraumatic stress disorder. *Brief Treatment and Crisis Intervention, 6,* 283-294.

Barrett, D. H., Green, M. L., Morris, R., Giles, W. H., & Croft, J. B. (1996). Cognitive functioning and posttraumatic stress disorder. *American Journal of Psychiatry, 153,* 1492-1494.

Batten, S. V. & Hayes, S. C. (2005). Acceptance and Commitment Therapy in the Treatment of Comorbid Substance Abuse and Post-Traumatic Stress Disorder: A Case Study. *Clinical Case Studies, 4,* 246-262.

Becker, B. J. & Schram C. M. (1994). Examining explanatory models through research synthesis. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 357 – 381). New York, NY: Russell Sage Foundation.

Becker C. B., Zayfert C., & Anderson E. (2004). A survey of psychologists' attitudes towards and utilization of exposure therapy for PTSD. *Behavior Research and Therapy, 42,* 277–292

Begg, C. B. (1994). Publication bias. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 399 – 409). New York, NY: Russell Sage Foundation.

Bernhardt, A. (2009). Rising to the challenge of treating OEF/OIF veterans with co-occurring PTSD and substance abuse. *Smith College Studies in Social Work, 79,* 344-367.

Bollerud, K. (1990). A model for the treatment of trauma-related syndromes among chemically dependent inpatient women. *Journal of Substance Abuse Treatment, 7,* 83-87.

Boudewyns, P. A., Woods, M. G., Hyer, L., & Albrecht, J. W. (1991). Chronic combat related PTSD and concurrent substance abuse: implications for treatment of this frequent "dual diagnosis". *Journal of Chronic Stress, 4,* 549-560.

Brady, K. T., Dansky, B. S., Back, S. E., Foa, E. B., & Carroll, K. M., (2001). Exposure therapy in the treatment of PTSD among cocaine-dependent individuals: Preliminary findings. *Journal of Substance Abuse Treatment, 21*, 47-54. *

Brady, K. T. & Sinha, R. (2005). Co-Occurring Mental and Substance Use Disorders: The Neurobiological Effects of Chronic Stress. *American Journal of Psychiatry, 162,* 1483-1493.

Brady, K. T., Sonne, S., Anton, R. F., Randall, C. L., Back, S. E., & Simpson, K., (2005). Sertraline in the Treatment of Co-occurring Alcohol Dependence and Posttraumatic Stress Disorder. *Alcoholism: Clinical and Experimental Research, 29*, 395-401.

Brady, K. T., Sonne, S. C., & Roberts, J. M. (1995). Sertraline treatment of comorbid posttraumatic stress disorder and alcohol dependence. *Journal of Clinical Psychiatry, 56,* 502–505.

Brady, K. T., & Verduin, M. L. (2005). Pharmacotherapy of comorbid mood, anxiety, and substance use disorders. *Substance Use & Misuse, 40,* 2021–2041.

Brady, K. T., Waldrop, A. E., McRae, A. L., Back, S. E., Saladin, M. E., Upadhyaya, H. P., Anton, R. F., & Randall, P. K. (2006). The Impact of Alcohol Dependence and Posttraumatic Stress Disorder on Cold Pressor Task Response. *Journal of Studies on Alcohol, 67,* 700-706.

Bremmer, 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.

Brinson, T. & Treanor, V. (1989). Alcoholism and posttraumatic stress disorder among combat Vietnam veterans. *Alcoholism Treatment Quarterly, 5,* 65-82.

Brown, P. J. (2000). Outcome in female patients with both substance use and post-traumatic stress disorders. *Alcoholism Treatment Quarterly, 18,* 127-135. *

Brown, V. B., Najavits, L. M., Cadiz, S., Finkelstein, N., Heckman, J. P., & Rechberger, E. (2007). Implementing an evidence-based practice: Seeking Safety group. *Journal of Psychoactive Drugs, 39,* 231-240.

Brown, P. J., Read, J. P., & Kahler, C. W. (2003). Comorbid posttraumatic stress disorder and substance use disorders: Treatment outcomes and the role of coping. In P. Ouimette & P. J. Brown (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 171-188). Washington, DC: American Psychological Association. *

Brown, P. J., Recupero, P. R., & Stout, R. (1995). PTSD substance abuse comorbidity and treatment utilization. *Addictive Behaviors, 20,* 251–254.

Brown, P. J., Stout, R. L., & Gannon-Rowley, J. (1998). Substance use disorder-PTSD comorbidity: Patients' perceptions of symptom interplay and treatment issues. *Journal of Substance Abuse Treatment, 15,* 445–448.

Brown, P. J., Stout, R. L., & Mueller, T. (1996). Posttraumatic stress disorder and substance abuse relapse among women: A pilot study. *Psychology of Addictive Behaviors, 10,* 124-128.

Brown, P. J., Stout, R. L., & Mueller, T., (1999). Substance use disorder and posttraumatic stress disorder comorbidity: Addiction and psychiatric treatment rates. *Psychology of Addictive Behaviors, 13,* 115-122.

Brown, P. J. & Wolfe, P. (1994). Substance abuse and post-traumatic stress disorder comorbidity. *Drug and Alcohol Dependence, 35,* 51-59.

Caldeira, N. A. (2004). Dissociation and treatment outcome in urban women with comorbid PTSD and substance use disorders. *Dissertation Abstracts International, 65(3-B),* 1540.

Chambless, D. L., Sanderson, W. C., Shoham, V., Johnson, S. B., Pope, K. S., Crits-Cristoph, P., Baker, M., Benjamin, M. B., Woody, S. R., Sue, S., Beutler, L.,

Williams, D. A. & McCurry, S. (1996). An update on empirically validated therapies. *The Clinical Psychologist, 49,* 5-18.

Chiavaroli, T. (1992). Rehabilitation from substance abuse in individuals with a history of sexual abuse. *Journal of Substance Abuse Treatment, 9,* 349-354.

Chilcoat, H. D., & Breslau, N. (1998). Posttraumatic stress disorder and drug disorders: Testing causal pathways. *Archives of General Psychiatry, 55,* 913–917.

Clark, H. W., Masson, C. L., Delucchi, K. L., Hall, S. M., & Sees, K. L. (2001). Violent traumatic events and drug abuse severity. *Journal of Substance Abuse Treatment, 20,* 121-127.

Claus, R.E., & Kindleberger, L.R. (2002). Engaging substance abusers after centralized assessment: Predictors of treatment entry and dropout. *Journal of Psychoactive Drugs, 34,* 25-31.

Cocozza, J. J., Jackson, E. W., Hennigan, K., Morrissey, J. P., Reed, B. G., Fallot, R., & Banks, S. (2005). Outcomes for women with co-occuring disorders and trauma: program-level effects. *Journal of Substance Abuse Treatment, 28,* 109-119.

Coffey, S. F., Dansky, B. S., & Brady, K. T., (2003). Exposure-based, trauma-focused therapy for comorbid posttraumatic stress disorder-substance use disorder. In P. Ouimette, & P. J. Brown (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 127-146). Washington, DC: American Psychological Association.

Coffey, S. F., Schumacher, J. A., Brady, K. T., & Cotton, B. D. (2007). Changes in PTSD symptomatology during acute and protracted alcohol and cocaine abstinence. *Drug and Alcohol Dependence, 87,* 241-248. *

Coffey, S. F., Schumacher, J. A., Brimo, M. L., & Brady, K. T., (2005). Exposure Therapy for Substance Abusers with PTSD: Translating Research to Practice. *Behavior Modification, 29,* 10-38.

Coffey, S. F., Stasiewicz, P. R., Hughes, P. M., & Brimo, M. L., (2006). Trauma-focused imaginal exposure for individuals with comorbid posttraumatic stress disorder and alcohol dependence: Revealing mechanisms of alcohol craving in a cue reactivity paradigm. *Psychology of Addictive Behaviors, 20,* 425-435.

Cohen, L. R & Hien, D. (2006). Treatment outcomes for women with substance abuse and PTSD who have experienced complex trauma. *Psychiatric Services, 57,* 100-106.

Cohen, J. A., Mannarino, A. P., Zhitova, A. C., & Capone, M. E., (2003). Treating child abuse-related posttraumatic stress and comorbid substance abuse in adolescents. *Child Abuse & Neglect, 27,* 1345-1365.

Condon, M. J. (2004). Interactive impacts of trauma, addiction, relapse, specialized treatment, and recovery on the lives of individuals. *Dissertation Abstracts International, 64(12-B),* 6008.

Conrod, P. J. & Stewart, S. H. (2003). Experimental studies exploring functional relations between posttraumatic stress disorder and substance use disorder. In P. Ouimette & P. J. Brown, (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 57-71). Washington, DC: American Psychological Association.

Cook, J. M., Walser, R. D., Kane, V., Ruzek, J. I., & Woody, G., (2006). Dissemination and feasibility of a cognitive-behavioral treatment for substance use disorders and

posttraumatic stress disorder in the Veterans Administration. *Journal of Psychoactive Drugs, 38,* 89-92. *

Cooper, H. & Hedges, L. V. (1994). Potentials and limitations of research synthesis. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 521 – 529). New York: Russell Sage Foundation.

Cottler, L. B., Compton, W. M., III, Mager, D., Spitznagel, E. L., & Janca, A. (1992). Posttraumatic stress disorder among substance users from the general population. *American Journal of Psychiatry, 149,* 664- 670.

Cramer, M. A., (2002). Under the influence of unconscious process; Countertransference in the treatment of PTSD and substance abuse in women. *American Journal of Psychotherapy, 56,* 194-210.

Dansky, B .S., Brady, K . T., & Roberts J. T. (1994). Post-traumatic stress disorder and substance abuse: empirical findings and clinical issues. *Substance Abuse, 15,* 247-257.

Dansky, B. S., Brady, K. T., & Saladin, M. E. (1998). Untreated symptoms of PTSD among cocaine-dependent individuals: Changes over time. *Journal of Substance Abuse Treatment, 15,* 499-504.

Dansky, B. S., Roitzsch, J. C., Brady, K. T., & Saladin, M. E. (1997). Post traumatic stress disorder and substance abuse: use of research in a clinical setting. *Journal of Traumatic Stress, 10,* 141-148.

Davis, J. L., Davies, S., Wright, D. C., Falsetti, S., & Roitzsch, J., (2005). Simultaneous Treatment of Substance Abuse and Post-Traumatic Stress Disorder: A Case Study. *Clinical Case Studies, 4,* 347-362.

Davis, T. M. & Wood, P. S. (1999). Substance abuse and sexual trauma in a female veteran population. *Journal of Substance Abuse Treatment, 16,* 123-127.

De Bellis, M. D. (2002). Developmental traumatology: A contributory mechanism for alcohol and substance use disorders. *Psychoneuroendocrinology, 27,* 155-170.

Den Bleyker, K. (2000). The dual diagnosis of posttraumatic stress disorder and substance abuse: A literature review and treatment protocol. *Dissertation Abstracts International, 60(8-B),* 4215.

Desai, R. A., Harpaz-Rotem, I., Najavits, L. M., & Rosenheck, R. A. (2008). Impact of the Seeking Safety Program on Clinical Outcomes Among Homeless Female Veterans With Psychiatric Disorders. *Psychiatric Services, 59,* 996-1003.

Deykin, E. Y. & Buka, S. L. (1997). Prevalence and risk factors for posttraumatic stress disorder among chemically dependent adolescents. *The American Journal of Psychiatry, 154,* 752-757.

Dickersin, K. (1994). Research registers. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 71 – 83). New York: Russell Sage Foundation.

Dierker, L. C. & Merikangas, K. R. (2001). Familial psychiatric illness and posttraumatic stress disorder: Findings from a family study of substance abuse and anxiety disorders. *Journal of Clinical Psychiatry, 62,* 715-720.

Dolan, J. (2008). Integrated Treatments for Dual Diagnosis Post Traumatic Stress Disorder and Substance Use Disorders: A Pilot Meta-Analysis. Unpublished manuscript. Milwaukee, WI: Marquette University.

Donovan, B., Padin-Rivera, E., & Kowaliw, S., (2001). “Transcend": Initial outcomes from a posttraumatic stress disorder/substance abuse treatment program. *Journal of Traumatic Stress, 14,* 757-772. *

Dragan, M. & Lis-Turlejska, M., (2007). Prevalence of posttraumatic stress disorder in alcohol dependent patients in Poland. *Addictive Behaviors, 32,* 902-911.

Drake, R., Mercer-McFadden, C., Mueser, K., Mc-Hugo, G., & Bond, G. (1998). Review of integrated mental health and substance abuse treatment for patients with dual disorders. *Schizophrenia Bulletin, 24,* 589–608.

Driessen, M., Schulte, S., Luedecke, C., Schaefer, I., Sutmann, F., Ohlmeier, M., Kemper, U., Koesters, G., Chodzinski, C., Schneider, U., Broese, T., Dette, C., & Havemann-Reinicke, U., (2008).Trauma and PTSD in patients with alcohol, drug, or dual dependence: A multi-center study. *Alcoholism: Clinical and Experimental Research, 32,* 481-488.

Dunner, D. L., (2001). Management of anxiety disorders: The added challenge of comorbidity. *Depression and Anxiety, 13,* 57-71.

Evans, K. & Sullivan, J. M. (1995). Treating addicted survivors of trauma. New York: The Guilford Press.

Feldstein, S. W. & Ginsburg, J. I. (2006). Motivational Interviewing With Dually Diagnosed Adolescents in Juvenile Justice Settings. *Brief Treatment and Crisis Intervention, 6,* 218-233.

Ford, J. D., Hawke, J., Alessi, S., Ledgerwood, D., & Petry, N. (2007). Psychological trauma and PTSD symptoms as predictors of substance dependence treatment outcomes. *Behaviour Research and Therapy, 45,* 2417-2431.

Ford, J. D., & Russo, E. (2006). A trauma-focused, present-centered, emotional self-regulation approach to integrated treatment for post-traumatic stress and addiction: Trauma Adaptive Recovery Group Education and Therapy (TARGET). *American Journal of Psychotherapy, 60,* 335–355.

Ford, J. D., Russo, E. M., & Mallon, S. D., (2007). Integrating treatment of posttraumatic stress disorder and substance use disorder. *Personnel & Guidance Journal, 85,* 475-489.

Fuller, M. G., Diamond, D. L., Jordon, M. L., & Walters, M. C. (1995). The role of a substance abuse consultation team in a trauma center. *Journal of Studies on Alcohol, 56,* 267-271.

Fullilove, M.T., Fullilove, R.E., Smith, M., Winkler, K., Michael, C., Panzer, P. G., & Wallace, R. (1993). Violence, trauma, and post-traumatic stress disorder among women drug users. *Journal of Traumatic Stress, 6*, 533-543.

Gaiton, L. R., (2005). Investigation of therapeutic alliance in a treatment study with substance-abusing women with PTSD. *Dissertation Abstracts International*, 65(9-B), 4828.

Gatz, M., Brown, V., Hennigan, K., Rechberger, E., O'Keefe, M., Rose, T., & Bjelejac, P. (2007). Effectiveness of an integrated trauma-informed approach to treating women with co-occurring disorders and histories of trauma. *Journal of Community Psychology, 35*, 863-878.

Giaconia, R. M., Reinherz, H. Z., Hauf, A. C., Paradis, A. D., Wasserman, M. S., & Langhammer, D. M., (2000). Comorbidity of substance use and post-traumatic

stress disorders in a community sample of adolescents. *American Journal of Orthopsychiatry, 70,* 253-262.

Gil-Rivas, V., Fiorentine, R., & Anglin, M. D. (1996). Sexual abuse, physical abuse, and post traumatic stress disorder among women participating in outpatient drug abuse treatment. *Journal of Psychoactive Drugs, 28,* 95-102.

Gleser, L. J. & Olkin I. (1994). Stochastically dependent effect sizes. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 339 – 355). New York: Russell Sage Foundation.

Goeders, N.E. (2003). The impact of stress on addiction. *European Neuropsychopharmacology, 13,* 435-441.

Greber, R. A., Allen, K. M., Soeken, K. L., & Solunias, B. L. (1997). Outcome of trauma patients after brief intervention by a substance abuse consultation team. *American Journal on Addictions, 6,* 38-47.

Hageman, W. J. J. M. & Arrindell, W. A. (1999). Establishing clinically significant change: increment of precision and the distinction between individual and group level of analysis. *Behaviour Research and Therapy, 37,* 1169 – 1193.

Hamilton, N. (2006). *Evaluation project on young African-American men.* American Center for Excellence (AACE) Program. (SAMHSA grant number TI14126), Unpublished report.

Harris, M. (1996). Treating sexual abuse with dually diagnosed women. *Community Mental Health Journal, 32,* 371-385.

Harris, M., Fallot, R. D., & Berley, R. W. (2005). Qualitative Interviews on Substance Abuse Relapse and Prevention Among Female Trauma Survivors. *Psychiatric Services, 56,* 1292-1296.

Harvey, E. M., Rawson, R. A., & Obert, J. L. (1994). History of sexual assault and the treatment of substance abuse disorders. *Journal of Psychoactive Drugs, 26,* 361-367.

Hawke, J. M., Albert, D., & Ford, J. D. (2008). Trauma and post-traumatic stress disorder in adolescent substance use disorders. In Y. Kaminer & O. G. Bukstein (Eds.), *Adolescent substance abuse: Psychiatric comorbidity and high-risk behaviors*. (pp. 291-321). New York: Routledge/Taylor & Francis Group.

Herman, S., Frank, K. A., Mowbray, C., Ribisl, K., Davidson, W. II, BootsMiller, B., Jordan, L., Greenfield, A. L., Loveland, D., & Luke, D. A. (2000). Longitudinal effects of integrated treatment on alcohol use for persons with serious mental illness and substance use disorders. *Journal of Behavioral Health Services & Research, 27,* 286–303.

Hermos, J. A; Young, M. M., Lawler, E. V., Rosenbloom, D., & Fiore, L. D. (2007). Long-term, high-dose benzodiazepine prescriptions in veteran patients with PTSD: Influence of preexisting alcoholism and drug-abuse diagnoses. *Journal of Traumatic Stress, 20,* 909-914.

Hien, D., Cohen, L., & Campbell, A. (2005). Is traumatic stress a vulnerability factor for women with substance use disorders? *Clinical Psychology Review, 25,* 813-823.

Hien, D. A., Cohen, L. R., Miele, G. M., Litt, L. C., Capstick, C., (2004). Promising treatments for women with comorbid PTSD and substance use disorders. *American Journal of Psychiatry, 161,* 1426-1432.

Hien, D. A., Nunes, E., Levin, F. R., & Fraser, D., (2000). Posttraumatic stress disorder and short-term outcome in early methadone maintenance treatment. *Journal of Substance Abuse Treatment, 19,* 31-37.

Hien, D. & Scheier, J. (1996). Trauma and short-term outcome for women in detoxification. Journal of Substance Abuse Treatment, *13,* 227–231.

Holdcraft, L.C. & Comtois, K.A. (2002). Description of and preliminary data from a women's dual diagnosis community mental health program. *Canadian Journal of Community Mental Health, 21,* 91-109.

Hughes, P. M., (2007). Study attrition in a PTSD/alcohol-dependent sample. *Dissertation Abstracts International,* 67(7-B), 4106.

Hunter, J. E. & Schmidt F. L. (1994). Correcting for sources of artificial variation across studies. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 323 – 336). New York: Russell Sage Foundation.

Hunter, J. E. & Schmidt, F. L. (2004). Methods of meta-analysis – Correcting error and bias in research findings. Thousand Oaks, CA: Sage Publications Inc.

Jacobsen, L. K., Southwick, S. M., & Kosten, T. R. (2001). Substance use disorders in patients with posttraumatic stress disorder: A review of the literature. *American Journal of Psychiatry, 158,* 1184-1190.

Jaycox, L. H., Ebener, P., Damesek, L., & Becker, K., (2004). Trauma Exposure and Retention in Adolescent Substance Abuse Treatment. *Journal of Traumatic Stress, 17*, 113-121.

Jelinek, J. M. & Williams, T. (1984). Post-traumatic stress disorder and substance abuse in Vietnam combat veterans: treatment problems, strategies and recommendations. *Journal of Substance Abuse Treatment, 1,* 87-97.

Kayo, R. (2004). The effect of unwanted sexual experiences on motivation among substance abusing women in addiction treatment. *Dissertation Abstracts International, 64(12-B),* 6331.

Kaysen, D., Pantalone, D. W., Chawla, N., Lindgren, K. P., Clum, G. A., Lee, C., & Resick, P. A. (2008). Posttraumatic stress disorder, alcohol use, and physical health concerns. *Journal of Behavioral Medicine, 31*, 115-125.

Kaysen, D., Simpson, T., Dillworth, T., Larimer, M. E., Gutner, C., & Resick, P. A. (2006). Alcohol Problems and Posttraumatic Stress Disorder in Female Crime Victims. *Journal of Traumatic Stress, 19,* 399-403.

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

Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry, 142,* 1259–1264.

Khouzam, H. R., (2001). Religious meditation and its effect on posttraumatic stress disorder in a Korean War veteran. *Clinical Gerontologist, 22,* 125-131.

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*, 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*, 692-700.

Kofoed, M. D., Friedman, M. J., & Peck, R. (1993). Alcoholism and drug abuse in patients with PTSD. *Psychiatric Quarterly, 64*, 151-171.

Kosten, T. R., Fontana, A., Sernyak, M. J., & Rosenheck, R., (2000). Benzodiazepine use in posttraumatic stress disorder among veterans with substance abuse. *Journal of Nervous and Mental Disease, 188*, 454-459.

Kovach, J.(1986). Incest as a treatment issue for alcoholic women. *Alcohol Treatment Quarterly, 3*, 1-15.

Kubiak, S. P., (2004). The Effects of PTSD on Treatment Adherence, Drug Relapse, and Criminal Recidivism in a Sample of Incarcerated Men and Women. *Research on Social Work Practice, 14*, 424-433.

Kuhne, A., Nohner, W., & Baraga, E. (1986). Efficacy of chemical dependency treatment as a function of combat in Vietnam. *Journal of Substance Abuse Treatment, 3,* 191-194.

Labbate, L. A., Sonne, S. C., Randal, C. L., Anton, R. F., & Brady, K. T., (2004). Does Comorbid Anxiety or Depression Affect Clinical Outcomes in Patients With Post-traumatic Stress Disorder and Alcohol Use Disorders? *Comprehensive Psychiatry, 45,* 304-310.

Lester, K. M. (2007). Posttraumatic stress disorder (PTSD) in cocaine-dependent homeless in treatment: A study of substance use and PTSD-related outcomes. *Dissertation Abstracts International, 68(2-B),* 1312.

Levan, K. (2006). Addressing interpersonal and sexual factors in integrative treatment for females with traumatic experiences and substance use disorders. *Dissertation Abstracts International, 66* (11-B), 6279.

Light, R. J., Singer, J. D., & Willett, J. B. (1994). The visual presentation and interpretation of meta-analysis. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 439 – 453). New York: Russell Sage Foundation.

Logan, T. K., Walker, R., Cole, J. & Leukefeld, C. (2002). Victimization and substance abuse among women: Contributing factors, interventions, and implications. *Review of General Psychology, 6,* 325-397.

Maine, C., (2005). Feminist-narrative therapy: Treating PTSD and substance abuse in women. *Dissertation Abstracts International,* 66(1-B), 564.

Mangrum, L. F., Spence, R. T., & Steinley-Bumgarner, M. D. (2006). Gender Differences in Substance-Abuse Treatment Clients With Co-occurring Psychiatric and Substance-Use Disorders. *Brief Treatment and Crisis Intervention, 6,* 255-267.

Matt, G. E. & Cook, T. D. (1994). Threats to the validity of research synthesis. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 503 – 520). New York: Russell Sage Foundation.

McClure, S. E. (2009). Co-occurring trauma and substance use disorders with criminal offenders. In A. Browne-Miller (Ed), *The Praeger international collection on addictions, Vol 2: Psychobiological profiles.* (pp. 61-77). Santa Barbara, CA: Praeger/ABC-CLIO.

McGovern, M. P., Lambert-Harris, C., Acquilano, S., Xie, H., Alterman, A. I., & Weiss, R. D., (2009). A cognitive behavioral therapy for co-occuring substance use and posttraumatic stress disorders. *Addictive Behaviors, 34,* 892 – 897. *

Mcnelis-Domingos, A. (2004). *Cognitive behavioral skills training for persons with co-occuring posttraumatic stress disorder and substance abuse*. Unpublished master's thesis, Southern Connecticut State University, New Haven, CT.

Meisler, A. W. (1999). Group treatment of PTSD and comorbid alcohol abuse. In B. H. Young & D. D. Blake (Eds.), *Group treatments for post-traumatic stress disorder* (pp. 117-136). Philadelphia: Brunner/Mazel.

Miller, D. & Guidry, L. (2001). *Addiction and trauma recovery: Healing the body, mind, and spirit.* New York: W. W. Norton and Co.

Miller, M. W., Vogt, D. S., Mozley, S. L., Kaloupek, D. G., & Keane, T. M. (2006). PTSD and substance-related problems: The mediating roles of disconstraint and negative emotionality. *Journal of Abnormal Psychology, 115,* 369-379.

Mills, K. L., Lynskey, M., Teesson, M., Ross, J., & Darke, S., (2005). Post-traumatic stress disorder among people with heroin dependence in the Australian treatment outcome study (ATOS): Prevalence and correlates. *Drug and Alcohol Dependence, 77,* 243-249.

Mills, K. L., Teesson, M., Ross, J., & Darke, S. (2007). The impact of post-traumatic stress disorder on treatment outcomes for heroin dependence. *Addiction, 102,* 447-454.

Mills, K. L., Teesson, M., Ross, J., Darke, S., & Shanahan, M., (2005). The Costs and Outcomes of Treatment for Opioid Dependence Associated With Posttraumatic Stress Disorder. *Psychiatric Services, 56,* 940-945.

Mills, K. L., Teesson, M., Ross, J., & Peters, L., (2006). Trauma, PTSD, and substance use disorders: Findings from the Australian National Survey of Mental Health and Well-Being. *American Journal of Psychiatry, 163,* 651-658.

Minkoff, K. & Cline, C. A., (2004) Changing the world: The design and implementation of comprehensive continuous integrated systems of care for individuals with co-occurring disorders. *Psychiatric Clinics of North America, 27,* 727-743.

Moggi, F., Ouimette, P. C., Finney, J. W., & Moos, R. H. (1999). Effectiveness of treatment for substance abuse and dependence for dual diagnosis patients: A model of treatment factors associated with one-year outcomes. *Journal of Studies on Alcohol, 60,* 856-866.

Monnelly, E. P., Ciraulo, D. A., Knapp, C., LoCastro, J., & Sepulveda, I., (2004). Quetiapine for treatment of alcohol dependence. *Journal of Clinical Psychopharmacology, 24,* 532-535.

Morrissey, J. P., Ellis, A. R., Gatz, M., Amaro, H., Reed, B. G., Savage, A., Finkelstein, N., Mazelis, R., Brown, V., Jackson, E. W., & Banks, S. (2005). Outcomes for women with co-occurring disorders and trauma: program and person-level effects. *Journal of Substance Abuse Treatment, 28,* 121-133.

Morrissey, J. P., Jackson, E. W., Ellis, A. R., Amaro, H., Brown, V. B., & Najavits, L. M. (2005)**.** Twelve-month outcomes of trauma-informed interventions for women with co-occurring disorders. *Psychiatric Services, 56,* 1213-1222.

Najavits, L. M, (1997). The link between substance abuse and posttraumatic stress disorder in women - A research review. *American Journal on Addictions, 6,* 273-283.

Najavits, L. M., (2000). Training clinicians in the Seeking Safety treatment protocol for posttraumatic stress disorder and substance abuse. *Alcoholism Treatment Quarterly, 18,* 83-98.

Najavits, L. M., (2001). Helping 'difficult' patients. *Psychotherapy Research, 11,* 131-152.

Najavits, L. M., (2002a). Clinicians' views on treating posttraumatic stress disorder and substance use disorder. *Journal of Substance Abuse Treatment, 22,* 79-85.

Najavits, L. M. (2002b). *Seeking safety: A treatment manual for PTSD and substance abuse.* Guilford substance abuse series. New York: Guilford Press.

Najavits, L. M., (2003). Seeking safety: A new psychotherapy for posttraumatic stress disorder and substance use disorder. In P. Ouimette, & P. J. Brown (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 147-169). Washington, DC: American Psychological Association.

Najavits, L. M., (2004). Treatment of posttraumatic stress disorder and substance abuse: Clinical guidelines for implementing Seeking Safety therapy. *Alcoholism Treatment Quarterly*, *22*, 43-62.

Najavits, L. M. (2006a). Present- Versus Past-Focused Therapy for Posttraumatic Stress Disorder/Substance Abuse: A Study of Clinician Preferences. *Brief Treatment and Crisis Intervention*, *6*, 248-254.

Najavits, L. M., (2006b). Seeking Safety: Therapy for Posttraumatic Stress Disorder and Substance Use Disorder. In V. M. Follette, & J. I. Ruzek (Eds.), *Cognitive-behavioral therapies for trauma (2nd ed)* (pp. 228-257). New York: Guilford Press.

Najavits, L. M. (2007). Seeking safety: An evidence-based model for substance abuse and trauma/PTSD. In K. A. Witkiewitz & G. A. Marlatt (Eds.), *Therapist's guide to evidence-based relapse prevention* (pp. 141-167). San Diego, CA: Elsevier Academic Press.

Najavits, L. M., Gallop, R. J., & Weiss, R. D. (2006). Seeking safety therapy for adolescent girls with PTSD and substance use disorder: A randomized controlled trial. *The Journal of Behavioral Health Services & Research*, *33*, 453-463. *

Najavits, L. M., Gotthardt, S., Weiss, R. D., & Epstein, M. (2004). Cognitive Distortions in the Dual Diagnosis of PTSD and Substance Use Disorder. *Cognitive Therapy and Research, 28,* 159-172.

Najavits, L. M., Harned, M. S., Gallop, R. J., Butler, S. F., Barber, J. P., Thase, M. E., & Crits-Christoph, P. (2007). Six-month treatment outcomes of cocaine-dependent patients with and without PTSD in a multisite national trial. *Journal of Studies on Alcohol and Drugs, 68,* 353-361. *

Najavits, L. M., Runkel, R., Neuner, C., Frank, A. F., Thase, M. E., Crits-Christoph, P., & Elaine, J., (2003). Rates and Symptoms of PTSD among Cocaine-Dependent Patients. *Journal of Studies on Alcohol, 64,* 601-606.

Najavits, L. M., Schmitz, M., Gotthardt, S., & Weiss, R. (2005). Seeking safety plus exposure therapy: An outcome study on dual diagnosis men. *Journal of Psychoactive Drugs, 37,* 425-435. *

Najavits, L. M., Sonn, J., Walsh, M., & Weiss, R. D. (2004). Domestic violence in women with PTSD and substance abuse. *Addictive Behaviors, 29,* 707-715.

Najavits, L. M., Sullivan, T. P., Schmitz, M., Weiss, R. D., & Lee, C. S. N., (2004). Treatment Utilization by Women with PTSD and Substance Dependence. *The American Journal on Addictions, 13,* 215-224.

Najavits, L. M., Weiss, R. D., & Liese, B. S. (1996). Group cognitive-behavioral therapy for women with PTSD and substance use disorder. *Journal of Substance Abuse Treatment, 13,* 13-22.

Najavits, L. M., Weiss, R. D., & Shaw, S.R. (1997). The link between substance abuse and posttraumatic stress disorder in women. *American Journal on Addictions, 6*, 273-283.

Najavits, L. M., Weiss, R. D., & Shaw, S. R. (1999). A clinical profile of women with posttraumatic stress disorder and substance dependence. *Psychology of Addictive Behaviors, 13,* 98-104.

Najavits, L. M., Weiss, R. D., Shaw, S. R., & Muenz, L. (1998). "Seeking Safety": Outcome of a new cognitive-behavioral psychotherapy for women with posttraumatic stress disorder and substance dependence. *Journal of Traumatic Stress, 11,* 437-456. *

National Center for Post-Traumatic Stress Disorder. (2008). Fact Sheet. Retrieved from http://www.ncptsd.va.gov/ncmain/ncdocs/fact_shts/fs_epidemiological.html.

National Research Council. (1992). What, why, and when to combine. In *Combining information: Statistical issues and opportunities for research.* (pp. 17-39). Washington D.C.: National Academy Press.

Norman, S. B., Tate, S. R., Anderson, K. G., & Brown, S., (2007). Do trauma history and PTSD symptoms influence addiction relapse context? *Drug and Alcohol Dependence, 90,* 89-96.

Norman, S. B., Wilkins, K. C., Tapert, S. F., Lang, A. J., & Najavits, L. M., (2010). A pilot study of Seeking Safety therapy with OEF/OIF veterans. *Journal of Psychoactive Drugs, 42,* 83-87. *

Orwin, R. G. (1994). Evaluating coding decisions. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 139 – 162). New York: Russell Sage Foundation.

Ouimette, P. C. (1997). Twelve-step and cognitive-behavioral treatment for substance abuse: A comparison of treatment effectiveness. *Journal of Consulting and Clinical Psychology, 65*, 230-240.

Ouimette, P. C., Ahrens, C., Moos, R. H., & Finney, J. (1997). Posttraumatic stress disorder in substance abuse patients: Relationship to 1-year posttreatment outcomes. *Psychology of Addictive Behaviors, 11*, 34-47. *

Ouimette, P. C., Ahrens, C., Moos, R. H., & Finney, J. W. (1998). During treatment changes in substance abuse patients with posttraumatic stress disorder: The influence of specific interventions and program environments. *Journal of Substance Abuse Treatment, 15*, 555–564. *

Ouimette, P. C., Brown, P. J., & Najavits, L. M. (1998). Course and treatment of patients with substance use and posttraumatic stress disorders. *Addictive Behaviors, 23*, 785-795.

Ouimette, P., Coolhart, D., Funderburk, J. S., Wade, M., & Brown, P. J. (2007). Precipitants of first substance use in recently abstinent substance use disorder patients with PTSD. *Addictive Behaviors, 32*, 1719-1727.

Ouimette, P. C., Finney, J. W., & Moos, R. H. (1999). Two-year posttreatment functioning and coping of substance abuse patients with posttraumatic stress disorder. *Psychology of Addictive Behaviors, 13*, 105-114. *

Ouimette, P. C., Humphreys, K., Moos, R. H., Finney, J. W., Cronkite, R., & Federman, B. (2001). Self-help participation and functioning among substance use disorder patients with PTSD. *Journal of Substance Abuse Treatment, 20*, 25–32.

Ouimette, P., Goodwin, E., & Brown, P. J. (2006). Health and well being of substance use disorder patients with and without posttraumatic stress disorder. *Addictive Behaviors, 31*, 1415-1423.

Ouimette, P., Moos, R. H., & Brown, P. J., (2003). Substance use disorder-posttraumatic stress disorder comorbidity: A survey of treatments and proposed practice guidelines. In P. Ouimette, & P. J. Brown (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 91-110). Washington, DC: American Psychological Association

Ouimette, P., Moos, R. H., & Finney, J. (2003). PTSD treatment and 5-year remission among patients with substance use and posttraumatic stress disorders. *Journal of Consulting and Clinical Psychology, 71*, 410-414.

Ouimette, P. C., Moos, R. H., & Finney, J. W., (2000). Two-year mental health service use and course of remission in patients with substance use and posttraumatic stress disorders. *Journal of Studies on Alcohol, 61*, 247-253.

Parrott, D. J., Drobes, D. J., Saladin, M. E., Coffey, S. F., & Dansky, B. S. (2003). Perpetration of partner violence: Effects of cocaine and alcohol dependence and posttraumatic stress disorder. *Addictive Behaviors, 28*, 1587-1602.

Petrakis, I. L., Poling, J., Levinson, C., Nich, C., Carroll, K., Ralevski, E., & Rounsaville, B., (2006). Naltrexone and Disulfiram in Patients with Alcohol Dependence and Comorbid Post-Traumatic Stress Disorder. *Biological Psychiatry, 60*, 777-783.

Peirce, J. M., Kindbom, K. A., Waesche, M. C., Yuscavage, A. S. E., & Brooner, R. K. (2008). Posttraumatic stress disorder, gender, and problem profiles in substance dependent patients. *Substance Use & Misuse, 43,* 596-611.

Pigott, T. D. (1994). Methods for handling missing data in research synthesis. In H. Cooper H. & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 163 – 175). New York: Russell Sage Foundation.

Powers, M. B., Halpern, J. M., Ferenschak, M. P., Gillihan, S. J., & Foa, E. B., (2010). A meta-analytic review of prolonged exposure for posttraumatic stress disorder. *Clinical Psychology Review, 30,* 635-641.

Price, R. K., Risk, N. K., Haden, A. H., Lewis, C. E., & Spitznagel, E. L. (2004). Post-traumatic stress disorder, drug dependence, and suicidality among male Vietnam veterans with a history of heavy drug use. *Drug and Alcohol Dependence, 76,* S31-S43.

Raghavan, C. & Kingston, S. (2006). Child Sexual Abuse and Posttraumatic Stress Disorder: The Role of Age at First Use of Substances and Lifetime Traumatic Events. *Journal of Traumatic Stress, 19,* 269-278.

Rauch, S. A. M. & Foa, E. B., (2006). Moving from trauma to triumph: Posttraumatic stress disorder with chronic pain and alcohol use. In R. L. Spitzer, M. B. First, J. B. W. Williams, & M. Gibbon, (Eds.), *DSM-IV-TR Reg. casebook: Experts tell how they treated their own patients (Vol. 2)* (pp. 237-247). Washington, DC: American Psychiatric Publishing, Inc.

Raudenbush, S. W. (1994). Random effects models. In H. Cooper & L. V. Hedges, (Eds.), *The handbook of research synthesis* (pp. 301 – 321). New York: Russell Sage Foundation.

Read, J. P., Brown, P. J., & Kahler, C. W., (2004). Substance use and posttraumatic stress disorders: Symptom interplay and effects on outcome. *Addictive Behaviors, 29*, 1665-1672.

Reed, J. G. & Baxter, P. M. (1994). Using reference databases. In Cooper H. & Hedges, L. V. (Eds.), *The handbook of research synthesis* (pp. 57 – 70). New York: Russell Sage Foundation.

Reed, P. L., Anthony, J. C., & Breslau, N. (2007). Incidence of drug problems in young adults exposed to trauma and posttraumatic stress disorder: Do early life experiences and predispositions matter? *Archives of General Psychiatry, 64,* 1435-1442.

Reynolds, M., Mezey, G., Chapman, M., Wheeler, M., Drummond, C., & Baldacchino, A., (2005). Co-morbid post-traumatic stress disorder in a substance misusing clinical population. *Drug and Alcohol Dependence, 77*, 251-258.

Riggs, D. S. & Foa, E. B. (2008). Treatment for co-morbid posttraumatic stress disorder and substance use disorders. In S. H. Stewart & P. J. Conrod (Eds.), *Anxiety and substance use disorders: The vicious cycle of comorbidity.* (pp. 119-137). New York: Springer Science

Riggs, D. S., Rukstalis, M., Volpicelli, J. R., Kalmanson, D., & Foa, E. B. (2003). Demographic and social adjustment characteristics of patients with comorbid

posttraumatic stress disorder and alcohol dependence: Potential pitfalls to PTSD treatment. *Addictive Behaviors, 28,* 1717-1730.

Rosenthal, M. C. (1994). The fugitive literature. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 85 – 94). New York: Russell Sage Foundation.

Rosenthal, R. (1994). Parametric measures of effect. In H. Cooper & L. V. Hedges, (Eds.), *The handbook of research synthesis* (pp. 231 – 244). New York: Russell Sage Foundation.

Rosenthal, R. (1995). Writing Meta-analytic reviews. *Psychological Bulletin, 118,* 183-192.

Rotunda, R. J., O'Farrell, T., J, Murphy, M., & Babey, S. H., (2008). Behavioral couples therapy for comorbid substance use disorders and combat-related posttraumatic stress disorder among male veterans: An initial evaluation. *Addictive Behaviors, 33,* 180-187.

Ruglass, L. M., (2006). Ethnocultural differences in therapeutic alliance and outcome for women with comorbid posttraumatic stress disorder and substance use disorder. *Dissertation Abstracts International,* 66, (8-B), 4499.

Ruzek, J. I., (2003). Concurrent posttraumatic stress disorder and substance use disorder among veterans: Evidence and treatment issues. In P. Ouimette, & P. J. Brown (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 191-207). Washington, DC: American Psychological Association.

Sageman, S. & Brown, R., (2006). Free at last: Natural and conventional treatment of a patient with multiple comorbid psychiatric disorders. In R. L. Spitzer, M. B. First, J. B. W. Williams, & M. Gibbon, (Eds.), *DSM-IV-TR Reg. casebook: Experts tell how they treated their own patients (Vol. 2)* (pp. 109-121). Washington, DC, US: American Psychiatric Publishing, Inc.

Samuelson, K. W., Neylan, T. C., Metzler, T. J., Lenoci, M., Rothlind, J., Henn-Haase, C., Choucroun, G., Weiner, M. W., & Marmar, C. R. (2006). Neuropsychological functioning in posttraumatic stress disorder and alcohol abuse. *Neuropsychology, 20*, 716-726.

Schafer, I. & Najavits, L. M. (2007). Clinical challenges in the treatment of patients with posttraumatic stress disorder and substance abuse. *Current Opinion in Psychiatry, 20*, 614-618.

Schmidt, S. N. & Cobb, P. B. (2007). To sleep, perchance to dream... *Journal of Addictions Nursing, 18*, 53-54.

Seidel, R. W., Gusman, F. D., & Abueg, F. R., (1994). Theoretical and practical foundations of an inpatient post-traumatic stress disorder and alcoholism treatment program. *Psychotherapy: Theory, Research, Practice, Training*, *31*, 67-78.

Shadish, W. R. & Haddock, C. K. (1994). Combining estimates of effect size. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 261 – 281). New York: Russell Sage Foundation.

Sharkansky, E. J., Brief, D. J., Peirce, J. M., Meehan, J. C., Mannix, L. M. (1999). Substance abuse patients with posttraumatic stress disorder (PTSD): Identifying

specific triggers of substance use and their associations with PTSD symptoms. *Psychology of Addictive Behaviors, 13,* 89-97.

Shipherd, J. C., Stafford, J., & Tanner, L. R. (2005). Predicting alcohol and drug abuse in Persian Gulf War veterans: What role do PTSD symptoms play? *Addictive Behaviors, 30,* 595-599.

Simpson, T., Jakupcak, M., & Luterek, J. A. (2006). Fear and Avoidance of Internal Experiences Among Patients With Substance Use Disorders and PTSD: The Centrality of Anxiety Sensitivity. *Journal of Traumatic Stress, 19,* 481-491.

Simpson, T. L, Kaysen, D, Bowen, S, MacPherson, L. M, Chawla, N, Blume, A, Marlatt, G. A, & Larimer, M. (2007). PTSD symptoms, substance use, and Vipassana mediation among incarcerated individuals. *Journal of Traumatic Stress, 20,* 239-249.

Simpson, T. L., Kivlahan, D. R., Bush, K. R., & McFall, M. E., (2005). Telephone self-monitoring among alcohol use disorder patients in early recovery: A randomized study of feasibility and measurement reactivity. *Drug and Alcohol Dependence, 79*, 241-250.

Sokhadze, T. M., Stewart, C. M., & Hollifield, M., (2007). Integrating cognitive neuroscience research and cognitive behavioral treatment with neurofeedback therapy in drug addiction comorbid with posttraumatic stress disorder: A conceptual review. *Journal of Neurotherapy, 11*, 13-44.

Somer, E. (2003). Prediction of abstinence from heroin addiction by childhood trauma, dissociation, and extent of psychosocial treatment. *Addiction Research & Theory, 11*, 339-348.

Stam, M. K., (2002). Posttraumatic stress disorder and substance abuse: Perspectives of women in recovery. *Dissertation Abstracts International,* 63(6-B), 3026.

Steele, C. T., (2000). Providing clinical treatment to substance abusing trauma survivors. *Alcoholism Treatment Quarterly, 18,* 71-81.

Steindl, S. R., Young, R. M., Creamer, M., & Crompton, D., (2003). Hazardous alcohol use and treatment outcome in male combat veterans with posttraumatic stress disorder. *Journal of Traumatic Stress, 16,* 27-34.

Stewart, S. H. (1996). Alcohol abuse in individuals exposed to trauma: A critical review. *Psychological Bulletin, 120,* 83-112.

Stewart, S. H., & Conrod, P. J. (2003). Psychosocial models of functional associations between posttraumatic stress disorder and substance use disorder. In P. Crosby-Ouimette & P. Brown (Eds.), *PTSD and substance use disorder comorbidity* (pp. 29–56). Washington, DC: American Psychological Association.

Stewart, S. H., Conrod, P. J., Pihl, R. O., & Dongier, M. (1999). Relations between posttraumatic stress symptom dimensions and substance dependence in a community-recruited sample of substance-abusing women. *Psychology of Addictive Behaviors, 13,* 78-88.

Stewart, S. A., Grant, V. V., Ouimette, P., & Brown, P. J. (2006). Are Gender Differences in Post-Traumatic Stress Disorder Rates Attenuated in Substance Use Disorder Patients? *Canadian Psychology, 47,* 110-124.

Stewart, S. H., Mitchell, T. L., Wright, K. D., & Loba, P. (2004). The relations of PTSD symptoms to alcohol use and coping drinking in volunteers who responded to the Swissair Flight 111 airline disaster. *Journal of Anxiety Disorders, 18,* 51-68.

Stewart, S. H., Pihl, R. O., Conrod, P. J., & Dongier, M. (1998). Functional associations among trauma, PTSD and substance-related disorders. *Addictive Behaviors, 23,* 797–812.

Stiffler, C. L., (2006). PTSD symptom reductions following seeking safety and relapse prevention treatments. *Dissertation Abstracts International*, 66(9-B), 5107.

Thompson, S. J., McManus, H., & Voss, T. (2006). Posttraumatic Stress Disorder and Substance Abuse Among Youth Who Are Homeless: Treatment Issues and Implications. *Brief Treatment and Crisis Intervention, 6,* 206-217.

Stock, W. A. (1994). Systematic coding for research synthesis. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 125 – 138). New York: Russell Sage Foundation.

Substance Abuse and Mental Health Services Administration. (2006). Results from the 2005 National Survey on Drug Use and Health: National Findings. Retrieved from http://oas.samhsa.gov/nsduh/2k5nsduh/2k5Results.htm.

Substance Abuse and Mental Health Services Administration. (2010). *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings* (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4586 Findings). Rockville, MD: Author.

Sullivan, M. J., & Evans, K. (1996). Trauma and chemical dependence: A summary overview of the issues and an integrated treatment approach. *Sexual Addiction & Compulsivity, 3,* 228-249.

Sullivan, T. P. & Holt, L. J. (2008). PTSD symptom clusters are differentially related to substance use among community women exposed to intimate partner violence. *Journal of Traumatic Stress, 21*, 173-180.

Sutton, A. J. (2009). Publication bias. In H. Cooper, L. V. Hedges, & J. C. Valentine, (Eds.), *The handbook of research synthesis* (2nd ed.) (pp. 435 – 452). New York: Russell Sage Foundation.

Taft, C. T., Kaloupek, D. G., Schumm, J. A., Marshall, A. D., Panuzio, J., King, D. W., & Keane, T. M. (2007). Posttraumatic stress disorder symptoms, physiological reactivity, alcohol problems, and aggression among military veterans. *Journal of Abnormal Psychology, 116*, 498-507.

Tate, S. R., Norman, S. B., McQuaid, J. R., & Brown, S. A. (2007). Health problems of substance-dependent veterans with and those without trauma history. *Journal of Substance Abuse Treatment, 33*, 25-32.

Teusch, R. (2001). Substance abuse as a symptom of childhood sexual abuse. *Psychiatric Services, 52,* 1530-1532.

Thaller, V., Marusic, S., Katinic, K., Buljan, D., Golik-Gruber, V., Potkonjak, J. (2003). Biological Factors in Patients with Post-traumatic Stress Disorder and Alcoholism. *European Journal of Psychiatry, 17,* 87-98.

Trafton, J. A., Minkel, J., & Humphreys, K., (2006). Opioid Substitution Treatment Reduces Substance Use Equivalently in Patients With and Without Posttraumatic Stress Disorder. *Journal of Studies on Alcohol, 67*, 228-235.

Triffleman, E., (2003). Issues in implementing posttraumatic stress disorder treatment outcome research in community-based treatment programs. In J. L. Sorensen, R.

A. Rawson, J. Guydish, & J. E. Zweben, (Eds.), *Drug abuse treatment through collaboration: Practice and research partnerships that work* (pp. 227-247). Washington, DC: American Psychological Association.

Triffleman, E., (2000), Gender differences in a controlled pilot study of psychosocial treatments in substance dependent patients with post-traumatic stress disorder: Design considerations and outcomes. *Alcoholism Treatment Quarterly, 18*, 113-126.

Triffleman, E., Carroll, K., & Kellogg, S. (1999). Substance dependence posttraumatic stress disorder therapy: An integrated cognitive-behavioral approach. *Journal of Substance Abuse Treatment, 17*, 3–14.

Ullman, S. E., Filipas, H. H., Townsend, S. M., & Starzynski, L. L. (2006). Correlates of comorbid PTSD and drinking problems among sexual assault survivors. *Addictive Behaviors, 31,* 128-132.

Ullman, S. E., Filipas, H. H., Townsend, S. M., & Starzynski, L. L. (2005). Trauma Exposure, Posttraumatic Stress Disorder and Problem Drinking in Sexual Assault Survivors. *Journal of Studies on Alcohol. 66,* 610-619.

Ullman, S. E., Townsend, S. M., Starzynski, L. L., Long, L. M. (2006). Correlates of Comorbid PTSD and Polysubstance Use in Sexual Assault Victims. *Violence and Victims*, *21,* 725-743.

Van Der Kolk, B., Greenburg, M., Boyd, H., & Krystal, J. (1985). Inescapable shock, neurotransmitters, and addiction to trauma: Toward a psychobiology of post-traumatic stress. *Biological Psychiatry, 20,* 314-325.

Waldrop, A. E., Back, S. E., Sensenig, A., Brady, K. T. (2008). Sleep disturbances associated with posttraumatic stress disorder and alcohol dependence. *Addictive Behaviors, 33,* 328-335.

Waldrop, A. E., Back, S. E., Verduin, M. L., & Brady, K. T. (2007). Triggers for cocaine and alcohol use in the presence and absence of posttraumatic stress disorder. *Addictive Behaviors, 32,* 634-639.

Waldrop, A. E., Santa Ana, E. J., Saladin, M. E., McRae, A. L., & Brady, K. T. (2007). Differences in early onset alcohol use and heavy drinking among persons with childhood and adulthood trauma. *The American Journal on Addictions, 16,* 439-442.

Wampold, B.E. (2000). Outcomes of individual counseling and psychotherapy: Empirical evidence addressing two fundamental questions. In S. D. Brown & R. W. Lent (Eds.), *Handbook of Counseling Psychology* (3rd ed.) (pp 711 – 739). New York: John Wiley & Sons.

Weaver, C. M., Trafton, J. A., Walser, R. D., & Kimerling, R.E. (2007). Pilot test of Seeking Safety with male veterans. *Psychiatric Services, 58,* 1012.

Weller, L. A. (2005). Group therapy to treat substance use and traumatic symptoms in female veterans. *Federal Practitioner, 22,* 27-38.

White, H. D. (1994). Scientific communication and literature retrieval. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 41 – 55). New York: Russell Sage Foundation.

Witkiewitz, K., & Marlatt, G. A. (2004). Relapse prevention for alcohol and drug problems: That was Zen, this is Tao. *American Psychologist, 59, 224-235.*

Woodward, S. H., Kaloupek, D. G., Streeter, C. C., Kimble, M. O., Reiss, A. L., Eliez, S., Wald, L. L., Renshaw, P. F., Frederick, B. B., Lane, B., Sheikh, J. I., Stegman, W. K., Kutter, C. J., Stewart, L. P., Prestel, R. S., & Arsenault, N. J. (2006). Hippocampal volume, PTSD, and alcoholism in combat veterans. *Journal of Psychiatry*, *163*, 674-681.

Woodworth, G. (1994). Managing meta-analytic databases. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 177 – 189). New York: Russell Sage Foundation.

Xian, H., Chantarujikapong, S. I., Scherrer, J. F., Eisen, S. A., Lyons, M. J., Goldberg, J., Tsuang, M., & True, W. R. (2000). Genetic and environmental influences on posttraumatic stress disorder, alcohol and drug dependence in twin pairs. *Drug and Alcohol Dependence*, *61*, 95-102.

Young, M. S., Hills, H. A., Rugs, D., Peters, R., Moore, K., Woods-Brown, L., & Pape, L. (2004, July). Integrating Seeking Safety into substance abuse treatment programs. Paper presented at the 112th annual meeting of the American Psychological Association, Honolulu, HI.

Young, H. E., Rosen, C. S., & Finney, J. W. (2005). A survey of PTSD screening and referral practices in VA addiction treatment programs. *Journal of Substance Abuse Treatment*, *28*, 313-319.

Zaslav, M. R. (1994). Psychology of co-morbid posttraumatic stress disorder and substance abuse: Lessons from combat veterans. *Journal of Psychoactive Drugs, 26*, 393 - 400

Zatzick, D., Roy-Byrne, P., Russo, J., Rivara, F., Droesch, R., Wagner, A., Dunn, C., Jurkovich, G., Uehara, E., & Katon, W., (2004). A randomized effectiveness trial of stepped collaborative care for acutely injured trauma survivors. *Archives of General Psychiatry*, *61*, 498-506.

Zlotnick, C., Najavits, L. M., Rohsenow, D. J., & Johnson, D., M., (2003). A cognitive-behavioral treatment for incarcerated women with substance abuse disorder and posttraumatic stress disorder: findings from a pilot study. *Journal of Substance Abuse Treatment*, *25*, 99-105. *

Zoricic, Z., Buljan, D., Thaller, V., & Karlovic, D. (2003). Aggression in Posttraumatic Stress Disorder Comorbid with Alcohol Dependence. *European Journal of Psychiatry*, *17*, 243-247.

Appendix A: Completed Coding Worksheets

Article Information

Article ID: 1 Title: Changes in PTSD symptomatology during acute and protracted alcohol and cocaine abstinence

Authors: Coffey, S. F., Schumacher, J. A., Brady, K. T., & Cotton, B. D.

Type of article:1 Date: 2007

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: 77% op; 23% ip + op Exposure: 0

Treatment Dosage: 4w Weekly Dosage: n/a

Demographics of Sample

Age: 33.6 Female%: 52 Caucasian%: n/a African-American%: n/a

Asian American%: n/a Latino%: n/a American Indian%: n/a Other%: n/a

%Vets: n/a Primary Substance(s): 30% cocaine; 23% ETOH; 47% both

SUD Type: D Trauma Type: multiple Dropout%: 20

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .19 Sample Size: 45 Measurement Time: post

Measurement Instrument: MPSS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: -.01 Sample Size: 45 Measurement Time: post

Measurement Instrument: MPSS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .13 Sample Size: 45 Measurement Time: post

Measurement Instrument: MPSS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .20 Sample Size: 45 Measurement Time: post

Measurement Instrument: MPSS Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD drug symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 2 Title: During treatment changes in substance abuse patients with posttraumatic stress disorder

Authors: Ouimette, P. C., Ahrens, C., Moos, R. H., Finney, J. W.

Type of article: 1 Date: 1998

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: ip Exposure: 0

Treatment Dosage: 4w Weekly Dosage: n/a

Demographics of Sample

Age: 44.93 Female%: 0 Caucasian%: 55.5 African-American%: 44.5

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 0

%Vets: 100 Primary Substance(s): 53.6 ETOH; 18.6 drugs; 27.9 both

SUD Type: A Trauma Type: n/a (majority assumed combat Dropout%: 5.7

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD drug symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Other symptoms

Observed Correlation: .46 Sample Size: 140 Measurement Time: post

Measurement Instrument: BSI Measurement Type: 1

Instrument Reliability: .94 What measured: general psych symptoms

Article Information

Article ID: 6 Title: Six-month treatment outcomes of cocaine-dependent patients with and without PTSD in a multisite national trial

Authors: Najavits, L. M., Harned M. S., Gallop, R. J., Butler, S. F., Barber, J. P., Thase, M. E., Crits-Christoph, P. Type of article: 1 Date: 2007

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: various Exposure: 0

Treatment Dosage: 6m Weekly Dosage: various

Demographics of Sample

Age: 32.71 Female%: 47.1 Caucasian%: 55.9 African-American%: 41.2

Asian American%: n/a Latino%: n/a American Indian%: n/a Other%: 2.9

%Vets: n/a Primary Substance(s): 100 cocaine; 44.1 ETOH; 2.9 cannibis; 2.9 sedatives

SUD Type: D Trauma Type: various Dropout%: 76.5

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .19 Sample Size: 34 Measurement Time: 3m

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .10 Sample Size: 34 Measurement Time: 6m

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .63 Sample Size: 34 Measurement Time: 3m

Measurement Instrument: ASI Drug Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .65 Sample Size: 34 Measurement Time: 6m

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: .09 Sample Size: 34 Measurement Time: 3m

Measurement Instrument: BSI Measurement Type: 1

Instrument Reliability: n/a What measured: general psych symptoms

Other symptoms

Observed Correlation: .16 Sample Size: 34 Measurement Time: 6m

Measurement Instrument: BSI Measurement Type: 1

Instrument Reliability: n/a What measured: general psych symptoms

Article Information

Article ID: 7 Title: Posttraumatic stress disorder in substance abuse patients: relationship to 1-year posttreatment outcomes

Authors: Ouimette, P. C., Ahrens, C., Moos, R. H., Finney, J. W.

Type of article: 1 Date: 1997

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: various Exposure: 0

Treatment Dosage: 3-4w Weekly Dosage: n/a

Demographics of Sample

Age: 44.88 Female%: 0 Caucasian%: 57.9 African-American%: 42.1

Asian American%: n/a Latino%: n/a American Indian%: n/a Other%: n/a

%Vets: 100 Primary Substance(s): n/a

SUD Type: A Trauma Type: n/a Dropout%: 12

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .31 Sample Size: 140 Measurement Time: 1y

Measurement Instrument: Alcohol consumption via Health & Daily Living Form

Measurement Type: 1 Instrument Reliability:n/a

SUD drug symptoms

Observed Correlation: .29 Sample Size: 140 Measurement Time: 1y

Measurement Instrument: Problems from Substance Use Scale

Measurement Type: 1 Instrument Reliability:n/a

Other symptoms

Observed Correlation: .06 Sample Size: 140 Measurement Time: 1y

Measurement Instrument: BSI Measurement Type: 1

Instrument Reliability: .94 What measured: general psych symptoms

Article Information

Article ID: 8 Title: Two-year posttreatment functioning and coping of substance abuse patients with posttraumatic stress disorder

Authors: Ouimette, P. C., Finney, J. W., Moos, R. H. Type of article: 1 Date: 1999

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: various Exposure: 0

Treatment Dosage: 3-4w Weekly Dosage: n/a

Demographics of Sample

Age: 42.83 Female%: 0 Caucasian%: 57 African-American%: 43

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 0

%Vets: 100 Primary Substance(s): 52.1 ETOH; 20 drug; 28.9 both

SUD Type: A Trauma Type: n/a Dropout%: n/a

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .32 Sample Size: 135 Measurement Time: 2y

Measurement Instrument: Alcohol consumption via Health & Daily Living Form

Measurement Type: 1 Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .30 Sample Size: 135 Measurement Time: 2y

Measurement Instrument: Problems from Substance Use Scale

Measurement Type: 1 Instrument Reliability: n/a

Other symptoms

Observed Correlation: .09 Sample Size: 135 Measurement Time: 2y

Measurement Instrument: BSI Measurement Type: 1

Instrument Reliability: .94 What measured: general psych symptoms

Article Information

Article ID: 11 Title: A cognitive behavioral therapy for co-occuring substance use and posttraumatic stress disorders

Authors: McGovern, M. P., Lambert-Harris, Chantel, Acquilano, S., Xie, H., Alterman, A. I. Weiss, R. D. Type of article: 1 Date: 2009

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: CBT for PTSD Exposure: 0

Treatment Dosage: 4-6w Weekly Dosage: 9-12h

Demographics of Sample

Age: 34 Female%: 91 Caucasian%: 100 African-American%: 0

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 0

%Vets: n/a Primary Substance(s): n/a

SUD Type: n/a Trauma Type: n/a Dropout%: 9

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .80 Sample Size: 11 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .86 Sample Size: 10 Measurement Time: 3m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .74 Sample Size: 11 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .77 Sample Size: 10 Measurement Time: 3m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .58 Sample Size: 11 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .66 Sample Size: 10 Measurement Time: 3m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .76 Sample Size: 11 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .84 Sample Size: 10 Measurement Time: 3m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .41 Sample Size: 11 Measurement Time: post

Measurement Instrument: TLFB + ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .42 Sample Size: 10 Measurement Time: 3m

Measurement Instrument: TLFB + ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .23 Sample Size: 11 Measurement Time: post

Measurement Instrument: TLFB +ASI drug Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .25 Sample Size: 10 Measurement Time: 3m

Measurement Instrument: TLFB +ASI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 12 Title: Alcohol dependence and posttraumatic stress disorder: differences in clinical presentation and response to cognitive-behavioral therapy by order of onset

Authors: Back, S. E., Jackson, J. L, Sonne, S., Brady, K. T.

Type of article: 1 Date: 2005

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: CB Coping Skills Therapy

Exposure: 0 Treatment Dosage: 12w Weekly Dosage: n/a

Demographics of Sample

Age: 36.62 Female%: 48 Caucasian%: 85.1 African-American%: 11.7

Asian American%: 0 Latino%: 1.1 American Indian%: 2.1 Other%: 0

%Vets: n/a Primary Substance(s): ETOH

SUD Type: D Trauma Type: n/a Dropout%: 34.9

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .64 Sample Size: 86 Measurement Time: post

Measurement Instrument: IES, MISS, CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .50 Sample Size: 86 Measurement Time: post

Measurement Instrument: TLFB Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 15 Title: Dissemination and feasibility of a cognitive-behavioral treatment for substance use disorders and posttraumatic stress disorder in the veterans administration

Authors: Cook, J. M., Walser, R.D., Kane, V., Ruzek, J. I., Woody, G.

Type of article: 1 Date: 2008

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Seeking Safety Exposure: 0

Treatment Dosage: n/a Weekly Dosage: n/a

Demographics of Sample

Age: 50 Female%: 28 Caucasian%: n/a African-American%: n/a

Asian American%: n/a Latino%: n/a American Indian%: n/a Other%: n/a

%Vets:100 Primary Substance(s): 78 ETOH, 61cocaine, 33 heroin

SUD Type: A Trauma Type: n/a Dropout%: 28

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .52 Sample Size: 18 Measurement Time: post

Measurement Instrument: PCL-Military Measurement Type: 1

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD drug symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 16 Title: “Transcend”: initial outcomes from a posttraumatic stress disorder/substance abuse treatment program

Authors: Donovan, B., Padin-Rivera, E., Kowaliw, S. Type of article: 1 Date: 2001

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Transcend Exposure: 1

Treatment Dosage: 12w Weekly Dosage: 10h

Demographics of Sample

Age: 49 Female%: 0 Caucasian%: 61 African-American%: 37

Asian American%: 0 Latino%: 2 American Indian%: 0 Other%: 0

%Vets: 100 Primary Substance(s): 30 ETOH 70 poly

SUD Type: A Trauma Type: n/a Dropout%: 10

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .32 Sample Size: 46 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .29 Sample Size: 46 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .30 Sample Size: 46 Measurement Time: 1y

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .21 Sample Size: 46 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .26 Sample Size: 46 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .23 Sample Size: 46 Measurement Time: 1y

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .25 Sample Size: 46 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .21 Sample Size: 46 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .17 Sample Size: 46 Measurement Time: 1y

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .30 Sample Size: 46 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .27 Sample Size: 46 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .33 Sample Size: 46 Measurement Time: 1y

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .40 Sample Size: 46 Measurement Time: 6m

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .40 Sample Size: 46 Measurement Time: 1y

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .35 Sample Size: 46 Measurement Time: 6m

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .33 Sample Size: 46 Measurement Time: 1y

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 27 Title: “Seeking Safety”: outcome of a new cognitive-behavioral psychotherapy for women with posttraumatic stress disorder and substance dependence

Authors: Najavits, L. M., Weiss, R. D., Shaw, S. R., Muenz, L. R.

Type of article: 1 Date: 1998

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Seeking Safety Exposure: 0

Treatment Dosage: 12w Weekly Dosage: 3h/w

Demographics of Sample

Age: 35.9 Female%: 100 Caucasian%: 88 African-American%: 12

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 0

%Vets: n/a Primary Substance(s): 41 ETOH, 41 Drug, 18 Both

SUD Type: D Trauma Type: various Dropout%: 37

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .28 Sample Size: 11 Measurement Time: 3m

Measurement Instrument: TSC-40 Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD drug symptoms

Observed Correlation: .26 Sample Size: 11 Measurement Time: post

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .20 Sample Size: 11 Measurement Time: 3m

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: n/r Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 28a Title: Seeking Safety therapy for adolescent girls with PTSD and substance use disorder: a randomized controlled trial

Authors: Najavits, L. M., Gallop, R. J., Weiss, R. D. Type of article: 1 Date: 2006

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Seeking Safety Exposure: 0

Treatment Dosage: 3m Weekly Dosage: 2h

Demographics of Sample

Age: 16.06 Female%: 100 Caucasian%: 78.8 African-American%: 3

Asian American%: 12.1 Latino%: 3 American Indian%: 0 Other%: 3

%Vets: 0 Primary Substance(s): ETOH + drug

SUD Type: A Trauma Type: various Dropout%: n/a

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .55 Sample Size: 18 Measurement Time: post

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .17 Sample Size: 18 Measurement Time: 3m

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .55 Sample Size: 18 Measurement Time: post

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .17 Sample Size: 18 Measurement Time: 3m

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: .12 Sample Size: 18 Measurement Time: post

Measurement Instrument: APS depression Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Other symptoms

Observed Correlation: .-.18 Sample Size: 18 Measurement Time: 3m

Measurement Instrument: APS depression Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Article Information

Article ID: 28b Title: Seeking Safety therapy for adolescent girls with PTSD and substance use disorder: a randomized controlled trial

Authors: Najavits, L. M., Gallop, R. J., Weiss, R. D. Type of article: 1 Date: 2006

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: n/a Exposure: 0

Treatment Dosage: n/a Weekly Dosage: n/a

Demographics of Sample

Age: 16.06 Female%: 100 Caucasian%: 78.8 African-American%: 3

Asian American%: 12.1 Latino%: 3 American Indian%: 0 Other%: 3

%Vets: 0 Primary Substance(s): ETOH + drug

SUD Type: A Trauma Type: various Dropout%: n/a**Outcomes**

(Dependent Variable)

Total PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .18 Sample Size: 15 Measurement Time: post

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .33 Sample Size: 15 Measurement Time: 3m

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .18 Sample Size: 15 Measurement Time: post

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .33 Sample Size: 15 Measurement Time: 3m

Measurement Instrument: APS SUD Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: .01 Sample Size: 15 Measurement Time: post

Measurement Instrument: APS depression Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Other symptoms

Observed Correlation: .10 Sample Size: 15 Measurement Time: 3m

Measurement Instrument: APS depression Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Article Information

Article ID:29 Title: Seeking safety plus exposure therapy: an outcome study on dual diagnosis men Authors: Najavits, L. M., Schmitz, M., Gotthardt, S., Weiss, R. D.

Type of article: 1 Date: 2005

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Seeking Safety + Exposure

Exposure: 1 Treatment Dosage: 5m Weekly Dosage: 30 sessions total

Demographics of Sample

Age: 37.6 Female%: 0 Caucasian%: 100 African-American%: 0

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 0

%Vets: 0 Primary Substance(s): various

SUD Type: D Trauma Type: various Dropout%: 0

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .85 Sample Size: 5 Measurement Time: post

Measurement Instrument: TSC-40 Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD drug symptoms

Observed Correlation: .81 Sample Size: 5 Measurement Time: post

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: .09 Sample Size: 5 Measurement Time: post

Measurement Instrument: BSI Measurement Type: 1

Instrument Reliability: n/a What measured: general psych symptoms

Article Information

Article ID: 30 Title: Outcome in female patients with both substance use and post-traumatic stress disorders Authors: Brown, P. J. Type of article: 1 Date: 2000

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: ip Exposure: 0

Treatment Dosage: n/a Weekly Dosage: n/a

Demographics of Sample

Age: 35.24 Female%: 100 Caucasian%: 86 African-American%: n/a

Asian American%: n/a Latino%: n/a American Indian%: n/a Other%: n/a

%Vets: n/a Primary Substance(s): 35 ETOH, 35 drug, 31 both

SUD Type: na Trauma Type: various Dropout%: 0

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .43 Sample Size: 29 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .62 Sample Size: 29 Measurement Time: 6m

Measurement Instrument: TLFB Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .62 Sample Size: 29 Measurement Time: 6m

Measurement Instrument: TLFB Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 31 Title: Exposure therapy in the treatment of PTSD among cocaine-dependent individuals: preliminary findings

Authors: Brady, K. T., Dansky, B. S., Back, S. E., Foa, E. B., Carroll, K. M.

Type of article: 1 Date: 2001

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Exposure and relapse prevention

Exposure: 1 Treatment Dosage: 16w Weekly Dosage: 1-3h

Demographics of Sample

Age: 33.5 Female%: 86.7 Caucasian%: 53.3 African-American%: 46.7

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 0

%Vets: n/a Primary Substance(s): cocaine

SUD Type: D Trauma Type: various Dropout%: 62

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .49 Sample Size: 15 Measurement Time: post

Measurement Instrument: MISS, IES, CAPS Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .67 Sample Size: 7 Measurement Time: 6m

Measurement Instrument: MISS, IES, CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .44 Sample Size: 15 Measurement Time: post

Measurement Instrument: IES, CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: .28 Sample Size: 7 Measurement Time: 6mt

Measurement Instrument: IES, CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .37 Sample Size: 15 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Hyperarousal PTSD symptoms

Observed Correlation: .61 Sample Size: 7 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .45 Sample Size: 15 Measurement Time: post

Measurement Instrument: IES, CAPS Measurement Type: 1

Instrument Reliability: n/a

Avoidance PTSD symptoms

Observed Correlation: .56 Sample Size: 7 Measurement Time: 6m

Measurement Instrument: IES, CAPS Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .38 Sample Size: 15 Measurement Time: post

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .55 Sample Size: 7 Measurement Time: 6m

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .62 Sample Size: 15 Measurement Time: post

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .71 Sample Size: 7 Measurement Time: 6m

Measurement Instrument: ASI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: .38 Sample Size: 15 Measurement Time: post

Measurement Instrument: BDI Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Other symptoms

Observed Correlation: .92 Sample Size: 7 Measurement Time: 6m

Measurement Instrument: BDI Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Article Information

Article ID: 33 Title: A cognitive-behavioral treatment for incarcerated women with substance abuse disorder and posttraumatic stress disorder: findings from a pilot study Authors: Zlotnick, C, Najavits, L. M., Rohsenow, D. J., Johnson, D. M.

Type of article: 1 Date: 2003

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Seeking Safety Exposure: 0

Treatment Dosage: 12w Weekly Dosage: 3h

Demographics of Sample

Age: 31.9 Female%: 100 Caucasian%: 66.7 African-American%: 11.1

Asian American%: 0 Latino%: 5.6 American Indian%: 0 Other%: 16.7

%Vets: n/a Primary Substance(s): 50 cocaine, 22.2 ETOH and drugs

SUD Type: D Trauma Type: various Dropout%: n/a

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .69 Sample Size: 18 Measurement Time: post

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .52 Sample Size: 18 Measurement Time: 3m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .61 Sample Size: 18 Measurement Time: 3m

Measurement Instrument: ASI ETOH Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .78 Sample Size: 18 Measurement Time: 3m

Measurement Instrument: ATI drug Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability: What measured:

Article Information

Article ID: 35 Title: Comorbid posttraumatic stress disorder and substance use disorders: treatment outcomes and the role of coping

Authors: Brown, P. J., Read, J. P., Kahler, C. W. Type of article: 2 Date: 2003

Treatment (Independent Variable)

Type of Treatment: 2 Treatment Subtype: ip Exposure: 0

Treatment Dosage: n/a Weekly Dosage: n/a

Demographics of Sample

Age: 37 Female%: 51 Caucasian%: 90 African-American%: n/a

Asian American%: n/a Latino%: n/a American Indian%: n/a Other%: n/a

%Vets: n/a Primary Substance(s): n/a

SUD Type: n/a Trauma Type: various Dropout%: 10

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .46 Sample Size: 55 Measurement Time: 6m

Measurement Instrument: CAPS Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .56 Sample Size: 55 Measurement Time: 6m

Measurement Instrument: TLFB Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: .56 Sample Size: 55 Measurement Time: 6m

Measurement Instrument: TLFB Measurement Type: 1

Instrument Reliability: n/a

Other symptoms

Observed Correlation: .30 Sample Size: 55 Measurement Time: 6m

Measurement Instrument: SC-90 Measurement Type: 1

Instrument Reliability: n/a What measured: general psych symptoms

Article Information

Article ID: 36 Title: A pilot study of seeking safety with OEF/OIF veterans

Authors: Norman, S. B., Wilkins, K. C., Tapert, S. F., Lang, A. J., Najavits, L. M.

Type of article: 3 Date: 2010

Treatment (Independent Variable)

Type of Treatment: 1 Treatment Subtype: Seeking Safety Exposure: 0

Treatment Dosage: 10w Weekly Dosage: 1.5h

Demographics of Sample

Age: 32.11 Female%: 0 Caucasian%: 66.7 African-American%: 22.2

Asian American%: 0 Latino%: 0 American Indian%: 0 Other%: 11.11

%Vets: 100 Primary Substance(s): 77.8 ETOH, 22.2 cannibis

SUD Type: n/a Trauma Type: n/a Dropout%: 36

Outcomes (Dependent Variable)

Total PTSD symptoms

Observed Correlation: .31 Sample Size: 9 Measurement Time: post

Measurement Instrument: PCL-military Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .75 Sample Size: 4 Measurement Time: 3m

Measurement Instrument: PCL-military Measurement Type: 1

Instrument Reliability: n/a

Total PTSD symptoms

Observed Correlation: .55 Sample Size: 4 Measurement Time: 6m

Measurement Instrument: PCL-military Measurement Type: 1

Instrument Reliability: n/a

Re-experiencing PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Hyperarousal PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Avoidance PTSD symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

SUD alcohol symptoms

Observed Correlation: .22 Sample Size: 9 Measurement Time: post

Measurement Instrument: AUDIT Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .49 Sample Size: 4 Measurement Time: 3m

Measurement Instrument: AUDIT Measurement Type: 1

Instrument Reliability: n/a

SUD alcohol symptoms

Observed Correlation: .55 Sample Size: 4 Measurement Time: 6m

Measurement Instrument: AUDIT Measurement Type: 1

Instrument Reliability: n/a

SUD drug symptoms

Observed Correlation: n/a Sample Size: Measurement Time:

Measurement Instrument: Measurement Type:

Instrument Reliability:

Other symptoms

Observed Correlation: .41 Sample Size: 9 Measurement Time: post

Measurement Instrument: BDI-II Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Other symptoms

Observed Correlation: .74 Sample Size: 4 Measurement Time: 3m

Measurement Instrument: BDI-II Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Other symptoms

Observed Correlation: .19 Sample Size: 4 Measurement Time: 6m

Measurement Instrument: BDI-II Measurement Type: 1

Instrument Reliability: n/a What measured: depression

Appendix B: Coding Definitions

Article Information

Article ID: Unique 3 digit number used to identify study. Will start at 001 and increase with each study

Title: Title of article

Authors: Authors of article

Type of Article: Single digit code defined as follows: Peer-reviewed journal = 1; Book chapter = 2; Technical/research report = 3; Presentation = 4; Dissertation = 5; Thesis = 6; Other = 7

Date: Publication or presentation year

Treatment (Independent Variable)

Type of Treatment: Single digit code defined as follows: Integrated treatment = 1; Non-integrated treatment SUD focused = 2; Non-integrated treatment PTSD focused = 3; Non-integrated treatment Other = 4; No-treatment Control = 5

Treatment Subtype: Name of Treatment (e.g. Seeking Safety or CBT)

Exposure: Presence of an exposure based component in treatment: 0 = No exposure; 1 = exposure

Treatment Dosage: Number of weeks of treatment

Weekly Dosage: Treatment hours per week

Age: Mean age of sample

<Demographics>%: % of individuals undergoing treatment type in each demographic category.

Primary Substance: Primary substance used by participants in study

SUD Type: Abuse or Dependence

Trauma type: type of trauma - 0 = unknown; 1 = childhood; 2 = military; 3 = accident; 4 = violence

Dropout %: % of individuals who did not complete treatment for any reason

Outcomes (Dependent Variable)

Sample Size: Number of individuals undergoing that treatment
Measurement Time: Number of weeks after pretest

Observed Correlation: Study observed effect size in r between pre and post tests

Measurement Instrument: Name of instrument

Measurement Type: Single digit code defined as follows: Self-report = 1; Physiological measure = 2; Behavioral Observation = 3

Instrument reliability: Reliability of instrument

Appendix C: Transformations (Rosenthal, 1994)*

t: $r=t/\sqrt{(t^2+df)}$

F: $r=\sqrt{(F/(F+df))}$

χ^2: $r=\sqrt{(\chi^2/n)}$

z: $r=z/\sqrt{n}$

Pre-post difference: $d = (m_1 - m_2)/sd$

p: Consult *z*-distribution table and set to *t*

d: $r=d/\sqrt{(d^2+4)}$

*Other conversion formulae were used for statistics not listed here.

Appendix D: Corrections (Hunter & Schmidt, 2004)

Formulae	Definitions
Attenuation: $r_c = r/(\sqrt{(r_{xx})} * \sqrt{(r_{yy})})$	r_c: corrected correlation
Construct Validity: $r_c = r/(a_1 * a_2)$	r: observed correlation
50/50 Dichotomization: $r_c = r/.8$	r_{xx}: dependent variable reliability
90/10 Dichotomization: $r_c = r/.59$	r_{yy}: independent variable reliability
Multiple Measures: $r_c = \sum r_{xy}/\sqrt{(k+k(k-1)\overline{r_{xx}})}$	a_1 and a_2: construct validities
Range Restriction: $r_c = ((\sigma_e/\sigma_r) * r)/\sqrt{(((\sigma_e/\sigma_r)^2 - 1)r^2 + 1)}$	k: # of intermeasure correlations
Correlation Bias: $r_c = r/((2N-3)/(2N-2))$	$\overline{r_{xx}}$: average of off-diagonal correlations between measures

Appendix E: Basic Meta-analysis formulae (Hunter & Schmidt, 2004)

Formulae

$\overline{r} = \sum(N_i r_i)/\sum N_i$ *

$\sigma_r^2 = \sum(N_i(r_i - \overline{r})^2)/\sum N_i$ *

$\sigma_e^2 = (1 - \overline{r}^2)^2/(\overline{N} - 1)$

$\overline{N} = N/K$

$\sigma_p^2 = \sigma_r^2 - \sigma_e^2$

Rel(r) = σ_e^2/σ_r^2

*Substitute $N_i A_i$ for N_i and r_c for r_i to weight by error

$x = K(\overline{r} / \overline{r}_c - 1)$

Definitions

$\overline{r}$: Corrected mean correlation

N_i: Study sample size

r_i: Observed study correlation

σ_r^2: Observed variance

σ_e^2: Expected variance

N: Total sample size

K: Number of studies

$\overline{N}$: Average sample size

σ_p^2: Corrected variance

Rel(r): Reliability of study correlations

A_i: Attenuation factor (denominators of corrections + Range restriction formula (p. 122))

$\overline{r}_c$: *Critical value for the correlation*

x: Number of studies averaging null results needed to bring the observed correlation down to the critical value