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Exposure dose, trauma type, and attrition in PTSD efficacy studies

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Exposure Dose, Trauma Type, and Attrition in PTSD Efficacy Studies

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Abstract

Both treatment outcome studies and meta-analyses document the efficacy of multiple cognitive-behavioral methods for treating PTSD. These reports have demonstrated that exposure-based therapies such as Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), and Eye Movement Desensitization and Reprocessing (EMDR) consistently match or exceed their non-exposure counterparts in regard to efficacy. Yet the issue of attrition remains a significant concern for exposure-based therapies specifically. The present study compared the relationship between exposure therapies, exposure dose, trauma type, and attrition rates. A comprehensive literature search located 32 studies that met search criteria (i.e., random assignment to groups, use of a control group, manualized treatment, and clinician-generated PTSD diagnosis). The hypotheses were tested using chi-square analysis of independence. The results suggest that there are not significant differences in attrition based on treatment type, exposure dose, or trauma type. The discussion addresses the implications of these findings and recommends improvements in publication standards that would allow enhance the rigor of attrition analysis.

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Literature Review

Posttraumatic Stress Disorder (PTSD) develops after exposure to trauma. As defined by the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (*DSM-5*; American Psychiatric Association, APA; 2013), PTSD requires exposure to actual or threatened death, serious injury, or sexual violence via direct experience, witnessing the event(s), learning of the event(s), or repeated exposure to aversive details of the event(s). Diagnosis necessitates the presence of symptoms from each of four clusters (intrusive recollection, avoidance, negative alterations in mood/cognitions, and hyper-arousal) that last for more than one month and cause clinically significant distress or impairment. Since the debut of PTSD in the *DSM-III* (3rd Edition, APA, 1980), experts have contested the factor structure of PTSD and its categorization as an anxiety disorder (Wilson, Friedman, & Lindy, 2001). A general trend in *DSM* revisions of PTSD has been the evolution of criteria A, which refers to the trauma event itself. The initial conceptualization of PTSD in the *DSM-III* (*3rd Edition*, APA, 1980) required that the individual personally experience the traumatic event. The *DSM-III-R* (*3rd Edition Revised*, APA, 1987) expanded this definition to include vicarious traumatization such as witnessing a trauma. The successive editions of the *DSM* have upheld and widened this conceptualization to include learning of a trauma (i.e., witnessing is no longer a requirement). The recently released *DSM-5* (APA, 2013) also alters the definition by not requiring a response of fear, helplessness, or horror *during* the trauma event. As such, research that aggregates PTSD data must consider this evolution.

Prevalence

The initial National Comorbidity study reports a lifetime prevalence rate of PTSD at 7.8% (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). The recent replication reports

lifetime prevalence at 5.7% and lifetime morbid risk, which combines lifetime prevalence with predicted future onsets, at 10.1% (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). As such, PTSD is one of the most common mental disorders in the United States (Benish, Imel, & Wampold, 2008) and the second most common anxiety related disorder (Kessler et al., 2012). The pervasiveness of PTSD stems from a greater than 50% lifetime exposure to trauma (Kessler et al., 1995). Gender is a significant predictor of PTSD and trauma exposure. Women are more than twice as likely to develop PTSD (Breslau, Davis, Andreski, & Peterson, 1991; Kessler et al, 1995; Kessler et al., 2012). However, men report a significantly higher amount of trauma exposure (Kessler et al., 1995). PTSD rates do vary across studies and populations. Creamer, Burgess, and McFarlane (2001) report an Australian lifetime trauma exposure rate of 64.5% for men and 49.5% for women, and a 12-month prevalence rate (lifetime not determined) of 1.33%. Similarly, Weich and colleagues (2011) reported a 12-month 2.9% prevalence rate for PTSD in London.

Trauma Types

Rates also vary dramatically across types of traumas. Kessler and colleagues (1995) report prevalence rates and conditional risks for the following trauma categories: rape, molestation, physical attack, combat, shock, threat with weapon, accident, natural disaster (including fires), witnessing a trauma, neglect, and physical abuse. The following subsections detail each group.

Sexual assault, rape, and molestation. Sexual assault prevalence rates differ according to gender and specific study (Koss, 1993). Lifetime prevalence rates of rape and molestation are 0.7% and 2.8% for men, and 9.2% and 12.3% for women, respectively (Kessler et al., 1995). Compared with other trauma events, sexual molestation and rape have relatively low prevalence

rates for both genders (Kessler et al., 1995), but victims of rape and molestation have the highest conditional risk of developing PTSD; specifically 65% of male and 46% of female victims develop PTSD following rape (Kessler, 2000; Creamer et al., 2001). Conditional risk of developing PTSD goes up as the severity of sexual abuse increases (Bennice, Resick, Mechanic, & Astin, 2003; Jonas et al., 2011).

Combat. For men, combat exposure has a low 6.4% lifetime prevalence rate, ranking as the third least prevalent trauma after rape and sexual assault (Kessler et al., 1995; Kessler, 2000), reflecting the small percentage of men who have combat exposure compared to the general population (Segal & Mady, 2004). Despite this low prevalence rate, the conditional risk of developing PTSD is 38.8%, which is higher than all other trauma categories aside from rape (Kessler, 2000), though combat surpasses rape as a predictor of lifelong PTSD using the same national sample (Prigerson, Maciejewski, & Rosenheck, 2001).

The historical ban on women holding a combat role (rescinded as of 2013) has not prevented females from experiencing combat trauma while performing supporting roles as mechanics, pilots, medics, military police, and drivers (Bell, Roth, & Weed, 1998; Pereira, 2002; Woodhead, Wessely, Jones, Fear, & Hatch, 2012). However, men are 3.5 time more likely to receive a PTSD diagnosis than women with similar symptoms (Pereira, 2002). Sternke (2011) suggests gender insensitive combat PTSD assessment measures are responsible for this disparity in rates across genders.

Physical attack, threat with weapon. The severity of physical assault/threat positively correlates with the likelihood of receiving a PTSD diagnosis (Johansen, Wahl, Eilertsen, & Weisaeth, 2007). Men report a significantly higher occurrence of both physical attack (men-11.1%, women- 6.9%) and threat with a weapon (men-19%, women-6.8%), but women have

considerably higher conditional risk of developing PTSD following physical attack (men-1.8%, women-21.3%) and threat with a weapon (men- 1.9%, women- 32.6%; Kessler, 2000). In fact, these closely related trauma classes have the greatest levels of gender disparity. The gender imbalance is also reflected in the percentage of people with PTSD who report physical attack/threat with weapon as the most upsetting trauma with women reporting this trauma type considerably more often than men (Kessler et al., 1995).

Life-threatening accident and natural disaster. Accidents and natural disasters cover a wide range of traumas including human-made, technological, and natural disasters (Neria, Nandi, & Galea, 2008). Traumas in this category have among the highest lifetime prevalence rates for both men and women. Twenty-five percent of men and 13.8% of women report experiencing a life-threatening accident and 18.9% of men and 15.2% of women report surviving a natural disaster (Kessler, 2000). Kessler (2000) reports the conditional risk of developing PTSD following a life-threatening accident at 6.3% (men) and 8.8% (women), and 3.7% (men) and 5.4% (women) following a natural disaster; gender differences are not significant for either trauma type (Kessler, 2000). Various traumas are lumped into this exposure class, but only a few traumas contribute substantially to prevalence and associated PTSD. Specifically, motor vehicle accidents are the second leading cause of PTSD in the United States (Norris, 1992). Serious motor vehicle accidents alone had a one year 2.6% national occurrence rate (Donahue, 2006). In regards to natural disaster, earthquakes have the highest potential for causing damage and fatalities (United States Geological Survey, 2007). McMillen, North, and Smith (2000) found that 13% of the Northridge, California earthquake survivors studied (n = 13) met diagnostic criteria for PTSD. Similarly, Wang and colleagues (2000) report that 24.2% of the Northern China earthquake survivors sample (n = 338) developed PTSD.

Vicarious trauma. The conditional risk of developing PTSD from vicarious trauma is 6.4% for men and 7.5% for women (Kessler, 2000). Interestingly, the percentage of individuals with PTSD who cite vicarious trauma as the most upsetting event is significantly higher for men (24.3%) than women (4.9%; Kessler et al., 1995). Despite the moderate rate of vicarious trauma-based PTSD, none of the first line PTSD treatment efficacy studies focus solely on these experiences (Foa, Kean, Friedman, & Cohen, 2009) making specific efficacy data unavailable.

Cost to the Individual and Society

A rich body of research demonstrates individuals with PTSD have a significantly higher rate of health care use (Waigandt, Wallace, Phelps, & Miller, 1990; Golding, 1994; Kimerling & Calhoun, 1994; Marshall, Jorm, Grayson, & O'Toole, 2000; Hoge, Terhakopian, Castro, Messer, & Engel, 2007). These findings make sense in light of the National Comorbidity study, which revealed that PTSD correlates with higher levels of self-reported health problems (Lauterbach, Vora, & Rakow, 2005). The increased use of health care results in elevated expenses. Walker et al. (1999) calculated that women reporting sexual abuse (n =1225) spent an average of $245 more a year than non-victimized controls. Military studies report similar findings with PTSD diagnosed veterans spending over $2,000 more per year on total health care costs including outpatient care, medical care, mental health, and medication (Chan, Cheadle, Reiber, Unutzer, & Chaney, 2009).

The cost of PTSD extends beyond health care to include numerous hidden expenses such as lost earnings and reduction in workplace productivity. Greenberg and colleagues (1999) calculated an average annual workplace cost of $256 per year for every worker with an anxiety disorder (including PTSD); 88% of this total was attributable to lost productivity. Furthermore, research on combat veterans with PTSD has demonstrated numerous significant relationships.

Combat veterans with PTSD on average report job satisfaction, occupation relations, and quality of life levels 50% below a normative sample (Frueh, Turner, Beidel, & Cahill, 2001), and consistently have difficulty locating a suitable job (Salisbury & Burker, 2011). Numerous studies have also demonstrated that combat-related PTSD is a predictor of suicide (Farberow, Kang, & Bullman, 1990; Hendin, & Haas, 1991; Kramer, Lindy, Green, Grace, & Leonard, 1994) and violent behavior (Beckham, Feldman, Kirby, Hertzberg, & Moore, 1997; D'Angelo, 2002).

Macro-level analysis places the total societal cost for anxiety disorders around $63.1 billion (Greenberg et al., 1999). Greenberg et al. (1999) do not provide a disorder specific breakdown, but they note PTSD has the highest rate of service use, which includes both psychiatric (counseling and medication) and medical (non-psychological) treatment. Kilmer, Eibner, Ringel, and Pacula (2011) utilized a micro-simulation procedure to aggregate and distinguish between all personal and societal costs associated with combat PTSD, and then conducted a military PTSD cost analysis. The model projected a two-year total cost of approximately $1100 million and a claim that a reduction in societal costs by 15% would occur if all veterans seeking treatment received empirically based treatments (Kilmer et al., 2011).

Treatment

PTSD treatments have incorporated various theoretical orientations. Yet exposure therapies have consistently stood out as best practice for the treatment of PTSD. Exposure therapy refers to any therapy that uses the trauma memory as a therapeutic mechanism of change. How and to what extent a given exposure therapy utilizes the traumatic event varies considerably, but exposure therapies in general have proven to be efficacious and effective across a multitude of trauma types (Rothbaum, Meadows, Resick, Foy, 2000; Cahill, Rothbaum, Resick, & Follette, 2009). As a result, the International Society for Traumatic Stress Studies

(ISTSS, Foa et al., 2009), the Australian Center for Posttraumatic Mental Health (2007) and the Veteran Affairs/Department of Defense (VA/DOD; United States Department of Veterans Affairs, 2010) have all labeled exposure therapies as first line treatments for PTSD.

Specifically, Prolonged Exposure (PE), Eye-movement Desensitization and Reprocessing (EMDR), and Cognitive Processing Therapy (CPT) are the most efficacious, effective, and well researched (Foa & Meadows, 1997, Rothbaum et al., 2000; Lee, Gavriel, Drummond, Richards, & Greenwald, 2002; Harvey, Bryant, & Tarrier, 2003; Cahill et al., 2009), and are the only adult, individual treatments to receive an A-level rating by ISTSS, a system based on the Agency for Health Care Policy and Research's classification approach (Foa et al., 2009). A-Level treatments are considered efficacious and are based on multiple randomized, well-controlled clinical trials (Foa et al., 2009). This system closely parallels Chambless and Hollen's (1998) standards for efficacy which have historically served as field standards. Chambless and Hollen (1998) and ISTSS both endorse classification systems that require randomization and high levels of control as the means of establishing efficacy (Foa et al., 2009). PE, EMDR, and CPT each warrant an efficacious/A-Level rating, yet each treatment differs in terms of theory, procedure, and emphasis on exposure.

Exposure Dose. As stated, PE, EMDR, and CPT each utilize exposure techniques as mechanisms of therapeutic change but differ substantially in terms of exposure. For this reason research groups them separately (Bradley et al., 2005; Hembree et al., 2003). Typically PE is placed in an exposure category, CPT is placed in a cognitive category, and EMDR is its own category (Hembree et al., 2003; Bradley et al., 2005). This can be confusing given that each treatment can generally be considered an exposure therapy. To address this, the present study refers to each manualized treatment by its published name, and will assign each treatment to an

exposure dose category (see Appendix A). The rationale for the categories comes in part from the taxonomies laid forth by Bradley et al. (2005) and Hembree et al. (2003); that is, PE, EMDR, and CPT are in distinct groups. However, unlike previous reviews, the percentage of exposure specifically determines group membership rather than unquantified differences (Hembree et al., 2003; Bradley et al., 2005).

Although this study is primarily concerned with how manualized A-level exposure therapies relate to attrition, there are numerous component analyzes of said treatments that bolster the sample sizes when included. The exposure dose system provides a means of using this data (i.e., Hypothesis 3) while preserving the precision of the main inquiry (i.e., Hypothesis 1). The following treatment summaries will include an exposure dose category label consistent with this study's convention.

PE. PE therapy is based on an emotional processing conceptualization of PTSD, which suggests that PTSD develops from escape and avoidance behavior under stimulus control of fear networks comprised of stimuli, responses, and meaning elements (Foa, Hembree, and Rothbaum, 2007; Cahill et al., 2009; Rauch, Eftekhari, & Ruzek, 2012). The mechanisms responsible for change include habituation and cognitive reprocessing achieved via imaginal and in vivo exposure (Foa & Hearst-Ikeda, 1996; Foa et al,. 2007; Cahill et al., 2009). Cognitive processing occurs within the exposure process without an explicit cognitive component (Foa & Kozak, 1986). Therapy consists of 10-15 weekly, 90-minute sessions. PE operates off the notion that more exposure to the fear network results in better outcomes (Foa & Hearst-Ikeda, 1996). PE is in the high exposure dose category because it uses exposure for at least 90% of treatment.

PE's efficacy has been the focus of numerous research studies, each finding significant improvement of PTSD symptoms (e.g., Foa, Rothbaum, Riggs, & Murdock, 1991; Foa et al.,

1999; Ironson, Freund, Strauss, & Williams, 2002; Taylor et al., 2003; Foa et al., 2005; Schnurr et al., 2007; Nacasch et al., 2007). Interestingly it is not clear whether combining imaginal and *in vivo* procedures significantly improve outcomes (Devilly & Foa, 2001; Bryant et al., 2008). A dismantling study conducted by Richards, Lovell, and Marks (1994) found similar outcomes for imaginal and *in-vivo* exposure individually.

EMDR. Shapiro (1989a, 1989b) developed EMDR in the 1980s as an innovative therapy for trauma survivors integrating "psychodynamic, cognitive, and systemic practice" (Shapiro & Laliotis, 2011, p. 191). EMDR's post-hoc theory known as the *adaptive information processing* model posits that trauma-based pathology results from the inadequate processing of distressing experiences at both the physiological and cognitive level, and EMDR serves to expedite the needed processing via eye movements and exposure (Shapiro & Maxfield, 2002). Explicitly, patients recall a specific traumatic scene and a corresponding cognition while engaging in therapist prompted rapid eye saccades (i.e., the rapid movement of eyes between fixed points in the periphery; Shapiro & Maxfield, 2002). EMDR's progenitors believe eye movements decrease the vividness of the trauma image, which engenders processing through desensitization (Shapiro & Maxfield, 2002). A large body of research clearly establishes the efficacy of EMDR (e.g., Jensen, 1994; Rothbaum, 1997; Lee et al., 2002; Ironson et al., 2002; Taylor et al., 2003; Rothbaum, Astin, & Marsteller, 2005).Yet a comprehensive review conducted by Chemtob, Tolin, van der Kolk, and Pitman (2000) concluded that the eye movement procedure in EMDR does not increase the efficacy of the treatment, a finding further substantiated by more recent reviews (Davidson & Parker, 2001; Hembree & Foa, 2003). Additionally, Spates, Koch, Cusack, Pagoto, and Waller (2009) claim, "The best provisional conclusion so far is that the bilateral stimulation component of EMDR does not incrementally influence outcome" (p. 289).

EMDR is an 8-session treatment, and exposure occurs throughout the duration of each session. Specifically, clients picture a trauma scene while engaging in rapid eye saccades. Later phases pair the trauma event with a preferred cognitive interpretation using the same process (i.e., eye saccades). The manualized form of EMDR does not incorporate in vivo exposure, but Ironson et al. (2002) added it as a way of balancing treatment length and exposure dose in one notable efficacy study. EMDR's strong focus on specific traumas for approximately 75% of treatment (i.e., in-session but not out of session) places it into a moderate exposure dose category.

CPT. CPT's information-processing theory posits that traumatic events contribute to a fear network that serves to facilitate avoidance/escape behavior, and that PTSD emerges when the fear network overgeneralizes and elicits escape responses in safe environments (Resick & Schnicke, 1992). The victim's belief that the event violated basic principles of safety causes the overgeneralization (Scheppele & Bart, 1983; Foa, Steketee, & Rothbaum, 1989; Resick & Schnicke, 1996). Consequently, adjusting the patient's perspective/schema is the primary focus of treatment. Resick and Schnicke (1992) also argue that sole use of a systematic exposure procedure (as in PE) fails to treat other moderating emotions; they offer cognitive restructuring procedures as the method of choice for eliciting and confronting these other emotions and correcting maladaptive schemas/beliefs.

CPT is a manualized treatment, which consists of 12-weekly sessions conducted in individual, group, or combination format (Chard, Ricksecker, Healy, Karlin, & Resick, 2012). CPT was originally developed for sexual assault victims but has been modified to treat a variety of PTSD populations (Resick & Schnicke, 1992). Each session utilizes cognitive mechanisms to extract, challenge, and shape the client's perception of the traumatic event. Written narrative

constructions, assigned as homework, incorporate cognitive changes and facilitate the identification of specific difficult memories known as stuck points (Resick & Schnicke, 1996). CPT utilizes exposure techniques for less than 25% of treatment, which place it in a low exposure dose category.

A group of well-controlled, randomized studies have established CPT's efficacy (e.g. Resick, Nishith, Weaver, Astin, & Feuer, 2002; Chard, 2005; Monson et al., 2006; Resick et al., 2008; Forbes et al., 2012). To date, one dismantling study has sought to determine the active components of CPT (Resick et al., 2008). Resick and colleagues (2008) found that CPT's cognitive component resulted in significantly lower Posttraumatic Diagnostic Scale scores than CPT's exposure writing intervention, but full CPT was not significantly better than either intervention alone. The apparent efficacy of the cognitive only variation has resulted in its inclusion alongside CPT and PE in the VA/DOD practice guidelines (United States Department of Veterans Affairs, 2010; Chard et al., 2012).

Treatment Comparison

Numerous treatment outcome studies have attempted to detect differences between PE, EMDR, and CPT. Individual studies and publications have resulted in a variety of claims about the supremacy of one treatment over the other. In regards to PE versus EMDR, Ironson and colleagues (2002) reported significant reductions of PTSD symptoms for both treatments, but found EMDR superior in terms of dropout, speed of effect, and Subjective Units of Distress Scores (SUDS). The following year, Taylor et al. (2003) published a study reporting almost the opposite results; PE produced significantly larger reductions in PTSD symptoms, was faster at reducing avoidance, and produced a larger number of participants no longer meeting PTSD criteria. Furthermore, attrition rates did not differ across treatment types. In yet another study,

Rothbaum et al. (2005) reported that PE and EMDR did not differ significantly on any measures at either post-treatment or follow-up. Perhaps because of these discrepancies, various meta-analyses have compared treatment results for these interventions. Spates et al. (2009) reported the outcome of five published meta-analyses that compared PE and EMDR; all five studies found no statistical difference between treatments despite having variations in data gathering, exclusion criteria, and analysis. For example, Siedler and Wagner (2006) found no significant difference between manualized forms of EMDR and trauma-focused CBT (i.e., PE) using PTSD diagnosis and head-to-head comparison as inclusion criteria ($N = 7$), and Van Etten and Taylor (1998) concluded the same despite incorporating pharmacologic treatments and other non-PE behavioral treatments ($N = 61$).

The literature comparing PE and EMDR to CPT is far less robust, yet the existing studies are well-controlled and randomized. Resick and colleagues (2002) conducted a randomized controlled trial of CPT, PE, and a wait list condition. Both treatments were statistically superior to wait list and were comparable in regards to overall effect. CPT showed significant improvement over PE on two guilt sub-scales of the Trauma-Related Guilt Inventory, but Resick et al. (2002) found no differences on measures of PTSD or depression. A second study, Resick et al. (2003), compared CPT to PE with a complex-trauma population and found no difference in treatment outcome between the two therapies. To date no studies have directly compared CPT to EMDR.

Treatment Utilization

A minority of therapists utilize exposure therapies despite their proven efficacy. A study of primary care patients with PTSD (n = 197) found that only 16% reported receiving exposure therapy while 30% received psychodynamic interventions (Rodriguez et al., 2003), which have not been deemed efficacious for adult PTSD populations by ISTSS (Foa et al., 2009). Rosen and colleagues (2004) report similar usages rates in the VA; less than 20% of PTSD specialists consistently used exposure techniques and less than 10% of general therapists used a maualized treatment at all. Cook, Schnurr, and Foa (2004) presented an exhaustive review of the usage of PE and concluded that a majority of clinicians do not utilize PE, sighting perceived aversiveness by both the client and patient as primary barriers to treatment utilization.

The notion that exposure is averse is indeed prevalent in the literature (Kilpatrick & Best, 1984; Pitman et al., 1991; Pitman et al., 1996; Tarrier et al., 1999). Pitman and colleagues (1991) concluded that the exposure technique *flooding* is effective but causes increased PTSD symptoms during therapy. In a similar study of EMDR, Pitman and colleagues (1996), using clinical judgment, concluded that EMDR is less aversive than flooding and endorsed less exposure when working with combat veterans. These claims continue to stigmatize exposure treatments despite studies that demonstrate high levels of exposure do not negatively impact treatment outcome (Hembree & Cahill, 2007). Additionally, for the small percentage of participants who exhibit an early exacerbation of symptoms, this also does not negatively impact treatment success (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002; Porter, 2007). Furthermore, the suggestion that exposure is inherently aversive has led to the implication that high exposure leads to premature dropout as perceived by patients (Cook et al., 2004) and clinicians (Hembree et al., 2003). A study of 207 psychologists found that 59% believe that using

exposure increases a patient's desire to dropout (Becker, Zayfert, & Anderson, 2004). Yet analyses of exposure and attrition, to date, suggest no link; the prevalence of attrition in PTSD treatment studies and the extent to which it can be attributed to exposure are covered in the following sections.

Attrition

Attrition is an important factor to consider when analyzing the efficacy and usage rates of first line treatments for PTSD. A significant portion of all clients who begin therapy for PTSD fail to complete or respond to therapy with rates varying significantly from study to study (Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008; Imel, Laska, Jakupcak, & Simpson, 2013). The most recent PTSD treatment reviews suggest that approximately 18%-21% of patients in efficacy studies dropout of treatment (Hembree et al., 2003; Bradley, Greene, Russ, Dutra, & Westen, 2005; Imel et al., 2013); this is comparable to attrition rates from other diagnostic groups (Hembree et al., 2003; Swift & Greenberg, 2012). Nonetheless, attrition is a serious concern for practitioners and researchers. Specifically, studies have demonstrated that dropping out of psychological treatment can exacerbate medical and psychological conditions (Reis & Brown, 1999; Tarrier et al., 1999). Furthermore, excessive dropout can substantially devalue the conclusions of statistical findings (Matthieu & Ivanoff, 2006). Unfortunately, current research on determining predictors mitigating attrition is lacking, inconclusive, and profoundly inconsistent (Hembree et al., 2003; Schottenbauer et al., 2008).

Attrition according to treatment type. As stated, multiple researchers have suggested that high levels of exposure are inherently aversive (Kilpatrick & Best, 1984; Pitman et al., 1991; Pitman et al., 1996; Tarrier et al., 1999), implying that exposure-based procedures cause attrition (Hembree et al., 2003). These claims have led to three large-scale reviews of attrition based on

treatment type. Hembree and colleagues (2003) analyzed 25 controlled studies and concluded that attrition rates do not differ between exposure treatments (20.5%), cognitive therapy (CT)/stress inoculation training (SIT; 22.1%), or EMDR (18.9%). Yet the extent to which these findings can be applied to PE, EMDR, and CPT is limited due to generalized treatment groupings. The "exposure" category included implosive, flooding, and trauma desensitization treatments; and the CT/SIT category included cognitive restructuring, SIT, and CPT (Hembree et al., 2003). Not all exposure treatments and certainly not all cognitive treatments included by Hembree et al. (2003) have earned an A-rating across trauma types. Therefore, while exposure in general is exculpated, the specific manualized therapies (i.e., EMDR, CPT, and PE) are not.

Bradley et al. (2005) came to a similar conclusion in regards to PTSD treatment in general based on broad treatment categories. Bradley et al. (2005) reported completion percentages for the following four treatment groupings: exposure (67.7%), cognitive behavioral therapy (76.8%), exposure plus cognitive (72.6%), and EMDR (60.5%). The constituents of each category range from fully manualized treatments to exploratory amalgamations (e.g. skills training plus exposure). Consequently, discerning the attrition associated with a specific empirically supported treatment is not possible.

Imel et al. (2013) analyzed variance among active treatments (not necessarily A-rated treatments) using an omnibus log odd ratio. The primary hypothesis did not use treatment classifications, which allowed for within- and between- study analysis. Imel and colleagues found the odds of dropout across comparison interventions to be close to 0 (LOR = .05), indicating limited variability among treatments. This study also addressed the relationship between exposure level and dropout, concluding that higher levels of exposure do not result in higher attrition (LOR = 0.21). PE was the only exposure treatment compared on its own (LOR =

-0.05).

Imel et al. (2013) adds important information about the within-study attrition variability, but specific claims about head to head treatment comparisons cannot be made due to the omnibus testing strategy. Similarly, the log odds ratio technique used to test exposure dose's effect on attrition did not offer pairwise comparisons (though the insignificant LOR suggests none would have been found). Lastly, the categories used to define exposure dose were imprecise, lumping high exposure treatments like PE in with moderate exposure treatments like EMDR (i.e., it is not clear from the text how CPT was categorized). Considering all three meta-analyses together, it is clear that further research is required to understand the particular relationship of PE, EMDR, and CPT to attrition.

Attrition according to demographics. A few outcome studies have attempted to pinpoint demographic and diagnostic specifics of treatment dropout. Some studies have found evidence that participants who dropout tend to have lower socioeconomic status (Foa et al., 1991; Foa et al., 1999), more previous psychological treatment (Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998), and more severe PTSD symptoms (Foa et al., 1991; Marks et al., 1998; Bryant, Sackville, Dang, Moulds, & Guthrie, 1999; Glynn et al., 1999; Bryant et al., 2007). However, other studies have found that these factors did not significantly contribute to attrition. Specifically, treatment completers and dropouts did not differ on general demographic characteristics (Brom, Kleber, & Defares, 1989; Tarrier et al., 1999; Cloitre, Koenen, Cohen, & Han, 2002; Taylor et al., 2003), non-PTSD symptoms (Foa et al., 1999; Cloitre et al., 2002; Resick et al., 2002), and measures of overall PTSD symptoms (Tarrier et al., 1999; Cloitre et al., 2002; Taylor, 2003). The inconsistency across studies disallows conclusive claims on what specific variables serve as predictors for attrition. Unfortunately, no one has performed a

thorough review because many of these studies did not report the necessary information to analyze attrition. The use of a review allows for a more comprehensive comparison by combining small studies together, thereby increasing power and the ability to detect potential differences between groups.

A demographic variable reported with more frequency is type of trauma, yet no review to date has analyzed the relationship between trauma type and attrition. Findings from individual studies implicating trauma type have been limited in regard to treatment outcome and attrition (Taylor, 2003; Hembree, Street, Riggs, & Foa, 2004). It is clear the paucity of research and the established differences between traumas in regards to prevalence and conditional risk warrant a more comprehensive review.

Rationale for Present Study

Current research clearly demonstrates that PTSD is a significant problem for both the individual and society. The personal cost of untreated PTSD can mean a lifetime of fractured relationships, risky behavior, and collateral medical issues that serve to demoralize and financially strain the individual. Coupling this with the staggeringly high societal cost from lost hours at work and medical expenses establishes the impetus for improving therapist and client acceptability of empirically supported treatments for PTSD.

Exposure has proven to be an indispensable tool in the treatment of PTSD. Numerous manualized treatments have demonstrated the efficacy of exposure as a mechanism of change. For this reason, exposure therapies are first line treatments domestically and internationally. Among the options for PTSD treatment, PE, EMDR, and CPT are the most efficacious. PE and EMDR have rich histories of proven efficacy with civilian traumatized populations, and more

recently with the military as well. CPT, although with less empirical evidence compared to PE and EMDR, has amassed an impressive amount of support across trauma types.

Despite the ameliorating effects of exposure treatments in general and the comparable efficacy of PE, EMDR, and CPT, some participants do not recover even with these well-established procedures. Clinicians and researchers indicate that the aversive nature of exposure-based procedures accounts for the high number of treatment failures and rates of attrition. Dropping out is in fact a significant concern in the treatment of PTSD, but research has not thoroughly addressed the effect of exposure dose on attrition rates. For this reason, the present study conducts a review of attrition across treatment types, exposure dosages, and trauma type.

Hypotheses

Hypothesis 1: Attrition rates will not be significantly different according to treatment type in regards to PE, EMDR, and CPT. The manualized implementation of each of these treatments in efficacy studies will not produce significantly different dropout rates.

Hypothesis 2: Attrition rates will vary according to type of trauma. Traumas associated with higher conditional risk (i.e., sexual assault and combat) will produce significantly higher drop out when compared to trauma types associated with lower conditional risk (i.e., natural disasters and vicarious trauma).

Hypothesis 3: Attrition rates will be non-significant according to exposure dose levels (i.e., amount of exposure). Coding and combining all manualized exposure treatments and related component analyzes based on amount of exposure will not produce a significant dosing effect.

Method

Search Methods

A thorough review of Pilots, Pubmed, PsychInfo, and the Cochrane Library utilizing the key words *PTSD* OR *Post-traumatic stress disorder* OR *trauma* AND *dropout* OR *attrition* produced eligible studies; figure 1 depicts the study flow diagram. The search parameters were set so that identified studies included any (rather than all) of the PTSD related search terms. Each identified abstract was reviewed according to the criteria for inclusion specified in the next section. All meta-analyses located during the search were reviewed for relevant studies not located in the database search. Before commencement, Eastern Michigan University's institutional review board approved this study (see Appendix B).

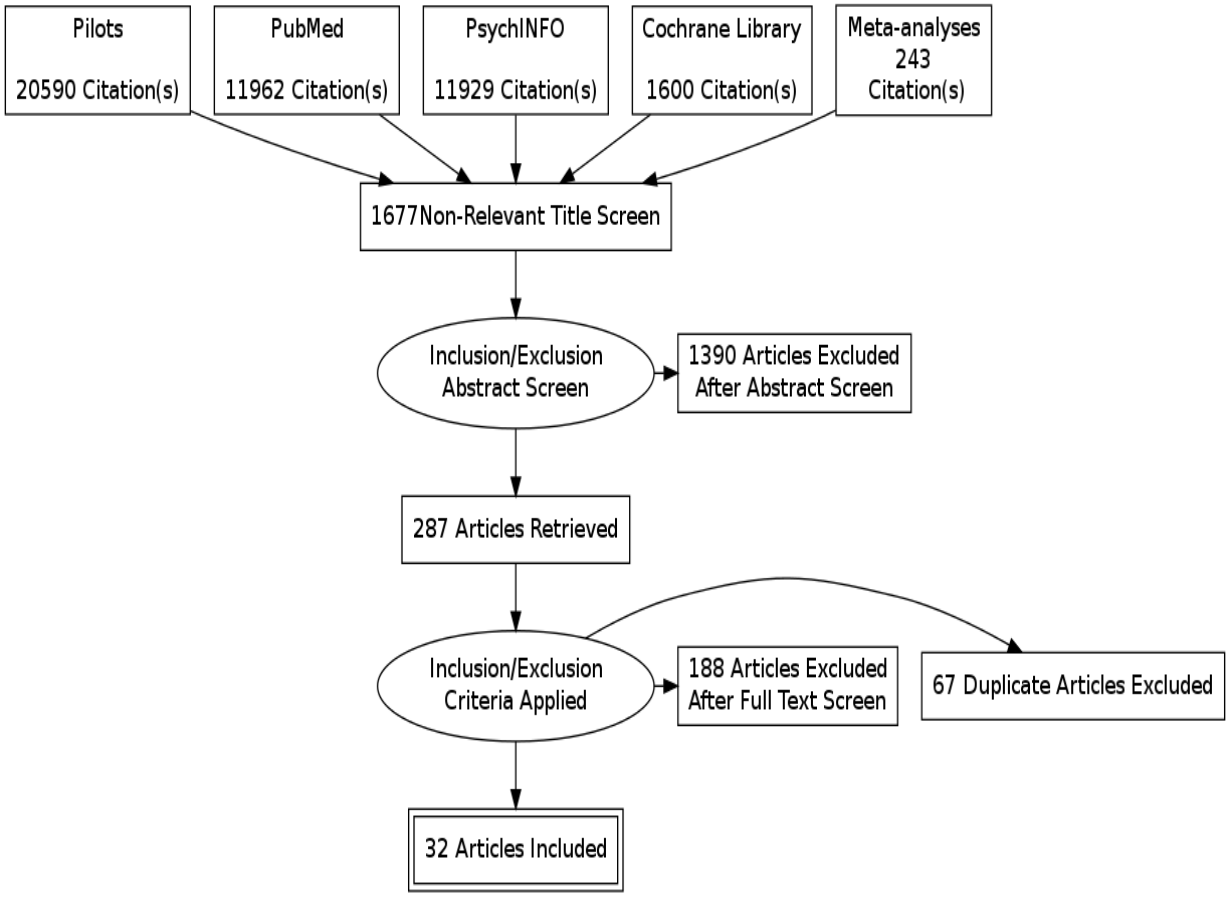

Figure 1. Study flow

Criteria for Inclusion

Study inclusion involved the following criteria:

1. Report attrition rates for treatment and control groups.
2. Utilize only original data.
3. Be published in English (translations accepted).
4. Participants receive a primary diagnosis of PTSD derived from a reliable and valid clinician-administered assessment instrument.
5. Participants are at least 17 years old.
6. Include at least one active treatment and a comparison or control group. Active treatments must be individual, empirically supported treatments for PTSD.
7. Treatment administered by a trained therapist, lasting a minimum of three sessions.
8. Random assignment to treatment conditions with a minimum of ten participants per condition.

Coding System

Study coding involved the following dimensions: (a) the number of dropouts from each treatment, (b) the number of completers in each treatment, (c) the type of intervention used, (d) exposure dosing level (see Appendix A for definitions), (e) trauma event type (see Appendix C for explanation), (f) time of dropout from treatment, and (g) reason for dropout from treatment. Because of the expected inconsistencies in attrition reporting, f and g are not in the primary analyses. However, coding this data when possible allowed for a thorough and detailed discussion. Table 1 lists each study, specifies the coding for variables a-e, and lists yes (i.e., information included) or no (i.e., information not included) for variables f and g.

Table 1

Included studies

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
Arntz et al., 2007	IE	23	19	1	Mixed	Yes	Yes
	IE + IR	8	21	2	Mixed	Yes	Yes
	WL	5	21	-	Mixed	No	Yes
Asukai et al., 2010	PE	3	9	1	Mixed	Yes	Yes
	TAU	1	11	5	Mixed	No	Yes
	PE-WL	1	10	1	Mixed	Yes	Yes
Bryant et al., 2003	IE	5	15	1	Mixed	No	No
	IE + CR	5	15	2	Mixed	No	No
	Supportive	3	15	-	Mixed	No	No
Bryant et al., 2008	IE	8	23	1	Mixed	No	No
	IVE	6	22	1	Mixed	No	No
	IE + IVE	10	21	1	Mixed	No	No
	IE + IVE + CR	4	24	2	Mixed	No	No

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
Carlson et al., 1998	EMDR	0	10	2	Combat	-	-
	Bio-feedback	1	13	-	Combat	No	No
	TAU	0	12	-	Combat	-	-
Chard, 2005	CPT	6	30	3	Sexual	No	No
	WL	7	28	-	Sexual	No	No
	CPT-WL	2	10	3	Sexual	No	Yes
Cloitre et al., 2002	CBT (i.e., PE)	9	22	1	Mixed	No	No
	WL	3	24	-	Mixed	No	No
Cottraux et al., 2008	CBT (PE + CT)	4	27	2	Mixed	Yes	Yes
	Supportive	14	15	-	Mixed	Yes	Yes
Devilly & Spence, 1999	EMDR	6	11	2	Mixed	Yes	No
	CBT (PE, CR, SIT)	3	12	2	Mixed	Yes	No
Feske, 2008	PE	2	9	1	Mixed	No	Yes
	TAU	1	12	-	Mixed	Yes	Yes

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
Foa et al., 1991	PE	4	10	1	Sexual	Yes	No
	SIT	3	14	-	Sexual	Yes	No
	Supportive	3	11	-	Sexual	Yes	No
	WL	0	10	-	Sexual	-	-
Foa et al., 1999	PE	2	23	1	Mixed	No	No
	PE + SIT	8	22	2	Mixed	No	No
	SIT	7	19	-	Mixed	No	No
	WL	0	15	-	Mixed	-	-
Foa et al, 2005	PE	27	52	1	Mixed	No	No
	PE + CR	30	44	2	Mixed	No	No
	WL	1	25	-	Mixed	No	No
Forbes et al., 2012	CPT	9	21	3	Combat	No	Yes
	TAU	9	20	-	Combat	No	Yes

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
Ironson et al., 2002	PE	3	7	1	Mixed	Yes	No
	EMDR (+ in vivo)	0	10	1	Mixed	-	-
Lee et al., 2002	EMDR	1	12	2	Mixed	No	No
	PE + SIT	1	12	2	Mixed	No	No
McDonagh et al., 2005	CBT (PE, CR)	12	17	2	Sexual	No	Yes
	Present centered	2	20	-	Sexual	No	No
	WL	3	20	-	Sexual	No	No
Mirjam et al., 2012	EMDR	20	50	2	Mixed	Yes	No
	BEP	25	45	-	Mixed	Yes	No
Monson et al., 2006	CPT	6	24	3	Combat	Yes	No
	WL	4	26	-	Combat	Yes	No
Nacash et al., 2011	PE	2	13	1	Mixed	No	Yes
	TAU	2	13	-	Mixed	No	Yes

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
Paunovic & Ost, 2001	Ex (IE +IVE)	1	10	1	Refuge	Yes	Yes
	CBT	3	10	-	Refuge	Yes	Yes
Power et al., 2002	EMDR	12	27	2	Mixed	Yes	No
	Ex + CR (PE + CR)	16	21	2	Mixed	Yes	No
	WL	5	24	-	Mixed	No	No
Resick, 2002	CPT	15	41	3	Sexual	Yes	No
	PE	15	40	1	Sexual	Yes	No
	Minimal attention	7	40	-	Sexual	Yes	No
Resick et al., 2008	CPT	26	27	3	Sexual	Yes	Yes
	CPT-Exp	20	30	1	Sexual	Yes	Yes
	CPT-Cog	18	29	3	Sexual	Yes	Yes
Rothbaum, 1997	EMDR	1	10	2	Sexual	Yes	Yes
	WL	2	8	-	Sexual	Yes	Yes

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
Rothbaum et al., 2005	PE	3	20	1	Sexual	Yes	Yes
	EMDR	5	20	2	Sexual	Yes	Yes
	WL	4	20	-	Sexual	No	Yes
Schneier et al., 2012	PE + ssri	6	13	1	Terrorism	No	Yes
	PE + placebo	5	13	1	Terrorism	No	Yes
Schnurr et al., 2007	PE	53	88	1	Mixed	Yes	Yes
	Present centered	30	113	-	Mixed	Yes	Yes
Tarrier et al., 1999	IE	6	29	1	Mixed	No	No
	CT	4	33	-	Mixed	No	No
Taylor et al, 2003	PE	4	15	1	Mixed	Yes	No
	EMDR	7	15	2	Mixed	Yes	No
	Relaxation	4	15	-	Mixed	Yes	No

Study	Treatment	Dropouts	Completers	Exposure Dose	Trauma Type	Time of dropout	Reason for dropout
van der Kolk et al, 2007	EMDR	5	24	2	Mixed	No	No
	SSRI	4	26	-	Mixed	No	No
	Placebo	3	26	-	Mixed	No	No
Vaughan et al., 1994	EMDR	0	12	2	Mixed	-	-
	Image habituation Training	0	13	-	Mixed	-	-
	Relaxation	0	11	-	Mixed	-	-

Note. Treatment: BEP = brief eclectic psychotherapy; CBT = cognitive behavioral therapy; CPT = cognitive processing therapy; CPT-Cog = cognitive only form of cognitive processing therapy; CPT-Exp = exposure only form of cognitive processing therapy; CPT-WL= waitlist group that became a cognitive processing therapy group; CT = cognitive therapy; EMDR = eye-movement desensitization and reprocessing; Ex + CT = exposure plus cognitive therapy; IE = imaginal exposure; IE + CR = imaginal exposure plus cognitive restructuring; IE + IR = imaginal exposure plus imagery rescripting; IE + IVE = imaginal exposure plus invivo exposure; IE + IVE + CR = imaginal exposure plus invivo exposure plus cognitive restructuring; IVE = invivo exposure; PE = prolonged exposure; PE + SIT = prolonged exposure plus stress inoculation therapy; PE-WL = waitlist group that became a prolonged exposure group; SIT = stress inoculation therapy; SSRI = selective serotonin reuptake inhibitor; TAU = treatment as usual; WL = waitlist. Exposure dose: 1 = high exposure dose; 2 = moderate exposure dose; 3 = low exposure dose.

Inter-rater Reliability

To ensure precise collection of data, one independent rater checked 15% of the final article pool. The crosschecked sample was selected by placing all 32 articles in numbered alphabetical order and then using a random number generator to select 5 articles. The secondary rater was trained by the first author to recognize and record relevant data but did not have contact with the actual data set until the comparison stage. The interdependent rater checked each datum listed in Table 1 for reliability.

Reliability was calculated by dividing the instances of agreement by the total opportunities for agreement. Each condition within a study had 7 opportunities for agreement; each column in Table 1 represents one opportunity domain. In total, there was 94% consistency between raters. All discrepancies were resolved collaboratively by referencing the relevant article. To ensure fidelity of the most crucial variables (i.e., attrition and completer data), the entire study pool was rechecked by the author. No additional inconsistencies were found.

Statistical Procedure

Each hypothesis was tested using Pearson's chi-square test of independence, which is a non-parametric procedure that enables analysis of categorical variables. A two-variable chi-square test of independence determines whether or not group status (e.g., treatment condition) influences outcome status (e.g., attrition stats). The null-hypothesis is that both variables (i.e., treatment and attrition) are independent of each other. Comparing obtained frequencies to the expected frequencies tests the null. For example, in Hypothesis 1, the group status refers to treatment type (i.e., PE, CPT, or EMDR) and outcome status refers to dropout/completer status. The obtained dropout/completer frequencies for each treatment are compared to the expected

frequencies. If the expected and obtained frequencies differ significantly, the null is rejected and attrition status is assumed to be dependent on treatment status.

Chi-square tests are calculated using the following formula:

$$\chi^2 = \sum \frac{(o - e)^2}{e}$$

where *o* refers to observed frequency and *e* refers to expected frequency. The variable *e* is calculated using the following formula:

$$Expected = \frac{Row\ total * Column\ total}{Total\ observations}$$

where row and column indicate the creation of a frequency matrix. For example, Hypothesis 1 generated a 3x2 matrix with treatment (i.e., PE, CPT, and EMDR) as the row variable and attrition status (i.e., dropout or completer) as the column variable. The degrees of freedom is simply (# of rows -1) x (# of columns – 1). Degrees of freedom for each analysis are specified below. SPSS was utilized to conduct all analyses.

Dependent variable. The outcome variable of interest was attrition, or more precisely dropout/completer status. The details and definition of what constitutes a dropout vary from study to study. As such, the individual criterion from each study determined if attrition occurred. Aggregating completers and dropouts across all studies derived frequency counts for the chi-square analyses. In all cases, only participants randomized into PE, EMDR, CPT, or a derivative thereof were included in frequency counts; this especially applies to Hypotheses 2, which predicts significance based on trauma type.

Results

Included Studies

A total of 32 studies met inclusion criteria. These studies included 51 treatment conditions relevant to this study's hypotheses. In regards to Hypothesis 1, there are 15 PE, 10 EMDR, and 6 CPT treatment conditions. In regards to Hypothesis 2, three distinct trauma types were identified (12 sexual, 3 combat, and 3 refugee/terrorism trauma conditions). The other trauma categories were imbedded within mixed samples and could not be parsed out for analysis. In regards to Hypothesis 3, there are 24 high, 20 moderate, and 7 low exposure dose conditions. Table 1 depicts this information as well as dropout and completer data for each condition. The following sections consider each hypothesis individually.

Hypothesis 1: Attrition based on treatment type

The mean attrition percentage for each treatment follows: PE- 28.8%, EMDR- 23.0%, CPT- 29.5%. A visual analysis of these means suggests that amount of exposure does not correlate with attrition level. CPT employs the least amount of exposure, but has the highest mean percentage of attrition. PE, the most intense exposure treatment, has the second highest dropout percentage, and EMDR has the lowest.

Table 2 contains the frequency data and analysis outcomes for Hypothesis 1. A total of 483 participants were randomized into PE across 15 conditions, with 139 attriters and 344 completers. Across 10 conditions, 248 were treated with EMDR, which resulted in 57 attriters and 191 completers. Lastly, 217 individuals, from 6 conditions, received CPT; 64 participants dropped out and 153 completed treatment. A comparison of the obtained frequencies against the expected frequencies did not yield a significant discrepancy X^2 (2, N = 948) = 3.37, p = .186. These findings are consistent with Hypothesis 1.

Table 2

Chi-square of treatment x attrition

Treatment Condition	Attrition Status		X^2	*p*
	Dropout	Completer		
PE	139	344	3.37	.186
	(132.5)	(350.5)		
EMDR	57	191		
	(68.0)	(180.0)		
CPT	64	153		
	(59.5)	(157.5)		

Note. PE = Prolonged Exposure; EMDR = Eye-movement Desensitization and Reprocessing; CPT = Cognitive Processing Therapy. Expected frequency accounts appear in parentheses below group frequencies.

Hypothesis 2: Attrition based on trauma type

The data collected did not allow for a thorough analysis of Hypothesis 2. Sexual trauma, combat trauma, and vicarious trauma were the only trauma types with usable data. Furthermore, the vicarious trauma group only included refugee/terrorism trauma. The poverty of data disallows a proper analysis of the hypothesis. Nonetheless, the analysis was run to promote future research on the relationship between attrition and trauma type. The mean attrition percentage for each trauma type is as follows: sexual trauma- 30.9%, combat trauma- 21.4%, refugee/terrorism trauma (i.e., vicarious trauma)- 25.0%. A visual analysis suggests that the anticipated relationship between conditional risk and attrition is not present in the data. The

absence of significance is confirmed by the chi-square test. Table 3 contains the frequency data and analysis outcomes for Hypothesis 2.

A total of 411 participants, across 12 conditions, received treatment for a sexual trauma, of which 127 dropped out and 284 completed. Across 3 conditions, 70 participants were treated for combat related PTSD, 15 dropped out and 55 completed. Lastly, 48 individuals, from 3 conditions, received treatment for refugee/terrorism-based trauma; 12 participants dropped out and 36 completed treatment. A comparison of the obtained frequencies against the expected frequencies was not significant X^2 (2, N = 529) = 3.03, p = .220. These findings are inconsistent with Hypothesis 2.

Table 3

Chi-square of trauma x attrition

	Attrition Status			
Trauma Type	Dropout	Completer	X^2	p
Sexual	127	284	3.03	.220
	(119.6)	(291.4)		
Combat	15	55		
	(20.4)	(49.6)		
Refugee/Terror	12	36		
	(14.0)	(34.0)		

Note. Expected frequency accounts appear in parentheses below group frequencies.

Hypothesis 3: Attrition based on exposure dose

Table 4 contains the relevant data and analysis outcomes for Hypothesis 3. The mean attrition percentage for each exposure level is as follows: high dose- 29.4%, moderate dose- 26.7%, low dose- 31.1%. A visual analysis of the percentages mimics the findings of hypothesis 1. Namely the low exposure dose treatments have the highest attrition, high dose conditions fall in the middle, and moderate dose treatments have the least dropout. Once again, the primary hypothesis of the study is corroborated; higher levels of exposure do not result in higher levels of attrition.

Table 4 contains the frequency data and analysis outcomes for Hypothesis 3. A total of 741 participants were randomized into a high exposure dose treatment across 24 conditions, with 218 attriters and 523 completers. Across 20 conditions, 554 were treated with a moderate exposure treatment, which resulted in 148 attriters and 406 completers. Lastly, 264 individuals, from 7 conditions, received a low exposure dose treatment; 82 participants dropped out and 182 completed treatment. A comparison of the obtained frequencies against the expected frequencies did not yield a significant discrepancy X^2 (2, N = 1559) = 1.97, p = .373. These findings are consistent with Hypothesis 3.

Table 4

Chi-square of exposure dose x attrition

Treatment Condition	Attrition Status		X^2	*p*
	Dropout	Completer		
High	218	523	1.97	.373
	(212.9)	(528.1)		
Moderate	148	406		
	(159.2)	(394.8)		
Low	82	182		
	(75.9)	(188.1)		

Note: High = high exposure dose; Moderate = moderate exposure dose; Low = low exposure dose. Expected frequency accounts appear in parentheses below group frequencies.

Discussion

Hypotheses 1 and 3 were substantiated by the chi-square analyses. As predicted, no significant differences emerged between treatment types or exposure dose. Chi-square scores and associated *p* values did not approach significance despite adequate sample size in all cells. Furthermore, a basic analysis of dropout rates between conditions revealed that the lowest exposure treatment (i.e., CPT) and the lowest exposure class have the highest attrition; this contradicts the assumption that exposure level is positively correlated with dropout rates. The findings of this study along with Hembree et al. (2003), Bradley et al. (2005), and Imel et al., (2013) encourage clinicians to revise their clinical judgments about the relationship between exposure and attrition.

Hypothesis 2 did not withstand analysis. Chi-square values, *p* values, and percentages suggested there are non-significant differences across trauma types. The analysis itself was novel, but the findings should be interpreted with caution. Firstly, two of the trauma groups were not represented in the analysis: physical assault and life-threatening accident. Furthermore, the *vicarious trauma* category only included refugee/terrorism trauma. This is qualitatively different from typical western forms of vicarious trauma. As such, Kessler's (2000) conditional risk data cannot be applied to this population, and the analysis cannot be directly applied to the hypothesis.

Critique of the Analyses

Each hypothesis in this study, as well as similar publications (Hembree et al., 2003, Bradley et al., 2005; & Imel et al., 2013), found a non-significant relationship between exposure and attrition. These findings indicate the absence of significant differences, but they do not establish equivalence, which is a more rigorous test of relatedness. Roger, Vessey, and Howard (1993) describe equivalence testing as the preferred means of comparing two experimental groups. Furthermore, Chambless and Holon (1998) endorse this method in their landmark article.

Equivalency analysis is well suited for this study's questions, but it is not appropriate for the data. Equivalency analysis requires a justified reference group and equivalency interval. Piaggio, Elbourne, Pocock, Evans, and Altman (2010) suggest using a statistical precedent from other treatment outcome studies, but such a comparison is not available at this time. Asserting a reference group or equivalency interval would be a-theoretical and would generate non-interpretable results. The present author chose to update and replicate the findings of earlier research rather than force an improper analysis. Nonetheless, equivalency, in a statistical sense,

cannot be unequivocally asserted at this time, and it will not be in the foreseeable future, barring the development of an alternative equivalency procedure.

Limitations

The main limitation of the study as a whole, especially Hypothesis 2, is the scarce amount of available data. The author's initial desire was to determine how demographic variables interact with treatment type to influence attrition. This fine-grained analysis would detect patterns of non-randomness across treatment conditions despite equal dropouts rates. Identifying demographic trends in dropout based on treatment type is a logical extension of treatment matching, and allows for an assessment of exposure's merits within given populations. This question, and similar permutations, cannot be addressed because the data are not consistently published.

Currently, the APA (2008) guidelines only recommend reporting *reason for dropout* and *time of dropout* (i.e., before or after treatment allocation), which partially explains the dearth of demographic data. But, APA openly invites professionals and journals alike into a collaborative relationship to improve existing standards. In this spirit, a proposal is made to adopt the standards laid forth by Dumville, Torgerson, and Hewitt (2006). Table 5 depicts a hypothetical demographics table utilizing the Dumville et al. (2008) model. Dumville and colleagues suggest that demographics should be published for the general participant population, attriters, and completers. Furthermore, Dumville et al. (2006) suggest that demographic data should be separated based on treatment group. This allows for an analysis of the relationship between demographics, treatment, and attrition. A secondary analysis of the included studies found that none reported treatment specific demographic data for dropouts.

Perhaps more troubling, a minority of included studies adhered to existing APA (2008) guidelines; items *c* (i.e., time of dropout from treatment) and *d* (i.e., reason for dropout) were coded to assess the state of reporting. Only 47% of included studies report time of dropout, and only 43% report the reason for dropout. This is unfortunate considering the value of this data. Lack of reporting is not well explained by the recency of APA's recommendations. The APA guidelines are essentially a replication of the CONSORT (i.e., consolidated standards of reporting trials) guidelines (Moher, Schulz, & Altman, 2001), which predates a majority of the RCTs included in this study.

This state of reporting is concerning given that approximately 20% of participants fail to complete treatment. Understanding this population should be an integral step in determining efficacy and establishing culture/person specific treatments. It is clear that the improvement and dissemination of attrition reporting standards are needed, especially in PTSD treatment outcome literature. More critical analysis of dropouts will help elucidate the relationship between attrition and exposure, which could greatly impact clinical utilization. Projective analyses suggest that increased use of efficacious exposure therapies would reduce cost of care and improve outcomes (Kilmer et al., 2011).

Table 5

Hypothetical demographics table

	All Participants		Participants lost to follow up		Completers	
Baseline Variable	PE (*n* = x)	CPT (*n* = x)	PE (*n* = x)	CPT (*n* = x)	PE (*n* = x)	CPT (*n* = x)
Age (years)	*M* (*SD*)					
Age at trauma	*M* (*SD*)					
Number of traumas	*M* (*SD*)					
African American	%					
Hispanic	%					
Female	%					
Sexual assault	%					
Physical assault	%					
SUD	%					
Comorbidity	%					

Note: PE = prolonged exposure; CPT = cognitive processing therapy; *M* = hypothetical mean; *SD* = hypothetical standard deviation; SUD = substance use disorder; Comorbidity = non-substance use disorder comorbid psychological disorder.

Conclusion

These findings corroborate and expound upon the conclusions of Hembree et al. (2003) and Bradly et al. (2005), and dispel the accusations that exposure treatments lead to higher attrition (Kilpatrick & Best, 1984; Pitman et al., 1991; Pitman et al., 1996; Tarrier et al., 1999).

Exposure's notorious reputation is not founded on empirical evidence, and clinicians unwilling to embrace efficacious approaches to treatment should be challenged to seek education and further training. This being said, much more research is needed to fully understand the relationship between treatment and attrition, but such research is impossible due to limited data and a lack of appropriate equivalency procedures.

Future directions must focus on how to influence reporting practices so that useful information is available for systematic review and analysis. There is clear precedent for analyzing attrition, yet few researchers report meaningful data on this population. Whether this is a result of top down edits from the journal or the decision of the authors is not clear. What is certain is that journals set the standards for reporting and publication. The inclusion of attrition data, as specified by Dumville et al. (2006), requires minor additional space in the manuscript. Furthermore, the digital compilation of journal articles allows for online publication of appendices, databases, and so on. As such, the additional data should be included in the reporting of treatment outcome studies. Once appropriate data are published, a wealth of research will be possible.

References

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (*3rd ed*.). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (*3rd ed.*, *text rev*.). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (*5th ed*.). Washington, DC: American Psychiatric Association.

American Psychological Association (2008). Reporting standards for research in psychology: Why do we need them? What might they be? *American Psychologist, 63*(9), 839-851.

Australian Center for Posttraumatic Mental Health. (2007). Acute stress disorder and posttraumatic stress disorder: Practitioner guide. Retrieved from: http://www.acpmh.unimelb.edu.au/resources/resources-guidelines.html

Becker, C. B., Zayfert, C., & Anderson, E. R. (2004). A survey of psychologists' attitudes towards and utilization of exposure therapy for PTSD. *Behaviour Research and Therapy, 42*(3), 277-292.

Beckham, J. C., Feldman, M. E., Kirby, A. C., Hertzberg, M. A., & Moore, S. D. (1997). Interpersonal violence and its correlates in Vietnam veterans with chronic posttraumatic stress disorder. *Journal of Clinical Psychology, 53*(8), 859-869.

Bell, E. A., Roth, M., & Weed, G. (1998). Wartime stressors and health outcomes: Women in the Persian Gulf war. *Journal of Psychosocial Nursing & Mental Health Services, 36*(8), 19-25.

Benish, S. G., Imel, Z. E., & Wampold, B. E. (2008). The relative efficacy of bona fide psychotherapies for treating post-traumatic stress disorder: A meta-analysis of direct comparisons. *Clinical Psychology Review, 28*(5), 746-758.

Bennice, J. A., Resick, P. A., Mechanic, M., & Astin, M. (2003). The relative effects of intimate partner physical and sexual violence on post-traumatic stress disorder symptomatology. *Violence and Victims, 18*(1), 87-94.

Bradley, R., Greene, J., Russ, E., Dutra, L., & Westen, D. (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *The American Journal of Psychiatry, 162*(2), 214-227.

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

Brom, D., Kleber, R. J., & Defares, P. B. (1989). Brief psychotherapy for posttraumatic stress disorders. *Journal of Consulting and Clinical Psychology, 57*(5), 607-612.

Bryant, R. A., Moulds, M. L., Guthrie, R. M., Dang, S. T., Mastrodomenico, J., Nixon, R. D., . . . Creamer, M. (2008). A randomized controlled trial of exposure therapy and cognitive restructuring for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 76*(4), 695-703.

Bryant, R. A., Moulds, M. L., Mastrodomenico, J., Hopwood, S., Felmingham, K., & Nixon, R. D. (2007). Who drops out of treatment for post-traumatic stress disorder? *Clinical Psychologist, 11*(1), 13-15.

Bryant, R. A., Sackville, T., Dang, S. T., Moulds, M., & Guthrie, R. (1999). Treating acute stress disorder: An evaluation of cognitive behavior therapy and counseling techniques. *American Journal of Psychiatry, 156*, 1780 – 1786.

Cahill, S. P., Rothbaum, B. O., Resick, P. A., & Follette, V. M. (2009). Cognitive- behavioral therapy for adults. In E. B. Foa, T. M. Keane, M. J. Friedman, & J. A. Cohen (Eds.), *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies* (2nd ed., pp. 139–222). New York, NY: Guilford Press.

Chambless, D. L. & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology*, *66*(1), 7-18.

Chan, D., Cheadle, A. D., Reiber, G., Unützer, J., & Chaney, E. F. (2009). Health care utilization and its costs for depressed veterans with and without comorbid PTSD symptoms. *Psychiatric Services, 60*(12), 1612-1617.

Chard, K. M. (2005). An evaluation of cognitive processing therapy for the treatment of posttraumatic stress disorder related to childhood sexual abuse. *Journal of Consulting and Clinical Psychology, 73*(5), 965-971.

Chard, K. M., Ricksecker, E. G., Healy, E. T., Karlin, B. E., & Resick, P. A. (2012). Dissemination and experience with cognitive processing therapy. *Journal of Rehabilitation Research and Development, 49*(5), 667-678.

Chemtob, C. M., Tolin, D. F., van der Kolk, B. A., & Pitman, R. K. (2000). Eye movement desensitization and reprocessing. In E. B. Foa, T. M. Keane, and M. J. Friedman (Eds.), *Effective Treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies* (pp. 139-154). New York, NY: Guilford Press.

Cloitre, M., Koenen, K. C., Cohen, L. R., & Han, H. (2002). Skills training in affective and interpersonal regulation followed by exposure: A phase-based treatment for PTSD related to childhood abuse. *Journal of Consulting and Clinical Psychology, 70*(5), 1067-1074.

Cook, J. M., Schnurr, P. P., & Foa, E. B. (2004). Bridging the gap between posttraumatic stress disorder research and clinical practice: The example of exposure therapy. *Psychotherapy: Theory, Research, Practice, Training, 41*(4), 374-387.

Creamer, M., Burgess, P., & McFarlane, A. C. (2001). Post-traumatic stress disorder: Findings from the Australian national survey of mental health and well-being. *Psychological Medicine, 31*(7), 1237-47.

D'Angelo, M. A. (2002). Mortality in a clinical sample of vietnam veterans diagnosed with posttraumatic stress disorder. Retrieved from ProQuest Dissertations and Theses. (UMI 305483309).

Davidson, P. R., & Parker, K. C. H. (2001). Eye movement desensitization and reprocessing (EMDR): A meta-analysis. *Journal of Consulting and Clinical Psychology, 69*(2), 305-316.

Devilly, G. J., & Foa, E. B. (2001). The investigation of exposure and cognitive therapy: Comment on Tarrier et al. (1999). *Journal of Consulting and Clinical Psychology, 69*(1), 114-118.

Donahue, R. G. (2006*). Predictors of posttraumatic psychological distress in young adult motor vehicle accident survivors: Gender similarities and differences*. Retrieved from ProQuest Dissertations and Theses. (UMI 3233308).

Dumville, J. C., Torgerson, D. J., & Hewitt, C. E. (2006). Reporting attrition in randomize controlled trials. *British Medical Journal, 322*, 969-971.

Farberow, N. L., Kang, H. K., & Bullman, T. A. (1990). Combat experience and postservice psychosocial status as predictors of suicide in Vietnam veterans. *The Journal of Nervous and Mental Disease, 178*(1), 32-37.

Foa, E. B., Dancu, C. V., Hembree, E. A., Jaycox, L. H., Meadows, E. A., & Street, G. P. (1999). A comparison of exposure therapy, stress inoculation training, and their combination for reducing posttraumatic stress disorder in female assault victims. *Journal of Consulting and Clinical Psychology, 67,* 194 – 200.

Foa, E. B., & Hearst-Ikeda, D. (1996). Emotional dissociation in response to trauma: An information-processing approach. In L. K. Michelson & W. J. Ray (Eds.), *Handbook of dissociation: Theoretical and clinical perspectives* (pp. 207–222). New York, NY: Plenum Press.

Foa, E. B., Hembree, E. A., Cahill, S. P., Rauch, S. A., Riggs, D. S., Feeny, N. C., & Yadin, E. (2005). Randomized trial of prolonged exposure for posttraumatic stress disorder with and without cognitive restructuring: Outcome at academic and community clinics. *Journal of Consulting and Clinical Psychology, 73*(5), 953-964.

Foa, E. B., Hembree, E. A., & Rothbaum, B. O. (Eds.). (2007). *Prolonged exposure therapy for PTSD: Emotional processing of traumatic experiences. Therapist guide*. New York, NY: Oxford University Press.

Foa, E. B., Keane, T. M, Friedman, M. J., & Cohen, J. A. (2009). *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies* (2nd ed). New York: Guilford Press.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*(1), 20-35.

Foa, E. B., & Meadows, E. A. (1997). Psychosocial treatments for posttraumatic stress disorder: A critical review. *Annual Review of Psychology, 48*, 449-480.

Foa, E. B., Rothbaum, B. O., Riggs, D. S., & Murdock, T. B. (1991). Treatment of posttraumatic stress disorder in rape victims: A comparison between cognitive-behavioral procedure and counseling. *Journal of Consulting and Clinical Psychology*, *59*, 715 – 723.

Foa, E. B., Steketee, G. S., & Rothbaum, B. O. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy*, *20*(2), 155-176.

Foa, E. B., Zoellner, L. A., Feeny, N. C., Hembree, E. A., & Alvarez-Conrad, J. (2002). Does imaginal exposure exacerbate PTSD symptoms? *Journal of Consulting and Clinical Psychology, 68*, 594-602.

Forbes, D., Lloyd, D., Nixon, R. D. V., Elliott, P., Varker, T., Perry, D., . . . Creamer, M. (2012). A multisite randomized controlled effectiveness trial of cognitive processing therapy for military-related posttraumatic stress disorder. *Journal of Anxiety Disorders, 26*(3), 442-452.

Frueh, B. C., Turner, S. M., Beidel, D. C., & Cahill, S. P. (2001). Assessment of social functioning in combat veterans with PTSD. *Aggression and Violent Behavior, 6*(1), 79-90.

Glynn, S. M., Eth, S., Randolph, E. T., Foy, D. W., Urbaitis, M., Boxer, L., . . . Crothers, J. (1999). A test of behavioral family therapy to augment exposure for combat-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 67*(2), 243-251.

Golding, J. M. (1994). Sexual assault history and physical health in randomly selected Los Angeles women. *Health Psychology, 13*(2), 130-138.

Greenberg, P. E., Sisitsky, T., Kessler, R. C., Finkelstein, S. N., Berndt, E. R., Davidson, J. R., . . . Fyer, A. (1999). The economic burden of anxiety disorders in the 1990s. *Journal of Clinical Psychiatry, 60*(7), 427–435.

Harvey, A. G., Bryant, R. A., & Tarrier, N. (2003). Cognitive behaviour therapy for posttraumatic stress disorder. *Clinical Psychology Review*, *23* (3), 501-522.

Hembree, E. A. & Cahill, S. P. (2007). Obstacles to successful implementation of exposure therapy. In D. C. Richard & D. L. Lautherbach (Eds.), *Handbook of Exposure Therapies* (pp. 389-408). San Diego, CA: Elsevier Inc.

Hembree, E. A., & Foa, E. B. (2003). Interventions for trauma-related emotional disturbances in adult victims of crime. *Journal of Traumatic Stress*, *16*(2), 187-199.

Hembree, E. A., Foa, E. B., Dorfan, N. M., Street, G. P., Kowalski, J., & Tu, X. (2003). Do patients dropout prematurely from exposure therapy for PTSD? *Journal of Traumatic Stress*, *16*(6), 555-562.

Hembree, E. A., Street, G. P., Riggs, D. S., & Foa, E. B. (2004). Do assault–related variables predict response to cognitive behavioral treatment for PTSD? *Journal of Consulting and Clinical Psychology*, *72*, 531–534.

Hendin, H., & Haas, A. P. (1991). Suicide and guilt as manifestations of PTSD in vietnam combat veterans. *American Journal of Psychiatry, 148*(5), 586-591.

Hoge, C. W., Terhakopian, A., Castro, C. A., Messer, S. C., & Engel, C. C. (2007). Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war veterans. *The American Journal of Psychiatry*, *164*(1), 150-3.

Imel, Z. E., Laska, K., Jakupcak, M., & Simpson, T. L. (2013). Meta-analysis of dropout in treatments for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 81*(3), 393-404.

Ironson, G., Freund, B., Strauss, J. L., & Williams, J. (2002). Comparison of two treatments for traumatic stress: A community-based study of EMDR and prolonged exposure. *Journal of Clinical Psychology, 58*(1), 113-128.

Jensen, J. A. (1994). An investigation of eye movement densensitization and reprocessing (EMD/R) as a treatment for posttraumatic stress disorder (PTSD) symptoms of Vietnam combat veterans. *Behavior Therapy, 25*(2), 311-325.

Johansen, V. A., Wahl, A. K., Eilertsen, D. E., & Weisaeth, L. (2007). Prevalence and predictors of post-traumatic stress disorder (PTSD) in physically injured victims of non-domestic violence. *Social Psychiatry and Psychiatric Epidemiology*, *42*(7), 583-593.

Jonas, S., Bebbington, P., McManus, S., Meltzer, H., Jenkins, R., Kuipers, E., . . . Brugha, T. (2011). Sexual abuse and psychiatric disorder in England: Results from the 2007 adult psychiatric morbidity survey. *Psychological Medicine, 41*(4), 709-719.

Kessler, R. C. (2000). Posttraumatic stress disorder: The burden to the individual and to society. *Journal of Clinical Psychiatry, 61*, 4-14.

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., & Wittchen, H. U. (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *International Journal of Methods in Psychiatric Research, 21*(3), 169-184.

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

Kilmer, B., Eibner, C., Ringel, J.S., & Pacula, R.C. (2011). Invisible wounds, visible savings? Using microsimulation to estimate the costs and savings associated with providing evidence-based treatment for PTSD and depression to veterans of Operation Enduring Freedom and Operation Iraqi Freedom. *Psychological Trauma: Theory, Research, Practice, and Policy, 3*, 201-211.

Kilpatrick, D. G., & Best, C. L. (1984). Some cautionary remarks on treating sexual assault victims with implosion. *Behavior Therapy, 15*, 421-423.

Kimerling, R. E., & Calhoun, K. S. (1994). Somatic symptoms, social support, and treatment seeking among sexual assault victims. *Journal of Consulting and Clinical Psychology*, *62*(2), 333-340.

Koss, M. P. (1993). Rape: Scope, impact, interventions, and public policy responses. *American Psychologist, 48*(10), 1062-1069.

Kramer, T. L., Lindy, J. D., Green, B. L., Grace, M. C., & Leonard, A. C. (1994). The comorbidity of post-traumatic stress disorder and suicidality in Vietnam veterans. *Suicide and Life-Threatening Behavior, 24*(1), 58.

Lauterbach, D., Vora, R., & Rakow, M. (2005). The relationship between posttraumatic stress disorder and self-reported health problems. *Psychosomatic Medicine, 67*(6), 939-947.

Lee, C. W., Gavriel, H., Drummond, P. D., Richards, J., & Greenwald, R. (2002). Treatment of PTSD: Stress inoculation training with prolonged exposure compared to EMDR. *Journal of Clinical Psychology, 58*(9), 1071-1089.

Marks, I., Lovell, K., Noshirvani, H., Livanou, M., & Thrasher, S. (1998). Treatment of posttraumatic stress disorder by exposure and/or cognitive restructuring: A controlled study. *Archives of General Psychiatry, 55*(4), 317-325.

Marshall, R. P., Jorm, A. F., Grayson, D. A., & O'Toole, B. I. (2000). Medical-care costs associated with posttraumatic stress disorder in Vietnam veterans. *Australian and New Zealand Journal of Psychiatry, 34*(6) 954-962.

Matthieu, M., & Ivanoff, A. (2006). Treatment of human-caused trauma attrition in the adult outcomes research. *Journal of Interpersonal Violence, 21*(12), 1654-1664.

McMillen, C. J., North, C. S., & Smith, E. M. (2000). What parts of PTSD are normal: Intrusion, avoidance, or arousal? Data from the Northridge, California, earthquake. *Journal of Traumatic Stress, 13*(1), 57-75.

Moher, D., Schulz, K. F., Altman, D. G. (2001). The CONSORT statement: revised recommendations for improving the quality of reports of parallel-group randomised controlled trials. *Lancet, 357*, 1191-1194.

Monson, C. M., Schnurr, P. P., Resick, P. A., Friedman, M. J., Young-xu, Y., & Stevens, S. P. (2006). Cognitive processing therapy for veterans with military-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 74*(5), 898-907.

Nacasch, N., Foa, E. B., Huppert, J. D., Tzur, D., Fostick, L., Dinstein, Y., . . . Zohar, J. (2011). Prolonged exposure therapy for combat- and terror-related posttraumatic stress disorder: A randomized control comparison with treatment as usual. *The Journal of Clinical Psychiatry, 72*(9), 1174-1180.

Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: A systematic review. *Psychological Medicine, 38*(4), 467-480.

Norris, F. H. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. *Journal of Consulting and Clinical Psychology*, *60*, 409-418.

Pereira, A. (2002). Combat trauma and the diagnosis of post-traumatic stress disorder in female and male veterans. *Military Medicine*, *167*(1), 23-27.

Piaggio, G., Elbourne, D. R., Pocock, S. J., Evans, S. J., and Altman, D. G. (2010). Reporting of noninferiority and equivalence randomized trials: Extension of the CONSORT 2010 statement. *Journal of the American Medical Association, 308*(24), 2594-2604.

Pitman, R. K., Altman, B., Greenwald, E., Longpre, R. E., Macklin, M. L., Poire, R. E., & Steketee, G. S. (1991). Psychiatric complications during flooding therapy for posttraumatic stress disorder. *The Journal of Clinical Psychiatry, 52*(1), 17-20.

Pitman, R. K., Orr, S. P., Altman, B., Longpre, R. E., Poire, R. E., & Macklin, M. L. (1996). Emotional processing during eye movement desensitization and reprocessing therapy of Vietnam veterans with chronic posttraumatic stress disorder. *Comprehensive Psychiatry, 37*(6), 419-429.

Porter, K. (2007). *Symptom reduction with prolonged vs. dosed exposure for PTSD: An exploratory study* (Unpublished masters thesis). Eastern Michigan University, Ypsilanti, MI

Prigerson, H. G., Maciejewski, P. K., & Rosenheck, R. A. (2001). Combat trauma: Trauma with highest risk of delayed onset and unresolved posttraumatic stress disorder symptoms, unemployment, and abuse among men. *The Journal of Nervous and Mental Disease, 189*(2), 99-108.

Rauch, S. A. M., Eftekhari, A., & Ruzek, J. I. (2012). Review of exposure therapy: A gold standard for PTSD treatment. *Journal of Rehabilitation Research and Development, 49*(5), 679-687.

Reis, B. F., & Brown, L. G. (1999). Reducing psychotherapy dropouts: Maximizing perspective convergence in the psychotherapy dyad. *Psychotherapy: Theory, Research, Practice, Training, 36*(2), 123-136.

Resick, P. A., Nishith, P., & Griffin, M. G. (2003). How well does cognitive-behavioral therapy treat symptoms of complex PTSD?: An examination of child sexual abuse survivors within a clinical trial. *CNS Spectrums, 8*(5), 340-342, 351-355.

Resick, P. A., Nishith, P., Weaver, T. L., Astin, M. C., & Feuer, C. A. (2002). A comparison of cognitive-processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape victims. *Journal of Consulting and Clinical Psychology*, *70*(4), 867-879.

Resick, P. A., & Schnicke, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting And Clinical Psychology*, *60*(5), 748-756.

Resick, P. A., & Schnicke, M. K. (1996). *Cognitive processing therapy for rape victims: A treatment manual*. Newbury Park, CA: Sage Publications.

Resick, P. A., Uhlmansiek, M. O., Clum, G. A., Galovski, T. E., Scher, C. D., & Young-xu, Y. (2008). A randomized clinical trial to dismantle components of cognitive processing therapy for posttraumatic stress disorder in female victims of interpersonal violence: PTSD/trauma. *Journal of Consulting and Clinical Psychology*, *76*(2), 243-258.

Richards, D. A., Lovell, K., & Marks, I. M. (1994). Post-traumatic stress disorder: Evaluation of a behavioral treatment program. *Journal of Traumatic Stress, 7*(4), 669-680.

Rodriguez, B. F., Weisberg, R. B., Pagano, M. E., Machan, J. T., Culpepper, L., & Keller, M. B. (2003). Mental health treatment received by primary care patients with posttraumatic stress disorder. *Journal of Clinical Psychiatry, 64*(10), 1230-1236.

Rogers, J. L., Howard, K. I., & Vessy, J. T. (1993). Using significance tests to evaluate equivalence between two experimental groups. *Psychological Bulletin, 3*, 553-565.

Rosen, C. S., Chow, H. C., Finney, J. F., Greenbaum, M. A., Moos, R. H., Sheikh, J. I., & Yesavage, J. A. (2004). VA practice patterns and practice guidelines for treating posttraumatic stress disorder. *Journal of Traumatic Stress, 17*(3), 213-222.

Rothbaum, B. O. (1997). A controlled study of eye movement desensitization and reprocessing in the treatment of posttraumatic stress disordered sexual assault victims. *Bulletin of the Menninger Clinic, 61*(3), 317.

Rothbaum, B. O., Astin, M. C., & Marsteller, F. (2005). Prolonged exposure versus eye movement desensitization and reprocessing (EMDR) for PTSD rape victims. *Journal of Traumatic Stress*, *18*(6), 607-616.

Rothbaum, B. O., Meadows, E. A., Resick, P., Foy, D.W. (2000). Cognitive-behavioral therapy. In: E. B. Foa, T. M. Keane, M. J. Friedman (Eds.), *Effective treatments for PTSD: Practice guide- lines from the International Society for Traumatic Stress Studies*. (pp. 320-325). New York, NY: Guilford Press.

Salisbury, A. G., & Burker, E. J. (2011). Assessment, treatment, and vocational implications of combat related PTSD in veterans. *Journal of Applied Rehabilitation Counseling*, *42*(2), 42-49.

Scheppele, K. L., & Bart, P. B. (1983). Through women's eyes: Defining danger in the wake of sexual assault. *The Journal of Social Issues, 39*(2), 63-80.

Schnurr, P. P., Friedman, M. J., Engel, C. C., Foa, E. B., TracieShea, M., Chow, B. K., . . . Bernardy, N. (2007). Cognitive behavioral therapy for posttraumatic stress disorder in women : A randomized controlled trial. *The Journal of the American Medical Association, 297*(8), 820-830.

Schottenbauer, M. A., Glass, C. R., Arnkoff, D. B., Tendick, V., & Gray, S. H. (2008). Nonresponse and dropout rates in outcome studies on PTSD: Review and methodological considerations. *Psychiatry, 71*(2), 134-168.

Segal, D. R., & Mady, W. S. (2004). America's military population. *Population Bulletin, 59*(4), 3-40.

Seidler, G. H., & Wagner, F. E. (2006). Comparing the efficacy of EMDR and trauma-focused cognitive-behavioral therapy in the treatment of PTSD: A meta-analytic study. *Psychological Medicine, 36*(11), 1515-22.

Shapiro, F. (1989a). Efficacy of the eye movement desensitization procedure in the treatment of traumatic memories. *Journal of Traumatic Stress, 2*(2), 199-223.

Shapiro, F. (1989b). Eye movement desensitization: A new treatment for post-traumatic stress disorder. *Journal of Behavior Therapy and Experimental Psychiatry, 20*(3), 211-217.

Shapiro, F., & Laliotis, D. (2011). EMDR and the adaptive information processing model: Integrative treatment and case conceptualization. *Clinical Social Work Journal, 39*(2), 191-200.

Shapiro, F., & Maxfield, L. (2002). Eye movement desensitization and reprocessing (EMDR): Information processing in the treatment of trauma. *Journal of Clinical Psychology, 58*(8), 933-946.

Spates, C. R., Koch, E. I., Cusack, K. J., Pagoto, S. L., & Waller, S. (2009). Eye movement desensitization and reprocessing. In E. B. Foa, T. M. Keane, M. J. Friedman, & J. A. Cohen (Eds.), *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies* (2nd ed., pp. 279–305). New York, NY: Guilford Press.

Sternke, L. M. (2011). *Women veterans and gender differences in the measurement of combat exposure and posttraumatic stress disorder*. Retrieved from ProQuest Dissertations and Theses. (UMI 3460813).

Swift, J. K., & Greenberg, R. P. (2012). Premature discontinuation in adult psychotherapy: A meta-analysis. *Journal of Consulting and Clinical Psychology, 80,* 547–559.

Tarrier, N., Pilgrim, H., Sommerfield, C., Faragher, B., Reynolds, M., Graham, E., & Barrowclough, C. (1999). A randomized trial of cognitive therapy and imaginal exposure in the treatment of chronic posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, *67*(1), 13-18.

Taylor, S. (2003). Outcome predictors for three PTSD treatments: Exposure therapy, EMDR, and relaxation training. *Journal of Cognitive Psychotherapy*, *17*(2), 149-162.

Taylor, S., Thordarson, D. S., Maxfield, L., Fedoroff, I. C., Lovell, K., & Ogrodniczuk, J. (2003) Comparative efficacy, speed, and adverse effects of three PTSD treatments: Exposure therapy, EMDR, and relaxation training. *Journal of Consulting and Clinical Psychology*, *71*(2), 330-338.

United States Department of Veterans Affairs. (2010). Management of Post-Traumatic Stress: VA/DoD Clinical Practice Guideline. Retrieved from:http://www.healthquality.va.gov/ptsd/CPGSummaryFINALMgmtofPTSDfinal021413.pdf.

US Geological Survey. (2007). Natural hazards-- A national threat. Retrieved from http://pubs.usgs.gov/fs/2007/3009/2007-3009.pdf.

Van Etten, M. L., & Taylor, S. (1998). Comparative efficacy of treatments for post-traumatic stress disorder: A meta-analysis. *Clinical Psychology and Psychotherapy, 5*(3), 126-144.

Waigandt, A., Wallace, D. L., Phelps, L., & Miller, D. A. (1990). The impact of sexual assault on physical health status. *Journal of Traumatic Stress*, *3*(1), 93-102.

Walker, E. A., Unutzer, J., Rutter, C., Gelfand, A., Saunders, K., VonKorff, M., . . . Katon, W. (1999). Costs of health care use by women HMO members with a history of childhood abuse and neglect. *Archives of General Psychiatry*, *56*(7), 609-613.

Wang, X., Gao, L., Shinfuku, N., Zhang, H., Zhao, C., & Shen, Y. (2000). Longitudinal study of earthquake-related PTSD in a randomly selected community sample in north china. *The American Journal of Psychiatry*, *157*(8), 1260-6.

Weich, S., McBride, O., Hussey, D., Exeter, D., Brugha, T., & McManus, S. (2011). Latent class analysis of co-morbidity in the adult psychiatric morbidity survey in England 2007: Implications for DSM-5 and ICD-11. *Psychological Medicine*, *41*(10), 2201-12.

Wilson, J. P., Friedman, M. J., & Lindy, J. D. (2001). Treatment goals for PTSD. In J. P. Wilson, M. J. Friedman, & J. D. Lindy (Eds.), *Treating Psychological Trauma and PTSD* (pp. 3-27.). New York, NY: Guilford Press.

Woodhead, C., Wessely, S., Jones, N., Fear, N. T., & Hatch, S. L. (2012). Impact of exposure to combat during deployment to Iraq and Afghanistan on mental health by gender. *Psychological Medicine*, *42*(9), 1985-96.

Appendix A

1. High exposure- Treatments focused solely on exposure techniques (i.e., repeated narrative reconstruction, imaginal exposure, and *in vivo* exposure both within and outside of therapy). Treatments in this category should employ exposure procedures for nearly 100% of therapy and homework.
2. Moderate exposure- Treatments primarily focused on exposure but not incorporating all exposure techniques in the high exposure category and/or not requiring exposure both within and outside of therapy. Treatments in this category should rely on exposure for more than 50% but less than 90% percent of therapy and homework.
3. Minimal exposure- Treatments incorporating exposure as a secondary change agent, primarily focused on cognitive interventions, or not utilizing or explicitly relying on the habituation/desensitization model of processing. Treatments in this category should incorporate exposure into less than 50% of therapy and homework.

Appendix B

IRB approval form

EASTERN MICHIGAN UNIVERSITY

Education First

October 29, 2013

David Phillips
Department of Psychology

Dear David:

The College of Arts and Sciences Human Subjects Review Committee (CAS HSRC) of Eastern Michigan University has reviewed and approved *as exempt* research your proposal (#1205) titled, "Exposure Therapy, Exposure Dose, Trauma Type, and Attrition in PTSD Efficacy Studies." The CAS HSRC determined that the rights and welfare of the individual subjects involved in this research are carefully guarded. Additionally, the methods used to obtain informed consent are appropriate, and the individuals participating in your study are not at risk.

Exempt research does not require reporting of continuation one year after approval if the project continues. However, should the sample or procedures change as to have an impact on human subjects, then CAS HSRC should be notified by using the *Minor Modification to Research Protocol* or the *Request for Human Subjects Approval* form depending upon the scope of the changes (see the forms online).

On behalf of the Human Subjects Committee, I wish you success in conducting your research.

Sincerely,

Michelle Byrd, Ph.D.
Interim CAS HSRC Chair

cc: Ellen Koch, Ph.D.

University Human Subjects Review Committee · Eastern Michigan University · 200 Boone Hall
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Appendix C

1. Sexual assault, rape, and molestation- Any trauma deemed sexual in nature by the study including unwanted sexual touch, rape, attempted rape, forced sexual acts, etc. This classification takes precedent should it be co-occurring with another trauma type. For example, sexual assault with a deadly weapon was categorized in this group and not in the physical attack group.
2. Combat- Any traumas occurring during military deployment, excluding military sexual trauma. Combat takes precedent over all other categories (except for sexual assault). For example, vicarious combat trauma (i.e., did not happen directly to the participant) was coded as combat and not vicarious trauma.
3. Physical attack, threat with weapon- Any attack or threat that is non-sexual and was not military related. This included both domestic and non-domestic violence.
4. Life-threatening accident and natural disaster- trauma types included human-made disasters (motor vehicle accidents, fire, etc.), and geological disasters (hurricane, earthquake, tornado, etc.).
5. Vicarious traumas- Any vicarious trauma and large-scale social trauma (such as non-descriptive refugee status) not covered above.