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Examining Dropout from Prolonged Exposure Therapy in Veterans with Posttraumatic Stress Disorder: A Mixed-Methods Study

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy

in

Clinical Psychology

by

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The Dissertation of Stephanie Y. Wells is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

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Dedication

To the veterans who participated in this study and to the larger veteran population who have served our country, especially those with posttraumatic stress disorder: Thank you.

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Publications

Peer-Reviewed Publications

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ABSTRACT OF THE DISSERTATION

Examining Dropout from Prolonged Exposure Therapy In Veterans with Posttraumatic Stress Disorder: A Mixed-Methods Study

by

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University of California San Diego, 2018

San Diego State University, 2018

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Rationale: Posttraumatic stress disorder (PTSD) is a serious public health condition and prevalence is much higher in veterans than in the general population. Although evidence-based PTSD treatments significantly reduce PTSD symptoms, veterans face several barriers to access care and many drop out of therapy prematurely. Approximately 36% of veterans dropout of PTSD treatments; however, dropout rates vary greatly across studies and service settings. Premature dropout prevents veterans from receiving an adequate dose of treatment. Novel treatment delivery modalities, such as videoconferencing and home-based care, have been widely implemented in the Veterans Affairs Healthcare System to overcome barriers to care, which may thereby reduce dropout rates. However, the current literature has revealed mixed findings about which factors contribute to veterans dropping out of PTSD treatment. Further, little research has examined differences in dropout rates between delivery modalities and if veterans' reasons for dropping out of treatment differ between delivery modalities. The current

study has three aims: 1) to determine if there are significant differences in dropout rates from PTSD Prolonged Exposure therapy (PE) between three modalities of care including in-home, in-person therapy (IHIP), home-based telehealth (HBT), and office-based telehealth (OBT); 2) to identify baseline and process factors, including demographic, baseline PTSD and depression symptoms, working alliance, attitudes and beliefs about mental health, and perceived barriers to care, that may predict dropout from PE; and 3) to explore whether there are differences in predominant themes and factors related to Veteran's reported reasons for dropout among the three modalities of care (IHIP, HBT, and OBT).

Design: This study was a QUANTITATIVE → qualitative explanatory sequential mixed methods study that examined data from an ongoing federally funded randomized controlled trial that evaluated the efficacy of variable length PE delivered via three delivery modalities: IHIP, HBT, and OBT. Participants were 159 veterans aged 18 years or older who were diagnosed with PTSD using the Clinician Assessed PTSD Scale for *DSM-5*, and who were randomized to one of the three delivery modalities to receive up to 15 sessions of PE. Data from all 159 veterans were included in the quantitative analyses. For the qualitative data analyses, approximately a third of the veterans who dropped out of PE (n = 22), and who was assigned to one of the three delivery modalities, participated in an individual interview about potential contextual and individual factors related to dropping out of PE. Veterans completed the Beck Depression Inventory-II, Working Alliance Inventory-SR, Credibility/Expectancy Questionnaire, a treatment delivery modality preference measure, a demographics questionnaire, and a modified version of the Stigma/Barriers to Care scale. For Aim 1, differences in dropout rates between delivery modality were tested. For Aim 2, a logistic regression was conducted to determine quantitative predictors of dropout. Individual semi-structured interviews were then conducted to explore veterans'

reasons for dropping out and to contextualize the quantitative findings. Team based coding was used to conduct open and focused coding. Qualitative and quantitative results were triangulated to identify which factors predicted veterans' dropout from PE. For Aim 3, a constant comparison approach was used to identify differences in reasons for dropping out of treatment between the three modalities.

Results: Forty-three percent of veterans dropped out of PE (n = 69) but dropout rates varied by treatment modality; 60% of veterans dropped out from OBT (n = 31), 44% from HBT (n = 24), and 26% (n = 14) from IHIP. Veterans in the OBT condition were more likely to dropout from therapy than individuals in the IHIP condition $\beta = 1.414$ $p < .01$, OR = 4.112, 95% CI [1.083, 9.379]. Compared to veterans in IHIP, Veterans in the HBT condition were also more likely to drop out of PE, $\beta = .801$, $p = .053$, OR = 2.229, 95% CI [.998, 5.025]. Individuals in OBT were more likely to drop out of therapy compared to individuals in HBT, $\beta = .613$, $p = .120$, OR = 1.845, 95% CI [.853, 3.991] but the difference in drop out was not statistically significant. Lower perceived credibility of PE at baseline, greater perceived stigma at baseline, and OBT also predicted a higher likelihood of dropout. Qualitative interviews were conducted with almost a third of the veterans (n = 22) who dropped out of PE. The qualitative interviews revealed that practical barriers, psychological and emotional factors, and the therapeutic context contributed to veterans' decisions to drop out from PE. There were also differences between modalities about how the modality itself impacted dropout. IHIP had the lowest impact on dropout; veterans in IHIP reported that the modality did not influence their decision to drop out of PE. Half of the veterans interviewed from the HBT condition reported that the modality had an impact, and the majority of veterans in OBT reported that the modality affected their decision to drop out. Veterans in OBT described greater logistical barriers that contributed to dropout.

Some veterans in both HBT and OBT said that the telehealth modality was impersonal and contributed to dropping out from PE. There were more reported internet connectivity issues in HBT influencing dropout compared to OBT.

Conclusion: Veterans drop out of PE for several reasons and many veterans have multiple reasons for dropping out of therapy. IHIP can decrease dropout but also may be more costly compared to HBT and OBT. The VA Healthcare System should continue providing PE via telehealth technologies and providers should openly discuss treatment concerns with veterans while in PE in an effort to reduce dropout. Identifying which factors contribute to dropout could lead to the development of engagement strategies to increase retention and maximize clinical gains.

CHAPTER 1: INTRODUCTION

1.1 PTSD is a Critical Public Health Concern

Posttraumatic stress disorder (PTSD) is a serious mental health condition and serious public health problem, particularly among veterans. Lifetime prevalence estimates of PTSD are higher in veterans than in the general population. A meta-analysis of 33 studies examined PTSD prevalence estimates in Iraq and Afghanistan era veterans and found the PTSD prevalence estimate to be 23% (Fulton et al., 2015). Vietnam veterans also have high rates of PTSD. The lifetime prevalence estimate of PTSD is 31% and 27% in male and female Vietnam veterans, respectively. In comparison, the lifetime prevalence estimate in the general population is 5.7% (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). The higher PTSD prevalence estimates in veteran populations compared to the general population highlights the importance of understanding and addressing PTSD in veterans.

PTSD is also associated with a range of comorbidities, including depression (Shalev et al., 1998), substance abuse (Jacobsen, Southwick, & Kosten, 2001; Mills, Teesson, Ross, & Peters, 2006), suicidality (Gradus et al., 2010), and poorer physical health (Pacella, Hruska, & Delahanty, 2013; Schnurr & Jankowski, 1999). PTSD also negatively affects quality of life (Mendlowicz & Stein, 2000; Rapaport, Clary, Fayyad, & Endicott, 2005), and occupational and social functioning (Kuhn, Blanchard, & Hickling, 2003; Zatzick et al., 1997). For example, individuals with PTSD are more likely to perpetrate physical aggression towards family members compared to veterans without PTSD (Monson, Taft, & Fredman, 2009). Veterans with PTSD also have more missed days at work compared to veterans without PTSD (Hoge, Terhakopian, Castro, Messer, & Engel, 2007). Thus, the high rates of comorbidity and the negative impact of PTSD on functioning has a large impact on society.

PTSD has a large economic and societal impact. During the years of 2004 to 2009, the Veterans Affairs Healthcare System (VHA) spent 1.4 billion dollars on caring for veterans with PTSD (Congressional Budget Office Report, 2012). In addition to the cost of PTSD on the VHA, PTSD is a great cost to society. A report by the RAND Corporation estimated the cost of PTSD within the first two years of returning home post-deployment; the impact of PTSD was over 1.2 billion dollars and most of these costs are due to lost productivity (Tanielian & Jaycox, 2008). Veterans with PTSD are less likely to be employed compared to veterans without PTSD and have fewer days at work, which decreases productivity (Hoge et al., 2007; Savoca & Rosenheck, 2000). Tanielian & Jaycox (2008) estimated that if veterans with PTSD were to receive evidence-based treatment, it would save society over 250 million dollars within the first two years of post-deployment. The greater prevalence estimates in veterans with PTSD compared to the general population, the impact of PTSD on psychological well-being and functioning, and the large cost to society supports the need for effective and available treatments for veterans with PTSD.

1.2 Effective Treatments for PTSD in Veteran Populations

There are multiple effective evidence-based treatments for PTSD. The Department of Defense (DoD) and Veterans Affairs (VA) have widely disseminated prolonged exposure therapy (PE) and cognitive processing therapy (CPT) treatments within their clinical services (Karlin et al., 2010; McHugh & Barlow, 2010) and these treatments have been proposed as the gold standard treatments for PTSD (VA/DOD Practice Guidelines, 2017). Several randomized controlled trials (RCTs), VA clinic effectiveness studies, and national PE dissemination training data have examined the efficacy of CPT and PE for veterans with PTSD and have found significant improvements in PTSD symptoms over time with large effect sizes (Acierno et al.,

2016; Eftekhari et al., 2013; Goodson, Lefkowitz, Helstrom, & Gawrysiak, 2013; Monson et al., 2006; Morland et al., 2014; Schnurr et al., 2007; Surís, Link-Malcolm, Chard, Ahn, & North, 2013; Tuerk et al., 2011). In addition, a recent meta-analysis examined the effectiveness of PE and CPT in military populations (i.e., veterans and active duty personnel) and found large within-group intent-to-treat ITT effect sizes for PE and CPT (Steenkamp, Litz, Hoge, & Marmar, 2015). One trial reported clinically meaningful symptom change and found that 70% of veterans had clinically meaningful symptom reduction at posttreatment (Steenkamp et al., 2015); similar results were found for CPT. Steenkamp and colleagues (2015) found that across the five studies examining CPT, 49-67% of participants had clinically meaningful symptom change from pretreatment to posttreatment (Steenkamp et al., 2015). CPT had large effect sizes compared to wait-list and treatment as usual controls but was only slightly superior to active non-trauma focused controls. Despite reductions in PTSD symptoms following PE and CPT, the majority of military personnel still retained their PTSD diagnosis following both treatments.

Although the Steenkamp and colleagues' (2015) meta-analysis provides useful information about the efficacy of PE and CPT in military populations, the meta-analysis was not unique to veterans and it has been criticized for excluding relevant PE and CPT treatment outcome studies with veteran and active duty personnel (Norman et al., 2016). Therefore, there is a need to increase treatment response to PE and/or CPT. Still, the current evidence suggests that both of these treatments can significantly reduce PTSD symptoms in veterans and should be offered as first-line PTSD treatments to veterans.

1.3 Dropout from PTSD Treatments is Common and Problematic

Dropout rates. Despite the effectiveness and broad dissemination of PE and CPT, retaining patients in treatment is a significant issue because many veterans prematurely drop out

of therapy. Veterans' dropout rates from evidence-based PTSD treatments have been well documented in the literature from both randomized controlled trials, VA clinic data, and national training program data. A systematic review of 20 PTSD treatment studies with Iraq and Afghanistan veterans found the overall dropout rate to be 36% (Goetter et al., 2015); clinic studies had slightly higher dropout rates (42%) than RCTs (28%), but the difference was not significant. Other studies have found variability in dropout rates. RCTs examining the efficacy of PE in veterans have reported dropout rates ranging from 26-38% and 15-43% for CPT (Acierno et al., 2017; Forbes et al., 2012; Gros, Allan, Lancaster, Szafranski, & Acierno, 2017; Maieritsch et al., 2016; Monson et al., 2006; Morland et al., 2014; Schnurr et al., 2007; Surís et al., 2013). Similar to the RCT dropout rates, VA clinic and national VA PE training program data have reported dropout rates between 27-44% and 31-50% for PE and CPT, respectively (Chard, Schumm, Owens, & Cottingham, 2010; Eftekhari et al., 2013; Goodson et al., 2013; Jeffreys et al., 2014; Mott et al., 2014; Tuerk et al., 2013; Tuerk et al., 2011). Previous studies have examined the dropout rate for RCTs and clinic studies that included multiple treatment types (e.g., PE, CPT, or another cognitive-behavioral therapy for PTSD) and found dropout rates to be between 28-68% (Garcia, Kelley, Rentz, & Lee, 2011; Gros, Price, Yuen, & Acierno, 2013; Kehle-Forbes, Meis, Spoont, & Polusny, 2016; Niles et al., 2017). The wide range in dropout rates from PTSD treatments is likely due to several factors, including different psychotherapies, inconsistent definitions of dropout, and dichotomization of dropout rates (Gros et al., 2017). However, the data from these studies suggest that it is common for at least a quarter of veterans to dropout from a variety of study types and treatments, which has negative clinical and systemic consequences.

Definition of dropout. One complicating factor within the CPT and PE treatment dropout literature in veteran populations is that dropout from therapy has been operationalized differently in different studies, which may account for some of the variability in dropout rates. Several studies have defined therapy dropout as a failure to complete a minimum number of therapy sessions; however, the threshold minimum number of sessions is variable across studies and has ranged from 6 to 10 sessions (e.g., Eftekhari et al., 2013; Morland et al., 2014; Tuerk et al., 2011; Tuerk et al., 2013). Additionally, the authors of prior studies have not always provided an explicit justification for the minimum number of sessions required, but an adequate dose of PTSD therapy is typically defined as 8 or 9 sessions (Eftekhari et al., 2013; Lu, Duckart, O'Malley, & Dobscha, 2011; Seal et al., 2010; Spoont, Murdoch, Hodges, & Nugent, 2010). Other studies have defined therapy dropouts as individuals who do not complete all sessions of a therapy protocol (Schnurr et al., 2007; Surís et al., 2013). Veterans may also be classified as dropouts if they do not reach predetermined therapy goals (e.g., loss of a PTSD diagnosis; Garcia et al., 2011), do not attend future scheduled appointments (Chard et al., 2010), or discontinue contact with the clinic and there is no therapy note indicating therapy completion (Erbes, Curry, & Leskela, 2009). The variability across research and clinical settings makes it difficult to compare results across studies. Although numerous definitions of dropout exist, a common theme across definitions is that veterans are prematurely discontinuing therapy prior to receiving a sufficient dose of therapy and without the therapist's agreement. Regardless of which operational definition is used, dropout is consistently a significant problem that warrants significant attention because it hinders veterans' clinical outcomes.

Impact of dropout. Dropout from PTSD treatments is problematic both for veterans and the healthcare system. Most importantly, veterans who drop out of treatment remain

symptomatic (Tuerk et al., 2011; Tuerk et al., 2013), which can lead to sustained distress and functional impairment. Veterans who drop out from therapy often drop out early in treatment or before receiving an adequate dose of therapy (Garcia et al., 2011; Harpaz-Rotem & Rosenheck, 2011; Kehle-Forbes et al., 2016; Mott et al., 2014). An adequate dose of therapy is essential to maximize clinical gains and dropping out of therapy prevents veterans from receiving a sufficient treatment dose. PTSD is chronic and untreated PTSD is associated with increased PTSD symptomatology, psychological and medical comorbidity (Chopra et al., 2014; Davidson, 2000; Goenjian et al., 2005). Additionally, veterans with PTSD have poorer quality of life compared to veterans without PTSD and greater impairment in interpersonal relationships (Vogt et al., 2017). Therefore, treating PTSD is important to improve veteran's quality of life and functioning; however, drop out from PTSD treatments will prevent improvement in these areas.

In addition to the impact on the individual, drop out from therapy also affects healthcare utilization, the healthcare system, and the larger society. Veterans who do not complete therapy have an increase in service utilization 12 months following PE compared to their utilization of VA services in the 12 months prior to starting PE (Tuerk et al., 2013). Additionally, veterans who drop out of therapy have higher service utilization costs in the year following PE compared to treatment completers (Tuerk et al., 2013). Similarly, when veterans drop out of therapy before experiencing clinical gains, it is an inefficient use of therapist resources and time (Barrett, Chua, Crits-Christoph, Gibbons, & Thompson, 2008). In addition to the impact of drop out on the healthcare system and providers, individuals with PTSD also are at greater risk for unemployment and greater missed days at work (Hoge et al., 2007; Savoca & Rosenheck, 2000). Lost productivity accounts for much of the 1.2-billion-dollar cost of PTSD on society within the first two years of returning home from deployment (Tanielian & Jaycox, 2008). If veterans

diagnosed with PTSD received an adequate dose of evidence-based PTSD treatment the cost to society would be significantly reduced. Given the negative effect of dropout on clinical outcomes, provider and healthcare system resources, and society, there is a critical need to improve our understanding of the factors that contribute to veterans dropping out of therapy.

1.4 Limited Access and Barriers to Seeking PTSD Treatments

Veterans with PTSD need evidence-based PTSD treatments but encounter numerous barriers to accessing PTSD care. Logistical factors, including distance to VA, lack of transportation, and scheduling difficulties, impede veterans from accessing and seeking treatment (Iversen et al., 2011; Ouimette et al., 2011; Sayer et al., 2009). Millions of veterans reside in rural areas and need PTSD treatment; however, there are limited qualified providers in these areas (Duke, 2012). Rural providers report feeling less confident than urban providers in their ability to treat PTSD and delivery evidence-based PTSD treatments (Kilpatrick, Best, Smith, Kudler, & Cornelison-Grant, 2011). Therefore, even when veterans are motivated to overcome logistical barriers, there may be insufficient providers to address their needs. Further, even when PTSD services are accessible, veterans are often unaware of available services (Iversen et al., 2011; Sayer et al., 2009). These barriers prevent veterans from engaging in care and living more fulfilling lives.

Difficulty accessing care likely contributes to the low rates of PTSD treatment initiation, engagement, and retention (Hoge, 2011; Hoge et al., 2004; Seal et al., 2010). However, there is little research examining how these barriers affect dropout rates. Reducing these barriers may increase treatment completion and reduce dropout rates. In an effort to overcome several of these obstacles, the Veterans Health Administration has widely disseminated videoconferencing and

home-based care and increased the number of veterans who can access care from afar and in a timely manner.

1.5 Potential Solutions: Novel Treatment Delivery Modalities May Reduce Dropout

Novel treatment delivery modalities, including videoconferencing and home-based care, have been developed, in part, to overcome some of the access, logistical, and attitudinal barriers that inhibit or preclude veterans from seeking and/or remaining in care. In response to this concern, the Veterans Health Administration has implemented several different delivery modalities to increase access to care.

Office based videoconferencing (OBV). Videoconferencing allows providers to meet with veterans remotely through a secure video connection. Within the VA Healthcare System, office-based videoconferencing (OBV) requires a veteran to travel to a local VA medical center or community-based outpatient clinic to use the videoconferencing equipment on site to remotely meet with a therapist. The majority of the research examining the efficacy of videoconferencing for delivering evidence-based PTSD treatments to veterans has studied OBV (Frueh et al., 2007; Morland et al., 2014; Morland et al., 2015). These studies have found that PTSD treatments delivered via OBV are non-inferior to traditional in-person office-based therapy.

Home-based videoconferencing (HBV). Due to the number of logistical and geographic barriers that many veterans face for in-person or OBV, the VA expanded its videoconferencing services to include home-based videoconferencing (HBV). HBV allows veterans to remain in their home or any non-VA setting while remotely meeting with a therapist through videoconferencing technology. Although the VA has widely disseminated HBV, there are only two studies that examine PTSD treatments delivered via HBV compared to traditional office-

based therapy (Acierno et al., 2016; Acierno et al., 2017). Similar to OBV, HBV has been demonstrated to be non-inferior to traditional office-based care. These results indicate that veterans can conveniently engage in care while minimizing logistical barriers and retaining clinical efficacy.

In-Home, in-person therapy (IHIP). Videoconferencing is a promising mode of delivering PTSD treatments but some veterans may be uncomfortable using technology to receive their care or may have concerns about meeting with a therapist remotely. Therefore, in-home, in-person (IHIP) treatments are another novel way to deliver PTSD treatments that may overcome barriers to care and reduce dropout rates. IHIP treatment requires a provider to travel to a veteran's home and provide therapy in their home. There are currently no published studies that have examined IHIP PTSD treatment, but the VA Healthcare System has implemented home-based primary mental health care for other disorders (Zeiss & Karlin, 2008). Given that there are no published studies of IHIP PTSD treatment, it is unknown if PTSD treatment delivered via IHIP is as efficacious as traditional office-based care and/or if it reduces dropout rates. Despite a lack of efficacy and dropout data, presumably IHIP would increase access to care, reduce logistical barriers, and reduce patient burden because the veteran does not need to leave his home or use technology software to meet with his therapy, which may increase retention. Additionally, veterans may feel more accountable to therapy if the therapist is driving to their home. If IHIP is found to be non-inferior to traditional office-based care then veterans will have increased service delivery options that may also increase engagement in care. However, although IHIP may reduce burden and enhance accountability, it may be less cost effective than other modalities. There is little research to date examining the cost effectiveness of IHIP but presumably therapists will treat fewer patients because of the increased travel time

between veterans' homes and travel reimbursement will increase costs. Therefore, IHIP may decrease burden and improve outcomes but it may be a more costly modality that will limit the uptake in health services.

Summary of Novel Delivery Modalities in the VA Healthcare System. Studies have found OBV and HBV to be non-inferior to traditional office-based therapy and the VA Healthcare System has disseminated OBV and HBV widely in an effort to increase access to care and reduce barriers that may prevent veterans from seeking and remaining in treatment. However, there is still little research examining if these service delivery modalities actually increase engagement (e.g., number of sessions attended) or reduce dropout rates. Determining the factors that are most likely to increase or decrease treatment dropout rates could lead to modifications of existing treatments or the development of new engagement strategies to reduce dropout.

1.6 Predictors of Veterans' Dropout from PTSD Treatments

The current literature examining veterans' dropout rates from PTSD treatments has examined a variety of predictors that vary between studies. Although the specific predictors vary across studies, the existing research has primarily examined demographic and clinical variables. Researchers should consider how beliefs and attitudes about mental health treatment, therapeutic process variables, logistical factors, and treatment delivery modalities affect dropout. Better understanding the variables which predict dropout from PTSD treatments could allow treatment developers to modify treatment techniques and clinicians to try to address these issues during therapy to prevent dropout.

Demographic variables. Demographic variables have been extensively studied and have yielded predominantly inconsistent or non-significant results throughout the literature, with a few exceptions. Marital status, employment status, and race/ethnicity have consistently been shown to be unrelated to dropout (Garcia et al., 2011; Goodson et al., 2013; Gros et al., 2017; Gros et al., 2013; Szafranski, Gros, Menefee, Wanner, & Norton, 2014; Tuerk et al., 2013). Similarly, prior studies have typically found sex to be unrelated to dropout (Goodson et al., 2013; Kehle-Forbes et al., 2016; Tuerk et al., 2013) but one study examining outcomes from the national PE training data did find that female veterans were more likely to drop out of treatment compared to males (Eftekhari et al., 2013). In a VA clinic sample (Mott et al., 2014), individuals who dropped out had a lower education level compared to those who completed treatment but another study of 282 veterans (Szafranski et al., 2014) found no association between dropout and education. Trauma type has also been inconsistently associated with dropout. Eftekhari and colleagues (2013) found that individuals with military sexual trauma were more likely to drop out of PE but another study did not find trauma type to be associated with dropout status (Goodson et al., 2013). The findings from these studies highlight that many demographic variables are not related to dropout from treatment.

Unlike other demographic variables, age and war era have fairly consistently been associated with dropout. Although some studies have found age to be unassociated with dropout (Gros et al., 2017; Gros et al., 2013; Niles et al., 2017; Szafranski et al., 2014; Tuerk et al., 2013), several studies have found that younger veterans are more likely to drop out of treatment compared to older veterans (Garcia et al., 2011; Goodson et al., 2013; Goodson et al., 2017, Jeffreys et al., 2014; Kehle-Forbes et al., 2016; Mott et al., 2014). Younger veterans may have greater competing demands (e.g., work, school, young children) or may be less motivated for

treatment because they have not experienced PTSD symptoms for as many years compared to older veterans. War era has also been consistently associated with dropout status; OEF/OIF/OND veterans are more likely to dropout and Vietnam veterans are less likely to drop out of therapy (Eftekhari et al., 2013; Erbes et al., 2009; Jeffreys et al., 2014; Kehle-Forbes et al., 2016; Mott et al., 2014); however, two studies (Gros et al., 2017; Niles et al., 2017) did not find an association between war era and dropout. Importantly, age and service era are highly correlated, which can make it difficult to parse the individual contribution of each variable.

In an effort to better understand the relationship between, age, war era, and dropout, studies have examined both variables in the same model. Mott and colleagues (2014) found that although dropouts were more likely to be younger compared to completers, when age was included in a model with service era, service era was the significant predictor of dropout; OEF/OIF veterans were more likely to dropout compared to other eras. In contrast, Jeffreys and colleagues (2014) found that age was the significant predictor of dropout when both age and service era were included in the model. The mixed findings for the relationship between age and service era and their association with dropout warrants the need to further understand the relationships between these variables and to better understand the reasons for why younger veterans and OEF/OIF veterans are at higher risk for dropping out.

Clinical variables.

In addition to demographic variables, previous research studies commonly examine clinical variables as a contributing factor to veterans dropping out of therapy. Greater baseline PTSD and depression symptoms are consistently unrelated to dropout (Eftekhari et al., 2013; Goodson et al., 2013; Gros et al., 2017; Gros et al., 2013; Niles et al., 2017). However, Garcia and colleagues (2011) did find greater baseline PTSD and depression symptoms to predict

dropout. One study also found a relationship between PTSD symptomatology during treatment to predict dropout (Gros et al., 2017). Veterans with greater PCL scores at their last session were more likely to dropout from therapy (Gros et al., 2017). If veterans do not perceive symptom improvement they may be more likely to discontinue treatment. Overall, the predominant pattern is that baseline PTSD and depression symptomatology are not significant predictors of dropout.

The literature examining whether veterans' disability status is associated with drop out contains mixed results. Two studies have found that veterans who have a service connected disability are more likely to drop out from therapy (Gros et al., 2017; Gros et al., 2013) but two studies have not found an association (Garcia et al., 2011; Szafranski et al., 2014). Veterans who are service connected may have more severe PTSD symptoms increasing risk for dropout or their disability may hinder their ability to participate in treatment. The relationship between service connection status and dropout remains unclear.

There are several other clinical indicators that have been infrequently studied but have been associated with increased drop out from therapy. A prior inpatient stay (Mott et al., 2014), less improvement in overall symptomatology during treatment (Szafranski et al., 2014), less improvement in functioning during treatment (Szafranski et al., 2014), higher drug use at baseline (Szafranski et al., 2014), and the Minnesota Multiphasic Personality Inventory-2 negative treatment indicators scale (Garcia et al., 2011) have all been associated with greater likelihood of dropping out from PTSD treatment prematurely. However, these findings have not been replicated across multiple studies, and additional research is needed.

Few clinical variables have been consistently associated with PTSD treatment dropout. Researchers should continue to examine how baseline symptom severity, symptom

improvement, and rate of improvement affect veterans' dropout. Understanding how mental health symptoms affect drop out from therapy could allow clinicians to try to address these issues to try to prevent treatment discontinuation.

Beliefs and attitudes towards mental health treatment.

Despite the growing body of literature examining demographic and clinical variables, little attention has been given to the relationship between dropout and veterans' beliefs and attitudes towards mental health treatment. There is reason to believe that personal beliefs and attitudes may also impact treatment dropout. Even when veterans are able to overcome logistical barriers, psychological barriers also prevent them from seeking treatment. Veterans report PTSD avoidance symptoms and fear of stigmatization or being labeled "crazy" or "violent" as barriers to seeking treatment (Iversen et al., 2011; Mittal et al., 2013; Ouimette et al., 2011; Sayer et al., 2009; Stecker et al., 2013; Vogt et al., 2017). Although military personnel and veterans report stigma as a barrier to care, few studies have actually examined if stigma predicts mental health service utilization (Vogt, 2011). Hoge and colleagues (2014) examined reasons for dropout from mental health services among active duty military personnel and found that soldiers reported perceived stigma as one of the reasons for dropping out. These findings suggest that stigma may also impact treatment retention but there is a need to examine this in a veteran population. In addition to stigma, Veterans' negative attitudes and beliefs about mental health systems and providers can also decrease treatment seeking (Iversen et al., 2011; Sayer et al., 2009; Ouimette et al.,2011) and these same attitudes may lead to drop out. Agency-level barriers also limit access to PTSD treatments.

Treatment preferences may also influence drop out but no studies have examined if veterans' preferences for delivery modality predict drop out from treatment. However, Feeny

(2017) found that individuals with PTSD who did not receive their preferred PTSD treatment *type* (i.e., PE or sertraline) were less likely to complete therapy. If negative beliefs about mental health treatment, perceived treatment credibility and expectancies, and incongruent treatment delivery preference contribute to dropout, clinicians may be able to discuss and challenge these negative beliefs, improve credibility and expectancy, and match veterans with their preferred delivery modality to decrease drop out from therapy.

Therapeutic Process.

Therapeutic alliance has yet to be examined as a predictor of veterans' dropout from PTSD treatments but findings from the larger psychotherapy literature suggest this as an area that may help to inform research on dropout. In a civilian population receiving PE, a stronger early therapeutic alliance had a moderate, positive association with treatment completion PE (Keller, Zoellner, Feeny, 2010). These results are consistent with the broader psychotherapy literature. Roos and Werbart (2013) conducted a literature review examining how process factors influence dropout from individual psychotherapy with adults across several psychiatric conditions. Results indicated that stronger, early therapeutic alliance was associated with continued engagement in therapy and low, early therapeutic alliance was associated with higher dropout rates. Early therapeutic alliance may be particularly important for veterans with PTSD because of the pervasive distrust of others, including mental health providers. Although therapeutic alliance has received little attention in the PTSD dropout literature, it is an important and under-examined construct that may impact treatment retention. For example, if supported by research, providers could modify engagement and intervention delivery strategies to increase therapeutic alliance to reduce dropout.

Hoge and colleagues (2014) found that soldiers' self-reported concerns about stigma, the perceived inability to manage problems on one's own, and negative attitudes towards mental health clinicians were primary reasons for dropping out of PTSD treatment. Additionally, veterans' perceived treatment credibility (e.g., how well they think a treatment will work) may affect their decision to remain in therapy but there are no studies examining the impact of perceived treatment credibility on veterans' dropout from treatment. However, Taylor (2003) found that lower perceived treatment credibility was associated with higher drop out PTSD treatment in civilians. Similarly, treatment expectancies (e.g., how much they expect to improve from treatment) might influence retention but no studies have examined the relationship between treatment expectancies and drop out from PTSD treatment.

Access and logistical factors.

Difficulty accessing care and logistical factors are frequently cited as barriers to health service utilization (Iversen et al., 2011; Ouimette et al., 2011; Sayer et al.,2009). Although there is little research examining how these issues affect dropout from PTSD treatment, they may increase dropout rates. Lack of transportation, distance to the nearest VA hospital, scheduling difficulties, lack of child care, and limited PTSD specialty providers, may pose barriers that discourage veterans from remaining in PTSD treatment. For example, active-duty soldiers reported that scheduling difficulties were one of the main reasons that they dropped out of therapy (Hoge et al., 2014). Although this finding is not from a veteran population, scheduling difficulties are likely a universal deterrent to completing therapy. These same barriers that discourage treatment seeking may also affect veterans' decisions to discontinue treatment.

Treatment delivery modality.

There is a need for further research to understand how treatment delivery modality influences drop out because HBV and OBV are widely implemented within the VA Healthcare System

OBV and dropout rates. Several studies found that dropout rates from OBV are comparable to traditional office-based, in-person care (Acierno et al., 2016; Frueh et al., 2007; Morland et al., 2014; Morland et al., 2015). Additionally, two studies did not find delivery modality (videoconferencing versus traditional office-based care) to predict drop out from therapy (Gros et al., 2013; Kehle-Forbes et al., 2016). However, one pilot study did find that the OBV condition had a slightly higher dropout rate compared to traditional office-based care but the sample size was too small to conduct inferential statistics (Tuerk, Yoder, Ruggiero, Gros, & Acierno, 2010). The dropout rates in OBV may not be lower than traditional office-based care because many of the barriers prohibiting veterans from seeking or remaining in traditional office-based care (e.g., distance, transportation, stigma) are still relevant to OBV.

***HBV and dropout rates*.** To date, two studies have examined veterans' dropout rates from PTSD treatments delivered via HBV compared to traditional office-based care (Acierno et al., 2016, Acierno et al., 2017). Dropout rates did not significantly differ between delivery modalities in either study. Although the larger parent study (Acierno et al., 2017) did not find a significant difference in dropout between traditional office-based care and HBV, Gros and colleagues (2017) conducted a secondary study using survival analysis and found higher dropout rates in the HBV condition. The authors propose that survival analysis is a more sensitive analysis to detect differences (Gros et al., 2017). Given that HBV should overcome several barriers that may prevent engagement in treatment, additional research is needed to replicate this finding and better understand why HBV may increase dropout rates.

***IHIP and dropout rates*.** There are no published studies examining how IHIP affects drop out from therapy.

Limitations. There is still a need for additional research to understand if delivery modality influences veterans' decisions to dropout from therapy. Although there are a couple of studies that suggest OBV and HBV may have higher dropout rates, several of these studies took place in the same Southeastern geographic location and were conducted by the same investigators. The local context, such as traffic and urbanity, may influence barriers to care that subsequently influences drop out. It is important to examine the relationship between treatment delivery modality and dropout from PTSD treatments in a different geographic location and more heavily populated area because these factors may increase barriers to care. Additionally, none of the existing studies examine dropout examined IHIP but the IHIP modality might further reduce dropout for the previously mentioned reasons. There is a need for further examination, particularly for home-based modalities. These findings could have important health service delivery implications for how the VA Healthcare System offers PTSD treatment.

Summary of predictors of dropout. Overall, the current literature examining what factors predict veterans' dropout from therapy is inconclusive. Demographic and clinical variables are typically unrelated to dropout and warrants identifying other factors that could increase the likelihood of veterans dropping out of therapy. Beliefs and attitudes about mental health, the therapeutic process, logistical factors, and the treatment delivery modality should be considered as potential predictors. If researchers can identify reasons to explain the high dropout rates from PTSD studies, then researchers, clinicians, and leadership can try to address these issues through possibly modifying interventions or health service delivery models.

1.7 Current Study

There are effective PTSD treatments but treatment drop-out is a significant problem that increases PTSD symptomatology, inefficiently utilizes resources, can adversely affect patients in multiple ways, and negatively impacts society. The existing literature has produced inconsistent findings regarding which factors predict dropout, and several theoretically important variables have not yet been examined. Additionally, the VA Healthcare System continues to disseminate novel delivery modalities but there is still little information about if these modalities reduce drop out from treatment despite widespread implementation. Therefore, there is a need to better determine which factors predict veterans to drop out from therapy, how delivery modality affects drop out, and to better understand *why* these factors contribute to drop out from PTSD treatment.

The current explanatory sequential mixed methods study addresses several of these issues. Explanatory sequential designs utilize and integrate quantitative and qualitative methods and data to answer research questions. More specifically, researchers collect and conduct quantitative data and analyses first and then use qualitative data and analyses to better explain or elaborate on the quantitative findings (Creswell & Plano Clark, 2011). In this study, both quantitative and qualitative approaches were used to better understand not only predictors of dropout, but also veterans' perspectives and potential solutions to dropout. An explanatory sequential mixed method design can be useful to provide a context for quantitative findings. In this study, the quantitative data is from an ongoing federally funded randomized controlled trial comparing PE delivered via one of three modalities of care: in-home, in-person therapy (IHIP), home-based telehealth (HBT), and office-based telehealth (OBT) in a sample of 159 veterans diagnosed with PTSD. Individual qualitative interviews were conducted with a subset of veterans who were enrolled in the larger RCT and had dropped out from the therapy. The proposed aims are as follows:

Specific Aim 1: To determine if there are significant differences in dropout rates (i.e., the percent of people who dropped out) from Prolonged Exposure therapy between the IHIP, HBT, and OBT modalities of care.

Hypothesis 1: There will be a significant difference in dropout between conditions:

1a. HBT will have significantly higher dropout than IHIP.

1b. OBT will have significantly higher dropout than and IHIP.

1c. OBT will have significantly higher drop out than HBT.

Specific Aim 2: To identify demographic, clinical, working alliance, attitudinal and beliefs about mental health, and barriers to care that predict dropout from Prolonged Exposure therapy.

Hypothesis 2: Younger age, lower education, higher baseline PTSD and depression symptoms, higher stigma, greater perceived barriers to care, more negative attitudes towards mental health, office-based telehealth, OEF/OIF status, and PTSD service connection will predict higher dropout.

Hypothesis 3: Treatment preference congruence, greater perceived credibility of PE, greater positive treatment expectancies, and greater early therapeutic alliance will be associated with lower dropout.

Specific Aim 3: To explore whether there are differences in predominant themes and factors related to Veterans' reported reasons for dropout among the IHIP, HBT, and OBT.

No hypotheses are made for aim 3 because it will be examined qualitatively through a constant comparison approach. However, the qualitative interviews included questions that

broadly assess for veterans' reasons for dropping out. Additionally, specific areas that may theoretically affect veterans' decisions to drop out from therapy were explored, including the therapeutic alliance, assigned delivery modality, and logistical factors (e.g., parking at the VA hospital).

CHAPTER 2: METHOD

The current study is a QUAN → qual explanatory sequential mixed methods study where uppercase "QUAN" appearing before the arrow indicates that quantitative methods occur first and that there is more emphasis on this method. The lowercase "qual" that occurs after the arrow indicates that qualitative methods occur after quantitative and that it is more explanatory rather than the most predominant method in this study design. This study examines dropout data from a larger federally funded larger parent RCT that examined the efficacy of variable length PE delivered via three delivery modalities: OBV, HBV, and IHIP. Veteran participants who dropped out of PE in the larger RCT were invited to participate in the qualitative interviews in the current study. Additionally, a subset of individuals that dropped out of treatment from each of the three delivery modalities were invited to participate in a semi-structured individual interview assessing their reasons for discontinuing treatment and their experiences with PE.

2.1 Participants

Quantitative methods. Participants were 159 veterans diagnosed with PTSD in an ongoing randomized controlled trial and were randomized to receive PE in one of three delivery modalities (OBT, HBT, or IHIP). Participants included both treatment completers (n = 90) and dropouts (n = 69). See Table 1 for demographics.

Qualitative methods. Participants for the qualitative interviews were a subset of veterans (n = 22) who prematurely dropped out from the larger RCT study, stemming from each of the three delivery modalities. They completed individual interviews about their experiences with PE and their reasons for dropping out of PE. The 22 veterans included male (n = 14) and female (n = 8) veterans. Nine veterans were in the HBT condition, seven in OBT, and six in IHIP. Individuals included in the qualitative interviews had to have completed at least four sessions of

PE therapy prior to dropping out of treatment in order to assure that they had sufficient experience with the treatment modality and PE.

2.2 Inclusion/Exclusion Criteria

All veterans in the parent study were diagnosed with current PTSD using the Clinician Assessed PTSD Scale for *DSM-5* (Weathers et al., 2013). Additionally, veterans needed to have a clear memory of the trauma related to their PTSD, access to internet and telephone service, and residence within a 35-mile radius of an urban VA Medical Center. Exclusion criteria included concurrent PTSD or exposure treatment, current alcohol or drug dependence as assessed by the AUDIT (Saunders et al., 1993) and DAST (Skinner, 1982), hospitalization for psychiatric reasons or incarceration within the past year, dementia, unmanaged psychosis or mania, recent suicide attempt (past year), being a registered sex offender, or perpetrating sexual or physical assault in the past 5 years.

For the qualitative phase of this study, veterans must have dropped out of therapy but completed a minimum of four sessions to ensure they were exposed to enough of the intervention (e.g., the imaginal exposure) and service delivery modality to adequately describe their experiences with the treatment and service delivery modality. Veteran participants must have previously consented to be re-contacted for future research studies.

2.3 Recruitment

Quantitative portion of the study. Individuals in the larger RCT were recruited through VA provider referrals, presentations at PTSD clinic meetings, and flyers and brochures posted around the VA hospital.

Qualitative portion of the study. Purposive sampling was used to select veterans to participate in the qualitative interviews. Veterans who met the qualitative interview eligibility criteria (i.e., dropped out of PE in the larger study, completed at least four sessions of PE, and previously consented to be contacted for future research studies during the baseline assessment) were invited to participate. This resulted in 51 veterans being eligible for the qualitative interviews. A random number generator was used to identify the order in which veterans would be invited to participate. The random number generator was used to attempt to more reduce bias (e.g., time since treatment completion, etc.). However, by the end of the recruitment period, all veterans that were eligible for the qualitative interviews were contacted by phone to be invited to participate.

2.4 Procedures

In the parent RCT, veterans who were referred to the trial also completed a phone screen to assess for initial eligibility and attended a baseline assessment to confirm eligibility in the study. Veterans were randomly assigned to receive PE delivered via OBT, HBT, or IHIP. Participants were expected to complete PE using a variable length design. Veterans could receive up to a maximum of 15 sessions of PE, attending once a week for 90-minute sessions. For the current study, to be considered a treatment completer, veterans had to have started therapy (i.e., attended at least the first session) and completed 15 sessions of PE *or* demonstrate rapid symptom improvement, defined as having a PCL-5 score less than 20 for two consecutive sessions prior to completing 15 sessions. Therefore, treatment dropouts were individuals who began treatment (i.e., attended at least 1 session) but did not complete a minimum of 15 sessions of therapy and did not demonstrate a rapid treatment response. Following completion of treatment or dropping out of therapy, participants were invited to attend an in-person post-

treatment assessment and six-month follow-up assessment, which included a PTSD diagnostic measure and self-report questionnaires. Additionally, participants completed a brief phone assessment at two and four-month follow-up, which assessed current self-reported PTSD symptoms in the past week.

For the qualitative phase of this study, veterans who consented at the baseline assessment to be re-contacted for future studies, and who meet the current project's eligibility requirements, were contacted via phone to invite them to participate in a semi-structured interview at the Veterans Medical Research Foundation. To make every effort to engage participants, both telephone or in-person interviews were offered. If veterans preferred a phone interview, informed consent was obtained verbally and then a copy of the informed consent without signature lines was mailed to participants. The compensation form was also mailed to participants with a pre-stamped addressed envelope to be mailed back. For those who preferred an in-person interview, the semi-structured interview occurred at Veterans Medical Research Foundation. Veterans who attended the in-person interview completed the informed consent and compensation form on the same day as the interview. Both in-person and phone interviews were audio-recorded. All participants were compensated $30 for completing the qualitative interview.

The project was approved by the VA San Diego Healthcare System Institutional Review Board (IRB), the University of California San Diego (UCSD) IRB, and the San Diego State University (SDSU) IRB prior to beginning data collection.

Semi-structured interview. Open-ended questions were developed with feedback from committee members to collect data about veterans' reasons for dropping out of PE and to expand upon the quantitative findings. The interview guide had the first question be open-ended so that the interviewers' questions would not affect the veterans' responses. The interview guide

included open-ended questions that were related to theoretically important constructs of interest (e.g., therapeutic alliance; see Appendix A for the interview guide). The interview guide was piloted with several veterans and minor modifications were made to increase the clarity of the questions for the remaining interviews. Interviews were approximately 60 minutes long. The interviewer collected field notes that included the date, length of the interview, interview setting (i.e., phone or in-person), and the participant involved. The field notes and the interview transcripts were stored on a secure VA server and/or in locked cabinets, in locked offices.

Qualitative data preparation. Following the interview, a research assistant listened to the audio-recordings and transcribed the interview verbatim into Microsoft Word. A second research assistant listened to the audio-recording while reading the transcript to check the transcription for accuracy and correct any transcription errors. If there were discrepancies in the transcription after two transcribers review it, then the principal investigator listened to the audio-recordings to reconcile any indiscernible recordings or discrepancies between the two transcribers. Any personal information, such as names, places or agencies were deleted from the transcript to maintain the privacy of the participant interviewee.

Overall mixed-methods integration. To integrate quantitative and qualitative findings, we examined the findings from both the quantitative and qualitative analyses separately and identified areas of difference or convergence. Results were placed side by side in a table to allow for identification of convergence (results that provide the same answer to the same question), elaborative complementarity (if qualitative findings can help to explain quantitative findings) and expansion (new and unexpected findings or if unanticipated findings in one dataset can explain findings in another).

2.5 Intervention

Veterans participated in up to 15 once-weekly, 90-minute sessions of individual PE; length of treatment was determined by treatment response. PE is an evidence-based PTSD treatment that includes psychoeducation about trauma and PTSD, a motivational interviewing session, breathing retraining, imaginal exposures, and in-vivo exposures. Veterans start to do in-session imaginal exposures during session four of this PE protocol because there is a session for motivational interviewing. Veterans create a fear hierarchy that includes activities that currently remind the veteran of the index trauma, situations that they avoid because of the index trauma, or activities that they used to enjoy but no longer engage in. Veterans are assigned weekly homework assignments to complete outside of therapy. Veterans are expected to listen to practice breathing retraining, listen to an audiorecording of the imaginal exposure daily, and participate in in-vivo exposures several times per week.

2.6 Quantitative Measures

Demographics. Participants completed a demographics questionnaire developed by the study investigators at the baseline assessment. Age and education are included in the current study.

Clinical variables.

***Baseline ptsd symptoms*.** The Clinician Assessed PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2013) was administered at the baseline assessment to determine diagnostic PTSD status. The CAPS-5 is 30-item structured interview with total scores ranging from 0-80. Internal consistency values for the CAPS-5 total score and the re-experiencing, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity symptom

clusters were α = .88, .77, .55, and .77, respectively (Weathers et al., 2017). Test-retest reliability for the CAPS-5 has been found to be .83 (Weathers et al., 2017) and is 74 in the current sample.

***Baseline depression symptoms*.** Veterans completed the Beck Depression Inventory-II (BDI-II; Beck et al., 1996) at baseline assessment to determine depression severity. The BDI-II is a 21-item self-report measure. Items are rated on a 4-point scale ranging from 0 (e.g., I don't have thoughts of killing myself) to 3 (e.g., "I would kill myself if I had the chance"); however, Items 16 and 18 have seven response options to indicate an increase or decrease in the symptom. A total score is calculated by summing the total of all 21 items, which ranges from 0 to 63. Cronbach's alpha in veteran samples is .93 (Palmer et al., 2014) and .88 in the current sample.

Therapeutic process variables.

Working alliance. The Working Alliance Inventory-SR, (WAI-SR; Hatcher & Gillaspy, 2006) was administered at the second, sixth, and last session of treatment. The WAI-SR is a 12-item measure and items are rated on a 1 ("seldom") to 5 ('always') scale; all items are positively worded (e.g., "As a result of these sessions, I am clearer as to how I might be able to change"). The WAI-SR contains three subscales, Task, Goal, and Bond and a total score can be calculated for overall working alliance. Greater scores indicate greater therapeutic alliance. The current study modified the item order of the WAI-SR; items were presented together by subscale (i.e., Task, Goal, Bond). Additionally, the current study modified the response anchors to be on a 1 (strongly agree) to 5 (strongly disagree) scale with lower scores indicating greater alliance. Therefore, all items will be reverse scored so that greater scores indicate greater therapeutic alliance. Given that early therapeutic alliance has been found to be associated with lower dropout, WAI-SR total scores from session two were included in the current study. Cronbach's alpha is .90 for the WAI-SR (Munder et al., 2010) and .96 in this study.

Perceived expectancy of PE. Veterans completed the Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) at the baseline assessment. The CEQ is a two-factor measure that assesses perceived credibility and expectancies of treatment. To assess perceived treatment expectancies in this study, the Expectancy subscale was used. The Expectancy subscale is a 3-item subscale and higher scores indicate better treatment expectancies. The expectancy subscale has an internal reliability of $\alpha = .90$ (Devilly & Borkovec, 2000) and in this sample it is .86.

Perceived credibility of PE. The Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) was administered at baseline. The CEQ is a two-factor measure that assesses perceived credibility and expectancies of treatment. The Credibility subscale was included in this study to assess perceived treatment credibility. The Credibility subscale is a 3-item subscale and higher scores reflect better treatment credibility. Cronbach's alpha has been found to be .86 (Devilly & Borkovec, 2000) and is .85 in this sample.

Attitudes and beliefs about mental health.

Stigma. Veterans completed a modified version of the Stigma/Barriers to Care questionnaire (SBTC; Britt et al., 2008). To assess stigma, the current study included a modified 7-item Stigma subscale. Items are rated on a 1 ("strongly disagree") to 5 ("strongly agree") scale with possible total scores ranging from 7-35; higher scores indicate greater concerns about stigma. The original SBTC Stigma subscale was six items so the version administered in this study included an extra item (i.e., "it would harm my career). Internal consistency is .91 in the current sample.

***Negative attitudes towards mental health*.** Veterans completed a modified version of the Stigma/Barriers to Care questionnaire (SBTC; Britt et al., 2008). The original SBTC is an 11-item measure that assesses possible concerns people may have that affect one's decision to seek psychological treatment. The original version of the SBTC has two subscales, Stigma (6 items, e.g., "My peers might treat me differently") and Barriers to Care (5 items, e.g., "I don't have adequate transportation"). The current study modified the measure to contain an additional subscale, Negative Attitudes Towards Mental Health. The Negative Attitudes Towards Mental Health four item subscale was used to assessed to veterans' negative attitudes towards mental health care (e.g., "mental health care doesn't work"). Items are rated on a 1 ("strongly disagree") to 5 ("strongly agree") scale. Higher scores indicate greater negative attitudes towards mental health care and possible total scores range from 4-20. Cronbach's alpha is $\alpha = .87$ in this sample.

Treatment preference congruence. The study investigators developed a treatment delivery modality preferences questionnaire to assess how veterans prefer to receive PE. The questionnaire briefly describes each of three possible delivery modalities (i.e., OBT, HBT, IHIP) and then veterans were instructed to rank their first, second, and third choice of treatment delivery modality prior to randomization. To examine treatment preference congruence, veterans' first choice delivery modality will be selected. An additional variable will then be created to determine if the veteran was randomly assigned to their preferred delivery modality (yes/no); this variable will be used in analyses to examine treatment preference congruence.

Barriers to Care. The current study examined veterans reported barriers to care using the Barriers to Care subscale of the Stigma/Barriers to Care questionnaire (SBTC; Britt et al., 2008). The Barriers to Care subscale is a 5-item subscale that assesses barriers to receiving care (e.g., "I don't have adequate transportation"). Items are rated on a 1 ("strongly disagree") to 5 ("strongly

agree") scale with possible total scores ranging from 5-25; higher scores indicate greater concerns about barriers to care. Cronbach's alpha in the current sample is $\alpha = .71$.

2.7 Data Analysis Plan

All analyses were conducted using a two-sided type I error level alpha = 0.05.

Aim 1. Logistic regression was used to determine if dropout rates significantly differed between the three conditions. The three conditions were coded by two indicators and the null hypothesis of no difference across the three conditions was tested using an appropriate linear contrast. If the null was rejected, post-hoc analyses were conducted to examine difference between any two of the three conditions as stated in hypotheses 1a) – 1c). The hypothesis was supported if 1) a significance difference exists between the two conditions, and 2) difference is in the hypothesized direction.

Aim 2.

Quantitative data analysis.

To evaluate goodness of fit, Hosmer and Lemeshow tests were performed; results indicated no conflict with model assumptions of fit ($p > .05$). To adjust for missing data in the covariates, a multiple imputations method was utilized with 50 iterations.

For both Hypotheses 2 and 3, a hierarchical logistic regression with four block increments was used to identify the predictive accuracy of patient characteristics, therapeutic process, attitudes towards mental health and therapy, and logistic factors of treatment dropout; logistic analysis was interpreted with two-sided type 1 error level alpha = .05 and 95 percent confidence. Treatment dropout was coded as dropout = 1 and completer = 0. To test hypotheses 2 and 3, all variables of theoretical interest were included in the initial full model, which

included four blocks. Variables were forced entered into different blocks based on theory; variables were grouped together if they shared theoretical similarities. Block 1 included patient characteristic variables that have previously been found to be associated with dropout from PTSD treatment (i.e., age, education, OEF/OIF status, PTSD service connection, baseline PTSD severity, and baseline depression severity) that were associated with dropout. Block 2 contained therapeutic process variables (i.e., working alliance, perceived credibility of PE at baseline, and expectancy of PE at baseline). Block 3 included attitudes towards mental health and treatment (i.e., negative attitudes towards mental health providers, perceived stigma, and treatment preference congruence). Block 4 contained logistical factors (i.e., practical barriers and delivery modality). Categorical independent variables were coded as follows: OEF/OIF status (0 = No; 1 = Yes), PTSD Service Connection (0 = No; 1 = Yes), Delivery Modality (0 = IHIP, 1 = HBT, and OBT = 2), Treatment Preference Congruence (0 = No, 1 = Yes). It is recommended to have at least 10 participants per variable for a logistic regression analysis (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996); therefore, the current sample size and analyses had enough participants to accommodate the 14 independent variables in the full model.

To reduce the full model to a more parsimonious model, which increases model precision, only variables that were statistically significant or trending towards significance ($p <$ .1) in the full model were retained in the final trimmed model. The trimmed model utilized hierarchical regression and entered variables into blocks based upon their theoretical similarity (i.e., patient characteristics, therapeutic process variables, attitudes towards mental health and therapy, and logistical factors). The hypothesized effect was supported if 1) the variable was retained in the final trimmed model, and 2) the coefficient of the variable is in the hypothesized direction. Nagelkerke's R is provided for the final trimmed model.

The Box-Tidwell test was used to test the linearity of the logit. The Box-Tidwell test requires computing the logit of each independent variable and then computing an interaction between the logit variable and the original variable. These variables are then used to predict the dependent variable in a logistic regression model. The linearity of the logit is violated if an interaction term is significant ($p < .05$). The linearity of the logit assumption was violated for the education variable. To address this violation, a polynomial of education was computed and then the logit of this variable was computed. These terms were then interacted with each other in the model, which no longer violated the linearity of the logit assumption ($p = .054$). Therefore, the polynomial of education was in the initial full and final models.

To detect potential multicollinearity, the variance inflation factor (VIF) was examined for all independent variables in the model. All of the independent variables had VIF values of less than 2.5, which does not provide evidence for multicollinearity.

Qualitative data analysis for Aims 2 and 3. To support the reliability of the data analysis process, team based coding procedures were used. The principal investigator of this study conducted team based coding with one other coder to increase validity of interpretation and discuss coding discrepancies in real time. The two coders developed the code book together to ensure that both coders agreed on the meaning of a code. The coders used an iterative process to review the transcripts and code text segments using Dedoose qualitative analysis software. The coders conducted an open coding cycle to identify descriptive (responses based on the topic) and structural (responses based on the questions) codes to identify common themes and to develop a coding schema. The structural codes were based on *a priori* questions that were informed by the current literature on veterans' reasons for premature drop out from PTSD treatment (e.g., mental health symptoms) and theoretically proposed topics of interest (e.g., working alliance). The

coders identified any emergent codes throughout the process. The open coding cycle informed the preliminary codebook. The preliminary codebook then was piloted on several transcripts and modified, as needed, to clarify the questions in the codebook. Subsequently a second cycle of focused coding was conducted to refine preliminary codes into a final code book. The final codebook was then used in the final analysis and uncommonly used codes were removed from the codebook. Codes were then grouped together based on similar content to form broad themes.

A constant comparison approach was used to explore if identified codes differ between subjects and if codes differ between delivery modalities to identify if reasons for dropping out differ between delivery modality. The constant comparison approach allows for data to be coded for new themes to emerge (Hewitt-Taylor et al., 2001). Researchers consistently review the data after initial rounds of coding until there are no new themes that can be identified (Hewitt-Taylor et al., 2001). Constant comparison helps researchers elicit theory (Glaser, 1965). When conducting a constant comparison approach, the researcher codes and examines data and then compares it with the other data. The researcher may compare previously coded and newly coded material several times (Boeije, 2002). Conducting comparisons allows the researcher to identify similarities and differences within the data (Boeije, 2002).

Quantitative Missing Data. Several approaches exist for handling missing data. Missing data values in the current study were estimated and integrated into data analysis using multiple imputation methods. Multiple imputations makes predictions for missing data based on known data and patterns of missing data (de Goeji et al., 2013). This approach also allows one to retain the uncertainty of the missing data values while approximating the real values (Patrician, 2002). Multiple imputation is desirable because it allows for the researchers' knowledge when creating the multiple model that is used to predict missing values (Patrician, 2002). Repeated estimates

are used to create variability in imputed missing data values to address the limitations of single mean imputation. By using all observed data, rather than a subset of subjects with complete data for all variables (covariates) as in complete case analysis, imputation increases efficiency by decreasing standard errors (Patrician, 2002). Thus, multiple imputation is favorable to other methods, such as single mean imputation or complete case analysis. Although single mean imputation allows one to retain all observed data, it may bias the estimated missing data if individuals with available data have different characteristics than those with missing data (de Goeji et al., 2013), a phenomenon known as the missing at random (MAR) mechanism. Additionally, the true value of a missing value is unlikely to be the overall mean. Variances also underestimate true sampling variability of parameter estimates in mean imputation (de Goeji et al., 2013). Complete case analysis is less desirable than multiple imputation because the researcher removes any cases with missing data; therefore, sample sizes are reduced, which reduces power, and the results may be biased under MAR because individuals with missing data may have different characteristics than individuals with complete data (de Goeji et al., 2013).

Prior to conducting the multiple imputation, patterns of missing data were analyzed in SPSS Version 24. Little MCAR's test was conducted to determine if data were MCAR. The results were non-significant which indicates that the data were missing completely at random and there was no pattern to the missing data, $\chi^2 = 1127.95$, df = 2413, $p = 1.00$. To further confirm that data were MCAR to support the use of multiple imputation, additional analyses were conducted. Ten participants (6%) were missing the WAI from session two. To determine if individuals who were missing the WAI were different than those with completed the WAI and attended session two on variables that may have impacted the missing data. Participants with the WAI and without the WAI from session two were compared on CAPS Avoidance symptoms,

credibility scores, expectancy scores, and delivery modality. An independent samples t-test was used to compare individuals on continuous variables (i.e., CAPS avoidance severity, credibility scores, and expectancy scores) and a chi-square analysis was conducted for categorical variables (i.e., modality). Individuals with and without the WAI at session two did not differ on CAPS avoidance severity $t(157) = -.17$, $p = .19$, credibility $t(157) = .263$, $p = .31$, expectancy $t(157) = -.51$, $p = .44$, or modality $\chi^2(2) = .17$, $p = .92$. These results indicate that was no pattern of missing data for the WAI at session two. From the above analyses, there was no evidence to reject the null of MCAR.

2.8 Power Analysis. Power analysis was performed to determine likelihood of detecting differential dropout between the groups. Since dropout rates observed in our sample show a clear pattern of differential dropout across the three groups, we used a one-sided type I error rate alpha = 0.05 when estimating power for our selected sample size.

This study has a sample size of $n = 159$, which is distributed across the three groups as follows: a) IHIP = 53; b) HBT = 54; and c) OBT = 52. In Aim 1, we hypothesize that (a) IHIP has a lower dropout rate than both HBT and OBT, and (b) HBT has a lower dropout rate than OBT. For (a), we combined HBT and OBT and performed power analysis to detect a difference between IHIP and the combined HBT and OBT. The dropout rates for the three groups based on the sample are:

IHIP Dropout = 26%, HBT Dropout = 44%, OBT Dropout = 60%.

For (a), using the pooled dropout rate for the combined HBT and OBT group, we will have 90% power to detect the observed difference in dropout rate between IHIP and the combined HBT and OBT group. We will also have 90% power to detect the observed difference in dropout rate

between the IHIP and OBT. However, we will have slightly over 50% power to detect the observed difference in dropout rate between the IHIP and HBT group. For (b), we will also have about 50% power to detect the observed difference in dropout rate between the HBT and OBT group.

We also estimated power for regression analysis. We have over 10 potential predictors for differential dropouts between the three groups, including binary (e.g., groups) and continuous (e.g., age) variables. Although our full model will include multiple predicators, power analysis for such multiple logistic regression is quite complex and difficult to perform. In the power analysis, we estimate power for each predictor, while controlling for the remaining predictors and covariates. Although not exactly the model that will be actually performed, power analysis based on the simplified model allows us to get some ideas about the effect size that will be detected with the proposed sample size.

We set power at 80% and estimated detectable odds ratio for one predictor, controlling for all other predictors and covariates in the multiple logistic regression. We set 0.3 as the multiple correlation coefficient relating the predictor to the other predictors and covariates. With the proposed sample size, we can detect an odds ratio as small as OR = 3.14 when the base drop rate is 0.26 or an odds ratio as small as OR = 3.24 when the reference dropout rate is 0.44. These estimates imply that we will have 80% power to detect an odds ratio of at least 3.14 when comparing dropout rates between the IHIP and the other groups and a slightly larger odds ratio of at least 3.24 when comparing the HBT and the other groups. For a continuous predictor, we will have 80% power to detect an odds ratio of at least 3.14 when the base dropout rate is 0.26 and an odds ratio of at least 3.24 when the base dropout rate is 0.44 for each unit increase in the predictor.

CHAPTER 3: RESULTS

3.1 Aim 1. Forty-three percent (n = 69) of veterans dropped out of PE in the overall study. Sixty percent (n = 31) of veterans dropped out OBT, 44% (n = 24) from HBT, and 26% (n = 14) from IHIP. Logistic regression models indicated that veterans in the OBT condition were more likely to dropout from therapy than individuals in the IHIP condition β = 1.414 p < .01, OR = 4.112, 95% CI [1.083, 9.379]. Veterans in the HBT condition were also more likely to drop out of therapy compared to veterans in IHIP, β = .801, p = .053, OR = 2.229, 95% CI [.998, 5.025]. Individuals in OBT were more likely to drop out of therapy compared to individuals in HBT, β = .613, p = .120, OR = 1.845, 95% CI [.853, 3.991] although the increase in drop out was not statistically significant (See Table 2).

3.2 Aim 2.

Quantitative Results.

Full Model. Block 1 revealed that patient characteristics did not statistically predict dropout rate (p ranged from .19-.22 across the original data and 50 multiple imputation datasets). Results indicated a small effect size (Nagelkerke R^2 ranged from .07-.08 across the original data and 50 multiple imputation datasets); multiple imputations method did not impact interpretation.

Block 2 was likely not significant, which revealed that the addition of process variables in block 2 did not statistically predict dropout rate. Multiple imputations method revealed majority iterations as ranging p = from .04-.13 across the original data and multiply imputed datasets; however, the majority of the imputed datasets were non-significant at the .05 level. Analysis of individual predictors revealed one statistically significant predictor of perceived credibility, p = .029, which impacted the Block 2 model. Results indicated a small effect size

(Nagelkerke R^2 = .11-15 across the original data and multiple imputed datasets) with an average R^2 change score of .055 for Block 2.

Block 3 revealed that the addition of attitudes towards mental health and therapy variables did statistically predict dropout rate. A multiple imputations method revealed significance values to range from p = .04-.13; however, only the original data was non-significant (p = .13) and all imputation datasets were significant. Nagelkerke's R^2 ranged from .18-.20 across the original data and 50 multiple imputation datasets. Results revealed an R^2 change of .06. Stigma (p = .045) was a significant individual predictor in this block. Perceived credibility (p = .052) and perceived expectancy (p = .086) were trending towards significance in Block 3.

Block 4 revealed that the full initial model, which included all variables of interest, statistically predicted dropout, all imputation datasets were $p < .01$. Multiple imputations method did not impact interpretation; significance values were less than .01 across the original and imputed datasets. Nagelkerke's R^2 ranged from .26-.29 across the original data and imputation datasets. Results revealed an R^2 change of .085. The Hosmer & Lemeshow test revealed a good model fit (p ranged from .16-.91 across the original and imputation datasets). Results from the full model indicated that age, education, OEF/OIF status, PTSD service connection, baseline PTSD severity, baseline depression severity, early therapeutic alliance, negative attitudes towards mental health providers, treatment preference congruence, and practical barriers were not associated with dropout (see Table 3). There was a strong trend for greater perceived credibility at baseline to be negatively associated with dropout; individuals with higher perceived credibility were significantly less likely to drop out of therapy, β = -.214, p = .051, OR = .807, 95% CI [.651, 1.001]. Perceived expectancy also trended towards significance; individuals with

greater perceived expectancy were 1.2 times more likely to drop out of therapy, β = .056, *p* = .07, OR = 1.2, 95% CI [.996-1.12]. There was also a trend towards significance for individuals with greater stigma to be 1.05 times more likely to drop out of therapy for every one point increase on the stigma measure, β = .056, *p* = .068, OR = 1.05, 95% CI [.996, 1.12]. Delivery modality significantly predicted dropout. Individuals in OBT were 4.25 times more likely to drop out of therapy compared to individuals in IHIP, β = 1.45 *p* < .01, OR = 4.235, 95% CI [1.68, 10.74]. However, individuals in HBT were not more likely to drop out of therapy compared to those in IHIP, β = .77, *p* = .103, OR = 2.1, 95% CI [.855, 5.453]. Similarly, individuals in OBT were not significantly more likely to drop out than those in HBT, β = .65 *p* = .14, OR = 1.96, 95% CI [.80, 4.58]. Perceived credibility, perceived expectancy, stigma, and delivery modality were retained in the final trimmed model.

Trimmed Model. The trimmed model significantly predicted dropout (*p* < .01, Nagelkerke's R^2 = .19). The Hosmer & Lemeshow test indicated good model fit, *p* = .18. Greater perceived credibility was associated with a lower likelihood of dropout β = -.21, *p* = .023, OR = .795, 95% CI [.677, .972]. Perceived expectancy at baseline was not associated with dropout, *p* = .12. Veterans with greater perceived stigma at baseline were more likely to drop out from PE β = .053, *p* = .03, OR = 1.05, 95% CI [1.004, 1.108]. Delivery modality was also significantly associated with dropout. Veterans in the OBT condition were 4.15 times more likely to drop out of PE compared to those in IHIP, β = 1.42, *p* < .01, OR = 4.15, 95% CI [1.73, 9.96]. There was a trend for veterans in the HBT condition to be 2.20 times more likely to drop out from PE than those in the IHIP condition β = .79, *p* = .07, OR = 2.20, 95% CI [.93, 5.19]. Veterans in the OBT condition were not significantly more likely to drop out of PE than those in HBT, *β* = .64, *p* = .12, OR = 1.89, 95% CI [.84, 4.25] (See Table 4).

Qualitative Results. The majority of veterans interviewed reported a variety of reasons for dropping out of PE, which have been organized in to the following thematic categories: 1) Barriers to Therapy; 2) Psychological and Physical Health Factors; and 3) Therapeutic Context. Barriers to therapy included logistical barriers and beliefs about treatment that hinder veterans from completing PE. Psychological and physical health factors were emotional or PTSD-related symptoms that affected dropout. Physical health factors were aspects of physical health that affected veterans' decisions to drop out of PE. The therapeutic context included aspects of PE that veterans disliked, the delivery modality, the therapeutic relationship, and perceived credibility and expectancy of PE.[11]

Theme 1: Barriers to Therapy.

Practical Barriers. Slightly more than half of veterans denied that practical barriers affected their decision to drop out of therapy, particularly veterans in the IHIP or HBT conditions. Several veterans in the HBT and IHIP conditions said that being in their own home on telehealth or having the therapist come to their home reduced practical barriers. However, there were some veterans in the IHIP and HBT conditions still experienced practical barriers. Almost half of veterans mentioned practical barriers as a reason for deciding to drop out of PE. Across the three delivery modalities, several veterans expressed that scheduling difficulties affected their decisions to drop out. For example, a couple of veterans found it difficult to identify appointment times that worked for both their schedule and their therapist's schedule. Another veteran described that there was confusion between himself and the VA staff about his appointment times or cancellations, such as not being notified about cancelled appointments.

[1] All pronouns have been changed to "she" to protect confidentiality.

Multiple veterans also reported having competing demands, including work obligations and school schedules that made it difficult to continue in therapy. As one veteran explained it:

> *"[the] only reason that I didn't continue was because I was in school at the time. As for that five weeks, my schedule was one way, and then the next 5 weeks my schedule flipped, but I couldn't switch my appointment time (HBT participant)."*

Veterans in the OBT condition report that travel time, difficulty obtaining transportation, traffic, and distance to appointments were also practical barriers that impacted their decision to drop out of PE. For example, one veteran in the OBT condition relied on VA transportation services to attend appointments; however, this veteran reported that the VA van often filled up, which resulted in having to use public transportation to get to appointments. This veteran also had health conditions that made it difficult to walk to and between the bus stops to travel to appointments. Veterans also described how the experience of going to the VA emotionally impacted them. For example, a couple of veterans found parking at the VA to be difficult and one of them explained how it caused him to become frustrated before his PE appointments.

> *"I already knew I was going to be irritated by the time I got there because I anticipated parking to be a complete mess and that's what it was every time…it was already starting as a fail (OBT Participant)."*

There were also practical barriers that were infrequently endorsed. One veteran in the HBT condition said that technological difficulties, such as freezing and volume loss, affected the decision to discontinue treatment. Another veteran also reported that their therapist left the VA during therapy to open a private practice and they were unable to be assigned to another PE provider on the study and was, therefore, unable to complete treatment. Several of veterans also had to relocate while in PE and therefore needed to discontinue therapy. For example, one veteran had to move to study abroad, another bought a house and moved outside of the study radius, and one veteran needed to live across the country for work for large periods of time.

Attitudes and Beliefs About Mental Health and Providers. Overall, veterans expressed positive attitudes towards mental health providers. The majority of veterans expressed respect towards their providers and felt that providers work hard to care for veterans and denied that their beliefs about mental health providers impacted their decision to drop out of PE. However, a couple of veterans did say that their views about mental health providers affected their decision to drop out. One veteran felt that providers care more about getting information than about the patient themselves. Another veteran expressed that they did not think that civilian providers can understand veterans and that he would have remained in therapy if he felt that providers could relate to his experiences.

The majority of veterans acknowledged that there is a societal stigma towards mental health. However, some veterans also recognized that mental health stigma has decreased in recent years, including due to the VA's efforts, and that some people are now more understanding about mental health problems and towards people with mental health disorders. Most of the veterans also expressed thinking that other people view often people with mental health difficulties negatively, such as being viewed as "crazy", "nuts", or weak. Veterans also described how this perceived stigma can impact mental health utilization. About a third of the veterans felt that the stigma towards mental health had prolonged them seeking therapy because of the fear of being viewed as "weak" or as a "problem" or because they thought they should "suck it up". Although stigma appears to delay some veterans from seeking mental health treatment, only two veterans felt that the stigma towards mental health contributed to them dropping out of PE. One of these veterans said that although it was not the primary factor in the decision to end therapy, and that he was not comfortable telling people that he was in therapy, and he was not proud to be in therapy. Additionally, he felt that his boss also did not like him

being in treatment. The other veteran said that he was worried that someone would find out he was in therapy and therefore wanted to finish therapy quickly. As he described it:

> *"the mental note of, you know, me trying to hurry up and get it over with before somebody finds out. It was there, you know what I mean, it was always there, you know? And it's just like you're counting down the sessions (HBT Participant)"*

Veterans spoke about their reasons for choosing their preferred delivery modality at baseline assessment, although some veterans had difficulty remembering why they chose they preferred modality. Almost all of the veterans denied that treatment preference congruence (i.e., being randomized to their preferred delivery modality) affected their decision to drop out; however, a few veterans did describe how being matched or unmatched with their preference affected their decision to discontinue therapy. One veteran preferred IHIP and was randomized to OBT, he described that not being given his preference affected his decision to drop out because he did not want to have to drive to the VA hospital. Another veteran that preferred HBT said that not receiving the top choice modality affected the decision to drop out because being assigned to OBT rather than HBT increased barriers to therapy (i.e., transportation), which led to feelings of self-blame when unable to attend appointments. A veteran who was matched with his preference said that he likely would not have participated in treatment if he had not received his preferred modality:

> "*Oh absolutely, yeah it was 100% having in-home, I mean, I probably would not have participated if I had to go in [to the office] (IHIP Participant)".*

Theme 2: Psychological and Physical Health Factors.

Psychological and Emotional Factors. Veterans spoke about the effect that psychological symptoms, such as PTSD symptoms, affected their decision to drop out. They also discussed how emotions or difficulty with emotions led to their decision to drop out. The impact of avoidance, including behavioral and experiential (i.e., avoidance of internal experiences, such as

thoughts, memories, feelings, bodily sensations) avoidance, emerged as a factor that affected a few veterans' decision to drop out of PE. One veteran spoke about how she did not want to engage in the homework assignments (i.e., in-vivo exposures) and this contributed to her dropping out of therapy. Some veterans spoke about how they felt that that PE was causing their symptoms to increase, such as their increased re-experiencing symptoms (e.g., nightmares and unwanted memories). The perceived increase in symptoms led to a few veterans wanting to be able to avoid thinking about the trauma so they decided to drop out from therapy. For example, one veteran described how not wanting to remember the trauma was the primary reason for dropping of out PE:

> *"The main thing is I'm not ready to go back to reliving it again. That's the only reason why I did not continue on (IHIP Participant)."*

An unexpected and emergent finding was that Veterans' perceptions of their symptom change also affected their decision to drop out. Half of the veterans thought that PE exacerbated their symptoms and caused their symptoms to become worse and that impacted their decision to end treatment. As one veteran stated:

> "*That's why I quit – it's because I didn't feel like it was helping my PTSD, I felt like it was making it worse (OBT Participant)."*

Veterans described a variety of ways in which they perceived symptoms worsening. A few veterans said that PE made them more anxious and one veteran described how the treatment increased distress but the distress would not decrease for days. Several veterans also said that the treatment was making them feel more depressed, which sometimes impacted their other symptoms, such as leading to more social isolation. For example, one veteran described feeling more depressed and noticing that he was socially isolating more often than before. He reported that he started to want to leave parties early and did not want to be around his wife as much as before. Veterans also perceived re-experiencing symptoms to be increasing, particularly intrusive

memories and nightmares. A few veterans thought that their hypervigilant behaviors were also increasing during therapy. For example, a veteran talked about how he was engaging in more hypervigilant safety behaviors, such as scanning rooms to look for exists, looking out windows, and waking up to walk around in the night. Several veterans described feeling more irritable and angry during treatment and felt that this was because of the therapy. Veterans were perceiving their symptoms to worsen and were concerned about the impact that this may have on their lives. One veteran who had recovered from drug addiction was concerned he would relapse if he remained in therapy and another was worried how their perceived worsening symptoms would impact their functioning. A single veteran spoke about how he did not think that the PE was impacting his symptoms. He described how although it did not make them worse, it also did not improve them. One veteran thought that PE was prolonging his symptoms. A unique and important experience shared by one veteran was the perception that he ended treatment because he thought PE made his symptoms better and that he had learned enough tools to manage his PTSD. Although he recognized that he still is experiencing some PTSD symptoms he had found PE to be helpful for him.

Difficulty tolerating distress and managing difficult emotions emerged as a factor that also affected dropout for several veterans. Several veterans spoke about how PE elicited difficult emotions and that they found it difficult to deal with these unexpected emotions. Veterans also expressed wanting to avoid these difficult emotions or feeling overwhelmed by them. One veteran talked about how PE brought up feelings from his trauma and that he questioned how he would be able to "handle" these emotions by himself. A female veteran described how she found the emotions to be too much and that dropping out of therapy was a solution:

> *"I couldn't deal with like all of the emotions. It was too much. So, I had to just, I had to either figure out how to fix it, and for me to fix it was to cut off what I felt was the underlying cause of the emotional turmoil (IHIP Participant)."*

A few veterans expressed how having limited social support during PE contributed to them dropping out of therapy. One veteran said how he did not have any friends or family to talk to after his therapy sessions for support. Another veteran spoke about how he would go home after therapy but was unable to talk openly to his husband about his experience and would need to process his emotions alone. An older male veteran in the HBT condition talked about how he would be alone after his sessions when he turned off his computer. He contrasted his experience with younger veterans whom he perceived would have more social support:

> *"The most important thing is getting riled or fired up and then the computers turning off and your alone, that's the most important thing or the number one thing that affected my decision to withdraw from the program (HBT Participant)."*

Physical Health Factors. The impact of physical health problems emerged as a reason for dropping out of PE. A third of veterans spoke about how their physical health affected their decision to end treatment. For some of these veterans, the physical health problems were distinct and unrelated to therapy, whereas others believed that the treatment was exacerbating pre-existing conditions. One veteran described a back injury, that later resulted in a spinal fusion surgery, that caused him severe pain and difficulty getting out of bed or sitting in a chair during therapy appointments. Another veteran learned while she was enrolled in the study that she had a tumor on her pituitary gland and needed to end treatment to have surgery and physically recover rather than continue PE. Similarly, another veteran needed to have surgery because of blood clots in her foot that had moved to her lungs, which made it difficult for her to walk and breathe. These experiences highlight how physical health problems that are unrelated to PE can still affect

veterans' abilities to remain in therapy because physical health concerns may take precedent over therapy.

Other veterans thought that PE was worsening their existing physical health issues. A couple of veterans thought that PE was impacting their chronic pain conditions. For example, a female veteran thought that the emotional pain from PE was causing her physical pain to worsen. Another veteran who had to drive to the VA for his appointments said that his back pain would worsen from sitting in the car during the drive. One veteran said that his chronic pain condition dictated his daily activities and that when he attended PE sessions he felt physically drained after the appointment. Aside from exacerbating pain, a veteran with irritable bowel syndrome described how he thought that the stress from PE was worsening his IBS, which affected his decision to end therapy.

> *"The stress was making my body really sick. My IBS, the constant adrenaline was making my body breakdown and my gut was turning to liquid on a regular basis (OBT Participant)."*

If veterans have pre-existing health conditions and perceive PE to be worsening their symptoms then they be at increased risk to discontinue therapy as a way to manage their health.

Theme 3: Therapeutic Context

Therapeutic Alliance. Overall, most of the veterans expressed positive feelings towards their providers and felt that their providers cared for them. These veterans denied that the therapeutic alliance had affected their decision to drop out. In fact, several veterans reported that they remained in therapy longer than they had wanted to because they felt connected to their therapist and did not want to disappoint them. However, there were several veterans that described a poorer therapeutic alliance and said that the relationship with their therapist had impacted their decision to drop out of therapy. A couple of these veterans described that their

therapist had "pushed" them to continue to repeat the imaginal exposure even though the veteran did not want to. Relatedly, they described that they thought their therapists were focused more on the schedule and PE protocol than on their needs. One veteran felt that he did not really feel bonded with his therapist although he did not feel negatively towards her. One of the veterans described how she had lost trust in her therapist and did not feel comfortable being open with her. Additionally, she described how her therapist had pushed her to engage in-vivo exposures but that she did not feel ready for this and felt that the pace of therapy was too fast for her.

> *"I just lost trust. I felt like she expected me to be able to complete those tasks…maybe she wanted to push me more but by this time I'm already like guarded, like you already lost me so… and I'm telling you I'm really not ready (HBT Participant)."*

Credibility and Expectancy. Veterans' perceptions of the helpfulness for PE as a treatment and for themselves varied. Many veterans expressed thinking that PE was helpful and did benefit them although they dropped out of therapy. Veterans felt that being able to talk about the trauma and learn skills, including in-vivo exposure, has been beneficial for them. One veteran expressed that he thinks PE is helpful because it makes veterans confront their issues and the traumatic event. In contrast, a couple of veterans felt that PE was not a helpful treatment and was not benefiting them. One veteran described how he does not think PE is beneficial for older veterans like himself because they have already been reliving the traumatic event for years. Another veteran expressed understanding the rationale of the treatment but that her subjective units of distress did not decrease over time and she felt that it did not help her and had done more harm than good for her. Several veterans expressed that they believed the treatment could be helpful for some veterans but did not think it would help them improve. For example, one veteran said that he had researched the treatment and thought it could work but that it wasn't for him:

> *"I can see it working, I told you honestly that I went online and researched it. Like I said it's not just the VA, it's like wide spread through the US and Europe. And the success rate is huge. I'm just not there. Maybe's it's not the best therapy for [veteran's name] (OBT Participant)."*

PE Described as Not a Good Fit for Veteran. Veterans expressed numerous ways in which PE was not the right fit for them or that they disliked aspects of the protocol, which affected their decision to drop out of therapy. An aspect of PE that affected several veterans' decisions to drop out of treatment was the repetitive aspect of the imaginal exposure. A couple of veterans described how they disliked having to repetitively repeat the imaginal and said that it caused them to have negative emotions, including feeling resentful and irritated. One of these veterans said he felt emotionally uncomfortable from having to continually repeat the imaginal and he became frustrated. Another veteran felt that it was tedious to keep repeating the imaginal, which made him not want to come in for therapy anymore. Disliking the imaginal exposure also seemed to be related to avoidance for another veteran. He described how having him repeat the imaginal led to his mind blocking it out and he did not find it helpful for him. A couple of veterans suggested that the duration and frequency be decreased for the imaginal exposure. Aside from the repetitive nature of the imaginal exposure, a couple of veterans also expressed that they felt that the PE protocol was rigid and did not allow for them to talk about other concerns, which contributed to them dropping out of therapy.

The majority of veterans described that the imaginal exposure was difficult for them to engage in and some of these individuals expressed explicitly disliking the imaginal and said that it had an impact on their decision to drop out of therapy; approximately half of the veterans interviewed expressed that the imaginal exposure was the primary or a secondary reason for dropping out of therapy. Interestingly, some veterans expressed that the imaginal exposure was hard but that it had no impact on their decision to end therapy. Of the veterans who did say that it

affected their decision to dropout, there were a variety of reasons for why the imaginal exposure had this impact. A few of these veterans expressed that they thought that the imaginal exposure was negatively impacting their emotional well-being. For example, one veteran expressed that she felt angry after sessions and was worried about the impact that this would have on her family, particularly because she had described an urge to "destroy things" after therapy sessions. Another veteran reported feeling increased anxiety, especially before therapy sessions. For two other veterans, they thought that the imaginal exposures were causing them to emotionally regress or not benefit from therapy. Further, veterans were uncomfortable with the amount of emotion that the imaginal elicited and felt that the imaginal exposure was negatively impacting them. One veteran described how having to relive the traumatic event was the primary reason for ending therapy:

> *"Well the only reason why I quit the therapy, again, is because it was making me relive every minute of the negative and the hell I was going through in Vietnam and I did not want to do that. I was not able to handle dealing with that part of it (OBT Participant).*

Several veterans mentioned that having to listen to the imaginal exposure for homework also impacted their decision to drop out. In contrast, a few veterans described how they actually had found in-vivo exposures to be helpful and have continued using this skill since dropping out of therapy.

Delivery Modality. The assigned delivery modality also had an impact on veterans' decision to drop out of therapy, although the impact of the modality varied across modalities. Every veteran in the IHIP condition said that the delivery modality had no impact on their decision to drop out of therapy. In contrast, the majority of veterans in the OBT condition expressed that the delivery modality affected their decision to drop out but the ways in which OBT impacted dropout varied across veterans. A couple of veterans said that there were

miscommunications about scheduling or appointment cancellations between the VA staff and themselves. For example, a veteran had arrived to the VA a couple times for her OBT appointment and found out that her therapist had to cancel but no one had notified her. Another veteran had similar experiences and said that it was a "hassle and a headache" to drive an hour and a half to his appointment and then try to find parking while also wondering if they may have cancelled his appointment without informing him. The OBT condition made it easier to walk away from therapy for one veteran because he was on the computer and felt that he did not need to have an explanation for his therapist. A few other veterans also said that the computer had affected their dropout. For example, a veteran described talking through the screen as robotic. For one veteran, he preferred to talk to someone in person rather than being on a computer. Similarly, he also described feeling self-conscious having to talk on the computer:

> *"It was just, everything that happened all at the same time, being in an office, talking about stuff I didn't want to talk about, and then looking through a computer, you know? I think that maybe I was a little bit self-conscious about looking through a computer (OBT Participant)."*

Interestingly and unexpectedly, although veterans did not explicitly state that the physical environment of the office affected their decision to drop out, a couple of veterans spoke about the importance of a therapeutic environment at the hospital. The VA office environment was described by a couple of veterans as "sterile". For example, one veteran noted that there was nothing hanging on the walls in the office that he used for OBT. And another veteran was in interior design school and although she was in the HBT condition she mentioned in her interview that she feels that the VA hospital does not provide a therapeutic environment and could use warmer lighting and more comfortable chairs in the offices.

Almost half of veterans in the HBT condition felt that the modality had a direct impact on their decision to end PE. There were some similarities with the reasons expressed by individuals

in OBT although veterans also shared unique concerns in HBT. Similarly to those in OBT, a couple of veterans mentioned that the HBT modality felt impersonal because they were on a screen rather than an in person. One veteran expressed that he usually winds down in his car following appointments but that because he was in HBT, he did not have the time to wind down following therapy and was alone after his therapy appointments. Technological issues were also a problem for veterans in the HBT condition. A veteran described that he had difficulty logging in to the telehealth software from his home, which would cause him to be late to his appointments. Two veterans also described connectivity issues when using the HBT software, such as audio problems. Another veteran mentioned concerns that her neighbors would hear her crying during her appointments.

3.3 Aim 3. Veterans' reasons for dropping out of PE were often shared across the delivery modalities. However, a couple of differences appeared between delivery modalities for the reasons for dropping out of therapy. Veterans in OBT expressed more practical barriers as reasons for dropping out compared to veterans in the HBT and IHIP conditions. More specifically, the majority of veterans in the OBT condition said that practical barriers affected their decision to stop PE, including scheduling, travel time, distance to the VA, traffic, and parking difficulties. In contrast, veterans in the HBT and IHIP conditions said that relocation and scheduling were the only practical barriers that led to them dropping out of PE. These findings highlight that some practical barriers, specifically scheduling and relocation, were shared across modalities, whereas others (e.g., travel time, distance to the VA, traffic, and parking) were unique to OBT.

There were also differences between delivery modality in regards to how the modality itself impacted drop out. Importantly, no veterans in the IHIP condition thought that the modality

affected their decision to drop out. The majority of veterans in OBT said that the modality impacted dropout compared to less than half of veterans in the HBT. Veterans in the HBT and OBT conditions had some shared reasons for dropping out, specifically preferring face-to-face communication with a therapist compared to being on a computer. Veterans in the HBT condition expressed more concerns about the impact of technological difficulties on their decision to drop out compared to those in the OBT condition. Similarly, one veteran in the HBT condition had concerns about privacy because she was worried that her neighbors would hear her crying, whereas veterans in the OBT condition did not express concerns about privacy in the office setting. Scheduling confusion was more commonly shared in the OBT condition compared to the other conditions. Further, the impact of the office environment on dropout was unique to OBT. Many veterans in the HBT and IHIP conditions shared that they enjoyed the physical environment because they felt safe and comfortable in their homes where this was not mentioned for veterans in OBT.

3.4 Mixed-Methods Triangulation.

Convergence. The quantitative and qualitative data were triangulated to determine if the different methodologies provided the same answer to the same question (See Table 5). Overall, the results from both datasets converged although there were divergent results for a couple of constructs. In both datasets, stigma was found to be an important but weak contributor to dropout. It appears that the impact of stigma on dropout is important for some veterans but not all veterans who drop out from PE and the effect may be less significant than other factors, which is also reflected by the odds ratio in the quantitative dataset. The datasets also converged for the impact of negative attitudes towards mental health providers because this was non-significant in the quantitative dataset and most veterans interviewed denied any impact. Only a

few veterans felt that negative attitudes about mental health providers had an impact on dropout. The delivery modality findings also converged although there were nuances. Office-based telehealth was associated with higher dropout in both datasets. In the quantitative data, individuals in OBT dropped out more than those in IHIP but not HBT. However, within the qualitative data more veterans in the OBT condition said that OBT had an effect on dropout compared to those in both HBT and IHIP. Therefore, it appears that OBT is associated with increased dropout but the impact is greater when compared to IHIP than HBT. In both of the datasets, treatment delivery modality preference congruence was not a significant contributor to dropout with the exception of a couple of veterans who were interviewed. This suggests that treatment delivery modality preference congruence is not a strong contributor to drop out. Greater perceived credibility of PE at baseline was found to be associated with lower dropout in the data and lower perceived credibility at baseline was associated with higher dropout. These findings mostly converged with the qualitative data because interviews showed that although many veterans found PE to be credible in general they did not find it to be credible for them personally. The findings also converged in regards to therapeutic alliance; therapeutic alliance was not a contributor to dropout for most veterans although a couple of veterans interviewed did have poorer alliance and said that this impacted their decision. Thus, alliance may be an important contributor to dropout when alliance is poor. However, overall veterans had strong alliances and said that although they dropped out from PE, the relationship with their therapist contributed to them staying in PE longer than they had originally intended to. Therefore, a strong alliance may actually increase treatment dose.

There were a couple of divergent findings between the two datasets. The practical barriers findings did not converge with each other. In the quantitative dataset, perceived barriers

were non-significant whereas in the qualitative dataset more than half of veterans interviewed said that practical barriers affected their decision to drop out of PE. The perceived PE expectancy findings also did not converge. In the quantitative data, perceived expectancy at baseline was not associated with dropout whereas several veterans interviewed said that they did not expect to benefit from PE, which affected their decision to drop out of PE, indicating that expectancies do affect dropout.

Complementarity. Complementarity can provide context and depth of findings. Complementary was used in the current study to help to explain the quantitative findings through the use of qualitative methodology. Perceived stigma at baseline was found to be a significant predictor of drop out. The qualitative findings suggest that perceived stigma is not an important contributor for dropout for many veterans but for some it is a contributor to drop out, which helps to explain the significant but weak effect size of stigma within the quantitative data. More specifically, veterans said that they were not proud of being in treatment so did not want others to know and also were concerned someone would find out that they were in therapy.

Perceived barriers were not significant in the quantitative data; however, they were prominent in the qualitative data, which highlights the benefit of using mixed methodologies. The qualitative interviews suggested that veterans actually experience many perceived practical barriers although most of the barriers veterans spoke about were not assessed in the quantitative measure that veterans completed. The qualitative data suggest that a more comprehensive measure may be needed to capture the perceived barriers and may explain why the quantitative data were non-significant.

Negative attitudes towards mental health providers was not related to dropout from PE in the quantitative data. The interviews showed that most veterans actually have positive views

about mental health providers, not negative, which helps explain why negative attitudes towards providers was non-significant in the quantitative data. There were a few veterans that had negative beliefs about mental health providers which did impact their decision to drop out. However, this was not common and helps to clarify why this hypothesis was largely unsupported in both datasets.

The qualitative data helped provide context for why veterans in OBT drop out of treatment. Veterans in the OBT condition experienced greater practical barriers to attend treatment due to needing to go to the VA hospital compared to being in their home. Although veteran in HBT experienced some barriers, fewer veterans endorsed them than in OBT and veterans in IHIP denied any barriers. Home-based care appears to reduce barriers but having a therapist go to the home provides even greater reduction in barriers than HBT.

Contrary to hypotheses, treatment delivery modality preference congruence was not associated with dropout except for a couple of veterans. Many veterans had difficulty remembering their preferences and reported enjoying their modality despite it often not being their preference. This suggests that veterans may be willing to engage in care through multiple modalities unless their original preference is strongly preferred. Perceived personal credibility seemed to be more important than the general credibility of the treatment because many veterans found PE to be a credible therapy but still dropped out or did not find it to be credible for themselves. Similarly, it appears that some veterans will drop out if they do not expect the treatment to help them. The qualitative interviews helped to explain why therapeutic alliance was not significant in the quantitative data. Overall, most veterans had strong positive alliance with their therapist and denied any impact on the relationship or thought that the relationship actually increased dropout. A few veterans did attribute a poor alliance to their dropout but this was only

a small portion of veterans and may help to explain why therapeutic alliance was not significant in the overall regression model. However, it provides some insight that if veterans do perceive a poor alliance then they are more likely to drop out.

Expansion. Several unexpected findings emerged from the qualitative interviews that had not been examined in the quantitative data or hypothesized about having an influence on dropout. The importance of physical health on veterans' decision to drop out was highlighted during the individual interviews. Veterans spoke about how physical problems that are distinct from PTSD can interfere with the ability to engage in treatment. Some veterans also thought that PE worsened pre-existing health conditions. Although this project had hypothesized that clinical variables are an important contribute to drop out; several additional clinical constructs were identified. The importance of having social support while engaging in PE was mentioned by several veterans. Veterans' perception of perceived symptom change was also a factor that affected drop out. Many veterans thought that PE was not helping them to improve. Further, PE can elicit strong emotions and some veterans had difficulty tolerating this emotions. The strong emotion in PE can also contribute to avoidance, which led to drop out for some veterans. Finally, the imaginal exposure is a primary component of the PE protocol but many veterans disliked the imaginal exposure which affected their decision to drop out. Each of these unexpected findings provides useful information about how veterans experience PE and helps us to better explain their reasons for discontinuing treatment.

CHAPTER 4: DISCUSSION

Dropout from PE is a serious problem within the veteran population and premature PTSD treatment dropout interferes with the ability to receive an adequate dose of therapy. Forty-three percent of veterans who attended a first session dropped out of treatment in this large RCT, which is consistent with dropout rates in studies and clinical practice. Premature dropout may hinder treatment gains so understanding why veterans discontinue treatment is important; the current study aimed to understand how dropout rates differ among service delivery modalities, the reasons why veterans prematurely drop out of PE, and if reasons for drop out vary by delivery modality. Not only does premature dropout affect veterans but it has a significant impact on the public and healthcare systems. Veterans who drop out of PE remain symptomatic (Tuerk et al., 2011; Tuerk et al., 2013), which increase unemployment and decreases productivity decreases productivity (Hoge et al., 2007; Savoca & Rosenheck, 2000). Further, the VA will spends more than a billion dollars treating veterans with PTSD (Congressional Budget Office Report, 2012). Thus, it is imperative to increase the rates of PTSD treatment completion to improve veterans' well-being and reduce the impact of PTSD on society and the healthcare system.

4.1 Differences in Dropout Rates by Delivery Modality.

The first hypothesis was partially supported; as hypothesized, both HBT and OBT had significantly higher dropout rates than IHIP. However, there was no significant difference in dropout rates between OBT and HBT. These findings demonstrate that veterans in telehealth conditions will be more likely to drop out from PE than veterans who receive face-to-face therapy in their homes. Thus, a benefit of PE delivered via IHIP is that veterans are more likely to stay engaged and complete treatment than those receiving PE through telehealth. Although

increased retention is desirable, IHIP may be less cost effective to deliver than telehealth modalities because of the cost of therapist transportation, travel time between veterans' homes, and the subsequent reduction in daily caseload because of travel time between veterans' homes. Future studies should also conduct cost analyses to determine the cost of IHIP compared to HBT and OBT. In addition, studies should examine other issues such as impact of treatment on employment and utilization of other health care services. However, there is little data examining health utilization among veterans who drop out of PE; therefore, if the health utilization costs of individuals whom dropout of PE exceeds the expenses of providing PE through IHIP, then the investment in IHIP may be warranted. Nonetheless, delivering PE through IHIP may be one potential solution to increase treatment retention.

4.2 Patient Characteristics as Predictors of Dropout from PE.

Previous studies have produced mixed findings about the impact of patient demographic variables on dropout from PE. Contrary to hypotheses, age, education, OEF/OIF status did not affect the likelihood of dropping out of PE in this study. There have also previously been mixed findings about whether clinical variables increase the likelihood of dropping out of PE. We hypothesized that greater baseline PTSD and depressive symptoms, and PTSD service connection status would be associated with higher dropout from PE but these hypotheses were not supported. Veterans with greater baseline PTSD and depressive symptoms may be more motivated to stay in treatment because they may be experiencing greater distress or impairment. Similarly, to be service connected for PTSD within the VA system, veterans need to be experiencing significant functional impairment related to their PTSD symptoms. Therefore, veterans who are service connected may also have an increased desire to remain in PE to decrease PTSD symptoms and improve functioning. The impact of demographic, PTSD service

connection status, and baseline clinical symptomatology on likelihood of dropout remains unclear; however, clinicians are unable to change these factors and so identifying other modifiable clinical variables that influence dropout is important.

4.3 Emergent Issues in Dropout from PE.

Several important clinical factors that were unexamined in the quantitative data emerged from the qualitative interviews with veterans. First, several veterans described that they perceived their PTSD symptoms were worsening because of PE, which led them to drop out of PE. These findings highlight the importance of veterans' own perceptions of their symptom change during PE when deciding if they should remain in therapy. Research suggests that a minority of individuals, between 10-20%, will experience a symptom exacerbation during PE, particularly after the first imaginal exposure (Foa et al., 2002; Larsen et al., 2016). In contrast to the qualitative findings in the current study, previous studies found that symptom exacerbations did not increase the likelihood of dropout. However, the two studies examining symptom exacerbations in PE were conducted with civilian women trauma survivors (Foa et al., 2002; Larsen et al., 2016); therefore, symptom exacerbations or the veteran's perception of symptom exacerbation, may be more common or have a greater impact on dropout in veteran populations. Nevertheless, the findings from the qualitative interviews suggest that veterans' own perceptions of their symptom change can contribute to decisions to drop out of PE. Therefore, it is recommended that clinicians should assess veterans' perceptions of their symptom change continually throughout treatment. Clinicians could use these discussions as an opportunity to address concerns about symptoms worsening and provide psychoeducation that symptom exacerbations and typically remit by the following session and are not found to be predictive of treatment outcomes (Foa et al., 2002; Larsen et al., 2016). Additionally, providers could compare

veterans' perception of their symptoms to the PTSD self-report data to see if the change in scores supports their perceived increase in symptoms. Although symptom changes may not affect all veterans' decisions to dropout from PE, openly discussing concerns about symptom change may increase retention for some veterans. Researchers should continue to assess how both perceived symptom change and measured symptom change (e.g., on the PCL-5) during treatment (e.g., through self-report measures) contribute to dropout from PE.

Aside from symptom worsening, a few veterans reported that their symptoms were not improving and discontinued, and in contrast, one veteran thought he had benefited from PE so he discontinued therapy. These findings build on previous studies that have examined symptom improvement, or lack of improvement or worsening, as a predictor of dropout. For example, Szafranski et al. (2014) found that less symptom change during treatment was associated with a shorter length of stay for OEF/OIF male veterans in inpatient PTSD treatment. Similarly, Gros et al. (2017) found that veterans who prematurely discontinued PE had higher PCL-5 scores at their last session compared to those who completed treatment. Therefore if individuals do not think they are improving from PTSD therapy then they may be more likely to drop out, which is consistent with what some of the veterans in our study reported. However, a recent study by Szafranksli and colleagues (2017) found that a portion of female civilian trauma survivors who dropped out from treatment actually experience clinically significant improvement for PTSD prior to dropping out (Szafranski et al., 2017). Therefore, there may be a minority of people who prematurely dropout of PE because they believe they are getting better. Conversely, a perceived lack of symptom improvement or perceived worsening could increase the likelihood of dropout. Additional studies should continue to examine the association between symptom change during PE and dropout within veteran populations.

Another emergent clinical finding from the qualitative interviews was how experiential and behavioral avoidance contributed to dropout for some veterans. Both experiential and behavioral avoidance are hallmark PTSD symptoms that maintain the disorder (Tull et al., 2004) and our findings show that avoidance can also interfere with treatment retention. PE directly targets experiential and behavioral avoidance through imaginal and in-vivo exposures; however, findings from our interviews suggest that for some veterans the desire to avoid may lead to drop out. There may be a portion of veterans with high experiential avoidance that could benefit from mindfulness based interventions prior to PE or infused within PE to help decrease experiential avoidance. Mindfulness encourages approaching rather than avoiding trauma related memories; therefore, increasing awareness and acceptance of internal emotions, trauma memories, and thoughts about the trauma may help veterans be able to better tolerate the exposures in PE by realizing they are temporary experiences (Vujanovic et al., 2011). Increased mindfulness may also facilitate engagement in PTSD treatments if the veteran is more aware of and able to manage internal experiences, which may allow veterans to be more open with their therapists about their emotional experiences (Vujanovic et al., 2011). Further, nonjudgmental acceptance may help people accept the negative emotions often experienced in PTSD (Vujanovic et al., 2011). In regard to PE specifically, mindfulness may help facilitate greater emotional processing in PE if veterans are more aware of their emotions during the imaginal exposure, in-vivo exposures and during processing. Further, increased mindfulness may increase participation in in-vivo exposures if individuals are able to better tolerate the distress. However, there is a dearth of empirical research examining the use of mindfulness techniques either prior to or during PE (Vujanovic et al., 2011) so this remains an empirical question to determine if incorporating mindfulness based approaches into PE could decrease dropout.

Avoidance is used as a way to manage unwanted trauma-related distress. The qualitative interviews revealed that some veterans had difficulty regulating emotions or tolerating distress during PE, which contributed to further avoidance. Difficulties with emotion regulation and distress tolerance may result in treatment dropout to avoid uncomfortable emotional experiences. Some veterans reported that they disliked or found the imaginal exposure to be difficult but did not dropout of PE because of this, whereas others directly attributed the imaginal exposure to their dropout. These findings indicate that some veterans may have a harder time tolerating distress elicited by exposure therapies. The use of dialectical behavioral therapy skills (DBT) incorporated into PE may be helpful (Becker & Zayfert, 2001). Clinicians may be able to incorporate DBT skills, as needed, to facilitate engagement and completion of PE for veterans who have difficulties with emotion regulation and distress tolerance (Becker & Zayfert, 2001). Harned and colleagues (2014) have also developed a DBT PE protocol that is aimed to address PTSD within high-risk clients that present with life-threatening behaviors or multiple diagnoses. Although not all veterans with PTSD will require phase based treatments, DBT PE may be a suitable option for veterans with greater emotion dysregulation. However, clinicians should be mindful to not collude with veterans' avoidance by delaying exposure treatment if it is not clinically indicated but could consider the use of additional mindfulness or DBT-based interventions for veterans that may not otherwise engage in PE.

Another unexpected and emergent theme (i.e., expansion) from the qualitative interviews was the relationship between lack of social support and dropout. These findings are consistent with Gros et al. (2013) who found that lower post-deployment social support was associated with increased risk for dropout in OEF/OIF veterans. Social support is one of the strongest protective factors against PTSD (Pietrzak et al., 2009) and our findings suggest that increasing social

support may also facilitate treatment completion. However, PTSD can decrease social support over time (King, Taft, King, Hammond, & Stone, 2006), which may interfere with the ability to receive support during therapy. Interventions to increase social support, improve relationship functioning, or include support persons in therapy may help to decrease dropout. For example, many veterans believe that they need to handle their problems on their own (Graziano & Elbogen, 2017); however, veterans with greater social support are less likely to believe that they have to handle their problems on their own and therefore engage in more mental health services (Graziano & Elbogen, 2017). When social support persons encourage veterans to seek care they may be more likely to perceive a need for treatment and be more likely to engage in therapy (Graziano & Elbogen, 2017). Additionally, inclusion of support persons could allow for feedback about feared situations and the feedback may help facilitate extinction learning (Price et al., 2013). Price and colleagues (2013) examined the impact of perceived social support on treatment outcomes and dropout. The authors found that perceived social support was unrelated to dropout from exposure therapy; however, support persons were not directly involved in treatment. Direct involvement of social support persons in therapy or the therapeutic process may be helpful to reduce dropout.

Cognitive behavioral conjoint therapy (CBCT) is a treatment for PTSD that is also aimed at improving intimate relationship functioning and decreasing relationship distress (Monson et al., 2012). Decreasing relationship distress may increase relationship satisfaction and support. However, not all veterans with PTSD have a partner to include in CBCT. Therefore, incorporating other support persons into PE, such as peer-support, may be helpful for veterans with limited social support. Hernandez-Tejada et al. (2017) conducted a pilot feasibility study to examine the use of peer support in PE to reduce dropout. The researchers contacted veterans who

had previously dropped out of PE to invite them to re-engage in PE with the help of a peer support person who had successfully completed PE and no longer met criteria for PTSD. Peer support persons provided support and encouragement during in-vivo homework assignments and had some contact with veterans and the therapist between therapy sessions. Preliminary results suggest that inclusion of peer supports may increase retention; over half of the veterans who were contacted were interested in attempting PE again (Hernandez-Tejada et al., 2017). Encouragement and support from family members or peers during therapy may help veterans better tolerate exposure therapy and increase motivation to stay in treatment. Further studies should evaluate the role of social support persons (e.g., familial, peer) to increase PTSD treatment completion.

Another emergent and unexpected finding from the qualitative interviews was the impact of physical health conditions on dropout. It is well established in the literature that PTSD is associated with poorer physical health (El-Gabalawy et al., 2018). However, the effect of physical health problems on treatment dropout has not been examined, to our knowledge. Physical health affected veterans' decision to drop out from PE in two important ways. Veterans experienced either physical health conditions that were unrelated to PE (e.g., diagnosis of a brain tumor) or veterans perceived that PE was exacerbating pre-existing or newly developed health conditions, such as IBS and pain. For some veterans their physical health problems may be more life threatening or impairing than their PTSD symptoms (e.g., a brain tumor, a stroke) and need to be addressed before engaging in or resuming PE. However, there may be opportunities for interdisciplinary collaboration or psychoeducation for physical health problems that can be successfully managed. For example, a psychologist may provide psychoeducation to a veteran about the relationship between pain and PTSD (Sharp & Harvey, 2001) while also coordinating

care with their pain management providers, as needed. Alternatively, new healthcare models such as the patient centered medical home (Baird et al., 2014) could be implemented more widely to address co-occurring physical and behavioral health problems. Researchers should continue to examine if physical health improves following PTSD treatment because psychoeducation about expected outcomes may help encourage veterans to remain in therapy. A holistic approach to caring for veterans' mental and physical health across providers could potentially reduce dropout from PE.

Prolonged exposure therapy is one of the most effective treatments for PTSD and should be routinely offered to veterans as a part of care. Despite the effectiveness of the therapy, not all veterans like aspects of the PE protocol. PE includes repeated imaginal exposures to help facilitate habituation and activate the emotion network to process trauma-related emotions. Although repetition of the imaginal is helpful for habituation to occur, recent research has shown that between session habituation is related to better outcomes rather than within session habituation and that most people do not experience habituation within session (Bluett, Zoellner, and Feeny, 2014; Sripada & Rauch, 2015). Additionally, several veterans in this study reported disliking the repetition of the imaginal exposure. This may be reflective of avoidance of the trauma memory but findings from the interviews suggest that it may not only be indicative of avoidance for all veterans. For example, one veteran suggested that the imaginal exposure be included but be shortened so that more time can be dedicated to emotional processing. Reducing the length of the imaginal exposure to 20 minutes for 60-minute PE sessions can still result in significant PTSD improvements (Nacasch et al., 2015). Thus, sixty-minute PE sessions may be helpful to retain veterans who may otherwise drop out of therapy because they dislike the repetition of the imaginal exposure. Alternatively, briefer versions of PE (Cigrang et al., 2015)

may be beneficial for veterans who are unwilling to do several sessions of prolonged imaginal exposures. Providers could spend more time discussing the rationale for imaginal exposures and why repetition is important prior to beginning the imaginal exposures in session and throughout treatment if people dislike the repetition

Imaginal exposure is one of the primary components of PE that helps to facilitate emotional engagement and habituation, which are two of the mechanisms of change in PE (Cooper, Clifton, and Feeny, 2017). Trauma memories are often fragmented or disorganized because of avoidance; therefore, engaging in the imaginal exposures may help to organize the traumatic memory and disconfirm maladaptive trauma-related beliefs (Cooper, Clifton, Feeny, 2017). Despite the importance of the imaginal exposure to assist in PTSD symptom change through these mechanisms, many veterans in this study found the imaginal exposure to be difficult, particularly due to the emotions that it elicited and the desire to avoid trauma related emotions and memories. Some veterans who found the imaginal exposure to be difficult also denied it having any impact on dropout whereas others attributed dropout partially or largely to the imaginal exposure. Therefore, it appears that some veterans may be less able to tolerate or less willing to partake in the imaginal exposure in PE. Given that PE is an EBP for PTSD clinicians should continue to offer PE to veterans and help increase motivation to stay in PE; however, alternative treatment options may be necessary for those who are unwilling to complete PE because of the imaginal exposure. This suggests that clinicians need efficient ways to identify and engage patients who likely to have a negative response to imaginal exposure.

Imaginal exposures and in-vivo exposures are the active components of PE; however, no studies have dismantled PE to examine if one form of exposure has a greater impact on PTSD symptom change. There have also been no studies that have examined only in-vivo exposures for

PTSD. In the current study, some veterans mentioned disliking and being unwilling to continue the imaginal exposures but found the in-vivo exposures to be helpful. In-vivo exposures can also promote emotional engagement and belief discontinuation (Cooper, Clifton, and Feeny, 2017). The use of only in-vivo exposures to treat PTSD may be another promising alternative that veterans could participate in if they are unwilling to do the imaginal exposures required in PE. Successfully completing in-vivo exposures may help promote mastery and challenge negative beliefs about one's ability to handle distress, which may increase their confidence in their ability to tolerate the imaginal exposure. Another alternative in addition to only in-vivo exposures is for veterans to include the imaginal exposure on the fear hierarchy to be targeted later in treatment through written or verbal imaginal exposures. This may allow for veterans to engage in imaginal exposure but only after they have successfully mastered other in-vivo exposures. However, the efficacy of in-vivo exposures only for PTSD remains an empirical question. Future studies could dismantle PE or examine the efficacy of individual or group in-vivo exposure therapy. PE should still be offered as a first line treatment but these may be options that could offered to veterans who refuse to engage in the imaginal exposure.

4.4 Beliefs and Attitudes Towards Mental Health and Providers.

Aside from clinical factors, beliefs and attitudes towards mental health and providers were also examined as contributors to dropout in this study. Consistent with our hypothesis, stigma was found in both the qualitative and quantitative datasets to have some impact on dropout from PE. The quantitative data revealed that stigma is a significant but weak contributor to dropout and the qualitative findings were consistent with these findings. A small proportion of veterans interviewed said that stigma was a factor in their decision to drop out although many denied stigma having an impact on dropout; these findings may help explain why it was a

significant but weak effect in the quantitative analyses. Differences in data collection may also help to explain why most veterans who were interviewed did not think that stigma affected their decision to drop out of PE despite the significant quantitative findings. More specifically, the quantitative data were collected at baseline with all veterans in the study and the interviews were conducted with individuals who completed at least four sessions of PE. Perceived stigma may have changed over time once veterans were enrolled in therapy. For example, when veterans seek treatment they have to sit in waiting rooms and be in a treatment facility, which may make their mental health problems seem more real and they can no longer deny or minimize them (Elbogen et al., 2013). Additionally, having to verbalize their mental health symptoms to a provider or other group members may lessen their ability to minimize their symptoms. Thus, veterans with greater perceived stigma may have dropped out of therapy prior to session four and so their experiences were not captured in the interviews.

The impact of stigma on veterans' decision to drop out from PE builds upon Hoge et al. (2014) who found soldiers to report that perceived stigma affected their decision to drop out of mental health treatment. These findings highlight the importance of addressing concerns about perceived stigma early in therapy, such as at the intake or session one, to decrease dropout (Elbogen et al., 2013). If veterans have unhelpful beliefs about seeking therapy, therapists could use cognitive restructuring to help veterans have more balanced and helpful thoughts about engaging in therapy. Therapists should also consider reinforcing veterans for seeking treatment through acknowledging the courage it takes to seek treatment.

Contrary to our hypothesis, negative attitudes towards mental health providers had little association to dropout from PE. Results from the quantitative data suggested that negative attitudes towards providers were not significant and the qualitative interviews helped to explain

this unexpected finding. Almost all veterans described having positive attitudes towards mental health providers, not negative attitudes, which may explain why quantitative findings were not significant. However, there were a couple of veterans that said they did have negative beliefs towards providers and it affected their decision to drop out from PE. The small number of veterans who described negative attitudes may explain why this was not captured in the quantitative findings. Taken together, the results from the two datasets are promising because most veterans think positively about mental health providers and only a small portion of veterans with negative beliefs may be at increased risk for dropout from PE. Clinicians may consider asking veterans about any concerns they have about treatment or the provider at the beginning of treatment to try to address any concerns.

4.5 Therapeutic Process and Dropout from PE.

Contrary to hypotheses, therapeutic alliance was not associated with dropout from therapy in either of the datasets with the exception of a few veterans who were interviewed. Overall, veterans had positive views of their therapists and several said that they stayed in treatment longer than they would have because they liked their therapist. Although a strong therapeutic alliance may not be enough to prevent dropout from PE when there are other reasons to drop out, a strong alliance could improve length of treatment. Future studies can consider identifying ways to bolster the therapeutic alliance to increase length in treatment, which may improve clinical outcomes by increasing the dose of therapy. Unfortunately, a few veterans did describe having a poorer therapeutic alliance which did contributed to their decision to drop out. Although there may not have been enough veterans with poor therapeutic alliance in our quantitative data to detect an effect our qualitative data provides some evidence that it could be an important factor for some veterans.

There were mixed findings about the impact of perceived credibility on dropout among veterans. The quantitative data supported our hypothesis that lower perceived credibility at baseline would be associated with higher dropout. However, in the qualitative interviews, many veterans stated that they did perceive PE to be credible despite dropping out of therapy. Therefore, it appears that veterans sometimes still drop out of PE even if they do perceive it to be credible. One possible explanation for this discrepancy between the datasets could be that although many veterans found PE to be a credible treatment in general they did not think it was credible for them specifically. Additionally, veterans interviewed completed at least four sessions of PE; the quantitative data included veterans who attended at least one session so veterans with lower perceived credibility may have dropped out prior to session four and were not included in the interviews. The impact of perceived credibility on dropout may also change throughout treatment; for example, the initial analyses found that veterans who did not attend session one had lower perceived credibility compared to those who attended session one. Thus, the impact of credibility may be most salient early on in PE. Lastly, perceived credibility of the intervention may change over time as veterans experience the intervention. Therefore, the perceived credibility at baseline, as examined in the quantitative data, may be different than credibility during therapy once veterans have engaged in exposure exercises, which may help to explain the differences between the two datasets. Future studies should examine if the impact of credibility differs throughout treatment.

Our findings did not support the hypothesis that greater perceived expectancy would be associated with lower dropout with the exception of a few veterans. There was no significant relationship between perceived expectancy and dropout in the regression analyses. Overall, the qualitative findings converged with these findings but a few veterans did say that they did not

think PE was going to help them get better and that contributed to their decision to drop out. Similar to the credibility measure, the expectancy measure was administered at baseline. Veteran's treatment expectancies may change as they go through PE; therefore, assessing perceived expectancy in treatment later in therapy (e.g., after the first imaginal exposure) could be useful.

4.6 Access and Logistical Factors and Dropout from PE.

The two datasets converged and showed that treatment delivery modality preference congruence was unrelated to dropout, contrary to our hypothesis. The qualitative interviews helped to provide context for these findings. Some veterans did not remember their reasons for their preference, which may be because their preference was not strong or because it had been awhile since that data was collected, or it may indicate that they did not originally have a strong preference. In contrast, a couple of veterans had a strong preference and said that had they not been matched with their preferred modality then they would not have started therapy. Additionally, many veterans who did not receive their preferred delivery modality still enjoyed their assigned modality. Thus, the strength of the treatment delivery modality preference may be more important than preference congruence. Future studies should examine how the strength of delivery modality preference affects dropout from PE.

There were important differences between delivery modalities in terms of how the modality itself affected veterans' decisions to end treatment. All of the veterans interviewed from the IHIP condition denied that the modality had any effect on their decision to end treatment. These findings provide additional evidence that delivering care face-to-face in people's homes can reduce dropout because it overcomes many of the barriers associated with office-based treatment (e.g., distance to the clinic, parking) and telehealth (e.g., connectivity issues). In

contrast, the majority of veterans in OBT said that the modality itself had some impact on their decision to drop out of PE. Veterans in OBT had greater logistical barriers, such as traveling to the clinic, parking difficulties, traffic, and travel time. Veterans in OBT also said that they found telehealth to be more impersonal although some veterans in HBT also shared this feedback. However, HBT reduced the amount of logistical barriers compared to OBT. IHIP may be the most promising modality to decrease dropout but it may be less scalable and expensive. Therefore, HBT may minimize treatment costs (e.g., no travel reimbursement pay for the VA) while also decreasing logistical barriers compared to OBT. These findings highlight how veterans' reasons to dropout can be influenced by how they receive their care and providers should consider these factors when discussing treatment delivery options with veterans.

Practical barriers are a barrier to veterans seeking treatment (Sayer et al., 2009; Stecker et al., 2013) but there is little research about how practical barriers affect dropout from PTSD treatment. The current study yielded mixed findings that did not converge between the two datasets; however, the qualitative interviews helped to explain the discrepancy between the findings. Within the quantitative data, practical barriers did not increase the likelihood of dropping out from PE. However, the majority of veterans interviewed said that practical barriers contributed to their decision to end therapy. This discrepancy between the datasets highlights the importance of mixed methods because without the qualitative interviews in this study, the impact of practical barriers on treatment dropout would not have been identified. Veterans described several different types of practical barriers, including scheduling, parking, traffic, distance to the facility, however the quantitative measure included in this study does not assess each of these barriers. Therefore, the non-significant quantitative findings may be due to a self-report measurement limitation because the quantitative measure does not comprehensively assess

practical barriers. Clinicians can try to work with other providers and/or veterans to try to overcome some of the practical barriers. For example, psychologists may work with case managers to help veterans obtain transportation to therapy appointments. Further, the addition of evening hours may help veterans to overcome scheduling restrictions. Veterans in the home-based conditions had fewer practical barriers than those in OBT so delivering therapy to the home may eliminate some barriers for veterans. However, veterans in HBT still described practical barriers so therapists may need to problem solve with veterans to overcome remaining barriers.

4.7 Limitations of the Current Study

The current study has expanded upon the existing literature in regards to what factors may affect veterans' decisions to dropout from PE and also had several limitations worth nothing. Our ability to detect significance effects in our logistic regression models may have been limited by the samples size in the current study. However, there are few studies that experimentally manipulate PTSD therapy delivery modality. Therefore, the present study does contribute to the literature. Additionally, the qualitative interviews were not conducted immediately following treatment and the time since treatment completion varied among veterans. Therefore, veterans' reported reasons for dropping out may have been affected by recall bias. Additionally, recall bias may have affected the accuracy of treatment preference congruence because veterans may not have remembered their reasons for preferring a certain modality at the baseline assessment and they may have received other therapies between completion in our study and the qualitative interviews. We also required veterans who participated in the qualitative interviews to have attended at least for sessions of PE to guarantee that they experienced the imaginal exposure and had adequate exposure to PE and the delivery modality to speak about

their experiences. However, our qualitative findings may not be representative of individuals who dropout of therapy before session four, which is one of the most common times to dropout of evidence-based trauma treatments (Gutner et al., 2016). The qualitative interview sample size per delivery modality was also relatively small so we may not have reached theoretical saturation. Additionally, the interview guide combined credibility and expectancy into a single question whereas having separate questions may have provided richer data. Despite this limitation, the findings from the qualitative interview provide insight into some of the reasons that veterans may drop out of therapy.

4.8 Strengths of the Study and Conclusions

This is the first mixed-methods study to examine veterans' reasons for dropping out of PE. Given the large numbers of veterans in need of PTSD treatment it is important to understand why veterans do not complete therapies so that strategies can be identified to decrease dropout. This study also included a diverse sample of veterans with PTSD, including men, women, all war eras, and military branches and trauma types, which increases the generalizability of these findings. The use of mixed-methods was an apparent strength in this study because the qualitative data revealed new areas for consideration, provided context and depth to the quantitative findings, and helped explain some of the unexpected non-significant findings in the quantitative data. The information learned in this study provides a roadmap for future research. Our findings bolster support that the use of home-based care may decrease drop out and allow more veterans to receive a full dose of PE. The findings in this study also highlight that the answer to why veterans drop out of PE is not simple but rather is dynamic and complex. Veterans dropout for many reasons, often more than one reason, which may be why the literature has been inconsistent thus far. Rather than trying to target a single factor that contributes to

dropout, the VA Healthcare System and providers need to consider offering comprehensive, interdisciplinary, and flexible care for veterans with PTSD to increase the likelihood of maximum treatment benefit.

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Tables

Table 1. *Demographic and Patient Characteristics of Veterans (n =159)**

	M (SD)	*n* (%)
Age	45.93 (13.73)	
Years of Education	14.44 (1.99)	
Sex		117 (74%)
Male		42 (26%)
Female		
Race		
White		71 (45%)
Black/AA		49 (31%)
American Indian/Alaskan Native		4 (3%)
Asian/Pacific Islander		18 (11%)
Other		16 (10%)
Income		
Less than 15,000 a year		29 (19%)
15,001-45,000 a year		58 (37%)
45,001-75,000 a year		36 (23%)
75,001-105,000 a year		21 (13%)
105,001 or more a year		13 (8%)
Relationship Status		
Single		41 (26%)
Married		86 (54%)
Committed Relationship		20 (13%)
Domestic Partnership		3 (2%)
Other		8 (5%)

Table 1. *Demographic and Patient Characteristics of Veterans (n =159) continued**

Employment Status		
Full-time		47 (30%)
Part-time		17 (11%)
Retired		46 (29%)
Unemployed		46 (29%)
OEF/OIF Status		
Yes		77 (48%)
No		82 (52%)
PTSD Service Connection		
Yes		88 (55%)
No		71 (45%)
CAPS-5 Severity- Baseline	41.70	
BDI-II Severity – Baseline	31.06	
Working Alliance Inventory - Session 2	51.35	
CEQ – Baseline		
Perceived Credibility	.13	
Perceived Expectancy	.07	
Stigma/Barriers to Care Measure – Baseline		
Stigma Baseline	16.24	
Practical Barriers	10.44	
Negative Attitudes towards Mental Health Providers Baseline	8.15	

* Demographics are reported using non-imputed data; therefore, some values may not add up to 159 if there were missing data.

Table 2. *Logistic Regression for Comparing Dropout Rates for Aim 1*

Difference in Dropout (n = 159)	*B*	*SE β*	*p*	*O.R.*	95% *CI*	
Delivery Modality						
OBT vs. IHIP^	1.414	.421	.001	4.112	1.803	9.379
HBT vs. IHIP^	.801	.415	.053	2.229	.988	5.025
OBT vs. HBT^	.613	.394	.120	1.845	.853	3.991
χ^2		12.096	.002			
Nagelkerke R^2		.098				

* = p<.05, ** = p<.01, *** = p<.001; O.R. = Odds Ratio; 95% CI = 95% Confidence Interval; ^ = reference group

Table 3. *Logistic Regression for Predicting Dropout Full Model for Aim 2*

Predictors of Dropout (n = 159)	*B*	*SE β*	*p*	*O.R.*	95% CI	
Block 1- Patient Characteristics						
Age	-.018	.017	.288	.983	.966	.999
Education	-.000	.000	.701	1.00	1.0	1.083
OEF/OIF	-.137	.441	.756	.872	.561	1.355
PTSD Service Connection	.484	.334	.149	1.622	1.16	2.266
Baseline PTSD Severity	.026	.026	.331	1.056	.975	1.080
Baseline Depression Severity	.017	.020	.403	1.107	.977	1.059
$X^{2\pm}$		8.34	.19			
Nagelkerke $R^{2\pm}$		.07				
Block 2 –Process Variables	*β*	*SE β*	*p*	O.R.	95% CI	
Patient Characteristics						
Age	-.022	.017	.193	.978	.946	1.011
Education	.000	.000	.687	1.00	1.00	1.00
OEF/OIF	-.114	.447	.799	.892	.371	2.144
PTSD Service Connection	.496	.344	.149	1.643	.837	3.224
Baseline PTSD Severity	.019	.027	.483	1.019	.966	1.075
Baseline Depression Severity	.013	.021	.539	1.013	.972	1.056
Process Variables						
Working Alliance	-.013	.018	.473	.987	.952	1.023
Credibility	-.208	.096	.029	.812	.672	.979
Expectancy	.128	.094	.175	1.136	.945	1.366
$X^{2\pm}$		5.6	.06			
Nagelkerke $R^{2\pm}$		.12				
Block 3 - Attitudes Towards MH	*β*	*SE β*	*p*	O.R.	95% CI	
Patient Characteristics						
Age	-.021	.018	.249	.980	.946	1.014
Education	.000	.000	.572	1.00	1.00	1.000
OEF/OIF	-.059	.461	.898	.943	.382	2.324
PTSD Service Connection	.685	.368	.063	1.983	.964	4.081.
Baseline PTSD Severity	.021	.029	.473	1.021	.965	1.080
Baseline Depression Severity	-.002	.023	.933	.998	.954	1.044
Process Variables						
Working Alliance	-.015	.019	.427	.985	.950	1.022
Credibility	-.201	.103	.051	.818	.669	1.001
Expectancy	.172	.100	.085	1.187	.976	1.445
Attitudes towards MH and Providers						

Table 3. *Logistic Regression for Predicting Dropout Full Model for Aim 2 continued*

Neg. Attitudes towards Providers	.043	.060	476	1.044	.928	1.174
Stigma	.058	.029	.045	1.060	.100	1.121
Matched Preferences	-.391	.403	.332	.677	.307	1.490
$X^{2\pm}$		7.8	.02			
Nagelkerke $R^{2\pm}$		.18				
Block 4 – Logistical Factors	β	*SE* β	*p*	O.R.	95% CI	
Patient Characteristics						
Age	-.022	.019	.248	.979	.943	1.015
Education	.000	.000	.893	1.00	1.00	1.00
OEF/OIF	-.088	.485	.856	.916	.354	2.368
PTSD Service Connection	.575	.388	.139	1.777	.830	3.803
Baseline PTSD Severity	.017	.030	.561	1.017	.960	1.079
Baseline Depression Severity	.011	.024	.651	1.011	.965	1.060
Process Variables						
Working Alliance	-.015	.019	.427	.985	.949	1.022
Credibility	-.214	.110	.051	.807	.651	1.001
Expectancy	.189	1.04	.068	1.209	.986	1.481
Attitudes towards MH and Providers						
Neg. Attitudes towards Providers	.077	.068	.263	1.080	.944	1.234
Stigma	.056	.031	.068	1.058	.996	1.124
Matched Preferences	-.411	.437	.347	.663	.282	1.561
Logistical Factors						
Practical Barriers	-.077	.053	.147	.926	.835	1.027
HBT to IHIP$^{\wedge}$	.770	.473	.103	2.160	.855	5.453
OBT to IHIP$^{\wedge}$	1.446	.473	.002	4.247	1.68	10.735
OBT to HBT$^{\wedge}$	.651	.444	.142	1.918	.804	4.575
$\chi^{2\pm}$		11.5	.01			
Nagelkerke $R^{2\pm}$		.27				

*p<.05, ** = p<.01, *** = p<.001; MH = Mental Health; O.R. = Odds Ratio; ± = SPSS output does not provide pooled values for the chi square coefficient, p values, or Nagelkerke's R. The minimum value for each is provided; $^{\wedge}$ = indicates the reference group.

Table 4. *Logistic Regression for Predicting Dropout Final Trimmed Model for Aim 2*

Predictors of Dropout (n = 159)	*B*	*SE β*	*p*	*O.R.*	95% CI	
Patient Characteristics						
Credibility	-.230	.101	.023	.795	.652	.969
Expectancy	.150	.096	.119	1.162	.962	1.40
Stigma	.053	.025	.034	1.055	1.004	1.108
OBT vs. IHIP^	1.424	446	.001	4.153	1.732	9.958
HBT vs. IHIP^	.787	.439	.073	2.198	.930	5.192
OBT vs. HBT^	.636	.414	.124	1.890	.840	4.251
χ^2		23.6	.00			
Nagelkerke R^2		.185				

*** = p<.001; O.R. = Odds Ratio; ^ = indicates reference group

Table 5. *Mixed-Methods Results Demonstrating Convergence of Reasons for Dropout from PE*

Method	**Quantitative**	**Qualitative**
Question	*Is greater stigma associated with dropping out of PE?*	*Is stigma identified with dropping out of PE?*
Answer	Yes: Veterans with greater perceived stigma at baseline were 1.05 times more likely to dropout from PE. Although this effect is significant, it is a weak effect based on the OR.	Yes: Most veterans acknowledged that mental health stigma exists but denied stigma having any impact on their decision to drop out of PE; however, a few veterans said that stigma did impact their decision to drop out of PE.
Question	*Are perceived barriers to care associated to drop out from PE?*	*Do perceived barriers to care contribute to drop out from PE?*
Answer	No: Perceived barriers to care were not associated with drop out.	Yes: More than half of veterans said that practical barriers affected their decision to drop out.
Question	*Do negative attitudes towards mental health providers contribute to drop out from PE?*	*Do negative attitudes towards mental health providers contribute to drop out from PE?*
Answer	No: Negative attitudes mental health providers did not predict drop out.	No: Most veterans had positive views of mental health providers, not negative, and denied their beliefs about providers affecting their decision to drop out. A few veterans did have negative view points of providers and said it did impact drop out.
Question	*Do veterans in OBT have a greater likelihood of dropout than those in other modalities?*	*Do veterans identify OBT with dropout from PE more than veterans in other modalities?*
Answer	Yes: Veterans in OBT are 4.15 times more likely to drop out than those in IHIP but they are not more likely to drop out than those in HBT.	Yes: The majority of veterans in OBT said that the modality impacted their decision to drop out. Veterans in IHIP denied that the modality impacted drop out and less than half in HBT said that the modality impacted drop out.
Question	*Is treatment delivery modality preference congruence related to lower drop out from PE?*	*Does treatment delivery modality preference congruence affect drop out from PE?*
Answer	No: Treatment delivery modality preference congruence was not significantly associated with drop out.	No: Most veterans denied that treatment preference congruence affected their decision to drop out. A couple of veterans said that not getting their preference impacted their decision to drop out because they did not want the condition that they were assigned.

Table 5. *Mixed-Methods Results Demonstrating Convergence of Reasons for Dropout from PE continued*

Question	*Does greater perceived credibility decrease drop out?*	*Does perceived credibility impact dropout?*
Answer	Yes: Veterans with greater perceived credibility at baseline are significantly less likely to drop out of therapy.	No: Veterans found PE to be credible as a treatment generally but said that it was not credible for them because they did not expect to benefit from it.
Question	*Does greater perceived expectancy decrease drop out?*	*Does perceived expectancy affect veterans' decision to drop out of PE?*
Answer	No: Perceived expectancy at baseline was not associated with drop out.	No: Several veterans expressed that they did not think that PE was going to help them and therefore dropped out.
Question	*Does greater therapeutic alliance decrease dropout?*	*Does therapeutic alliance affect dropout?*
Answer	No: Not associated with drop out in the quantitative data.	No: Most veterans expressed a positive therapeutic alliance and said that the alliance did not impact dropout and in some cases it increased treatment length. However, there was a subset of several veterans that had poorer therapeutic alliance and said it did impact dropout.

O.R. = Odds Ratios

Table 6. Mixed Methods Results Regarding Complementarity.

Method	**Quantitative**	**Qualitative**
Question	*Is greater stigma associated with dropping out of PE?*	*Why is stigma associated with dropout?*
Answer	Yes: Veterans with greater perceived stigma at baseline were 1.05 times more likely to dropout from PE. Although this effect is significant, it is a weak effect based on the OR.	Most veterans thought stigma existed but did not think it impacted dropout. However, for those who thought it affected dropout it was because they were not proud to be in therapy or did not want other people to find out that they were in therapy so wanted to be done with treatment.
Question	*Are perceived barriers to care associated to drop out from PE?*	*Why are perceived barriers to care in the quantitative data unrelated to drop out?*
Answer	No: Perceived barriers to care were not associated with drop out.	More than half of veterans actually endorsed barriers. The lack of significance in the quantitative data is likely a measurement issue because most of the items in the quantitative data did not assess the barriers that veterans discussed in interviews.
Question	*Do negative attitudes towards mental health providers contribute to drop out from PE?*	*Why do negative attitudes towards mental health providers not contribute to dropout in the quantitative data?*
Answer	No: Negative attitudes mental health providers did not predict drop out.	Few veterans had negative beliefs about mental health providers which likely explains why this is not significant in the quantitative data. Most veterans had positive views about providers. Of the couple of veterans that did express negative views about providers, only a couple of them thought this affected their decision to drop out of PE.
Question	*Do veterans in OBT have a greater likelihood of dropout than those in other modalities?*	*Why do veteran in OBT drop out more often than those in HBT or IHIP?*
Answer	Yes: Veterans in OBT are 4.15 times more likely to drop out than those in IHIP but they are not more likely to drop out than those in HBT.	Home-based care reduces barriers to care for veterans. However, veterans in OBT had more barriers when going to the VA hospital such as parking difficulties, transportation time, and distance to the hospital.

Table 6. Mixed Methods Results Regarding Complementarity.

Question	*Is treatment delivery modality preference congruence related to lower drop out from PE?*	*How come treatment delivery modality preference does not affect drop out?*
Answer	No: Treatment delivery modality preference congruence was not significantly associated with drop out.	Some veterans had difficulty remembering their reasons for their preference and others described their reasons but still enjoyed the modality that they had received. A couple of veterans had strong preferences and did say that they would have dropped out had they not received their preferred modality.
Question	*Does greater perceived credibility decrease drop out?*	*How does credibility impact dropout?*
Answer	Yes: Veterans with greater perceived credibility at baseline are significantly less likely to drop out of therapy.	Veterans who perceived the intervention to be credible generally still dropped out. Some veterans also thought that the intervention was credible but did not think it was credible for them.
Question	*Does greater perceived expectancy decrease drop out?*	*Why does perceived expectancy not affect drop out?*
Answer	No: Perceived expectancy at baseline was not associated with drop out.	Interviews actually showed that for some veterans perceived expectancies were important and if they did not think PE would work then they dropped out.
Question	*Does greater therapeutic alliance decrease dropout?*	*How come therapeutic alliance is not identified with drop out?*
Answer	No: Not associated with drop out in the quantitative data.	Most veterans had a strong therapeutic alliance with their therapist and therefore did not think that this affected dropout and actually thought it increased treatment length at times. However, when veterans did have poorer alliance, they said it did impact dropout.

Appendix A

Thank you for coming in today and meeting with me so that we can learn more about veterans' experiences with PTSD treatment and their reasons for ending therapy. You were invited today because you were previously a part of our PTSD research project that was looking at how Prolonged Exposure therapy (PE) for PTSD can be delivered in different ways to increase access to care for veterans with PTSD. You participated in PTSD therapy with us from (insert dates of therapy) with (insert therapists name).

As a reminder, prolonged exposure therapy is an evidence-based PTSD treatment that can last up to 15 sessions and you were able to complete (insert # of sessions completed). Prolonged exposure therapy involves:

- Learning about PTSD
- Learning a breathing technique
- Engaging in imaginal exposures where you talk about your trauma in detail with your therapist during the session
  Processing this afterwards at the end of the therapy appointment.
  Complete out of session homework assignments where you would listen to yourself talking about your trauma on an audiorecorder every day, practice breathing techniques, and start to do things that you may have been avoiding doing before because of your trauma, also called in-vivo exposures.

Today I would like to learn more about your experience with PE that you were involved in on our
project and some of the reasons why you may have decided to end therapy. Many veterans have received other therapy in the VA but for the purpose of today we will just be talking about the therapy that you received on our study from (insert dates of therapy) with (insert therapists name).

Sample Interview Guide for Semi-Structured Interviews

1. What are the reasons you stopped the Prolonged Exposure therapy on our project?
   Possible Probe: Any other reasons you can think of?

We are now going to talk about some other things that may or may not have affected therapy and how long you stayed in therapy & your decision to end therapy.

2. Before you started therapy in our project, we asked how you would like to get your care through in-home, in-person therapy, home-based telehealth, and office-based telehealth; as a reminder, you chose (insert preferred modality) as your top choice setting for getting therapy on our project. What was the reason why you wanted to participate in therapy via (insert preferred modality).

3a. At the beginning of the project, you said you wanted to receive your therapy via (insert their preferred delivery modality) and you were assigned to receive (insert their randomized

condition). What can you tell me about your experience with (insert their randomized condition):

3b. In what ways did (insert assigned modality condition) affect your decision to not finish the therapy you were involved in?

3c. How did getting/not getting your top choice therapy setting affect your decision to end therapy?

4. In what ways did practical things like transportation problems, parking difficulties, or challenges in making convenient appointments, affect your decision to end therapy?

5a. What are your views about people who get mental health therapy?

5b. In general, how do you feel about mental health providers?

5c. In what ways did these views affect your decision to end therapy?

6a. How do you think other people view mental health in general?

6b. How much do your views about what other people think about mental health affect you seeking therapy?

6c. In what ways did these views affect your decision to end therapy?

7a. How would you describe your current/past mental health and physical health in general?

7b. How did your other mental or physical health problems affect your decision to end therapy?

8a. What kind of relationship did you have with your therapist (insert therapist's name) on our project (insert therapist's name as a reminder).

8b. How did your relationship with your project therapist affect your decision to not finish the PTSD treatment in our study?

8c. How did your relationship with your therapist affect how long you stayed in therapy?

9a. How helpful do you think prolonged exposure therapy is for PTSD?

9b: What did you think about the imaginal exposures -- where you talk in detail about your trauma in-session with your therapist?

9c: How did the imaginal exposures impact your decision to end therapy?

9d: What did you think about the out of session homework assignments, including

listening to your exposures on tape, breathing exercises, and practicing doing things you had been avoiding before?

9e: How did the out of session homework assignments affect your decision to end therapy?

9f. What did you think about the processing time after the imaginal exposure during session?

9g. How do you think the PE offered by our project impacted your PTSD?

9h. How did the changes in your PTSD affect your decision to end therapy?

9i. What do you think would be a beneficial or trustworthy PTSD therapy?

10a. What factors might have helped you to remain in Prolonged Exposure therapy longer?

10b: How do you think providers could improve PTSD therapies?

10c: What suggestions do you have for how to deliver PTSD therapies or make them more accessible?