University of Nevada, Reno

Development and Evaluation of a Web-based Acceptance and Commitment Therapy Program for Trauma Related Problems: A Pilot Study

A dissertation submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Psychology.

by

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December 2014

THE GRADUATE SCHOOL

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prepared under our supervision by

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Entitled

Development And Evaluation Of A Web-Based Acceptance And Commitment Therapy Program For Trauma Related Problems: A Pilot Study

be accepted in partial fulfillment of the
requirements for the degree of

DOCTOR OF PHILOSOPHY

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Abstract

Interpersonal violence against women is notably prevalent in our societies. Examination of well-suited alternative approaches are needed to address the larger set of problems associated with interpersonal trauma. The current dissertation is a pilot study which involves the evaluation of a web-based Acceptance and Commitment Therapy (ACT) program for psychologically distressed women who experienced interpersonal violence in a sample of 22 women. The study examined feasibility, acceptability, and changes across a range of psychological domains including PTSD, depression, anxiety, general distress, complex traumatic stress, and quality of life. Changes in theoretically relevant process measures, including psychological flexibility, self-compassion, and ACT knowledge, were studied. Results indicated satisfactory ratings of acceptability and good usability for the web-based program within this sample. Analyses found significant changes in all measures of psychopathology from pre to post treatment but not on quality of life. Significant improvement in all process measures were also found across time. Measures of psychological flexibility and self-compassion were related to measures of psychopathology and quality of life at pre-treatment. However, the relationships between pre to mid changes in process measures and mid to post changes in outcome measures were not significant. Current findings are compared to the larger literature, and possible explanations for the pattern of results found in the study are explored. Limitations and implications of these findings and the study are also discussed. Overall, the results of this pilot study indicate that the existing web-based ACT program may have utility with regard to changes across a broad range of psychological domains and processes in interpersonal trauma survivors.

Acknowledgements

I am humbled and fortunate to have had the experiences I have had thus far. To Dr. Victoria Follette, my advisor and mentor, thank you for your dedication to trauma work, for setting a context in which I could challenge myself and grow, and for many years of encouragement, honesty, and caring. I am especially indebted to Caitlin McLean who invested a tremendous amount of time and dedication to this project. I would like to thank everyone else on my dissertation committee including Dr. Yani Dickens, Dr. Steven Hayes, Dr. Jacqueline Pistorello, and Dr. Shernaaz Webster for the intellectual input and support throughout the course of this dissertation. With regard to my clinical supervisors, I am grateful to Dr. Alan Fruzzetti for the lessons I've learned from him and for his never-ending kindness, and to Dr. Anthony Papa and Dr. Steven Hayes for exemplifying how to integrate critical thinking in our pursuit as helping professionals. I would like to acknowledge Dr. Yani Dickens, Dr. Cynthia Marczynski, and Dr. Patricia Chatham, my supervisors during externship, who modeled and taught how meaningful changes can occur from different perspectives. With much gratitude, I also remember Dr. Gerald Metalsky, my undergraduate advisor who played an integral role in building the foundation for my interest in this field.

Several family members and friends have contributed deeply to my life. To my mother, who has sacrificed for me time after time in her life and has shown compassion for others even during the most difficult of moments, I love you very dearly and cannot wait till we live in the same country again. I would like to thank my father for many important life lessons which have helped me get to where I am and my brother who has always been a steady and reliable force in my life. I have much gratitude for my friends

Amrita Mishra and Susan Daflos for their emotional support. To my husband who I met while pursuing graduate education, thank you so much for sharing my journey with me, rain or shine, for staying up many late nights while I worked and for reminding me how much I mean. I am fortunate to have had your love and support. Finally, I would like to express appreciation for my dog Maya who has been the best companion one could have and has sat by me as I worked on much of my dissertation and graduate work.

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CHAPTER 1: INTRODUCTION

A large body of research has demonstrated high rates of interpersonal violence against women during childhood and adulthood, in the U.S. population (Centers for Disease Control, 2010; Planty & Truman, 2011; Tjaden & Thoennes, 2000; 2006). The negative sequelae following interpersonal violence has been noted particularly among women who have experienced childhood sexual abuse, childhood physical abuse, adult sexual victimization, and intimate partner violence (Briere & Jordan, 2004). A history of interpersonal violence has been associated with a range of negative outcomes, which extend beyond discrete psychiatric disorders to include more general measures of distress and impairment in daily functioning. It has also become well-known that different forms of interpersonal violence and psychological consequences not experienced in a random fashion. Rather, individuals who are exposed to one form of interpersonal violence are more likely to experience additional types of interpersonal violence, which in turn is associated with greater problems in functioning (Classen, Palesh, & Aggarwal, 2005; e.g., Cox, Kotch, & Everson, 2003; Weaver, Kilpatrick, Resnick, Best, & Saunders, 1997). In light of the substantial amount of research documenting a wide range of correlates associated with interpersonal violence in women, researchers have recommended that increased consideration be given to the broader scope of problems in addition to specific psychiatric outcomes (e.g., Briere & Jordan, 2004; Hughes, Humphrey, & Weaver, 2005). The vast majority of interventions for survivors of interpersonal violence have focused primarily on a narrow range of psychiatric outcomes, particularly PTSD, necessitating the application of other theoretically relevant interventions that can have a far-reaching impact on mental health and well-being.

Prevalence of Interpersonal Violence

Childhood Sexual Abuse

National estimates regarding the one-year incidence rates of child sexual abuse in the US range anywhere from 78,800 cases to over 2 million, depending on the source of the data and the methodology used (Sedlak & Broadhurst, 1996; National Incidence-Based Reporting System, 2002; Finkelhor, Hammer, & Sedlak, 2004; National Crime Victimization Survey, 2002) In general, lower incidence has been found in studies that are built on cases that have been investigated and substantiated by child protection agencies or other professionals, compared to those obtained by survey data. National surveys of adolescents and adults in the US, have found lifetime prevalence rates of childhood sexual abuse that range from 9% to 33% for women, and 5% to 10% for men (Finkelhor & Dziuba-Leatherman, 1994; Ruggiero et al., 2004; Briere & Elliott, 2003; Vogeltanz et al., 1999). A meta-analysis of US studies that included local or regional representative samples in addition to national samples indicated that 30%-40% of women, compared to approximately 13% of men experience sexual abuse during childhood (Bolen & Scannapieco, 1999). Another recent meta-analysis examined studies, spanning some 22 different countries, and indicated that the lifetime prevalence rate is 19.7% in females and 7.9% in males (Pereda, Guilera, Forns, & Gomez-Benito, 2009). While child sexual abuse is prevalent in men, women are shown to be at greater risk across the wide range of samples. Women within clinical samples report the highest lifetime rates of child sexual abuse, ranging from 35% to 75% across studies (Cloitre, Cohen, Edelman, & Han, 2001; Polusny & Follette, 1995).

Childhood Physical Abuse

In 2007, there were roughly 124,000 cases of physical abuse in children that were reported and substantiated by public social service agencies or CPS agencies (U.S. Department of Health and Human Services, 2009). Of these substantiated cases of physical abuse, almost 80% consisted of physical abuse of the child by a parent. Taking into consideration the number of cases that go unreported, the actual incidence of physical abuse in children is presumed to be much higher. Regarding the lifetime prevalence of childhood physical abuse, a review of studies conducted by the Department of Justice (Tjaden & Thoennes, 2000) revealed that approximately 50% of all adult women that are surveyed, report some form physical abuse at the hands of caretakers or acquaintances during childhood, when the entire range of severity of violent acts are included. The Second National Family Violence Survey (Wolfner & Gelles, 1993), showed that approximately 11% of surveyed adults use severe physical violence to discipline their children (kicked, bit or hit the other family member with a fist; hit or tried to hit with an object; beat up; burned or scalded; threatened with a gun or a knife, used a knife or a gun), while 62% report using some form of minor violence (e.g. slapped or spanked; pushed, grabbed or shoved) toward, a family member. Briere and Elliott (2003) found that 22.2% of males and 19.5%, of males and females respectively, reported experiences meeting standard criteria for childhood physical abuse. While there were no differences between males and females with regards to lifetime prevalence of physical abuse in childhood, which is consistent with other studies, females reported that the abuse went on for a longer length of time and also reported their abuse experiences as being more upsetting at the time.

Adult sexual victimization

Approximately 620,000 women, 18 years and older, experienced forcible rape in 2010 according to the National Intimate Partner and Sexual Violence Survey (NISVS; Black et al., 2011). The NISVS also estimated that 14.6 million, or approximately 12.3%, of American women experience a completed forced rape in their lifetime. Numerous other national household studies have estimated that 10% to 18% of women in the US experience rape as adults (Breslau et al., 1998; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Tjaden & Thoennes, 2000). Women in undergraduate institutions face particularly high risk for experiencing sexual victimization, as studies have shown that roughly 25% of college women report a sexual assault during the course of obtaining an academic degree (Hirsch, 1990). Moreover, a large body of research has documented the phenomenon of revictimization, which includes findings that show that individuals who have experienced prior abuse, particularly child sexual abuse, experience greater risk for being sexually victimized in adulthood (Messman-Moore & Long, 2003).

Intimate partner violence

Intimate partner violence is also highly prevalent among women in both the general population and in clinical settings (Coker, Smith, & Fadden, 2005; Kramer, Lorenzon, & Mueller, 2004; Magnussen et al., 2004; Ross, Walther, & Epstein, 2004). According to figures provided by the US Department of Justice, intimate partner violence accounts for 21.5% of nonfatal assaults against women and 3.6% of nonfatal assaults against men annually (Tjaden & Thoennes, 2000). Approximately 5.3 million women, 18 and older, experience intimate partner violence nationally each year, resulting in nearly 2 million injuries and nearly 1,300 deaths (Center for Disease and Control, 2003). Other national surveys suggest that 2% to 12% of women in the United States report

experiencing physical and/or sexual IPV in the past year, and 25% to 30% of women physical and/or sexual abuse by an intimate partner during their lifetime (Elliott and Briere, 2003; Haggerty & Goodman, 2003; Lipsky, Holt, Critchlow, & Easterling, 2004). While men are as likely as women to experience IPV, women are at greater risk for severe violence as they are 2 to 3 times more likely to report being pushed grabbed or shoved and 7 to 14 times more likely to report being beat up, choked , or tied down (Tjaden and Thoennes 2000). Nearly 10% of women in the United States experience severe victimization at the hands of intimate partners in which they are hit with a fist or object, beat up, threatened or assaulted with a knife or a gun (Wilt & Olson, 1996). Intimate partner violence victimization is also known to occur at a significantly increased rate among those who have experienced prior interpersonal violence, particularly in childhood (Rodriguez, Bauer, & Flores-Oetiz, 1998; Whitfield, Anda, Dube, & Felitti, 2003). More recently, attention has also been drawn to the problem of military sexual assault, and among OEF/OIF/OND veterans returning seeking VA care, 15% of women report military sexual assault.

Outcomes Associated with Interpersonal Violence

PTSD

PTSD is one of the most common problems experienced by survivors of interpersonal trauma. Women who report childhood sexual abuse are three to five times more likely to be diagnosed with PTSD compared to non-abused women (Saunders, Kilpatrick, Hanson, Resnick, & Walker, 1999; Coid et al., 2003). Upwards of 31% of women who have experienced intimate partner violence meet criteria for PTSD, according to the results of one meta-analysis (Golding, 1999). Evidence for the link

between intimate partner violence and PTSD is also available for longitudinal samples, suggesting that approximately half of the women who experience intimate partner violence experience PTSD even 6 to 9 years after the end of the relationship (Woods, 2000b). The National Women's Study (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993) revealed that among rape survivors, almost 31% meet criteria for lifetime PTSD and 11% meet criteria for current PTSD. In comparison to women who had never been victims of crime, survivors of rape are 6.5 times more likely to develop lifetime PTSD and 6.5 times more likely to have current PTSD. Studies have shown that experiences of interpersonal trauma precipitate PTSD more commonly than some other types of traumatic events (Resnick et al., 1993). A study comparing survivors of rape to those involved in a serious accident found that 55% of those who experienced rape developed PTSD compared with only 7.5% of the latter group (Kessler et al., 1995). In another study comparing different trauma types, 2.2% of those who experienced a natural disaster and 4.4% of those in an accident developed PTSD versus 13.3% of those who had been in combat (Norris, 1992). The rates of PTSD were most elevated among those who had experienced interpersonal violence such that 24.4% of those who had been physically assaulted and 37.8% of those who had been sexually assaulted developed PTSD.

Inconsistent patterns in prevalence rates have been reported when race/ethnic differences have been examined in relation to PTSD. One national study on the lifetime prevalence of PTSD found no differences between Blacks or Hispanics and Whites (Breslau et al., 2006a). Other studies have also shown no difference between African American and Caucasian individuals, in particular, in a general population sample (Breslau et al., 1998) and in samples of female sexual assault survivors (Zoellner, Lilly,

Graham-Bermann, Feeny, Fitzgibbons, & Foa, 1999). In contrast, higher rates of PTSD have been reported in African Americans compared to Whites in other studies (Himle et al., 2009; McGruder-Johnson, Davidson, Gleaves, Stock, & Finch, 2000). The inconclusive nature of findings in the literature has been reported in reviews which have discussed PTSD and ethnicity (Kilpatrick & Acierno, 2003; Hatch & Dohrenwend, 2007). Some discrepancy in findings has been attributed to the nature of studies which have been limited to specific geographic areas or have used clinic-based samples. Compared to studies that have focused on specific geographic areas in which no difference in the conditional risk of PTSD between Whites and Blacks have been found (Breslau et al. 1991; Norris, 1992), elevated rates of PTSD have been found in minorities in studies including clinical samples (Santos et al., 2008). Moreover, it has been found that higher rates of posttraumatic stress in ethnic minorities may interact with or be explained by other demographic variables such as age and socioeconomic status (Breslau et al., 1991, Norris, 1992).

Depression

Interpersonal victimization has been increasingly recognized as a significant predictor of depression. According to several meta-analyses that have examined the effects of child sexual abuse, effect sizes regarding the relationship between child sexual abuse and depression have ranged from small to medium (Jumper, 1995; Neumann, Houskamp, Pollock, & Briere, 1996; Paolucci, Genius, & Violato, 2001; Rind, Tromovitch, & Bauserman, 1998). Larger effect sizes have been observed in clinical populations, cases of intrafamilial abuse, and cases in which physical or emotional abuse

have also occurred (Neumann et al., 1996; Rind et al., 1998). Longitudinal studies have also found that women who are physically abused in childhood experience greater risk for depression during adolescence and adulthood (Silverman, Reinherz, & Giaconia, 1996; Springer, Sheridan, Kuo, & Carnes, 2007). The vast majority of studies also suggest a moderate to strong association between intimate partner victimization and depression, according to recent reviews (Beydoun, Beydoun, Kaufman, Lo, & Zonderman, 2012). Bonomi et al.(2009) found that the odds of Major Depressive Disorder were 3.26 times higher among women reporting a history of intimate partner violence, compared to those without such a history, and other studies have also reported similar findings (Golding, 1999). Depression has also been recognized as the primary reason for visiting a primary health care provider in women who report experiencing intimate partner victimization (McCauley et al., 1995).

Anxiety

Anxiety symptoms and anxiety disorders have been identified as being common short- and long-term psychological correlates of interpersonal violence victimization. Significant associations between CPA and a variety of anxiety disorders, including specific phobias, PTSD, social anxiety disorder, panic attacks and panic disorder have been reported (Cougle, Keough, Riccardi, & Sachs-Ericcson, 2009; Goodwin, Fergusson, & Horwood, 2005; Green et al., 2010; MacMillan, Fleming, & Streiner., 2001; Springer et al., 2007). A history of child sexual abuse has also been linked to generalized anxiety disorder (McCauley et al., 1997), panic disorder (Burnam et al., 1988), and phobias (Burnam et al., 1988; Silverman, Reinherz, & Giaconia, 1996). One longitudinal investigation that analyzed data from a birth cohort of over 1,000 participants, followed

until the age of 25, and found that exposure to CSA and/or CPA was associated with increased risks of anxiety disorders in adulthood, including generalized anxiety disorder, panic disorder, agoraphobia, social phobia, and specific phobia (Fergusson, Boden, Horwood, 2008). Although fewer studies have examined anxiety in relation to interpersonal violence experienced in adulthood, women exposed to interpersonal violence or rape have also been reported to experience increased risk of developing an anxiety disorder and for experiencing greater severity of anxiety symptoms (Blasco-Ros, Sanchez-Lorente, & Martinez, 2010; Pico-Alfonso et al., 2006).

Alcohol Use

Studies using clinical and non-clinical samples have shown that child abuse is associated with increased odds of alcohol related problems (Dennis & Stevens, 2003; Hamburger, Leeb, & Swahn, 2008). Survey data from 3,680 women who participated in the 2005 U.S. National Alcohol Survey indicated that child physical or sexual abuse was significantly associated with lifetime consumption of alcohol, consumption of alcohol during the past year, and problematic consequences related to alcohol use in adulthood (Lown, Nayak, Korcha, & Greenfield, 2011). Longitudinal investigations have also established that sexual or physical abuse in childhood, predicts alcohol use disorders in adolescence, and adulthood (Widom, White, Czaja, and Marmorstein, 2007). In reviewing the literature on child sexual abuse, Polusny & Follette (1995) reported that 27% to 37% of sexually abused women had alcohol-related problems, compared to 4% to 20% of non-abused women. In the National Women's Study, high rates of alcohol consumption and problems associated with alcohol use were found among survivors of rape, compared to non-crime victims (Resnick et al., 1993). Specifically, rape survivors

were 13.4 times more likely than non-crime victims to have two or more major alcohol problems. In a two year longitudinal analysis of the relationship between violent assaults and alcohol use in women, those who had experienced past and/or recent assault were 2 to 3 times more likely to develop alcohol abuse disorders, compared to women who had not been assaulted, even when baseline alcohol use was controlled for (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997).

Complex PTSD

In order to account for the range of psychiatric diagnoses in addition to PTSD and more importantly, the wider range problems with functioning observed in a significant subset of trauma survivors, an alternative diagnostic formulation called Complex Traumatic Stress has received attention in recent years (Follette, Iverson, & Ford, 2013). Complex Traumatic Stress is proposed to arise from victimization experiences that are severe, prolonged, repetitive, and typically interpersonal in nature (Herman, 1992b). Such traumatic processes are considered to result in a range of symptoms that go beyond what is traditionally labeled as PTSD. Symptoms include marked alteration in self-perception, attention and consciousness, affective regulation, and interpersonal disruptions; collectively described as Complex Traumatic Stress (Herman, 1992b; Courtois, 2008; Follette, Iverson, & Ford, 2013). Although the diagnosis of Complex Traumatic Stress represents has been controversial in some quarters (Lewis & Grenyer, 2009), the construct has had important implications in treatment development because it highlights the thought that chronic abuse impacts normative developmental processes leading to marked alterations that are not captured by the traditional PTSD diagnosis. While the

diagnosis of Complex Traumatic Stress has not been added to the most recent version of the DSM, it is being considered for addition as a diagnosis in the upcoming ICD 11.

Chronic self-perceptions of helplessness and hopelessness, impaired trust, self-blame, low self-esteem, somatization, sexual problems, and suicidality are some problems related to Complex Traumatic Stress that have been documented among survivors of interpersonal abuse (Briere & Elliott, 1994). Both retrospective and prospective studies have also linked dissociation, one of the features of Complex Traumatic Stress, to a history of sexual trauma (Briere & Runtz, 1993; Sar & Ross, 2006). Fewer studies have examined the proposed diagnostic category Complex Traumatic Stress in itself, partly due to limitations with regards to measuring the phenomenon. One of the earliest examinations of Complex Traumatic Stress compared 74 survivors of sexual abuse to 34 women without histories of sexual abuse, and found that the sexual abuse group showed increased severity on Complex Traumatic Stress symptoms of somatization, dissociation, hostility, anxiety, alexithymia, social dysfunction, maladaptive schemas, self-destruction, and adult victimization (Zlotnick et al., 1996). Furthermore, studies have shown that individuals who report cumulative experiences of sexual and physical abuse, particularly those arising early in childhood, have the highest base rates of Complex Traumatic Stress symptoms (Roth, Newman, Pelcovitz, van der Kolk, & Mandel, 1997; Cloitre et al., 2009). While a comprehensive discussion of Complex PTSD symptoms in relation to interpersonal violence is beyond the scope of this proposal, research has made it clear that victimization in interpersonal relationships is associated with a range of difficulties that extend beyond traditional trauma specific diagnoses.

Quality of Life

Going beyond specific psychiatric diagnoses, several studies have substantiated a link between a history of abuse and lowered quality of life. Ventegodt, Flensborg-Madsen, Anderson, & Merrick (2006) measured quality of life in a comprehensive manner using the Self-Evaluation of Quality of Life Scale which measures global quality of life including well-being, life satisfaction, happiness, fulfillment of needs, experience of temporal and spatial domains, expression of life's potentials, and objective factors. Among the range of stressful life events that were assessed, sexual assault by well-known offender, rape, incest, sexual assault, were some variables that were significantly associated with quality of life. Another study focused on victimization within women in the military has also found that women who were physically assaulted or raped reported significantly lower health-related quality of life with those who had both traumas reporting the most severe impairment, comparable to levels observed in women with chronic illnesses (Sadler, Booth, Nielson, & Doebelling, 2000). In a large scale community study of intimate partner violence (Bonomi et al., 2006), physically and/or sexually abused women were nearly three times as likely to report fair or poor health, and women who had experienced any type of intimate partner violence also reported significantly lower mental and social functioning scores, compared to non-abused women. Poor health related quality of life, lower emotional well-being, and decreased self-esteem have also been substantiated among individuals who experienced dating violence in adolescence, compared to their victimized peers (Ackard & Neumark Sztainer, 2002; Coker, Smith, Bethea, King, & McKeown, 2000). Sexual abuse and physical abuse have also been found to be associated with poor quality of life and social

functioning, even after adjusting for the effects of numerous psychiatric diagnoses (Afifi, Enns, Cox, & de Graff., 2007, Dickinson, de Gruy, Dickinson, & Candib, 1999).

Current State of Interventions for Survivors of Interpersonal Trauma

Significant advances have been made in the development and evaluation of psychological interventions for PTSD in the past few decades. The most systematically studied and recommended psychosocial interventions for trauma consist of cognitive-behavioral treatments, aimed at treating PTSD, which typically consist of exposure therapy, anxiety management, and/or cognitive restructuring (Foa, Keane, Friedman, & Cohen, 2009). There is sufficient scientific evidence to show that existing cognitive behavioral treatments are helpful in reducing symptoms of PTSD (Bradley, Greene, Russ, Dutra, & Westen, 2005). Because of their efficacy in the treatment of PTSD, the VA/DOD Clinical Practice Guidelines (2010) as well as the Institute of Medicine (2007) have strongly recommended cognitive-behavioral therapies as the most effective treatment for PTSD across a range of difference trauma populations.

Limitations

Despite the robust body of findings that women who have experienced interpersonal victimization experience a range of psychiatric disorders and psychological difficulties, that extend beyond PTSD, the vast majority of studies have focused primarily on reducing symptoms of PTSD in those diagnosed with the disorder (Foa, Keane, & Friedman, 2008). In the recent meta-analysis of psychotherapy for PTSD (Bradley et al., 2005), a positive relationship was found between the number of exclusion criteria and outcome, resulting in a recommendation to take caution in making generalizations about current treatment of choice for patients with PTSD given the heterogeneous nature of the

group. Because of the significance of the variety of trauma survivors who are not included in these studies (e.g. substance abusers), evaluation of alternative or augmented treatments have been deemed a priority (Bradley, 2005). Some treatments are not designed to treat the wide range of symptoms associated with trauma, there is a significant dearth of knowledge regarding the extent to which current interventions are able to treat individuals with poly-symptomatic profiles and larger personality differences, observed more frequently among survivors of interpersonal trauma. Furthermore many treatments have focused on one or two specific types of interpersonal trauma, particularly rape, without addressing the needs to the larger group of survivors who also present with significant problems.

Although not all trauma survivors need treatment since there is individual variability with regard to whether psychological difficulties are experienced after trauma (Bonanno, 2004; 2005), another challenge in the trauma literature is that only a minority of individuals, of those who experience trauma actually seek psycho-social help (Fugate, Landis, Riordan, Naureckas, & Engel, 2005; Kimerling & Calhoun, 1994; Mahoney, 1999). Many survivors do not seek treatment possibly due to shame and guilt (Fugate et al., 2005; Mazza, Dennerstein, & Ryan, 1996). In attending to the acceptability of current evidence based interventions for trauma, it can be noted that upwards of 20% of participants in CBT conditions in clinical trials drop out (Hembree et al., 2003). Dropout rates reported in randomized controlled trials of childhood abuse survivors are typically higher and range from 30% to 40% (Cloitre, Koenen, Cohen, & Han, 2002; McDonagh-Coyle et al., 2001). Consistent with the finding that dropout rates for CBT for certain disorders are doubled in clinical settings compared to what is reported in RCTs, dropout

rate for those with PTSD has been found to range from 0% to 50%, depending on the population and incentive to seek help (Schottenbauer, Glass, Arnkoff, Tendlick & Gray, 2008). Several factors that are related to the problems observed among survivors of interpersonal trauma including pretreatment anxiety, depression, guilt, severity of PTSD, alcohol use and comorbidity, have been found to be associated with dropout from CBT (Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Taylor, Fedoroff, Koch, 1999).

Failure of Clinicians to Adopt Empirically Supported Treatments

Despite the efficacy of CBT in controlled clinical trials, practitioners do not appear to utilize exposure interventions with great frequency (Becker, Zayfert, & Anderson, 2004; Cook, Schnurr, & Foa, 2004). In one survey of 207 psychologists, in which clinician utilization of exposure therapy was investigated, only 17% of the sample used exposure therapy to treat PTSD and 59% reportedly believed that using it was likely to increase patient desire to dropout from treatment (Becker, Zayfert, & Anderson, 2004). For these reasons, further work is needed of developing trauma treatments that reach, and are acceptable to, a wider sample of survivors and providers.

Experiential Avoidance: A Functional Approach to Classifying Trauma-Related Outcomes

Alternative methods of categorizing outcomes related to interpersonal victimization are needed for purposes of research and clinical effectiveness. In the field of psychopathology, the primary classification systems have been based on syndromes, focused on signs and symptoms, to identify disorders with a known etiology, course, and response to treatment (Foulds, 1971; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). With regards to traumatic stress, PTSD has been recognized as a primary problem, and

the identification and treatment of PTSD has received considerable attention. While this work is important, exclusively focusing on PTSD can limit the understanding and treatment of trauma for a number of reasons. The literature points to significant individual diversity in the trajectories of symptoms over time (Bonanno, Rennicke, & Dekel, 2004; 2005). Some quickly return to baseline levels of functioning, others demonstrate a slower return to baseline after a period of acute symptomology, and yet another group of individuals demonstrate chronically elevated levels of PTSD for years after the event. Finally, there is also a pattern of a delayed emergence of symptoms, in which individuals experience sub-threshold PTSD that gradually worsens over time (Bonanno et al., 2005; Buckley, Blanchard, & Hickling, 1996). Despite the high prevalence of exposure to traumatic events, the conditional risk of PTSD, or the risk of PTSD among those exposed to traumatic events is generally low (Breslau, Davis, Andreski, & Peterson, 1991). Furthermore, the problems associated with trauma extend beyond PTSD; PTSD is well known to be comorbid with a number of other psychiatric disorders, consistently upwards of 50% for substance abuse and affective disorders, and higher than 30% for other disorders including another anxiety disorder (Gold, 2004; Kessler et al., 1995). The data regarding the epidemiology and course of PTSD suggest that, even amongst a similar group of individuals based on a diagnostic criterion, there is significant heterogeneity with regards to symptom development, onset and recovery. Rather than attending to the topography of problematic behaviors, Hayes et al. (1996) suggest a functional approach to classification in which behaviors or sets of behaviors are organized by the functional processes that are hypothesized to generate and maintain them. Compared to the atheoretical goals of a syndromal system of classification, a

functional classification approach is theoretically driven and directly relates to applied research.

Experiential Avoidance is Theoretically Relevant to Trauma-Related Problems

One functional process that has been conceptualized to play a central role in the wide array of psychological difficulties associated a history of abuse is experiential avoidance (Follette, Palm, & Rasmussen-Hall, 2004; Pistorello, Follette, & Hayes, 2000, Polusny & Follette, 1995). Experiential avoidance refers to instances in which an individual is unwilling to experience or contact aversive private experiences including bodily sensations, emotions, thoughts, memories, and behavioral tendencies (Acceptance and Commitment Therapy; Hayes et al., 1996). Clinically, experiential avoidance can be observed as attempts to avoid or escape private events in a psychologically inflexible manner, even in contexts that may call for alternative strategies. Experiential avoidance is also particularly useful in facilitating the organization of a range of potential outcomes of trauma understood diagnostically as Complex Posttraumatic Stress Disorder (Follette, Iverson, & Ford, 2009).

Experiential avoidance is highly relevant to the avoidance features associated with a range of trauma outcomes, which include efforts to avoid experiences related to the trauma, difficulties recalling the trauma, diminished interest in activity, feelings of detachment, restricted affect, and a feeling that one's future has been foreshortened. Accordingly, the construct of experiential avoidance includes avoidance behaviors developed in the context of experiencing trauma which may initially be focused on or associated with trauma related activities and stimuli. Additionally, in keeping with the theoretical understanding that such behaviors may generalize over time to result in a

coping style marked by avoidance, experiential avoidance also includes chronic efforts to avoid a variety of internal experiences that may or may not be directly relevant to the traumatic event. The wide range of problematic behaviors that are observed in the context of exposure to trauma (e.g. substance use, dissociation, thought suppression, and self-harm) are thought to represent regulatory processes that function to avoid the experience and expression of painful trauma-related thoughts and emotions, and to produce or maintain the variety of problems associated with trauma (Polusny & Follette, 1995)

Empirical Evidence supports the Relevance of Experiential Avoidance to Trauma-Related Problems

In the past decade, research on a variety of traumatic stress populations has linked experiential avoidance to psychological functioning among trauma survivors. The use of cognitive and emotional suppression, strategies to control and avoid thoughts and emotions respectively, are forms of experiential avoidance that survivors may engage in to manage trauma related distress. Experiential avoidance is shown to be highly correlated with the use of suppression (Hayes et al., 2004) and while suppression as a coping strategy may seem effective intuitively, the general literature on the effects of thought suppression as well as studies on suppression in clinical samples have demonstrated that suppression of thoughts leads to a paradoxical increase in the thoughts being avoided, at least in the long term (Clark, Ball, & Pape, 1991; Wegner & Schneider, 2003; Wenzlaff & Wegner, 2000). Shipherd and Beck (1999) examined suppression of thoughts among survivors of sexual assault with and without PTSD. Participants with PTSD reported a rebound in the frequency of rape-related thoughts after deliberately suppressing their thoughts compared to participants without PTSD who did not

experience such a rebound effect. Emotional suppression involving the avoidance of emotional experiencing is also known to be problematic because it is associated with poor psychological health (Gross & John, 2003). Overall, the research on suppression indicates that its use as a coping strategy among trauma survivors may only facilitate the maintenance of trauma related symptoms.

Studies on numerous forms of interpersonal violence have implicated experiential avoidance in the relationship between a wide variety of interpersonal trauma events and post-traumatic symptoms. Higher levels of experiential avoidance have been found among individuals with a history of child maltreatment (Gratz, Bornovalova, Delany-Brumsey, Nick, & Lejuez, 2007; Sullivan, Meese, Swan, Mazure, & Snow, 2005), child sexual abuse, domestic violence, dating violence and rape. Experiential avoidance has also been shown to predict the severity of posttraumatic psychological functioning above and above and beyond the effects of trauma severity (Plumb, Orsillo, & Luterek, 2004). Experiential avoidance has been identified as a mediator in the relationship between childhood sexual abuse and global psychological distress (Marx and Sloan, 2002), childhood sexual abuse and trauma related psychological distress (Rosenthal, Rasumussen-Hall, Palm, Batten, & Follette, 2005), and between adolescent sexual victimization and negative outcomes in adulthood (Polusny, Rosenthal, Aban, & Follette, 2004). Studies on sexual victimization have shown that experiential avoidance mediates the relationship between sexual victimization, including child, adolescent and adult sexual experiences, and PTSD symptoms in both Caucasians (Marx & Sloan, 2002; Polusny et al., 2004) as well as a more ethnically diverse sample (Merwin, Rosenthal, & Coffey, 2009). This pattern of experiential avoidance as a mediator has also been

observed in the relationship child maltreatment and PTSD symptoms in adolescence and adulthood (Orcutt, Pickett, & Pope, 2005; Shenk, Putnam, & Noll, 2012), psychological abuse and mental health symptoms in adulthood (Reddy, Pickett, & Orcutt, 2012), and physical abuse and revictimization in the form of dating violence (Fiorillo, Papa, & Follette, 2013). With regards to quality of life, greater post-traumatic growth and meaning in life has been found in individuals reporting psychological distress, and less reliance on experiential avoidance (Kashdan & Kane, 2011).

Overview of Acceptance and Commitment Therapy

Acceptance and Commitment Therapy is an approach with an emphasis on increasing psychological flexibility by targeting several processes, including the reduction of experiential avoidance. Psychological flexibility refers to "contact with the present moment as a conscious human being, fully and without defense, as it is an not what it says it is, and persisting with or changing a behavior in the service of chosen values" (Hayes, Strosahl, & Wilson, 2011, p. 138). A combination of mindfulness, acceptance, values and commitment processes can be targeted in ACT to form a unified approach to behavior change. Each of the six processes of change in ACT, namely defusion, acceptance, contact with the present moment, self-as-context, values, and committed action, is discussed below.

Defusion involves creating conditions that weaken the transformation of stimulus functions associated with language and cognition, to reduce the behavioral control of verbal events in the determination of behavior and to broaden behavioral repertoires. In simple terms, defusion involves noticing thoughts as just thoughts, rather than the literal truth, in order to enable individuals to act in more flexible way instead of being restricted

by the content of their thoughts. Defusion stands as an alternative to cognitive control (e.g. changing, suppressing, or eliminating thoughts) by changing one's relationship with, rather than the form, frequency, or situational sensitivity of verbal behavior.

Acceptance refers to the process of actively embracing moment to moment thoughts and feelings, including aversive private experiences. In contrast to experiential avoidance (EA), which encompasses attempts at modifying the form, frequency, and situational sensitivity of private events, even when doing so produces harm (Wilson, Hayes, Gregg, & Zettle, 2001), acceptance represents a more effective alternative that fosters psychological flexibility, the ability to contact the present moment more fully with consciousness and to change or persist in behavior when doing so is consistent with ones values, as also defined earlier. Acceptance requires a psychological stance in which one is open, receptive, flexible, and nonjudgmental with regards to private experience. Additionally, it also represents the behavioral willingness to initiate and sustain contact with difficult private experiences or the events that may occasion them. Because acceptance reflects openness to moment to moment experience without being judgmental of the self, including one's negative emotions, it is important to the development of self-compassion.

Contact with the present moment involves maintaining flexible contact with one's experiences in the present moment, in a voluntary, flexible way rather than rigidly attending to a narrow set of stimuli or thoughts about the past/future. In contacting the present moment (i.e., here and now), one is able to distance from processes such as problem-solving, worry, and rumination, which can inhibit flexible attention to respond effectively to other features of their surroundings. Both defusion, which can empower

this process by weakening the dominance of verbal processes, and acceptance which is integral in making the present moment awareness of difficult emotional experiences possible, can facilitate this process.

Self-as-context is a sense of self, or the place from which one observes one's own experience, that is distinct from a conceptualized self or the context by which one identifies the self and explains ones behavior. While describing and defining oneself using particular content (e.g. I am a victim of abuse) is a universal human experience, identifying excessively with any particular content can limit willingness to experience content believed to be incompatible with, and restrict behavior to actions that are supposedly in keeping with, the conceptualized self. The alternative approach in ACT emphasizes the "observing self," also known as self-as-experiencer or self-as-perspective, in which the sense of self is based on the perspective of the speaker rather than on any particular physical characteristics. In self-as-context, the self is also framed from a "here and now" perspective, from which all other things (e.g., sensations, emotions, and thoughts) are experienced. Exercises focusing on mindfulness and deliteralization are used to loosen the association between a conceptualized sense of self and one's behavior and to strengthen sense of self as context.

Clarification of *Values* occurs when patterns of activity associated with pre-dominant intrinsic reinforcing qualities are developed and defined. This is well suited for individuals with PTSD, because chronic behavioral restriction often means that their lives are far removed from personal choices and meaningful living in the form of significant relationships, vocational activities, and recreational activities.

Committed action is the final goal in ACT and refers to commitment to valued action and behavioral change with the goal of constructing larger patterns of flexible and effective behavior. Committed action serves as an alternative in which behavior is guided by values, unique to each individual, emphasizes volition and self-direction. The practice of defusion, acceptance, present moment awareness, and self-as-context, recognized in terms of their associated pain, are highlighted in the service of valued living. Commitment involves an actual pattern of behavior in the present, rather than a promise about the future, and keeps in line with ACT's identification as a behavior therapy. Committed action also involves a lifelong process of taking responsibility compassionately when actions fall short of valued intensions, while persisting to carrying out the next action as a valued one.

Acceptance and Commitment Therapy as a Relevant and Novel Intervention for Survivors of Interpersonal Trauma

The current dissertation proposal seeks to evaluate a web-based intervention, adapted from the self-help text "Finding Life Beyond Trauma; Using Acceptance and Commitment Therapy to Heal from Post-Traumatic Stress and Trauma-Related Problems" (Follette & Pistorello, 2007), for women who are survivors of interpersonal trauma. Acceptance and Commitment Therapy is a contextual cognitive behavioral therapy (ACT; Hayes et al., 1996; Hayes, Villatte, Levin & Hildebrandt, 2011). ACT may be well suited as an intervention for survivors of interpersonal trauma, including in terms of a web-based delivery, for several reasons which are outlined below.

ACT Targets a Wide Array of Trans-diagnostic Issues Related to Trauma

Because ACT addresses psychological inflexibility/experiential avoidance as a trans-diagnostic process based on a functional dimension of avoidance, ACT is particularly well suited to treat the range of psychological conditions observed in survivors of interpersonal victimization. There is a large body of research demonstrating that experiential avoidance is a risk factor for other psychological disorders, in addition to PTSD, such as depression, substance use disorders, anxiety, and panic disorder (Hayes, Luoma, Bond, Masuda & Lillis, 2006; Hayes, Strosahl, Wilson, Bissett, Pistorello, et al., 2004). This trans-diagnostic nature of ACT differs from traditional treatments whose conceptualizations are primarily geared towards a single diagnosis, as in the case of PTSD. In addressing experiential avoidance, which encompasses avoidance of any aversive private experiences, ACT facilitates changes in ones response to a wide range of negative emotional stimuli. In this manner, ACT addresses a wide range of emotional responding that are commonly observed in interpersonal victimization such as guilt, shame, anger, and sadness. Another important advantage that ACT offers is its focus beyond symptom reduction as an outcome, to include improvement in life domains deemed to be important to each individual being treated. ACT represents an idiographic approach in terms of how it views the clinical significance of changes associated with treatment. This approach stands in contrast to most traditional interventions, which operationalize symptom reduction in advance, using a particular outcome measure, which may be limiting in that it may not map up to that individual's ability to function better in some tangible way (Kazdin, 1999). Symptom reduction cannot be disregarded, and as discussed below has been reported to occur successfully among individuals treated with ACT. However, in addition to symptom reduction, helping clients identify valued life

directions and commitment to actions consistent with those values may provide additional benefit in increasing quality of life.

Research has shown that Client Changes Can be Facilitated by Targeting Psychological Inflexibility/Experiential Avoidance

Several studies have found that ACT can produce improvements in depression and anxiety disorders (Hayes et al., 2006). Some studies that have compared ACT to Cognitive Therapy (CT) have found equivalent outcomes on depression (Forman et al, Herbert, Moitra, Yeomans, & Geller, 2007), general anxiety symptoms (Forman et al., 2007), and social anxiety (Block & Wulfert, 2000). Other studies have found superior outcomes for ACT compared to CT on depression (Lappalainnen et al., 2007; Zettle, Rains & Hayes, 2011). In a randomized trial, ACT was found to produce superior effects for depression compared to treatment as usual (Hayes, Boyd, & Sewell, 2011). In another randomized trial, superior effects were found for ACT compared to progressive relaxation training for obsessive compulsive disorder (Twohig et al., 2010). The effectiveness of ACT in improving trauma related conditions has yet to be studied in a treatment trial and published, but case studies have supported its utility in improving outcomes related to treatment resistant PTSD (Twohig, 2009), and comorbid substance abuse and PTSD (Batten & Hayes, 2005). Additionally, pilot research with ACT for survivors of trauma in a group format showed that it had utility in reducing psychological symptoms and increasing psychological flexibility (Follette, Herman, & Follette, 1991). Overall, these studies suggest that ACT is an effective intervention for depression and anxiety disorders. Additionally, there is evidence to support the underlying mechanism of change in ACT as several outcome studies have provided evidence that the improvement

in symptoms are related to reductions in psychological inflexibility (Hayes et al., 2006). Studies have found that ACT significantly reduces psychological inflexibility, which in turn relates to improvements in anxiety and depression (Dalrymple & Herbert, 2007; Forman et al., 2007; Lappalainnen et al., 2007)

ACT can be implemented in a Self-Guided Format

Web-based interventions have been theorized to offer several advantages because it can reach a large population at relatively low cost, can be done at a place and time most suitable for the client, can be helpful for those experiencing self-stigma as a barrier, is amenable to personalization and tailoring to fit diverse groups, and can easily be updated, refined, and expanded to fit new findings (Amstadter, Broman-Fulks, Zinzow, Ruggiero, & Cercone, 2009). Recent developments in the treatment of psychological disorders have increasingly emphasized web-based interventions as a form of treatment. The results of a meta-analysis on web-based interventions for a variety of problems, spanning 92 studies, found an overall mean weighted effect size of 0.53 (medium effect), which is quite similar to average effect size of traditional face to face therapy (Barak, Hen, Boniel-Nissim, & Shapira, 2008). Given the small percentage of individuals that require treatment that seek traditional treatment, and because web-based interventions could be especially suited to address certain post traumatic features such as alienation, avoidance, and detachment, a small number of computer-based interventions for PTSD have also been established and evaluated (Amstadter et al., 2009).

A web-based ACT intervention for survivors is particularly timely because current web-based interventions for trauma have also focused specifically on PTSD, without a larger applicability to traumatic stress populations presenting with a wide range

of comorbid problems. Additionally, none of the web-based interventions have focused specifically on survivors of interpersonal trauma, a group with significant need for treatment. Studies examining the efficacy of ACT bibliotherapy have found it to be an effective intervention in the reduction and prevention of mental health problems, when applied to individuals with chronic pain (Johnston, Foster, Shennan, Starkey & Johnson, 2010), those with anxiety disorders (Russo et al., 2010), at-risk college students and individuals with mild to moderate depression and anxiety (Muto, Hayes, & Jeffcoat, 2011; Fledderus et al., 2011), and teacher wellness (Lazzarone et al., 2007). While bibliotherapy differs from web-based therapy because it is not delivered over the internet, it provides support for web-based therapy because they are both considered self-guided interventions with very limited or no direct contact with a therapist. Furthermore, initial pilot studies utilizing ACT in a web-based format indicate that it may be feasible and effective for smoking cessation (Brikcer, Wyszynski, Comstock, & Heffner, 2013) and is highly acceptable and feasible for the prevention of depression and anxiety among college students (Levin, Pistorello, Seeley, & Hayes, 2014).

Web-based interventions, compared to self-help, may be particularly advantageous because research has shown individuals are increasingly using the internet as a source of health information, and recognizing its role in helping to cope with a major illness (Atkinson & Gold, 2002). Within web-based interventions, however, recent meta-analytic studies have shown therapist-supported approaches are most helpful and tend to demonstrate larger effect sizes, compared to interventions without any clinical contact (Barak et al., 2008; Spek et al., 2007). Such approaches address the concern of attrition which has been noted to be high in the case of self-guided treatment (Barak et al., 2008).

In the case of one web-based study, only a 1.03% completion rate was observed when CBT for panic disorder and agoraphobia was delivered in the form of a freely available 12 session web-based format in a sample of 1161 users (Farvolden, Denisof, Selby, Bagby, & Rudy, 2005).

Summary and Rationale for the Current Study

In summary, the problems faced by survivors of interpersonal trauma are widespread and challenging. While treatments for trauma related symptoms have shown promise, there is great need for treatments which emphasize the larger context of problems experienced by survivors of interpersonal trauma. Even with the delivery of empirically supported treatments for PTSD, challenges related to access, attrition, and acceptability are concerning in nature. In recent years, web-based interventions have been recommended as an approach to improving access to treatment in general and the literature indicates that web-based interventions can have a meaningful impact for a variety of psychological problems including PTSD, as demonstrated in recent studies. However, limitations exist when considering treatments for survivors of interpersonal trauma due to the lack of web-based studies focused specifically on this population, whether it relates to PTSD or other trauma-related difficulties. Acceptance and Commitment Therapy as a transdiagnostic intervention which emphasizes decrease of experiential avoidance/increase of psychological flexibility, issues relevant to the experience of interpersonal trauma survivors, could fill an important gap in the treatment of survivors by addressing the wide array of post-traumatic problems observed in this population. Delivered in a web-based format, such a treatment could improve access to treatment at the same time for a variety of reasons. To date, there is indication that ACT can be delivered in a self-help format

and early evidence to indicate that it may be acceptable and feasible when applied in web-based mode. Accordingly the literature lends support for the utilization of ACT for the treatment of problems experienced by trauma survivors. However, the application of ACT in studies focused on post-traumatic problems, outside of a few case studies which have shown positive outcomes, have not been undertaken. As such, the delivery of ACT in a web-based format and an understanding of its acceptability, feasibility, and preliminarily efficacy, all of which this study attempts to understand is of important need when considering trauma generally and interpersonal trauma in particular.

Current Study

The present pilot study was conducted to examine a six session (six week) web-based ACT program for interpersonal trauma.

Aim 1. Test the effectiveness of this brief intervention for various trauma-relevant psychopathology (PTSD symptoms, depression, anxiety, general psychological distress, complex traumatic stress symptoms) and quality of life.

Aim 2. Evaluate the feasibility and acceptability of the program as indicated by rates of attrition as well as participant rated measures of acceptability and feedback (client satisfaction and system usability).

Aim 3. Examine changes in theoretically relevant processes of change (i.e., psychological flexibility, self-compassion) and their association with treatment outcome and examine changes in ACT knowledge as a manipulation check.

CHAPTER 2: METHOD

Participants and Recruitment

<u>Inclusion Criteria</u>

Participants were included in the study if they met all of the following inclusion criteria and they were allowed to be in concurrent therapy elsewhere while participating in the study.

a) female
b) endorsed a prior history of interpersonal trauma (childhood sexual abuse, childhood physical abuse, adolescent or adult sexual assault, intimate partner violence) in response to the Stressful Life Events Screening Questionnaire (SLESQ; Goodman, Cocoran, Turner, Yuan, & Green, 1998)
c) reported significant psychological distress as indicated by a cutoff score of 4 on the General Health Questionnaire (Goldberg, 1972)
d) access to the internet
e) fluency in English
f) 18 years of age or older

Recruitment

In order to increase the likelihood of obtaining a representative sample, recruitment efforts aimed to gather participants consisted of a wide variety of methods. Flyers which included a brief description about the study were provided to staff and providers at university counseling centers, private practices, and community mental health agencies. Dr. Victoria Follette and Dr. Jacqueline Pistorello extended information about the study and provided flyers to several people in their contact network. In addition to providing materials, a request was made to staff at various agencies encouraging them to give information about the study to potential candidates. Flyers were posted throughout these agencies and at numerous locations in the community such as grocery

stores and coffee shops and on posting boards at the University of Nevada and Truckee Meadows Community College. Information regarding the study was also made available through local print media which included ads in the local Sunday newspaper and weekly ads in the Reno newsletter focused on arts and events. Information was also posted on the Nevada Psychological Association website. Recruitment efforts were also extended to other relevant online avenues including craigslist and the classifieds section of the web-version of the local newspaper. Recruitment materials described the study as an online program for those who had experienced stressful sexual and physical experiences or abuse in childhood, adolescence, or adulthood. The main features of the study including eligibility criteria, study procedures, and time commitment were outlined in materials used for recruitment. Information regarding gift card compensation for participation in the study was also outlined. To facilitate contact with the investigators, a phone number and an email address were provided.

Sample Size and Power

As noted in the introduction, previous web-based studies for PTSD have demonstrated medium to large effect sizes and ACT based self-help interventions have also demonstrated medium to large effect sizes. Assuming an effect size of .65 with power set at .80, it was deemed that a sample size of 17 participants were required to test initial efficacy.

Telephone Screening

Interested individuals who initiated contact via the advertised phone number or email address were screened for initial eligibility over the phone by the study investigator and another graduate student (CM) who also held the role of research coordinator in the

Trauma lab, supervised by Dr. Victoria Follette. The screening tools included 1) a brief questionnaire assessing the sex, age, English fluency level, and nature of internet access of participants 2) four brief questions from the Life Events Questionnaire asking the caller if she had experienced unwanted or stressful physical or sexual experiences in childhood or adulthood and 3) the Global Health Questionnaire to determine psychiatric levels of psychological distress. Participants who were eligible, in that they met all inclusion criteria discussed under the eligibility section, and responded positively to the brief screening question assessing for interpersonal trauma were invited for an in-person intake, in which further assessment around trauma continued for inclusion in the study. This was also done in order to address any safety concerns. Those who did not meet criteria were given other alternative referrals based on their needs.

Intake and Consent

The in-person intake was administered by the study coordinator (CM), supervised by Dr. Follette in the Trauma Research lab. The intake included an extended screening for the presence of interpersonal trauma using the Stressful Life Events Questionnaire, an interviewer administered semi-structured interview with behaviorally specific questions that assess for different types of trauma including specific experiences of interpersonal trauma. Participants were then invited to continue with the study and were given a consent form which specified details concerning the study procedures, confidentiality, potential risks and benefits, compensation, and the right to withdraw from the study at any time without being penalized. Questions regarding the study were answered and consent was indicated once the person provided a written signature to indicate participation. Once participants had consented to participation, they filled out pre-

treatment measures in the lab. The assessment was hosted using Qualtrics which also served to familiarize participants with using the web-based system for completing surveys.

Web-based ACT for Interpersonal Trauma Program

Once participants had completed the in-person interview and pre-treatment measures, they were provided a link to the web-based intervention, with instructions to begin the program within a week of being assessed at pre-treatment. The study investigator called all participants to make sure they were able to sign up on the website and to aid them in doing so if they required help.

Web-based ACT for TR (W-ACT-TR). W-ACT-TR is a web-based program which consists of 6 separate multimedia sessions. The web-based program was hosted on the New Harbinger delivery platform. Multimedia sessions were made up of a combination of audio and video narration, text components, interactive exercises, and worksheets. These materials were adapted directly from an ACT based self-help book for trauma "Finding Life beyond Trauma", with some modifications, made specific to the population being treated. Additionally, the lessons also included experiences of a set of "fictional" characters (associated with stock photographs provided by New Harbinger), who were presented as survivors of different types of interpersonal trauma and featured throughout the sessions to clarify key concepts. Participants were asked to wait approximately a week between completing each session and beginning the next session. Participants also received one to two phone calls or emails prompting them to complete session modules.

Assessment and Intervention Schedule

Participants were asked to complete outcome, process, and program measures two more times, after first set measures were completed during intake. The second set of measurement was completed mid-way through participation in the program, after completion of the third session (mid-point). The third and final set of assessment took place after completion of all six modules (post). Please see Table 1 for assessment schedule and corresponding measures. A survey link, hosted by Qualtrics was made available to each participant during the time points at which assessment data were collected.

Table 1. *Assessment Schedule*

Measures		Screening	Pre	Mid	Post
Screening	General Health Questionnaire (GHQ-12)	X			
	Stressful Life Events Screening Questionnaire (SLESQ)	X			
	Demographic Information Questionnaire (DIQ)		X	X	X
Outcome	Brief Symptom Inventory (BSI)		X	X	X
	PTSD Checklist 5 – Civilian Version (PCL-C)		X	X	X
	Depression and Anxiety Stress Scales (DASS)		X	X	X
	Trauma Symptom Inventory (TSI)		X		X
	World Health Organization Quality of Life (WHOQOL)		X		X
Process	ACT Processes (AAQ-II)		X	X	X
	Self-Compassion Scale (SCS)		X	X	X

Manipulation Check	ACT Knowledge (ACT Knowledge Test)	X	X
Acceptability	Participant Satisfaction	X	X
	System Usability	X	X

Procedures to Address Safety Concerns and Drop-Out

Participants were provided a list of numbers to call in the case of an emergency. Furthermore, during the first multimedia session, participants were reminded that if they were to experience suicidal urges or have concerns about their safety, they should contact the national crisis hotline or study personnel. Individuals who dropped out were contacted via phone call/email to assess reasons for their drop-out and to see if they were willing to provide that information.

Compensation

Upon completion of each assessment schedule, participants received compensation in the form of a $34 gift card to Target. Given this schedule, participants who completed all three sets of assessment received a combined total of $102. Those participants who dropped out of the study received monetary compensation for the sets of assessments they completed prior to drop-out but not for those they did not complete due to drop-out. All of these policies were clearly outlined in the consent form. Compensation was made possible because of a research award that had been obtained from the Graduate Student Association.

Data Management

A database for all questionnaire data was created in SPSS, with the participant data that was downloaded from Qualtrics. All participants' data was entered under the unique participant ID number. This process was used to insure confidentiality such that none of their data could be linked to any identifying information and had to be protected from members outside the research team. The investigator and the study coordinator (CM) in Dr. Victoria Follette's lab, were responsible for monitoring data collection, including timeliness of data submission, keeping track of response rates, and dropout rates. Routine data backup and archiving measures were also carried out by the investigator.

Measures

Brief descriptions of the measures for the study are listed in the sections below.

Measures for Screening

General Health Questionnaire – 12 (GHQ-12; Goldberg, 1972). The GHQ-12 is a brief version of the General Health Questionnaire and the 12 items in the GHQ assesses for the ability to concentrate, loss of sleep over worry, functioning as a useful member of society, capability of making decisions, constant strain, problems overcoming difficulties, enjoyment of normal activities, unhappiness or depressed mood, loss of confidence in oneself, thoughts of worthlessness, and feelings of reasonable happiness. The scale includes four subscales: somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression. Each of the 12 items in the GHQ can be ranked on a 4 point Likert scale which is useful for measuring clinical changes. Additionally, the GHQ scaling method (0-0-1-1) is useful in screening for non-psychotic psychiatric distress, with scores above 4 being used as a cut-off (Swallow, Lindow, Mason, & Hay, 2003). Because the

use of this measure in the study is relevant for screening purposes, the latter method of scoring was utilized. The GHQ has been used extensively as a screening instrument for non-psychotic psychiatric distress across a wide range of populations and has demonstrated and has demonstrated good reliability and validity (see Tait, Hulse, & Robinson, 2002 for a review).

Stressful Life Events Screening Questionnaire (SLESQ; Goodman et al., 1998). The SLESQ is widely used as a screener for a history of 13 different types of stressor events often associated with post-traumatic symptoms. Adequate reliability and validity has been shown for the SLESQ (Goodman et al., 1998). The Questionnaire includes screening questions that assess a wide range of traumatic events, but is specifically suited to inquire about a history of childhood or adult sexual victimization, childhood physical abuse and intimate partner violence. This questionnaire was used for purposes of screening, in its interviewer-administered format, with some modifications to allow for greater details regarding abuse histories.

Demographic Measure for Baseline and Ongoing

Demographic Information Questionnaire (DIQ). This measure was created for the study specifically. Participants were asked to indicate their age, race/ethnicity, sexual identity, relationship status, household income, education level, employment status, and insurance status at baseline. In addition, participants were asked to indicate whether they had seen a therapist and the number of times, or received any psychological medications in the past 4 months. Participants were also asked to indicate whether they had seen a therapist along with the relevant number of sessions or experienced any changes in their psychological medications in the past 3 weeks, at mid-point and post assessment.

Measures for Assessing Outcomes

Brief Symptom Inventory (BSI; Derogatis, 1975). The BSI is a self-report instrument measuring psychological distress. It measures both general distress as well as distress along 9 symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The BSI has acceptable to good internal consistency with cronbach's alphas ranging from .71 to .85, and test-retest reliability of .9 for total BSI scores (Derogatis & Melisaratos, 1983). It has been widely used as a measure of treatment outcome and has been shown to be sensitive to treatment effects (see Derogatis & Fitzpatrick, 2004).

PTSD Checklist – Civilian Version, DSMV (PCL-C: Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013). The PCL (DSMV) is a 20-item self-report measure which assesses DSM-V symptoms of PTSD. The PCL has a number of purposes including screening individuals for PTSD, aiding in diagnostic assessment of PTSD, and monitoring change in PTSD symptoms. For this study the PCL-C (civilian DSMV) version was used which measures symptoms in relation to generic "stressful experiences", allowing assessment of multiple traumas, as symptoms are not endorsed to a particular even criterion. The 20 items are scored on a 5 point range (0 = "not at all" to 4 = "extremely"). A total symptom severity score (range = 0-80) can be obtained by summing the scores for the 20 items. Reliability and validity data are not available for this version of the PCL-C as it has only recently been developed. The previous version of the PCL-C, a 17-item measure based on symptoms consistent with DSM-IV version of PTSD and similar to the current measure, had sufficient evidence supporting validity and

reliability (Norris & Hamblen, 2003) and excellent internal consistency of .86 and test-retest reliability of .80 (Vontureya, Yao, Coltraux, Note, & Guillard, 2002).

Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995). The 21-item version of the DASS used as a measure for depression and anxiety symptoms. The measure is made up of three distinct subscales which assess depression, anxiety and stress symptoms. Participants are asked to reflect on the last week and rate how much each statement applied to them on a 4-point scale ranging from 0 "did not apply to me at all" to 3 "applied to me very much, or most of the time." The 21-item version of the DASS was used in the current study, instead of the full 42-item version of the scale, as the former has been found to have a better factor structure than the full version (Antony, Bieling, Cox, Enns, & Swinson, 1998). Additionally, the shorter scale was better suited to reduce the assessment burden for participants. The measure has been found to have adequate covergent and divergent validity with other self-report measures of depression and anxiety and to match expected patterns in symptoms among clinical samples with depression and anxiety disorders in past studies (Antony et al., 1998; Lovibond & Lovibond, 1995a). In comparison to the Beck Depression Inventory (Beck, Steer, & Brown, 1996) and Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988), the DASS depression and anxiety subscales are better able to distinguish depression and anxiety symptoms (Lovibond & Lovibond, 1995b). The sensitivity of the DASS in detecting treatment effects from self-guided ACT interventions has also been shown (e.g., Muto et al., 2011). According to past research, the 21-item DASS possesses adequate reliability and a Cronbach's alpha of .94, .87, and .91 have been reported for the depression, anxiety, and stress subscales respectively (Antony et al., 1998).

Trauma Symptom Inventory. The Trauma Symptom Inventory (TSI; Briere, 1995) is a 100 item self-report questionnaire that assesses overall level of acute and chronic posttraumatic distress and related psychological symptomatology, without making references to any particular traumatic event. The TSI has three validity scales (Response Level, Atypical Response, and Inconsistent Response) and 10 clinical scales (Anxious Arousal, Depression, Anger/Irritability, Intrusive Experiences, Defensive Avoidance, Dissociation, Sexual Concerns, Dysfunctional Sexual Behavior, Impaired Self-Reference, and Tension Reduction Behavior). Because of the variety of symptoms assessed by the TSI, it has been recommended and used as a broad spectrum measure of complex posttraumatic outcomes (e.g., Resick, Nishith, & Griffin, 2003). The clinical scales have been shown to be sensitive to the effects of a variety of different traumatic events (e.g., Green et al., 2000; Runtz & Roche, 1999). The TSI has established psychometric properties; it appears to have good reliability and to possess various indices of validity (Briere, 1995).

World Health Organization Quality Of Life-BREF (WHOQOL-BREF; Skevington, Lotfy, & O'Connell, 2004). The WHOQOL-BREF consists of 26-items that provide two baseline single-item measures for quality of life satisfaction and quality of health. Additionally there are four quality of life domains: physical health, psychological, social relationship, and environment. Items are rated on 5-point Likert scales, and higher scores indicate a better quality of life in each domain. The WHOQOL-BREF has been used in many studies and has demonstrated good internal consistency of greater than .70 (Skevington et al., 2004). The quality of life satisfaction measure and the psychological quality of life domain were used for this study.

Process Measures

Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). The AAQ-II consists of 7 self-report items, rated on a 7-point Likert scale ranging from "never true" to "always true." The AAQ-II is a general measure of ACT processes; higher total scores on the AAQ-II indicate lower levels of experiential avoidance and higher levels of experiential acceptance and psychological flexibility. The measure has been shown to have good internal consistency (Cronbach's alpha = .84), and test-retest reliability (.81 and .79, for 3 and 12 months respectively). Additionally, AAQ-II is highly correlated with AAQ-I (r = .97) which has been found to mediate ACT outcomes in different studies (Bond & Bunce, 2000; Flaxman & Bond, 2010).

Self-Compassion Scale (SCS; Neff, 2003). The SCS is a measure of self-compassion that contains 26 items, rated on a 5-point scale ranging from 1 "almost never" to 5 "almost always", which can provide a total score. The scale also consists of 6 subscales; self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. In past studies, the SCS has been found to have high internal consistency, test-retest reliability and validity (Neff, 2003; Van Dam, Sheppard, Forsyth & Earleywine, 2011). The SCS could be useful to explore as a process measure because the SCS has been shown to be responsive to treatment, and in comparison to mindfulness measures, it has been found to be a stronger predictor of depression and anxiety symptoms (Van Dam et al., 2011).

Acceptability, Feasibility, and Manipulation Check Measures

ACT Knowledge Questionnaire. A knowledge questionnaire based on another ACT knowledge questionnaire that was originally developed for use in ACT

bibliotherapy studies (Lazzarone et al., 2007), was modified as necessary and used to assess changes in participants' understanding of ACT core concepts at every assessment time point. This was primarily used as a manipulation check to understand if the program was associated with increase in ACT knowledge. The questionnaire consists of multiple choice and true/false questions related to ACT concepts which were presented specifically in the current web-based intervention.

Client Satisfaction Measure (CSQ - 8). Because the intervention involves the use of a novel program, that has not been previously delivered, participants were asked a number of questions regarding their reactions to the program through the use of the CSQ-8 (Larsen et al., 1979). The CSQ – 8 is brief instrument with 8 items and is designed to measure client satisfaction as a single, broad construct. The questions in the measure assess factors such as comprehension, usability, acceptability, engagement, and perceived utility of the program. The measure was originally designed for use in mental health programs but has since been also applied to a variety of other areas. The scale has very good to excellent internal consistency, with values for coefficient alpha that range from .83 (Roberts & Attkisson, 1983) to .94 (Cox, Brown, Peterson, & Rowe, 1982). Research has shown that the scale also has concurrent validity as it correlates with other related variables such as program completion (Attkisson & Zwick, 1982).

System Usability Scale (SUS; Brooke, 1996). Satisfaction with the website in particular was evaluated using a widely used 10 item scale designed to assess website usability (e.g., how easy it is to navigate the website, satisfaction with the website). Responses are provided on a 5 point scale ranging from strongly disagree to strongly agree. Assessment of the SUS has indicated excellent reliability of .91 for coefficient

alpha (Bangor, Kortum, & Miller, 2008). The SUS has also demonstrated validity, both with regard to sensitivity and concurrent validity (Bangor, Kortum, & Miller, 2008).

Data Analytic Strategy

Preliminary Analyses

Before proceeding to formal statistical examinations, exploratory data analyses were conducted to note data patterns and to examine underlying distributional assumptions. Normality of dependent variables was assessed by examining means, standard deviations, skewness and kurtosis and by examining histograms. Data were required to have skewness within -2.00 and 2.00 and kurtosis between -4.00 and 4.00 to meet criteria for normality.

Examination of Relationship between Variables at Pre-treatment

Pearson bivariate correlations were carried out to evaluate relationships between outcome and process variables at pre-treatment. Additionally, differences in demographic data and process and outcome measures between completers and drop-outs were analyzed descriptively and by using statistical tests such as ANOVAs and chi-squares.

Changes on Outcome and Process Measures

Mixed Model Repeated Measurement (MMRM) analyses were conducted to examine changes over time on the various outcome and process measures (Hedeker & Gibbons, 2006). Unstructured covariance models were used in MMRM analyses. In unstructured covariance models, no constraints are imposed on the values, each variance and each covariance is estimated uniquely from the data. For each outcome and process measure, time effects were examined, followed by post hoc analysis to examine differences in scores between pre and post-treatment, pre and mid-treatment, as well as

mid and post-treatment. Changes on subscales of the PTSD measure were also assessed in this way. For the outcome measures which were only measured at pre and post (TSI and WHOQOL-BREF), only pre and post differences were estimated. Effect sizes were calculated using a method specified by Wackerly, Mendenhall, and Scheaffer (2008) and interpreted using recommended cutoffs for Cohen's d.

This MMRM method was chosen over the traditional analysis of variance or repeated measures model because it allowed for us to take an intent-to-treat sample using data from all participants who initially completed measures at pre-treatment. In this method, analytic problems that arise due to missing data are addressed by taking into account the obtained outcome and nature of missingness for those cases with missing data.

Analyses of Clinical Significance and Changes in Provisional Diagnosis

In order to calculate the proportion of participants who achieved clinically significant improvement, analyses were conducted on the depression and anxiety measures (DASS) using the reliable change index, a well-regarded approach of clinical significance (Jacobson & Truax, 1991). Accordingly, treatment responders were defined as those participants whose scores, post-treatment, moved within the range of the functional rather than the dysfunctional population. Normative data from Henry & Crawford (2005) based on a large nonclinical sample was used (depression M = 2.83 SD 3.87, anxiety M =1.88, SD= 2.95) and compared to the pre-treatment scores of the current sample. Clinically significant improvement was also calculated for PTSD scores (PCL-5) based on recommended standards for this measure (Weathers et al., 2013) by using a 10 point difference score as a threshold for clinically meaningful change.

Additionally, changes in the proportion of individuals likely to meet criteria for PTSD diagnosis across time were calculated, using a total PCL-5 score of 38 as the threshold for diagnostic efficiency (Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013). Provisional PTSD diagnosis was also made following the DSM-5 diagnostic rule within which a certain number of symptoms in each cluster had to rated moderate or higher to meet criteria for a provisional PTSD diagnosis (1 cluster B symptom, 1 cluster C symptom, 2 cluster D symptoms, and 2 cluster E symptoms). McNemar's test, an analyses used to examine paired proportions, was used to examine changes in pre and post rates of provisional PTSD diagnosis, using both the diagnostic cutoff score as well as the DSM-5 diagnostic rule as provision diagnosis.

Relationship between Changes in Process and Outcome Variables

To observe whether change in treatment outcome measures were associated with changes in ACT-related process measures, Pearson correlation analyses were conducted between the pre to post-treatment changes on primary outcome measures and ACT-related process measures of psychological flexibility (AAQ) and self-compassion (SCS). Additionally, correlations were also assessed for other time points. Pre to mid-treatment changes on process measures and mid to post-treatment changes on treatment outcome measures were analyzed. Following this, mid to post-treatment changes on process measures and mid to post-treatment changes on measures on treatment outcome were examined.

Program Usability and Satisfaction

To examine measures of program usability and satisfaction, in addition to examining mean scores based on overall usability and satisfaction, each of the items in

both these measures were descriptively examined with regard to the proportion of the sample indicating favorable or unfavorable responses on these measures. For qualitative data on the satisfaction measures participant's responses were coded based on the type or category of response to examine patterns.

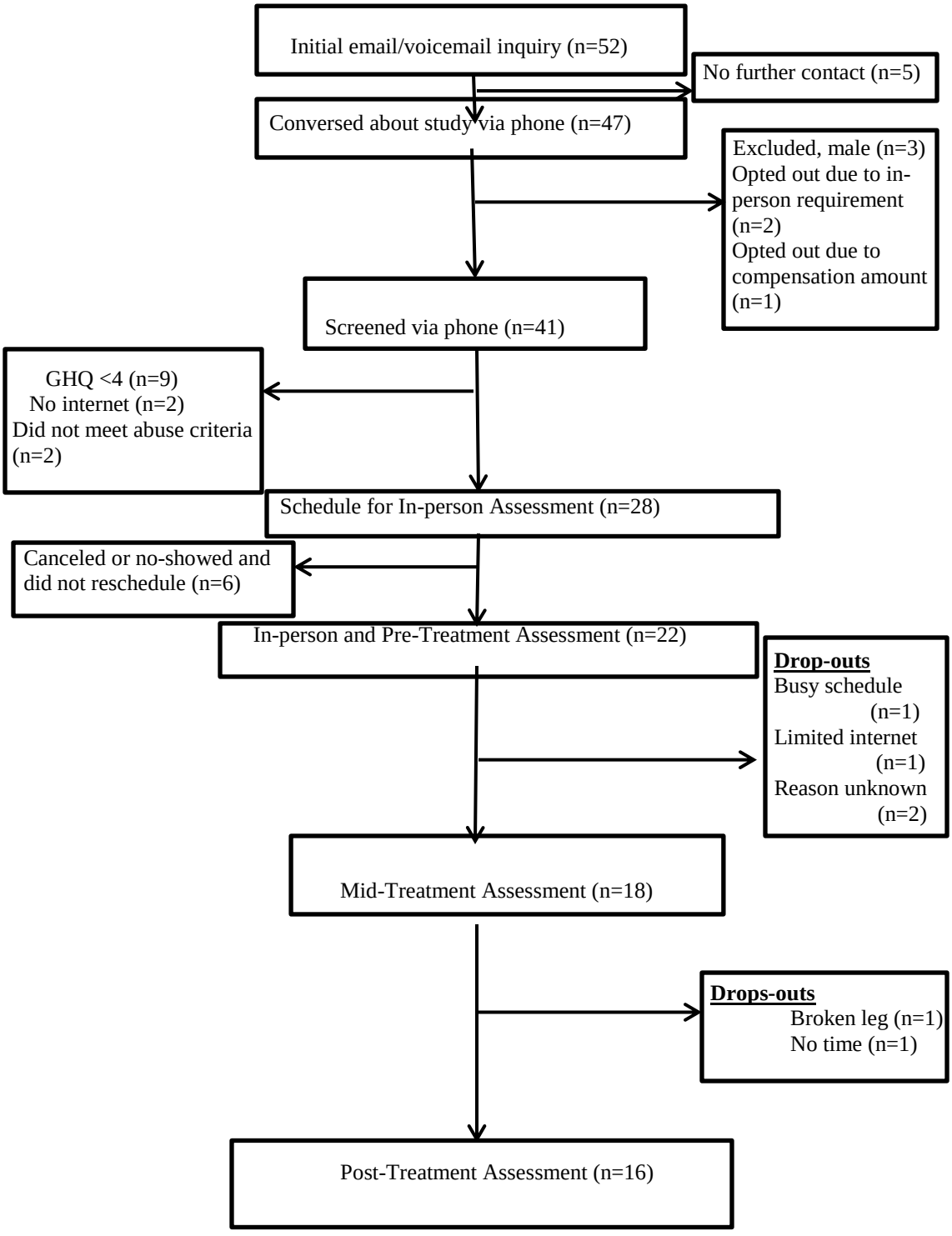
CHAPTER 3: RESULTS

Participant Flow

Participant flow through the different study phases is depicted in Figure 1 below. A total number of 52 individuals made contact via phone number or email indicating interest in the study. Of these, five persons did not respond to following attempts to contact them, two did not want to participate in the in-person assessment and thus did not enroll, one decided not to enroll because she was primarily interested in monetary compensation and she did not believe it was worth the amount of time required for participation. An additional sixteen individuals were excluded from study participation because they did not meet inclusion criteria. Of these, nine scored at a range lower than required for study inclusion on the GHQ screening measure (mean = 1.55), two were male, two did not have internet access, and two did not endorse a history of abuse that met criteria for the study. Of the two who did not meet abuse criteria, one noted interest due to being traumatized as a result of her physical disability and the other stated that she has had people mistreat her emotionally but did not experience any physical or sexual interpersonal abuse. Thus, of the fifty two people who called, twenty eights individuals were scheduled for an in-person assessment. Six participants cancelled or did not show up for that meeting and did not reschedule leaving twenty two women who participated in the in-person assessment session. All were deemed eligible and consented to participation

in the study. Of these, one of the participants did not complete any of the lessons, and notified the study investigator that she was withdrawing but did not provide reasons for drop out. Another participant dropped out after one session and stated that she had taken on a lot of other responsibilities, which did not leave her with enough time. One participant stopped taking any lessons after the first one and did not respond to phone calls or emails, and another stated that she could not keep up because of difficulties accessing the computer. Out of the twenty two participants who enrolled, eighteen continued participating and completed mid-point assessment and 16 of those also completed post-assessment. Two participants dropped out after the mid-point assessment. The first reported that she broke her leg and had difficulties getting to and from her computer and the other stated that she has had trouble finding time.

Figure 1. *Participant Flow*



Participant Characteristics

Demographic Information

Demographic information was obtained from all participants seen for an in-person meeting (n=22), all of whom enrolled in the study. The average age of the participants was 37.7 (*SD* = 14.7). A majority of the sample was Caucasian (72.7%). The majority of the sample was heterosexual (77%). With regard to current relationship status, 41% reported being single and approximately 45% were married or living with a partner. More than half the sample reported a yearly household income of less than $25000 (55%) with a significant percentage of the total participants reporting household income of less than $10,000 (41%). Education attainment of participants was generally high with all participants (100%) having attained at least a high school or equivalent degree and having attended at least some college, and almost a quarter (23%) having attained a graduate or professional degree. Approximately 36% of the participants identified primarily as students, about 23% were employed and roughly 18% unemployed. Half of the sample (50%) reported having seen a therapist or counselor in the past four months prior to pre-treatment assessment while the other half did not. Almost half of the participants had received some psychological medications in the past four months (45%), with the medications consisting primarily of anti-depressants and anxiolytics. Detailed demographic characteristics of those enrolled participants are outlined in table 2 below.

Table 2. *Demographic Characteristics of Enrolled Participants (n=22)*

	n	**%**
Race Ethnicity		
Asian/Pacific Islander	1	4.5

African-American/Black	1	4.5
Hispanic/Latino	3	13.6
White/Non-Hispanic	16	72.7
Other (not Native American)	1	4.5
Sexual Identity		
Bisexual	2	9.1
Heterosexual	17	77.3
Lesbian	1	4.5
Transsexual	1	4.5
Unsure	1	4.5
Current Relationship Status		
Single	6	27.3
Single but dating significant other	3	13.6
Living with partner	5	22.7
Married	5	22.7
Divorced	3	13.6
Household current yearly income		
0 - $10,000	9	40.9
$10,001 - $25,000	3	13.6
$25,001 - $50,000	4	18.2
$50,001 - $75,000	3	13.6
$75,001 - $100,000	1	4.5
Other	2	9.0
Highest level of education		
Some college by not a 4-year degree	10	45.5
2-year college degree	3	13.6
4-year college degree	3	13.6
Some graduate or professional study but no graduate degree	1	4.5
Graduate or professional degree	5	22.7
Current employment/student status		

Full-time	4	18.2
Part-time	1	4.5
Unemployed	4	18.2
Disabled	3	13.6
Retired	1	4.5
Student	8	36.4
Other	1	4.5
Health insurance		
Yes, Medicare	5	22.7
Yes, Medicaid	3	13.6
Yes, other	9	41.0
No	5	22.7
Therapist or counselor (past 4 months)		
No	11	50
Yes	11	50
1 session	2	9
2 - 4 sessions	2	9
5 - 8 sessions	1	4.5
9 – 16 sessions	5	22.7
>20	1	4.5
Psychological Medications (past 4 months)		
No	12	54.5
Yes	10	45.5

Trauma Characteristics

Interpersonal Trauma History. Information about trauma history made available through the four interpersonal trauma phone screening questions taken from the Life Events Checklist indicated that of the total enrolled sample, the majority of women (86.4%) had experienced some form of physical assault which included being attacked,

hit, slapped, kicked, or beaten up, and fewer proportion of participants (40.9%) reported assault with a weapon such as being shot, stabbed, threatened with a knife, gun, or a bomb. Most of the participants (90.9) also experienced sexual assault which included experiences of attempted rape, completed rape, or made to perform any type of sexual act through force or threat of harm. The majority of participants (77.3%) also reported other unwanted or uncomfortable sexual experiences. There was significant overlap between experiences of physical and sexual trauma, with eighteen (81.8%) reporting either physical assault or assault with a weapon as well as sexual assault or other unwanted sexual experience.

Table 3. *Frequency of Interpersonal Trauma Events based on LEC Screening Questions (n=22)*

Event	*n*	%
Physical assault	19	86.4
Assault with a weapon	9	40.9
Sexual assault	20	90.9
Other unwanted or uncomfortable sexual experience	17	77.3

Stressful or Traumatic Life Events. A range of traumatic experiences were reported at the in-person semi-structured interview using the SLESQ which in its complete form inquires about a larger set of traumatic events, beyond interpersonal trauma. The mean number of types of trauma, assessed by the SLESQ, that was reported by participants was 6.2 (*SD*=2.4). Of the 13 possible types of traumatic experiences, two participants (9.1%) reported experiencing the minimum reported total of 2 combined

traumatic experiences. 22.7% (*n*=5) reported between 3 to 5 trauma events. The remainder, which consisted of over half the sample, reported having experienced 6 or more types of trauma. The frequencies associated with each of the 13 trauma categories are reported in Table 4.

Table 4. *Frequency of Various Types of Traumatic Events based on the SLESQ (n=22)*

Event	*n*	%
Life-threatening illness	8	36.4
Life-threatening accident	7	31.8
Traumatic bereavement	16	72.7
Robbery or mugging with weapon	2	9.1
Rape	19	86.4
Attempted rape	14	63.6
Childhood physical abuse	13	59.1
Physical Assault/Abuse	10	45.5
Emotional abuse	16	72.7
Threat of violence with a weapon	9	40.9
Witness to trauma	13	59.1
Serious injury or danger to life in any other situation	1	4.5
Other traumatic event	8	36.4

Preliminary Analyses

Differences between Completers and Drop-Outs

Because of the small sample size between groups, differences in demographic variables between the completers and drop-outs are presented in a descriptive manner. See Table 5 for comparative information about the two groups with regard to demographic variables and mean process and outcome measures at pre-treatment (time 1). On average dropouts appeared to be younger than completers, by about 4 years on average. There appeared to be a greater proportion of individuals with an income less than $10,000 or $25,000 among those who were not able to complete the program compared to completers and descriptively, non-completers had a higher rate of unemployed individuals and students compared to completers. Medication use in the past four months was similar but a greater proportion of drop-outs appeared to have had contact and more regular contact with a therapist in the past four months compared to completers. A descriptive observation of mean scores with regard to process and outcome measures completed at pre-treatment suggested greater psychopathology across most measures, lower levels of psychological inflexibility, and lower self-compassion among dropouts. Statistical methods utilized to assess differences did not yield statistically significant differences in the two groups with regard to these variables, likely due to low sample size, other than for mean psychological flexibility scores. Mean scores in psychological flexibility differed significantly between the two groups, F (1, 20) = 8.54, p<.01. Additionally, marginally significant differences between the two groups were found with regard to cumulative trauma score, with drop-outs on average reporting a greater sum of traumatic experiences, F (1,20) = 3.53, p=.077 .

Table 5. *Differences between Completers and Drop-outs on Demographic Variables and Mean Process and Outcome Scores at Pre-treatment Assessment (Time 1*)

	Completers (*n*=16)		**Drop-outs (*n*=6)**	
	n	**%**	***n***	**%**
Race/ethnicity				
Asian/Pacific Islander	1	6.3	0	0
African-American/Black	1	6.3	0	0
Hispanic/Latino	1	6.3	2	33.3
White/Non-Hispanic	13	81.3	3	50
Other (not Native American)	0	0	1	16.7
Sexual identity				
Bisexual	1	6.3	1	16.7
Heterosexual	13	81.3	4	66.7
Lesbian	1	6.3	0	0
Transsexual	0	0	0	0
Unsure	1	6.3	1	16.7
Current relationship status				
Single	6	37.5	0	0
Single but dating significant other	0	0	3	50
Living with partner	3	18.8	2	33.3
Married	5	31.3	0	0
Divorced	2	12.5	1	16.7
Household current yearly income				
0 - $10,000	6	37.9	5	83.3
$10,001 - $25,000	2	12.5	1	16.7
$25,001 - $50,000	4	25.0	0	0
$50,001 - $75,000	3	18.8	0	0
$75,001 - $100,000	1	6.3	0	0
Highest level of education				
Some college but not a 4-year degree	7	43.8	3	50
2-year college degree	2	12.5	1	16.7

4-year college degree	2	12.5	1	16.7
Some graduate or professional study but no graduate degree	0	0	1	16.7
Graduate or professional degree	5	31.3	0	0
Current employment/student status				
Full-time	4	25	0	0
Part-time	1	6.3	0	0
Unemployed	1	6.3	3	50
Disabled	3	18.8	0	0
Retired	1	6.3	0	0
Student	5	31.3	3	50
Other	1	6.3	0	0
Health insurance				
Yes, Medicare	3	18.8	2	33.3
Yes, Medicaid	2	12.5	1	16.7
Yes, other	8	50	1	16.7
No	3	18.8	2	33.3
Therapist or counselor (past 4 months)				
No	9	56.3	2	33.3
Yes	7	43.8	4	66.7
1 session	1	6.3	1	16.7
2 - 4 sessions	2	12.6	0	0
5 - 8 sessions	1	6.3	0	0
9 – 16 sessions	3	18.8	2	33.3
>20	0	0	1	16.7
Psychological meds (past 4 months)				
No	9	56.3	3	50
Yes	7	43.8	3	50
	Mean	***SD***	**Mean**	***SD***
Age	38.94	14.01	34.5	17.49

Cumulative Trauma Score (SLESQ)	5.62	2.39	7.67	1.86, p=.077
Psychological Flexibility (AAQ-II)	25.37	8.63	36.5	5.43, p<.01
Self-Compassion (SCS)	17.86	4.67	14.53	3.95
PTSD Symptom (PCL-5)	37.56	16.20	43.67	12.45
Depression (DASS-D)	9.25	7.00	10.67	4.41
Anxiety (DASS-A)	6.94	4.88	9.17	4.88
General Distress (BSI)	1.60	.64	1.89	.50
Complex Trauma Symptoms (TSI)	87.25	38.43	105.33	29.53
Overall Life Satisfaction (WHOQOL)	3.06	.10	3.00	.89
Quality of Life – Psychological (WHOQOL)	17.87	6.36	16.5	3.73

Note. *p* values provided for statistically significant differences between completers and non-completers

Examination of Data Distributions

Before proceeding to formal statistical examinations, exploratory data analyses were conducted to note data patterns and to examine underlying distributional assumptions. Normality of dependent variables was assessed by examining means, standard deviations, skewness and kurtosis and by examining histograms. Data were required to exhibit skewness between -2.00 and 2.00 and kurtosis between -4.00 and 4.00. Changes did not have to be made to the data.

Pre-treatment (Time 1) Outcome Correlations

Pearson bivariate correlations among pre-treatment outcome and process variables were conducted to evaluate relationships among measures of interest at pre-treatment (Time1). The correlations between outcome variables are listed in Table 6. Among the

psychopathology outcome variables all variables (depression, anxiety, general distress, post-traumatic stress disorder symptoms, and complex trauma symptoms) demonstrated significant strong positive correlations with one-another in the expected direction. All these psychopathology outcome measures were also moderately or strongly correlated in a significant manner, with quality of life indices (overall life satisfaction rating and psychological domain scores of quality of life), other than in the case of complex trauma symptoms which correlated with overall life satisfaction, in a marginally significant manner.

Table 6. *Pearson Correlations at Pre-Treatment between Outcome Variables*

	Depression (DASS-D)	Anxiety (DASS-A)	General Distress (BSI)	Complex Trauma (TSI)	Life Satisfaction Rating (WHOQOL)	Quality of Life Psych Domain (WHOQOL)
PTSD (PCL-5)	.826**	.770**	.816**	.717**	-.636*	-.730**
Depression (DASS-D)		.661**	.650**	.593**	-.607**	-.911**
Anxiety (DASS-A)			.831**	.669**	-.551**	-.668**
General Distress (BSI)				.631**	-.510*	-.624**
Complex Trauma (TSI)					-.357 †	-.487*
Life Satisfaction Rating (WHOQOL)						.610**

Note. * = †$p < .10$, $p < .05$ (2 tailed), ** = $p < .01$ (2 tailed). For all correlations, $n = 22$.

Pre-treatment (Time 1) Outcome and Process Correlations

A strong correlation was found between psychological flexibility and self-compassion, two primary process variables. Relationships between process variables and the relationship of outcome variables to process variables are outlined in Table 7. Experiential avoidance/psychological flexibility was significantly correlated to a moderate to large degree, in the positive direction, with all primary psychopathology outcome measures other than anxiety with which it was correlated to marginally significant degree (p=.064). It was also significantly negatively correlated with quality of life variables, in the expected direction. Self-compassion was negatively correlated in a significant manner, as expected, with all psychopathology outcome measures including depression, PTSD symptoms, anxiety and complex trauma. It was significantly and positively correlated with psychological domain of quality of life as well as life satisfaction rating.

Table 7. *Pearson Correlations between Psychopathology Outcome Measures and Process Measures*

	Experiential Avoidance / Psychological Flexibility (AAQ-II)	Self-Compassion (SCS)
Experiential Avoidance / Psychological Flexibility (AAQ-II)		-.847**
Self-Compassion (SCS)		
PTSD (PCL-5)	.692**	-.624**

Depression (DASS-D)	.615**	-.515*
Anxiety (DASS-A)	.401†	-.486*
General Psych Distress (BSI)	.518*	-.569**
Complex Trauma (TSI)	.549**	-.645**
Overall Life Satisfaction Rating (WHOQOL)	-.478*	.441*
Quality of Life – Psychological Domain (WHOQOL)	-.592**	.534*

Note. †$p < .10$, * = $p < .05$ (2 tailed), ** = $p < .01$ (2 tailed). For all correlations, $n = 22$.

Means and Standard Deviations across Time

Means and standard deviations based on all available data for each time point were calculated for reference. Table 8 below lists the means and standard deviations of scores reflecting primary and secondary outcome variables, some measured at three time points (pre, mid, and post) and others measured pre and post, in addition to values for process variables. Additionally, scores for PTSD symptom subscales were also computed and are listed in the table.

Table 8. *Means and Standard Deviations of Outcome and Process Variables based on Measurement Time*

Measure	Pre-Tx Mean (*SD*)	Mid-Tx Mean (*SD*)	Post-Tx Mean (*SD*)
PTSD Symptoms (PCL-5)	39.23 (15.24)	28.06 (15.67)	19.31 (16.83)
PTSD-Cluster B	8.77 (4.87)	6.28 (4.96)	4.00 (4.83)

PTSD Cluster C	5.00 (2.60)	2.67 (2.33)	1.50 (1.55)
PTSD Cluster D	14.41 (6.57)	10.61 (5.69)	7.19 (6.73)
PTSD Cluster E	11.05 (4.74)	8.50 (4.99)	6.62 (5.04)
Depression (DASS-D)	9.64 (6.33)	9.39 (6.60)	6.44 (6.39)
Anxiety (DASS-A)	7.55 (4.87)	4.67 (3.73)	3.87 (3.78)
General Distress (BSI)	1.67 (.61)	1.26 (.69)	.86 (.55)
Complex Trauma Symptoms (TSI)	92.18 (36.47)	NA	55.00 (42.35)
Overall Life Satisfaction Rating (WHOQOL-BREF)	3.05 (.950)	NA	3.19 (1.17)
Quality of Life – Psychological Domain (WHOQOL-BREF)	17.50 (5.71)	NA	18.62 (5.98)
Psychological Flexibility (AAQ)	28.41 (9.27)	27.00 (10.29)	33 (8.32)
Self-Compassion (SCS)	2.82 (.77)	3.10 (.73)	3.35 (.70)
ACT Knowledge (Quiz)	8.64 (3.16)	12.44 (1.88)	12.81 (2.53)

Note. Pre-treatment (*n*=22). Mid-treatment (*n*=18). Post-treatment (*n*=16).

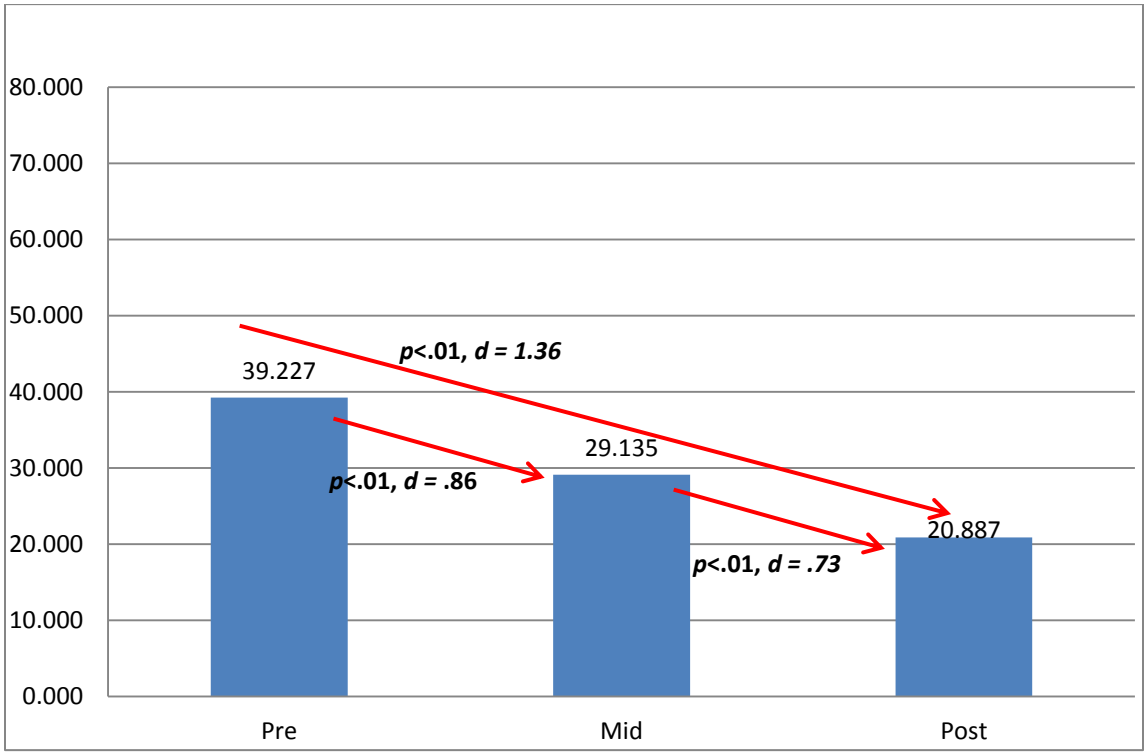
Analyses of Changes in Outcomes: PTSD, Depression, and Anxiety

The results of statistical analyses in the form of mixed model analyses in relation to changes in primary psychopathology outcome variables, namely PTSD symptoms, depression, and anxiety, are presented, each followed also by clinical interpretation of treatment effects.

PTSD Symptoms

MMRM analyses revealed a significant time effect, F (2, 17.67) = 15.93, p<.001, effect size = 1.90. Post hoc analyses indicated significant improvements in total PTSD symptoms from pre to post (estimate = -18.34, SE = 3.26, t (18.23) = -5.63, p < .001, Cohen's d = - 1.36). Significant improvements were also observed from pre to mid treatment (estimate = -10.10, SE = 2.73, t (18.66) = -3.70, p < .01, Cohen's d = - 0.86) and from mid to post treatment (estimate = -8.25, SE = 2.79, t (16.57) = -2.96, p < .01, Cohen's d = - 0.73).

Figure 2. *Changes in PTSD Symptoms across Time Based on MMRM Analyses*



PTSD Cluster B Symptoms - Intrusion

There was a significant time effect for cluster B symptoms from pre to post treatment according to MMRM analyses, F (2, 18.47) = 14.54, p<.001, effect size =1.77. Post hoc tests indicated a significant improvement in cluster B symptoms from pre to post

treatment, (estimate = -4.75, SE = .89, *t* (17.92) = -5.34, *p* < .001, Cohen's *d* =1.29). Post hoc tests also indicated significant improvement in cluster B symptoms from both pre to mid treatment (estimate = -2.32, SE = .95, *t* (19.35) = -2.44, *p* < .05, Cohen's *d* = -0.57). The same pattern of significant changes in Cluster B symptoms were also found from mid to post treatment (estimate = -2.43, SE = 1.08, *t* (17.86) = -2.25, *p* < .05, Cohen's *d* =-0.55).

PTSD Cluster C Symptoms - Avoidance

MMRM analyses examining cluster C scores, also based on the PCL-5, found a significant time effect across treatment, *F* (2, 19.19) = 21.69, *p* < .001, effect size = 2.13). Post hoc analyses indicated significant decrease in cluster C symptoms from pre to post treatment (estimate = -3.40, SE = .52, *t* (20.84) = -6.54, *p* < .001, Cohen's *d* =-1.48). The improvement in cluster C symptoms from pre to mid treatment were also found to be significantly different (estimate = -2.36, SE = .48, *t* (19.09) = -4.92, *p* < .001, Cohen's *d* =-1.12). Significant improvement was also found when considering mid to post treatment differences in cluster C symptom scores (estimate = -1.04, SE = .375, *t* (17.99) = -2.77, *p* < .05, Cohen's *d* = -.66).

PTSD Cluster D Symptoms – Negative Alterations in Cognitions and Mood

There were significant time effects for Cluster D symptoms from pre to post, based on MMRM analyses, *F* (2, 18.37) = 8.34, *p* < .01, effect size = 1.35. Post hoc tests showed that all pairwise relevant pairwise comparison were significant and indicative of improvement in cluster D scores; pre and post treatment (estimate = -6.44, SE = 1.58, *t* (19.08) = -4.07, *p* < .001, Cohen's *d* = -0.97), pre and mid treatment (estimate = -3.38, SE

= 1.37, *t* (19.42) = -2.47, *p* < .05, Cohen's *d* = -0.56), and mid to post treatment (estimate = -3.06, SE = 1.22, *t* (16.41) = -2.51, *p* < .05, Cohen's *d* = -0.62).

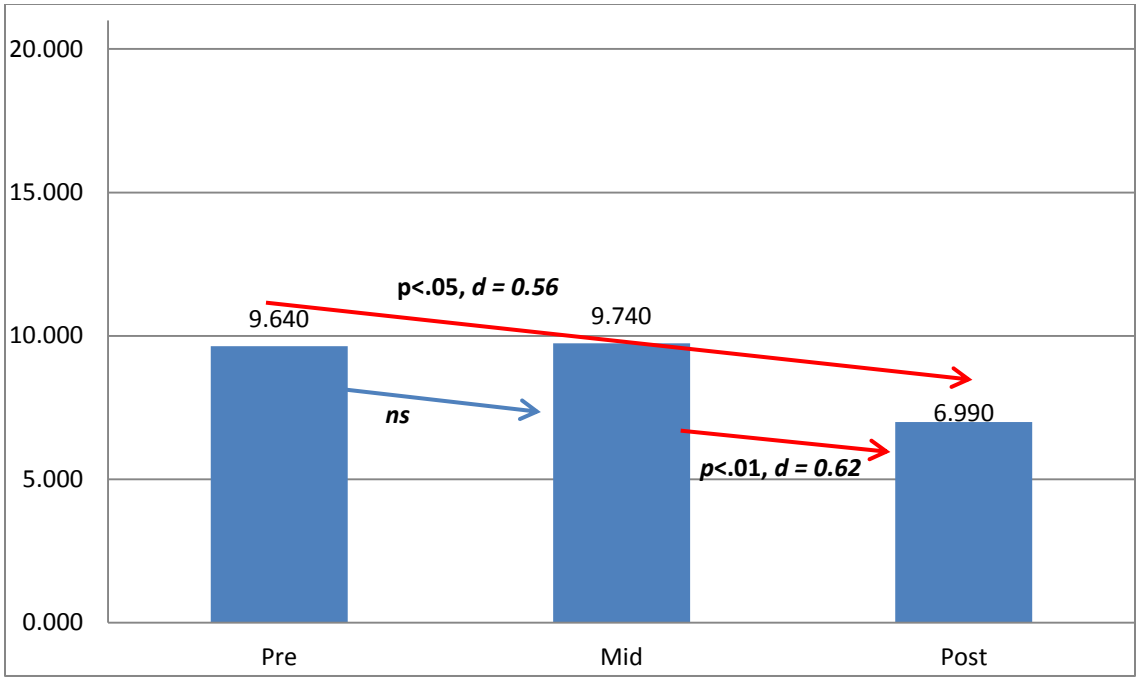
PTSD Cluster E Symptoms – Alterations in Arousal and Reactivity

MMRM analyses revealed a significant time effect for Cluster E symptoms from the PCL-5 as well, *F* (2, 18.69) = 7.12, *p*<.01, effect size = 1.23. Post hoc analyses indicated significant improvements in total cluster E PTSD symptoms from pre to post treatment (estimate = -4.18, SE = 1.15, *t* (19.98) = -3.63, *p* < .01, Cohen's *d* = - 0.86). Significant improvements were also found between from pre and mid treatment (estimate = -2.30, SE = .76, *t* (18.81) = -3.03, *p* < .01, Cohen's *d* = - 0.70). Marginally significant differences were indicated in terms of cluster E PTSD symptom from mid to post treatment (estimate = -1.89, SE = .92, *t* (17.45) = -2.05, *p* = .057, Cohen's *d* = - 0.50).

Depression

MMRM analyses examining depression scores based on DASS-D found a near significant time effect *F* (2, 17.84) = 3.45, *p* = .054, effect size = 0.88). Post hoc analyses indicated significant decrease in depression scores, pre to post treatment (estimate = -2.64, SE = 1.14, *t* (17.61) = -2.32, *p* < .05, Cohen's d = - 0.56). Significant improvement was also found when considering mid to post treatment differences in terms of DASS-D scores (estimate = -2.74, SE = 1.08, *t* (16.43) = -2.54, *p* < .05, Cohen's d = - 0.62). Changes in depression scores between pre and mid treatment were not significant (*p* = .903).

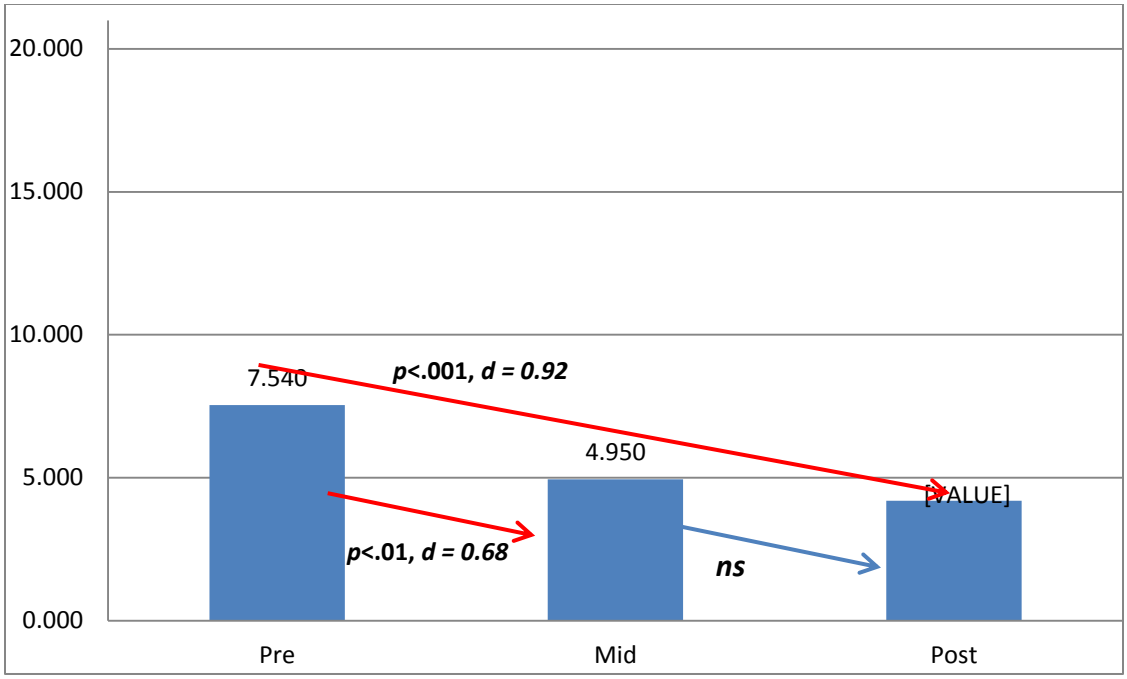
Figure 3. *Changes in Depression across Time Based on MMRM Analyses*



Anxiety

MMRM analyses revealed a significant time effect with in terms of anxiety scores as measured by DASS –A, F (2, 18.51) = 7.87, p<.01, effect size = 1.30. Post hoc analyses indicated significant improvements in anxiety scores from pre to post treatment (estimate = -3.35, SE = .85, t (19.65) = -3.94, p < .001, Cohen's d = - 0.92). Significant improvements were also observed from pre to mid treatment (estimate = -2.59, SE = .87, t (19.27) = -2.98, p < .01, Cohen's d = - 0.68). Changes between mid and post treatment in terms of anxiety scores were not significantly different (p=.287).

Figure 4. *Changes in Anxiety across Time Based on MMRM Analyses*



Clinical Interpretation of Treatment Effects for Primary Outcomes

PTSD

In this study, formal diagnoses for PTSD were not obtained. However, when using PCL-5 as a measure of PTSD symptoms, there are standards which exist to help with screening or diagnosis of PTSD. Even though the PCL-5 is a relatively new measure, significantly revised from its last version, and complete data regarding norms and cutoffs are not provided, it has been suggested that a total score of 38 is likely a reliable score to use as a way to maximize diagnostic efficiency (Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013). Using this cutoff score, the proportion of participants meeting diagnostic criterion for PTSD at pre, mid, and post-treatment were 43.8%, 25%, and 18.8% respectively. Another standard diagnostic method related to the PCL-5 is one

in which a provisional PTSD diagnosis can be made by considering each item rated as moderately or higher on a symptom scale as being indicative of a symptom endorsement. Following that, the new DSM-5 diagnostic rule can be applied which requires at least: 1 cluster B symptom, 1 cluster C symptom, 2 cluster D symptoms, and 2 cluster E symptoms. Utilizing this method, the percentage of participants who were likely have PTSD at pre-, mid-, and post-treatment was 56.3%, 31.3% and 18.8% respectively. McNemar's test was used to examine changes in mid- and post- rates of PTSD compared to those obtained at pre-treatment. Mc Nemar's test did not find significant differences between rates of PTSD at mid-treatment compared to pre-treatment (p=.250) or at post-treatment compared to pre-treatment (p=.125). With regard to the diagnostic changes using the DSM-5 criteria, significant changes were not found between pre and mid-treatment PTSD rates (p=.125), but differences were significant between pre and post-treatment PTSD rates (p=.031). Another way in which changes in PCL-5 scores can be understood from a clinical interpretation standpoint is by using a 5 point difference threshold in scores to indicate that a person has responded to treatment and a 10 point difference threshold to determine if that change is clinically meaningful. While these norms were linked to the prior version of the PCL-C, Weathers et al (2013) estimate that meaningful change on the most recent version of the PCL (PCL-5) will be in a similar range. Using these criteria, results showed that from pre to mid-treatment, 31.3% of the participants had responded to treatment and another 37.5% had exceeded the threshold recommended for clinically meaningful change. Thus, from pre to mid-treatment, 68.8% had responded to treatment. Using the same criteria and looking at changes from pre to

post-treatment, 81.3% of participants showed clinically meaningful change with regard to PTSD symptoms.

Depression and Anxiety

For estimating clinically relevant changes on depression and anxiety as measured by the DASS-21, the Jacobson and Truax (1991) definition of clinically significant improvement as falling closer to the functional rather than dysfunctional population mean was used. For this purpose, normative data from Henry & Crawford (2005) based on a large nonclinical sample was used (depression M = 2.83 SD 3.87, anxiety M =1.88, SD= 2.95). Results indicated that of the 16 completers for whom, post-treatment scores were available, 62.5% of participants had post-treatment scores that were closer to the normative depression mean than the mean obtained from the current sample. Similarly, 62.5% also had post-treatment scores on anxiety that were closer to the normative anxiety mean compared to the means generated from the current sample.

Analyses of Changes in Additional Outcomes: General Distress, Complex Trauma Symptoms, and Quality of Life

General Distress

There was a significant time effect with MMRM analyses for general distress scores as measured by the GSI index of the BSI measure F (2, 18.50) = 17.59, p<.001, effect size 1.95 . Post hoc tests showed that improvement in general distress was significant from pre to post treatment (estimate = -.772, SE = .13, t (19.78) = -5.94, p < .001, Cohen's d = -1.40). Additionally, significant improvement was also found between pre and mid treatment scores (estimate = -.36, SE = .11, t (18.28) = -3.27, p < .01,

Cohen's *d* = - 0.75), and also in the case of mid to post treatment changes in scores (estimate = -.415, SE = .12, *t* (18.55) = -3.46, p < .01, Cohen's *d* = - 0.84).

Complex Trauma Symptoms

Significant time effect was observed for total complex trauma symptoms scores as measured by the TSI at pre-treatment and post-treatment, such that complex trauma symptoms decreased significantly from time pre to post, (estimate = -.415, SE = .6.21, *t* (16.22) = 5.28 < .001., Cohen's *d* = - 1.32).

Quality of Life

The time effect was not significant for either of the quality of life outcomes; overall life satisfaction rating (*p* = .478) or psychological aspects of quality of life (*p* = .294).

Analyses of Changes in Process Variables

Psychological Flexibility

In analyzing the AAQ-II, an MMRM analysis revealed a significant effect for time *F* (2, 17.75) = 7.127, *p*<.01, effect size = 1.27. According to post hoc analyses, participants showed significant improvements in psychological flexibility from pre to post treatment (estimate = -5.10, SE = 1.71, *t* (18.65) = -2.98, *p*<.01, Cohen's *d* = - 0.71). Participants showed no significant change in psychological flexibility from pre to mid treatment (*p* = .833) but significant improvement was found from mid to post treatment (estimate = -4.59, SE = 1.80, *t* (18.44) = -2.55, *p*<.05, Cohen's *d* = - 0.62).

Self-Compassion

There was a significant time effect for self-compassion *F* (2, 18.37) = 3.76, *p*<.05, effect size = .090). Significant improvement was found among participants between pre

and post treatment (estimate = .42, SE = .159, *t* (19.301) = 2.64, p<.05, Cohen's *d* =0.62). However, differences in self-compassion from pre to mid treatment were not significant (*p* = .181), and neither were differences from mid to post (=.112).

Analyses of Changes in ACT Knowledge

ACT Knowledge

MMRM analyses indicated a significant effect of time of time on ACT knowledge as measured by the ACT quiz, *F* (2, 15.05) = 20.32, p<.001, effect size = 2.32. Post hoc tests showed that improvement in ACT knowledge occurred from pre to post treatment (estimate = 3.99, SE = .68, *t* (15.04) = 5.87, *p*<.001, Cohen's *d* =1.36). Post hoc tests also indicated that significant increase in ACT knowledge also took place from pre to mid treatment (estimate = 3.59, SE = .59, *t* (16.14) = 6.08, *p*<.001, Cohen's *d* =1.35). Significant differences were not observed with regard to changes in ACT knowledge scores from mid to post treatment (*p*=.388).

Relationship of Changes in Process and Outcomes

In order to examine the psychological flexibility model which assumes that participants who improve in related process would subsequently improve on mental health outcomes, correlation analyses were conducted to examine the relationships between pre to post changes in ACT-related process measures and pre to post changes in outcome variables, as well as pre to mid changes in process measures and mid to post changes in outcome variables (see tables 9 and 10). To further understand relationships, mid to post changes of process variables were also compared to mid to post changes in outcomes.

Relationship of Changes in Process Measures (Pre to Post) to Changes in Outcomes (Pre to Post)

Results did not show improvements in psychological flexibility from pre to post to be related to improvements in any of the outcome variables from pre to post other than depression. Improvement, pre to post, on the AAQ was marginally correlated with pre to post decrease in anxiety. Results were mixed for pre- to post-treatment improvement in self-compassion and its relationship with changes in outcome variables, pre- to post-treatment. There was a marginally significant relationship between -improvement in self-compassion and decrease in depression severity and the relationship between pre- to post-treatment changes in self-compassion and pre- to post-treatment changes in psychological domain of quality of life was significant, such that as self-compassion improved, so did quality of life in the psychological domain. However, significant correlations were not indicated between changes in self-compassion, pre- to post-treatment, and pre- to post-treatment changes in the rest of the outcome variables.

Table 9. *Correlation Results Examining Pre to Post Changes in Process Measures and Pre to Post Changes in Outcomes*

	PTSD (PCL-5)	Depression (DASS-D)	Anxiety (DASS-A)	General Distress (BSI)	Complex Trauma (TSI)	Overall Life Satisfaction (WHOQOL)	Quality of Life Psychological (WHOQOL)
Psychological Flexibility (AAQ-II)	.31	.46†	-.23	.12	.14	-.22	-.39
Self-Compassion (SCS)	-.30	-.43†	.06	-.09	-.37	.07	.51*

†$p < .10$, *$p < .05$; **$p < .01$

Relationship of Changes in Process Measures (Pre to Mid) to Changes in Outcomes (Mid to Post)

The only significant relationships between pre to mid changes in process measure and improvements in mid to post outcomes were in an unexpected direction such that decrease in scores on the AAQ or decrease in psychological flexibility was related to increase in PTSD, depression, anxiety and general distress outcomes, at post.

Table 10. *Correlation Results Examining Pre to Mid Changes in Process Measures and Mid to Post Changes in Outcomes*

	PTSD (PCL-5)	Depression (DASS-D)	Anxiety (DASS-A)	General Distress (BSI)
Psychological Flexibility (AAQ-II)	-.63**	-.54*	-.51*	-.635**
Self-Compassion (SCS)	.17	.23	.35	.312

†$p < .10$, *$p < .05$; **$p < .01$

Relationship of Changes in Process Measures (Mid to Post) to Changes in Outcomes (Mid to Post)

Evaluating the relationships between mid to post changes on outcome and process variables indicated significant and strong correlations between changes in psychological flexibility and changes in all primary psychopathology variables, such that as psychological flexibility improved, so did psychopathology symptoms. Of the other relationships, improvement in self-compassion from mid to post-treatment was marginally correlated with improvement in anxiety symptoms, mid to post, but not otherwise correlated with other variables. Changes in

Table 11. *Correlation Results Examining Mid to Post Changes in Process Measures and Pre to Post Changes in Outcomes*

	PTSD (PCL-5)	Depression (DASS-D)	Anxiety (DASS-A)	General Distress (BSI)
Psychological Flexibility (AAQ-II)	.72**	.78**	.52*	.75**
Self-Compassion (SCS)	-.37	-.35	-.47†	-.36

†$p < .10$, *$p < .05$; **$p < .01$

Acceptability Findings and Participation

Participation Trends

In general, the majority of participants (n=11) out of the 16 completers participated in the study for 6 or 7 weeks from pre-treatment to post-treatment, as had been planned. Four participants took approximately 8 weeks to get through study participation, while one person finished participating in 5 weeks. All but two of the participants opted to communicate via emails rather than the phone when provided a choice but all noted being okay with receiving reminder voicemails. No safety concerns came up during the in-person assessment meetings or during the course of the study.

System Usability Data

The mean SUS rating at mid-treatment was 82.19 (SD = 13.66) and at post-treatment was 84.06 (SD = 11.51). A significant difference was not found between SUS ratings at the two time points according to a paired samples t-test (p=.546). Both these scores are within the range of 71.4 to 85.5, considered a "good" rating on a 7-point adjective scale which ranges from "worst imaginable" to "best imaginable", with "good"

falling 2 points below the best rating (Bangor, Kortum, & Miller, 2008). Within the SUS, each of the 8 items are endorsed on a five point scale ranging from strongly disagree on one end to strongly agree on the other, without a particular specifier for each point beyond the two anchor points. In table 12, for each item pertaining to the scale at post-treatment, the number of participants endorsing the two responses closest to strongly disagreeing, the two responses closest to strongly agreeing, and those endorsing the response in between agreeing and disagreeing (neutral) are listed-treatment. In general, the vast majority of participants disagreed that the system was unnecessarily complex (*n*=15, 93.3%), most thought it was relatively easy to use (*n*=14, 87.6%). The vast majority of participants (*n*=13, 81.3%) imagined that most people would learn to use the system quickly, none of the participants agreed that they would need the support of a technical person to be able to use the system and furthermore, all sixteen (100%) participants endorsed feeling confident using the system. While none of the participants thought that they would need the support of a technical person to be able to use the system, one participant (6.3%) did find the system cumbersome/complicated to use and one (6.3%) found it to be unnecessarily complex. Of the sixteen participants, two participants (12.6%) endorsed thinking a lot needed to be learned about the system before being able to use it. In comparison to all the other usability items which garnered largely positive ratings from most participants, with regard to item assessing whether participants would like to use the system frequently, descriptively more participants appeared to provide negative or neutral ratings. Three participants (18.8%) disagreed or strongly disagreed with this particular statement and another four (25%) were also neutral.

Table 12. *Frequencies of Responses to Items on the System Usability Survey at Post-Treatment.*

	Agree/Strongly Agree	Neutral	Disagree/Strongly Disagree
Would like to use the system frequently	9 (56.3)	4 (25%)	3 (18.8)
Found the system unnecessarily complex	1 (6.3%)	0 (0%)	15 (93.3%)
Thought the system was easy to use	14 (87.6%)	1 (6.3%)	1(6.3%)
Thought the support of a technical person to be able to use the system would be needed	0 (0%)	1 (6.3%)	15 (93.3%)
Found the functions in the system well integrated	13 (81.3%)	2 (12.6%)	1 (6.3%)
Thought there was too much inconsistency in the system	2 (12.6%)	1 (6.3%)	14 (87.6%)
Imagined that most people would learn to use the system very quickly	13 (81.3%)	2 (12.6%)	1 (6.3%)
Found the system very cumbersome to use	1 (6.3%)	0	15 (93.3%)
Felt very confident using the system	16 (100%)	0 (0%)	0 (0%)
Thought a lot needed to be learned about the website before being able to effectively using it	2 (12.5%)	2 (12.5%)	12 (85%)

Satisfaction with the Program

Additional participant satisfaction specifically with the ACT program, rather than the website system specifically, assessed via the CSQ-8, resulted in a mean score of 24.25 (*SD* = 4.39) at mid-treatment and 25 .13 (*SD* =3.56), at post-treatment, with so

significant changes between the time points (p =.223). On this measure, the lowest possible score is 8 and the highest possible is 32. While no definite standards exist about how to interpret these results, the current mean score is considered well above the midpoint of the scale at 20. The current scores fall a few points below what has been reported as the norm for adults in mental/health counseling settings which is 27.8 (Atkinson & Greenfield, 2004).

Table 13 below includes a list of specific items assessed through the CSQ-8 along with the number of participants rating that item according to the least favorable to the most favorable response, on a four point scale, at post-treatment. Descriptive analyses related to each item within the CSQ provides further information about program satisfaction. All of the participants (n=16) who completed post-assessment rated the quality of the program as "excellent" or "good". All participants also indicated that in an overall, general sense, they were "mostly satisfied" or "very satisfied" with the program and most (n=15) indicated that they had "generally" or "definitely" received the kind of service they had wanted. While all participants (n=16) reported that the program "helped" or "helped a great deal" to deal more effectively with their problems more effectively, fewer although most participants (n=11) endorsed being satisfied with the amount of help they received. A number of participants endorsed being "quite dissatisfied" with the amount of help (n=3) or "indifferent or mildly dissatisfied" with the amount of help (n=2). Regarding whether their needs had been met by the program, the vast majority (n=11) endorsed that "most" of their needs although only one participant endorsed "all" of her needs had been met. While none of the participants indicated that "none" of their needs had been met, there were some (n=4) who indicated that only a few of their needs

were met by the program. Most of the participants (*n*=13) indicated that they would recommend the program to a friend and as far as whether they themselves would return to the program again, about a quarter (*n*=12) reported that they thought they would return or would definitely return to the program if they were to seek help again.

Table 13. *Frequencies of Ratings Provided in Response to the Client Satisfaction Questionnaire*

	1 (least favorable rating)	2	3	4 (most favorable rating)
Quality of service received	0	0	10	6
Received service they wanted	0	1	11	4
Met participants need	0	4	11	1
Recommend to a friend	1	2	6	7
Satisfied with amount of help	3	2	7	4
Deal more effectively with problems	0	0	10	6
Overall satisfaction with program	0	0	9	7
Would come back to program	0	4	8	4

Open Ended Participant Satisfaction Questions

As part of the CSQ-8, participants completed three open ended questions assessing what they liked most about the program, what they liked least about the program, and what changes they would recommend based on their experience. Each of these sets of responses were coded by the study investigator based on their content

themes. The results of participant responses for each of the three open-ended questions are presented in different tables below.

Table 14. *Coded responses for the question "What did you like best about the program?"*

Response Category	No of participants
Simple, easy to use	2
Help stay present in the moment or mindfulness	3
Particular exercises in the program (e.g. leaves on a stream)	4
Metaphors (e.g. passengers on the bus)	4
Applicability of program to life	1
Concepts, Ideas, Philosophy of ACT	2
Tools and techniques provided for help	3
Help confronting or working on trauma	3
In-person contact via meeting and phone calls	1
Reminders related to lessons	1
Written transcript of videos and audio	2
Ability to access the program from home	6
Case examples	3
Emphasis on Acceptance	2
Defusion to deal with difficult thoughts	1

Table 15. *Coded responses for the question "What did you like least about the program?"*

	No of Participants
Walking mindfulness exercise caused panic	1
Did not feel good after mindfulness module	1
Vague	2
Did not have an effect on a "deeper" level	1
Wording or grammatical issues	1

Technical difficulties	2
Quality of videos	5
Videos were too technical	1
Some activities were repetitive	1
Some issues did not feel relevant	2
Not interactive enough	1
Worksheets were not printer friendly	1
Lack of interactions with therapists beyond web-based content	1
Increased hyperarousal, trauma related thoughts	1
No one to make sure you stay on track	1
No new enlightenment beyond what has been obtained in years of therapy	1

Table 16. *Coded responses for the question "What changes would your recommend to the program based on your experience?"*

Fix technical issues	No of participants
Redo videos	2
Make screens more interesting, colorful, interactive	1
More interaction in general	1
Make printer accessible	1
Make recommendations for next steps after program completion	1
Improve audio due to low sound on the latter videos	1
Improve review or ability to "look back at the program"	1
Fix technical issues	1
Autofill for repetitive answers on activities	1
Increase activities and lessen didactics	1
Increase methods of staying on track with the lessons	2
Wait till later in the program before introducing "shocking" experiences of the case examples	1

More suggestions or instruction with regard to what to do 1

CHAPTER 4: DISCUSSION

Treatments for trauma survivors have included approaches designed by and large to address PTSD, with comparatively less focus on addressing underlying processes that may be relevant not just to PTSD but several other important domains of psychological functioning in trauma survivors, particularly for those who have experienced interpersonal trauma. Less is known about treatment of this population despite the need. This current study attempted to address this by testing the utility of a treatment approach, Acceptance and Commitment Therapy, a transdiagnostic approach focused on the functional processes related to psychological flexibility. We examined the feasibility and efficacy of a web-based ACT program for distressed survivors of interpersonal trauma focusing not just on PTSD but a larger set of psychological difficulties. This pilot study provided preliminary support for the feasibility, acceptability, and safety of ACT for interpersonal trauma survivors. This study that looked at multiple domains of functioning within a relatively small sample demonstrated significant improvements in most domains of functioning over the course of the treatment. Significant improvements in process variables that may impact outcomes, namely psychological flexibility and self-compassion, were also observed over the course of the treatment. Overall results indicated that the majority of the women finished participating in the program. While changes to the current program were recommended as expected, satisfaction with the program was acceptable and the program was well received by participants.

Sample Characteristics

All of the participants in the study consisted of women with ages ranging from 20 to 68 years old and the sample included a fair mix or students and non-students. Overall, the participants were of lower socio-economic status, with many participants living under the poverty level and most living on an income of less than $25,000. Participants who enrolled consisted primarily of Caucasians but the general proportion of individuals from other racial groups were fairly representative of the larger population in Reno and Sparks, from which this sample was drawn. The same also appeared to be true for sexual orientation. With regard to trauma characteristics, the vast majority of participants had experienced both physical and sexual victimization, such that their level of combined trauma experience, even beyond interpersonal trauma experiences was very high. In the current sample, participants reported on average experiencing six different types of trauma, as measured by the SLESQ. Research has shown that when studies assess for most than one type of trauma, individuals typically report several types of trauma as a significant proportion of interpersonal trauma survivors experience cumulative trauma (Edwards, Holden, Felliti, & Anda, 2003).

Feasibility and Acceptability

The drop-out rate in this study was 27.7% even when considering one participant who could not continue to due to breaking her leg which limited her computer access. With regard to statistical differences, two variables emerged that distinguished completers from non-completers, experiential avoidance and cumulative trauma score. It appears that psychological flexibility is an important factor that could determine whether one approaches and follows through with treatment or not. At least in an inpatient setting, previous research has shown that experiential avoidance is associated with higher

treatment drop-out from DBT (Rusch et al, 2008). The drop-out group included a slightly higher rate of ethnic minorities, the limitations of which will be discussed in the generalizability of findings in a latter part of the results. The drop-out rate in this study is comparable to drop-out rates in other similar studies using web-based treatments for trauma (Spence et al., 2013). In RCT's, rates have ranged from 50% to 100%, for non-guided approaches (Christensen, Griffiths, & Farrer, 2009). It is unclear to what extent the compensation in the form of gift cards served as a motivator but consistent with recommendations made in the web-based arena and from previous studies to reduce drop-out, and to assess for safety, this study included contact with participants through phone calls and email reminders and an in-person intake. It is possible that these factors may have helped with retention and two participants noted in their comments that this is what they liked about the program. There was variability in the experience of participants however with regard to the type of contact they responded to. Although the study investigator contacted each participant in this study through phone and email, most participants responded to emails compared to phone calls in terms of maintaining contact. Most communication via email consisted primarily of email reminders and updates back and forth. Even though most preferred communication via email, it cannot be assumed that emails were the primary factor in helping with retention. Participants also had contact with study personnel during the phone screening, in-person interview, and at least one more time on the phone when helping them log on to the program before using emails, and it is possible that emails helped to retain participants because they was linked to a person they had previously communicated with. It would be interesting to see what

retention would look like with emails generated from individuals not known to participants.

There were no adverse events in this study, indicating that for at least some clients, web-based interventions can be used safely. However, further research is needed to further assess the issue of safety in remotely delivered treatments. No significant adverse events or crises came up during the course of the study. One participant reported increase in post-traumatic stress symptoms, which although not favorable, is not unique to this study (Taylor, Thordarson, Maxfield, Fedoroff, Lovell, & Ogrodniczuk, 2003). Two individuals reported difficulties related to the mindfulness module, one noting panic in response to the walking mindfulness practice and the other more general. From the comments that they provided, it is unclear what factors specific to mindfulness may have led to reported difficulties. As mindfulness based interventions have started to be delivered via the web, this becomes an important issue to manage. It is possible that for interpersonal trauma survivors, certain types of mindfulness practices may be difficult, particularly if their memories of sensations associated with trauma overwhelms them during their practice. In another recent study in which mindfulness based stress reduction was applied to low income minority women with PTSD and a history of intimate partner violence, one participant was cited to have dropped out because of panic attacks that were triggered by body scan exercises (Dutton, Bermudez, Matas, Majid, & Myers, 2013). While neither study indicates this to be a universal problem by any means, it may be important to consider how this could be addressed for trauma survivors. Typically, when mindfulness is done in traditional psychotherapy or within mindfulness retreats, there is some room for providers to both observe and understand the person's experience, in time,

particularly in case of distress and make therapeutic or educational decisions about how to proceed, adapt, or shape behaviors. This appears to be one potential limitation in the current format, one that perhaps increased psychoeducation about mindfulness may be able to help.

Additionally, while relatively more participants than not, stated that the case example used in the program were helpful, one participant noted that hearing about examples of others and "discussions about details related to trauma" was stressful. Although the case examples did not recount details about traumatic experiences and instead demonstrated how each person worked through their difficulties using ACT principles, it did make general mention of the type of traumatic experience the case experienced. In incorporating these experiences within future adaptations it may be helpful to think about what pieces of the intervention, including the case examples could be clearly communicated in terms of their function. Additionally, making some sections optional, assuming that they are not critical to learning but rather supplemental or additive, could help. Participants were told that they could skip anything that may be distressing to them but in the future it may serve to improve retention and perhaps facilitate learning to let these be optional pieces. Even though the sample was small, it appears that providing choice when it comes to certain pieces of the program was well received by participants more generally. Two participants in particular noted that they did not like going through the videos and preferred to read the script of videos and audios which were made available to them. This also highlights the point that what is generally thought of as being more interactive and potentially more engaging may not be applicable to all individuals and some may simply prefer other choices. This preference for text-

driven functions is consistent with previous studies including an ACT based prevention approach (Levin et al., 2014; Vandelanotte et al, 2012)

Overall treatment satisfaction was relatively high, well above the middle of the scale reflecting satisfactory ratings. On most items reflective of satisfaction, including quality of service, whether they received what they wanted, overall satisfaction with the program, whether the program met participants' needs, and whether it helped them deal with their problems, the vast majority rated the program as favorable. It should be noted that there were a few participants who were not satisfied with the amount of help by the end of the program. This is important because it suggests that while participants may have been satisfied overall, some may still have desired more in terms of help. This was a challenge with regard to designing the program, in terms of attempts to be detailed while being limited to the six weeks session structure. One way in which this problem could be addressed with regard to dissemination at least could be to potentially have structured sets of treatment modules with regard to advancement. In that way individuals could have a choice in terms of when they stopped if they believed they had received enough treatment and when they might proceed, similar to what may happen in individual therapy to a certain extent.

Responses about the system usability, referring to some of the technical aspects of the program were good with most endorsing few problems. About 13% did indicate that the length of time taken to learn to use the system though was long. The comments related to changes that would be recommended to the program included several statements related to the system with suggestions to improve audio, redo videos, make the screen content more interactive, add capabilities to be able to use autofill to copy

previous work, increase printer capability and so forth. These were challenges within the format of the current intervention because of the limits set by what the hosting company was able to provide, and the financial limits, although these would become integral to the next phase of development.

Although not all content covered in the program was mentioned as things participants liked about the program, some ACT specific content were relayed as being well-received by participants including metaphors such the Passenger on the Bus metaphor, exercises, defusion, and acceptance. Furthermore, despite few concerns about mindfulness discussed earlier, about 20% of participants reported that they enjoyed the mindfulness module. In addition to ACT concepts, about 20% also referenced finding the emphasis on trauma to be helpful. Since most participants only left a comment or two for each question, the sample does not allow for broad claims about any of these issues but the mention of ACT related processes and the comments about trauma relevance indicates that factors specific to this treatment were noted, at least to some extent. In general, participants provided favorable ratings and comments about participation in the study.

As discussed earlier, prior research indicates that increasing personal contact greatly increases the engagement and program adherence among participants in web-based programs. Given the small sample size in this case, and the division of responsibility limited to just two people on the research team (study investigator who initiated screening and ongoing contact and walk-throughs over the phone for setting up and starting the program and CM, the study coordinator, who completed all in-person assessments), in this case, participants were in close contact with individuals involved in

the research. Furthermore, in the process of discussing personal life histories to some degree at screening and an even greater degree in the in-person meetings, individuals may have felt supported or connected to the program. In most emails received after completion, feeling supported and being grateful were things that many participants expressed. While this is a strength with regard to being able to retain participants, it may have biased participants to respond to satisfaction and usability questions in ways that may have seemed favorable to the research team members. In further work, how to separate feedback from coaching or reminders will require thought.

Baseline Models

Correlations among Outcome and Process Measures

As would be expected, correlations among outcome measures conducted at Time 1 indicated that all primary and secondary measures of psychopathology including PTSD (PCL-5), depression and anxiety (DASS subscales), general psychological distress (BSI) and complex trauma symptoms (TSI) correlated with one another positively and to a significant degree. PCL-5 correlated particularly highly with other psychopathology variables. This is consistent with what would be expected in a trauma sample, given the great degree of overlap and comorbidity that has been observed between PTSD and other psychological problems (Institute of Medicine and National Research Council, 2007). Quality of life variables were also as expected, correlated with measures of psychopathology in the expected direction, with depression in particular being very highly correlated with psychological domain of quality of life. Such an extremely high correlation could have occurred because there is significant overlap between the items within the psychological domain of the WHOQOL which was used for this study and

items that are reflective of depression such as items about concentration, negative feelings, and life enjoyment. Furthermore, it is well known that the depression impacts quality of life, comorbidity associated with depression in the form of PTSD and anxiety, are particularly likely to be associated with even lowered quality of life (Mittal, Fortney, Pyne, Edlund, & Wettherell, 2006). Due to elevated levels of PTSD and anxiety in this sample, in addition to depression, the relationship between depression and quality of life may have been particularly strong.

Correlations among outcome and process variables also revealed similar patterns such that most process variables and outcome variables were correlated in the expected direction, other than the relationship between anxiety as measured by DASS-A and the AAQ-II which were correlated but to a marginally significant degree. In general though, the pattern of results is consistent with the idea that self-compassion and psychological flexibility are interconnected with psychological difficulties and quality of life, and lend some early support for examining the possibility that targeting process variables including self-compassion and experiential avoidance could play an important role in impacting outcomes.

Efficacy

The program demonstrated efficacy overall across a wide range of primary and secondary outcome, particularly for pre to post changes, although efficacy was also demonstrated for most variables with regard to pre and mid changes, and mid and post changes.

PTSD

The results showed a significant difference in symptoms of PTSD across all time points. The effect was large in the case of changes that occurred between pre and post treatment. The effect was also large when considering pre to mid treatment changes and medium when considering changes from mid-treatment to post-treatment. The magnitude of change observed in this study on the PCL-C is within the range of those observed for other trauma based interventions, delivered in-person (Jonas, Cusack, & Forneris, 2013). The pre to post effect size related to PTSD in this study is similar to those found for previous web-based cognitive-behavioral interventions in which the sample consisted of mixed trauma experiences or non-interpersonal trauma survivors (Knaevelsrud & Maercker, 2007; Spence et al., 2013). The current study provides early indication that ACT may have utility in targeting symptoms of PTSD, as calculated by a total trauma score on the PCL-5. Additionally, the results support the view that ACT may also be able to impact all subscales of PTSD, including intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity, with large effects across all PTSD symptom clusters, pre to post. It appears that even with utilizing an approach that targets psychological flexibility and trauma symptoms more generally, a large magnitude of change in PTSD still took place. This could provide some support for the view that targeting functional processes that maintain psychological difficulties could be important in changes. The current results regarding statistical changes in PTSD symptoms were further supported by the findings on clinical interpretation which indicated that a significant decrease in the proportion of participants meeting diagnostic criteria, pre and post treatment using the PCL-C as s diagnostic tool, were also found in the current sample.

Depression and Anxiety

Effects sizes for both depression and anxiety also indicated moderate gains pre to post for depression and large gains pre to post with regard to improvement on anxiety. What was interesting also was the relative difference between anxiety and depression in terms of the pattern of changes observed, pre to mid-treatment, and mid- to post treatment. For depression, there were no significant changes between pre and mid-treatment, and moderate effect sizes were observed for changes between mid- and post. For anxiety, a moderate effect size was observed between pre and mid, although any change between mid and post was not significant. This suggests that barring external factors that may have impacted outcomes in this study, emphasizing acceptance and mindfulness without an emphasis on defusion, self-as-context, and values work, were related to differential patterns of anxiety and depression changes at mid-point.

Several issues are relevant to the pattern of change discussed with anxiety and depression. It makes sense that simply targeting mindfulness and acceptance could have impacted early change with regard to anxiety. There is much work related to ACT which suggests that processes applied earlier in the treatment before mid-treatment, acceptance and mindfulness, can impact changes in anxiety (Arch & Craske, 2006; Hofmann et al., 2009; Levitt, Brown, Orsillo, & Barlow, 2004). Additionally, until very recently with the advent of the DSM V, PTSD was classified as an anxiety disorder and although separate now, anxiety and PTSD have been shown to share similarities in symptoms of re-experiencing, avoidance, and arousal (Forbes et al., 2011). As such, it is possible that early changes in PTSD may have impacted anxiety. By mid-point, the mean anxiety score in terms of the DASS was in the low range, which may have limited the ability of the

intervention to impact further change at least with regard to statistical differences, particularly given the small sample size.

In contrast to participants initial experience of anxiety, the mean depression score as measured by the DASS at pre-treatment was also moderate judging by clinical cutoffs, but results lent support to the idea that the combination of components covered until mid-point may not have been able to sufficiently impact change. By post treatment though, sizeable effects were obtained with regard to improvement in depression. For depression, the latter parts of the program which emphasized defusion, self-as-context, and values components may have been essential. In the psychotherapy literature the importance of behavioral activation in affecting changes in depression has been highlighted (Jacobson, Dobson, Truax, & Addison, 1996). It may be possible that behavioral activation that is functionally connected to values driven behavior, consistent with an ACT approach, may have played a role with regard to changes in depression.

In terms of clinically significant changes on measures of depression and anxiety, at post treatment, more than half of participants (62.5%) in this sample were experiencing depression symptoms in a manner than was closer to the functional mean based on the Jacobson and Truax (1991) definition. Similarly, for anxiety, the same proportion of individuals met criteria for clinically significant change. These results which are complementary to the pattern of results obtained in terms of statistical significance are important because they help us understand that even at the level of individuals, a meaningful impact may have been experienced by a notable proportion of the participants.

Changes in General Psychological Distress, Complex Trauma Symptoms, and Quality of Life.

Changes in general distress, complex trauma symptoms, and quality of life although not primary variables, are important variables according to the literature on interpersonal trauma. As noted earlier, the TSI measures both acute and chronic post-traumatic states in several areas including anxious arousal, depression, anger/irritability, intrusive experiences, defensive avoidance, dissociation, sexual concerns, dysfunctional sexual behavior, impaired self-reference, and tension reduction behavior. Assessment of these variables allows for an understanding of changes in domains beyond specific diagnostic based categories. It appears that the current program may be able to impact changes beyond PTSD, anxiety, and depression, at least as it relates to other psychopathology outcomes. In particular, large effect sizes were shown in terms of pre to post changes in general psychological distress as measured by the BSI and with regard to improvement in symptoms of complex trauma as measured by the TSI. Although there is some overlap between these measures in that they both include subscales on depression and anxiety, they have significant variability with regard to the types of other items they assess. For this reason, it seems reasonable to assume that some of those other differing areas may have been impacted. For further studies, it may be potentially valuable to understand how an approach like the one utilized in the current study impacts specific subareas that these variables represent.

Surprisingly, quality of life was not impacted in the current study. Neither overall life satisfaction nor the psychological domain relevant to quality of life changed as a function of time and with participation in the study. On the one hand the results about the

quality of life are puzzling given the earlier literature with ACT which suggests that changes in quality of life can be impacted by ACT. At least in one study measuring quality of life as assessed by the same measure (Lundgren, Dahl, Melin, & Kies, 2006), in which changes in quality of life were compared between ACT and supportive therapy for drug refractory epilepsy, improvement in quality of life in the ACT condition compared to the other, did not emerge until follow-up period, and quality of life increased further over the course of the year. As such, it is possible that changes in quality of life may not begin to shape until later and because there was no follow-up, these changes could not be assessed. Additionally, a recent literature review on CBT for anxiety has indicated that web-based interventions relative to face to face interventions, have minimal impact in improving quality of life (Hofman, Wu, Boettcher, 2014). It may have been the case that the current format in the web-based format, and also the brief nature of the intervention, may have limited the ability to be able to impact changes in quality of life as well.

Psychological Flexibility and Self-Compassion

Changes in both psychological flexibility and self-compassion were observed in the study. Effect sizes pre to post treatment were moderate for both processes, albeit slightly higher for psychological flexibility. Neither process measures were altered to a significant degree during the first part of the treatment, pre to mid. This is not surprising for self-compassion, for a number of reasons. First, while ACT conceptually has similarities to self-compassion and various ACT processes could impact self-compassion, the current intervention was not a self-compassion focused intervention primarily. Rather it was an intervention designed to increase psychological flexibility. Furthermore, in the

current intervention, self-compassion was not directly addressed, or mentioned, until the second half of the program. It is possible that either the dose of self-compassion was not sufficient pre to mid, or that even if some changes could have taken place in self-compassion, participants may not have been able to label their experience given the lack of context with regard to labeling their experience.

In terms of psychological flexibility as well, it is possible that the combination and dosage of ACT components presented in the first half were not enough to make a meaningful difference. Although acceptance and mindfulness had been covered by mid-point, in teaching of mindfulness, practice is often emphasized as being of utmost importance and the amount of time allowed for practice before completing the AAQ-II may simply not have been enough to impact changes in psychological flexibility. Beyond this, previous work on ACT, including a recent meta-analysis (Powers, Vording, & Emmelkamp, 2009) suggests that effect sizes may vary according to whether mindfulness processes are combined with values, such that when they are combined, interventions appear to have a markedly greater impact than when they are not.

Although changes across all these process measures took place across the length of the treatment, none of the changes in our process variables pre to post, were associated with improvement in outcome measures, mid to post. Furthermore, changes in AAQ were associated with worsening of symptoms. These results are puzzling given the strong relationships between process and outcome variables at various times and the small sample size in this study limits our ability to understand this in greater detail.

ACT Knowledge

Significant gains were observed with ACT knowledge with time. This suggests that participants' level of knowledge about ACT may have increased with participation in the program.

Implications

The research on ACT has seen tremendous gains in the past decade. ACT is now considered an empirically supported treatment for a variety of psychological problems (Ruiz, 2010). However, as it relates to trauma, the research on ACT is still limited even though numerous studies as noted earlier have linked experiential avoidance to problems associated with trauma, particularly interpersonal trauma. Clinical research in this area has included some case study designs that have been important in providing some support for ACT (Batten & Hayes, 2005; Orsillo & Batten, 2005; Twohig, 2009). One pilot study utilizing a group design showed improvement in psychological symptoms and experiential avoidance in trauma survivors (Follette, Herman, & Follette, 1991). However, further progress in examining the suitability of ACT for trauma has been limited. This study which represents the first that we know of to examine the utility of ACT for survivors of interpersonal trauma could increase the scope of ACT to include yet another population to which it has been linked.

The current study provides promising empirical support for the utility of ACT as a treatment for PTSD. Reductions in PTSD were comparable to those found in other effective treatments for PTSD (Bradley et al., 2005) as well as other web-based interventions for PTSD (Klein et al., 2010; Knaevelsrud & Maercker, 2009). Furthermore, notable reductions in the proportion of individuals with provisional diagnosis of PTSD were observed in this study, which indicates potential clinical

influence at an individual level. Current treatments for PTSD are by no means behind. Both Prolonged Exposure and Cognitive-Processing Therapy are highly effective interventions that have been recognized as gold-standards in the treatment of PTSD (Institute of Medicine, 2007). However, current EBTs for PTSD have faced some challenges with regard to acceptability from clinicians in the community (Cahill, Hembree, & Foa, 2006). Additionally, some individuals do not respond to these treatments (Cahill et al., 2006). For these reasons, even though the current ACT approach was not designed with just PTSD in mind, the initial findings regarding the effectiveness of ACT for PTSD is important.

The findings regarding changes in depression and anxiety are also important. Although PTSD is one primary problem associated with trauma, estimates of comorbidity are high ranging upwards of 62% in population-based research (Keane, Brief, Pratt, & Miller, 2007; Perkonigg, Kessler, Storz, & Wittchen, 2000). The presence of comorbid disorders have been shown to diminish the positive effects of exposure based interventions (Foa et al., 2007) and many individuals with MDD are still symptomatic by the end of PTSD treatment (Resick et al., 2002). Furthermore, as depression and anxiety symptoms are both positively related to PTSD, they can also interfere with successful resolution of PTSD symptoms during and after treatment (Shalev et al., 1998). For these reasons, the capability of an approach to affect changes in these other primary areas in addition to PTSD is essential. ACT, by nature, is transdiagnostic and the current results are not only consistent with what would be expected from an ACT based approach but also consistent with the treatment needs of many trauma survivors whose problems are comorbid in nature.

One of the more important results of this study is that ACT may be helpful for addressing the larger needs of interpersonal trauma survivors in areas that have not been traditionally targeted. The International Society of Traumatic Stress Studies acknowledged in 2008 that the traditional PTSD framework excludes problems experienced by survivors of prolonged and repeated trauma, especially interpersonal trauma, and that these symptoms can contribute to significant distress and disability for survivors (Foa, Keane, Friedman, & Cohen, 2008). Theoretically, ACT principles and techniques fit well with what has been recommended for the treatment of Complex Traumatic Stress. Because Complex Traumatic Stress involves an inability to make full use of emotional, social, cognitive, and psychological competencies, a strengths based approaches which emphasize learning in these different areas has been considered preferable to those that simply focus on diminishing symptoms (Cloitre et al., 2012). The results of the current study are important because it provides early evidence that ACT, which at its core is a strengths based approach that emphasizes increase in psychological flexibility, could be helpful in addressing general psychological distress as well as Complex Traumatic Stress symptoms. This is especially important in considering the relative lack of established treatments for CPTSD.

The remotely delivered method of dissemination of the current approach also has important implications. Prior web-based research has not focused specifically on interpersonal trauma survivors, although certain studies that have focused on PTSD more generally have included participants with such a history within a mixed sample. The findings of this pilot study indicate that a web-based approach could be relatively safe for this population, although further research is warranted in this area. Other than one

participant reporting some increase in distress which is not unusual for trauma based treatment or treatments in general, the treatment appeared to be generally well tolerated without any adverse events. In the current environment in which there is both a drive to increase remotely delivered care as well as caution, particularly with regard to licensure concerns about the practice of therapy across state lines, provision of information about general safety of web-based interventions, as this study does, is important.

Beyond safety, the current web-based treatment received high ratings with regard to acceptability both in terms of usability and satisfaction with treatment. The qualitative feedback provided by participants included favorable comments about several ACT concepts. The rate of drop-out was generally low and likely linked to our use of email and phone reminders. Our approach using email and phone reminders is consistent with recent literature indicating the importance of messaging elements in web-based interventions (Mohr, Schueller, Montag, Burns, & Rashidi, 2014). As further work continues in the web-based arena continues, particularly with interpersonal trauma survivors, the utilization of approaches such as the current one to encourage participation may be important. The availability of a radically different approach in which therapy can be remotely accessed could have much value for survivors of trauma who may not otherwise seek treatment. This method also circumvents one of the major barriers to dissemination faced by empirically supported treatments for trauma, non-acceptance by clinicians. It is well-known that despite the existence of several EBTs, helping professionals have difficulties adopting them into their practice. Research has shown that one of the major reasons that helping professionals do not use EBTs is because they do not feel that they have been adequately trained (Becker et al., 2005). While it is hoped

that ACT gains acceptance among trauma-based clinicians if found to be efficacious, the use of a web-based approach offers an alternate way through which ACT could be more easily, quickly, and widely disseminated.

Limitations

There are several limitations in the current study which are important to consider. A notable disadvantage of this study is the absence of a wait list or a control condition against which to evaluate observed changes. This design limited our ability to understand how factors such as time, repeated measurement, or non-specific factors impacted the results obtained in the study. For example, it is unknown to what extent participation in psychotherapy outside of the current treatment, may have impacted changes in our sample. Because of the small sample size in this study, our capability to analyze questions of interest was limited. An examination of differences between completers and drop-outs were not well-suited for statistical analysis and we were unable to evaluate the impact of process variables, more rigorously, using moderation and mediation analyses. Another limitation is the lack of follow up assessment which could otherwise provide some information about whether the current approach is associated with long terms gains or changes. The format of the study included an intake assessment with a study coordinator and ongoing email and/or phone contact with the study investigator. While this may have helped with retention, it limits our ability to know if a similar approach without personal contact, may alter safety, drop-out, and changes in psychological functioning. The impact of such in-person contact on ratings of acceptability and feasibility is also unknown. The study was clearly designed for survivors of interpersonal trauma and for this reason, the generalizability of this program for survivors of other

types of trauma is also not known. Similarly, because the current study did not include much variability with regard to ethnicity and sexual orientation, particularly in the sample that completed treatment, the findings regarding the acceptability and utility of this treatment for minorities need to be interpreted with caution. Consistent with limitations of other types of intervention studies, the findings in this study occurred within a research setting. Due to this, it is difficult to know how much of our results could have been impacted by self-selection bias of a treatment seeking population within a research context.

Future Directions

While this is not a randomized controlled trial, and despite some limitations, this study is an initial important step in collecting data on ACT for trauma and testing the feasibility and acceptability of ACT delivered for interpersonal trauma survivors via the web. Continued data collection for this pilot study will continue which may help us further substantiate these findings and understand some of the nuances in the data. It is hoped that the results obtained in this study will set the way for future work in this area. This could include revisions to the current program based on observations in this study and recommendations obtained from participants. The next step would be to examine the revised program in the form of a randomized controlled trial which includes follow-up data and a larger sample size to evaluate mechanisms of changes. In these ways, we hope that further research will continue to increase our understanding of ways to enhance the lives of trauma survivors by emphasizing psychological flexibility.

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