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Determining the Effectiveness of Virtually-Delivered Written Exposure Therapy for Treatment of Posttraumatic Stress Symptoms

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DETERMINING THE EFFECTIVENESS OF VIRTUALLY-DELIVERED WRITTEN EXPOSURE THERAPY FOR TREATMENT OF POSTTRAUMATIC STRESS SYMPTOMS

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The COVID-19 pandemic has disproportionately impacted individuals with mental health issues (Swendsen, 2020). Although the peak destruction of the COVID-19 pandemic has passed, the psychological fallout remains. Social isolation, home confinement, and travel restrictions have exacerbated mental health issues during the COVID-19 pandemic, contributing to negative psychological distress (Smith et al., 2020). Survivors of trauma have higher vulnerability to prolonged psychological distress than the general population and others with non-trauma-related mental health conditions, which has been exacerbated during and following the COVID-19 pandemic. For these reasons, survivors of trauma may particularly benefit from virtual-delivery of trauma-focused treatments. Mental health providers have adapted to the need for telehealth services, delivering previously in-person evidence-based treatments through video-conferencing platforms. Written Exposure Therapy (WET) is a structured and partly scripted five session weekly mental health treatment designed to treat posttraumatic stress symptoms (Sloan & Marx, 2019). The goal of the current study was to investigate whether WET delivered virtually, through videoconferencing services, is efficacious in the reduction of psychological symptoms in individuals who have experienced a traumatic event. Twenty-six individuals completed a full dose of WET. Mean reductions in the per-protocol sample (n = 26) at five-weeks were 29.5 points on the PCL-5 (CI 25.4, 33.6; Cohen's *d* = 2.95), 7.3 points on the PHQ-9 (CI 5.3, 9.3, *d* =

1.40), and 6.7 points on the ISI (CI 4.6, 8.8, $d = 1.20$), which were maintained at two-month follow-up. A repeated-measures ANOVA was utilized to estimate treatment effect ($\eta^2_p=0.88$). All 26 participants (100%) experienced clinically meaningful reductions in PTSD symptoms by the end of treatment. These findings suggest that WET, especially when adapted to a telehealth format, seems to be a promising treatment option for individuals with significant posttraumatic stress symptoms, irrespective of trauma type.

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by

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INTRODUCTION

Problematic Psychological Sequelae Following Traumatic Events

Researchers estimate that approximately 90% of individuals experience a trauma in their life (Daskalakis et al., 2018). PTSD prevalence is much lower than trauma exposure prevalence, with lifetime PTSD prevalence in the USA between 6.8-7.8% (Kessler et al., 1995, Kessler et al., 2005, Aichberger, 2015), and globally between 8.3-9% (Aichberger, 2015; Stuber et al., 2006). Functionally, PTSD is chronically debilitating, impacting individuals' social, occupational, familial, educational, and recreational functioning. For example, maintaining regular work may be challenging for people with PTSD, due to sleep problems, concentration difficulties, and re-experiencing symptoms (Sloan & Marx, 2019). Socially, sustaining relationships with others may be difficult due to challenges with emotion regulation, social isolation, and feeling estranged from others.

Because of the pervasive nature of trauma exposure's impact on overall wellbeing, co-occurring mental health diagnoses are very common in individuals with PTSD. The most common co-occurring mental health disorders are insomnia (60-90% of individuals with PTSD), depression (50% of individuals with PTSD), and substance use disorders (30% of individuals with PTSD) (Kessler et al., 1995; Ohayon & Shapiro, 2000; Pigeon, 2010; Walter et al., 2018; Zayfert & Deviva, 2004). Due to the high comorbidity rates with PTSD, better understanding co-occurring symptoms may illuminate mechanisms by which trauma survivors recover over time.

Barriers to Seeking Treatment for Trauma-Related Symptoms

There are several barriers that impact one's ability to seek mental health treatment. For example, many individuals are unable to obtain evidence-based treatments because there are no nearby mental health providers competent in providing evidence-based practices (EBPs) for

trauma-related symptoms and providers who do provide EBPs often have long waitlists. Additionally, individuals may not be able to afford expensive therapy rates for a full dose of care (e.g. twelve one-hour therapy sessions). The time commitment and inflexible schedules for receiving an EBP may restrict some individuals from engaging in treatment because of occupational, educational, or familial responsibilities.

Evidence-based and empirically-supported treatments for trauma have a unique set of barriers which impact treatment seeking. Most PTSD treatments have an approximate dropout rate of at least 20% (Foa et al., 2007; Peterson et al., 2019; Rauch et al., 2009), although some studies have measured evidence-based PTSD treatment dropout rate between 47-56% (Schnurr et al., 2022). Many clinicians are hesitant to use exposure-focused trauma treatments due to patients' perceived limited tolerability of the treatments. Exposure-focused trauma interventions involve getting clients to emotionally engage with their trauma memories. In spite of patient concerns about exposure therapies, only approximately 10-15% of patients experience PTSD symptom worsening during exposure therapy for PTSD. Even so, these negative effects reduce during the course of treatment and do not predict dropout or a negative treatment outcome.

Virtual Delivery of Mental Health Treatments

The COVID-19 pandemic has disproportionately impacted individuals with mental health issues (Swendsen, 2020). Virtual healthcare has taken off, out of necessity, with routine healthcare appointments occurring from patients' homes. Mental health providers have adapted to the need for telehealth services, delivering previously in-person evidence-based treatments through video-conferencing platforms, e.g. Zoom, Google Meet, Microsoft Teams, and WebEx. Using technology has made accessing mental health treatment more accessible, e.g. reducing transportation and cost barriers**.** Social isolation, home confinement, and travel restrictions have

exacerbated mental health issues during the COVID-19 pandemic, contributing to negative psychological distress (Smith et al., 2020). Although the peak destruction of the COVID-19 pandemic has passed, the psychological fallout remains. Survivors of trauma may already be social isolated, engage in risky or destructive behavior, have decreased interest in activities, lack positive feelings, experience sleep problems, and endure persistent negative feelings (e.g. anger, shame, guilt, fear). These experiences and behaviors may make survivors of trauma more vulnerable to prolonged psychological distress than the general population and others with non-trauma-related mental health conditions during and following the COVID-19 pandemic. For these reasons, survivors of trauma may particularly benefit from virtual-delivery of trauma-focused treatments.

Written Exposure Therapy (WET)

Written Exposure Therapy is a structured and partly-scripted five session weekly mental health treatment designed to treat posttraumatic stress symptoms (Sloan & Marx, 2019). WET has moderate support to demonstrate significant reductions in posttraumatic stress disorder (PTSD) symptoms regardless of baseline PTSD severity, depression severity, time since trauma, sex, age, racial identity, or educational level. The research findings to date support WET as an efficacious and well tolerated treatment for individuals with PTSD. WET appears to be more tolerable than other PTSD treatments with current dropout rates between 5-10% (Sloan & Marx, 2019).

There are two main components within WET: imaginal exposure and cognitive restructuring. Clients are instructed to write about the details of their traumatic experience for thirty minutes. Cognitive restructuring takes place through the writing process, as clients also reflect on the meaning of their trauma, how it has changed their lives, how it has impacted their

meaning of life, and how it has affected their relationships with others (Sloan & Marx, 2019). There is growing evidence to suggest that imaginal exposure predicts trauma-related belief changes (Sloan & Marx, 2019). Cognitive restructuring is proposed to be a key mechanism in cognitive-focused trauma treatments, e.g. Cognitive Processing Therapy. Through the writing process of WET, clients tend to experience a belief shift toward more factual and less distorted cognitions (Sloan & Marx, 2019). Although still in the early stages of research, current data is promising for WET to be considered as a front-line treatment for PTSD.

The Present Study

An early study focused on WET delivered through a non-traditional modality was unsuccessful. For example, researchers found that sessions via telephone were not reliable to track patient engagement in the writing task, as well as their engagement in distraction or avoidance activities (Sloan & Marx, 2019). The goal of the current study was to investigate whether Written Exposure Therapy (WET) delivered virtually, through videoconferencing services, is efficacious in the reduction of psychological symptoms in individuals who have experienced a traumatic event. More specifically, we aimed to determine whether WET, in its telehealth delivery format, could be considered a beneficial treatment for trauma survivors, irrespective of trauma type or baseline symptom severity. Much is still unknown about the effectiveness of virtually-delivered mental health treatments. To address the research questions, self-report data were collected on a range of demographic variables, experienced traumatic events, trauma-related symptoms, depressive symptoms, and insomnia. Given the high level of comorbidity between PTSD, depression, and insomnia, this study explored the benefits of WET-Telehealth on the improvement of trauma-related symptoms, depressive symptoms, and insomnia.

The following research questions were addressed in the proposed study:

1. *Question 1:* Does a full dose (5 sessions) of WET-Telehealth reduce psychological symptoms?
    a. Does a full dose of WET-Telehealth reduce trauma-related symptoms?
    b. Does a full dose of WET-Telehealth reduce depressive symptoms?
    c. Does a full dose of WET-Telehealth reduce insomnia?
2. *Question 2:* Do reductions in psychological symptoms post-WET maintain at two-month follow-up?
    a. Do reductions in trauma-related symptoms maintain at two-month follow-up?
    b. Do reductions in depressive symptoms maintain at two-month follow-up?
    c. Do reductions in insomnia maintain at two-month follow-up?

METHOD

Participants

Based on an a priori power analysis, sixteen participants were determined to ensure adequate power. Forty individuals were recruited to participate in this study. Individuals were over the age of eighteen and currently residing in the state of Michigan.

Recruitment

Participants were recruited from college campuses and from the general community. Individuals currently enrolled in both undergraduate and graduate programs at Western Michigan University were targeted for recruitment via email correspondence, as well as through GoWMU. Social media and online platforms that facilitate recruitment of mental health treatment and research participation, such as Facebook and Reddit Surveys were utilized for recruitment.

Community mental health facilities in Michigan (e.g. WMed, Unified Clinics), wellness centers (e.g. gyms, yoga studios, and exercise centers), and community bulletin boards were also utilized for distribution of recruitment materials.

Informed Consent

Individuals interested in learning more about participation were directed to call the study's clinic phone number, a Google Voice number. Interested individuals arranged a time with the student investigator to virtually meet through WebEx to explain the study using the informed consent document, describe participant requirements, answer questions, and obtain informed consent. Prior to accessing any study materials, interested individuals read through the informed consent document. During the meeting with the student investigator, interested participants electronically signed the informed consent document and emailed it to the clinic email, to indicate their decision to participate in the study and to express their consent for the use of the answers they provide.

Eligibility Criteria

After receiving informed consent, interested individuals completed a semi-structured interview to collect demographic information, as well as details related to the participant's mental health treatment history and current treatment. They completed the Life Events Checklist (LEC-5), and finished the Extended Criterion A orally with the student investigator. After identifying an index trauma, the interview continued with the PTSD Checklist for DSM-5 (PCL-5), Patient Health Questionnaire (PHQ-9), and the Insomnia Severity Index (ISI). Individuals who were currently receiving mental health treatment or in the process of changing, starting, or terminating psychological medications within the last eight weeks were excluded from the study.

Completed LEC-5, PCL-5, PHQ-9, ISI, and demographic questionnaires were used to determine eligibility for participation in the study. To be included, individuals were required to identify an index trauma that meets criteria for a DSM 5 Criterion A traumatic event. They had to endorse significant trauma-related symptoms, measured by a PCL-5 index score of at least 15. Individuals who reported having trouble remembering important parts of their stressful experience (PCL-5, item 8) were further assessed to determine if their trauma memory lacked a beginning, middle, end, and sufficient detail. If they were unable do so, they were excluded from the study. The student investigator asked the participant to describe their index trauma during the initial interview to determine eligibility.

Procedure

Most individuals were notified of their eligibility immediately after completing the initial assessment materials. When eligibility was unclear, a licensed clinical psychologist was consulted with. These individuals were contacted within four days of their initial assessment to communicate their eligibility/ineligibility. Individuals who were deemed ineligible received an explanation for their ineligibility and were provided with alternative mental health care resources and referrals. The student investigator scheduled the next appointment (check-in session) and first WET session with eligible participants. Participants initiated the first session of intervention within one week of completing the initial assessments.

All eligible participants in the study were offered to receive only five sessions of Written Exposure Treatment (WET). (For one participant [A4], who experienced an additional trauma during the course of treatment, the individual took a pause from treatment for three months after completion of session 3. They were offered the option to continue with session 4 with the previous trauma or begin from the eligibility session for the newly experienced traumatic event.

They opted to be evaluated for consideration of the new event as the target of treatment and were deemed eligible for this trauma. The individual began treatment with a focus on the newly experienced traumatic event. In total, they received eight sessions.) All participants received standard WET (Marx & Sloan, 2019), delivered virtually through WebEx, a videoconferencing platform. Once the session started, the therapist locked the WebEx room, which prevented others from joining the virtual session. To ensure safety, the therapists collected the participant's physical location and confirmed an emergency contact each session before beginning the WET protocol.

The treatment began with a scripted psychoeducation focused session, lasting 60 minutes. One variation from the scripted treatment protocol (Marx & Sloan, 2019) was the inclusion of subjective units of distress scores (SUDS) to measure present-moment arousal (Foa et al., 2007). SUDS were introduced and explained during the psychoeducation component in session one. During sessions, the mental health provider verbally asked the participant, "What is your SUDS right now?" and then record their response. SUDS were collected pre-writing, halfway through writing, and post-writing. The following sessions, two through five, were 40 minutes in duration and were primarily focused on the writing assignment. Weekly individual therapy sessions were focused on the completion of a structured writing assignment, related to each participant's most distressing traumatic experience. Participants were instructed to describe their traumatic event, using as much sensory detail as possible, and including thoughts and feelings during the event. They were encouraged to use as much detail as possible (e.g. people involved, setting, what they saw, what they heard, etc.). This task was completed independently, with the therapist monitoring the time. During the writing task, the therapist was present, with their video camera on and microphone off. Participants also were required to keep their video camera on during the

entirety of the session. Participants completed the writing using pen and paper. Completing the writing task using a computer, tablet, or smart phone was not permitted. Following completion of the writing task, the participant took a picture of the completed writing and submitted it via email to a unique WMU email, specific to the proposed study. Individual sessions consisted of thirty minutes of writing, then ten minutes of check-in.

One component of Written Exposure Therapy was modified for the current study. Inhibitory learning has been shown to enhance the treatment effects of exposure-focused treatments for anxiety and trauma-related disorders. Craske and colleagues (2014) determined that exposure-focused treatments are more effective when inhibitory learning takes place. Based on their recommendation to facilitate inhibitory learning for exposure-focused treatments, five additional questions were added to the treatment protocol two pre-writing task and three post-writing task (Appendix G) in order to directly facilitate inhibitory learning. These additional questions were drawn directly from Craske and colleagues' (2014) clinical recommendations for trauma-related disorders. The brief check-in following the writing task included the Craske-inspired questions, as well as an opportunity to address and trouble-shoot any barriers or answer any questions that the participant may have that remain unresolved or unanswered.

For most participants, sessions took place weekly. (With one participant [A7], there was a pause for several weeks after completion of session 3 before continuing. Another participant [A4], who experienced an additional trauma during the course of treatment, as stated earlier, took a pause from treatment for three months after completion of session 3, and then opted to begin the treatment from the beginning with a focus on the newly experienced traumatic event). During the five-week Written Exposure Treatment, the PCL-5, PHQ-9, and ISI were administered weekly, for a total of five data points during treatment. Following completion of the five-week

treatment program, participants completed the PCL-5, PHQ-9, and ISI at a two-month follow-up. In total, participants who completed the entire WET protocol have seven data points. With the two-month follow-up included, the eight timepoints span approximately three and a half months.

Assessing risk and safety planning. If a participant reported thoughts of suicide or death on the PHQ-9 (item 9), the therapist completed a suicide risk evaluation. If deemed that the participant was not at imminent risk or harming themselves or others and feels able to manage their thoughts, the therapist completed a safety plan with them during session. For one participant [A7], who was deemed at acute risk of harming themselves during the course of treatment, the therapist communicated their concern to the participant and the participant self-admitted to an inpatient program. This participant continued with WET once stable.

Therapists. Treatment was provided by a doctoral level mental health therapist who completed a formal training in WET and is pursuing a Ph.D. in clinical psychology. The therapist was required to have a master's degree in psychology. A licensed psychologist was available for ongoing supervision and consultation. Consultation with a WET certified licensed psychologist was available, as necessary.

Treatment Fidelity. To ensure the quality of intervention delivery and treatment fidelity, therapists utilized session scripts (Marx & Sloan, 2019). The therapist was required to complete a checklist following each session, which included time of session, use of therapist script, collection and scoring of assessment measures, check-in for suicidal ideation and risk, collection of subjective distress scores, collection of written task (via email), and scheduling of next session.

Measures

Demographic Questionnaire (Appendix A). This investigator-developed questionnaire asked questions about basic demographics, including age, gender, sexual orientation, education level, military status, and student status. Participants were asked about their history and current mental health treatment, as well as psychological medication use.

Life Events Checklist (LEC-5) (Appendix B). The Life Event Checklist (LEC) with extended Criterion A consists of seventeen categories of traumatic events (Blevins et al., 2015), as well as asks participants to specify the traumatic event that bothers them the most. Participants report whether or not they have personally experienced, witnessed, learned about, experienced because of occupational requirements, or were never exposed to each type of event (Blevins et al., 2015). Strong convergence with measures of psychopathology, known to be associated with trauma exposure, has been demonstrated with the LEC (Gray et al., 2004). The LEC has been found to elicit reliable information about post-trauma exposure, with strong temporal stability (Gray et al., 2004).

PTSD Checklist for DSM-5 (PCL-5) (Appendix C). The Posttraumatic Stress Disorder Checklist (PCL) is widely used to screen and assess for PTSD symptoms. The PCL-5 is a psychometrically sound measure of PTSD symptoms that represent the most up-to-date criteria within the *Diagnostic and Statistical Manual of Mental Disorders-5* (Blevins et al., 2015). It has strong internal consistency (α= .94) and test-retest reliability (α= .82). Internal consistency for the current sample was high, α= .79-.89. It consists of a 20-item self-report measure that assesses for the 20 DSM-5 symptoms of PTSD (U.S. Department of Veterans Affairs, 2016). The self-report scale ranges from 0-4 for each symptom. The rating scale includes the descriptors "Not at all," A little bit," "Moderately," "Quite a bit," and "Extremely" (U.S. Department of Veterans

Affairs, 2016). All items are summed for a total score. Higher scores indicate a greater trauma-related symptom severity. To assess for more specific change over time, this study utilized the weekly version of the PCL-5, which asks participants to assess posttraumatic symptoms within the last week, instead of within the last month. All questions items are identical between the PCL-5 and PCL-5 Weekly.

Patient Health Questionnaire-9 (PHQ-9) (Appendix D). The PHQ-9 is a 9-item self-report measure that assesses for symptoms of depression. There is strong diagnostic validity as well as internal consistency (Kroenke et al., 2001). There is strong internal reliability (α= .89), as well as test-retest reliability (α= .84). Internal consistency for the current sample was high, α= .82-89. The self-report scale ranges from 0-3 for each symptom. The rating scale includes the descriptors "Not at all," "Several days," "More than half the days," and "Nearly every day". All items are summed for a total score. Higher scores indicate a greater depression severity. Sensitivity and specificity for major depression are both strong (α= .88).

Insomnia Severity Index (ISI) (Appendix E). The ISI is a 7-item self-report measure that assesses for difficulties related to sleep quantity, quality, and satisfaction. The ISI is a valid and reliable instrument used to track insomnia severity and improvement over time (Morin et al., 2011). There is strong internal consistency (α= .90-.91), within the current sample, α= .79-.91. All items are summed for a total score. Higher scores indicate a greater insomnia severity.

Data Collection

This study was conducted virtually, with the therapist and all participants physically residing in the state of Michigan. All study sessions were completed using WebEx, which has sufficient safeguards for privacy, e.g. HIPAA compliant, ability to lock the virtual conference room.

Data Storage. Participants who provided identifying information, e.g. email, contact phone number, were notified of the anonymity of their responses and that their contact information and other identifying information was stored separately from their assessments and written responses. Individual assessment data from the study were entered directly into a password-protected electronic database for review by researchers, using a de-identified participant code. A password-protected crosswalk file including the participant codes and identifying information was stored separately from the study data.

Design

The present study used an open single-arm uncontrolled clinical trial design to investigate the impact of virtually-delivered Written Exposure Therapy on the reduction of PTSD symptoms, depressive symptoms, and insomnia symptoms. There was no control group. 89.7% of participants who completed session one of WET received the allocated intervention.

Analytic Strategy

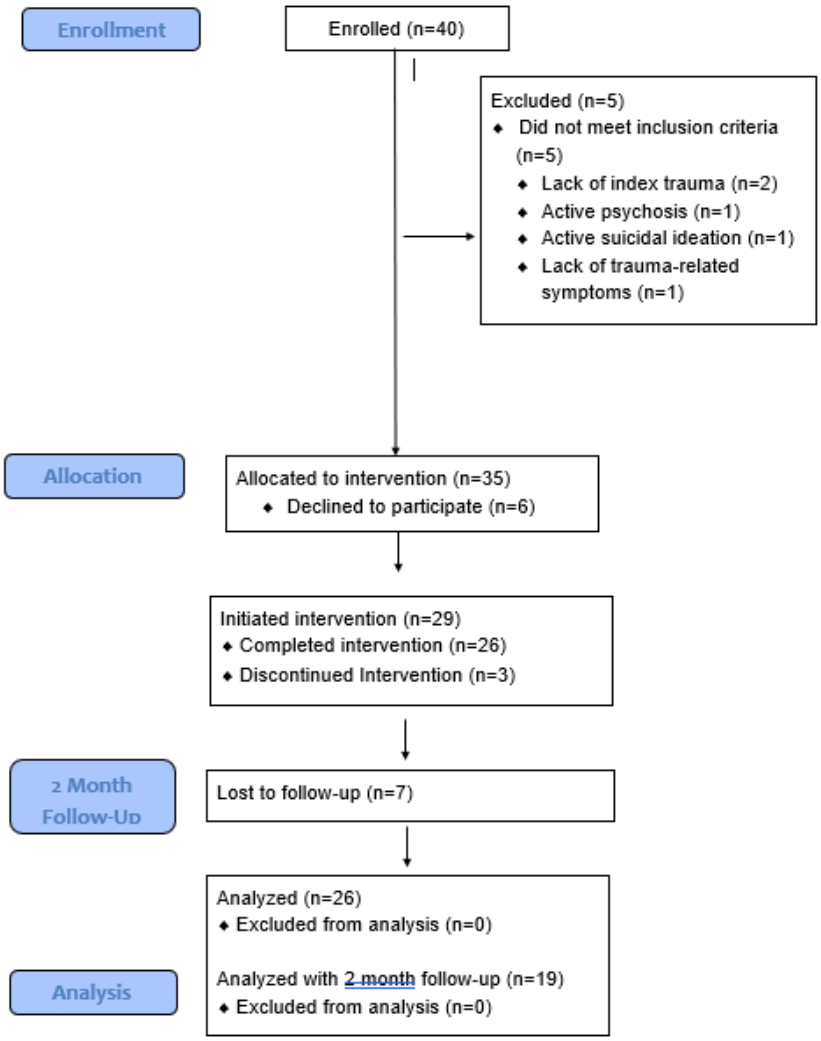
A per protocol (PP) analysis was utilized in order to determine the efficacy of the intervention with participants who received a full dose of WET (five sessions). Based on an a priori power analysis, it was determined that 15 participants would ensure adequate power of 0.90. Repeated measures ANOVA analyses were used to determine main effects of the treatment over time, for baseline (eligibility/initial assessment), five weeks (session five), and two-month follow-up, for trauma-related, depressive, and insomnia symptoms. Descriptive statistics, the distribution of responses, and all data analysis were computed and analyzed using SPSS, where all information was kept safe and confidential.

RESULTS

Participant Flow

Participant flow is displayed in a CONSORT diagram (see Figure 1). Forty individuals completed informed consent, were enrolled in the study, and assessed for eligibility. Of the 29 individuals who initiated WET, 26 completed treatment. Nineteen patients (73%) completed follow-up assessment at two-months. Participants were recruited from February 2021 to December 2022 and follow-up was completed in February 2022.

Figure 1
CONSORT Diagram



Baseline Data

Forty individuals were assessed and 35 (87.5%) met inclusion criteria. Six patients declined participation. Loss to follow-up was 26.9% at two-month follow-up. There were 26 participants who initiated and completed all five sessions of Written Exposure Therapy. The majority of participants were between the ages of 19-39, most (88.5%) identified as female, white/Caucasian (76.9%), and were from the United States (92.3%). Mean age was 29.5. Most participants (96.2%) endorsed personally experiencing more than one traumatic event (between 3-12), that involved actual or threat of death, serious injury, or sexual violence. Mean number of trauma events endorsed was 6.0. Physical assault or threat of physical assault was not only the most selected trauma type for focus of treatment, but also tied for the most endorsed (58%) trauma type, with sexual assault (rape, attempted rape, coercion to perform sexual acts). Types of index traumas varied considerably, e.g. death of child during labor, discovering loved one's body after suicide, physical assault by patient, helicopter crash, witnessing loved one self-harm or end their life, being held hostage during armed robbery, domestic violence, as well as bodily harm caused by medical providers. Table 1 presents a summary of the demographic characteristics of the final sample. The sample was representative of an outpatient mental health clinical population in southwest Michigan (see Table 1).

Table 1

Sample Demographics (n=26)

Characteristic	n	%
Gender Identity		
Woman	23	88.5
Man	3	11.5
Age (mean ± SD)	29.5 ± 10.8	
Racial Identity		
Black/African American	4	15.4
Multiracial/Biracial	2	7.7
White/Caucasian	20	76.9

Table 1 – continued

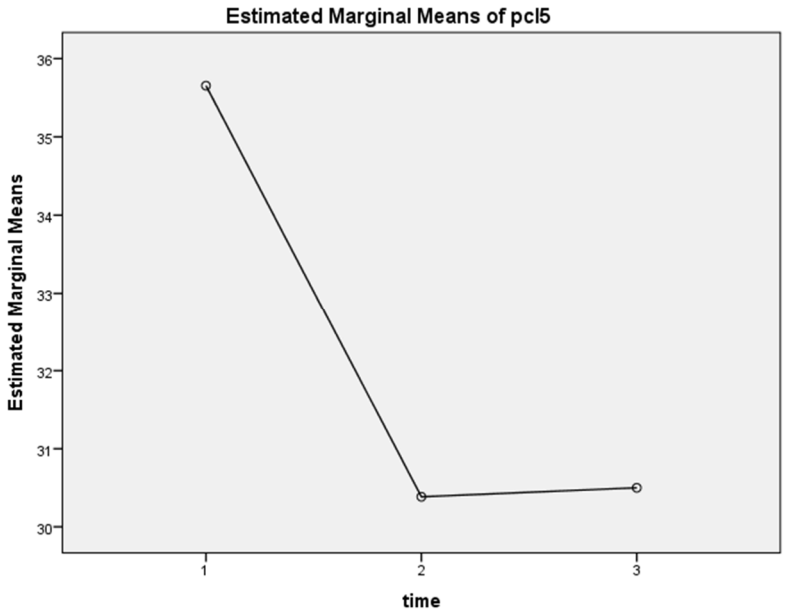
Sexual Orientation		
Bisexual	2	7.7
Gay/Lesbian	2	7.7
Heterosexual	20	76.9
Questioning	2	7.7
Education		
Associate's Degree	1	3.8
Bachelor's Degree	1	3.8
Current Master's Student	7	26.9
Master's Degree	6	23.1
Some college courses	11	42.3
Currently Employed		
No	4	15.4
Yes	22	84.6
Undergraduate/Graduate Student		
No	8	30.8
Yes	18	69.2
Military Veteran		
No	24	92.3
Yes	2	7.7
Index Trauma		
Life threatening illness or injury	2	7.7
Physical assault or threat of physical assault	8	30.7
Physical assault with weapon	4	15.4
Sexual assault	1	3.8
Sudden accidental death	1	3.8
Sudden violent death or injury	3	11.5
Transportation accident	2	7.7
Other stressful life event	5	19.2

Determining Baseline. To test for a stable baseline of PTSD symptoms, a repeated measures ANOVA was utilized. Significant differences between timepoint 1 (eligibility session), timepoint 2 (one week check-in), and timepoint 3 (prior to delivery of WET session #1) were evaluated. Mauchly's Test of Sphericity indicated that the assumption of sphericity was fulfilled, $\chi 2(2) = 3.80$, $p = .150$. A repeated-measures ANOVA determined that mean PCL-5 differed significantly across the three baseline time points ($F(2, 50) = 5.36$, $p = .008$).

A post hoc pairwise comparison using the Bonferroni correction showed a decreased PCL-5 score between the initial assessment and the check-in one week later (35.7 vs 30.4,

respectively, p =.005). When comparing the one-week check-in to session 1 (one week later) (30.4 vs 30.5), there was no reduction of PTSD symptoms. Recent validation studies for the PCL-5 have recommended a cutoff score between 28 and 37 for a diagnosis of PTSD (Ashbaugh et al., 2016; Blevins et al., 2015), whereas 31 to 33 is considered the optimally efficient cutoff for a diagnosis of PTSD (Bovin et al., 2016).

Figure 2
Estimated Marginal Means for Baseline Measured by PCL-5



In the eligibility session, participants were asked questions about their traumatic experiences. The therapist asked for some detail in order to help the participant to identify an index trauma. By doing so, the participant thought about, felt associated emotions, experienced physiological changes, and very likely saw vivid memories related to the experience they were describing. Although much briefer in nature, this process mimics the journaling exercises that participants were asked to complete. In this setting though, the brief exposure was aloud, not in writing. Given that in the one-week check-in there was no discussion about the participant's traumatic experiences, the participant did not have the same opportunity to be exposed to

uncomfortable associated thoughts, feelings, bodily changes, or memories. Therefore, the eligibility session was selected to be the baseline, with consideration to the therapeutic effect of assessing for PTSD symptoms, as a brief exposure, and the lack of therapeutic change between the one-week check-in to session one. Given recommended cutoff scores, the present study's baseline PTSD symptoms appear to be consistent with a clinical sample that largely meet criteria for PTSD.

Outcomes

Primary outcomes were PTSD symptoms (PCL-5 score), depression symptoms (PHQ-9 score), and insomnia symptoms (ISI score). Means and standard deviations were calculated for all study measures. Mean reductions in the per-protocol sample (n = 26) at five-weeks was 29.5 points on the PCL-5 (CI 25.4, 33.6; Cohen's d = 2.95; see Table 2), 7.3 points on the PHQ-9 (CI 5.3, 9.3, d = 1.40), and 6.7 points on the ISI (CI 4.6, 8.8, d = 1.20). Clinically meaningful reductions on the PCL-5 was determined to be a reduction of 15 to 18 (Marx et al., 2021). Clinically meaningful reductions are considered to be less than or equal to a raw score of 9, a reduction of 50%, or a reduction of 5 points (McMillian et al, 2010; Bernd et al., 2004; Löwe et al., 2004). Clinically meaningful reductions in sleep problems measured by the ISI were found to be a reduction of 7 points (Morin et al., 2011).

Mean Scores for Post-Treatment and Two-Month Follow-Up. Treatment gains were maintained at two-month follow-up. Mean decrease between five-weeks to two-month follow-up (n = 19) was 3.0 points on the PCL-5 (CI 0.1, 5.9; Cohen's d = 0.40; see Table 2), 7.3 points on the PHQ-9 (CI 5.3, 9.3, d = .30), and 5.2 points on the ISI (CI -0.8, 4.8, d = .38). For mean scores for the PCL-5, PHQ-9, and ISI, see Table 2. For estimated marginal means for pre-treatment, five-weeks, and two-month follow-up, see Figure 4.

Treatment Effect – PTSD Symptoms. For a more precise estimation of treatment effect on PTSD symptoms measured by the PCL-5, a repeated-measures ANOVA was utilized (see Figure 4). For repeated-measures ANOVA, effect values are 0.01 (small), 0.06 (medium), and 0.14 (large). The three timepoints included were baseline, five-weeks, and two-month follow-up. Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi 2(2) = 8.753$, $p = .013$, and therefore, a Greenhouse-Geisser correction was used. Based on these analyses, mean PCL-5 scores differed significantly across three time points overall ($F(1.9, 25.7) = 133.518$, $p < .001$). Effect size, indicated by partial eta-squared (η^2_p), was 0.88. To determine which timepoints differed significantly, a post hoc pairwise comparison using the Bonferroni correction was utilized, which showed a decreased PCL-5 score between the initial assessment and five weeks later (35.7 vs 7.4, respectively, $p < .001$). When comparing the five-week timepoint to the two-month follow-up (7.4 vs 4.4), there was a minimal reduction of PTSD symptoms; however, this was not statistically significant ($p = .128$). All 26 participants (100%) experienced clinically meaningful reductions in PTSD symptoms by the end of treatment. Therefore, we can conclude that the results for the ANOVA indicate that a full dose of virtually-delivered WET did significantly reduce PTSD symptoms, which were maintained at two-month follow-up.

Treatment Effect – Depressive Symptoms. Similarly, to determine the treatment effect on depressive symptoms measured by the PHQ-9, a repeated-measures ANOVA was utilized. The assumption of sphericity was violated ($p < .001$). For this reason, a Greenhouse-Geisser was utilized, ($p = .624$). A repeated-measures ANOVA determined that mean PHQ-9 scores differed significantly across three time points ($F(1.3, 22.5) = 33.719$, $p < .001$). Effect size was 0.65. A post hoc pairwise comparison using the Bonferroni correction showed a decreased PHQ-9 score

between the initial assessment and five weeks later (12.0 vs 4.6, respectively, $p < .001$). When comparing the five-week timepoint to the two-month follow-up (4.6 vs 3.4), there was a minimal reduction of depressive symptoms; however, this was not statistically significant ($p = .098$). Nineteen out of 26 participants (73%) experienced clinically meaningful reductions in depressive symptoms by the end of treatment. For participants who reported a baseline of moderate to severe depressive symptoms (PHQ-9: 10+), 93% (14 participants) experienced clinically-meaningful reductions in depressive symptoms post-treatment. Therefore, we can conclude that the results for the ANOVA indicate that a full dose of virtually-delivered WET did significantly reduce depressive symptoms, which were maintained at two-month follow-up.

Treatment Effect – Insomnia Symptoms. Finally, to determine the treatment effect on insomnia symptoms measured by the ISI, a repeated-measures ANOVA was utilized. The assumption of sphericity was fulfilled. A repeated-measures ANOVA determined that mean ISI scores differed significantly across three time points ($F(2, 36) = 28.066$, $p < .001$). Effect size was 0.61. A post hoc pairwise comparison using the Bonferroni correction showed a decreased ISI score between the initial assessment and five weeks later (12.5 vs 5.3, respectively, $p < .001$). When comparing the five-week timepoint to the two-month follow-up (5.3 vs 3.3), there was a minimal reduction of insomnia symptoms; however, this was not statistically significant ($p = .443$). For the 26 participants who completed WET, 13 participants (50%) experienced clinically meaningful reductions in insomnia symptoms by the end of treatment. For participants who reported a baseline of at least subthreshold clinical insomnia (ISI: 8+), 77% experienced clinically-meaningful reductions in insomnia symptoms. Therefore, we can conclude that the results for the ANOVA indicate that a full dose of virtually-delivered WET did significantly reduce insomnia symptoms, which were maintained at two-month follow-up.

Table 2

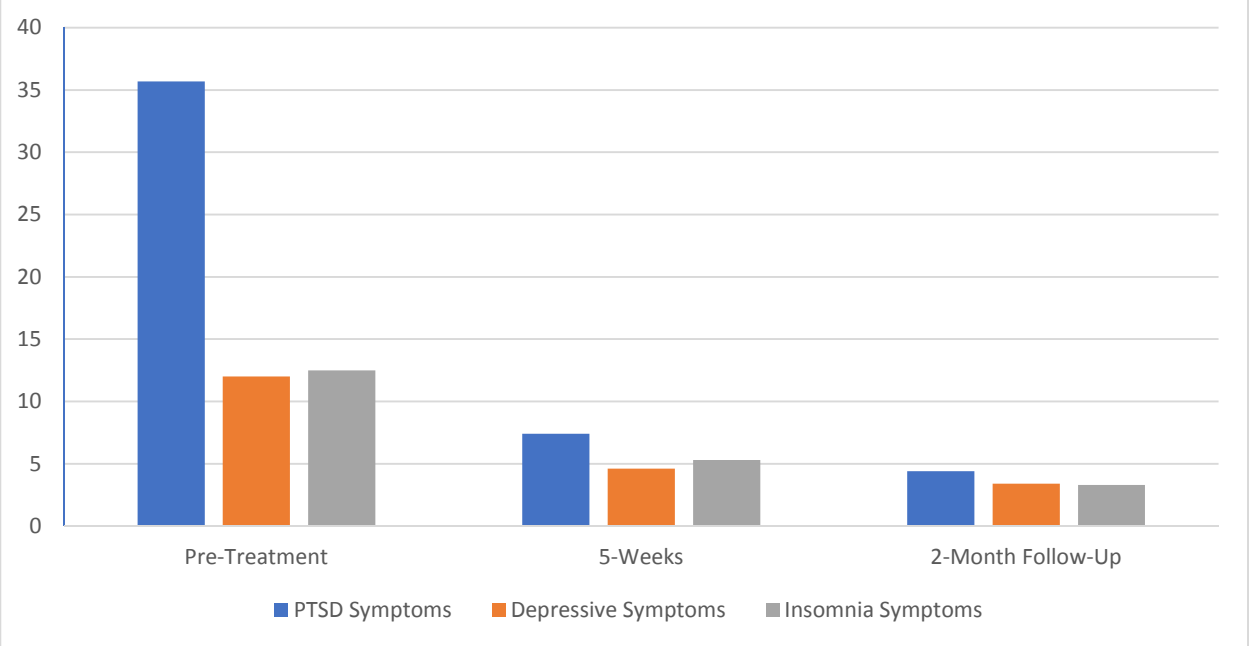
One-Way Repeated Measures ANOVA (Within-subjects design)

Measure	Timepoint	Mean	η^2_p	F-statistic	*p*-value
PCL-5	Baseline	35.7			
	5-weeks	7.4	.88	133.52	.000[a]
	2-month follow-up	4.4			.128[a]
PHQ-9	Baseline	12.0			
	5-weeks	4.6	.65	33.72	.000[a]
	2-month follow-up	3.4			.098[a]
ISI	Baseline	12.5			
	5-weeks	5.3	.61	28.07	.000
	2-month follow-up	3.3			.443

Note: Within-group effect sizes are expressed as partial eta squared. Effect sizes are calculated as $\eta^2_p = SS_{effect} - 1 / SS_{effect} + SS_{error}$. For repeated-measures ANOVA, effect values are 0.01 (small), 0.06 (medium), and 0.14 (large). Because the assumption of sphericity was not fulfilled, the *p*-value reported corresponds to a Greenhouse-Geisser correction, indicated with x^a.

Figure 3

Means for Primary Outcome Measures



DISCUSSION

The COVID-19 pandemic has disproportionately impacted individuals with mental health issues (Swendsen, 2020). Social isolation, home confinement, and travel restrictions have exacerbated mental health issues during the COVID-19 pandemic and years hereafter, contributing to negative psychological distress (Smith et al., 2020). Virtual healthcare has taken off, out of necessity, with routine healthcare appointments occurring from patients' homes. Mental health providers have adapted to the need for telehealth services, delivering previously in-person evidence-based treatments through video-conferencing platforms, e.g. Zoom, Google Meet, Microsoft Teams, and WebEx. Medical care worldwide has adapted due to institutional restrictions to in-person care, patient needs and stressors (e.g. loss of income, caregiving responsibilities), and potential illness and health-related stress on providers (e.g. burnout, mandate to work in-person/virtually) (LoSavio et al., 2021). Using technology has made accessing mental health treatment more accessible, e.g. reducing transportation, parenting, and cost barriers. The present study offers more support for the continuation of virtual mental health care beyond the COVID-19 pandemic. WET delivered virtually appears to be a feasible and reasonable treatment option for individuals who would otherwise have limited access to evidence-based mental health care. More research is needed to explore the effectiveness of empirically-supported treatments, like WET, and their applicability and adaptability to virtual-delivery.

Given the high tolerability, feasibility, and documented treatment success, studies evaluating WET are being conducted internationally. From the time this study was initiated until now, numerous efficacy studies exploring Written Exposure Therapy in different populations have been completed worldwide, which is notable given the ongoing COVID-19 pandemic.

Recent studies examined WET's efficacy in civilians/Veterans, multiple languages, different treatment settings (e.g. virtual vs. telehealth), and with added components (e.g. WET + suicidal ideation). The present study's results are consistent with recently published global studies. In the first study evaluating WET in Asia, Park and colleagues (2021) administered WET to 25 patients in the Republic of Korea. In their sample, which was 50% sexual assault victims, they found a 21.52 point reduction on the PCL-5 from pre- to post-treatment. They also noted a 7.22 point decrease in depressive symptoms, measured by the PHQ-9. Furthermore, they found more reductions in PTSD and depressive symptoms at 24 weeks post-treatment, which was lower than the post-treatment mean scores, but not statistically significant. These results are also consistent with the current study. Their tolerability was strong, with only 8% dropout during treatment. Although outpatient and virtual-delivery results seem promising, WET has not been adequately evaluated in residential, inpatient, or primary care settings.

Similarly groundbreaking, Andrews and colleagues (2021) conducted the first study evaluating the effectiveness of WET in Spanish with 20 Spanish-speaking Latine immigrants, from Mexico, El Salvador, Guatemala, Honduras, and Puerto Rico. Consistent with the present study, they noted a 23.12 point decrease on the PCL from pre- to post-treatment. Additionally, the noted an 8.38 point decrease in depressive symptoms, measured by the PHQ-9. Different from other studies, Andrews and colleagues (2021) noted 25% did not complete all treatment sessions. Early research of WET in languages other than English is very promising. Because of the limited nature of studies in languages other than English, more research is needed.

Until recently, WET had been successfully utilized in civilian settings, yet had not been examined in military veterans. The first Written Exposure Therapy national training for mental health care providers in the VA healthcare system was conducted in 2019. As part of the national

rollout of WET, providers collected data which was included for analysis. LoSavio and colleagues (2021) evaluated the effectiveness of in-person and telehealth WET for 277 U.S. military veterans in the Department of Veterans Affairs (VA). They found that symptom improvement was equal between in-person and telehealth delivery. Age, gender, race/ethnicity, index trauma, and co-occurring mental health conditions did not predict treatment outcome or dropout. Level of education, though, did predict treatment outcome and dropout, with individuals who were more educated, were more likely to complete and benefit from treatment. The present study's participants were very educated and responded considerably well to the five-session WET intervention. In order to generalize the utility of this treatment, future studies must prioritize the inclusion of individuals without a college education, in particular those with some elementary, middle, or high school experience.

Consistent with Craske and colleagues' (2014) treatment recommendations for anxiety and trauma-related disorders, specific questions targeting inhibitory learning were added prior and immediately following the writing exercise. Participants were asked what they were most worried about will happen if they write about their trauma and how likely they thought this scenario would happen today. Then following the writing, they were asked whether what they were most worried about came true or not, how 'they know', and what they learned from this process. Although not formally examined in this study, participants appeared to generally respond very positively to the added questions and had corrective learning experiences. The current study adds further support for Craske's recommendations in the delivery of anxiety and trauma-related interventions. At times, during the debriefing component, there was brief discussion on this concept, with the use of the 'pandora's box' metaphor vs. the 'messy closet' metaphor of trauma (Ehlers & Clark, 2000). Participants would most commonly comment, "It

wasn't as bad as I thought it would be". This type of comment alludes to inhibitory learning, which has been largely promoted as a very important therapeutic factor by other leading psychologists in trauma and anxiety-related disorders. It would be worthwhile to explore WET's efficacy with and without explicit inhibitory learning questions. Doing so would further tease apart whether inhibitory learning is a natural consequence of WET (and thus a possible central mechanism of change) or whether it is necessary to emphasize it therapeutically in order to enhance the effectiveness of WET when delivered.

This study's findings should be interpreted in the context of several limiting factors. First, there was no control group. Future studies should consider comparing virtually-delivered WET to treatment-as-usual, and other empirically-supported treatments for PTSD (e.g. Prolonged Exposure, Cognitive Processing Therapy, etc.). Second, the sample size was limited. Although the current sample had much diversity with respect to trauma type, the sample is not representative of the general population. Given the lack of diversity related to gender, education level, racial identity, and military status, future studies exploring WET should consider targeting recruitment of individuals with non-majority identities (e.g. indigenous, transgender, high school educated, disabled, etc.). Third, all study-related activities, including recruitment, enrollment, assessment, intervention, and follow-up were conducted by a single person. The therapist, the person providing care, has been considered by some psychologists to be of more importance to success of the patient than the actual treatment provided (Miller et al., 2008). Due to the nature of activities and amount of contact with the primary researcher, it is possible that participants were impacted by social desirability and the tendency to 'people-please'. Over the course of treatment, individuals may have minimized their psychological symptoms when asked by the researcher because of a desire to please her and appear as a 'good' patient. Without performance

validity testing and objective assessments, it is impossible to determine with reasonable certainty the validity of participants' self-report of symptoms. Lastly, the present study did not assess for co-occurring mental health conditions. Given the difficulty of PTSD recovery with certain co-occurring conditions, additional studies must consider evaluating WET's efficacy in populations with PTSD and comorbid serious mental illness (e.g. bipolar I/II, schizophrenia), obsessive-compulsive disorder, cognitive impairment, traumatic brain injury, and physical or cognitive conditions that inhibit ability to handwrite.

There appear to be some barriers that may limit the efficacy of WET across all cultures, communities, preferences, goals, values, and individual factors. Because of the requirement to turn in the writing account to the therapist, individuals who have a mistrust of medical providers, authority, or the government may have difficulty engaging in WET. Some individuals may prefer to process traumatic experiences orally through storytelling and sharing. Thus, individuals who prefer to have a more collaborative and directive processing experience may prefer other treatments available, which include a more intensive processing component, e.g. Prolonged Exposure, Cognitive Processing Therapy. Many patients have been socialized to expect therapy to be long-term and involve a lot of directive support from therapists. Individuals who prefer longer-term mental health care would not be the best fit for WET. Given differences in spirituality, collectivistic decision-making, and involvement of elders and community leaders, WET may not align with patients who seek "expert" opinions. Instead, individuals in WET are guided to come to their own realizations without therapist interference. More research is needed to evaluate Written Exposure Therapy across cultures, underrepresented groups, and communities.

The present study is the first of its kind that evaluated WET with considerable diversity with respect to trauma type. Previous study focused primarily on one type of index trauma (e.g. motor vehicle accidents, sexual assault, combat trauma). This study demonstrated that WET can be successfully applied to a variety of types of trauma, including those with low base rates. Given the approachability, tolerability, and success of WET across types of trauma, future approaches may consider revising WET to include stressful live events, that do not qualify as an index trauma, e.g. divorce, being fired from a job, transitioning out of the military, 'coming out' as LGBTQIA+.

WET provides a milder alternative to traditional cognitive behavioral therapy. Journaling is an approachable hobby that mental health gurus, popular psychology, and the lay community have embraced. For this reason, WET can sneak its way in as a more tolerable and welcomed evidence-based treatment under the guise of journaling. The familiarity alone allows patients an easier way to approach versus avoid details of their trauma. It should be then of no surprise that less people dropout of WET, between 6-25% (*present study*; Andrews et al., 2021; LoSavio et al., 2021; Park et al., 2021; Sloan et al., 2012, 2013, 2018), compared to 27-69% dropout rate for other trauma-focused psychotherapy in clinical settings (Schnurr et al., 2022; Edwards-Stewart et al., 2021; Hale et al., 2019; LoSavio et al., 2021). Given the ease and time required to successfully deliver WET, more providers can be equipped as a first-line treatment. WET appears to be a foot-in-the-door therapy. After some success, if more intensive mental health treatment is required, patients may be more amenable and open to additional treatment options. Many patients turn down therapy in favor of psychopharmaceutical options. WET, especially when adapted to a telehealth format, seems to be a promising treatment option for individuals with posttraumatic stress disorder.

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Appendix A
Demographic Questionnaire

1. Age
2. Gender
3. Race/ethnicity
4. Sexual orientation
5. Educational level
6. Country of citizenship/national identity
7. Are you currently residing in the state of Michigan?
8. Current employment/job title
    a. Please specify: _____
    b. Currently unemployed
9. Are you a student?
10. Are you serving or have previously served in the military?
    a. If yes, are you currently active duty?
        i. Which branch of the military are you serving?
        ii. If no, which branch of the military did you serve?
            1. What were your years of service?
11. Have you ever received any mental health treatment, e.g. therapy?
    a. If yes, are you currently receiving mental health treatment, e.g. therapy?
        i. What are you currently receiving treatment for?
12. Are you currently taking medications for any mental health diagnoses?
    a. If yes, which medications are you currently taking?
    b. If yes, when did you begin taking the medication?

Appendix B

Life Events Checklist for DSM-5 (LEC-5) with Criterion A

For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you're not sure if it fits; or (f) it doesn't apply to you.

1. Natural disaster
    a. Flood
    b. Hurricane
    c. Tornado
    d. Earthquake

2. Fire or explosion

3. Transportation accident
    a. Car accident
    b. Boat accident
    c. Train wreck
    d. Plane crash

4. Serious accident
    a. At work
    b. At home
    c. During recreational activity

5. Exposure to toxic substance (for example, dangerous chemicals, radiation)

6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)

7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)

8. Sexual assault
    a. Rape
    b. Attempted rape
    c. Made to perform any type of sexual act through force or threat of harm

9. Other unwanted or uncomfortable sexual experience

10. Combat or exposure to a war-zone
    a. In the military

b. As a civilian

11. Captivity
    a. Being kidnapped
    b. Abducted
    c. Held hostage
    d. Prisoner of war

12. Life-threatening illness or injury

13. Severe human suffering

14. Sudden violent death (for example, homicide, suicide)

15. Sudden accidental death

16. Serious injury, harm, or death you caused to someone else

17. Any other very stressful event or experience
    a. Briefly identify the event you were thinking of _____

If you have experienced more than one of the events in Question #1, think about the event you consider the worst event, which for this questionnaire means the event that currently bothers you the most. If you have experienced only one of the events in PART 1, use that one as the worst event. Please answer the following questions about the worst event (check all options that apply):

a. Briefly describe the worst event (for example, what happened, who was involved, etc.).

b. How long ago did it happen?

c. How did you experience it?
    i. It happened to me directly
    ii. I witnessed it
    iii. I learned about it happening to a close family member or close friend
    iv. I was repeatedly exposed to details about it as part of my job (for example, paramedic, police, military, or other first responder)
    v. Other, please describe _____.

d. Was someone's life in danger?
    i. Yes, my life
    ii. Yes, someone else's life
    iii. No

e. Was someone seriously injured or killed?
    i. Yes, I was seriously injured
    ii. Yes, someone else was seriously injured or killed
    iii. No

f. Did it involve sexual violence? Yes No

g. Did the event involve serious injury or death to a close family member or close friend? Y/N
    i. Was it due to some kind of accident or violence, or was it due to natural causes?
        1. Accident or violence
        2. Natural causes

h. How many times altogether have you experienced a similar event as stressful or nearly as stressful as the worst event?
    i. Just once
    ii. More than once (please specify or estimate the total number of times you have had this experience _____)

Appendix C

PTSD Checklist for DSM-5 (PCL-5)

Below is a list of problems that people sometimes have in response to a very stressful experience. Keeping your worst event in mind, please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past week.

In the past week, how much were you bothered by:

Not at all (0), a little bit (1), moderately (2), quite a bit (3), extremely (4)

1. Repeated, disturbing, and unwanted memories of the stressful experience?
2. Repeated, disturbing dreams of the stressful experience?
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?
4. Feeling very upset when something reminded you of the stressful experience?
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?
6. Avoiding memories, thoughts, or feelings related to the stressful experience?
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?
8. Trouble remembering important parts of the stressful experience?
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?
10. Blaming yourself or someone else for the stressful experience or what happened after it?
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?
12. Loss of interest in activities that you used to enjoy?
13. Feeling distant or cut off from other people?
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?
15. Irritable behavior, angry outbursts, or acting aggressively?

16. Taking too many risks or doing things that could cause you harm?

17. Being “super alert” or watchful or on guard?

18. Feeling jumpy or easily startled?

19. Having difficulty concentrating?

20. Trouble falling or staying asleep?

Scoring

PCL-5 weekly has a total score range of 0-80, with higher scores indicating greater PTSD symptom severity.

0-10: no or minimal symptoms reported
11-20: mild symptoms reported
21-40: moderate symptoms reported
41-60: severe symptoms reported
61-80: very severe symptoms reported

Appendix D
Patient Health Questionnaire–9 (PHQ-9)

Over the last two weeks, how often have you been bothered by any of the following problems?
Not at all (0), several days (1), more than half the days (2), nearly every day (3)

1. Little interest or pleasure in doing things

2. Feeling down, depressed, or hopeless

3. Trouble falling or staying asleep, or sleeping too much

4. Feeling tired or having little energy

5. Poor appetite or overeating

6. Feeling bad about yourself, or that you are a failure or have let yourself or your family down

7. Trouble concentrating on things, such as reading the newspaper or watching television

8. Moving or speaking so slowly that other people could have noticed? Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual

9. Thoughts that you would be better off dead or of hurting yourself in some way

10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?
Not difficult at all, somewhat difficult, very difficult, extremely difficult

Scoring
0: no depressive symptoms
1-4: mild
5-9: moderate
10-14: moderate
15-19: moderately-severe
20-27: severe

Appendix E
Insomnia Severity Index (ISI)

Please rate the CURRENT (i.e. LAST 2 WEEKS) SEVERITY of your insomnia problem(s).
None (0), Mild (1), Moderate (2), Severe (3), Very Severe (4)

1. Difficulty falling asleep

2. Difficulty staying asleep

3. Problems waking up too early None (0), Mild (1), Moderate (2), Severe (3), Very Severe (4)

4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?
Very satisfied (0) Satisfied (1) Moderately satisfied (2) Dissatisfied (3) Very dissatisfied (4)

5. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?
Not at all noticeable (0) A Little (1) Somewhat (2) Much (3) Very much noticeable (4)

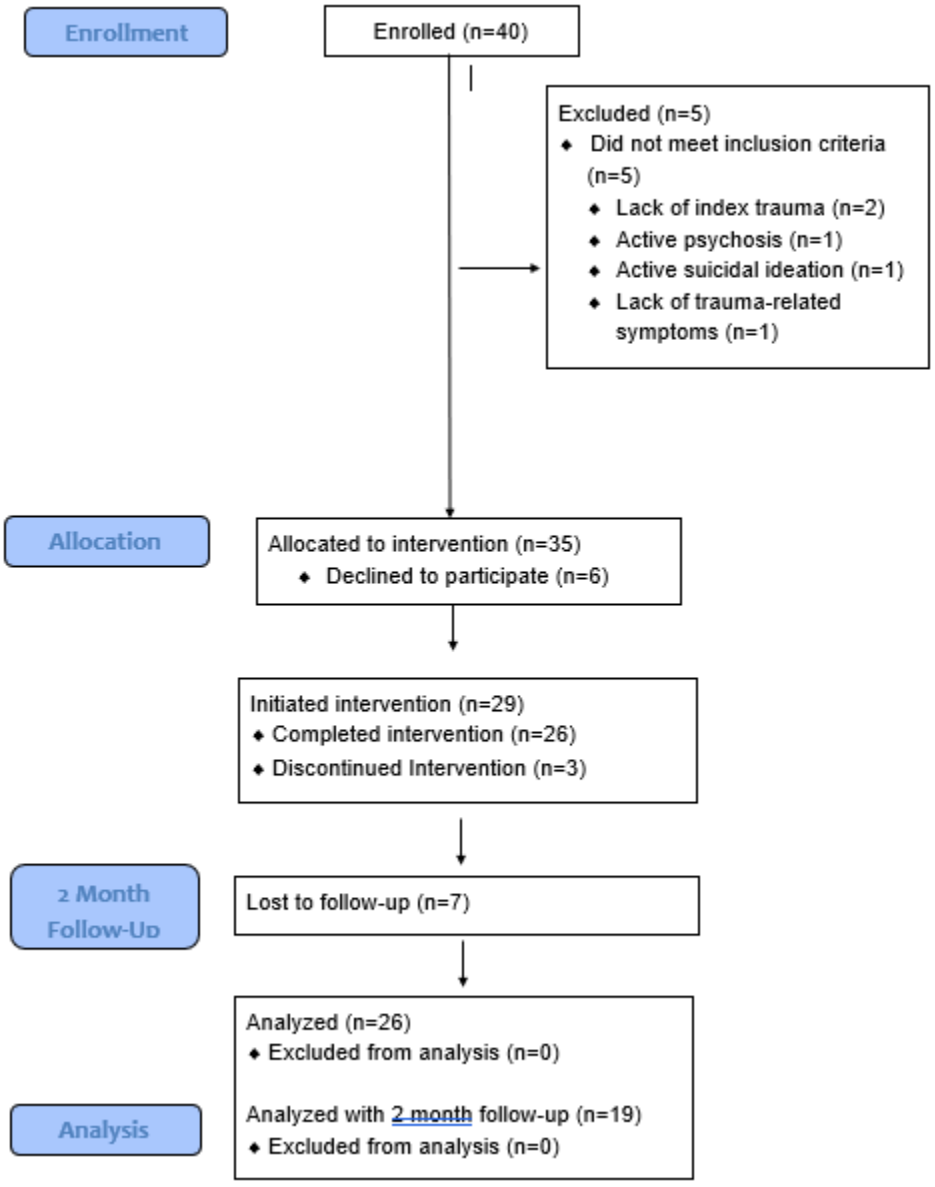
6. How WORRIED/DISTRESSED are you about your current sleep problem?
Not at all worried (0) A Little (1) Somewhat (2) Much (3) Very much worried (4)

7. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?
Not at all interfering (0) A Little (1) Somewhat (2) Much (3) Very much interfering (4)

Scoring
0-7: No clinically significant insomnia
8-14: Subthreshold insomnia
15-21: Clinical insomnia (moderate severity)
22-28: Clinical insomnia (severe)

Appendix F
CONSORT Diagram

Figure 1



Appendix G

Additional Questions: Inhibitory Learning

Before writing:

1. What are you most worried about will happen?

2. On a scale from 0-100, how likely does this seem?

After writing:

1. Did what you were most worried about occur? Yes or No

2. How do you know?

3. What did you learn?

Appendix H
HSIRB Approval Letter

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: January 7, 2021

To: Amy Naugle, Principal Investigator
Stephanie Haft, Student Investigator for dissertation

From: Barb Esch, Ph.D., Interim Vice-Chair

Re: WMU IRB Project Number 20-12-01

This letter will confirm that your research project titled "Determining the Effectiveness of Virtually-Delivered Written Exposure Therapy (WET) for Treatment of Posttraumatic Stress Symptoms" has been **approved** under the **full** category of review by the Western Michigan University Institutional Review Board (IRB). The conditions and duration of this approval are specified in the policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved.
You must seek specific board approval for any changes to this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study"***). Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the IRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: **December 15, 2021**