AN ASSESSMENT OF THE FLASH VERSION OF EYE MOVEMENT DESENSITIZATION AND REPROCESSING (EMDR) IN MEMORY DISTRESS: DOUBLE-BLINDED RANDOMIZED CONTROLLED TRIAL

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Abstract

Background: Exposures to traumatic events can cause post-traumatic stress disorder (PTSD). Eye Movement and Desensitization Reprocessing (EMDR) is a validated exposure-based psychological PTSD treatment. Although proven effective, exposure-based therapies can evoke upsetting memory reactions, resulting in distress and treatment dropout. Flash Technique (FT), a modification of EMDR, emphasizes indirect exposure to distressing memories by focusing on a Positive Engaging Focus (PEF) and has appeared effective in subjective distress reduction invoked by traumatic memories.

Method: This randomized controlled trial compared FT and EMDR efficacy delivered via online videos in reducing PTSD-related symptoms, depression, and anxiety. Informed written consent were obtained from 90 participants which were randomly allocated to the experimental (video instruction of FT) or control group (video instruction of EMDR). Self-report measures were taken at baseline, post-intervention, and 1-month follow-up. The study underwent REB approval and is registered with clinicaltrials.gov (registration #: NCT05262127). The primary outcome measure was self reported PTSD symptoms. Anxiety and depression symptoms were also included as secondary measurements.

Results: Linear mixed model analysis did not reveal a significant between groups difference for reducing PTSD symptoms at 1-month follow-up. A significant between-group difference was observed for state anxiety levels at post-intervention.

Conclusions: Findings suggest that FT is more effective in reducing state anxiety and depression. In addition, both online FT and EMDR videos have the potential to reduce PTSD symptoms. Future research is needed to replicate study findings and clarify the mechanism of FT.

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1. Introduction

1.1. Rationale

Exposures to events described as 'traumatic' are widespread (Kessler et al., 1995; Krinsley et al., 2003; van der Kolk et al., 2007) and some result in the diagnosis of Post Traumatic Stress Disorder (PTSD) (Bomyea et al., 2012; Olff et al., 2005). Whether or not the memories of traumatic events lead to diagnosable PTSD, disturbing memory retention can negatively impact one's physical and psychological health (Kolassa et al., 2010; Miao et al., 2018; Neuner et al., 2004). Thus, it can be helpful for innovative interventions to reduce memory-based disturbances to prevent future PTSD diagnoses and reduce disturbances related to traumatic memories.

While traumatic memory prevalence is hard to estimate, in an epidemiological study of 2991 Canadian adults, 76% of participants indicated that they were exposed to at least one traumatic experience of a severe nature (i.e., sexual assault, kidnapping) sufficient to cause a PTSD diagnosis (Van Ameringen et al., 2008). The prevalence of diagnosed PTSD is ~ 3.9% worldwide and >10% in Canada (Dückers et al., 2016; Koenen et al., 2017; Van Ameringen et al., 2008). Current pharmacologic treatments for PTSD and PTSD-like symptoms include antidepressants, sympatholytic drugs, antipsychotics, anticonvulsants, and benzodiazepines (Kelmendi et al., 2017; Lynn, 2010; Ravindran & Stein, 2009). Despite the variety of agents applied, the limited pharmacotherapeutic efficacy, especially with singular agents, has shifted attention to adjunctive behavioural interventions (Van Etten & Taylor, 1998; Merz et al., 2019).

In addressing traumatic memories, the most prominent methods include Cognitive Behavior Therapy (CBT), Cognitive Processing Therapy (CPT), Prolonged Exposure (PE), and Eye Movement Desensitization Reprocessing (EMDR) (Bisson et al., 2013; Cusack et al., 2016;

Taylor et al., 2003). Other psychological therapies include Narrative Exposure Therapy (NET), Stress Inoculation Therapy (SIT), Stress Management (SM), and Written Exposure Therapy (WET; Jericho et al., 2021).

In traditional EMDR, patients are instructed to follow the horizontal movement of the therapist's index finger while recalling vivid details of the traumatic (Houben et al., 2021). Attention to the finger movement during the recall of a traumatic memory supposedly reduces the intensity or intrusion of traumatic memories (Shapiro, 2001). EMDR is now supported for effectiveness with PTSD and, more recently, for other mental health conditions (e.g., generalized anxiety disorders and depression) (Gauhar, 2016; Gauvreau & Bouchard, 2008).

Nevertheless, it has been reported that traumatic memory confrontation can generate high arousal levels and emotional pain, sometimes resulting in dissociation and treatment dropout (Becker et al., 2004; Hembree et al., 2003; van Minnen et al., 2012). The novel variant of EMDR for PTSD being investigated in the proposed study is the Flash Technique (FT) (Manfield et al., 2017, 2021). In combination with typical EMDR procedures, FT emphasizes using a Positive Engaging Focus (PEF) while performing a right-hand-left hand alternate tapping of the knees instead of vividly recalling the traumatic memory (Manfield et al., 2017, 2021; Wong, 2019).

The COVID-19 pandemic has created the opportunity for the growth of scientific investigation on internet-based psychotherapies such as online CBT and EMDR. The efficacy of remote FT in reducing PTSD symptoms, depression, and anxiety has never been examined, even though certified EMDR clinicians have been utilizing this technique within their practice (Wong, 2019, 2021). Thus, the present study aims to investigate the efficacy of remote FT on several self-reported psychological measures.

1.2. Objective

Since FT is a novel EMDR variant, the related research is in its early stages. While previous findings suggest in-person FT efficacy in reducing the Subjective Units of Distress Scale (SUDS; Wolpe, 1969) levels caused by distressing memories (Manfield et al., 2017, 2021; Wong, 2019), the current study examines the efficacy of FT delivered via an online platform with a video of guidance and support from the treatment developers. The evaluation takes place within a double-blinded RCT, a considerably more rigorous assessment than any previously undertaken and includes a variety of self-reported measurements. This study aims to compare the efficacy of FT with EMDR regarding PTSD symptoms, anxiety, and depression by using a pre-taped video of these interventions.

2. Literature Review

2.1. Post-Traumatic Stress Disorder (PTSD)

According to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013), PTSD follows certain exposures to traumatic events. Based on the DSM-5 (APA, 2013) criteria, a person can receive a PTSD diagnosis following exposure to a traumatic event in one of the following ways: 1. directly experiencing the event(s), 2. witnessing, in person, the event(s) as it occurred to others, 3. learning that a relative or a close friend was exposed to the traumatic event(s), 4. Indirect exposure to aversive details of the trauma, usually in the course of professional duties (i.e., first responders collecting human remains). (See Appendix H for DSM-5 diagnostic criteria for PTSD)

Frequently related to psychological impairments, PTSD is associated with sleep disturbance, social avoidance, emotion regulation disruptions, and other negative outcomes (Boscarino, 2006; Coughlin, 2011). One frequent consequence of PTSD is an intrusive re-

experiencing of the traumatic event, which evokes physical and mental distress (Kleim & Ehlers., 2009; Sherman, 1998; Vieweg et al., 2006). As defined by the DSM-5, four distinct diagnostic clusters associated with PTSD are: 1. re-experiencing, 2. avoidance, 3. alterations in cognition and mood, and 4. heightened arousal and reactivity.

2.1.1. Pathophysiology of PTSD

Recent advancements in neurobiology and neuroimaging have led to conceptualizing PTSD as a state of hyper-responsiveness to threatening stimuli and a lack of inhibitory control over threat sensitization (Liberzon & Sripada, 2007; Pitman et al., 2001; Rauch & Shin, 1997). Neuroimaging findings have indicated the importance of activities in the amygdala, medial prefrontal cortex (mPFC), and hippocampus (Hughes & Shin, 2011; Shin et al., 2006). Notably, there have been findings of heightened amygdala activity and reduced ventromedial prefrontal cortex (vmPFC) activity during viewings of fearful faces in individuals diagnosed with PTSD compared to control subjects (Graham & Milad., 2011).

The amygdala has been referred to as a critical brain threat 'detector' (Adolphs et al., 1996; LeDoux, 2003; Shin & Liberzon, 2010) and has a central role in both threat learning and threat extinction (Alexandra Kredlow et al., 2022). It has been shown that amygdala activity can be downregulated by the prefrontal cortex (PFC) (Loos et al., 2020; Marek et al., 2019). In PTSD patients, an increased responsivity of the amygdala has been observed during symptomatic states as well as during the processing of trauma-unrelated affective information (Milad et al., 2009; Semple et al., 2000). Excess arousal of the amygdala could result in emotional responses based on fragments of information, rather than a complete perception of stimuli (Fernandez & Solomon, 2010)

Amygdala hypersensitivity and hyperactivity are associated with PTSD symptom severity, and decreased mPFC activity is correlated with PTSD symptom severity (Koenigs & Grafman, 2009). As such, the brain of a PTSD-diagnosed individual tends to exhibit a hyperactive amygdala which overwhelms the PFC (Terpou et al., 2019). Neuroimaging studies suggest that dysfunctional amygdala–vmPFC interactions could be at the core of PTSD symptoms (Parsons & Ressler, 2013)

Additionally, recent meta-analyses of fMRI-observed neurocircuitry related to PTSD indicated that PTSD is associated with reduced functional connectivity between the vmPFC, hippocampus, and amygdala (Hayes et al., 2012; Patel et al., 2012). Hippocampal hyperactivity, in particular, can lead to enhanced access to episodic and autobiographical memories leading to flashbacks and re-experiencing symptoms (Rauch et al., 2006).

2.1.2. Current PTSD Treatments

A variety of psychological and pharmacological treatment options are now available for PTSD. Recent literature suggests the following psychological treatments for PTSD: Trauma-Focused Cognitive Behavioural Therapy (TF-CBT), Eye Movement Desensitization and Reprocessing (EMDR), Cognitive Processing Therapy (CPT), Metacognitive Therapy (MCT), Prolonged Exposure (PE), Stress Inoculation Therapy (SIT), Stress Management Therapy (SMT), Narrative Exposure Therapy (NET), Written Exposure Therapy (WET), Non-directive Counselling, Psychodynamic Therapy and Present-Centered Therapy (Gerger et al., 2014; Jericho et al., 2021). Amongst the FDA-approved pharmacological treatments for PTSD are paroxetine (Paxil) and sertraline (Zoloft) (Kelmendi et al., 2017).

Most of the aforementioned psychological therapies include various forms of exposure to a traumatic event. However, dropouts from PTSD treatments reduce potential positive outcomes.

Several studies reflect a range of dropout rates from 30 to 60 percent for exposure approaches such as CPT and PE (Alpert et al., 2020; Najavits, 2015). In addition, although exposure therapies have demonstrated some of the most robust empirical support regarding PTSD treatment, researchers have noted drawbacks (Becker et al., 2004; Cook et al., 2017; Cloitre et al., 2011; van Minnen et al., 2012). For example, PTSD patients report high comorbidity rates (~ 80%) (Grinage, 2003; Kessler et al., 1995) in relation to the exposure treatments received. It is unsurprising that exposure therapy may be contra-indicated for patients with pre-existing suicidality, psychotic disorder, dissociative disorder, and comorbid anxiety disorder (Becker et al., 2004; Cook et al., 2017; van Minnen et al., 2012). Cloitre et al. (2011) have asserted that treatment approaches based primarily on exposures to traumatic events are inappropriate for "complex" PTSD (i.e., PTSD with features such as dissociative symptoms and dysregulation of affect and behaviour).

The concerns above regarding exposure therapies have resulted in innovative psychological modalities that can function adjunctively with existing PTSD psychological interventions. These new psychological interventions deviate from directly confronting traumatic memory (e.g., Compassion-Focused Therapy) in order to reduce disturbing arousal levels, through other methods, during the course of treatment (Beaumont et al., 2016; Hyer et al., 1996; Thrasher et al., 2010).

2.2. Eye Movement Desensitization and Reprocessing (EMDR)

EMDR is regularly used as a PTSD treatment and supported in numerous RCTs (Acarturk et al., 2015; Carletto et al., 2016; de Jongh et al., 2013). Depending on the intensity and nature of the trauma, one session of EMDR can range from 60-90 minutes per patient, with each session divided into the eight phases listed below (APA, 2013).

1. **History taking:** The therapist obtains the client's background information such as medical history, psychotherapy experiences, and somatic symptoms. Depending on the client's stability and goals, the suitability of EMDR treatment is assessed. The therapist provides clear and accurate information regarding EMDR and communicates possible treatment outcomes. Before initiating the next phase, the therapist identifies treatment targets, including memories, current triggers, and/or future goals.
2. **Preparation:** The client is instructed on the treatment protocol and practices engaging in bilateral eye movements before initiating treatment. The therapist ensures the client has adequate information about treatment and its effects. Setting reasonable expectations and educating the client on their symptoms is another goal of the preparation phase.
3. **Assessment:** The memory is activated, and different aspects of the memory processing are assessed and brought to the client's attention by its primary elements: image, cognition, affect, and body sensations. Using a Subjective Unit of Distress Scale (SUDs), the client expresses how disturbing their traumatic memory is from a scale ranging from zero to ten. The client is also asked to identify positive cognitive beliefs (e.g., I am lovable, or I am successful) that will be used in later stages.
4. **Desensitization:** The client is instructed to focus on the traumatic memory and initiate bilateral eye movements while vividly recalling the memory. The simplest method involves moving the fingers back and forth in front of the client's face after instructing them to follow the movement with their eyes. After 20-30 seconds of horizontal movement of fingers, the therapist stops, and the client is asked to take a deep breath and provide feedback on their disturbance. Depending on the intensity of the trauma, the

therapist should adjust the length and the number of eye movement sets. This phase ends when the initial SUDs level drops to zero, as reported by the client.

5. **Installation:** The installation phase refers to purposefully thinking of the target memory and a positive cognition (e.g., I am lovable, or I am successful) while experiencing dual-attention stimulation. The client also focuses on generalizing positive EMDR effects with associated memories.
6. **Body scan**: The therapist asks the client to notice any residual tension caused by the traumatic memory during the body scan phase. These tensions could be addressed during the next treatment session.
7. **Closure:** The therapist ensures the client is stabilized via various self-control techniques (i.e., breathing techniques). If the memory does not get fully processed, the therapist would mention that processing may continue after the session, and it's beneficial if the client maintains a journal related to their sensations. Other treatment modalities could be suggested if no effects are seen throughout the first session.
8. **Reassessment:** The client's treatment effect is assessed (i.e., reassessing memory from the last session). The client's journal might also be reviewed in order to evaluate the effects of the previous treatment session.

During EMDR administration, clients are encouraged to recall all the visual images and negative beliefs regarding their traumatic memory while engaging in bilateral eye movements. It has been observed that in clients with high distress levels during the preparation phase, evoked distress can obstruct treatment continuation (Manfield et al., 2017, 2021). As a result, an EMDR approach which is less emotionally arousal, especially in the desensitization phase is deemed desirable.

2.2.1. Efficacy of EMDR

Studies have supported the efficacy of EMDR for multiple disorders, including generalized anxiety disorder (Gauvreau & Bouchard, 2008), panic disorder (Fernandez & Faretta, 2007; Goldstein et al., 2000), phobia (de Jongh et al., 2002), depression (Sepehry et al., 2021), substance use disorders (Pilz et al., 2017), sexual dysfunction (Wernik, 1993), chronic pain (Grant & Threlfo, 2002), and phantom limb pain (Schneider et al., 2008). EMDR has gained significant attention since its inception and is regarded as a highly effective and empirically supported by the American Psychiatric Association (APA) (2013) and also recognized by the World Health Organization (WHO) (Born et al., 2013; Chen et al., 2015; Valiente-Gomez, 2017).

Several meta-analyses and systematic reviews have documented the effectiveness of EMDR in comparison with other psychological treatments for PTSD (Chen et al., 2015; Cusack et al., 2016; Davidson & Parker, 2001; Ehring et al., 2014; Forman-Hoffman et al., 2018; Ho & Lee, 2012; Gerger et al., 2014; Jericho et al., 2021; Khan et al., 2018; Lewey et al., 2018; Mavranezouli et al., 2020; Seidler & Wagner, 2006). Some of these meta-analyses (Cusack et al., 2016; Forman-Hoffman et al., 2018; Lewey et al., 2018) have concluded that TF-CBT is superior in efficacy to EMDR in reducing PTSD symptoms. Contrary to the statement above, other reviews indicated that EMDR was superior to TF-CBT in reducing PTSD-specific symptoms and anxiety (Chen et al., 2015; Ho & Lee, 2012; Khan et al., 2018). Another meta-analysis by Bisson et al. (2013) concluded that EMDR and TF-CBT were the most effective therapies in reducing PTSD symptom severity but found no significant differences between TF-CBT, EMDR, and Stress Management approaches in reducing PTSD symptom severity at post-intervention.

Contrary to the meta-analyses mentioned above, Gerger et al. (2014) reviewed 66 trials and found that no superior approach amongst multiple psychological therapies (CBT, Cognitive Therapy, EMDR, Exposure Therapy, Stress Management, and Supportive Therapies, and Other Psychological Interventions) for PTSD with a large heterogeneity in the results reviewed. A recent meta-analysis by Mavranezouli et al. (2020) aimed to review a larger pool of studies, judging the number of studies in the meta-analyses mentioned above as too few and representative of too narrow a range. The authors included 90 trials and concluded that EMDR, combined somatic/cognitive therapies, and TF-CBT were the most effective psychological therapies for PTSD.

De Jongh et al. (2019) summarized the literature regarding the status of EMDR as a PTSD treatment over the 30 years that elapsed since its conception in 1989. The authors included 17 EMDR studies categorized by study participants divided into separate groups of adults vs. children and adolescents (de Jongh et al., 2019). Out of 13 studies in the adult group, in six studies EMDR was found to be significantly more effective than TF-CBT, while in two studies TF-CBT was found to be significantly more effective than EMDR, and in five studies, there were no differences found in effectiveness between EMDR and TF-CBT. In addition, four studies were identified as RCTs on EMDR in children and adolescents, where it was indicated that EMDR was superior to the waitlist control conditions and was equal in efficacy to TF-CBT.

Interestingly, a recent meta-analysis by Jericho et al. (2021) reported that the effect sizes achieved with Metacognitive Therapy (MCT) were significantly larger than those found with EMDR for PTSD. Additionally, regarding the effects of EMDR on other mental health problems separate from PTSD, a meta-analysis by Cuijpers et al. (2020) concluded that there was insufficient evidence supportive of EMDR efficacy for mental health disorders.

In recent years, there has been an increased interest in investigating the efficacy of *online* EMDR therapy, either alone or in conjunction with other online psychotherapies (Kaptan et al., 2022; Lenferink et al., 2020). The COVID-19 pandemic has emphasized the importance of evidence-based *online* PTSD treatments as many clinicians were forced to deliver treatments via videoconferencing platforms, email, and audio calls.

While there have been several meta-analyses regarding the effects of online CBT for PTSD, there has been only one meta-analysis regarding the effects of online EMDR, where only one uncontrolled RCT was identified (Lenferink et al., 2020). This uncontrolled RCT by Spence et al. (2013) employed a 6-week intervention of online-delivered CBT combined with a web-based EMDR tool. Analyses revealed a statistically significant decrease in clinician-rated PTSD symptom severity post-treatment but no reduction in self-reported PTSD symptom severity (Spence et al., 2013). Given the limited investigations on online EMDR, exploring the efficacy of online delivery of EMDR is an important pursuit.

2.2.2 Mechanisms of EMDR

EMDR was initially developed by Francine Shapiro, who, in personal testing, found that lateral eye movements reduced the negative emotions associated with distressing memories (Shapiro, 1995). In a theory of adaptive information processing (AIP), she proposed that an innate information processing system registers new experiences and stores them in existing memory networks. AIP postulates that assimilation and integration of new information with currently held material leads to relief of emotional distress and the availability of personal material for future use (Shapiro & Maxfield, 2002). But if a traumatic memory is not processed, the AIP model suggests that initial perceptions and distorted thoughts or perceptions experienced at the time of the event are stored separately (Landin-Romero et al., 2018; Shapiro & Maxfield,

2002). A reduction in perceptual vividness and emotional reactivity to the disturbing memory is a goal of EMDR (Gunter & Bonder, 2009).

The memory reconsolidation effect in EMDR suggests that the aim of the bilateral stimulation is to access the traumatic memory and assimilate it with more adaptive memory networks and/or information to reduce distressing PTSD symptoms (Andrade et al., 1997; Chamberlin, 2019; Shapiro, 2001). In this way, EMDR results in desensitization and more complete processing of the traumatic memory. As a result, when the client is asked to simultaneously attend to the past traumatic memory and bilateral stimulation, a reduction of the vividness and emotion of the memory occurs, given there is competition for the limited working memory resources operating (Maxfield et al., 2008; Landin-Romero et al., 2018).

Amidst multiple theoretical explanations, traditional EMDR protocol remains controversial in terms of the determination of primary mechanisms (Greenwald, 1996; Schubert & Lee, 2009; Sikes & Sikes, 2003). For example, debates remain about whether the bilateral eye movements are the solely functional routes of eliciting dual attention and whether other methods such as hearing progressive rhythmic tones or tapping of thighs may also be effective (van den Hout et al., 2011; de Jongh et al., 2013).

2.3. Flash Technique

The Flash Technique (FT) is an EMDR variant designed to rapidly reduce disturbing memory-associated distress levels with more minimal subjective disturbances for clients than even traditional EMDR (Manfield et al., 2017, 2021). As a variant of EMDR, it has been taught to about 8000 licensed psychotherapists in workshop conditions during the last 5 years (L. Engel, personal communication, 2023). Thus, there appears to be a widespread perception of its

efficacy. Given this attention, measuring efficacy in a double-blind RCT is appropriate as there has been an enthusiasm about FT and a ‘reputation’ that can result in a placebo response.

2.3.1. FT Protocol

1. Choosing a disturbing memory

The therapist guides the client to identify or select a disturbing memory or image to address, referred to as the "target" throughout the protocol. Next, the client is asked to rate the subjective unit of distress on the SUDS that the target memory or image generates when they recall the traumatic memory. Then, they are instructed not to think about their target memory and are encouraged not to think of details nor remember vivid pictures/scenes.

2. Positive Engaging Focus (PEF)

Upon identifying a disturbing memory, the client is asked to choose a Positive, Engaging Focus (PEF), an imagined activity, animal, person, memory, or musical selection that provides an immediate experience of recreational pleasure (i.e., it's positive *and* engaging). PEF immersion is perceived as critical throughout the protocol, and the client is instructed to think of their PEF at all times. If a client thinks about their target memory, they are instructed to refocus on their PEF. If the client wishes to listen to a music selection (i.e., engage with auditory imagery), this can be used as a substitute for visual imagery.

3. Distraction component

Following the guidance of a therapist, clients are directed to tap one thigh and then the other simultaneously. The therapist instructs, “I am going to tap my thighs, and I would like you to copy my movements, tapping your thighs while focusing on the positive engaging focus you have identified'. Usually, the therapist converses with the client about their PEF while tapping to maximize engagement with the PEF.

4. Flash

The word "flash" prompts the client to blink three or five times rapidly. The therapist says "flash" periodically while tapping their thighs and encouraging the client to focus on their PEF. The instruction is: "When I say 'flash,' blink your eyes rapidly three, four, or five times while immersing in your PEF."

5. Check-In

Check-in periods occur after about six sets of rapid blinking, thigh tapping, and PEF focus. During these check-in periods, the client is asked to stop tapping and blinking and avoid thinking directly about the target memory. Instead, they are instructed to "check in" to notice any change that may have occurred in the level of disturbance. The sequence of tapping and six sets of triple blinks followed by a "check-in" phase is repeated as needed until the disturbance is significantly decreased or the intervention does not reduce the disturbance. A suggestion of modifications such as using another PEF or employing different psychotherapeutic methods would be appropriate if no results are obtained.

6. Measurement

SUDS levels are assessed until the levels appear substantially reduced. If the second check-in results in no change, the therapist should consider whether the PEF selected is weak (i.e., not sufficiently engaging). If so, it can be strengthened or altered. If the disturbance appears to be alleviated and the client is less aroused, the therapist explores if there are other aspects of the target memory that could be processed.

2.3.3. FT Efficacy

FT is characterized as a low-intensity intervention with apparent reductions in subjective disturbances associated with traumatic memories. In addition, it has been demonstrated to be

tolerable to clients of all ages (Manfield et al., 2021). The first report on FT explained its protocol and gave four case examples of past clients with PTSD diagnoses. The authors mentioned a significant drop in the SUDS levels post-intervention, and results remained after 1 week (Manfield et al., 2017). The second report on FT involved the effects of a one-hour webinar on FT and two guided 15-minute FT interventions delivered by the FT developers to 98 psychotherapists who had experienced working with COVID-19 patients (Manfield et al., 2021). Analysis revealed a statistically significant decrease in SUDS scores post-intervention.

A recent study by Yasar et al. (2021) investigated the effects of one FT session (90 – 120 minutes) on 36 participants and found a statistically significant reduction in PCL-5 scores 1 month after the session. Other measures used in the study were SUDS and Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997), and analyses indicated a statistically significant decrease in both scales as well (Yasar et al., 2021). In a randomized controlled trial by Yasar et al. (2022), 39 volunteers who had been in car collisions were randomized either to 3 sessions of FT (ranging from 60 – 75 minutes), or 3 sessions of Stress Management Module psychoeducation. Analyses revealed a statistically significant reduction in anxiety on Depression-Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995) and IES-R intrusion and avoidance.

A study conducted by Brouwers et al. (2021) investigated the effects of one session of FT compared to abbreviated EMDR on the emotionality and vividness of a disturbing memory. Both interventions were 8 minutes long and delivered online. The authors concluded that there was no significant difference between FT and abbreviated EMDR in terms of reductions in emotionality and vividness reductions; however, FT was deemed more pleasant by participants.

2.3.4 Mechanisms of FT

There are several differences between FT and standard EMDR. In all therapeutic trauma approaches, including EMDR, emphasis on exposure is expected. As mentioned above, some traumatic memories can be disturbing enough that exposure results in dissociation and treatment termination (Becker et al., 2004; Cook et al., 2017; van Minnen et al., 2012). The distinguishing factor between FT and EMDR is that traumatic events are recalled in FT with less attention to detail (Manfield et al., 2017, 2021; Wong, 2019). During traditional EMDR, the client is instructed to focus on their negative thoughts and memories in detail, emphasizing exposure to vivid imaginary or auditory components of the traumatic memory (Shapiro, 1995).

The developers of the FT have explained the mechanisms behind this modality as "subliminal exposure" to a memory in which the client does not have enough time to consciously think of their traumatic memory. The developers explained FT by referencing prior literature on fear-processing pathways when confronted with external stimuli. Manfield et al. (2017) suggested that the same effects of subliminal exposure to external subliminal stimuli can be expected for stimuli originating from traumatic memories. The term "fear" mentioned throughout the explanation of the mechanisms of FT, refers to the emotional response that one experiences subsequent to recalling a traumatic memory.

2.4. Fear Processing Mechanisms:

To adaptively process and store memory, integration of somatic, cognitive, and emotional aspects of an experience (as a whole) is necessary (Shapiro, 1995). Neurophysiological findings on disrupted memory processing have resulted in insights into the neural circuitry of fear processing (Fernandez & Solomon., 2010). When sensory information enters the central nervous system (CNS), it proceeds through the thalamus, and is relayed onwards to the amygdala and

PFC (LeDoux, 1996). When information reaches the amygdala, an immediate, autonomic response is triggered based on stimulus features (Morris et al., 2015; Ohman, 2005).

Then the amygdala becomes further activated by the arrival of sensory and semantic information pre-processed through the PFC (LeDoux, 2007; Siegel et al., 2011). This activation is related to the *conscious* processing of fear and is delayed when compared to the first activation of the amygdala (which is *unconscious and happens immediately after the presence of a fearful stimulus*). As a result, a rapid response to fear stimuli is first achieved through the amygdala and other subcortical brain regions, potentiating fast reactions to potentially harmful stimuli (Carlsson et al., 2004; Morris et al., 2001).

Functional MRI studies have demonstrated that humans show robust increases in the activity of the amygdala and the dorsal anterior cingulate during fear acquisition and expression (Graham & Milad, 2011; Greco & Liberzon, 2016). The fast, unconscious reaction of subcortical regions results in immediate autonomic responses, which, although understudied, may be key to understanding fear, trauma, and PTSD.

The finding that fear learning can occur outside conscious awareness led to hypotheses that fear *habituation* can also happen via unconscious routes (LeDoux, 2003, 2014; Siegel & Weinberger, 2009). Thus, it has been hypothesized that if fear responses can be acquired without full awareness, diminished fear responses can be achieved without full awareness (Siegel & Warren, 2013). One approach to assessing whether unconscious fear habituation occurs has involved assessing a technique termed Very Brief Exposure (VBE) (Siegel et al., 2013). VBE technique research has been also used to describe the mechanisms underlying FT (Manfield et al., 2017, 2021) and thus are worthy of review.

2.4.1. Very Brief Exposure (VBE):

In a series of studies by P. Siegel, habituation in the absence of conscious recall was directly tested with pre-assessed individuals inclined to react phobically to spiders. Very Brief Exposure (VBE) was postulated as an effective approach to fear reduction despite the absence of recall of the feared stimuli exposure (Siegel & Ghallagher, 2015; Siegel & Warren, 2013; Siegel & Weinberger, 2009; Siegel et al., 2011, 2017). During VBE studies, participants in the experimental group were exposed to images presented for periods so brief (33.4 ms stimulus duration) that they were unable to consciously recognize and recall the 'flashed' image.

The design of all studies concerning VBE included a control group that takes a Clearly Visible Exposure (CVE) approach. Members of the CVE group saw the pictures of spiders for more extended periods of time (117-ms duration), sufficient for recognizing the fear-stimulating pictures. After participants in both groups (VBE and CVE) viewed spider images, they were subsequently exposed to and asked to approach a live, caged tarantula. The previously fearful participants in the VBE group could, in comparison with the CVE group, more proximally approached the tarantula after very brief image exposure, demonstrating a fear reduction effect involving potential unconscious processing.

Both the PFC and the subcortical structures associated with emotion/fear (including the amygdala, thalamus, and hippocampus) were theorized to be initially activated in both VBE and CVE groups. Despite the initial activations, Siegel et al. (2017) hypothesized that reductions in amygdala activity would only be observed over time in the VBE group. Consistent with their hypothesis regarding the VBE group, fMRI data collected by Siegel et al. (2017) indicated that while the brain registers the 'fearful' stimuli, the amygdala seems to have insufficient time to intensify its activation.

Although the amygdala activation is reduced, the PFC remains activated in the VBE group. Thus, the parts of the PFC that support emotion regulation, the ventral prefrontal cortex (vPFC) and dorsolateral prefrontal cortex (DLPFC), are more strongly activated in the VBE group compared to CVE counterparts. Both regions (DLPFC and vPFC) are associated with attentional control and fear inhibition, respectively.

fMRI data taken from the same study mentioned above by Siegel et al. (2017) regarding the CVE group showed that regions of the brain associated with vision (the occipital and parietal areas) were activated since the spider-phobic subjects could see the spiders and recall their recognition. In addition, the subcortical structures associated with emotion/fear, including the amygdala, thalamus, parahippocampal gyri, and hippocampus, were more intensely activated (than in the VBE group). More intensive activation of the amygdala and the relative deactivation of the PFC indicated the subjects were engaged in a hyperarousal fear response, with the PFC unable to provide emotion regulation in relation to the amygdala.

2.5. Primary Research Question

The present study examines the efficacy of online FT in reducing PTSD symptoms, and the only variable that is different between the two groups is the presence of PEF. Since research on FT is minimal and has been primarily investigated in in-person settings, the study hypotheses have been inspired by prior literature on the online delivery of standard EMDR and other psychological modalities for traumatic memories. The majority of studies on the effects of EMDR include a measurement of PTSD symptoms (Khan et al., 2018; Lewey et al., 2018), and the same applies to the one online EMDR study conducted by Spence et al. (2013) on online CBT combined with EMDR. Measuring PTSD symptoms would broaden the possibility of using video-based FT and/or EMDR as adjunctive treatments for PTSD.

2.5.1. Hypothesis 1

The FT intervention will be significantly more effective than EMDR in reducing self-reported PTSD symptoms at the 1-month follow-up. In other words, there will be a significant between-group difference in PTSD symptom levels at 1-month follow-up.

2.6. Secondary Research Questions

A common result of trauma and traumatic memories is depression (O'Donnell et al., 2004; Brewin, 1999), and investigations on TF-CBT generally analyze the effects of the intervention(s) on depressive symptoms (Khan et al., 2018). As a result, investigating the effects of online FT and EMDR on depression levels is deemed important. Another common adverse effect of traumatic memories is uncomfortable emotional arousal, especially increased anxiety levels (Wald & Taylor, 2008). Since FT has been described as more tolerable for clients with PTSD, this study aims to extend the effects of EMDR and FT on both anxiety and depression.

2.6.2. Hypothesis 2

The FT intervention will be significantly more effective than EMDR in reducing self-reported depressive symptoms at the 1-month follow-up, hypothesizing a significant between-group difference.

2.6.3. Hypothesis 3

The FT intervention will be significantly more effective than EMDR in post-intervention reducing self-reported state anxiety symptoms. In other words, there will be a statistically significant between-groups difference in state anxiety scores at post-intervention.

2.6.4. Hypothesis 4

Members of FT intervention will report a significantly lower state anxiety symptoms compared to EMDR at 1-month follow-up, emphasizing a significant between-group difference.

2.6.5. Hypothesis 5

Members of FT intervention will report a significantly lower state negative affect and higher positive affect compared to EMDR at 1-month follow-up, emphasizing a significant between-group difference.

3. Methods

3.1. Sample Size and Participants

3.1.1 Sample Size Estimation

With the assistance of the Institute for Social Research at York University, the sample size was calculated for a 2-way repeated measures analysis of variance (ANOVA). Sample size calculation was conducted using G*Power 3.1.9.4 (Faul et al., 2009). The options in G*Power 3.1.9.4 were as follows: (1) test family – "F-test", (2) statistical test – "ANOVA: Repeated measures, between and within", (3) Type of power analysis – "A priori: Compute required sample size – given α, power, and effect size". An a priori power analysis was completed using a moderate effect size ($f = 0.25$), 0.8 power ($1 - \beta$ error probability), and an alpha error probability at $p < .05$. G*Power 3.1.9.4 determined that a minimum sample size of 37 participants per group provides ample testing power. Considering a 20% over-sampling to account for potential participant drop-out and experimental error ($n = 7.4$), a proposed minimum sample size of $n = 44$ per group is deemed adequate to detect statistically significant within-groups, between-groups, and group x time interactions based on a repeated measures design.

3.1.2 Inclusion Criteria

Participants must have passed the CloudResearch platform's standardized assessment of *attention*, *engagement*, and *language comprehension* for study participation. On the platform, language comprehension is assessed by identifying synonyms, reading articles, and answering

comprehension questions. Additional attentional competencies are assessed by evaluating factual correctness in answers to demographic questions (e.g., "I work 28 hours in a typical workday"). In addition, the CloudResearch platform screening is based on a recorded history of eliciting high-quality data in prior study participation.

In the investigator-based criteria, participants must have been: 1) between 25 and 60 years of age and maintained residence in the United States or Canada; 2) were able to identify a memory regarding an event that occurred more than 2 years ago that has not been since repeated; (2) identified the memory as moderately upsetting, or more than moderately upsetting when it happened; (3) clearly recalled the identified memory; (4) found the memory as still moderately upsetting, or more than moderately upsetting, when recalled; (5) identified the memory as not tied to an earlier memory that was equally or more disturbing.

3.1.3 Exclusion Criteria

Individuals who disclosed a past or present self-reported diagnosis of Bipolar Disorder, Borderline Personality Disorder, Obsessive-Compulsive Disorder, Schizophrenia, or Substance Abuse/Addiction in the past three months were excluded. In addition, Individuals who disclosed having suicidal ideation or who have attempted suicide in the six months prior to the start of the study were ineligible to partake in the study.

3.2. Recruitment and Randomization

The study underwent REB approval and is registered with clinicaltrials.gov (registration #: NCT05262127). Participants were recruited from an online platform (CloudResearch) (www.cloudresearch.com). After consultation with the CloudResearch team, a streaming recruitment method was employed where the study description was available for 10 to 15 minutes duration prior to a participation-designated interview time slot. This provided potential

participants time to enter the study description link, read a description of the study format, and pass the eligibility criteria before proceeding further with study participation.

The additional steps to 'streaming recruitment' require specifying a "Total Number of Survey Participants" and limiting how many participants could access the Zoom link for the experiment at a given time. The total number of participants accessing the meeting was set at n = 10. If more than one subject entered the Zoom waiting room, the principal investigator entered the first participant to the meeting, while the remaining waiting room occupants were thanked for their interest and prompted to leave the meeting.

3.3. Recruitment Plan and Informed Consent

Potentially eligible participants were pre-screened, and eligibility assessed. After eligibility screening, they were invited to a Zoom meeting during which the study conductor (Nazanin Babaei) explained study procedures. If the participant was eligible and interested in participating, informed written consent was obtained prior to randomization. The principal investigator performed electronic randomization with CloudResearch IDs blindly assigned to experimental and control group participants. The Study ID information was recorded on an excel sheet as well as on the SurveyMonkey platform. After a participant completed baseline questionnaires, blinded research assistants played the pre-taped version of the video of either FT or EMDR instructions assigned to the participant in accordance with the randomization plan. According to the Consolidated Standards of Reporting Trials (CONSORT) Statement 2010, it is preferable that the primary assessor be unaware of the random allocation of participants even if they are not involved in care providing (Schulz et al., 2010). However, in the present study, the primary investigator performed the randomization; hence, they were aware of the randomized allocation.

3.4. Procedure

The present study required two commitments from participants. The two commitment points are 4-weeks apart. The first interaction included gaining consent, completing pre-intervention psychometric questionnaires, watching a 15-minute video, and completing immediate post-treatment questionnaires. Subsequently, participants were provided with a debriefing statement. The second interaction with participants was a follow-up of intervention outcomes four weeks after the initial interaction which examined the long term effect of the intervention. A SurveyMonkey link was sent out to participants via the CloudResearch platform, which included all primary and secondary outcome measures.

3.5. Interventions

3.5.1. Experimental Group (FT)

After a participant consented and completed demographic and baseline psychometric questionnaires, a 'blinded' research assistant shared their computer screen to play a pre-taped video of FT containing detailed instructions by two licensed EMDR practitioners. Participants were asked to follow the instructions with their full attention in a distraction-free environment. If a participant was assigned to the experimental condition, the video instructor invited them to perform the following tasks (Table 1).

Table 1.

Experimental Group Protocol (FT)

Disturbing memory choice	Participants were guided to select a disturbing memory, referred to as the "target". They were next asked to rate the disturbance experienced with target recall on the SUDS. They were instructed to not think further about the target and to not recall target-associated details involving reactive disturbance or anxiety.

Positive Engaging Focus (PEF)	After target identification, the participant was asked to choose a Positive Engaging Focus (PEF) (an imagined activity, animal, person, memory, or musical selection associated with immediate gratification). PEF immersion was central, and the participant was instructed to think of the PEF whenever possible.
Distraction component	Per video instructions, participants tap one thigh and then the other at a relaxed pace. The video instructor stated that "I am going to tap my thighs, and would like you to copy my movements, tapping your thighs while focusing on the PEF identified'.
Flash	Per video instructions, the word "flash" prompted participants to blink several times rapidly. "Flash" was re-stated periodically while thighs were tapped and while participants focused on the PEF. The verbal instruction was: "When I say 'flash,' blink your eyes rapidly while immersing in your PEF."
Check-In	Check-in occurred between six sets of blinking, tapping, and PEF focus. During check-in periods (between sets), the participant was asked to stop tapping and blinking but to not think directly about the target. They were periodically instructed to "check-in" to notice any change in target-associated SUDS levels.

At the end of the video, the instructor asked participants to rate their target memory again on the SUDS once more. The assigned research assistant collected SUDS reports at baseline and post-intervention.

3.5.2. Control Group (EMDR)

Members of the control group were exposed to a pre-taped video following the instructions of the same licensed EMDR practitioners as the experimental group. Similar to the experimental group, participants were instructed to identify a traumatic target memory. However, the concept of PEF was not mentioned in the video nor included in the protocol. The instructions directed participants to focus on the traumatic memory and recall as many details as possible throughout the experiment. The duration of tapping and blinking was identical to what was done in the experimental group, and SUDS measurements were taken in the same manner. The control group protocol closely resembled phase 4 (desensitization) of the traditional EMDR format,

where a client generates back-and-forth eye movements while focusing on vivid recalls of the traumatic event.

Table 2.

Control Group Protocol (EMDR)

Choose a disturbing memory	Participants guided to select a disturbing memory, referred to as the "target". They were next asked to rate the disturbance experienced with target recall on the SUDS. Participants were instructed to think about all aspects of the target memory and its details throughout the video.
Distraction component	Following the video guidance, participants were directed to tap one thigh and then the other at a relaxed pace. The video instructor stated that "I am going to tap my thighs, and I would like you to copy my movements, tapping your thighs."
Flash	The word "flash" prompted the participant to quickly blink several times. The guide said "flash" periodically while blinking and tapping thighs. The verbal, scripted instruction was: "When I say 'flash,' blink your eyes rapidly three, four, or five times."
Check-In	Check-in occurred after six sets of rapid blinking and thigh tapping. During check-in periods, the participant was asked to stop tapping and blinking and not think further about the target. Instead, they were instructed to "check-in" to notice any change that in their SUDS levels.

At the end of the video, the instructor asked participants to rate their target memory again on the SUDS. The assigned research assistant collected SUDS reports at baseline and post-intervention.

3.6. Outcome Measures

All outcome measures were self-reported questionnaires. The SurveyMonkey platform was used to create the questionnaires which were sent out to participants via electronic links so they could fill out the following self-reported measures virtually. The study team had access to the answers which was saved on the SurveyMonkey platform.

3.6.1. PTSD Checklist for DSM-5

The primary outcome measure is the PTSD Checklist for DSM-5 (PCL-5). It is a 20-item self-report instrument measuring the presence and severity of PTSD symptoms. The PCL-5 has demonstrated good internal consistency ($\alpha = 0.94$) and test-retest reliability ($r = 0.82$) (Blevins et al., 2015; Wortmann et al., 2016). Each item is rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely), indicating how much each symptom has bothered the respondent in the past month. Higher scores indicate more severe PTSD-like symptoms, and a score higher than 31- 33 alerts to a possible PTSD diagnosis.

3.6.2. State-Trait Anxiety Inventory (STAI)

The State-Trait Anxiety Inventory Form Y-1 (State subscale; S-STAY) is a 20-item self-report scale that measures subjective tensions, apprehension, nervousness, worries, and physiological arousal. The customary cut-off score for probable clinical levels of anxiety is 40 and above. Trait anxiety is measured by State-Trait Anxiety Inventory Form Y-2 (Trait Subscale; T-STAY), which is a 20-item self-report scale. The trait scale measures how people generally feel and is among the most widely used measures for assessing anxiety in clinical and experimental settings. The STAI has demonstrated good internal consistency, with reliability coefficients ranging from 0.86 to 0.95 in various populations, including college students, working adults, and military recruits (Metzger, 1976; Spielberger, 1983).

3.6.3. Patient Health Questionnaire (PHQ-9)

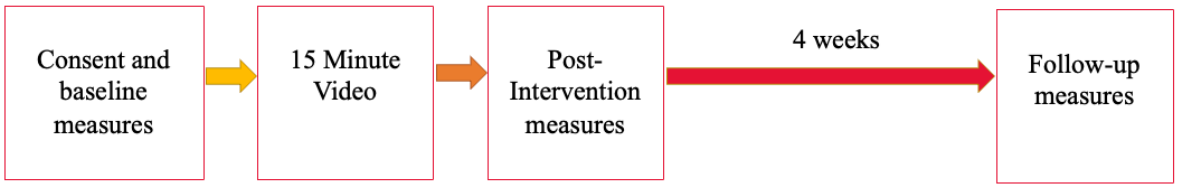
Patient Health Questionnaire (PHQ-9) is used to assess depression levels. This questionnaire has 9 items rated on a five-point Likert scale from 0 (not at all) to 4 (nearly every day). Respectively, expected ranges for non-minimal, mild, moderate, moderately severe, and severe depression are 0-4, 5-9, 10-14, 15-19, and 20-27. PHQ-9 has demonstrated a high degree of internal consistency ($\alpha = .88$) and rest-retest reliability ($r=0.94$) in primary care patients (Zuithoff et al., 2010).

3.6.4. Positive and Negative Affect Schedule (PANAS)

Positive and Negative Affect Schedule (PANAS) is a 20-item questionnaire that measures positive (10 items), and negative (10 items) affect. Each item is scored with a 5-point Likert scale ranging from 1 (not at all) to 5 (very much). Higher scores on a positive scale translate to higher levels of positive affect, whereas lower scores on negative affect suggest low levels of negative affect. This reliable and valid self-report scale is brief, easily administered, highly internally consistent and stable at appropriate levels over a 2-month time period (Watson et al., 1988).

Figure 1.

Visual Representation of Study Procedure



Baseline measures: STAI-S, STAI-T, PCL-5, PHQ-9, PANAS

Post-Intervention measures: STAI-S

Follow-up outcome measures: STAI-S, STAI-T, PCL-5, PHQ-9, PANAS

3.7. Statistical analysis

In line with the CONSORT Statement 2010, the primary investigator who conducted the statistical analysis was masked to the categorization of the two groups guided by consulting statisticians, Study outcomes will be presented as means and standard deviations for continuous variables and frequencies and percentages for categorical variables. To evaluate possible between-groups differences at baseline (i.e., pre-intervention) in demographic and psychological variables, independent sample's t-tests (Welch-adjusted in case of unequal variances) were employed for continuous variables, and Chi-square tests of independence were employed for categorical and ordinal variables. Subsequently, to evaluate differences in study outcomes on primary (PCL-5) and secondary outcomes (PHQ-9, STAI-S, STAI-T, PANAS-P, PANAS-N) on a between and within groups bases, Linear mixed model (LMM) analyses for repeated measures were employed for each study outcome. LMM evaluated the effects of group and time as fixed effects, along with their interaction (group × time). Statistically significant group × time interactions, were then followed by simple main effect evaluation. Cohen d effect sizes for between-group and within-group comparisons were also be calculated according to procedures outlined in Lakens (2013).

3.7.1 Missing data

In the context of the present study, missing data would occur if study participants dropped out prematurely before the 1-month follow-up assessment or missed a portion of the 1-month follow-up assessment (i.e., item-level missing data). Missing observations, in addition to specific reasons for dropouts are monitored and presented as part of the associated study flow diagram (Figure 2). Compared to the classical repeated measures ANOVA, LMM employs a Restricted Maximum Likelihood (REML) strategy to estimate study parameters. REML

produces unbiased estimates of study parameters if the missing observations are missing at random.

4. Results

4.1. Participant flow

Figure 2 presents the flow of participants through experimental phases. Of the 429 potentially eligible participants, 339 participants were ineligible, as they did not meet the inclusion criteria. These included: having clinically diagnosed Bipolar, Borderline Personality, Obsessive Compulsive, Schizophrenia, and/or Substance Abuse disorders in the past three months and having had suicidal ideation the past six months. Altogether, a total of 90 participants met the inclusion criteria, were randomly assigned to the FT or EMDR intervention, and completed baseline evaluations, which included PCL-5, PHQ-9, STAI-S, STAI-T, and PANAS questionnaires. At post-intervention - after the 15-minute intervention, all 90 participants completed the post-intervention assessment, which included STAI-S and a series of questions regarding the perceived effects of the intervention. At 1-month follow-up, the FT intervention group had a retention rate of 89% (40/45), compared to an 84% retention rate (38/45) in the active EMDR comparison group. At 1-month, all remaining 78 participants completed the 1-month follow-up PCL-5, PHQ-9, STAI-S, STAI-T, and PANAS assessments.

4.2. Descriptive Statistics

Data obtained from participants during the study were documented as electronic case reports on the SurveyMonkey platform. Demographic and psychological characteristics of all study participant is summarized in Table 3. There were no statistically significant between-group differences in either the demographic (i.e., age, gender, education, and ethnicity) or psychological characteristics at baseline.

4.3. Missing Data Handling

Out of the 90 participants randomized to the either FT or EMDR groups, 12 participants dropped out before 1-month follow-up. Out of the remaining 78 participants who completed the 1-month follow-up, 17 did not complete the 1-month follow-up assessments completely (i.e., item-level missing data). This precluded calculation of total questionnaire scores for these participants. Individual item-level missing data ranged between 5-45 percent of individual scale items, with 15 participants missing between 1-3 items (5-15%) within STAI-S, STAI-T, PANAS-P, and PANAS-N scales at 1-month follow-up and two participants missing between 30 to 45 percent on the STAI-T. Participants who had missing observations (i.e., those with overall and item-level missing data) were not systematically different than those who had completed data in terms of their baseline PCL-5, PHQ-9, and demographics, suggesting that missingness was random.

Figure 2

Flow diagram of participant eligibility assessment, intervention, and follow-up evaluation

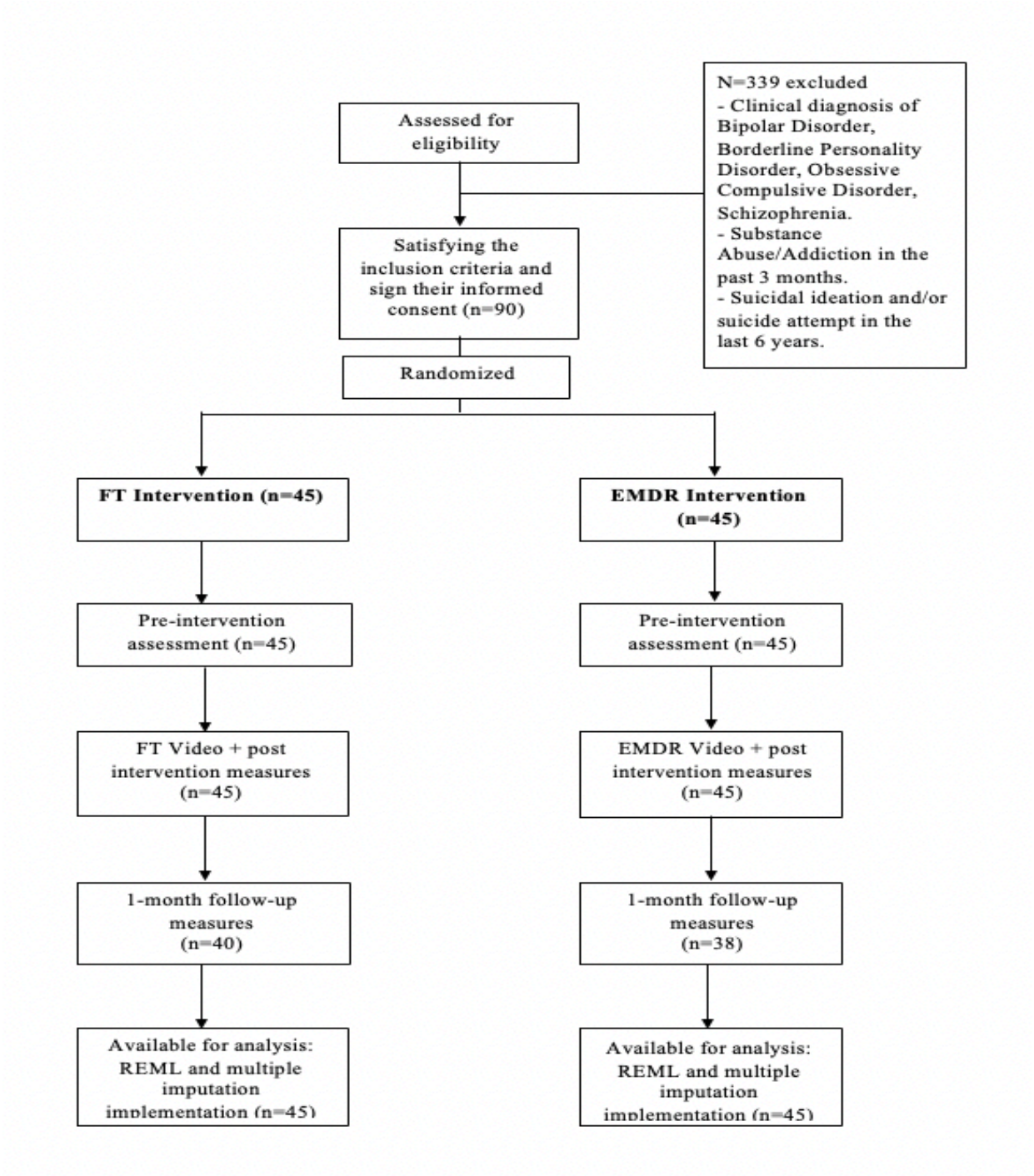


Table 3

Demographic and Psychological Characteristics at Baseline

Demographic Characteristics	**All (n= 90)**	**FT (n= 45)**	**EMDR (n= 45)**	***P* value**
Age, mean years (SD)	39.81 (10.12)	39.11 (9.87)	40.51 (10.44)	0.52
Gender, n (%)				
Male	41 (45.6)	20 (44.4)	21 (46.7)	1.00
Female	49 (54.4)	25 (55.6)	24 (53.3)	
Education, n (%)				
University degree and above	56 (62.2)	28 (62.2)	28 (62.2)	0.51
College diploma	12 (13.3)	5 (11.1)	7 (15.6)	
High school and below	20 (22.2)	10 (22.2)	10 (22.2)	
Other	2 (2.2)	2 (4.4)	0	
Ethnicity, n (%)				
Caucasian	65 (72.2)	33 (73.3)	32 (71.1)	0.96
Hispanic	4 (4.4)	2 (4.4)	2 (4.4)	
Black	13 (14.4)	6 (13.3)	7 (15.6)	
Chinese	5 (5.6)	2 (4.4)	3 (6.7)	
South East Asian	3 (3.3)	2 (4.4)	1 (2.2)	
Psychological Characteristics, mean (SD)				
STAI-S	38.26 (12.32)	38.82 (12.01)	37.69 (12.74)	0.62
STAI-T	44.02 (11.88)	43.91 (12.42)	44.13 (11.44)	0.83
PCL-5	22.29 (14.85)	21.33 (14.93)	23.24 (14.88)	0.55
PHQ-9	6.22 (4.59)	6.49 (4.59)	5.96 (4.63)	0.62
PANAS-P	30.04 (7.63)	30.42 (7.79)	29.67 (7.53)	0.58
PANAS-N	17.88 (6.53)	18.51 (6.86)	17.24 (6.20)	0.32

Note: PCL-5: Post-traumatic Stress Disorder Checklist for DSM-5; PHQ-9: Patient Health Questionnaire-9; STAI-S: State Trait Anxiety Inventory - State; STAI-T: State Trait Anxiety Inventory - Trait; PANAS-P: Positive and Negative Affect Schedule - Positive; PANAS-N: Positive and Negative Affect Schedule – Negative

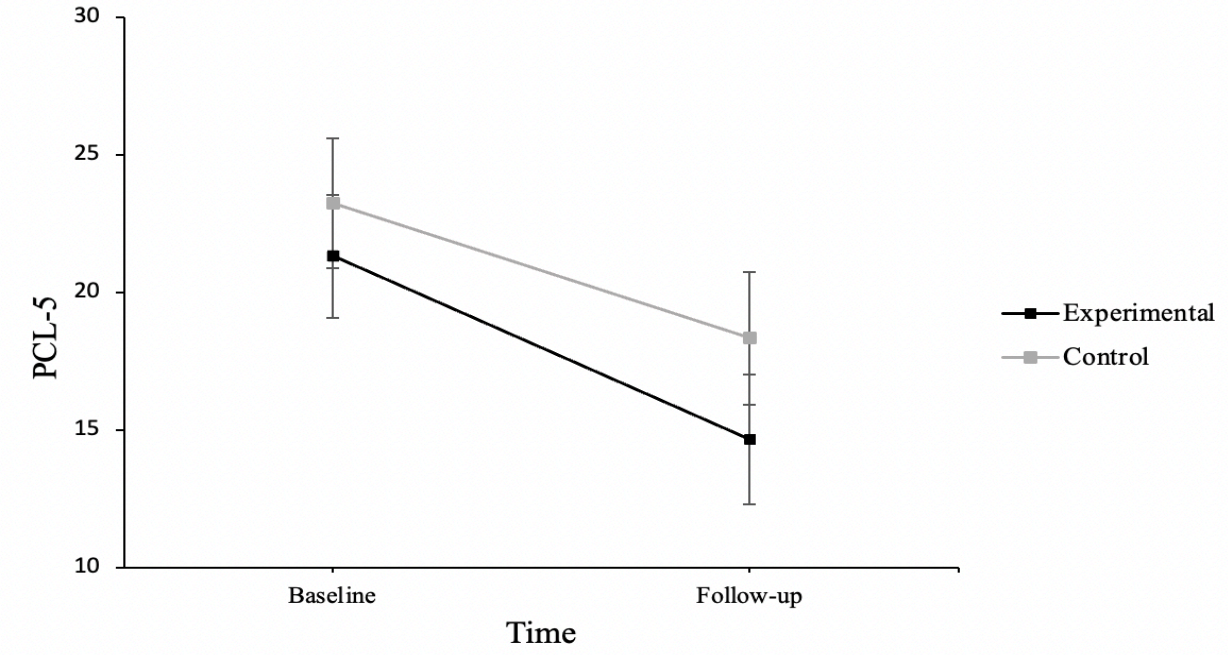
4.4. Primary Outcome

4.4.1. PTSD Checklist for DSM-5 (PCL-5)

The LMM, evaluating the effect of changes between-groups (at 1-month follow-up) and within-groups (from baseline to 1-month follow-up) revealed non-statistically significant main effects for group (b= -1.91, t (153.81) = -0.61, p= 0.55), time (b= -4.92, t (87.36) = -1.83, p= 0.07), and the group × time interaction (b= -1.17, t (86.43) = -0.47, p= 0.64). As shown in Figure 3 and Table 4, despite both groups showing a decrease in PCL-5 scores at the 1-month follow-up compared to baseline values, further evaluation of simple main effects was not conducted considering the non-statistically significant group × time interaction. Based on these findings, the hypothesis 1 regarding a significant between-group difference in PTSD symptom levels at 1-month follow was rejected.

Figure 3

Visual representation of change in Post-traumatic Stress Disorder Checklist for DSM-5 (PCL-5) scores across time



Note: The plot depicts the mean PCL-5 ratings at baseline and 1-month follow-up. Error bars represent ±1 standard error.

4.5. Secondary Outcomes

4.5.1. Patient Health Questionnaire (PHQ-9)

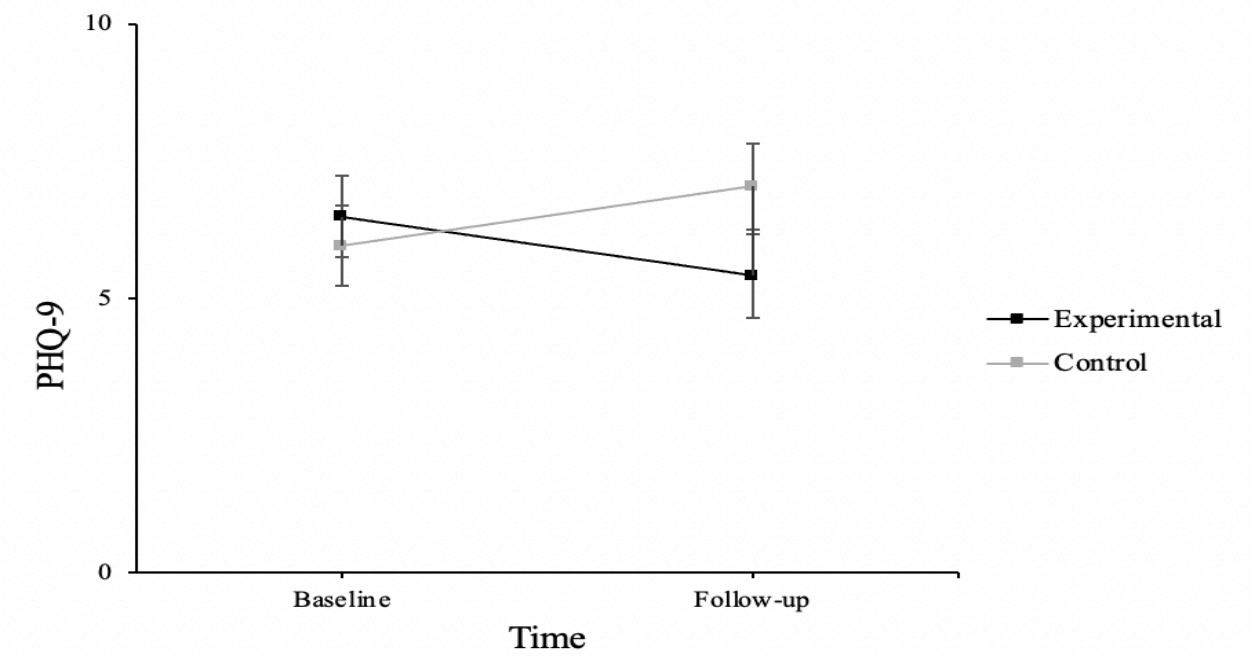
The LMM analysis revealed a statistically significant group x time interaction effect (b= -2.16, t (84.55) = -2.09, p= 0.04). However, the main effects for group (b= 0.53, t (133.91) = 0.51, p= 0.61) and time (b= 1.08, t (85.24) = 1.46, p= 0.15) were not statistically significant. The statistically significant group × time interaction was followed up by an evaluation of Bonferroni-adjusted simple main effects. These indicated not statistically significant between groups at either study time points or within groups from pre to 1-month follow-up.

Despite lower PHQ-9 scores in FT intervention compared to EMDR group at 1-month follow-up, this difference was not statistically significant (M difference= -1.63, p = 0.14). Hence, hypothesis 2 regarding a significant between-group difference in reducing self-reported depressive symptom levels at 1-month follow-up was rejected.

Figure 4 captures the change in PHQ-9 scores from baseline to 1-month follow-up. In terms of within group changes, Bonferroni-adjusted simple main effects showed no statistically significant differences from baseline to 1-month follow-up in either experimental (M change= -1.08, p = 0.15) or control groups (M change= 1.08, p = 0.14).

Figure 4

Visual representation of change in Patient Health Questionnaire (PHQ-9) scores across time



Note: The plot depicts the mean PHQ-9 ratings at baseline and 1-month follow-up. Error bars represent ±1 standard error.

4.5.2. State Trait Anxiety Inventory - State (STAI-S)

A significant main effect for group x time interaction for STAI-S scores (b=-3.90, t (160.76) = -2.94, p=0.004) emerged in LMM analysis. Both main effects for group (b=0.37, t (136.41) = 0.14, p=0.89) and time (b=2.00, t (160.56) = 1.90, p= 0.059) were statistically non-significant. LMM was then followed by evaluation of Bonferroni-adjusted simple main effects, given the significant group x time interaction.

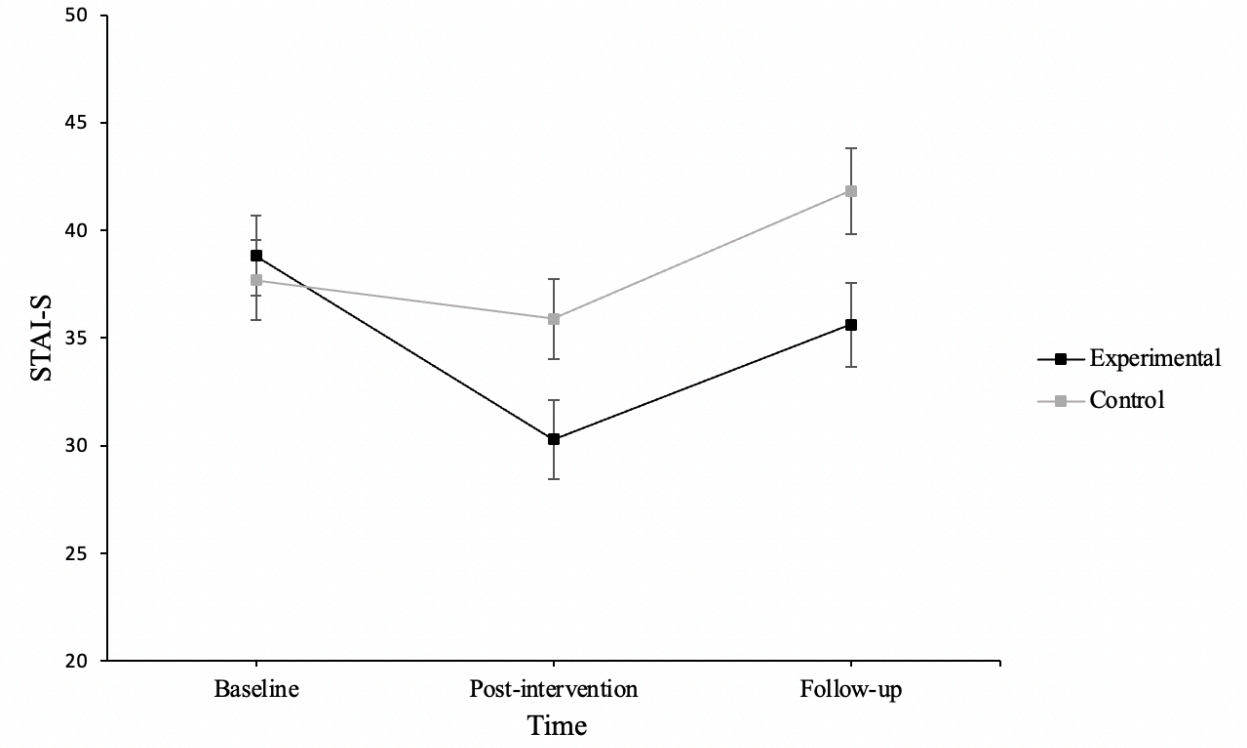
In terms of between group differences, pairwise comparisons showed a statistically significant mean difference between the two groups at immediate post intervention, indicating significantly lower STAI-S score in the FT intervention compared to the control group at post-intervention (M difference = -5.60, p= 0.03). Based on these findings, hypothesis 3 regarding a significant between-group difference in state-anxiety levels at immediate post-intervention was accepted. Statistically significant between-group differences also emerged at the 1-month follow-

up, as shown in significantly lower STAI-S scores in the FT intervention group compared to the EMDR group (M difference = -6.21, p = 0.03) which is in line with hypothesis 4. Figure 5 provides a visual representation of STAI-S findings from baseline to 1-month follow-up.

Regarding within-group differences, simple main effect evaluations indicated statistically significant reductions in the FT intervention group at post-intervention scores compared to baseline values (M difference=-8.53, p=0.001). However, as shown in Figure 5, both the FT intervention (M difference= 5.32, p= 0.008) and EMDR group (M difference = 5.93, p= 0.002) experienced a significant increase in STAI-S scores at 1-month follow-up compared to their immediate post-intervention scores.

Figure 5

Visual representation of change in State Trait Anxiety Inventory – State (STAI-S) scores across time



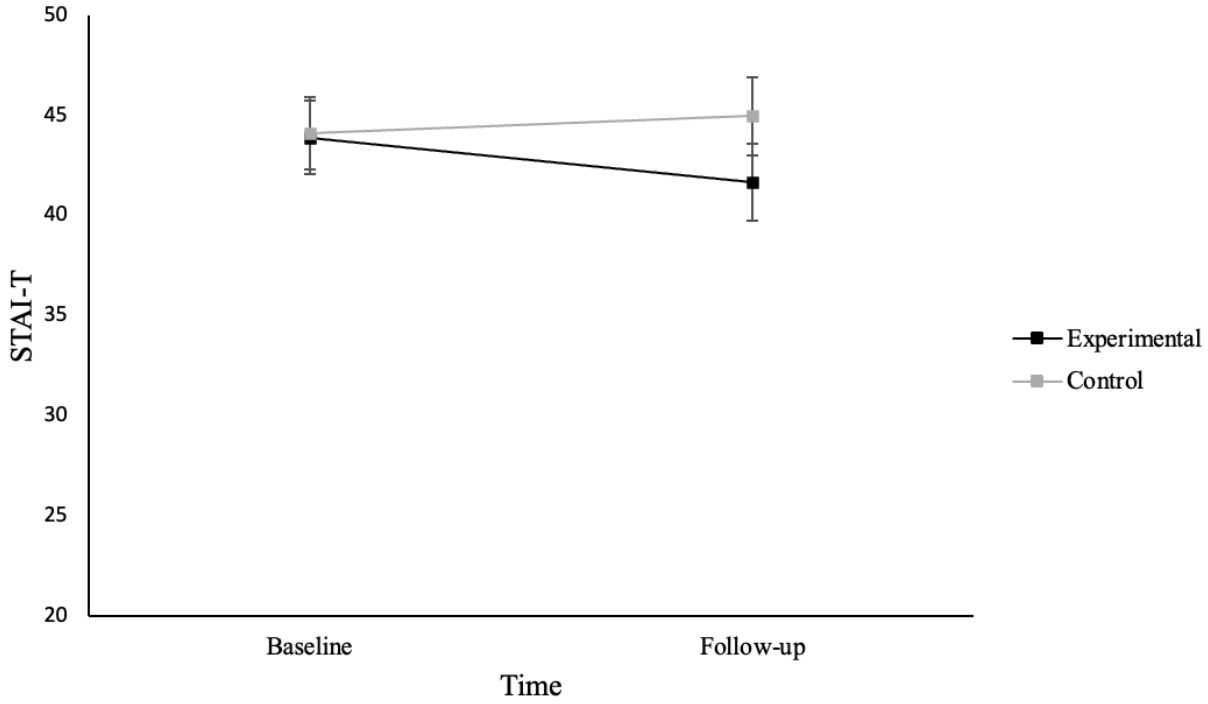
Note: The plot depicts the mean STAI-S ratings at baseline, post-intervention, and 1-month follow-up. Error bars represent ±1 standard error.

4.5.3. State Trait Anxiety Inventory - Trait (STAI-T)

The LMM revealed a statistically non-significant main effects for group (b= -0.22, t (106.64) = -0.09, p= 0.93), time (b= 0.83, t (70.75) = 0.56, p= 0.58), and group × time interaction (b= -3.08, t (70.36) = -1.48, p= 0.14). Due to the non-statistically significant group x time interaction, further evaluation of simple main effects was not conducted. As shown in Figure 6 and Table 4, there was a slight increase in STAI-T scores in the EMDR group from baseline to 1-month follow-up. Conversely, the FT intervention group observed a decrease in STAI-T scores from baseline to 1-month follow-up.

Figure 6

Visual representation of change in State-Trait Anxiety Inventory - Trait (STAI-T) scores across time



Note: The plot depicts the mean STAI-T ratings at baseline and 1-month follow-up. Error bars represent ±1 standard error.

4.5.4. Positive and Negative Affect – Negative Affect (PANAS-N)

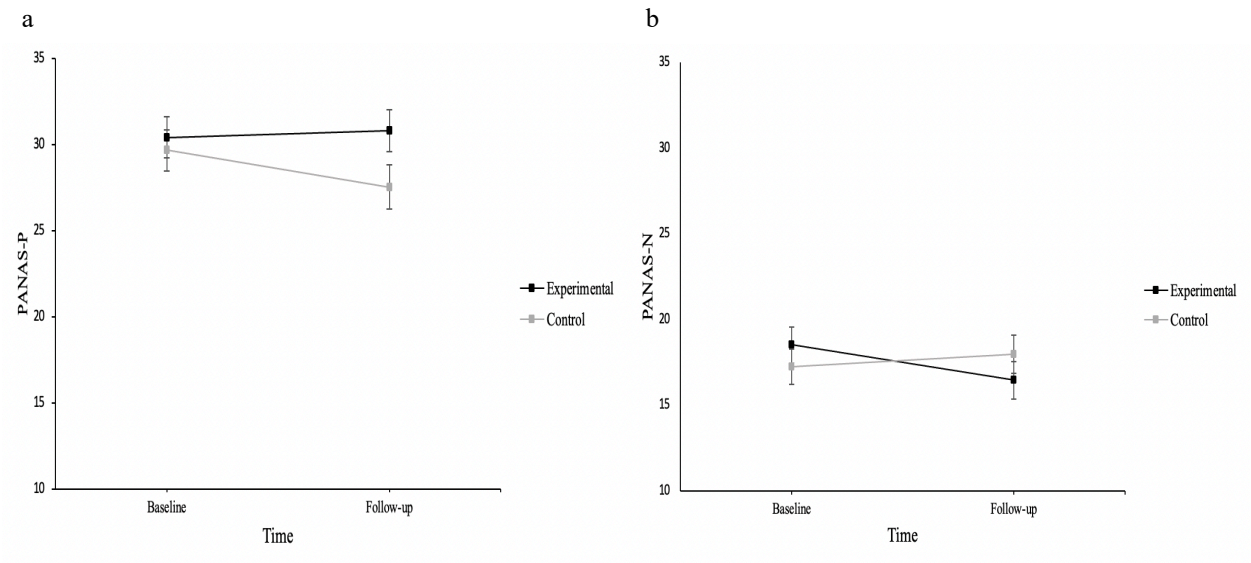
The LMM revealed a non-statistically significant main effects for group (b= 1.27, t (134.58) = 0.87, p= 0.39), time (b= 0.73, t (76.83) = 0.64, p= 0.52), and group × time interaction (b= -2.79, t (76.44) = -1.73, p= 0.09). Further evaluation of simple main effects was not conducted considering non-statistically significant group × time interaction. Figure 6a illustrates the change in PANAS-N scores for both groups. As shown in Table 4, PANAS-N scores decreased in the FT intervention group from baseline to 1-month follow-up, while PANAS-N scores increased from baseline to 1-month follow-up in the EMDR group.

4.5.5. Positive and Negative Affect – Positive Affect (PANAS-P)

A statistically significant main effect for time (b=-2.13, t (78.02) = -2.08, p=0.04) emerged by the LMM analysis. Both group (b=0.76, t (113.43) = 0.45, p=0.65) and time x group interaction (b=2.52, t (76.93) = 1.78, p= 0.08) main effects were statistically non-significant. LMM was not followed by further analysis of Bonferroni-adjusted simple main effects given the non-significant group x time interaction. As shown in Figure 6, PANAS-N scores increased from baseline to follow-up in FT intervention while PANAS-P scores decreased in EMDR group.

Figure 7

Visual representation of change in Positive and Negative Affect Schedule (PANAS) scores across time



Note: The plot depicts the mean PANAS ratings at baseline and 1-month follow-up. Error bars represent ±1 standard error.
6a: Positive and Negative Affect Schedule – Positive (PANAS-P)
6b: Positive and Negative Affect Schedule – Negative (PANAS-N)

4.6. Cohen D Effect Sizes

Table 5 presents Cohen D effect sizes for study participants with complete pre-intervention and 1-month follow-up evaluations (n= 90).

Table 4

Psychological Characteristics at Baseline, Post-intervention, and 1 month Follow-up

Outcomes, mean (SE)	**FT (n=45)**	**EMDR (n=45)**	**Group**			**Time**			**Time * Group**		
			b	***t (df)***	**p**	***b***	***t (df)***	**p**	***b***	***t (df)***	**p**
PCL-5											
Baseline	21.33 (2.23)	23.24 (2.23)	-1.91	-0.61 (153.81)	0.55	-4.92	-1.83 (87.36)	0.07	-1.77	-0.47 (86.43)	0.64
Follow-up	14.65 (2.35)	18.33 (2.41)									
PHQ-9											
Baseline	6.49 (0.74)	5.96 (0.74)	0.53	0.51 (133.91)	0.61	1.08	1.46 (85.24)	0.15	-2.16	-2.09 (84.55)	0.04
Follow-up	5.41 (0.77)	7.04 (0.78)									
STAI-S											
Baseline	38.82 (1.85)	37.69 (1.85)	0.19	0.07 (135.20)	0.94	1.80	1.93 (160.21)	0.056	-3.89	-2.93 (160.41)	0.004
Post-intervention	30.29 (1.85)	35.89 (1.85)									
Follow-up	35.61 (1.99)	41.82 (1.97)									
STAI-T											
Baseline	43.91 (1.82)	44.13 (1.82)	-0.22	-0.09 (106.64)	0.93	0.83	0.56 (70.75)	0.58	-3.08	-1.48 (70.36)	0.14
Follow-up	41.67 (1.92)	44.97 (1.95)									
PANAS-P											
Baseline	30.42 (1.19)	29.67 (1.19)	0.76	0.45 (113.43)	0.65	-2.13	-2.08 (78.02)	0.04	2.52	1.78 (76.93)	0.08
Follow-up	30.80 (1.23)	27.53 (1.28)									
PANAS-N											
Baseline	18.51 (1.03)	17.24 (1.03)	1.27	0.87 (134.58)	0.39	0.73	0.64 (76.83)	0.52	-2.79	-1.73 (76.44)	0.09
Follow-up	16.46 (1.09)	17.98 (1.10)									

Note: PCL-5: Post-traumatic Stress Disorder Checklist for DSM-5; PHQ-9: Patient Health Questionnaire-9; STAI-S: State-Trait Anxiety Inventory - State; STAI-T: State Trait Anxiety Inventory- Trait; PANAS-P: Positive and Negative Affect Schedule – Positive; PANAS-N: Positive and Negative Affect Schedule – Negative.

Table 5

Outcome measure levels for the two groups at Baseline, Post-intervention, and 1-month Follow-up

Outcomes, (mean, SD)	**FT**	**EMDR**	***d (between)***
PCL-5[a]			
Baseline	21.31 (14.93)	23.24 (14.88)	-
Follow-up	14.65 (15.76)	18.33 (16.17)	0.24
d (within)	0.43	0.32	
PHQ-9[a]			
Baseline	6.49 (4.59)	5.96 (4.63)	-
Follow-up	5.41(5.17)	7.04 (5.23)	0.32
d (within)	-0.22	0.22	
STAI-S[a]			
Baseline	38.82 (12.01)	37.69 (12.74)	-
Post-intervention	30.29 (12.41)	35.89 (12.41)	0.46
Follow-up	35.61 (13.35)	41.82 (13.22)	0.47
d (within)[b]	0.25	0.32	
STAI-T[a]			
Baseline	43.91 (12.42)	44.13 (11.44)	-
Follow-up	41.67 (12.88)	44.97 (13.08)	0.26
d (within)	0.10	0.07	
PANAS-P[a]			
Baseline	30.42 (7.79)	29.67 (7.53)	-
Follow-up	30.80 (8.25)	27.53 (8.59)	0.39
d (within)	0.05	0.26	
PANAS-N[a]			
Baseline	18.51 (6.86)	17.24 (6.20)	-
Follow-up	16.46 (7.31)	17.98 (7.38)	0.21
d (within)	0.29	0.11	

[a] PCL-5: Post-traumatic Stress Disorder Checklist for DSM-5; PHQ-9: Patient Health Questionnaire-9; STAI-S: State-Trait Anxiety Inventory - State; STAI-T: State Trait Anxiety Inventory - Trait; PANAS-P: Positive and Negative Affect Schedule - Positive; PANAS-N: Positive and Negative Affect Schedule – Negative
[b] For STAI-S, within-group effect size is calculated between the pre-intervention and follow-up periods

5. Discussion

5.1. FT and PTSD Symptoms

This double-blind RCT focused on evaluating the novel FT variant of EMDR, delivered online in a video viewing of about 15 minutes duration. Although the primary hypothesis of a significant between-group difference in outcomes on the PCL-5 was not supported, both groups experienced a reduction in PCL-5 scores at 1-month follow-up. This time effect was non-significant, but the FT intervention showed a larger effect size (d=0.43) than standard EMDR (d=0.32). This finding suggests that both methods could potentially benefit motivated individuals in distress.

There are several differences between the present RCT and prior investigations on FT, primarily the length and mode of delivery. For instance, a prior RCT by Yasar et al. (2021) on the effects of FT showed a significant reduction in PTSD symptoms as measured by the Impact of Event Scale-Revised (IES-R) compared to a control group. However, their interventions were longer (3 group sessions ranging from 60-75 minutes) and delivered in person rather than virtual. Another study conducted by the same investigational group involved a 90-minute single session of FT and found a statistically significant decrease in PCL-5 symptoms at post-intervention and 1-month follow-up (Yasar et al., 2022).

It is plausible that the brevity of both interventions in the present study (15 minutes) could be the underlying reason that a significant PTSD symptom reduction was not achieved. Given that there was a reduction in PTSD symptoms, one can speculate that the more frequent use of the online video of FT could result in higher benefits.

5.2. FT and Depression

The study findings did not support our hypothesis regarding a significant between-group difference in depression levels at the 1-month follow-up. However, participants in the FT group experienced a decrease in depression scores from baseline to 1-month follow-up,

while their EMDR counterparts experienced an increase in depression. The reduction of depression levels in the FT group is consistent with prior findings regarding the effects of in-person FT (Wong, 2019; Yasar et al., 2022).

One plausible explanation for why FT has a depressive-reducing effect is the change in emotionality and vividness of the traumatic memory. Prior research on traumatic memories has found that these memories are characterized by great vividness and negative emotions resulting in fear and depressive symptoms (Newby & Moulds, 2011). Brouwsers et al. (2021) have shown that a single 8-minute session of FT or EMDR results in reduced emotionality and vividness of aversive memories. This effect which results in less depressive symptoms has also been shown in mindfulness meditation (van den Hout et al., 2011).

The increase in depression scores at the 1-month follow-up in the EMDR group was unexpected since EMDR has the same effects on the vividness of traumatic memories. However, there could be multiple plausible explanations behind this increase. Firstly, it is conceivable that the intervention was too brief, and some participants did not have enough time to process their disturbing memory. Also, a participant could likely have chosen a memory which was severely disturbing and overwhelming that was unsuitable for one bout of 15-minute online EMDR without further psychotherapeutic aids.

5.3. FT and State Anxiety

Results of the current study indicated that both groups experienced a reduction in state anxiety from baseline to post-intervention; however, this reduction was only significant in the FT group. This finding which confirmed the third hypothesis, is consistent with prior research regarding the effects of FT on anxiety in post-interventions, signifying immediate anxiety reductions (Yasar et al., 2021; 2022). These results are also in line with the developer's declaration that FT is tolerable for clients and less anxiety-provoking (Manfield et al., 2017, 2021. In addition, participants in the FT group also showed a significantly lower score on

state anxiety at the 1-month follow-up compared to the control group confirming the fourth hypothesis and suggesting the long-term effects of FT.

These findings indicate that the presence of a distracting component in FT has more substantial anxiety-reducing effects rather than continual exposure. It is important to note that the presence of PEF in FT intervention is intended to minimize exposure to the vivid details of the traumatic memory and tax the working memory rather than momentarily placing the participant in a positive state of mind. As a result of lessening exposure to the details of the traumatic memory, the participant could engage in bilateral stimulation with lower levels of emotional arousal.

5.4. Video Delivery as an Adjunctive Psychotherapy

In the last decade, there has been a considerable interest in the use of online video and module-based psychotherapy, such as mindfulness meditation and CBT (Farris et al., 2021; Fernandez et al., 2021; Pflugeisen et al., 2016; Shabahang et al., 2021). Based on the findings above, the use of video delivery of either FT or EMDR has the potential to be an adjunctive therapy to PTSD treatments. For some individuals, video exposure could potentially be preferable, as the contact did not involve acknowledging the vulnerability of mental health problems to another person. This study demonstrated an autonomous, highly accessible alternative that people affected by disturbing traumatic memories and PTSD symptoms could use to reduce emotional arousal on their own time. In addition, this self-practice could assist patients already receiving EMDR therapy from external sources, although it was used without any additional guidance in this study.

5.5. Attention Networks and EMDR

The current study did not focus on the underlying mechanisms of either FT or EMDR. However, it is important to speculate on the underlying mechanisms for future research. Although the originators of FT have only been focusing on subliminal exposure and the

unconscious fear-processing mechanisms, we believe it is also important to investigate the attentional networks and their relation to FT mechanisms.

According to prior literature, it has been shown that there is a large overlap between the functional areas for attention and eye movements (Corbetta et al., 1998). Moreover, motor and sensory aspects of attention share overlapping neuroanatomy (Nobre et al., 2000; de Haan et al., 2008). As such, we speculate that the bilateral stimulation and blinking in the FT utilizes most attentional networks. As such, the individual does not have enough resources to attend to the traumatic memory resulting in reduced arousal and a decrease in the vividness of the traumatic memory.

5.5. Limitations and Future Directions

This study had several limitations which require careful review. Firstly, both videos were guided by two licenced EMDR practitioners who are the originators of FT. By having the same therapists convey both variants, some control was achieved in therapist-related efficacy. However, a related question is whether the therapists in the videos conveyed more enthusiasm about one version vs. the other. Future RCTs should employ therapists other than the developers of the method.

Secondly, the sample consisted of non-clinical participants recruited through an online platform. Although a non-clinical sample is commonly employed in a lab-based study, future research should include a clinical and larger sample to increase the generalizability of the findings. Including a clinical population, especially individuals with PTSD, would be a positive step in testing the efficacy of FT as a PTSD treatment. Thirdly, the fixed treatment duration of 15 minutes in both conditions might have been too brief to unveil long-term treatment efficacy. In terms of future investigations, it would be optimal to include more frequent use of these videos.

Finally, the inclusion criteria in this study specified that the memory should be moderately upsetting. However, even though the participants declared that their chosen memory met the inclusion criteria, the intensity of the chosen memory was not evaluated by a certified clinical psychologist before the start of the study. Therefore, employing a baseline interview with participants to assess the severity of the traumatic memory would be an improvement for future studies.

6. Conclusion

The novel FT variant of EMDR has gained some popularity over the past 6 years, and licenced therapists have been implementing in-person and/or virtual FT. This modality is deemed to be more tolerable and less anxiety provoking since it has been designed to reduce exposure to past traumatic events. The present study provides preliminary evidence that FT has the potential to be an adjunctive therapy to other evidence-based psychological treatments. These findings contribute to the ongoing research on online EMDR and its variants. In addition, by evaluating the efficacy of easily accessible psychological modalities for processing traumatic memories, this research may be a positive step for therapeutic developments in clinical and health psychology.

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Appendices

Appendix A: Demographic Questionnaire

1. Participant ID: _____

2. What gender do you identify with?
a. Female
b. Male
c. Prefer not to disclose
d. Other

3. What is your age (in years)?

4. Please describe your current education status
a. High school graduate degree
b. College Degree/Diploma
c. Bachelor's Degree (i.e., BA, BSc, AB)
d. Master's Degree (i.e., MA, MSc, MEng, MEd, MSW, MBA)
e. Professional Degree (i.e., MD, DDS, DVM, LLB, JD)
f. Doctorate Degree (i.e., PhD, EdD)
g. Other

5. What is your ethnicity (please select all that apply.)
1. Aboriginal (Inuit, Metis, North American Indian)
1. West Asian (e.g., Armenian, Egyptian, Iranian, Iraqi, Lebanese, Moroccan)
2. Black – African (e.g., African, Somali etc.)
3. Black – Caribbean (e.g., Haitian, Jamaican etc.)
4. Indo – Caribbean (e.g., Guyanese, Trinidadian etc.)
5. White (Caucasian – European/American)
6. Hispanic
7. Latin American
8. Chinese
9. Japanese
10. Korean
11. South Asian (e.g., Indian, Pakistani, Bangladeshi, Sri Lankan etc.)
12. South East Asian (e.g., Filipino, Thai, Cambodian, Malaysian, Indonesian etc.)
13. Other: _____

6. In which state do you currently reside?
7. Do you have a history of mental illness in your family (i.e. first degree relatives)

a. Yes
b. No

8. Do you currently use recreational drugs?
a. If yes, please specify type and frequency _____
b. No

Appendix B: Patient Health Questionnaire (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
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	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

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

Appendix C: The Positive and Negative Affect Schedule (PANAS)

Indicate the extent you have felt this way over the past week.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1.Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

Appendix D: PTSD Checklist for DSM-5

Introduction: Below is a list of problems that people sometimes have in response to a very stressful experience. 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 month

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

	Not at all	**A little bit**	**Moderately**	**Quite a bit**	**Extremely**
1.Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4.Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
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?	0	1	2	3	4
10. Blaming yourself or someone else for	0	1	2	3	4

the stressful experience or what happened after it?					
11. Having strong negative negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behaviour, angry outburst, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being “superalert” or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

Appendix E: State-Trait Anxiety Inventory (STAI)

STAI Form Y-1

Directions:

A number of statements which people have used to describe themselves are given below. Read each statement and then blacken the appropriate circle to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

		Not at all	Somewhat	Moderately so	Very Much So
1	I feel calm	1	2	3	4
2	I feel secure	1	2	3	4
3	I am tense	1	2	3	4
4	I feel strained	1	2	3	4
5	I feel at ease	1	2	3	4
6	I feel upset	1	2	3	4
7	I am presently worrying over possible misfortunes	1	2	3	4
8	I feel satisfied	1	2	3	4
9	I feel frightened	1	2	3	4
10	I feel comfortable	1	2	3	4
11	I feel self-confident	1	2	3	4
12	I feel nervous	1	2	3	4
13	I am jittery	1	2	3	4
14	I feel indecisive	1	2	3	4
15	I am relaxed	1	2	3	4
16	I feel content	1	2	3	4
17	I am worried	1	2	3	4
18	I feel confused	1	2	3	4
19	I feel steady	1	2	3	4
20	I feel pleasant	1	2	3	4

STAI Form Y-2

Directions:
A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate you generally feel.

		Almost Never	Sometimes	Often	Almost Always
1	I feel pleasant	1	2	3	4
2	I feel nervous and restless	1	2	3	4
3	I feel satisfied with myself	1	2	3	4
4	I wish I could be as happy as others seem to be	1	2	3	4
5	I feel like a failure	1	2	3	4
6	I feel rested	1	2	3	4
7	I am “calm, cool, and collected”	1	2	3	4
8	I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9	I worry too much over something that really doesn’t matter	1	2	3	4
10	I am happy	1	2	3	4
11	I have disturbing thoughts	1	2	3	4
12	I lack self-confidence	1	2	3	4
13	I feel secure	1	2	3	4
14	I make decisions easily	1	2	3	4
15	I feel inadequate	1	2	3	4
16	I am content	1	2	3	4
17	Some unimportant thought runs through my mind and bothers me	1	2	3	4
18	I take disappointments so keenly that I can’t put them out of my mind	1	2	3	4
19	I am a steady person	1	2	3	4
20	I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Appendix F: Study Consent Form

Study Name: **An Assessment of Flash/Eye Movement Desensitization Reprocessing (EMDR) for Reducing Memory Distress Using Online Programming/Intervention.**

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You are being asked to take part in a research study. Before agreeing to take part in this study, it is important that you read and understand the following explanation of the proposed study procedures. The following information describes the purpose, procedures, potential harms/risk/discomforts, and the benefits associated with this study. It also describes your right to refuse to participate or to withdraw from any part of the study at any time.

In order to decide whether you wish to participate in this research study, you should understand enough about it to make an informed decision. This is known as the informed consent process. Please ask the researcher to explain any words you do not understand before signing this consent form. Make sure all your questions have been answered to your satisfaction before signing this document. All research procedures throughout this study will take place online and in person interaction is not required

Purpose

You have been asked to participate in a study designed to examine the effects of Flash/Eye Movement Desensitization Reprocessing (EMDR) in reducing symptoms associated with memories of upsetting events from your past. Research from this study will be presented at conferences and utilized for thesis requirements and future publications.

Role of Research Participant

Your participation in this study will entail a time commitment of 45 minutes. You will be granted 20$ for attending both parts of the study. If you agree to participate in this study, you will be asked to provide your up-to-date medical history during the prescreening. These questions will help the researchers determine if you qualify for this specific investigation. There will be a follow up study after 4 weeks. Follow up study consists of 4 online SurveyMonkey questionnaires and it will take approximately 10 minutes to complete.

If you choose to participate in this study, you will be asked to complete 5 online baseline self-report questionnaires via SurveyMonkey followed by a 15-minute video demonstrating the flash technique, followed by a set of follow-up online SurveyMonkey questionnaires. There will be a follow up online SurveyMonkey Questionnaire after 4 weeks.

Questionnaires:

1. **Demographic and Prescreen Questionnaire**

2. **PTSD Checklist for DSM-5 (PCL-5):** This 20-item self-report questionnaire assesses the presence and severity of PTSD symptoms (Weathers et al., 2013). The PCL-5 can be used to screen and to evaluate change over time. The PCL-5 has demonstrated good internal consistency ($\alpha = .94$) and test-retest reliability ($r = .82$) and has been useful within various populations including undergraduate students (Blevins et al., 2015; Wortmann et al., 2016).

3. **State-Trait Anxiety Inventory:** The 20-item state anxiety subscale measures subjective tensions, apprehension, nervousness, worries, and physiological arousal. The STAI-S has demonstrated good internal consistency, with reliability coefficients ranging from .86 to .95 in various populations including college students, working adults, and military recruits (Spielberger, 1983). As the STAI-S measures transitory anxiety states, its test-retest correlations are relatively modest (correlation coefficients ranging from .16 to .62; Spielberger et al., 1983). The 20-item trait scale measures how people generally feel and is among the most widely used measures for assessing anxiety in clinical and experimental settings. The STAI-T has demonstrated good internal consistency in normative samples (Spielberger., 1983) and test-retest reliability in student populations (correlation coefficients ranging from .65 to .86; Spielberger, 1983).

4. **Patient Health Questionnaire – 9**: This is a depression self-report instrument. In validation studies, the PHQ-9 was completed by 6,000 patients in 8 primary care clinics and 7 obstetrics-gynecology clinics. Construct validity was assessed using self-reported sick days and clinic visits, and symptom-related difficulties. Criterion validity was assessed against an independent structured mental health professional (MHP) interview in a sample of 580 patients.

5. **Positive and Negative Affect Schedule:** This reliable and valid self-report scale is brief, easily administered, highly internally consistent and stable at appropriate levels over about a 2-month time period. Normative data and factorial and external evidence of convergent and discriminant validity have been derived. (Watson, Clark, and Tellegen,1988)

6. **Distressing Memory Scale:** This self-report questionnaire investigates the perceived progress that has been made throughout the intervention regarding anxiety and confidence levels and efficacy of the intervention.

Computer Interaction Tasks:

Eye Movement Desensitization Reprocessing (EMDR) has been frequently used and assessed as a clinical technique for reducing symptoms of Post-Traumatic Stress Disorder (PTSD). EMDR and is regarded as a highly effective and empirically supported by the American Psychiatric Association (APA) (2013) and also recognized by the World Health Organization (WHO) (Born et al., 2013; Chen et al., 2015; Valiente-Gomez, 2017).

It may be advantageous to make accessible an Online EMDR treatment to individuals motivated to reduce symptoms associated with disturbing (traumatic) memories. In this study you have access to (online) instructions for using the program for optimal benefit.

In this study, you will be asked to sit quietly and watch a 15-minute video. You will be asked to choose a memory that fits the criteria in the pre-screening process. In the video, the speaker will be instructing Flash technique, which is a form of EMDR, and you will be asked to follow his lead. You will also be asked to record the level of disturbance that you feel regarding the memory that you have chosen before and after the instructions.

In this study, two different beneficial online programs are assessed in which varying program elements are emphasized. In order to optimally compare the benefits of each program, subjects will be randomly assigned to treatment alternative I, or treatment alternative II. Due to the randomization, you will have a 50% chance of receiving alternative I and a 50% chance of receiving alternative II.

While you are completing the questionnaires, we establish a zoom linkage designed to assist you in maintaining an optimal orientation to the study. You are not obligated to maintain the zoom contact and can choose not to connect with it and/or to terminate it at any time.

Potential Harms, Risks or Discomforts

Some of the questions ask about private matters such as whether or not you have been clinically diagnosed with a mental health disorder or if you have any other diagnosed conditions. There are no known risks for using the programs in this study. However, for optimal safety you should not hesitate to callcall 1-800-273-TALK (8255) to reach a 24-hour crisis center, or text MHA to 741741 at the Crisis Text Line. These resources will be provided again at the end of the survey.

Potential Benefits

There may be benefits associated with participating in this study. However, these are experimental treatments and there are no statistically based indications of effectiveness. This investigation may lead to a better understanding of your memory experiences and possibly to lower disturbance levels.

Voluntary Participation and Withdrawal

Your participation in this study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer, to stop participating, or to refuse to answer particular questions will not influence the nature of the relationship with CloudResearch platform either now, or in the future. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. Should you wish to withdraw after the study you will have the option to also withdraw your data up until the analysis is complete.

Confidentiality

Unless you choose otherwise all information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in

any report or publication of the research. The experimental data acquired in this study is collected in an anonymized form that cannot be connected back to you. This research may be used for teaching purposes, presented at meetings, published, shared with other scientific researchers, or used in future studies. Your name or other identifying information will not be used in any publication or teaching materials without your specific permission.

Any data collected via computer will be securely stored on password protected USB keys and laptops with solely the researcher having access to this data. Electronic data will be retained on a password protected USB in a locked filing cabinet until September 2027. Handwritten notes (with no identifying information) will also be retained until September 2027 in a locked filing cabinet

Confidentiality will be provided to the fullest extent possible by law. The data collected in this research project may be used – in an anonymized form – by members of the research team in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our institutional REB. Any secondary use of anonymized data by the research team will be treated with the same degree of confidentiality and anonymity as in the original research project.

The researcher acknowledges that the host of the online survey (Survey Monkey) may automatically collect participant data without their knowledge (i.e., IP addresses). Although this information may be provided or made accessible to the researchers, it will not be used or saved without participant's consent on the researcher's system. Further, because this project employs e-based collection techniques, data may be subject to access by third parties as a result of various security-based legislation now in place in many countries and thus *the confidentiality and privacy of data cannot be guaranteed during web-based transmission*.

The Zoom linkage will have a private meeting code and a passcode which will be only used for this study. Participants won't be asked to screen share. The Zoom connection will only be used for the purpose of clarifying any questions that the participant might have. The meeting will be locked in order to avoid any unwanted guests.

This study will use Zoom to collect data, which is an externally hosted cloud-based service. When information is transmitted over the internet privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). Further, while York University researchers will not collect or use IP addresses or other information which could link your participation to your computer or electronic devices without informing you, there is a small risk with any platform such as this of data that is collected on external servers falling outside the control of the research team. If you are concerned about this, we would be happy to make alternative arrangements (where possible) for you to participate, perhaps via telephone. Please contact Nazanin Babaei by email (nazaninb@my.yorku.ca) for further information.

Recordings (audio/video) will be saved in a password protected file to research team members' local computer, not the cloud-based service. Please note that it is expected that participants do not make any unauthorized recordings of the content of a meeting / data collection session.

Questions

If you have questions about the research in general or about your role in the study, please

feel free to contact Nazanin Babaei by email (nazaninb@my.yorku.ca) or Dr. Paul Ritvo by telephone at (416) 736-2100 ext. 22396 or by e-mail (pritvo@yorku.ca). You can also contact the Kinesiology and Health Science department by email (kahs@yorku.ca).

This research has received ethics review and approval by the Delegated Ethics Review Committee, which is the delegated authority to review research ethics protocols by the Human Participants Review Sub-Committee, York University's Ethics Review Board, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Kaneff Tower, York University (telephone 416-736-5914 or email ore@yorku.ca).

Legal Rights and Signatures:

I, _____, consent to participate in this research study, "**An Assessment of Flash/Eye Movement Desensitization Reprocessing (EMDR) for Reducing Memory Distress Using Online Programming/Intervention** conducted by Dr. Paul Ritvo (Principal Investigator) and Nazanin Babaei. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

_____ _____

Participant Signature _____ Date

_____ _____

Additional Consent: Consent for e-mail communication approximately one month after today's experiment:

This study includes a brief follow-up assessment that, like today's study, is completed electronically. If you agree, the research team will invite you via e-mail to complete a brief 15-minute follow-up survey one month after today's experiment.

The survey will consist of four of the previously mentioned questionnaires:

1. PTSD Checklist for DSM-5 (PCL-5):
2. Patient Health Questionnaire – 9 (PHQ-9)
3. State-Trait Anxiety Inventory (STAI)
4. Positive and Negative Affect Schedule (PANAS)

There are certain risks of using email that need to be disclosed: 1) the security of email messages is not guaranteed, 2) messages sent to, or from the York University research staff regarding the intended follow-up may be seen by others using the internet, and 3) e-mail may be accidentally forwarded, and may exist indefinitely.

No names or identifying information would be included in any publications or presentations based on the e-mail exchange, and your responses to this follow-up survey will remain confidential.

I, _____, consent to receiving email communication about a follow-up survey assessment by the following research staff:

☐ Principal investigator, Nazanin Babaei

☐ Research Assistant for this specific study

The best email to contact me at is: _____

Signature: Date:

_____

_____

Participant: (name)

Appendix G: Study Debriefing Form

Study Name: An Assessment of Flash/Eye Movement Desensitization Reprocessing (EMDR) for Reducing Memory Distress Using Online Programming/Intervention

Principal Investigator: Nazanin Babaei, MSc (cand.)
nazaninb@my.yorku.ca
138 Chemistry Building
York University

Supervisor: Dr. Paul Ritvo
pritvo@yorku.ca
136 Chemistry Building
York University

Purpose:

Thank you for participating in this study designed to examine the effects of Flash/Eye Movement Desensitization Reprocessing (EMDR) in reducing symptoms associated with memories of upsetting events from your past. Here we explain what EMDR consists of and give you a brief description of the flash technique. We will also explain our own hypothesis. The last page contains a list of resources that will help you learn more, if interested.

Confidentiality:
You may decide that you do not want your data used in this research. If you would like your data removed from the study and permanently deleted, please advise the experimenter. Whether you agree or do not agree to have your data used for this study, you will still receive 20$ (USD) for full completion of the study (both part 1 and part 2).

Also, please do not disclose research procedures and/or hypotheses to anyone who might participate in this study in the future as this could affect the results of the study.

Protocol:

Eye Movement Desensitization Reprocessing (EMDR)

For several years, Eye Movement Desensitization Reprocessing (EMDR) has been used and assessed as a clinical technique for reducing symptoms of Post-Traumatic Stress Disorder (PTSD). EMDR and is regarded as a highly effective and empirically supported by the American Psychiatric Association (APA) (2013) and also recognized by the World Health Organization (WHO) (Born et al., 2013; Chen et al., 2015; Valiente-Gomez, 2017).

Given these validations, this study examines whether it could be advantageous to make accessible an online EMDR treatment to individuals motivated to reduce symptoms associated with disturbing (traumatic) memories.

Flash Technique:

The Flash Technique (FT) is a recently developed psychological intervention for rapidly reducing the distress levels of disturbing memories or images, with minimal subjective disturbance for clients during the process. Flash is considered to be helpful in the process of EMDR treatment if the patient is severely distressed. This procedure requires the participant to choose a disturbing memory and rate the level of its disturbance. Next step would be choosing a positive engaging focus (PEF). Then the participant would start tapping their knees rhythmically while being immersed in their PEF. The participant will hear the word "flash" which prompts blinking the eyes rapidly for 3-5 times.

In this study, we were first assessing the safety and effectiveness of the Flash Technique (FT) for reducing symptoms associated with upsetting memories. Secondly, we wanted to see whether exposure to a positive engaging focus would influence the amount of reduction in upsetting memories and if so, to how much. Our main hypothesis was that the presence of PEF is the key ingredient in the success of this technique.

There were two experimental groups in the study: Treatment alternative I was instructed to utilize a PEF and the other group (treatment alternative II) was never introduced to the concept of PEF. All other elements were the same. In order to optimally compare the benefits of each program, subjects were randomly assigned to treatment alternative I, or treatment alternative II. Due to the randomization, we will have a 50% chance of receiving alternative I and a 50% chance of receiving alternative II. This debriefing is important because we don't want you to register any experience of failure from engaging in the Flash technique if you did not feel any change. In fact, your engagement was a success as you provided us and other researchers valuable help in better understanding stress. Ultimately these understandings can be translated into ways to help people in reducing the level of disturbance of upsetting memories.

Follow-up Study:

As a reminder, there will be a follow-up assessment 4 weeks later. The assessment is brief and involves 4 questionnaires, which can be completed in under 10 minutes.

Finally, we provide a list of support resources should you experience adverse effects from this study.

Questions:
We hope that this was a positive experience for you. If you have questions about the research in general or about your role in the study, please feel free to contact Nazanin Babaei (nazaninb@my.yorku.ca) or Dr. Paul Ritvo by telephone at (416) 736-2100 ext. 22396 or by e-mail (pritvo@yorku.ca). You can also contact the Department of Kinesiology and Health Science by email (kahs@yorku.ca).

Support Resources:

Some of the questions ask about private matters, such as whether or not you have been clinically diagnosed with a mental health disorder or if you have any other diagnosed conditions. There are no known risks for using the programs in this study. However, for optimal safety you should not hesitate to call 1-800-273-TALK (8255) to reach a 24-hour

crisis center, or text MHA to 741741 at the Crisis Text Line. These resources will be provided again at the end of the survey.

Additional resources:

Knaevelsrud, C., Maercker, A. Internet-based treatment for PTSD reduces distress and facilitates the development of a strong therapeutic alliance: a randomized controlled clinical trial. *BMC Psychiatry* 7, 13 (2007). https://doi.org/10.1186/1471-244X-7-13

Lancaster, C. L., Teeters, J. B., Gros, D. F., & Back, S. E. (2016). Posttraumatic Stress Disorder: Overview of Evidence-Based Assessment and Treatment. *Journal of clinical medicine*, *5*(11), 105. https://doi.org/10.3390/jcm5110105

Landin-Romero, R., Moreno-Alcazar, A., Pagani, M., & Amann, B. L. (2018). How Does Eye Movement Desensitization and Reprocessing Therapy Work? A Systematic Review on Suggested Mechanisms of Action. *Frontiers in Psychology*, *9*, 1395. https://doi.org/10.3389/fpsyg.2018.01395

Lange, A., Rietdijk, D., Hudcovicova, M., van de Ven, J.-P., Schrieken, B., & Emmelkamp, P. M. G. (2003). Interapy: A controlled randomized trial of the standardized treatment of posttraumatic stress through the internet. *Journal of Consulting and Clinical Psychology, 71*(5), 901–909. https://doi.org/10.1037/0022-006X.71.5.901

Litz, B. T., Williams, L., Wang, J., Bryant, R., & Engel, C. C., Jr. (2004). A Therapist-Assisted Internet Self-Help Program for Traumatic Stress. *Professional Psychology: Research and Practice, 35*(6), 628–634. https://doi.org/10.1037/0735-7028.35.6.628

Miao, X. R., Chen, Q. B., Wei, K., Tao, K. M., & Lu, Z. J. (2018). Posttraumatic stress disorder: from diagnosis to prevention. *Military Medical Research*, *5*(1), 32. https://doi.org/10.1186/s40779-018-0179-0

Shapiro F. (2014). The role of eye movement desensitization and reprocessing (EMDR) therapy in medicine: addressing the psychological and physical symptoms stemming from adverse life experiences. *The Permanente journal*, *18*(1), 71–77. https://doi.org/10.7812/TPP/13-098

Appendix H: DSM-5 Criteria for PTSD Diagnosis

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:
   1. Directly experiencing the traumatic event(s).
   2. Witnessing, in person, the event(s) as it occurred to others.
   3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
   4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). **Note:** Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s), beginning after the traumatic event(s) occurred:
   5. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). **Note:** In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.
   6. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event(s). **Note:** In children, there may be frightening dreams without recognizable content.
   7. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) **Note:** In children, trauma-specific reenactment may occur in play.
   8. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
   9. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

C. Persistent avoidance of stimuli associated with traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one of both of the following:
   10. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
   11. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
   12. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia, and not to other factors such as head injury, alcohol, or drugs).
   13. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," "The world is completely dangerous," "My whole nervous system is permanently ruined").
   14. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
   15. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).

16. Markedly diminished interest or participation in significant activities.
17. Feelings of detachment or estrangement from others.
18. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

19. Irritable behaviour and angry outbursts (with little or no provocation), typically expressed as verbal or physical aggression toward people or objects.
20. Reckless or self-destructive behaviour.
21. Hypervigilance.
22. Exaggerated startle response.
23. Problems with concentration.
24. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).

F. Duration of the disturbance (Criteria B, C, D and E) is more than 1 month.
G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.

Specify whether:
With dissociative symptoms: The individual's symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

1. **Depersonalization:** Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).
2. Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted). Note: To use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behaviour during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

Specify whether:
With delayed expression: If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate).