Comparative Efficiency of EMDR and Prolonged Exposure in Treating Posttraumatic Stress Disorder: A Randomized Trial

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The comparative treatment efficiency of eye movement desensitization and reprocessing (EMDR) therapy and prolonged exposure (PE) therapy for the treatment of posttraumatic stress disorder (PTSD) was tested for 20 participants diagnosed with PTSD. Efficiency was operationalized as the total exposure time to traumatic memories during and between sessions; the number of trauma memories processed over the course of therapy; how many sessions were required to resolve the primary trauma; and lower subjective units of disturbance (SUD) levels after the initial treatment session. Participants were randomized to each condition and received 12 90-minute sessions of therapy over 6 weeks. Symptoms were assessed by treatment-blind assessors at posttreatment, and at 3 and 6 months follow-up. Results demonstrated a significant decrease in symptoms posttreatment for PTSD *(d* = .64), depression (*d* = .46), anxiety (*d* = .52) and stress (*d* = .57) for both groups, which was maintained at 3 months. At 6 months there was a small increase in symptoms compared to the 3-month time point on the Clinician-Administered PTSD Scale (CAPS) but no significant change in any self-report symptoms EMDR was significantly more efficient than PE. EMDR participants had less total exposure time to traumatic memories when homework hours were included (*d* = .66), reported lower SUD scores after the first session (*d* = .45), required fewer sessions for the target memory to decrease to near zero distress levels (*d* = .84), and processed more traumatic memories.

Keywords: eye movement desensitization reprocessing (EMDR) therapy; prolonged exposure; posttraumatic stress disorder (PTSD); comparative; treatment outcomes; efficiency

Trauma-focused psychotherapeutic approaches have an established evidence base for effective treatment of posttraumatic stress disorder (PTSD). Of these approaches, trauma-focused cognitive behavioral therapy (TF-CBT), prolonged exposure (PE) therapy, and eye movement desensitization and reprocessing (EMDR) therapy are currently considered first-line interventions for PTSD under several international trauma guidelines, including the World Health Organization (2013) and the International Society for Traumatic Stress Studies (n.d.). Outcome studies, of varying methodological rigor, have searched for differences between EMDR, TF-CBT, and PE treatment models. However, few demonstrable differences in treatment efficacy have been found (Chen, Zhang, & Liang, 2015; Ho & Lee, 2012; Van den Berg et al., 2015).

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Both treatment types attempt to desensitize the client's emotions and accompanying unpleasant physical sensations to the original memory and are similarly effective in terms of treatment outcomes. Nevertheless, there may be differences in treatment efficiency between EMDR and CBT. In some studies EMDR required fewer sessions than CBT to accomplish equivalent symptom changes (De Roos et al., 2011; Nidjam, Gersons, Reitsma, Jongh, & Olff, 2012). In addition, the subjective units of disturbance (SUD) measure may drop more over the first session, or first few sessions, in EMDR therapy in comparison to CBT or exposure therapies (Ironson, Freund, Strauss, & Williams, 2002; Nidjam et al., 2012). The SUD scale is used as an ongoing measure throughout the delivery of both treatment models to determine clients' progress in terms of desensitizing their emotional response to the original memory. In PE, the treatment protocol directs therapists to ask clients their SUD score frequently during in vivo and imaginal exposure; for example, during imaginal exposure, SUDs are requested every 5 minutes on a 100-point scale (Foa, Hembree, & Rothbaum, 2007). In PE, desensitization is deemed to have occurred when the SUD scores are at 20 or 30 and for EMDR (SUD measured on a 10-point scale) when SUDs are 0 or 1 (Shapiro, 2001). Hence comparing SUD scores between treatments may well be a suitable indicator of treatment efficiency.

While in meta-analysis each treatment has equivalent effect sizes, the number of hours of between-session homework completed could also be indicative of treatment efficiency (Ho & Lee, 2012). Homework can be defined as the amount of time participants spend completing exposure tasks outside of treatment sessions (Kazantzis et al., 2016). Homework is considered an important component of exposure therapy, as increasing exposure to the fear memory potentially increases habituation or extinction between sessions (Bluett, Zoellner, & Feeny, 2014; McLean & Foa, 2011). In a meta-analysis of studies that compared EMDR to CBT, it was found that the average amount of prescribed homework was approximately 23 hours for CBT in comparison to approximately 2.65 hours for EMDR (Ho & Lee, 2012). This study concluded that when homework is taken into account, the total exposure time in CBT (including in session and homework exposure) was significantly more than the in-session and between-session exposure time for EMDR. It was noted that this result might be indicative of superior efficiency for EMDR. However, they also noted that it was rare for any of the studies analyzed to report actual time that participants spent in homework and that using prescribed homework as the statistic may not represent what happens in practice. Therefore, in the current study the amount of homework was formally logged to help investigate if there was an efficiency advantage in total treatment time between the two treatments.

In this study efficiency was operationalized as the total exposure time to traumatic memories during and between sessions; the number of trauma memories processed over the course of therapy; how many sessions were required to resolve the primary trauma; and SUD levels after the initial treatment session.

Method

Participants

Following approval by the Murdoch University ethics committee and South Metropolitan Area Health Service ethics committee, 55 potential participants were recruited from the Posttraumatic Stress Clinic at Fremantle Hospital, Murdoch University Psychology Clinic, and local medical practices in Perth Australia between August 2011 and July 2013. Prior to assessment 7 potential participants disengaged; 28 participants were excluded from the study. Participants were considered suitable for study inclusion if they met the following criteria: they were willing to participate voluntarily in treatment and to undergo MRI and PET scans; they provided written consent; satisfied *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition (*DSM-IV*) criteria for PTSD; and were aged between 18 and 65 years. Participants were excluded if they met criteria for a cluster B personality disorder, a psychotic illness, or a substance dependency disorder; had received EMDR or PE for trauma previously; or were concurrently receiving a trauma-focused intervention during the study period. Details of participants excluded ($N = 35$) and those included ($N = 20$) are presented in Figure 1. The average age of the 20 participants was 42.15 years (standard deviation [*SD*] 10.94).

Design and Procedures

This study originated from a grant received for research on brain structures that may be affected by treatment for PTSD. Funding was obtained for 20 participants (a substantial number for MRI scan research); thus, the aim was to achieve 10 completers for each condition. The results of the image analysis were reported in an earlier article by Laugharne et al. (2016).

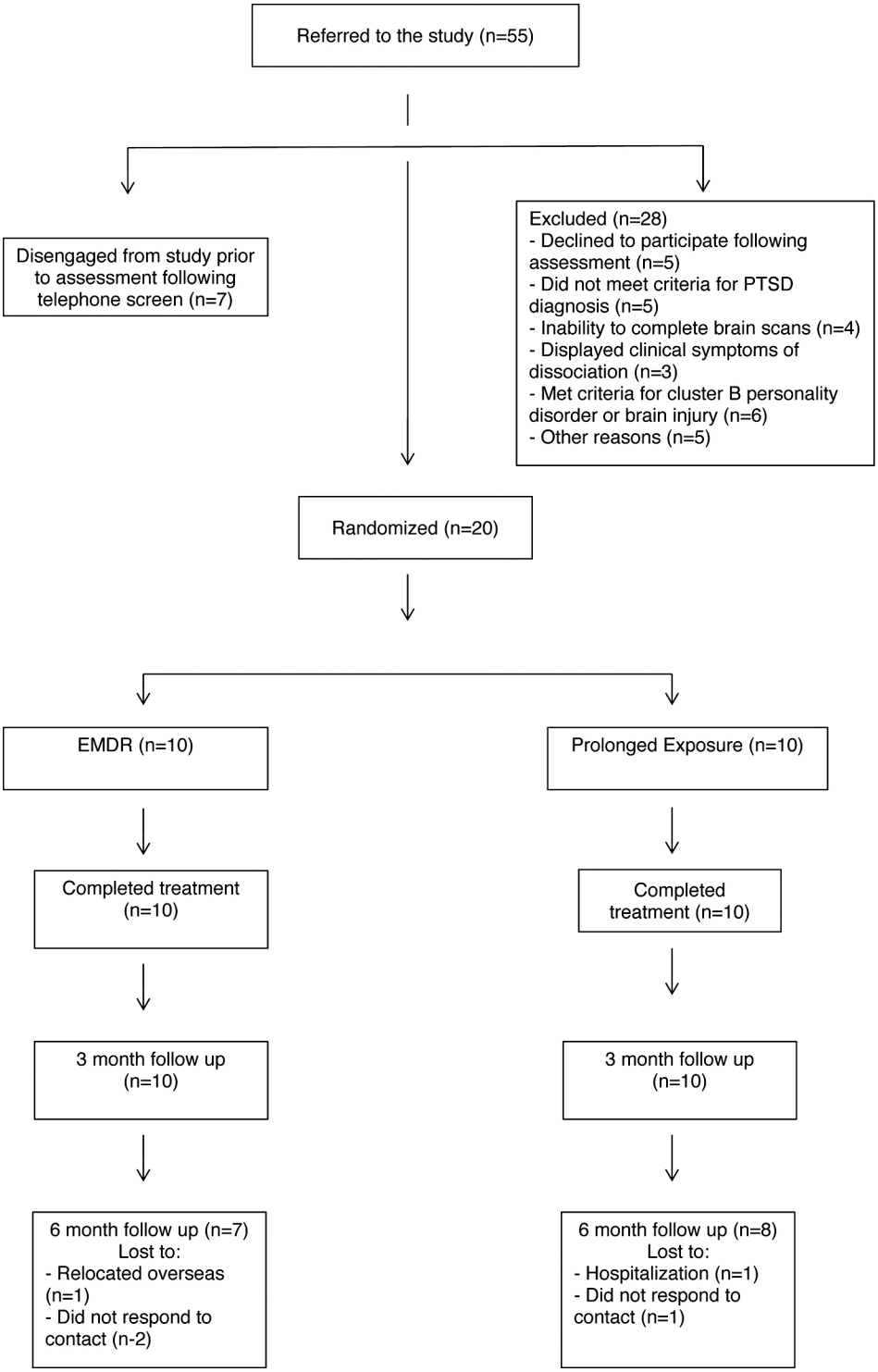

FIGURE 1. Consort flow diagram of participants.

The study was a randomized trial with a between- and within-subjects design. A randomization sequence based on a random number table was used to allocate participants to a therapist following the initial screening telephone call. Participants were then mailed appointment letters, directions, the Dissociative Experiences Scale (DES), and Structured Clinical Interview for DSM-IV TR Axis II Disorders (SCID II) questionnaires to complete. These measures were used on this one occasion only, as part of the selection process, to ensure that participants met criteria to enter the study.

The participants then attended two 90-minute initial assessment sessions (B1) at Murdoch University or Fremantle Hospital PTS clinic. The therapists were blind to the randomized allocation of group during

assessment. During the assessment a full trauma history was collected, diagnosis was confirmed with self-report and assessor measures of PTSD; inclusion criteria were established, written consent was given, and study information was provided. Participants were booked into MRI and PET scans during the 6-week time period where participants acted as their own minimal intervention wait-list group. All participants were guided through diaphragmatic breathing training as an arousal reduction technique to use during brain scans if necessary.

Participants in both conditions attended two 90-minute sessions each week for 6 weeks. At posttreatment, participants completed a posttreatment MRI scan and PET scan (Laugharne et al., 2016). Therapeutic outcomes, assessed via self-report measures of PTSD, Depression, Anxiety, and Stress, and a structured interview for PTSD were collected at five time points; assessment (baseline 1, B1), beginning of therapy (following 6 weeks of wait-list control with minimal intervention (baseline 2, [B2]), posttherapy (T3), 3 months (T4), and 6 months (T5) follow-up. Hence, at the conclusion of treatment, and at 3 and 6 months follow-up, one of three independent assessors, blind from treatment condition, administered inventory that was used at B1 and conducted a short tape-recorded interview relating to how the participant experienced the therapy and quality-of-life changes. This data is still being analyzed and will form the basis of another article.

Measures

Pretreatment assessments were conducted by the postgraduate therapist and registered mental health nurse who delivered the treatment. Posttreatment and follow-up assessments were conducted by three postgraduate clinical psychology trainees attending Murdoch University who did not administer the treatment. All of the assessors were blind to treatment conditions at the time the assessments were taken. Pretreatment assessments included the SCID-II and the DES to ensure that the participant met criteria to enter the study; these measures were taken only at pretreatment.

Several self-report and assessor-rated outcome measures were used to assess PTSD symptomatology and comorbid features of depression, anxiety, and stress throughout the study. The following measures were implemented at baseline 1 and 2 (pretreatment) and at T3, T4, and T5 posttreatment follow-up appointments.

The Clinician-Administered PTSD Scale (CAPS). The CAPS (Blake et al., 1995) was designed to assess current and lifetime PTSD symptoms for both frequency and severity. Symptoms cluster into three subscales that cover Criteria B (re-experiencing), C (avoidance), and D (arousal) of the PTSD diagnostic criteria in *DSM-IV* TR. Scoring was calculated using the F1/I2 rule that stipulates for a symptom to meet criteria the frequency must be rated 1 or higher and the intensity 2 or higher (Blake et al., 1995). The F1/I2 rule requires criterion B to have one or more symptoms met, criterion C three or more, and criterion D two or more (Keane, Weathers, & Ruscio, 1999). Participants must also meet criteria E and F for duration and distress/impairment to gain a diagnosis. For data analysis the total severity >65 rule (TSV65; Keane et al., 1999) was used. The TSV65 is an overall calculation of both frequency and severity for each symptom question with an overall score of over 65 meeting criteria for PTSD. Reliability for the CAPS is excellent, with coefficients between .90 and .97.

PTSD Checklist. The PTSD Checklist (civilian version) is a 17-item self-report questionnaire measuring PTSD symptoms over the past month in accordance with *DSM-IV* TR criteria (Weathers, Litz, Huska, & Keane, 1994). Subscales include 5 items measuring re-experiencing symptoms, 7 items measuring avoidance, and 5 items measuring hyper arousal. Each symptom is rated on a scale that indicates the degree to which the subject has been bothered by a particular symptom from 1 (not at all) to 5 (extremely). The cut point method of scoring was used where a calculation of all items provided a total score; scores above 44 were considered to signify a diagnosis of PTSD. The PTSD Checklist had good internal consistency in this sample, with Cronbach's alpha of .79.

Depression Anxiety Stress Scale (DASS-42). The DASS 42 is a self-report inventory designed to measure states of depression, anxiety, and stress (Lovibond & Lovibond, 1995). Symptoms of depression are frequently comorbid with PTSD and hence are of particular interest when measuring outcomes of PTSD (Breslau, Davis, Peterson, & Schultz, 2000). Items are rated on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). Higher scores on each subscale indicate higher levels of depression, anxiety, and stress, with each subscales scores ranging from 0 to 42. Internal consistency was excellent in this sample with Cronbach's alpha of .91 for the depression

scale, .80 for the anxiety scale, and .81 for the stress scale.

Treatment Conditions

Treatment was conducted by one postgraduate therapist and one registered mental health nurse. Both therapists had received Level I and II training in EMDR, and attended 3-day training workshops in cognitive behavioral techniques and 2-day training in prolonged imaginal exposure and in vivo exposure. In both treatment conditions, history taking and diaphragmatic breathing were covered during the assessment session, B1. This incorporated a combination of questions from the respective treatment manuals of Shapiro (2001) and Foa et al. (2007).

EMDR. EMDR was structured in accordance with the procedures outlined by Shapiro (2001). The first of 12 treatment sessions covered treatment rationale, installation of a safe place, and treatment planning. Sessions 2 to 11 involved the selection of a target memory, formulation of a negative and positive belief, identification of emotional and physical responses, and distress levels using an SUD Scale (Wolpe, 1982). The SUD scale is a Likert scale; in EMDR 11 points are used (0 = *neutral* and 10 = *maximum disturbance*). Developed by Joseph Wolpe (1982), the scale was originally 0–100, to measure self-rated disturbance before and after an intervention. Desensitization began with the participant's attention being directed to the memory, their negative belief, and current body sensations while bilateral saccadic eye movements were triggered by following the therapist's fingers (bilateral physical stimulation in the form of tapping was used for one participant when difficulties emerged with the eye movements).

Following a set of eye movements the therapist asked the client to report what they "noticed now"; they were then asked to either focus on what had emerged, on a body sensation, or, if appropriate, feedback ratings were reviewed using an SUD score. Cognitive interweaves were used at the discretion of the therapist. When disturbance had decreased to 0 or 1 SUD, a preferred positive cognition or belief was then identified and rated on the validity of cognition scale (VOCS). This scale is rated from 1 (completely untrue) to 7 (completely true) in relation to how the belief feels in relation to the memory. The positive belief statement was installed with saccadic eye movements, until the positive statement was rated as completely true. A body scan was then completed while the participant reported any negative body sensations; saccadic eye movements were continued until there were no longer any negative body sensations. Each session concluded with debriefing and closure procedures. Each new session involved evaluation of the memory targeted in the previous session. If the memory was reported with a SUD score of 1 or less, a new target was selected. In Session 12, or when all distressing memories were desensitized, a future template was established and used as a target memory to desensitize in the manner reported above.

Prolonged Exposure. PE was structured in accordance with the procedures outlined by Foa et al. (2007) and Rothbaum, Foa, and Hembree (2007). The trauma interview and breathing retraining technique were administered in the assessment sessions (B1). Each subsequent session began with a review of homework and presentation of the agenda for the session. The first session of treatment covered the treatment rationale and a review of breathing retraining homework. Session 2 consisted of psycho-education about PTSD symptomatology, and the rationale for in vivo exposure. The in vivo exposure hierarchy was constructed with concurring SUD scores (0 = *complete relaxation* to 100 = *maximum distress*) to rank the intensity of each situation. Participants were then assigned in vivo exposure homework tasks following each therapy session, as outlined in the treatment protocol.

Session 3 consisted of the presentation and administration of imaginal exposure during which the therapist directed the participant to relive the traumatic event by closing their eyes and as vividly as possible recounting the event aloud, speaking in the present tense. The therapist intervened only to guide the participant to their thoughts, images, or body sensations or to request an SUD level (taken at 5-minute intervals). Following 60 minutes of imaginal exposure the participant was encouraged to talk about their reactions to revisiting the trauma, bringing attention to their feelings, thoughts, and meaning in their life. Homework from Session 3 through to the final session consisted of listening to the audiotape of the entire session, listening to the imaginal exposure part of the session several times while recording their SUD, and embarking on the chosen in vivo exposure homework. Sessions 4 through 11 consisted predominantly of homework review, 60 minutes of imaginal exposure of either the whole memory or memory "hot spots," and setting homework. In the final session, Session 12, imaginal exposure using the whole memory was conducted followed by a review of the participant's

progress, skills learnt, and directions for continued practice.

Treatment Fidelity

Treatment sessions were recorded electronically. The files were then divided into type of treatment and whether they were early (first six sessions) or late treatment sessions (last six sessions). A member of the university clerical staff then chose four DVDs at random from each group of discs. A 3-point scale was used to rate both treatments. An approved consultant rated the eight EMDR sessions on a 15-item EMDR fidelity checklist. Each item was scored on a 3-point scale: 0 (no adherence), 1 (weak adherence), or 2 (good adherence). The mean rating for each EMDR session was 1.82 ($SD = .32$). The eight CBT tapes were rated by a therapist who had delivered CBT training approved by the Australian Psychological Society; the therapist was not a PE-approved consultant. Given that a 3-point rating scale of adherence had also been used for CBT treatments of PTSD in a previous study, the rater was asked to use the scale described above to rate each CBT tape. Therapist adherence in the CBT tapes was also high ($M = 1.88$, $SD = .24$).

Results

Sample Description

All 20 participants who began treatment completed treatment. Attrition did not occur until the 6-month follow-up time point, see Figure 1. There was no significant difference in age between the groups (EMDR $M = 39.70$, $SD = 9.55$, PE $M = 44.60$, $SD = 12.18$). Participants had experienced a range of traumas including sexual abuse, domestic violence, motor vehicle accidents, natural disasters, and physical assault. Of those assigned to EMDR, 80% reported additional traumas to those identified in the CAPS; 60% of those in the PE group reported other significant trauma histories. For both groups 60% of participants reported histories of childhood trauma. Of the total pool of participants, 25% had previously been admitted to an inpatient psychiatric ward, and 75% had a prior history of mental healthcare utilization.

Minimal Intervention

Changes during the wait-list period were assessed on multiple measures, including overall PTSD symptoms, subcategories of PTSD symptoms, avoidance, intrusions, hypervigilance, and symptoms of depression, anxiety, and stress as according to DASS. Given the large number of comparisons, Bonferroni corrections were applied. The analysis was consistent with no significant changes during this period. Mean scores for the PTSD checklist and DASS depression for this timeframe are shown in Table 1.

Data Analysis

Split Plot Analysis of Variance (SPANOVA) was used to analyze all relevant within- and between-subjects factors and interactions. This type of analysis reduces the risk of experiment-wise type 1 error, and increases the power by partitioning error (Shen & Armstrong, 2008). Time was the within-subject factor (assessment B1, pretreatment B2, posttreatment, and 3-month follow-up) and group was the between-subject factor (EMDR and PE). Within-subjects contrasts were assessed to define the time period during which significant changes occurred: p-Values of less than .05 were considered statistically significant; two-tailed tests were used throughout. At the 6-month time period (T5), data from four participants were missing due to loss of contact with two participants, one participant moving overseas and one participant being in hospital. A "Missing Completely at Random" analysis failed to identify a pattern as the expectation maximization values were not significant. Therefore, an imputation analysis was run for missing data at T5 for the PTSD checklist and DASS-42 data.

Symptom Improvement Over Time

Over the time points it was clear both treatments were successful with large effect sizes, see Table 2. There were no significant differences between the treatments in reducing PTSD symptoms or symptoms of depression over 12 sessions of treatment (Tables 1 and 2). Both treatments resulted in improvements over time. Symptom reductions were maintained (when compared with the posttherapy measures) for both EMDR and PE at both 3 and 6 months following the conclusion of therapy for all measures except the CAPS overall results. The CAPS overall scores showed a significant increase in symptoms for both groups between the 3- and 6-month time points, $F(1,13) = 5.34$, $p = .038$, $\eta_p^2 = .29$. However, there was no significant difference between the two therapy types, $F(1,13) = 1.24$, $p = .29$, $\eta_p^2 = .09$. The increase in symptoms over this time period was based on a small participant number ($n = 15$) and was for the CAPS only. All

TABLE 1. Means and Standard Deviations for Outcome Measures by Treatment Group

	Preassessment		Pretherapy		Posttherapy		3-Month Follow-Up		6-Month Follow-Up	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
CAPS overall										
EMDR	86.71	22.85			22.57	21.68	21.43	21.17	38.57	23.88
PE	77.88	13.07			17.13	16.23	18.38	13.26	24.38	11.03
PTSD Checklist										
EMDR	59.8	11.94	59	16.63	34.4	13.95	36.1	17.14	33.7	15.07
PE	59.8	11.49	53.4	12.55	34.9	12.13	35.9	17.62	28.1	8.4
DASS Depression										
EMDR	24.5	14.68	23.1	12.83	10.5	14.44	12.7	14.05	16.7	16.35
PE	25.3	10.78	19.3	10.46	7.8	7.61	12.2	13.7	12.4	10.41

Note. CAPS = Clinician-Administered PTSD Scale; DASS = Depression Anxiety Stress Scale; PE = prolonged exposure; PTSD = posttraumatic stress disorder; *SD* = standard deviation.
The analysis of baseline data demonstrated that all measures were comparable for both treatment groups.

TABLE 2. SPANOVA Results Pre–Posttreatment

Inventory	*df*	Main Effect Time *F*	Partial Eta Squared	Group × Time Interaction F	Partial Eta Squared
CAPS overall	1,13	66.3*	0.83	0.44	0.32
CAPS criterion B	1,13	87.2*	0.87	0.65	0.05
CAPS criterion C	1,13	36.9*	0.74	1.26	0.09
CAPS criterion D	1,13	25.9*	0.66	0.06	0.00
PTSDCL overall	1,18	32.6*	0.64	0.44	0.24
PTSDCL criterion B	1,18	26.4*	0.59	0.99	0.05
PTSDCL criterion C	1,18	27.5*	0.60	0.84	0.05
PTSDCL criterion D	1,18	31.7*	0.64	0.73	0.04
DASS 42 Depression	1,18	15.3*	0.46	0.44	0.02
DASS 42 Anxiety	1,18	19.3*	0.52	0.68	0.04
DASS 42 Stress	1,18	23.8*	0.57	0.60	0.03

Note. CAPS = Clinician-Administered PTSD Scale; DASS = Depression Anxiety Stress Scale; *df* = degrees of freedom; PTSDCL = posttraumatic stress disorder checklist; SPANOVA = split plot analysis of variance.
* $p < 0.01$.

the self-report measures indicated symptom improvement was maintained.

Treatment Efficiency

Total Exposure Time to Traumatic Memories During and Between Sessions. Assessing in session hours and homework hours, the average time spent in therapy overall was 20.65 (*SD* = 3.07) for the EMDR participants and 63.20 (*SD* = 23.97) for the PE participants: a difference of 42.55 hours, with EMDR participants spending significantly less time engaged with therapy in comparison to PE participants, $t(18) = -5.567$, $p = .000$, while reaching equivalent symptom reduction results. An average of 45.05 (*SD* = 23.40) hours of homework was completed by each PE participant over the treatment period. Both groups were instructed to practice diaphragmatic breathing between B1 and B2; the mean amount of time spent on this task was 2.67 (*SD* = 4.80) hours for the EMDR participants and 2.51 (*SD* = 3.17) hours for PE participants. This was the only homework task EMDR participants were required to complete. Hence, a difference of 43.38 hours between the EMDR and PE group was spent on out-of-session homework $t(18) = -5.91$, $p = .008$. The effect size was large ($\eta_p^2 = .66$).

Number of Trauma Memories Processed Over the Course of Therapy. Significantly more trauma memories were processed/desensitized in EMDR therapy ($M = 4$, $SD = 2.1$) than PE ($M = 1.5$, $SD = .9$, $t(11.9) = 3.48$, $p = .003$), with a large effect size ($\eta_p^2 = .40$).

Number of Sessions Required to Resolve the Primary Trauma. Fewer sessions were required to process the primary trauma memory for EMDR ($M = 4.75$, $SD = 3.3$) than for PE ($M = 8$, $SD = 1.5$), $t(12.6) = -2.87$, $p = .047$; $\eta_p^2 = .84$.

SUD Score Levels After the Initial Treatment Session. The SUD score (converted to a scale of 0–100 for EMDR [0–10 scale × 10] in order to compare date with PE results) at the conclusion of the initial session of processing was lower for EMDR ($M = 22$, $SD = 20.9$) than PE ($M = 59$, $SD = 24.7$); $t(18) = -3.61$, $p = .002$) with a large effect size ($\eta_p^2 = .45$), see Figure 2.

Discussion

The aim of this study was to assess the efficiency of EMDR in comparison to prolonged exposure. Both EMDR and PE were effective in symptom reduction in comparison to minimal intervention. The improvement for both treatments was maintained at 3 months; however, there was some symptom deterioration between the 3-month and 6-month follow-up.

The results showed EMDR was more efficient than PE in terms of total exposure time to traumatic memories during and between sessions; the number of trauma memories processed over the course of therapy; time taken to process the primary trauma memory; and SUD levels at the conclusion of the first treatment sessions. These results add support to previous studies that have suggested that EMDR is a more efficient treatment model than PE (Chen et al., 2015; De Bont, Van Minnen, & De Jongh, 2013; Ho & Lee, 2012).

Total Exposure Time to Traumatic Memories During and Between Sessions

The role and impact of between-session homework, which increases overall treatment exposure time, on therapeutic outcome is not well understood. The PE protocol incorporates a substantial level of between-session homework. Participants in this study completed an average of 45 hours of between-session homework, compared with less than 3 hours of homework in the EMDR group. Adherence rates were high in this study in comparison to other studies. Thus, PE required substantially more client hours overall to achieve equivalent results to EMDR.

The impact of between-session homework on treatment outcome has been questioned in research; however, it appears very little research has assessed the impact of homework on individuals with PTSD specifically (Bluett et al., 2014; Kazantzis et al., 2016). In a meta-analysis in 2010, Kazantzis, Whittington,

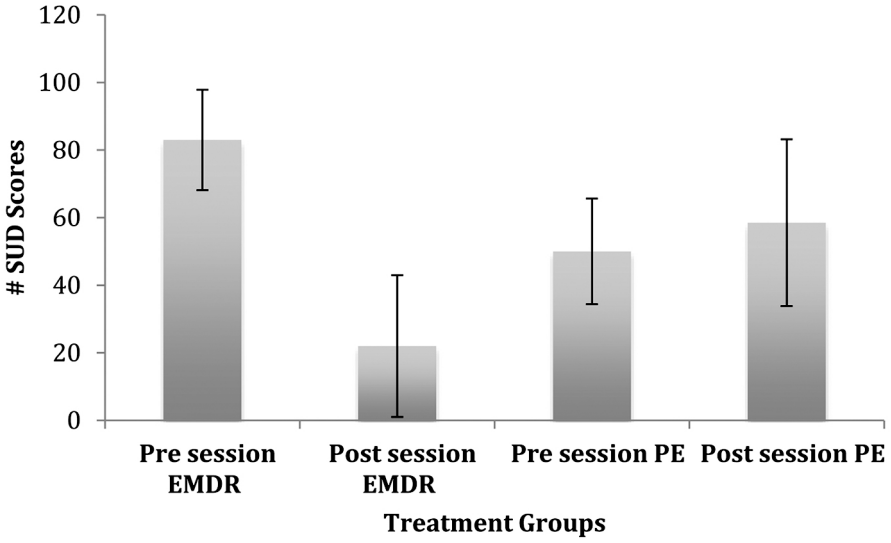

FIGURE 2. SUD scores at the beginning and the conclusion of the first treatment session.
Note. SUD = subjective units of disturbance. EMDR pre -SD = 14.87, standard error (SE) = 4.70; PE pre -SD = 15.64, SE = 4.94; EMDR post -SD = 20.98, SE = 6.63; PE post -SD = 24.70, SE = 7.81.

and Dattilio (2010) reported that therapy involving homework had superior results than therapy that did not involve homework. This was not relating to treating PTSD. In later research Kazantzis et al. (2016) reported that quantity and quality of homework compliance in CBT therapy was significantly related to treatment outcome. In relation to PTSD specifically, Bluett et al. (2014) found perceived helpfulness of homework, not adherence, had an indirect effect on the relationship between decreases in distress and clinical outcomes for PE.

Importantly, there is currently little empirical evidence assessing the impact of between-session homework on treatment outcomes or treatment efficiency for PTSD. If research confirms that between-session homework is imperative for the success of exposure therapy, understanding in what way homework impacts outcomes is vital, and whether poor adherence or perceived helpfulness is the important factor. Future research that identifies the processes of homework and the most effective amount of homework for PE may provide a true measure of efficiency. Overall, for this study we focused on efficiency as determined by looking at overall exposure time to treatment. EMDR was more efficient as it required limited out-of-session homework in this study.

Number of Trauma Memories Processed Over the Course of Therapy and Number of Sessions Required to Resolve the Primary Trauma

Treatment efficiency was also assessed by the number of trauma memories processed over the course of therapy and the number of treatment sessions taken to desensitize the primary (target) memory. EMDR resulted in both the resolution of significantly more trauma memories over an equal number of sessions (12 sessions) and significantly fewer sessions were needed to desensitize the primary (target) memory in comparison to PE in the current study. This aligns with research showing EMDR takes fewer sessions to be effective than PE (Nijdam et al., 2012; Power et al., 2002). Power et al. (2002) compared EMDR to exposure plus cognitive restructuring (E+CR) and a waiting list. Findings revealed EMDR took an average of 4.2 sessions compared to 6.4 sessions of E+CR to solicit the same symptoms outcome results (Power et al., 2002).

Nijdam et al. (2012) demonstrated that EMDR led to faster symptom decline when compared to brief eclectic psychotherapy (that included a component of imaginal exposure). They reported a more gradual improvement in the PE group. However, overall, in line with the current study, this study showed EMDR and traditional exposure resulted in the same level of symptom reduction in PTSD, depression, and anxiety at the completion of therapy (Nijdam et al., 2012). Nijdam et al. (2012) suggested that the speed of EMDR may be due to the type of exposure used: short interrupted exposures alternated with free association, resulting in more efficient memory processing (Nijdam et al., 2012), whereas traditional exposure models focus intently on the re-experiencing of the trauma in detail, prompting more gradual processing of the event.

SUD Score Levels After the Initial Treatment Session

EMDR produced an average lower SUD level at the conclusion of the first treatment session than did PE. This is consistent with previous research by Nijdam et al. (2012), who reported significantly lower distress levels (as measured by SUD) at the conclusion of the initial treatment session when comparing EMDR with PE. Again this may reflect the processes of PE, as it starts more gradually, unfolding the memory progressively from the beginning to end, increasing access (and SUD scores) throughout the session. Hence, it is anticipated in PE that SUD scores will decrease over time with homework. Interestingly, these factors did not make a difference to treatment outcome in our study, suggesting that although SUD levels decreased more gradually, symptom reductions were significant and equal to EMDR. Overall, SUD levels may demonstrate that EMDR is more efficient at desensitizing each target memory; therefore, it is more efficient at desensitizing more target memories over a period of time. Hence, it may be suggested that EMDR is more efficient at treating multiple-incident trauma where there are several traumatic memory networks.

Conclusion

Our study applied strong methodological rigor as outlined in the CONSORT guidelines and in reviews of methodological rigor (Maxfield & Hyer, 2002) The current study was registered with the clinical trials registry ANZCTR; approved trial ID ACTRN12611000843954. This study has a number of methodological strengths recommended in the CONSORT statement extension for nonpharmacologic treatments (Boutron, Moher, Altman, Schulz, & Ravaud, 2008); for example, precise details of

both treatment models, standardized adherence to treatment protocols, details of fidelity (and how adherence to the protocol was assessed), clearly defined outcome measures, details of blind assessors and clinicians, method used to generate the random allocation sequence and transparency in data analyses performed by way of effect sizes, and reporting all analyses performed; Boutron et al., 2008). However, there are limitations to this study. The small sample size limited the power to detect significant differences between groups, although effect sizes and significance levels were large for treatment outcomes.

As government policy and healthcare organizations continue to scrutinize the cost-effectiveness of mental health services, studies that assess treatment efficiency become crucial. We are faced with a population that has increased exposure to distressing events and that has less time to invest in both prolonged therapy and exercises outside of therapeutic sessions. It is vital we are selecting the most effective and efficient therapies to ensure the best outcomes in this environment.

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