Running Head: Treatment Of Trauma

The Relative Efficacy and Treatment Distress of EMDR and a Cognitive Behavior Trauma

Treatment Protocol in the Amelioration of Post Traumatic Stress Disorder.

Grant J. Devilly

and

Susan H. Spence

Department of Psychology,

University of Queensland,

Qld, 4072. Australia.

Abstract

The growing body of research into treatment efficacy with Post Traumatic Stress Disorder (PTSD) have, by-and-large, been limited to evaluating treatment components or comparing a specific treatment against wait-list controls. This has lead to two forms of treatment, Eye Movement Desensitization and Reprocessing (EMDR) and Cognitive behaviour Therapy (CBT), vying for supremacy without a controlled study actually comparing them. This research compared EMDR and a CBT variant (Trauma Treatment Protocol, TTP) in the treatment of PTSD, via a controlled, clinical study using therapists trained in both procedures. It was found that TTP was both statistically and clinically more effective in reducing pathology related to PTSD and that this superiority was maintained and, in fact, became more evident by three month follow-up. These results are discussed in terms of past research and directions for future research are suggested.

The treatment of Post Traumatic Stress Disorder (PTSD) has received considerable attention within the last few years, most notably due to the research and marketing of Eye Movement Desensitization & Reprocessing (EMDR). EMDR was initially trialed and reported by Shapiro (1989), and with a reported 100% success rate within one treatment session it quickly became the focus of debate and research. However, until now research has focussed on the utility of eye movements in EMDR (e.g. Devilly, Spence and Rapee, 1998; Pitman, Orr, Altman & Longpre, 1996), its relative efficacy in comparison to other unitary treatment regimes or, remarkably, as the sole comparison to a waitlist control (e.g. Wilson, Becker and Tinker, 1995). While comparison to a wait list control details the effect size of treatment, the current authors argue that this tells us little about the nature and relative efficacy of the technique under investigation. Specific treatments that have been utilised in comparison to EMDR include image confrontation (Sanderson and Carpenter, 1992), exposure in vivo (Muris and Merkelbach, 1998), biofeedback assisted relaxation (Carlson, Chemtob, Rusnak, Hedlund and Muraoka, 1998), and active listening (Scheck, Schaeffer and Gillette, 1998). Comparative results have been mixed, although it appears that eye movements contribute little, if anything, to the procedure. Furthermore, while EMDR appears to display superiority over inert procedures, it compares less favourably to validated, active, treatments (for a critical review of these areas readers are directed to Lohr, Tolin and Lilienfield, 1998). This study aims to add to the limited research which compares EMDR to an alternative treatment approach by comparing nine sessions of an EMDR protocol with nine sessions of an operantly cognitive-behavioral therapy protocol.

There are very few PTSD treatment - outcome studies that have validated a CBT treatment approach using adequate research methodologies. Among those that have, the studies by Keane, Fairbank, Caddell, and Zimering (1989) and Foa, Rothbaum, Riggs and Murdock (1991) are prominent. Keane et al., (1989), conducted a randomized clinical trial of implosive (flooding) therapy with 24 Vietnam veterans diagnosed with PTSD. These participants either received 14-16 sessions of implosive therapy, including relaxation training, or were assigned to a wait-list control. When compared with the controls, at post-treatment and 6 month follow-up, the experimental condition evidenced significant improvement in the symptom clusters of re-experiencing the event and anxiety and depression. However, the numbing and social avoidance aspects of PTSD did not show improvement.

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Foa et al., (1991) also compared a wait-list control (WL) with three treatment regimens; stress inoculation training (SIT), supportive counselling (SC) and prolonged exposure (PE). All 45 participants were female rape victims with a PTSD diagnosis and each received 9, bi-weekly treatment sessions of 90 minutes duration. The results revealed that all treatment conditions displayed very significant improvement at post-treatment and follow-up. Immediately following treatment SIT was associated with significantly greater improvement on PTSD symptomatology than PE, although both were significantly better than SC and WL. At follow-up (3 month) PE produced significantly greater improvement on PTSD symptomatology than the other conditions. This improvement was across all 3 symptom clusters, in contrast to the Keane et al. (1989) study. It is suggested that the inclusion of in vivo exposure during the PE protocol (Foa et al., 1991), the theorised most active ingredient in the treatment of avoidance symptoms (Marks, 1987), may have increased the treatment efficacy compared to the Keane et al., (1989) study. Foa (1995) argued that if subjects responded best in the short term with SIT, due to the anxiety management aspects of this treatment, and better in the long term with PE then a combination of the two treatments would be the most effective.

Subsequently Foa (1995), working with female rape and non-sexual assault victims, diagnosed with PTSD, compared the efficacy of WL, SIT, PE and PE+SIT. Again 9 bi-weekly treatment sessions, each of 90 minutes duration, were administered. It was found that whilst subjects in all conditions improved, the effect size of PE was larger than SIT and SIT+PE. Also patients that received PE (i.e. PE alone and PE+SIT) were significantly improved than those who did not received PE (SIT alone and WL). On the other hand, those who received SIT (SIT alone and SIT+PE) were not significantly better than those who did not receive SIT (PE alone and WL). On all other analyses, the three active groups did not differ significantly from one another, but consistently the means of PE were better than those of other groups. One possible reason for the failure of PE to show superiority over the other treatments is due to the lack of sufficient power (Foa, personal communication). However, the current authors suggest that another reason for the less favourable results of PE+SIT may be that the subjects were seen on a bi-weekly basis. The combination of exposure and stress inoculation training places considerable demands on the participant which require the attention and practice needed for all cognitive behaviour therapies. This may not have afforded time for a). consolidation of the SIT skills through home-based practice,

and b). the therapist to correct any problems concerned with the application of the techniques, that may have emerged through the practice. Subjects who see therapy as difficult or a process whereby they 'fail' certain tasks are less likely to comply with activities such as homework. This process may also compound feelings of ineffectiveness and an already low self-esteem, symptoms frequently associated with PTSD (DSM-IV, 1994).

Therefore it is suggested here that one week between sessions is likely to be preferable for maximising treatment gains from PE+SIT. Indeed, it is proposed that once weekly sessions would be the appropriate method of delivery for the PE+SIT approach and EMDR, as Shapiro (1992) has suggested one week between EMDR sessions allows the continued reprocessing of trauma related memories, that have been activated during the session.

Also due to the fact that the EMDR process contains elements of both these procedures (e.g. imaginal exposure, cognitive restructuring and guided self-dialogue) it has been decided to utilise the combined protocols of PE and SIT, but to also extend the cognitive component. This methodology will allow a direct comparison of the two procedures (EMDR and PE+SIT+COG). Furthermore, the present study will clarify whether a CBT trauma treatment protocol (TTP; PE + SIT+ COG) is as effective in treating trauma from events other than rape.

<center>Method</center>

Design

This study used a mixed groups experimental design with two conditions, namely TTP and EMDR. Time was treated as a repeated measure, with data being collected at pre-treatment, post-treatment, 2 week (postal) and 3 month (postal) follow-up. Participants were assigned to their experimental group using a stratified randomization technique: the first 10 referrals were assigned to the TTP condition (after a 50% chance of either TTP or EMDR) and the following 10 were assigned to the EMDR condition. This was done in order to consolidate therapist skills in each protocol and offset cross-pollination of the two, different, therapeutic protocols. Subsequently, subjects were assigned alternatively to the two conditions until a full cohort was obtained in each condition.

Therapists

Two therapists administered treatment with therapist A treating 8 participants in the EMDR condition and all 12 in the TTP condition and therapist B treating 3 participants in the EMDR

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condition. Both therapists were trained in EMDR to the advanced standard with therapist A being trained by Shapiro in 1992. This therapist treated all those in the TTP condition, and was an experienced CBT clinician who had also attended a training workshop on prolonged exposure with Foa in 1995. Therapist B was trained by the EMDR Institute in 1996 and was very positive and enthusiastic with regards to EMDR, an attitude fostered by the directors of this research throughout the study. Sessions were video-taped where participants agreed, and these tapes were rated by an independent assessor for therapist adherence to the two protocols. The EMDR fidelity checklist was based on that devised by the EMDR institute and obtained, with permission, from Pitman et al. (1996). The TTP integrity checklist was devised by the current authors. The independent rater was a practising clinician, associated with neither the EMDR institute nor Foa's research group. This rater had extensive experience in both EMDR (trained to level II) and CBT, and the researchers had no previous links with the rater other than casual acquaintance and therapeutic reputation. Indeed the rater was based in a different city.

Participants

Participants were self-referred following a radio announcement, publicity material and word-of-mouth. Three participants were referred by psychiatrists and one by a clinical psychologist.

Inclusion / exclusion criteria were as follows: Had undergone a traumatic incident and fulfilled DSM-IV criteria for PTSD, the trauma occurred greater than 4 weeks prior to assessment, were over the age of 18, were currently receiving no psychotherapy for PTSD, no current psychosis or organic mental dysfunction, had not previously received CBT for their symptoms nor EMDR, were not depressed with suicidal ideation judged severe enough to warrant concern for the participant's life, could be seen at the University of Queensland School of Psychology, and did not wish to use the therapy to reinforce a medico-legal claim. All participants were advised that the individual results of the research would be confidential and that video-taping would cease should they so desire.

Twenty three participants completed treatment, although it should be noted that nine participants dropped out of treatment before completion, of which three were in the TTP condition and six were in the EMDR group. Within the TTP condition one participant completed only one session before drop-out, one completed two sessions and the other completed three sessions, while within the EMDR condition five completed only the first session before drop-out and one completed

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two sessions. There appeared to be no distinguishing personal features or severity of complaints at intake which differed those who completed and those who dropped out.

Eight of the twenty three participants were men and the overall average age was 37.96 years (SD=12.82). The mean duration of symptoms was 112.44 months, but this had a high variance (SD=147.49). All participants satisfied the criteria for a lifetime diagnosis of PTSD as measured by the DSM-III-R based, clinician administered, PTSD Interview (Watson, Juba, Manifold, Kucala, & Anderson, 1991). Furthermore, all subjects received a current diagnosis of PTSD as measured by this scale and the DSM-IV based PTSD Symptom Scale - Self-Report (Foa, Riggs, Dancu & Rothbaum, 1993).

This study aimed to be representative of a practising clinicians referral base and therefore did not necessitate the participants, in any condition, to terminate any medical treatment. Of those responding, 43.48% were currently taking psychotropic medication, with 30.45% still seeing a psychiatrist, although only for their medication. Within the 3 months prior to first assessment 39.13% had seen a psychiatrist, 17.39% a psychologist and 56.52% had engaged with other health care professionals (social worker, day hospital, counselling service, etc.). Other demographic variables are presented in Table 1. Checks conducted after assignment to groups confirmed that these variables were equivelent across groups.

Measures

Severity of presenting complaints was assessed throughout the study (pre-, post-treatment, 2 week and 3 month follow-up) using the following measures; the trait measure of the Spielberger State-Trait Anxiety Inventory (STAI-Y2; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), Symptom Checklist-90-R (SCL; Derogatis, 1992), Subjective Units of Disturbance Scale (SUD; Wolpe, 1969), Personal Problem Definition Questionnaire (PPD; Devilly & Gournay, work in progress), Civilian Mississippi scale for PTSD (CMS; Keane, Caddell & Taylor, 1988), Impact of Events Scale (IES; Horowitz, Wilner & Alvarez, 1979), PTSD Symptom Scale - Self-Report (PSS-SR; Foa et al., 1993), PTSD Interview (PTSD-I; Watson et al., 1991), Credibility / Expectancy Questionnaire (CEQ), and the Distress Evaluation Scale for Treatment (DEVS-T). A noted factor in past research on Foa's protocols and Shapiro's is the lack of commonality in assessment measures and so the above measures were utilised to allow comparison between past studies on

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both EMDR and CBT.

The Spielberger State-Trait Anxiety Inventory (STAI; Spielberger et al, 1983). A test of state (Y1) and trait (Y2) anxiety, this measure has good concurrent validity, a good level of reliability for trait anxiety (test-retest reliability coefficient of .73) and, as one would expect, a low level for state anxiety (.33) (Spielberger, 1983). As state anxiety would be expected to change over time regardless of intervention, trait anxiety was used as the outcome measure in this study. This measure was administered at pre-, post-treatment and 3 month follow-up.

The Beck Depression Inventory (BDI; Beck et al., 1961). The BDI was completed by the subjects to assess mood and depressive symptomatology. This measure demonstrates high internal consistency, with alpha coefficients of .86 and .81 for psychiatric and non-psychiatric populations respectively. Concurrent validity of the BDI with respect to clinical ratings and the Hamilton Psychiatric Rating Scale for Depression with non-psychiatric populations is .60 and .74, respectively (Beck, Steer, & Garbin, 1988). This measure was administered at pre-, post-treatment and 3 month follow-up.

The Symptom Checklist-90-R (SCL; Derogatis, 1992). The SCL is a measure of psychiatric symptoms that can derive indices of global distress. With nine primary symptom dimensions as well as three global indices of distress, this measure has been used more frequently to gauge the disturbance from the PTSD array. Internal consistency coefficients (alpha) have been reported with a range from .79 for Paranoid Ideation to .90 for depression, and 10 week test-retest reliability coefficients range from .68 for Somatization to .83 for Paranoid Ideation (Horowitz, Rosenberg, Baer, Ureno & Villasenor, 1988). However, other research has questioned such factor solutions and have proposed that only the one factor (distress) be interpreted with confidence, particularly with a subject pool of mixed gender (Carpenter and Hittner, 1995; Rauter, Leonard and Swett, 1996; Cyr, McKenna-Foley and Peacock, 1985). This measure was administered at all fixed time points, and the global scale of distress (SCL-G) was used as the primary outcome measure from this assessment device due to the nature and stability of this overall index.

Subjective Units of Disturbance (SUD; Wolpe, 1969). This measure comprises a Likert-type scale (0-100) to give an indication of the degree of distress caused by the mental picture of a noxious memory / situation. While some research has suggested this scale to possess concurrent validity with physiological indicators of stress, such as pulse rate $r = .39$; $p < 0.05$) and peripheral

vasoconstriction $\underline{r}$ = -.84; $\underline{p}$ < 0.01; Thyer, Papsdorf, Davis, & Vallecorsa, 1984), other research has not found such robustness (Devilly et al., 1998). This measure was taken at all fixed time periods and during the actual treatment phases, and was treated mainly as a process variable.

The Personal Problem Definition Rating Scale (PPD; Devilly et al., 1998).The PPD is a five-item rating scale designed to elicit a subjective perspective of the major problems individuals face. Participants, under the guidance of the interviewer, define the five main problems that they perceive to be currently interfering with their day to day functioning. These problems are then rated on a 9-point Likert-type scale (0-8) for severity. Although this scale is still being investigated, it is believed to be a qualitative description of individual problems that can be quantified, and used as a goal attainment scale. Therefore, it is proposed that this scale is particularly useful when working with specifically distressed groups (e.g. PTSD). This measure was administered at all fixed time points.

The Civilian Mississippi Scale for PTSD (CMS; Keane et al., 1988).The CMS is a non-veteran measure of PTSD developed from the Mississippi Scale for Combat Related PTSD (Keane et al., 1988). There are two versions of the CMS, one containing 35 items and one containing 39 items. The version used in this study was the 39 item questionnaire as this contains four extra items reflecting changes in the DSM-III-R to DSM-IV, relating to re-experiencing symptoms, psychogenic amnesia, hypervigilance and increased arousal. This measure displays high internal consistency ($\%$−.89, split-half reliability $\underline{r}$ −.80) and can discriminate between traumatized and non-traumatized individuals, as well as being sensitive to the sequellae of different types of traumas (Lauterbach, Vrana, King & King, 1997). However, it should also be noted that the CMS appears to correlate higher with more general indices of psychopathology (e.g. BDI) than other direct PTSD measures (e.g. the Purdue PTSD Questionnaire - Revised), although it has correlated highly with both types (Lauterbach et al., 1997). This measure was administered at pre-, post-treatment and 3 month follow-up.

The Impact of Events Scale (IES; Horowitz et al., 1979). The IES is a 15 item questionnaire evaluating experiences of avoidance and intrusion which attempts to "reflect the intensity of the post-traumatic phenomena" (McGuire, 1990). Both the intrusion and avoidance scales have displayed acceptable reliability (alpha of .79 and .82, respectively), and a split-half reliability for the whole scale of .86 (Horowitz et al., 1979). The IES has also displayed the ability

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to discriminate a variety of traumatized groups from non-traumatized groups (see Brier, 1997 for review). This measure was administered at pre-, post-treatment and 3 month follow-up.

The PTSD Symptom Scale - Self-Report (PSS-SR; Foa et al., 1993). The PSS-SR questionnaire administered throughout this study was the DSM-IV based research version, which contains 17 items that derive a PTSD diagnosis and global severity score. Cronbach's alpha has been reported as .91 for the total PSS-SR score, and .78, .80 and .82 for the re-experiencing, avoidance and arousal scales, respectively. One month test-retest reliability displays .74 for the total score and .66, .56 and .71 for re-experiencing, avoidance and arousal, respectively (Foa et al., 1993). This measure was administered at pre-, post-treatment and 3 month follow-up.

The PTSD Interview (PTSD-I; Watson et al., 1991). The PTSD-I is a DSM-III-R based diagnostic interview for PTSD and was administered at pre-treatment to give a severity / frequency measure of symptomatology and to aid in a clear diagnosis of PTSD. It demonstrates high internal consistency (alpha = .92) and test-retest reliability (Total score r = .95; diagnostic agreement = 87%), as well as showing a high level of agreement with the NIMH DIS (specificity = .94, sensitivity = .89, overall hit rate = .92). The PTSD Interview was administered at pre-treatment and again at post-treatment. However, it should be noted that at post-treatment the items were asked with respect to the "last 2 weeks" and this questionnaire was not originally devised with this in mind. This shorter assessment period was selected in order to allow for comparison with another study on EMDR efficacy which adopted a similar procedure (Wilson, Becker & Tinker, 1995) and for consistency with the PSS-SR (which uses a 2-week time frame).

The Credibility / Expectancy Questionnaire (CEQ; Devilly & Borkovec, in submission; Borkovec & Costello, 1993). The CEQ is a questionnaire, the first version of which was developed for use by Borkovec and Costello (1993), which derives two factors: expectancy for change and treatment credibility (Devilly & Borkovec, work in progress). These factors have been found to be stable across different populations, with high internal consistency within each factor and very high test-retest reliability (Devilly and Borkovec, work in progress). It comprises of 6 questions, 4 on 'thinking' and 2 on 'feeling'. On the 'thinking' questions 3 are rated on a Likert-type scale from 1 (not at all), through 5 (somewhat) to 9 (very), and the fourth is rated from 0% to 100%. These questions, respectively, are: "At this point, how logical does the therapy offered to you seem"; "at this point, how successfully do you think this treatment will be in reducing your trauma symptoms";

"how confident would you be in recommending this treatment to a friend who experiences similar problems"; "by the end of the therapy period, how much improvement in your trauma symptoms do you think will occur"? One of the 'feeling' questions is rated on the 1 to 9 scale and the other on the 0% to 100% scale, and are, respectively: "At this point, how much do you really feel that therapy will help you to reduce your trauma symptoms"; "by the end of the therapy period, how much improvement in your trauma symptoms do you really feel will occur"? The CEQ was administered during the second session, after the treatment rationale was given to the participants of both conditions, and the results were not disclosed to the therapist. For analyses, all items were standardised and composites were derived for the expectancy and credibility factors.

The Distress Evaluation Scale for Treatment (DEVS-T; Devilly, work in progress). This is an eight item, rationally based, measure of the distress and intrusiveness of the technique utilised during the therapeutic experience. It contains eight items that are rated on a 9 point Likert-type scale from 1 (not at all) through 5 (somewhat) to 9 (very), and it is administered / returned after the termination of therapy. This is not a judgement of the therapist, but rather a judgement of the actual therapeutic technique. Questions include: how much distress did you experience during the first assessment session; how much distress did you experience during the first treatment session; on leaving the first therapy session, how much distress did you experience for the next few hours (This is a rating of the distress caused by the 'therapy' as opposed to your 'normal' levels of distress); how anxious were you about returning to therapy for your second treatment session; overall, how intrusive did you find the therapy; overall, how distressing did you find the whole treatment; if at the beginning of therapy you knew as much about the treatment technique as you do now, how inclined would you have been in still participating; and how likely are you to recommend this form of treatment to someone else with similar problems? The DEVS-T was returned by post at the 2 week follow-up.

Treatment Procedures

Cognitive behaviour Therapy Trauma Treatment Protocol (TTP). An overview of the TTP protocol is presented in Table 2. All sessions were conducted to give sufficient time for anxiety management techniques to be practised, problem-solved and consolidated before learning a new technique. The protocol utilised Stress Inoculation Techniques (SIT), prolonged exposure and in-depth cognitive therapy. It was decided to use only those SIT components that taught direct coping

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strategies for managing anxiety, and excluded those elements that are hypothesised to be "inert procedures" (p. 722, Foa et al., 1991). Otherwise the SIT procedure followed that outlined by Foa (1995). The deletion of some of the SIT elements allowed for a greater concentration on cognitive components in the latter part of the treatment. Firstly, discussion and behavioural experiments were used. Although cognitive challenging may lead the patient into intellectually 'knowing' that a belief is irrational, it is hypothesised that a behavioural experiment leads to a greater possibility of him / her 'believing' this. An example of this was with one patient who believed that if she stood outside a church (a conditioned stimulus) she would cry and that people would laugh at her. Her homework that week was to purposefully stand outside a church crying and test the hypothesis that people would laugh at her. In fact firstly she found it difficult to cry outside of the church and then found that people were concerned and asked if she needed their assistance. Cognitive challenging and guidance were also used during the prolonged exposure. This technique, involves encouraging the patient to "keep with the scene" yet challenge their irrational beliefs associated with that scene (e.g. "I should have done more"). It was proposed that, by accessing the traumatic schema, the patient experienced greater affect and the disputation of previously held erroneous concepts would be more meaningful. Furthermore, it was hypothesised that if the patients could dispute their own beliefs when anxious, then they would be more likely to effectively utilise cognitive challenging in stressful situations outside of the therapeutic context. Armoury cards were used throughout and provide a method of self-cuing the learned techniques at all times (Devilly & Sanders, 1993).

Eye Movement Desensitization & Reprocessing (EMDR). The first session of the EMDR condition was assigned to assessment and the exploration of the associated trauma and personal history. The protocol for the EMDR treatment was that described by Shapiro (1989, 1995) and Devilly et al., (1998). Up to eight treatment sessions were provided by the therapist and session length was as for the TTP condition, with an appropriately selected, logical, termination point for the session.

<div align="center">Results</div>

Analyses were firstly conducted into pre-treatment differences between groups. Following this a repeated measure MANOVA was applied to the PTSD measures, as it was conceptually held that these questionnaires were measuring the same underlying construct - PTSD pathology. Repeated measure ANOVAs were applied to each questionnaire related to associated pathology,

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as it was conceptually held that these were measuring different underlying pathology constructs (i.e. anxiety, depression, distress, idiosyncratic problems). These analyses were then broken down into smaller time periods using the same procedures to assess differential response between conditions at the assessed time points. Further analyses were applied to the independent ratings of treatment fidelity, treatment distress and treatment drop-out rates and response by trauma type.

Pre-Treatment

Of the 23 participants who completed the pre- and post-treatment assessments, 12 were in the TTP condition and 11 were in the EMDR condition. Non-parametric analyses conducted on the demographic data in Table 1 displayed no statistical differences ($\% < .05$) between condition. A 1-way MANOVA into the PTSD measures (PTSD-I, IES, PSS-SR and CMS) displayed no significant differences for Condition (Wilks' $Ë_{(4, 18)} = .83$, ns). Addressing concurrent validity, all the PTSD measures were correlated with each other at intake ($p < .02$). Addressing the associated measures of pathology (BDI, STAI-Y2, SCL-G, and PPD) a 1-way MANOVA again demonstrated no significant difference between the groups (Wilks' $Ë_{(4, 18)} = .95$, ns), as did a 1-way ANOVA applied to the process variable of SUD ($F_{(1, 21)} = .36$, ns).

Repeated Measures Results

All of the twenty three participants that completed the post-treatment assessment also completed the 2 week and 3 month follow-up assessments. Effect sizes (partial Eta-Squared) and Power are reported after each analysis for the interaction effects of Condition by Time, as it is believed that this is an appropriate method of reporting effect sizes in a longitudinal and comparative study.

Mean scores and standard deviations at all time periods are presented in Table 3, as are effect sizes. A repeated measures MANOVA was applied to the measures of PTSD (IES, PSS-SR and CMS) from pre-treatment, through post-treatment to 3 month follow-up. This displayed no significant effect for Condition, Wilks' $Ë_{(3, 19)} = .85$, ns, but did show an effect for Time, Wilks' $Ë_{(6, 16)} = .26$, $p < .001$, and an interaction effect between Condition and Time, Wilks' $Ë_{(6, 16)} = .37$, $p < .007$ ($c^2 = .63$, $P = .93$)[1]. The individual measures of PTSD symptomatology, over time, are presented in Figure 1. As can be seen, TTP was more effective than EMDR at all assessments with a growing, relative, efficacy over time.

This trend can also be seen with the associated measures of distress (Y2, BDI, SCL-G,

PPD and SUD), presented in figure 2. These associated measures were analysed using repeated measure ANOVAs as they are, unlike the PTSD measures, assessing different aspects of pathology. Repeated measure (2 x 3) ANOVAs were applied to both Y2 and BDI. For Y2, no significant effect was noted for Condition, $F(1, 21)$ = .55, ns, but an effect over Time, $F(2, 42)$ = 8.40, p < .001, yet no effect for the interaction of Condition over Time, $F(2, 42)$ = 1.74, ns, (c^2 = .08, P = .34). BDI likewise displayed no effect for Condition, $F(1, 21)$ = .75, ns, an effect for Time, $F(2, 42)$ = 15.35, p < .001, and no effect for the interaction, $F(2, 42)$ = 2.02, ns, (c^2 = .09, P = .39). Repeated measure (2 x 4) ANOVAs were applied to SCL-G, PPD and SUD. The SCL-G displayed no effect for Condition, $F(1, 21)$ = .69, ns, but an effect over Time, $F(3, 63)$ = 10.71, p < .001, and an effect for the interaction of Condition over Time, $F(3, 63)$ = 4.63, p < .006 (c^2 = .18, P = .87).This was also the case for PPD, with no effect for Condition, $F(1, 21)$ = 2.19, ns, but an effect for Time, $F(3, 63)$ = 28.80, p < .001, and an interaction effect, $F(3, 63)$ = 4.31, p < .008 (c^2 = .17, P = .85). SUD also displayed no effect for Condition, $F(1, 21)$ = 2.34, ns, and an effect for Time, $F(3, 63)$ = 45.96, p < .001, but only a trend towards an interaction effect, $F(3, 63)$ = 2.19, p < .10 (c^2 = .09, P = .53).

Pre- to Post-Treatment

A 2-way MANOVA was applied to the measures related directly to PTSD pathology (PTSD-I, CMS, IES and PSS-SR). While there was no effect for Condition, Wilks' $\ddot{E}(4, 18)$ = .91, ns, there was an effect for both Time, Wilks' $\ddot{E}(4, 18)$ = .07, p < .001, and for the interaction of Time and Condition, Wilks' $\ddot{E}(4, 18)$ = .54, p < .03 (c^2 = .46, P = .79).

A series of repeated measure ANOVAs were conducted for the dependent variables STAI-Y2, BDI, SCL-G, SUD and PPD. Bonferroni corrections were not applied to these analyses as it was seen that these data are measuring different aspects of pathology. This would also allow the experimental conditions the greatest latitude to display any differences and avoid leaving the researchers open to the criticism of a type II error. Trait anxiety (STAI-Y2) displayed a significant effect for Time, $F(1, 21)$ = 14.22, p < .002, but neither a significant effect for Condition, nor for the interaction between Condition and Time. The measure of depression (BDI) revealed a significant effect for Time, $F(1, 21)$ = 23.81, p < .001, but neither a significant effect for Condition, nor a Condition by Time interaction effect. The global distress measure (SCL-G) displayed a significant difference for Time, $F(1, 21)$ = 23.37, p < .001, and no effect for Condition, although the

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interaction of Time and Condition was less equivocal, $\underline{F}(1, 21) = 3.94$, $\underline{p} = .06$ ($\underline{c}^2 = .16$, $\underline{P} = .47$). SUD, likewise, displayed an effect for time, $\underline{F}(1, 21) = 70.79$, $\underline{p} < .001$, but no effect for Condition, and no effect for the interaction of these two. PPD also displayed an effect for time, $\underline{F}(1, 21) = 54.88$, $\underline{p} < .001$, but no effect for Condition, and no effect for the interaction.

       <u>Clinical Change</u> Of interest to the clinician is the issue of whether the participants in research protocols made <u>meaningful</u> reductions in symptomatology, and particularly whether they still met the criteria for PTSD after treatment. While researchers have offered various statistical methods of measuring reliable and clinical change (e.g. Jacobson and Traux, 1991), this study utilised two measures that are capable of assessing PTSD criteria. An adaption of the DSMIII-R based, clinician administered, PTSD-I was also delivered at post-treatment, as was the self-response, DSM-IV version of the PSS-SR. Ten out of the 12 participants (83.33%) in the TTP condition did not meet the diagnostic criteria for PTSD at post-treatment utilising the PTSD-I, compared to only 4 out of the 11 participants (36.36%) in the EMDR condition. Using a two tailed Fisher's exact test, this rate of clinical change is statistically different, $\underline{p} < .04$. When looking at the PSS-SR, 7 participants (58.33%) in the TTP condition did not meet all criteria for PTSD, compared to 3 participants (27.27%) in the EMDR condition. This difference was not statistically different using a two tailed Fisher's exact test. However, it should be noted that this self-report measure is prone to be very inclusive in deciding whether a participant meets the criteria for PTSD.

       Further analyses were conducted to examine the number of participants who significantly improved on PTSD symptoms in each condition. Following the suggestion of Jacobson and Traux (1991) and the procedure of Foa et al. (1991), a participant was classified as significantly improved where they scored, at post-treatment (and later in this article at 3 month follow-up), more than two standard deviations below the mean of the pre-treatment sample. This is presented in Table 4.

       A 2 X 4 chi-square test was used to examine the percentage of patients in each condition that significantly improved on the PTSD measures at post-treatment (PSS-SR, IES, CMS and PTSD-I), as shown in Table 4. The TTP condition displayed a higher percentage of participants who were significantly improved compared to the EMDR condition on all measures, $\underline{c}^2$ (3, N = 23) 9.24, $\underline{p} < .05$.

<u>Pre-Treatment to Two Week Follow-Up</u>

       A series of repeated measures analyses of variance, from pre-treatment to 2 week follow-

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up, were applied to the dependent variables SCL-G, SUD and PPD. Again, Bonferroni corrections were not applied to these analyses as it was seen that these data are measuring different aspects of pathology. Global distress (SCL-G) displayed a significant effect for Time, $F(1, 21) = 17.26$, $p <$ .001, but neither an effect for Condition, nor a significant difference on the interaction. Likewise, SUD displayed an effect for time, $F(1, 21) = 65.27$, $p < .001$, but no effect for Condition, nor a significant effect for the interaction of these two. The PPD displayed a similar result with an effect for Time, $F(1, 21) = 42.63$, $p < .001$, but no effect for Condition and no effect for the interaction of these two.

Pre-Treatment to Three Month Follow-Up

A 2-way MANOVA was applied to the measures related directly to PTSD pathology (CMS, IES and PSS-SR). While there was no effect for Condition, Wilks' Ë $(3, 19) = .87$, ns, there was an effect for both Time, Wilks' Ë $(3, 19) = .32$, $p < .001$, and for the interaction of Time and Condition, Wilks' Ë $(3, 19) = .47$, $p < .002$ ($ç^2 = .54$, $P = .96$).

Again a series of repeated measures analyses of variance were conducted for the associated measures of pathology (STAI-Y2, BDI, SCL-G, SUD and PPD). Trait anxiety significantly reduced over Time, $F(1, 21) = 6.74$, $p < .02$, but there displayed no significant effect for Condition, nor for the interaction of these two. The BDI also displayed a significant effect for Time, $F(1, 21) = 18.19$, $p < .001$, but no effect for Condition. However, the interaction of Time by Condition approached significance, $F(1, 21) = 4.19$, $p < .06$ ($ç^2 = .17$, $P = .50$). Global distress displayed no effect for Condition, but a significant effect for Time, $F(1, 21) = 9.04$, $p < .007$, and a significant effect for the interaction of Time by Condition, $F(1, 21) = 9.06$, $p < .007$ ($ç^2 = .30$, $P = .82$). SUD displayed an effect for Condition, $F(1, 21) = 4.49$, $p < .05$, as well as an effect for Time, $F(1, 21) = 53.78$, $p < .001$, and a trend towards a significant effect for the interaction of Condition and Time, $F(1, 21) = 3.98$, $p < .06$ ($ç^2 = .16$, $P = .48$). The PPD displayed an effect for Condition, $F(1, 21) = 5.17$, $p < .04$, and Time, $F(1, 21) = 33.88$, $p < .001$, and the interaction of Condition over Time, $F(1, 21) = 11.60$, $p < .003$ ($ç^2 = .36$, $P = .90$).

Clinical Change As the PTSD-I could not be administered through a postal follow-up, diagnostic change was gauged solely through the PSS-SR. In the TTP condition, seven participants (58.33%) did not meet all the criteria for PTSD, compared to only 2 participants (18.18%) in the EMDR condition. While a two tailed Fisher's exact test was not significant, it displayed a trend in the

direction of TTP superiority ($p < .09$). Again the number of participants who significantly improved was calculated and the percentages are presented in Table 4. Although a higher number of TTP participants significantly improved on all PTSD outcome measures, this percentage did not reach statistical significance, χ^2 (2, N = 23) 2.53, ns.

Post-Treatment To Three Month Follow-Up

Inspecting the means presented in Figures 1 and 2, it appears that while the TTP condition maintains, or increases, improvement in symptomatology from post-treatment to 3 month follow-up, the EMDR condition decreases in efficacy. To ascertain the veracity of such assumptions analyses were applied from post-treatment to three month follow-up. A 2-way MANOVA on the PTSD measures (PSS-SR, IES and CMS) elicited a significant effect for Condition, Wilks' Ë (3, 19) = .62, $p < .03$, with TTP displaying less severe symptomatology, but no effect for Time or the interaction of Time by Condition.

Utilising repeated measure ANOVAs for the associated measures of pathology, trait anxiety (Y2) displayed an effect for neither Condition nor Time, yet a trend for the interaction of these two, $F(1, 21) = 3.00$, $p < .10$ ($c^2 = .13$, $P = .38$), and the BDI displayed no significant effects at all. The SCL-G also displayed an effect for neither Condition nor Time, yet again a trend for the interaction of these two was apparent, $F(1, 21) = 3.03$, $p < .10$ ($c^2 = .13$, $P = .38$). Personal Problem Definition scores displayed an effect for Condition with TTP levels lower, $F(1, 21) = 5.07$, $p < .04$, an effect for Time, $F(1, 21) = 4.81$, $p < .04$, and a trend for a significant interaction effect, $F(1, 21) = 4.23$, $p < .06$ ($c^2 = .17$, $P = .50$). With respect to SUDS, while there was no significant effect for Time, there was a trend towards significance for both Condition, $F(1, 21) = 3.17$, $p < .09$, and for the interaction of Condition over Time, $F(1, 21) = 3.53$, $p < .08$ ($c^2 = .14$, $P = .43$).

Therapists and Treatment Integrity

To assess for differences in outcome that could be attributable to therapist variables, a series of Mann-Whitney U Tests were applied to the change scores from pre-treatment to 3 month follow-up for all measures for the two therapists. Even without corrections for the number of analyses, none approached significance, although it should be noted that one of the therapists only treated three participants and the degrees of freedom are accordingly small.

Treatment integrity ratings were performed by the independent rater on all video taped sessions. Eleven EMDR and eleven TTP sessions were rated on each facet of treatment delivery as

well as an overall "acceptance" level. This 7 point likert-type rating scale was rated as: 0 (unacceptable), 1 (marginal), 2 (low), 3 to 5 (acceptable), and 6 (high). All sessions were rated as at least acceptable with a mean EMDR rating of 4.91 (sd = .30, range = 4 to 5) and a mean TTP rating of 5.64 (sd = .51, range = 5 to 6). It can, therefore, be concluded that there was a good level of treatment adherence to both treatment protocols.

<u>Subsidiary Analyses</u>

The CEQ utilises two scales during it's administration (1 to 9, and 0% to 100%), and so a composite score was obtained for each factor (expectancy and credibility) by first standardizing the individual items and summing those items for each factor. Treatment credibility and expectancy was then compared between groups, using a 1-way MANOVA and a significant effect was noted, <u>Wilks' Ë</u>(2, 19) = .38, <u>p</u> < .001. There was found to be a significant difference in means for both expectancy (TTP <u>Q</u> = 1.76 (1.78) and EMDR <u>Q</u> = -1.93 (2.33)) and credibility (TTP <u>Q</u> = 1.83 (1.13) and EMDR <u>Q</u> = -2.17 (2.44)). As the expectancy and credibility factors displayed reasonable variability in scores both within each condition and overall, they were then analysed to see whether these measures correlated with change scores overall and within each condition. This was performed in order to determine whether these variables should be used as covariates. To protect against a Type II error with so many analyses, yet enable the chance of detecting a correlation with so few subjects, an alpha level of .01 was decided upon. Overall, the expectancy factor correlated with change scores from pre- to post-treatment on the SCL-G (.68) and the IES (.65), while credibility did not correlate with any changes in outcome. From pre-treatment to 3 month follow-up expectancy correlated with the SCL-G (.70), BDI (.57), Y2 (.60), PPD (.71), PSS-SR (.65), CMS (.62) and the IES (.65), while credibility again did not correlate with any changes in outcome. However, when looking <u>within</u> each condition, expectancy correlated only with the SCL-G (.74) for the TTP condition from pre- to post-treatment and at 3 month follow-up correlated again with only the SCL-G (.77). However, expectancy did not correlate with any change in outcome measures within the EMDR condition at either time point. Credibility did not correlate with any change scores within either condition. It can, therefore, be seen that the expectancy and credibility of the treatment was part of the actual treatment effect and was, on balance, a reflection of the independent variable (condition) and should not be partialled out from the analyses. However, even when expectancy was used as a covariate on SCL-G this did not

change the interpretability of the results.

Treatment distress (DEVS-T) displayed no differences between TTP ($\underline{O}$ = 38.33, sd = 11.41) and EMDR ($\underline{O}$ = 38.36, sd = 17.09), as detected by an independent $\underline{t}$-test, $\underline{t}(21)$ = .01, $\underline{ns}$, suggesting that EMDR was no more distressing to undergo as a therapeutic technique than TTP. It should be noted that nine participants dropped out of treatment before completion, of which three were in the TTP condition and six were in the EMDR group. With such small numbers, analyses leading to meaningful conclusions are prohibited. It should be noted that a full compliment (12 participants) was not obtained in the EMDR condition. The reasons for this are twofold: Firstly the dropout rate was higher in this condition, and secondly, when yet another participant was required for EMDR it had become apparent that the TTP condition was more effective (both with a high effect size and strong power) and thus the research directors were ethically obliged to discontinue this form of treatment.

Two participants in the TTP condition completed only eight of the nine sessions. This was due to them believing they were now "cured" and also displaying no symptomatology. Two participants in the EMDR condition completed only seven of the nine sessions for the same reasons. All of these participants maintained treatment gains through to 3 month follow-up. One participant in the EMDR condition received ten sessions as she was too fragile for therapy termination at session nine. This participant maintained her symptomatology and was then offered the TTP intervention after the research received her 3 month, postal, follow-up.

For comparison with past research, treatment effect sizes (Cohen's $\underline{d}$) were computed for the change in scores from pre-treatment to 3 month follow-up for each of the outcome measures for both the TTP condition and the EMDR condition. The only exception was with the clinician administered PTSD-I, for which treatment effect sizes were computed from pre- to post-treatment as this interview could not be administered at 3 month follow-up. As can be seen from Table 3, the PTSD-I derived a treatment effect size of 1.73 for the TTP condition and 1.52 for the EMDR condition. Looking at the self-report PTSD measures (CMS, IES, PSS-SR) at 3 month follow-up, a mean effect size of 1.13 for the TTP condition and 0.32 for EMDR was found. With respect to the associated measures of pathology (BDI, Y2, SCL-G, PPD) TTP obtained an average effect size of 1.10 compared to 0.31 for EMDR. The process variable (SUDs) displayed an effect size of 1.01 for TTP and 1.08 for EMDR. To provide a baseline for future research comparing these two

protocols the effect size (Cohen's d) of the interaction effect of condition by time for each measure was also computed. This was accomplished using the same methodology as past research (Devilly, Spence and Rapee, 1998), where the difference in change scores from pre-treatment to 3 month follow-up (with the exception of the PTSD-I) was divided by the total population standard deviation of the change scores. All interaction effect sizes were in the direction of TTP superiority, and ranged from .60 (moderate) to 1.19 (large).

A 2-way MANOVA (Condition X Trauma type) was applied to the change scores in the PTSD measures (IES, PSS-SR and CMS) from pre-treatment to 3 month follow-up to ascertain whether there was an interaction effect between trauma type and treatment condition. As one would expect, there was a significant effect for Condition, Wilks' Ë (3, 13) = .56, p < .05, but no effect for Trauma type, Wilks' Ë (9, 31) = .32, ns, and no interaction effect, Wilks' Ë (9, 31) = .32, ns. However, it should be noted that due to the small subject numbers this analysis is only a general indication, and not a definitive finding.

Discussion

This research examined the comparative efficacy of EMDR and TTP, an overtly CBT based approach, on participants with PTSD. The results indicated the TTP approach to be both statistically and clinically more effective than the EMDR approach, both in the short and long term, on indices measuring PTSD symptomatology. On indices measuring associated psychopathology, again the TTP proved to be more effective although to a lesser extent than with the PTSD symptomatology.

Statistical analyses of the PTSD measures from pre-treatment, through post-treatment to 3 month follow-up displayed a large interaction effect between treatment type and time, with TTP displaying superiority with a large effect size and a very acceptable power. When this was broken down into smaller time periods it became clear that TTP was more effective from pre- to post-treatment, with a reasonable effect size and high power, and that this superiority became even more pronounced from pre-treatment to 3 month follow-up. Using a clinician administered interview schedule, clinical analyses also displayed superiority in favour of the TTP condition, with 83% of the participants in that condition no longer meeting the criteria for PTSD at post-treatment compared to only 36% in the EMDR condition. Using a self-rating PTSD questionnaire (PSS-SR), at 3 month follow-up 58% of the participants in the TTP condition no longer met the criteria for PTSD

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compared to only 18% in the EMDR condition. Furthermore, more subjects displayed improvement in the TTP condition at post-treatment and at 3 month follow-up.

Looking at Cohen's measurement of effect size (d), all measures indicated TTP to have a large to very large effect size from pre-treatment to 3 month follow-up, while EMDR displayed predominantly small to moderate effect sizes. Interestingly, however, the EMDR condition displayed a pre- to post-treatment effect size of 1.52 on the PTSD-I. This clinician administered interview is based on DSM-III-R criteria and was altered at post-treatment to focus on symptoms over the past 2 weeks. However, it was included to allow for a comparison with past research who adopted a similar procedure. The derived effect size is congruent with that reported by Wilson et al. (1995), who reported an effect size of 1.28, yet remarkable in that one would expect a smaller effect size as the current research questioned "over the past 2 weeks" as opposed to "the last 7 days" as used by Wilson et al. (1995). However, the effect size of the TTP condition on this measure was even larger (1.73). The effect (Cohen's d) of the interaction between condition and time, from pre-treatment to 3 month follow-up, was in the direction of superiority for the TTP condition on all outcome measures and displayed moderate-to-large to large effect sizes. Furthermore, when looking at the significant interaction effect of the three PTSD measures for the two conditions over all measured time points (pre-, post-treatment and 3 month follow-up), it is estimated that Eta Squared equalled a very high .63 with an also exceptionally high power of .93.

Analyses of the associated measures (depression, anxiety, global distress and subjective ratings of personal problems and anxiety), from pre- to post-treatment, also displayed a superiority for TTP, although the effect size for the interaction of condition by time was not as large as for the PTSD measures. However, the gains made by the TTP participants continued to be built upon during follow-up, while the gains in the EMDR condition tended to dissipate over time.

Typically, little attention has been paid to the measurement of patients' perceptions of the distress caused by the therapeutic procedures in comparative studies. Our research attempted to address this deficiency and found that TTP and EMDR did not differ in the level of distress experienced by the participants during treatment. Overall, subjects rated both procedures as "somewhat distressing" and would be "somewhat" to "very inclined" to undergo their treatment again or recommend it to a friend with similar problems. Furthermore, the drop-out rate was higher for EMDR than TTP and this brings into question any suggestion that EMDR is 'kinder to patients'.

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Although data is not available to determine whether the higher drop-out rate reflected discomfort with the procedure, lack of credibility or some other factor, the evidence did suggest that participants in this research found the TTP condition more credible.

It is suggested that the patients in the TTP condition continued to improve during follow-up as they had not only habituated to the traumatic memories but also learned and consolidated anxiety management techniques that aided their coping when once 'triggers' re-occurred. Furthermore, utilizing verbalised, imaginary, prolonged exposure (PE) makes avoidance of the exposure a very difficult task, a factor not as evident with EMDR. The results of this study and the above suggestion are congruent with Haw and Dickerson (1998). In an analogue study Haw and Dickerson found that while EMDR (a distraction task in their research) reduced anxiety equally well as a focussed exposure task within sessions, by follow-up the gains in the EMDR condition had dissipated to a greater degree than the exposure condition. They suggest that this adds further support to the notion that "the maintenance of desensitisation effects is best served by focussed exposure" (p. 768).

Furthermore, the utilisation of a cognitive component during the exposure phase is hypothesised to help the patient proceduralize the cognitive changes needed when in high risk times and it may well be this change in cognitive perspective that underlies the efficacy of the behavioural treatments. On the other hand, with eye movements now being accepted as adding little to the EMDR protocol, it should be recognised that EMDR is also a cognitive behavioral procedure, but one which does not teach beneficial anxiety management techniques and tends to externalise any improvements that occur.

The current finding that the therapeutic effect of EMDR dissipates over time is consistent with some past research, particularly with a combat related population (e.g. Devilly et al., 1998; Pitman et al., 1995), yet not with others (e.g. Shapiro, 1989; Wilson et al., 1995). We propose that the use of a postal follow-up in the current study is partly responsible for the differential findings. Primarily, the demand effects for "the good patient role" within both procedures are reduced and, therefore, provide a more valid reflection of the participant's functioning. It is suggested that the EMDR procedure in particular has many demand characteristics which may result in a minimisation of symptomatology when follow-up data is collected by face-to-face contact. Secondly we propose that whilst blind assessor rating is conceptually expedient, in practice it becomes meaningless, as the rater would be likely to know a subject's treatment condition within the first five minutes of the

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interview, even if they were initially ignorant of the possible conditions of the research.

It could be argued that the present research is deficient in that it did not contain a wait-list control / no treatment condition. The current authors argue that such experimental conditions add very little to the value of treatment research and are ethically questionable. Furthermore, evidence is available from prior research to demonstrate the relative stability of PTSD over 3, 6 and 12 month intervals (La Greca, Silverman, Vernberg and Prinstein, 1996; Kessler, Sonnega, Bromet, Hughes and Nelson, 1995).

Although another possible criticism of this research is the use of small subject numbers, the power level of the research was found to be good and the effect sizes likewise large, and so this criticism does not hold substance. However, the major criticism of this paper is that the research utilised aspects not unique to Foa's protocol and this slightly limits the comparability of the TTP condition in this research to Foa's initial studies. It is suggested that future research address this issue by replicating the current research and investigating the utility of the various techniques used within the CBT protocol. The contribution of cognitive techniques on the amelioration of PTSD has to date not been assessed and whether a combination with behavioural strategies is superior remains unclear. We also believe that the utilisation of a video rater that did not have any financial or personal investments in either technique was a major strength of this research and a procedure that future research should also employ.

It is also suggested that, in light of current research evidencing changes in amygdalic functioning, as well as other neurobiological areas when imagining a trauma (Shin et al., 1997), future research should determine whether CBT treatment correlates with changes in neuroanatomical functioning from pre- to post-treatment. This would allow for greater appreciation of the degree to which symptomatic and biological changes covary, and suggest mechanisms of change.

In conclusion, the present study found that an operantly CBT approach involving prolonged imaginal exposure, stress inoculation techniques and cognitive therapy was superior in the short term to EMDR in the treatment of PTSD and that this relative efficacy became more pronounced over time. This effect was evident particularly for trauma symptoms and, to a lesser extent, for associated pathology.

References

Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., and Erbaugh, J. (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 561-571.

Beck, A.T., Steer, R.A., and Garbin, M.G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. Clinical Psychology Review, 8, 77-100.

Borkovec, T.D., and Costello, E. (1993). Efficacy of applied relaxation and cognitive-behavioral therapy in the treatment of generalized anxiety disorder. Journal of Consulting and Clinical Psychology, 61, 611-619.

Briere, J. (1997). Psychological assessment of adult posttraumatic states. Washington, D.C., American Psychological Association.

Carlson, J.G., Chemtob, C.M., Rusnak, K., Hedlund, N.L., and Muraoka, M.Y. (1998). Eye Movement Desensitization and Reprocessing (EMDR) treatment for combat-related posttraumatic stress disorder. Journal of Traumatic Stress, 11, 3-24.

Carpenter, K.M. and Hittner, J.B. (1995). Dimensional characteristics of the SCL-90-R: Evaluation of gender differences in dually diagnosed inpatients. Journal of Clinical Psychology, 51, 383-390.

Cyr, J.J., McKenna-Foley, J.M., and Peacock, E. (1985). Factor structure of the SCL-90-R: Is there one? Journal of Personality Assessment, 49, 571-578.

Derogatis, L.R. (1992). SCL-90: Administration, scoring and procedures manual-II. Baltimore. Clinical Psychometric Research.

Devilly, G.J. and Sanders, M.R. (1993). "Hey dad watch me": The effects of training a child to teach pain management skills to a parent with recurrent headaches. Journal of Behaviour Change, 10, 237-243.

Devilly, G.J., Spence, S.H., and Rapee, R.M. (In Press). Statistical and reliable change with eye movement desensitisation and reprocessing: treating trauma within a veteran population. Behavior Therapy.

DSM-IV. (1994). Diagnostic and Statistical Manual of mental disorders (4th edition). Washington D.C., American Psychiatric Association.

Foa, E.B. (1995). PTSD workshop. World Congress of Cognitive and Behavioural Therapies. Copenhagen, Denmark.

Foa, E.B., Riggs, D.S., Dancu, C.V., and Rothbaum, B.O. (1993). Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. Journal of Traumatic Stress, 6, 459-473.

Foa, E.B., Rothbaum, B.O., Riggs, D.S., and Murdoch, T.B. (1991). Treatment of posttraumatic stress disorder in rape victims: A comparison between cognitive-behavioral procedures and counseling. Journal of Consulting and Clinical Psychology, 59 (5), 715-723.

Haw, J., and Dickerson, M. (1998). The effects of distraction on desensitization and reprocessing. Behaviour Research and Therapy, 36, 765-769.

Horowitz, L.M., Rosenberg, S.E., Baer, B.A., Ureno, G., and Villasenor, V.S. (1988). Inventory of interpersonal problems: Psychometric properties and clinical applications. Journal of Consulting and Clinical Psychology, 56, 885-892.

Horowitz, M., Wilner, M., and Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. Psychosomatic Medicine, 41, 209-218.

Jacobson, N. S. and Traux, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. Journal of Consulting and Clinical Psychology, 59, 12-19.

Keane, T. M., Caddell, J. M., and Taylor, K. L. (1988). Mississippi scale for combat-related PTSD: Three studies in reliability and validity. Journal of Consulting and Clinical Psychology, 56, 85-90.

Keane, T.M., Fairbank, J.A., Caddell, J.M., and Zimmering, R.T. (1989). Implosive (flooding) therapy reduces symptoms of PTSD in Vietnam combat veterans. Behavior Therapy, 20, 245-260.

Kessler, R.C., Sonnega, A., Bromet, E., Hughes, M., and Nelson, C.B. (1995). Posttraumatic stress disorder in the national comorbidity survey. Archives of General Psychiatry, 52, 1048-1060.

La Greca, A.M., Silverman, W.K., Vernberg, E.M., and Prinstein, M.J., (1996). Symptoms of posttraumatic stress in children after Hurricane Andrew: A prospective study. Journal of Consulting and Clinical Psychology, 64, 712-723.

Lauterbach, D., Vrana, S., King, D.W., and King, L.A. (1997). Psychometric properties of the civilian version of the Mississippi PTSD Scale. Journal of Traumatic Stress, 10, 499-513

Lohr, J.M., Tolin, D.F., and Lilienfeld, S. O. (1998). Efficacy of Eye Movement Desensitization and Reprocessing: Implications for behavior therapy. Behavior Therapy, 29, 123-156.

Marks, I.M. (1987). Fears, phobias, and rituals: Panic, anxiety and their disorders. Oxford, Oxford University Press.

McGuire, B. (1990). Post-traumatic stress disorder: A review. The Irish Journal of Psychology, 11, 1-23.

Pitman, R.K., Orr, S.P., Altman, B., Longpre, R.E., Poiré, R.E., and Macklin, M.L. (1996). Emotional processing during Eye Movement Desensitization and Reprocessing therapy of Vietnam veterans with chronic posttraumatic stress disorder. Comprehensive Psychiatry, 37, 419-429.

Rauter, U.K., Leonard, C.E., and Swett, C.P. (1996). SCL-90--R factor structure in an acute, involuntary, adult psychiatric inpatient sample. Journal of Clinical Psychology, 52, 625-629

Sanderson, A., and Carpenter, R. (1992). Eye movement desensitization versus image confrontation: A single-session crossover study of 58 phobic subjects. Journal of Behavior Therapy and Experimental Psychiatry, 23, 269-275.

Scheck, M.M., Schaeffer, J.A., and Gillette, C. (1998). Brief Psychological Intervention with traumatized young women: The efficacy of Eye Movement Desensitization and Reprocessing. Journal of Traumatic Stress, 11, 25-44.

Shapiro, F. (1989a). Efficacy of the eye movement desensitization procedure in the treatment of traumatic memories. Journal of Traumatic Stress, 2, 199-223.

Shapiro, F. (1992). Three day training course (levels 1 and2) in EMDR. Gold Coast, Australia.

Shapiro, F. (1995). Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures. Guildford Press, New York.

Shin, L.M., Kosslyn, S.M., McNally, R.J., Alpert, N.M., Thompson, W.L., Rauch, S.L., Macklin, M.L., and Pitman, R.K. (1997). Visual imagery and perception in posttraumatic stress disorder: A positron emission topographic investigation. Archives of General Psychiatry, 54, 233-241.

Spielberger, C.D., Gorsuch, R.L., Lushene, R.D., Vagg, P.R., and Jacobs, G.A. (1983).

Manual for the State-Trait Anxiety Inventory. Palo Alto, Consulting Psychologists Press.

Thyer, B.A., Papsdorf, J.D., Davis, R., and Vallecorsa, S. (1984). Autonomic correlates of the subjective anxiety scale. Journal of Behavior Therapy and Experimental Psychiatry, 15, 3-7.

Watson, C.G., Juba, M., Manifold, V., Kucala, T., and Anderson, P.E.D. (1991). The PTSD Interview: Rationale, description, reliability, and concurrent validity of a DSM-111-based technique. Journal of Clinical Psychology, 47, 179-188.

Wilson, S.A., Becker, L.A., and Tinker, R.H. (1995). Eye movement desensitization and reprocessing (EMDR) treatment for psychologically traumatized individuals. Journal of Consulting and Clinical Psychology, 63, 928-937.

Wolpe, J. (1969). The practice of behavior therapy. New York: Pergamon Press.

Table 1.

Demographics for participants by condition

	ALL(%)	TTP(%)	EMDR(%)
Sex			
Males	34.78	41.67	27.27
Education			
Secondary	26.09	25.00	27.27
College	8.70	8.33	9.09
Tertiary	65.22	66.67	63.64
Marriage			
Single	43.48	58.33	27.27
Married	34.78	25.00	45.46
Divorced	17.39	16.67	18.18
Defacto	4.35	0.00	9.09
Living Partners			
Alone	21.74	33.33	9.09
With child	13.04	8.33	18.18
With sibling	4.35	0.00	9.09
With spouse	26.09	16.67	36.36
With spouse & Child	21.74	16.67	27.27
With friend	8.70	16.67	0.00
Other	4.35	8.33	0.00
Accommodation			
House	65.22	66.67	63.64
Unit	30.44	25.00	36.36
Caravan	4.35	8.33	0.00
Medication (over past 3 months)			
Psychotropic	56.52	66.67	45.46
Only non-psychotropic	13.05	16.66	9.09
No medication	30.44	16.67	45.46
Still taking psychotropic	43.48	41.67	45.46
Trauma Type			
Accident / disaster	26.09	25.00	27.27
Non-sexual assault	30.44	41.67	18.18
Sexual assault	34.78	25.00	45.46
War zone	8.70	8.33	9.09
Age $\bar{Q}$ (sd)	37.96 (12.82)	35.92 (14.53)	40.18 (10.90)

Table 2.

Treatment Protocol for the TTP Condition.

Session 1:	Assessment interview and breathing
	- Begin treatment rationale, if time (90 minutes)
Session 2:	Education and treatment planning
	- Measure credibility of therapy
	- Construct exposure hierarchy (90 minutes)
Session 3:	Deep muscle relaxation and breathing retraining
	Cue controlled and differential relaxation
	Thought-stopping (90 minutes)
Session 4:	60 minute exposure to traumatic scene - Taped (90 minutes)
Session 5:	30-45 minute exposure to traumatic scene
	Beck/Ellis cognitive restructuring (120 minutes)
Session 6:	30-45 minute exposure to traumatic scene
	Guided self-dialogue (120 minutes)
	Armoury cards X 2
Session 7:	30-45 minute exposure to traumatic scene
	Cognitive intervention
	- Discussion and behavioural experiment (90 minutes)
Session 8:	30-45 minute exposure to traumatic scene
	Cognitive intervention during exposure
	- Activate traumatic schema
	Make new tape (90 minutes)
Session 9:	30-45 minute exposure to traumatic scene
	- Activate traumatic schema
	Review coping skills
	Termination (90 minutes)

Figure 1. Mean PTSD Outcome Scores Over Time Between TTP and EMDR
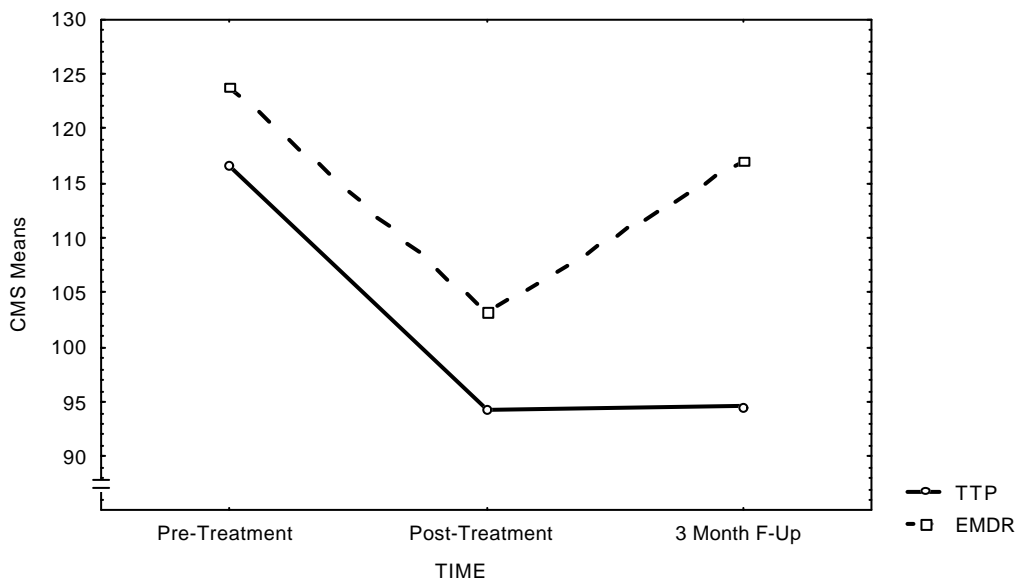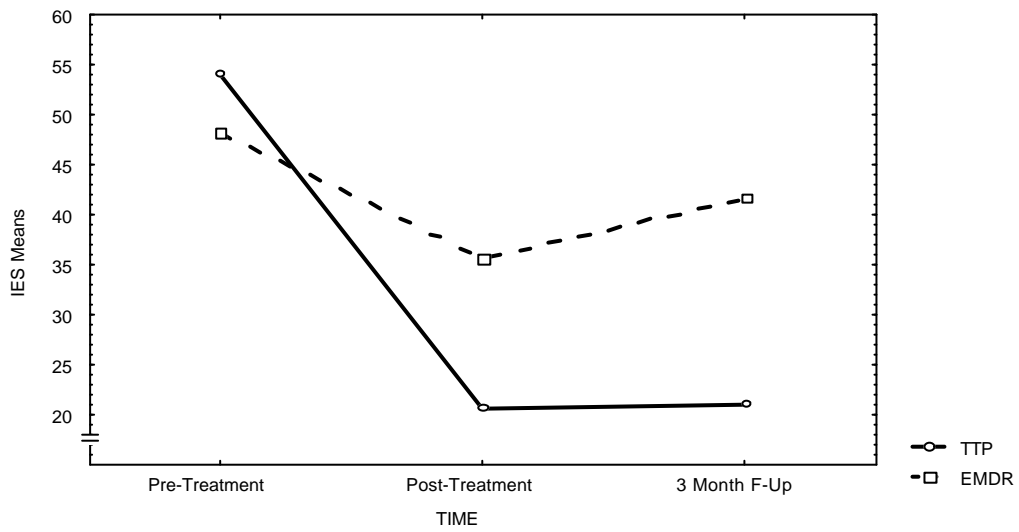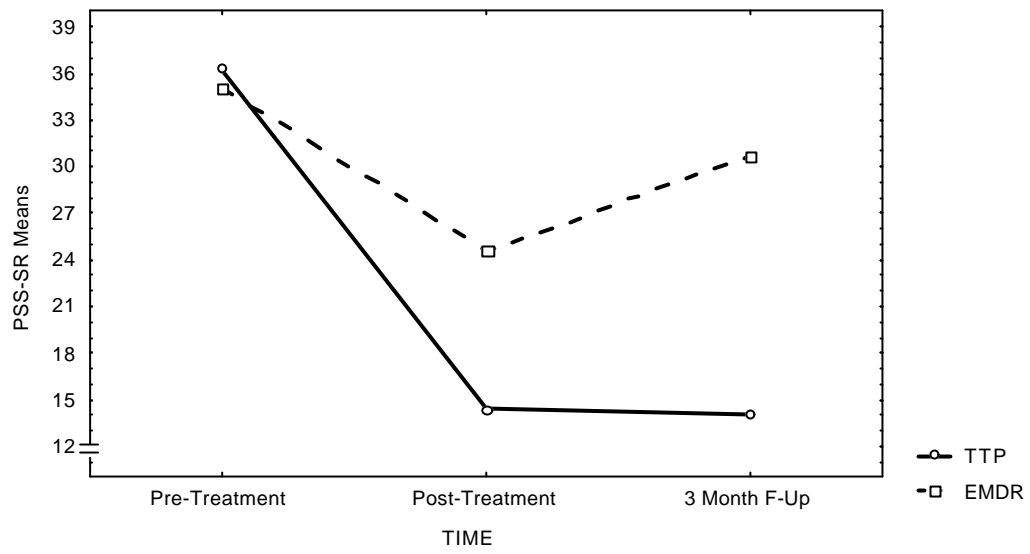
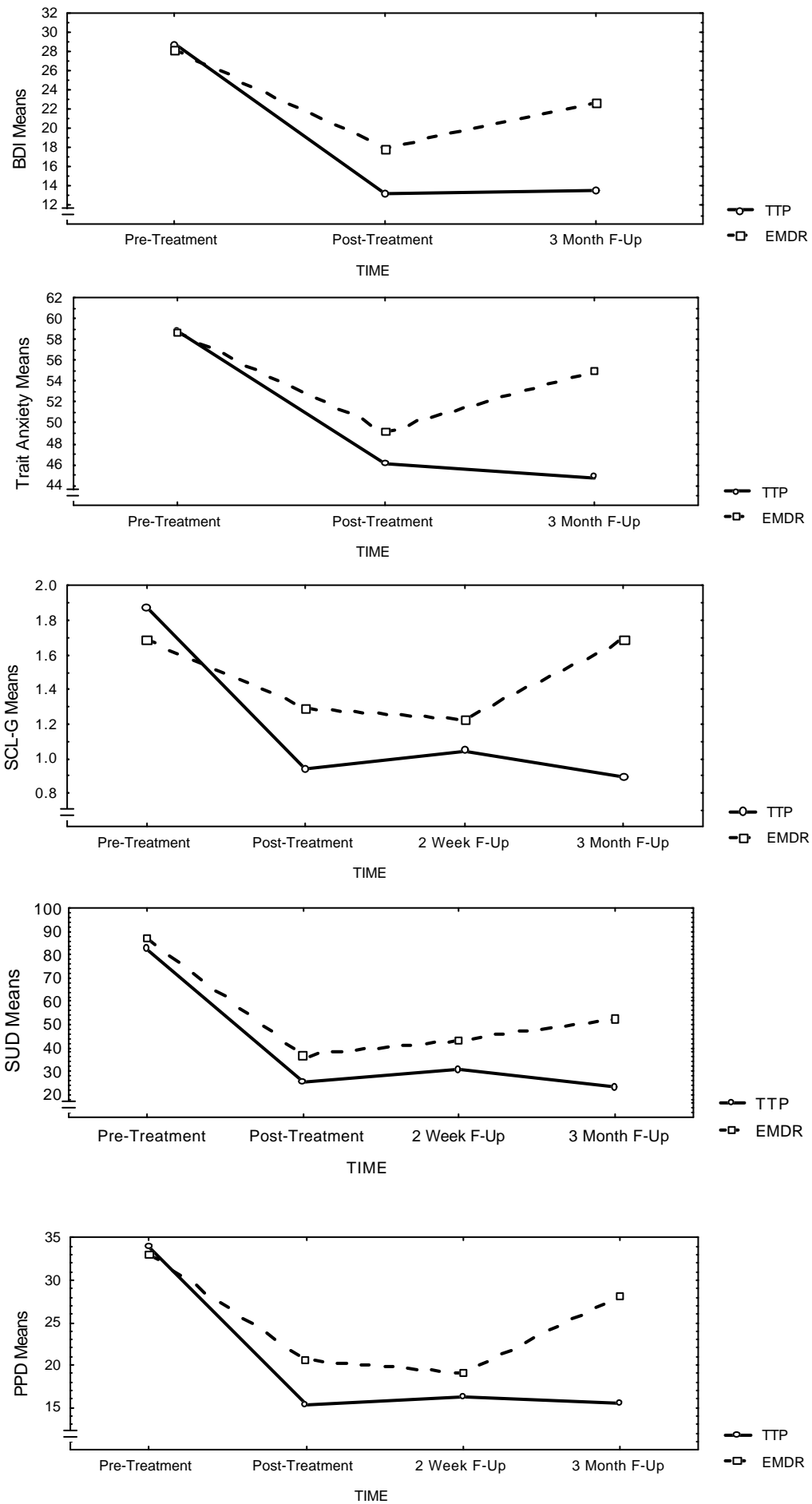Figure 2. Mean Scores Of Associated Pathology Over Time, Between TTP and EMDR

Table 3. Pre-, Post-treatment, 2 week and 3 Month Follow-up Means (and SD) for EMDR (N=11) and TTP (N=12).

Measure	Group	Pre-treatment	Post-treatment	2 Week Follow-up	3 Month Follow-up	Cohen's $\underline{d}$ (P) a	b
Spielberger Trait Anxiety	TTP	58.83 (11.18)	46.08 (19.66)	----	44.75 (22.45)	0.8	0.62 (0.42)
	EMDR	58.73 (7.02)	49.18 (15.63)	----	55.09 (17.12)	0.3	
Beck Depression Inventory	TTP	28.83 (7.93)	13.25 (14.39)	----	13.58 (14.46)	1.1	0.80 (0.58)
	EMDR	28.18 (14.25)	18.00 (15.74)	----	22.82 (16.25)	0.4	
SCL-90-R Global Distress	TTP	1.88 (.59)	.94 (.88)	1.05 (1.00)	.90 (.98)	1	1.08 (0.81)
	EMDR	1.69 (.72)	1.30 (.92)	1.23 (1.01)	1.69 (1.13)	0	
Subjective Units of Disturbance	TTP	82.50 (21.80)	25.42 (28.32)	30.83 (28.11)	22.92 (22.41)	1	0.78 (0.57)
	EMDR	86.82 (10.55)	36.82 (31.80)	43.18 (30.68)	52.73 (36.90)	1.1	
Personal Problem Definition	TTP	34.00 (3.19)	15.33 (10.30)	16.33 (12.47)	15.58 (10.98)	1.5	1.17 (0.86)
	EMDR	33.09 (5.36)	20.55 (11.23)	19.00 (11.72)	28.27 (9.24)	0.6	
Civilian Mississippi Scale	TTP	116.58 (19.10)	94.33 (27.98)	----	94.58 (35.35)	0.7	0.60 (0.40)
	EMDR	123.73 (20.95)	103.27 (32.31)	----	117.00 (28.78)	0.3	
Impact of Events Scale	TTP	54.08 (13.76)	20.75 (22.28)	----	21.08 (22.77)	1.3	1.19 (0.87)
	EMDR	48.36 (11.10)	35.64 (21.66)	----	41.72 (23.13)	0.4	
PTSD Symptom Scale	TTP	36.25 (9.56)	14.42 (14.13)	----	14.08 (14.74)	1.3	1.17 (0.86)
	EMDR	35.09 (11.35)	24.64 (16.10)	----	30.72 (16.40)	0.3	
PTSD Interview (DSMIII-R)	TTP	92.75 (9.77)	34.17 (20.63)	----	----	1.7	0.81 (0.60)
	EMDR	91.82 (14.87)	49.54 (20.39)	----	----	1.5	
Distress Evaluation Scale	TTP	----	----	38.33 (11.41)	----	----	----
	EMDR	----	----	38.36 (17.09)	----	----	

Note: Cohen's $\underline{d}$ (P) = effect size (Power at á = .05): a = over time between pre-treatment and 3 month follow-up for each condition, b = for the interaction of condition over time (pre-treatment to 3 month follow-up). The effect size and power for the PTSD scales combined, obtained from a (2 X 3) MANOVA using the CMS, IES and PSS-SR, was $\underline{\varsigma}^2$ = .63, $\underline{P}$ = .93.

Table 4.

Percentage of Participants Significantly Improving at Post-treatment and 3 Month Follow-up.

Measure	Time Period	TTP (N=12)	EMDR (N=11)
PTSD Symptom Scale	Post-treatment	75.00%	27.27%
	3 month follow-up	66.67%	27.27%
Impact of Events Scale	Post-treatment	66.67%	36.36%
	3 month follow-up	66.67%	27.27%
Civilian Mississippi Scale	Post-treatment	50.00%	36.36%
	3 month follow-up	41.67%	9.09%
PTSD Interview	Post-treatment	91.67%	72.73%

Footnotes

[1]   Effect size and power is provided for all interaction effects as the Condition X Time
        interaction is the statistic of primary importance with the design of this study ($\underline{c}^2$ =
        Eta Squared, $\underline{P}$ = Power).