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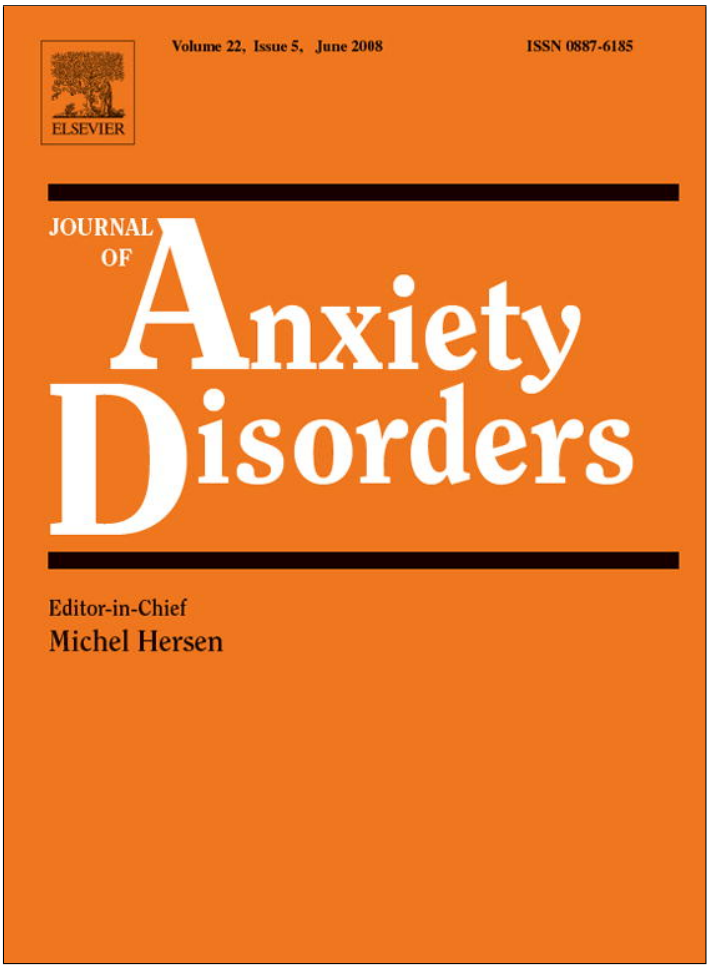

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Effects of eye movement versus therapist instructions on the processing of distressing memories

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Abstract

The effectiveness of components of eye movement desensitization and reprocessing (EMDR) was tested by randomly assigning 48 participants to either an eye movement or an eye stationary condition and to one of two types of therapist instructions (reliving or distancing). Participants were university students (mean age 23) who were asked to recall a personal distressing memory with measures of distress and vividness taken before and after treatment, and at follow-up. There was no significant effect of therapist's instruction on the outcome measures. There was a significant reduction in distress for eye movement at post-treatment and at follow-up but overall no significant reduction in vividness. Post hoc analysis revealed a significant reduction in vividness only for the eye movement and distancing instruction condition. The results were consistent with other evidence that the mechanism of change in EMDR is not the same as traditional exposure.
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Keywords: EMDR; Eye movement; Randomized comparison

1. Introduction

EMDR has been acknowledged as an evidence-based form of treatment for post-traumatic stress disorder in the United Kingdom by the National Institute for Clinical Excellence (2005), in America by the American Psychiatric Association (2004), in Australia by the Australian Centre for Posttraumatic Mental Health (2007), and in the Netherlands by the Dutch National Steering Committee for Guidelines for Mental Health Care (2003). However, the mechanism of action for the success of EMDR remains controversial (Rogers & Silver, 2002; Smyth & Poole, 2002).

Previous studies of traditional exposure techniques have emphasized that 'reliving' is a key process in recovery during treatment (Jaycox, Foa, & Morral, 1998). However, reliving was not associated with improvement in a study of key processes during EMDR for 44 participants with post-traumatic stress disorder (Lee, Taylor, & Drummond, 2006). Instead the greatest improvement occurred when clients gave distancing responses. 'Distancing' involved focusing on the trauma material but from an observational or detached perspective. Furthermore, cross-lagged panel correlations were consistent with the proposition that distancing was a consequence of the EMDR procedure rather than a response that covaried with improvement.

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Although the findings from this study suggested that distancing during EMDR is related to improvement, they did not provide any evidence as to what ingredients of EMDR cause the distancing. Distancing could be promoted by two distinct mechanisms: therapist instructions or eye movement (Lee et al., 2006). For example, in the introduction to the desensitization phase, Shapiro (1995) recommended that the client be instructed to "Imagine you are on a train and the scenery is passing by. Just notice the scenery without trying to grab hold of it or make it significant" (p. 107). The emphasis in the process is "Let whatever happens happen" and "To just notice . . . whatever arises" (Shapiro, 1995: pp. 127–128). Smyth and Poole (2002) also observed that the therapist instructions during EMDR may encourage 'mindful observation' of the traumatic experience which is similar to the distancing concept described above. They likened the instructions during EMDR to the practice of mindful acceptance which has been recommended as an important process in facilitating treatment in traditionally difficult-to-treat populations (Segal, Williams, & Teasdale, 2002).

Alternatively, eye movements themselves might generate distancing, perhaps by disrupting the "visuospatial sketchpad" (Andrade, Kavanagh, & Baddeley, 1997) or by producing a de-arousal effect through initiating an orienting response (Barrowcliff, Gray, Freeman, & MacCulloch, 2004). That eye movements do indeed promote distancing received empirical support from a study on the effects of eye movements, finger tapping, and a control condition not involving eye movement or finger tapping on the emotive memories of undergraduate students (van den Hout, Muris, Salemink, & Kindt, 2001). The memories were rated as less aversive after an exposure intervention accompanied by eye movements, but not after the other interventions. In addition, eye movements led to a greater reduction on a vividness measure. Similarly, the degree of aversiveness and degree of vividness of personal memories decreased significantly more during an exposure task accompanied by eye movement than by spatial tapping (Andrade et al., 1997).

A greater reduction in arousal and vividness for memories associated with fear and anxiety was also found for eye movement over an eye stationary condition using physiological measures of arousal (Barrowcliff et al., 2004). Finally, Kavanagh, Freese, Andrade, and May (2001) found that eye movement resulted in reduced ratings of distress and vividness compared to a no eye movement condition and a passive visual interference task.

The present study attempted to find which of the two ingredients of EMDR linked to the distancing response – eye movement or instructions – produce the most improvement in a non-clinical sample. Participants were randomly assigned to either an EMDR treatment, which involved eye movement, or an identical procedure that did not involve eye movement. In addition, therapists were instructed either to encourage the participant to take a distancing perspective on the traumatic memory or to maximize reliving in a manner similar to that which occurs during traditional exposure treatments. The objective was to test the effects of eye movement and distancing instructions on changes in vividness and emotional response immediately after treatment and at 1-week follow-up.

2. Method

2.1. Participants

Study participants were recruited from psychology undergraduate courses at an Australian University and received course credit for participating in the research. Of the 59 recruited, 10 were excluded because their distress at pretest was so high that the intervention might have been harmful. Another participant was excluded because the level of distress was too low. The 14 men (29.2%) and 34 women (70.8%) who completed treatment ranged in age from 18 to 38 years (mean age 23, median 21). Apart from four participants, who were international students, the sample was predominantly Caucasian Australian. All participants were given an information sheet on the study and were asked to sign a consent form approved by the Murdoch University human research ethics committee.

2.2. Measures

2.2.1. Dissociative experiences scale (DES-II: Carlson & Putnam, 1993)

This is a 28-item questionnaire designed for screening dissociative tendencies in both non-clinical and clinical samples. High scorers in college student samples have been identified as those scoring above 30 (Zingrone & Alvarado, 2001). The DES-II appears to have satisfactory internal consistency with coefficient alpha values for college students ranging from .92 to .94 (Gibbs & Rude, 2004; Zingrone & Alvarado, 2001).

2.2.2. Impact of event scale (IES: Horowitz, Wilmer, & Alvarez, 1979)

This is one of the most widely used self-report measures of post-trauma symptomatology. The original IES assesses the extent of avoidance, numbing and

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intrusion symptoms. Its advantages are that it has been used across a number of different trauma samples and that it is very easy to administer (Newman, Kaloupek, & Keane, 1996). Coefficients of internal consistency across studies range from .79 to .92 and it has proven sensitivity for detecting treatment effects (Weiss and Marmar, 1997). There are published guidelines on three levels of clinical concern with scores less than 9 as low, 9–19 as medium and greater than 19 as high (Horowitz, 1982).

2.2.3. Subjective units of discomfort scale (SUDS)

This was one of two primary outcome measures used in the study. SUDS is a widely used measure of intensity of subjective distress (Wolpe, 1991). It is an 11-point scale where 10 reflects the highest level of distress or disturbance and 0 the lowest level or absence of distress/disturbance. It has been shown to correlate with several physiological measures of stress (Thyer, Papsdorf, Davis, & Vallecorsa, 1984).

2.2.4. Vividness scale

This was the second primary outcome measure used in the study. The indication of the degree of vividness associated with a particular image involved asking the participant to hold the image in mind for 10 s and then indicate on a 10 cm visual analogue scale the degree to which the image appeared vivid from "not clear at all" (extreme left) to "very clear" (extreme right). This is identical to a procedure used in previous studies on vividness (van den Hout et al., 2001).

2.2.5. Expectancy scale

This measure was designed to assess the degree to which the student expected their assigned treatment condition to be successful. The 10-point scale was based on expectancy and credibility items used in previous research (Borkovec & Nau, 1972; Feske & Goldstein, 1997). However, given that only expectancy has been found to contribute to treatment outcome (Devilly & Borkovec, 2000), the credibility items were dropped.

2.3. Procedure

2.3.1. Participant screening and safety issues

To avoid increasing the distress levels of participants with dissociative tendencies, those eight who scored more than 30 on the DES-II were excluded prior to any discussion of trauma memories. The remaining 51 participants were asked to recall a stressful or traumatic experience. However, they were asked not to choose anything that was highly distressing. This was quantified for them by introducing the SUDS. They were asked to recall an incident that was associated with a score of approximately 6 on this scale. Three participants were excluded at this point, two because their SUDS scores were too high (9) and one because she could not recall a memory associated with any distress greater than a SUDS of 2. Participants were then asked to describe the memory and to fill out an IES for that event. They were then taught a relaxation procedure that involved controlled breathing (rate of 10 breaths per minute) as a tool to enable them to calm themselves should they become distressed during the treatment. However, none of the participants needed to do this during the treatment.

After the breathing training, the participant was allocated to a treatment condition (see Section 2.3.2) by the therapist drawing the top unmarked therapist instruction package from a pile that had been shuffled by a person who was unaware of the package content. Treatment rationales were then given as per the instructions in the package for the particular assigned condition, and the therapist administered the Expectancy Scale. Treatment was then administered.

2.3.2. Treatments

There were four treatment conditions (eye movement/distancing, eye movement/reliving, eye stationary/distancing, eye stationary/reliving). Phase 3 of the EMDR protocol was followed in all conditions (Shapiro, 2001). First the therapist guided the client to identify the worst moment/image from the traumatic memory. The therapist then attempted to elicit a negative cognition (self-statement related to the memory) using Socratic dialogue. If this was not successful after 5 min, the participant was shown a list of generic negative cognitions and asked to select the one that best matched their experience. A similar process occurred for a positive cognition. Participants then identified the present affect associated with the experience, the physical location of any distress associated with this affect, and rated their overall distress on the SUDS. Phase 4 of the EMDR treatment – focusing on a moving (or stationary) finger – began at this point and proceeded until the SUDS was 0 or 45 min had elapsed since the beginning of this treatment phase.

In both the eye movement and eye stationary conditions the therapist followed Shapiro's (2001) recommendations for targeting an old memory, except that participants in the eye stationary condition were instructed to keep their eyes still for an equivalent amount of time to the time spent performing eye

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movement in the other condition (approximately 24 s for each trial).

In the group of participants receiving reliving instructions, the therapist directions differed from the standard protocol. If the participant did not give a response following a set of eye movements (or an eye stationary period) consistent with reliving, the therapist instructed the participant to refocus on the experience to try to imagine that it was still happening to them now; the therapist then proceeded with the next set of eye movements or eyes stationary time. If the participant gave a response consistent with reliving, the therapist said "good, you are doing well."

For those given distancing instructions, failure to give a response that indicated distancing had occurred resulted in the therapist giving instructions to imagine being removed from the scene in some way. This included suggestions of a perceptual distortion. Examples of this were to ask the participant to see the event projected onto a movie screen or to see the event as if it was happening to somebody else. If the participant gave a response consistent with distancing the therapist would say "good, you are doing well."

At the conclusion of the desensitization phase each participant was re-tested on the SUDS and Vividness Scale by the therapist. A week later the SUDS and Vividness Scale were re-administered while the student recalled the traumatic event.

2.3.3. Therapists

Four post-graduate clinical psychology students administered the procedures. Prior to the study, each therapist had undergone level I EMDR training (accredited by the international EMDR association) and had seen six clients under supervision of the primary author.

2.3.4. Testing condition integrity

After all the data had been collected, a rater who had been trained in a previous study (Lee et al., 2006) examined the tapes and coded each participant's response according to whether distancing or reliving content occurred. This data was then analyzed to test the effects of the therapist instruction manipulation.

3. Results

3.1. Preliminary analysis

The SUDS scores of the participants indicated that most chose memories with a moderate degree of discomfort (mean = 6.40, S.D. = 1.96). Most participants chose an interpersonal conflict where they felt either anger (18.8%) or shame (16.7%). Traditional trauma events involving threat to life (14.6%) or physical integrity (14.6%) or witnessing the death of another (8.3%) were next most common. Seven (14.6%) chose an incident where they first became phobic of a particular object. Other incidents included seeing someone else suffer, childhood fears, failing exams and motor vehicle accidents not involving threat to life. The associated scores on the IES indicated a medium level of trauma symptomatology (mean = 13.23, S.D. = 10.66). Table 1 provides the mean outcome scores for each treatment condition over time. There were no significant mean differences in pre-treatment scores between participants assigned to the eye movement or eye stationary conditions in SUDS, $t(46) = .50$, $p = .62$, or vividness, $t(46) = .81$, $p = .42$. There were also no significant mean differences in pre-treatment scores between participants assigned to the distancing or reliving conditions in SUDS, $t(46) = .83$, $p = .41$, or vividness, $t(46) = -.29$, $p = .77$. Thus, the random assignment appears to have resulted in each condition having equivalent dependent measure scores prior to the intervention.

Most participants expected that the treatment would help them. The mean expectancy ratings for the four conditions were as follows: 6.50 (S.D. = 3.02) for the reliving condition with eye movement; 5.83 (S.D. = 1.59) for the reliving condition without eye movement; 5.25 (S.D. = 3.02) for the distancing condition with eye movement; and 5.17 (S.D. = 2.37) for the distancing condition without eye movement. A 2 × 2

Table 1
The effects of eye movement and therapist instructions on measures of emotional distress and vividness

Stimulus	Instruct	Time	SUDS		Vividness	
			Mean	S.D.	Mean	S.D.
Eyes moving	Distancing	Pre	5.25	1.76	6.13	1.87
		Post	1.29	0.84	3.75	1.90
		Follow-up	2.37	1.03	4.21	2.29
	Reliving	Pre	5.63	2.00	7.04	1.21
		Post	1.88	1.33	6.42	2.19
		Follow-up	1.58	1.49	4.58	2.18
Eyes stationary	Distancing	Pre	5.79	1.34	6.75	1.66
		Post	3.46	1.80	6.04	2.32
		Follow-up	3.42	1.93	4.67	1.96
	Reliving	Pre	4.58	1.73	5.92	2.30
		Post	2.96	1.94	5.35	2.48
		Follow-up	2.29	1.84	4.08	1.16

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(Eyes [moving, fixed] × Therapist Instructions [distancing, reliving]) ANOVA was conducted to calculate the effects that condition assignment had on treatment expectancy. There were no significant main effects for eye movement, $F(1,44) = .31$, $p = .58$, or therapist instructions, $F(1,44) = 2.05$, $p = .16$. Neither was there a significant interaction between these effects, $F(1,44) = .19$, $p = .66$. Thus, there was no evidence that expectancy played a part in treatment effects.

The effect of therapist instruction condition on the responses of participants was tested. The proportion of distancing responses in the distancing condition (0.27) was significantly greater than the proportion of reliving responses (0.18), $t(46) = 3.77$, $p < .001$. Also the proportion of reliving responses in the reliving condition (0.37) was significantly greater than the proportion of distancing responses (0.10), $t(46) = -3.71$, $p < .001$. Thus, therapist instructions affected participants' responses.

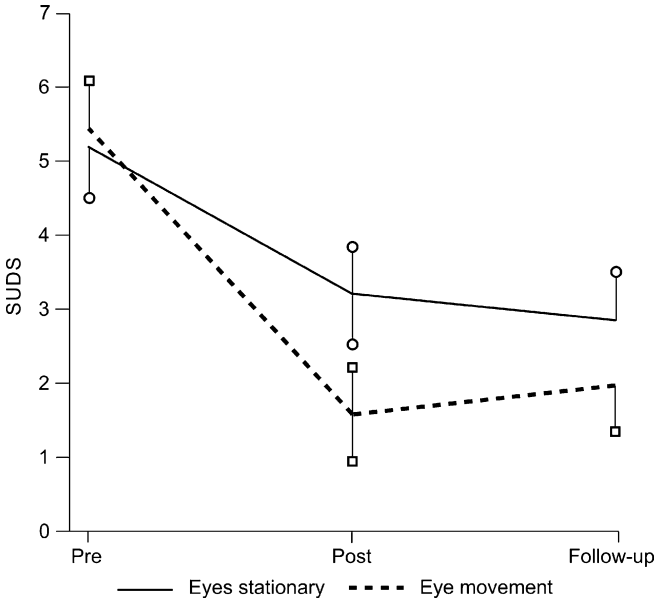

Fig. 1. Effect on distress of eye movement averaged across reliving and distancing conditions (mean and standard error).

3.2. Main analysis

A 2 × 2 × 3 mixed model multivariate analysis of variance (MANOVA) was performed on SUDS and vividness scores. Between subject variables were Eyes (stationary versus moving) and Therapist Instruction (distancing versus reliving). Time was analyzed as a within-subjects variable given that data was collected on three occasions (pre, post and follow-up). A full factorial model was used. The assumption that the variance matrices were the same across the cells formed by the between-subjects effects was examined using Box's M test and found to be satisfactory ($p = .27$).

With the use of Wilks' criterion, there were no significant main effects for eye movement, $F(2,43) = 2.20$, $p = .12$, $\eta^2 = .09$, nor instruction condition, $F(2,43) = 1.40$, $p = .26$, $\eta^2 = .06$. There was a significant eye movement by time interaction, indicating that the combined dependent variables were affected by eye movement across the course of the study, $F(4,41) = 3.13$, $p < .05$, $\eta^2 = .23$ (i.e., a medium effect size), but not by therapist instruction $F(4,41) = 2.43$, $p = .06$, $\eta^2 = .19$, or by an eye movement and therapist instruction interaction $F(4,41) = 1.28$, $p = .29$, $\eta^2 = .11$.

Univariate analyses indicated a significant interaction between time and eye movement for SUDS, $F(2,45) = 6.67$, $p < .005$, $\eta^2 = .13$ (i.e., a medium effect size). The greater reduction in SUDS for the eye movement condition compared to no eye movement is shown in Fig. 1. The decrease in SUDS immediately after the intervention was greater in the eye movement group than in the eye stationary group, $F(1,46) = 11.09$, $p < .005$, $\eta^2 = .19$ (i.e., a medium effect size). The change in SUDS scores from immediately after treatment to follow-up did not differ between the eye movement and eye stationary conditions, $F(1,46) = 3.40$, $p = .07$, $\eta^2 = .07$.

Unlike the results for SUDS, there was no interaction between time and eye movement for vividness, $F(2,45) = 1.04$, $p > .05$, $\eta^2 = .01$. This was in contrast to previous research that had found an effect of eye movement on vividness immediately after an intervention (Andrade et al., 1997; Barrowcliff et al., 2004; Kavanagh et al., 2001; van den Hout et al., 2001) but consistent with no differential effect at follow-up (Kavanagh et al., 2001). Therefore, separate univariate analyses were performed investigating the effects from pre-test to post-test on the dependent variable vividness for both eye movement and instruction conditions. There was no significant main effect for eye movement $F(1,44) = 1.47$, $p = .22$, $\eta^2 = .03$, or instruction condition, $F(1,44) = 2.59$, $p = .12$, $\eta^2 = .06$. However, there was a significant interaction between eye movement, instruction type and time $F(1,44) = 4.14$, $p < .05$, $\eta^2 = .09$ (i.e., a small effect size).

The source of this interaction was investigated with t-tests. To control for type I errors, the Bonferroni correction was applied. Fig. 2 indicates that instruction had a significant impact on vividness ratings in the eye movement condition but not in the eye stationary condition. To test whether the distancing condition strengthened the effects of eye movement on loss of vividness, separate pre- versus post-paired t-tests were

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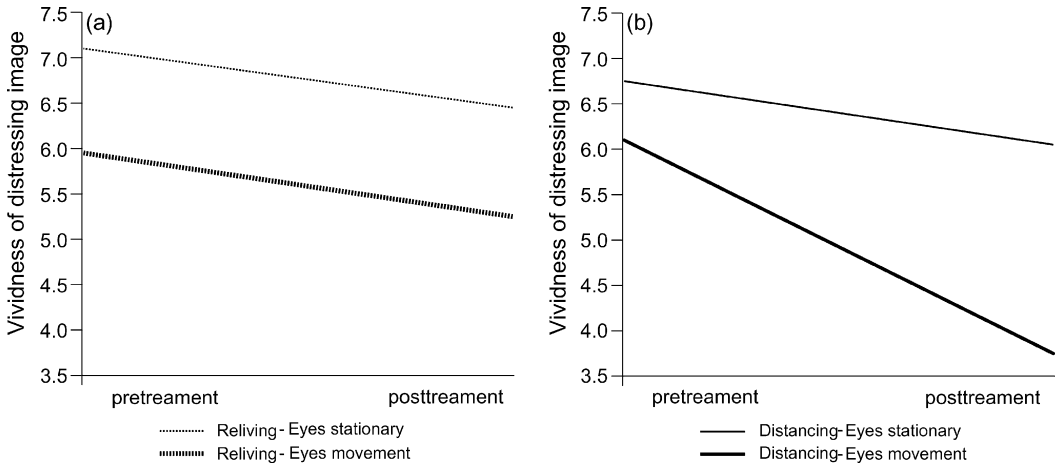

Fig. 2. (a) Pre- and post-treatment vividness scores for therapist reliving instruction under eye movement and eyes stationary conditions. (b) Pre- and post-treatment vividness scores for therapist distancing instruction under eye movement and eyes stationary conditions.

conducted on the effect of eye movement in the reliving and distancing conditions. There was a significant reduction in vividness post-treatment in the distancing condition $t(11) = 3.37$, $p < .01$ but not in the reliving condition $t(11) = .57$, $p = .58$.

4. Discussion

The results of this study indicated that the eye movement component of EMDR rather than the suggestions made by therapists facilitated reductions in distress. Participants in the eye movement condition reported less distress immediately after treatment and at follow-up than participants who were encouraged to keep their eyes stationary, irrespective of whether they were told to relive the incident or encouraged to distance themselves. This is consistent with previous research on the effect of eye movement on levels of distress for personal memories (Andrade et al., 1997; Barrowcliff et al., 2004; Kavanagh et al., 2001; van den Hout et al., 2001).

The finding that reductions in distress following eye movement were maintained is at odds with a previous investigation (Kavanagh et al., 2001). That study only had 64 s of eye movements (eight trials of 8 s each) whereas eye movement in the current study was on average 468 s (18 trials of 26 s each). Thus, the different findings may simply be a dose effect. Another difference is that the current study included the entire eight treatment phases whereas Kavanagh et al. (2001) simply paired eye movement with the emotional memory. The extra phases such as eliciting a positive cognition and providing a future orientation may alternatively lead to the maintenance of the treatment effect. Studies that have omitted such steps have resulted in lower effect sizes (Maxfield & Hyer, 2002).

Contrary to previous findings, the eye movement procedure in this study did not lead to a significant decrease in vividness compared to an eye stationary task. The failure to find an overall effect may have been due to an effect of therapist instruction on the eye movement process. In the present study participants were extensively redirected or reinforced by the therapist to relive the experience or to distance themselves from the memory. A significant interaction in the eye movement condition between therapist instruction and time was found for vividness ratings. Post hoc analysis indicated that there was a reduction in vividness over time in the eye movement condition with distancing instructions, but no significant change in vividness in the eye movement condition with reliving instructions. Thus, the reliving instruction may have masked the reduction in vividness ratings reported in previous studies (Andrade et al., 1997; Barrowcliff et al., 2004; Kavanagh et al., 2001), whereas the distancing instruction either allowed or supported the reduction in vividness.

We also investigated whether the superior treatment effects obtained in eye movement conditions were due to participants expecting to obtain a greater benefit, but found no support for this hypothesis. This is consistent with previous studies that also failed to find any significant difference in expectancy ratings for eye movement treatment compared with an eyes stationary control condition (Feske & Goldstein, 1997; Gosselin & Matthews, 1995). There were also no significant differences in the expectancy levels between the distancing and reliving conditions.

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There were some limitations of the current study. First the measurement of treatment outcome was entirely based on simple subjective measures. It would have been interesting to include physiological measures given a recent treatment study of PTSD that found eye movement covaried with physiological arousal and that overall arousal decreased with additional eye movement sets (Elofsson, von Schèele, Theorell, & Söndergaard, 2008). Second, the number of participants in each condition was small ($N = 12$). However, the resultant medium effect sizes provided sufficient power to produce significant findings for eye movements. To be confident that this was not a type I error or that the failure to find an effect of vividness was not a type II error, larger samples would be required. Third, the therapists providing treatment received only half of the recommended training by EMDRIA necessary to treat PTSD. Nevertheless, Level one training and 6 h supervision was thought to be sufficient given that any participant with clinical levels of psychopathology was excluded from the study.

The final potential limitation is whether the findings from testing variations in treatment on emotional memories in a normal population can be generalized to clinical populations. In a recent meta-analysis a medium significant treatment effect (Cohen's $d = .48$) was found for studies of EMDR with eye movement compared to EMDR without eye movement using clinical populations satisfying DSM criteria (Davidson & Parker, 2001). However, when every study that compared eye movement to no eye movement was included the effect size was smaller (Cohen's $d = .30$) and not significant (Davidson & Parker, 2001). Although the treatment effect of eye movement may be greater in clinical than non-clinical populations, another key variable might be a focus on personal memories (Wilson, Silver, Covi, & Foster, 1996) as distinct from contrived trauma (Sanderson & Carpenter, 1992; Tallis & Smith, 1994). Combining studies that have used such disparate stimuli complicate conclusions because eye movement has been found to result in significant reductions in distress for autobiographical memory of negative material but not pictures of negative events (Andrade et al., 1997). Similarly, eye movements were found to enhance memory processing for episodic memories and memory for everyday events but not for implicit memory (Christman, Garvey, Propper, & Phaneuf, 2003). This suggests that studies that have tested the efficacy of EMDR therapy for negative images that are not autobiographical (Tallis & Smith, 1994) are not likely to give the same results as those that target the autobiographical memories of relevance to clinical populations. The present findings are consistent with past studies in that eye movements appear to facilitate processing of autobiographical memories.

The present findings add further weight to the preliminary conclusions of a prior study that the processes of EMDR and traditional exposure are different (Lee et al., 2006). In that study it was found that the distancing processes facilitated improvement. Indeed a point of departure between the two procedures is that in traditional exposure therapies with its emphasis on reliving, the therapist would instruct a client who reports in session that an image is further away or describes it in the third person to refocus their attention on the worst aspect of the incident and to restate their description in the first person (Foa & Rothbaum, 1998); whereas in EMDR, the therapist's instructions would be to tell the client to continue to focus on the experience and then follow-up with another set of eye movements. In this study it was found that the combination of distancing and eye movement instructions reduced vividness ratings whereas reliving instructions and eye movements did not reduce vividness ratings; nor did no eye movement and distancing instructions. Hence, the instructions to relive are perhaps the antithesis of what is achieved in the EMDR procedure but are considered essential in traditional exposure (Foa & Rothbaum, 1998; Jaycox et al., 1998). Future studies should investigate whether instructions to distance in combination with the eye movements are more or less effective than the instructions that are part of the existing EMDR protocol.

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