Regular Article

Psychotherapy and Psychosomatics

Psychother Psychosom 2016;85:357–365
DOI: 10.1159/000447671

Received: June 4, 2016
Accepted after revision: June 16, 2016
Published online: October 15, 2016

A Comparison of Dual Attention, Eye Movements, and Exposure Only during Eye Movement Desensitization and Reprocessing for Posttraumatic Stress Disorder: Results from a Randomized Clinical Trial

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Key Words
Posttraumatic stress disorder · Exposure-based psychotherapy · Working mechanism of psychotherapy

Abstract
Background: Currently, there is controversy on the possible benefits of dual-attention tasks during eye movement desensitization and reprocessing (EMDR) for patients with posttraumatic stress disorder (PTSD). ***Methods:*** A total of 139 consecutive patients (including 85 females) suffering from PTSD were allocated randomly among 3 different treatment conditions: exposure with eyes moving while fixating on the therapist's moving hand (EM), exposure with eyes fixating on the therapist's nonmoving hand (EF), and exposure without explicit visual focus of attention as control condition (EC). Except for the variation in stimulation, treatment strictly followed the standard EMDR manual. Symptom changes from pre- to posttreatment were measured with the Clinician-Administered PTSD Scale (CAPS) by an investigator blinded to treatment allocation. ***Results:*** In total, 116 patients completed the treatment, with an average of 4.6 sessions applied. Intention-to-treat analysis revealed a significant improvement in PTSD symptoms with a high overall effect size (Cohen's d = 1.96, 95% CI: 1.67–2.24) and a high remission rate of PTSD diagnosis (79.8%). In comparison to the control condition, EM and EF were associated with significantly larger pre-post symptom decrease (ΔCAPS: EM = 35.8, EF = 40.5, EC = 31.0) and significantly larger effect sizes (EM: d = 2.06, 95% CI: 1.55–2.57, EF: d = 2.58, 95% CI: 2.01–3.11, EC: d = 1.44, 95% CI: 0.97–1.91). No significant differences in symptom decrease and effect size were found between EM and EF. ***Conclusions:*** Exposure in combination with an explicit external focus of attention leads to larger PTSD symptom reduction than exposure alone. Eye movements have no advantage compared to visually fixating on a nonmoving hand.

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Introduction

Posttraumatic stress disorder (PTSD) is characterized by intrusive memories, fear and avoidance, increased arousal symptoms due to memories and triggers of traumatic events, and (as a fourth symptom cluster added in 2013 to the DSM-5) negative alterations in cognitions and mood. According to evidence-based guidelines [1], individual trauma-focused cognitive behavioral therapy and eye movement desensitization and reprocessing (EMDR) are the first-line psychotherapeutic treatments for PTSD.

Various concurrent theories exist about the possible working mechanisms of trauma-focused psychotherapy. Traditionally, PTSD is conceptualized as an anxiety disorder sustained by avoidance of both mental and behavioral confrontation with reminders of the trauma. Therefore, the traditional rationale of exposure-based treatment aims at a reduction of subjective distress and psychophysiological arousal through prolonged exposure and habituation to the stressor instead of avoidance [2]. The cognitive model [3] describes trauma-related anxiety and distress as consequences of negative appraisal and behavioral or cognitive avoidance of traumatic memory cues. More recently, a trauma-related information-processing paradigm has been proposed and supported by research on the reconsolidation of memory [4, 5].

From early on, proponents of EMDR claimed adaptive information processing as the core working mechanism [6]. In this regard, bilateral stimulation is thought to accelerate memory processing. EMDR breaks with the traditional long-lasting exposure paradigm by applying short-term phases of exposure of typically 30–60 s. EMDR therapy involves bringing to mind distressing trauma-related images, beliefs, and physical sensations while the therapist evokes dual attention during exposure by inducing eye movements from side to side or alternating stimulation by touch or auditory stimuli [7].

Several empirical studies among healthy participants have clearly shown that dual attention decreases the vividness and distress of autobiographical memories [8–13]. Lee and Drummond [14] described the improvement of PTSD symptoms as associated with more detached reexperiencing of the trauma memory during dual attention. In an experimental study, Holmes et al. [15] reported subsequently reduced flashbacks when a dual-attention task (playing the video game Tetris) was applied after watching a traumatic film. In a randomized pilot study Servan-Schreiber et al. [16] found alternating tactile stimuli associated with reduced subjective distress.

Despite the empirical support cited above that dual attention might be helpful in reducing symptoms related to traumatic stress, controversy still exists about the underlying working mechanisms and the specific function of eye movements in EMDR. Two earlier meta-analyses of dismantling studies on EMDR concluded that eye movements are not necessary [17, 18]. In contrast, a 2013 meta-analysis [19] encompassing 26 studies concluded that eye movements had an additional effect on EMDR treatment and were associated with an increase in effect size (Cohen's d = 0.41 in clinical studies and d = 0.74 in experimental studies). However, all the studies cited in past reviews suffer from either a small sample size or methodological problems. This exhibits the need for a randomized study with a sufficiently large sample size comparing the effects of eye movements to control treatment conditions in a realistic treatment setting with patients suffering from PTSD [20].

Our study was planned to address those issues following the idea of dismantling effects of exposure in combination with dual-attention tasks by comparing symptom reduction during EMDR in combination with two different dual-attention tasks (with and without eye movements) and a control condition without dual attention in a randomized controlled design. We hypothesized that (1) exposure in combination with dual attention is more effective than exposure alone and (2) exposure with dual-attention task eye movements (EMDR) is more effective than exposure with dual attention by visually fixating on a nonmoving hand.

Methods

Patients

Participants were 139 patients with PTSD from two specialized centers for psychotraumatology at the Department of Psychosomatic Medicine and Psychotherapy, University Hospital Rechts der Isar, Technische Universität München, and the Department of Psychosomatic Medicine and Psychotherapy, Justus-Liebig-Universität Giessen, from January 2010 to September 2013. All participants were informed about the aims of the study and provided a written consent to participate. The study protocol was approved by the ethics committees of both universities and registered at ClinicalTrials.gov prior to data collection (NCT01209377).

Patients were aged between 18 and 70 years and met the criteria for PTSD according to DSM-IV as assessed by the Clinician-Administered PTSD Scale (CAPS) interview. Severe medical problems and cardiac medication were assessed by taking a medical history. Both were exclusion criteria due to possible stress induced exacerbation of cardiac symptoms during trauma exposure. Further exclusion criteria were psychotic disorder, substance abuse disorder, severe depressive or dissociative disorder, or other un-

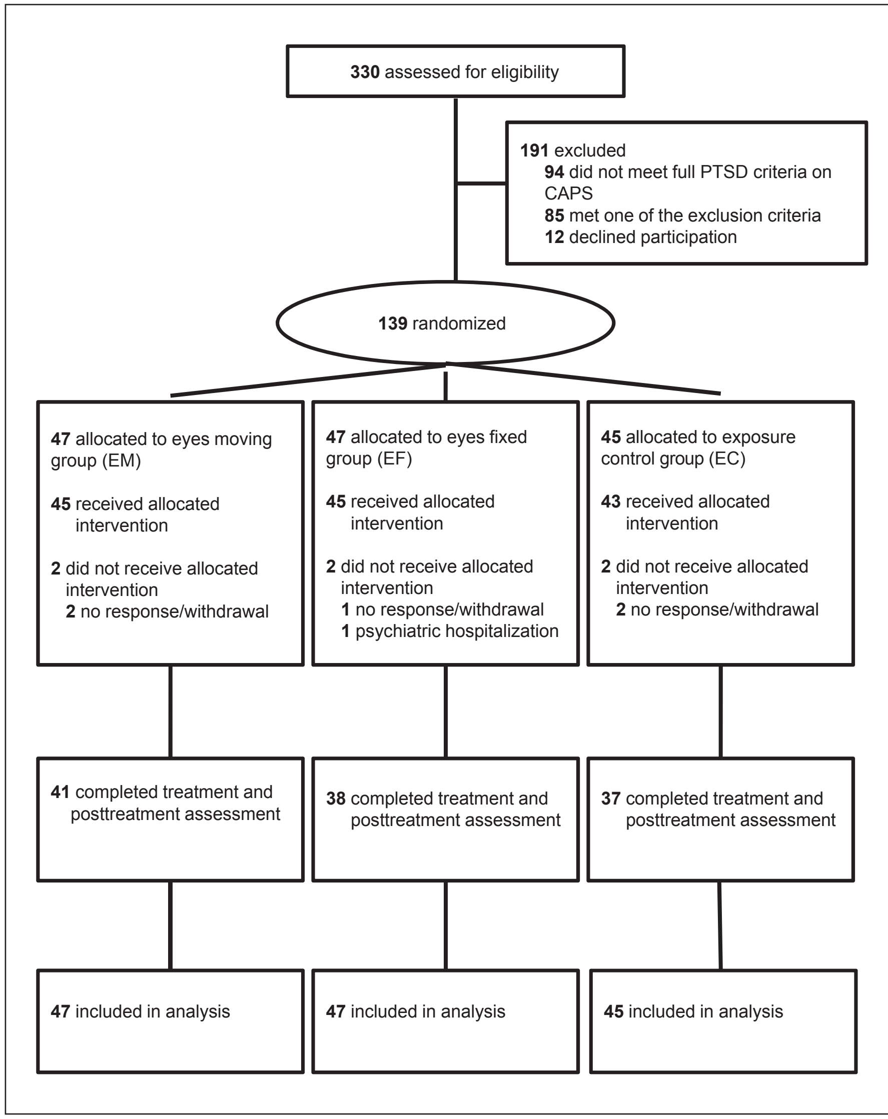

Fig. 1. Flow of participants through the trial.

stable psychological conditions preventing exposure therapy. Exclusion criteria were assessed by psychotherapists experienced in diagnostics applying ICD-10 checklists [21]. The participant flow through the study is depicted in figure 1.

Measures

The CAPS [22] is a structured clinical interview that assesses the 17 symptoms of DSM-IV PTSD and rates the severity and frequency of these symptoms on a 5-point scale. The validated German version [23] was used, and the CAPS total score served as the primary outcome measure to our study.

In order to monitor the trajectories of PTSD prevalence over the course of treatment the validated German version [24] of the SCID-PTSD module was used before every therapy session. For this purpose, a time window on the prevalence of PTSD during the last week was applied. Treatment-related symptoms of distress were evaluated by the therapist after the last treatment session using a custom-developed checklist monitoring distress during treatment sessions, memory actualization and abreactions, and temporary increase of symptoms.

To assess subjectively experienced levels of symptoms, each patient completed the Beck Depression Inventory (BDI-II) [25, 26], the Dissociative Experiences Scale (DES) [27] and the Impact of Event Scale (IES) [28, 29] before the beginning of treatment and 1 week after treatment.

Procedure

The screening for eligible patients included the application of the SCID-PTSD and checklists for comorbid diagnosis and inclusion/exclusion criteria. After providing informed consent, each patient went through three assessment steps. The first was premeasurement, usually 1 or 2 weeks before the beginning of therapy. This included the CAPS interview and completion of the psychometric questionnaires (BDI, IES, and DES). The second step consisted of therapy sessions scheduled on a weekly basis. At the start of each treatment session the PTSD diagnosis was evaluated by applying the SCID-PTSD, which scrutinizes symptoms within the last week. All therapy sessions were videotaped for later therapy adherence rating. The third step was posttreatment assessment scheduled 1 week after the last session that included a videotaped CAPS interview.

For equal allocation among the 3 treatment conditions, two stratified random sequences were generated for each center for participants with high and low CAPS values (≤60 vs. >60), respectively. Treatment allocation according the randomized sequence was placed in closed envelopes with a consecutive number before starting the study. After the CAPS assessment and before the beginning of treatment, the next available participant number either in the low or high CAPS stratification determined the randomized allocation.

Treatment

The psychotherapists (n = 12) in the study were all formally trained and clinically experienced EMDR therapists. Two update sessions on how to administer the EMDR study protocol properly were scheduled before the start of the study and at the beginning of the second year. Supervision was provided every 4 weeks based on videotapes of the treatment sessions by a certified and clinical experienced EMDR supervisor. Additionally, on-call supervision was available on demand.

The treatment closely followed the EMDR manual in focusing on distressing trauma-related images, beliefs, and bodily sensations, as described by Solomon and Shapiro [30]. Participants were randomly allocated to 3 different treatment conditions: exposure with eyes moving while fixating on the moving hand of the therapist (EM), exposure with fixating on the nonmoving hand of the therapist (EF), and exposure without the explicit task of fixating on an external focus of attention (e.g. eyes closed or eyes open and looking unfocused into the room, EC) as control condition. So as not to disturb the therapy setting, fixation of the eyes was not controlled by a technical device such as an eye tracker. The therapists were trained to give precisely the same instructions and the same amount of verbal support during exposure in all 3 treatment conditions. Therapy was limited to a maximum of 8 sessions and was terminated when the criteria for PTSD diagnosis were no longer met or after 3 sessions without subjective symptom reduction.

Treatment Adherence

All therapy sessions were videotaped. A random sample of 36 patients (31% of all completers) was equally drawn to represent all 3 treatment conditions and rated by an independent rater applying a custom-designed 25-item checklist for assessing adherence to the EMDR manual over the course of treatment. The adherence checklist covers the EMDR treatment manual phases 3–6 assessing the adequate focusing of the treatment target, guiding the patient through the exposure phase and ending the session by focusing on a positive cognition and physical sensations. On a scale from 0 (not at all) to 3 (very good), the mean adherence was 2.24 (range: 1.58–2.67) with no significant statistical differences in treatment adherence between the 3 treatment conditions (EM: 2.24 ± 0.33, EF: 2.30 ± 0.18, EC: 2.17 ± 0.26; F(2): 0.89, p = 0.46).

Statistical Methods

Characteristics of the pretreatment conditions were compared by using χ^2 tests for categorical variables, t tests, and one-way analysis of variance (ANOVA) for continuous variables. All randomized participants were included in the intention-to-treat (ITT) sample. Missing CAPS score values at posttreatment (n = 23, 16.5% of the total sample) and missing data for the symptom questionnaires were obtained by using multiple imputations [31].

Kaplan-Meier survival analysis was administered to examine the number of sessions until remission, considered as events, for subjects in the 3 treatment groups. Comparisons of survival were done with the log-rank test [32]. Covariates (such as baseline trauma severity and type of trauma) during the time until remission of PTSD were investigated by using the Cox proportional hazards regression analysis [32].

Primary outcomes were analyzed by using the linear mixed model [33, 34], taking into account the intraindividual variance over time. Our model included the subjects as random effects, time as repeated factor, and treatment groups as fixed effects. Baseline severity, type of trauma, sex, number of sessions, number of stimulation periods, stimulation time, therapist, and site were also analyzed. Comparisons of treatment groups according to our psychological hypotheses were done by using a priori contrasts.

Cohen's d was used to compute the effect sizes, which were classified as small (d = 0.20), medium (d = 0.50), and large (d = 0.80) [35]. Descriptive statistics and comparisons at pretreatment were done with IBM SPSS Statistics, version 21. Survival analysis, multiple imputations, the linear mixed model, and Cohen's d calculations were done with the open-source Software R, version 3.2 (Comprehensive R Archive Network: http://cran.r-project.org), with the packages survival, mice, nlme, and compute.es.

Results

A total of 139 patients suffering from PTSD were included in the study, randomized into 3 treatment conditions. The total treatment dropout rate was 16.5% (n = 23). The dropout rates among EM (n = 6, 12.8%), EF (n = 9, 19.1%), and EC (n = 6, 14%) did not differ significantly (χ^2 = 0.78, p = 0.68). The baseline PTSD symptom severity as measured with the CAPS was higher in the dropout sample (mean: 67.9 ± 20.5) than in the completer sample (mean: 57.3 ± 18.1; t = 2.5, p = 0.014).

There were no adverse events leading to dropout in the EM condition, 1 adverse event (psychiatric hospitalization) in the EF condition, and 1 adverse event (psychiatric hospitalization) in the EC condition. None of the adverse events were rated as study related.

Table 1 presents the demographic and clinical characteristics of the patients. Interpersonal trauma was reported by 48.9% (n = 68) of all participants. No significant differences in trauma category prevalence were found between treatment groups (χ^2 = 1.8, p = 0.91). No statistically significant differences between groups were found regarding the pretreatment assessment data presented in table 1 (all p > 0.05).

Table 1. Descriptive statistics of final sample

Variable	EM (n = 47)	EF (n = 47)	EC (n = 45)	Total (n = 139)
Age, years	39.3±11.8	40.9±13.1	38.8±12.5	39.6±12.4
Sessions completed	4.2±1.8	4.7±1.9	3.9±1.8	4.3±1.9
Exposure periods[a]	75.7±55.5	76.7±42.3	67.8±39	73.6±46.5
Exposure time[a], min	106.3±65.4	130.2±67.2	115.8±54.9	117.1±63.3
Gender				
Female	32 (68.1)	26 (55.3)	31 (68.9)	89 (64.0)
Male	15 (31.9)	21 (44.7)	14 (31.1)	50 (36.0)
Education				
≤High school	9 (19.1)	13 (27.6)	9 (20.0)	31 (22.3)
College	16 (34.0)	8 (17.0)	11 (24.4)	35 (25.2)
>College	22 (46.8)	26 (55.3)	25 (55.6)	73 (52.5)
Marriage				
Single	21 (44.7)	23 (48.9)	28 (62.2)	72 (51.8)
Married	15 (31.9)	18 (38.3)	12 (26.7)	45 (32.4)
Divorced/separated	10 (21.3)	4 (8.5)	3 (6.7)	17 (12.2)
Widowed	1 (2.1)	2 (4.3)	2 (4.4)	5 (3.6)
Work status				
Employed	33 (70.2)	37 (78.7)	31 (68.9)	101 (72.6)
Retired	7 (14.9)	7 (14.9)	11 (24.4)	25 (18.0)
Unemployed	7 (14.9)	3 (6.4)	3 (6.7)	13 (9.4)
Type of trauma				
Natural disaster/severe disease	4 (8.5)	9 (19.1)	3 (6.7)	16 (11.5)
Accident	21 (44.7)	18 (38.3)	21 (46.7)	60 (43.2)
Physical assault	15 (31.9)	12 (25.5)	13 (28.9)	40 (28.8)
Sexual trauma	7 (14.9)	8 (17.0)	8 (17.8)	23 (16.5)
Medication				
Antidepressants	3 (6.4)	8 (17.0)	8 (17.8)	19 (13.7)
Neuroleptics	0 (0)	3 (6.4)	3 (6.7)	6 (4.3)
Benzodiazepines	0 (0)	0 (0)	3 (6.7)	3 (2.2)
Other psychotropic medication	2 (4.3)	2 (4.3)	3 (6.7)	7 (5.0)
Comorbid psychiatric disorders				
Depressive disorders	21 (44.7)	22 (46.8)	21 (46.7)	64 (46.0)
Anxiety disorders	5 (10.6)	8 (17.0)	4 (8.9)	17 (12.2)
Somatoform disorders	4 (8.5)	1 (2.1)	7 (15.6)	12 (8.6)
Personality disorders	1 (2.1)	3 (6.3)	4 (8.9)	8 (5.8)
Other	1 (2.1)	1 (2.1)	4 (8.9)	6 (4.3)
Questionnaire measures[b]				
IES-pre	39.9±14.3	41.8±15.2	41.7±13.4	41.1±14.3
IES-post	17.4±13.8	18.3±12.8	16.2±16.1	17.3±14.2
DES-pre	13.8±11.8	10.8±8.6	14.4±8.3	13.0±9.6
DES-post	10.3±10.6	6.4±10.3	9.3±7.9	8.7±10.1
BDI-II-pre	24.0±8.4	23.0±12.0	22.9±9.9	23.3±10.1
BDI-II-post	17.8±11.7	10.6±11.7	11.8±11.5	13.4±11.6

Data are presented as means ± SD or n (%), as appropriate.
[a] Calculated for patients receiving at least 1 treatment session (n = 133).
[b] Number of missing values postmeasurement in regard to the completer sample (n = 116): IES-pre (n = 9), IES-post (n = 13), DES-pre (n = 14), DES-post (n = 11), BDI-II-pre (n = 19), and BDI-post (n = 7).

Table 2. Main outcome of ITT sample (n = 139) and completer sample (n = 116) on CAPS

	Pretreatment			Posttreatment			Fixed effects								
	EM	EF	EC	EM	EF	EC	EM			EF			EC		
							β	t	p	β	t	p	β	t	p
ITT	58.6±16.6	60.8±15.5	57.6±23.9	22.8±18.1	20.3±16.3	26.6±18.8	3.9	2.5	0.01*	3.8	2.5	0.01*	0.1	0.05	0.9
Completers	56.8±15.4	60.4±16.0	54.5±22.4	21.3±16.5	18.5±16.9	23.7±17.7	3.7	2.4	0.01*	3.8	2.4	0.02*	0.1	0.1	0.9

Data are presented as means ± SD. Missing values in the ITT sample were imputed using multiple imputation. Coefficient β reflects fixed effects obtained with linear mixed modeling using a priori contrasts (repeated factor = time, random factor = subject).

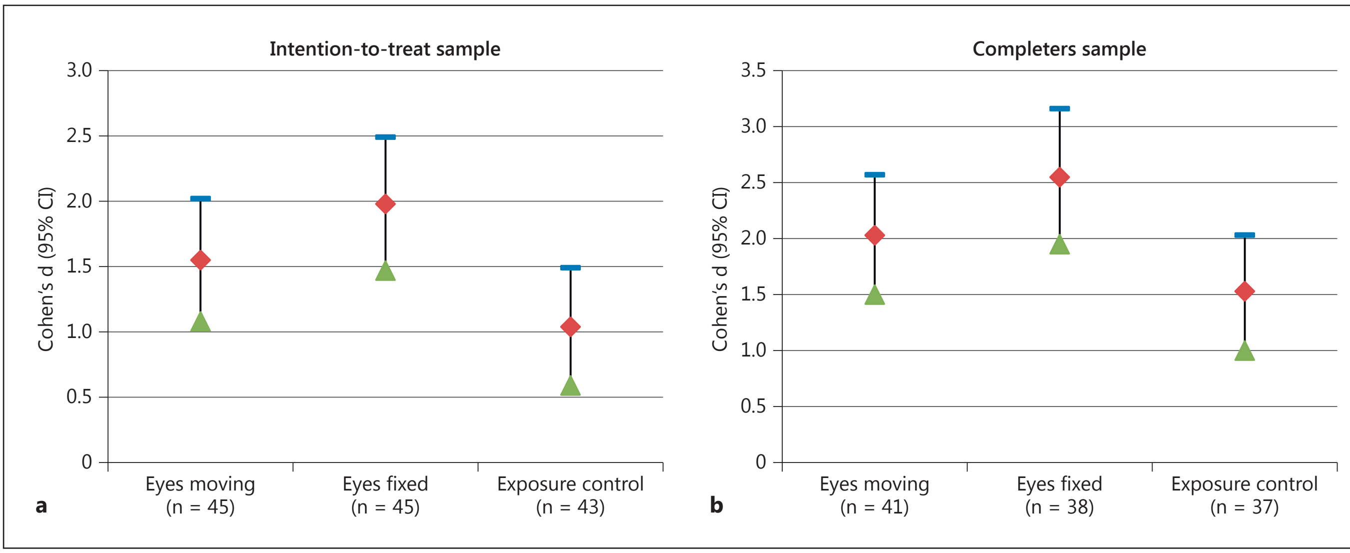

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Fig. 2. Effect sizes of the CAPS per treatment condition.

Primary Outcome

Based on the session-to-session SCID-PTSD assessment, 111 subjects showed remission of PTSD diagnosis. The EM (n = 38 of 47, 80.9%), EF (n = 37 of 47, 78.7%), and EC (n = 36 of 45, 80.0%) groups did not differ in the number of remitted participants ($\chi^2 = 0.070$, p = 0.97).

The Kaplan-Meier analysis of remission rates showed a slightly higher number of treatment sessions to remission in the EF (mean: 5.0) than in the EM (mean: 4.1) and EC (mean: 4.2) groups, but this finding was not significant ($\chi^2 = 3.4$, p = 0.18). A Cox proportional hazards regression analysis including treatment condition, baseline PTSD symptoms (CAPS total score), and type of trauma as covariates revealed no significant effects (Wald = 0.57, p = 0.90).

ITT Analysis

Table 2 presents the CAPS scores, which is the main outcome measure. In all treatment groups, the CAPS scores improved from pre- to posttreatment (t = 21.0, p < 0.001). The linear mixed-model analysis revealed lower CAPS scores in the EM (d = 2.06, p < 0.001) and EF (d = 2.58, p < 0.001) groups than in the EC group (d = 1.44, p < 0.001). Effect sizes in CAPS score reduction for the ITT sample per treatment condition are depicted in figure 2a. The a priori contrasts showed similar β values in the EM and EF groups, whereas the β value in the EF group was higher than that in the EC group (table 2). A significant fixed effect of PTSD symptoms (CAPS total score) at baseline (β = 28.2, t = 16.6, p < 0.001) indicated that participants with higher CAPS scores had greater improvement from pre- to posttreatment in all conditions. Wald tests on the β value for site, therapist, sex, type of trauma, and number of sessions did not indicate a significant influence (all p > 0.05).

Table 3. Symptoms of distress during the course of treatment and clinical meaningful symptom responses[a]

	EM	EF	EC	χ^2	p value
Symptoms of distress					
Temporary increase of PTSD symptoms	14 (34.1)	12 (32.6)	16 (43.2)	1.2	0.54
Temporary increase of other symptoms	12 (29.3)	14 (36.8)	12 (32.4)	0.52	0.77
Actualization of traumatic memory details	10 (24.4)	9 (23.7)	11 (29.7)	0.43	0.81
Abreactions during therapy sessions	5 (12.2)	13 (34.2)	3 (8.1)	10.1	0.006
Any symptoms of distress during treatment	19 (46.3)	21 (55.3)	21 (56.8)	1.0	0.60
Clinical meaningful treatment response					
ΔCAPS pre-post >20	33 (80.5)	33 (86.6)	23 (62.2)	6.9	0.03

Data are presented as n (%). ΔCAPS = Difference of CAPS.
[a] Sample of completers (n = 116).

Completer Analysis

There were no significant differences regarding CAPS total scores between treatment conditions at pretreatment (all p > 0.05). In all groups, the CAPS scores improved from pre- to posttreatment (t = 18, p < 0.001). The linear mixed-model analysis revealed lower posttreatment CAPS scores in the EM (d = 2.22, p < 0.001) and EF groups (d = 2.55, p < 0.001) than in the EC group (d = 1.53, p < 0.001). Effect sizes in CAPS score reduction for the completer sample per treatment condition are depicted in figure 2b. The a priori contrasts showed similar β values for the EM and EF groups, whereas the β value for the EF group was higher than that in the EC group. The fixed effect of PTSD symptoms (CAPS total score) at baseline was significant (β = 26, t = 14.7, p < 0.001), indicating that participants with higher CAPS scores presented greater improvement from pre- to posttreatment under all conditions. The Wald test on the β value for the number of sessions showed a significant result (β = 26, t = 14.7, p < 0.001), with the highest improvement of the CAPS scores observed after sessions 2 (ΔCAPS = 29.1) and 8 (ΔCAPS = 31.0), hinting at a reversed U-shape relationship. Wald tests on the β value for site, therapist, sex, type of trauma, number of sessions, and length of stimulation did not indicate a significant influence (all p > 0.05).

Table 3 presents the clinically meaningful CAPS response, defined by a difference of 20 points on the CAPS from pre- to posttreatment. A total of 89 (76.7%) participants who completed the treatment showed a meaningful response, with a higher proportion in the treatment conditions EM and EF than in EC (χ^2 = 6.9, p = 0.03).

Symptoms of distress potentially provoked during treatment were reported by 61 (52.9%) of all completers. Although no group differences were found in actualization of trauma memory, temporarily increased PTSD, or other temporarily increased symptoms such as sleeping disturbances or somatoform complaints, significantly more abreactions during treatment sessions were found in the EF condition compared to EM and EC (see table 3 for details). All reported symptoms of distress were temporary in nature and in no case caused treatment termination.

Discussion

Our study investigated different types of dual attention effects on pre-post changes of PTSD symptoms during the treatment of PTSD with EMDR, comparing the effects of exposure with eyes moving while fixating on the therapist's moving hand (EM), exposure with eyes fixating on the nonmoving hand (EF), and exposure without explicit external visual focus of attention (EC) as a control condition. Except for the variation in stimulation, treatment strictly followed the EMDR treatment manual.

In our sample of 139 patients the overall treatment effects were high, and all 3 treatment conditions led to a comparable remission of PTSD diagnosis. Compared to the control condition, and regarding our interview-based measure of PTSD symptoms (CAPS), both the dual-attention tasks resulted in a significant additional treatment effect and an additional Cohen's d of 0.88 for the ITT sample that represents a large additional treatment effect size [33] (d = 0.88 for the ITT sample). The use of eye movements as a dual-attention task had no additional treatment effects compared to dual attention with visual fixation on a nonmoving hand. Not reaching the level of statistical significance, however, larger treatment effects were observed for EMDR with fixating on a nonmoving hand in comparison to EMDR in combination with eye movements.

Regarding the assumed working mechanism of EMDR therapy, our study queries the specific role of bilateral stimulation by inducing eye movements in reducing symptoms of PTSD, because fixation on the nonmoving hand is a continuous and not an alternating stimulus. Instead, provoking dual attention seems to be a crucial mechanism for enhancing the efficacy of EMDR.

The results of this study show that distraction during exposure could be less counterproductive than classical exposure paradigms postulate [2]. Contrary to the paradigm of prolonged exposure and habituation, dual attention during exposure did not minimize but enhanced the effects of exposure therapy. Thereby, it seems to be of no importance whether the dual-attention tasks are visually presented in a moving or nonmoving fashion. In this vein, the results of our study add evidence to previously reported research indicating the benefits of dual attention in processing traumatic memories [14, 36] and reducing flashbacks [15].

Limitations

As the experimental design of the study was focused on the potential working mechanisms of EMDR, time between trauma and treatment, duration of PTSD diagnosis, and prior treatments were not assessed, and no follow-up assessment was included. Therefore, we have no information on whether the reported treatment outcome was stable over time. In addition, we only investigated the effects of visual stimulation. It is possible that other stimulation conditions intended to induce dual attention such as tactile or auditory stimulation may affect the treatment outcome differently. Visual fixation on the therapist's hand was not objectively measured with a technical device so as not to disturb the therapy process. While focusing on the hand was easily observable, we cannot exactly determine whether dual attention also occurred during the control condition without explicit visual attention focus. This is a major weakness in regard to our study design. Because all therapists who participated in the study were trained and experienced practitioners of EMDR, we cannot completely rule out the possibility of a therapist allegiance to working with eye movements given that they are experienced and feel comfortable with this technique. Also, patients could have been potentially biased to see EMDR therapy in combination with eye movements as the more effective therapy since this is standard practice. We tried to compensate for any potential bias on behalf of the EM condition by training the study therapists to give exactly the same standardized instructions to all 3 treatment groups as well as to adhere to the treatment manual as closely as possible. Additionally, video-based supervision (1 session per treatment on average) and feedback were routinely practiced.

Conclusions

To summarize, our study found a significant advantage of EMDR in combination with an explicit external focus of attention regarding pre-post reductions of PTSD symptoms. Therefore, we conclude that external tasks of attention such as fixating the hand of the therapist possibly generate a dual focus of attention that might be helpful for processing traumatic memories and reducing associated PTSD symptoms. The results of our study do not support the idea that during EMDR the induction of eye movements by following the therapist's moving hand offers an advantage compared to visually fixating on a nonmoving hand [5–10]. Further research is needed to identify the exact mechanism by which an external focus of attention might help to increase treatment effects during exposure therapy.

Disclosure Statement

M. Sack is a trained EMDR supervisor and obtained money from contributing articles to textbooks on trauma therapy, including EMDR. All other authors declare no conflicts of interest.

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