EMDR RESEARCH

Randomized Clinical Trials


EMDR is effective in reducing earthquake anxiety and negative emotions (e.g. PTSD, grief, fear, intrusive thoughts, depression, etc) resulting from earthquake experience. Furthermore, results show that, improvement due to EMDR was maintained at a one month follow up.


Thirty-three 6-16-year-old children with a DSM-IV diagnosis of PTSD were randomly assigned to eight weekly EMDR sessions or the WLC group. EMDR was found to be an effective treatment in children with PTSD from various sources and who were suffering from a variety of co-morbid conditions.


Forty-two patients undergoing cardiac rehabilitation . . . were randomized to a 4-week treatment of EMDR or imaginal exposure (IE). EMDR was effective in reducing PTSD, depressive, and anxiety symptoms and performed significantly better than IE for all variables. Because the standardized IE procedures used were those employed in-session during [prolonged exposure] the results are also instructive regarding the relative efficacy of both treatments without the addition of homework.


This randomized pilot study reported that after eight sessions of treatment, EMDR therapy was superior to a variety of CBT techniques. “Almost all the patients (20 out of 21, 95.2%) did not have PTSD after the EMDR treatment.


Twelve sessions of EMDR eliminated post-traumatic stress disorder in 77.7% of the multiply traumatized combat veterans studied. There was 100% retention in the EMDR condition. Effects were maintained at follow-up. This is the only randomized study to provide a full course of treatment with combat veterans. Other studies (e.g., Boudewyns/Devilly/Jensen/Pitman et al./Macklin et al.) evaluated treatment of only one or two memories, which, according to the International Society for Traumatic Stress Studies Practice Guidelines (2000), is inappropriate for multiple-trauma survivors. The VA/DoD Practice Guideline (2004) also indicates these studies (often with only two sessions) offered insufficient treatment doses for veterans. EMDR therapy is listed as an “A” level treatment in the VA/DoD Practice Guideline (2004, 2010).


In the EMDR condition, measurements at posttest and follow-up revealed 85% and 100% PTSD remission, respectively.

*EMDR was found to be an effective treatment for children with disaster-related PTSD who had not responded to another intervention. This is the first controlled study for disaster-related PTSD, and the first controlled study examining the treatment of children with PTSD.*


*EMDR treatment of disturbing life events (small “t” trauma) was compared to active listening, and wait list. EMDR produced significantly lower scores on the Impact of Event Scale (mean reduced from “moderate” to “subclinical”) and a significantly smaller increase on the STAI after memory recall.*


*In patients with chronic psychotic disorders PE and EMDR not only reduced PTSD symptoms, but also paranoid thoughts. Importantly, in PE and EMDR more patients accomplished the status of their psychotic disorder in remission.*


*Children (n=52, aged 4-18) were randomly allocated to either CBT (n=26) or EMDR (n=26) in a disaster mental health after-care setting after an explosion of a fireworks factory. Both treatment approaches produced significant reductions on all measures and results were maintained at follow-up. Treatment gains of EMDR were reached in fewer sessions.*


*A mixed sample of full and partial PTSD was evaluated. Both treatments are effective in children with PTSS in an outpatient setting. Results on both child and parent measures support this conclusion.*


*EMDR treatment resulted in lower scores (fewer clinical symptoms) on all four of the outcome measures at the three-month follow-up, compared to those in the routine treatment condition. The EMDR group also improved on all standardized measures at 18 months follow up (Edmond & Rubin, 2004, Journal of Child Sexual Abuse).*


*Combination of qualitative and quantitative analyses of treatment outcomes with important implications for future rigorous research. Survivors’ narratives indicate that EMDR produces greater trauma resolution, while within eclectic therapy, survivors more highly value their relationship with their therapist, through whom they learn effective coping strategies.*

Employees who had experienced “person-under-train accident or had been assaulted at work were recruited.” Six sessions of EMDR resulted in remission of PTSD in 67% compared to 11% in the wait list control. Significant effects were documented in Global Assessment of Function (GAF) and Hamilton Depression (HAM-D) score.


Both EMDR and prolonged exposure produced a significant reduction in PTSD and depression symptoms. Study found that 70% of EMDR participants achieved a good outcome in three active treatment sessions, compared to 29% of persons in the prolonged exposure condition. EMDR also had fewer dropouts.


Participants were treated two weeks following a 7.2 earthquake in Mexico. One session of EMDR-PRECI produced significant improvement on symptoms of posttraumatic stress for both the immediate-treatment and waitlist/delayed treatment groups, with results maintained at 12-week follow-up, even though frightening aftershocks continued to occur frequently.


Evaluation of co-workers 10 days after they witnessed seven people killed in an explosion revealed a mean of 22 on the SPRINT, indicating severe PTSD symptoms. After two consecutive-day 60-minute EMDR sessions the mean SPRINT scores for immediate and delayed treatment groups declined to equally low levels on both posttest and follow-up.


An effect for EMDR was identified on primary outcome and process measures including the Child Post-Traumatic Stress – Reaction Index, clinician rated diagnostic criteria for PTSD, Subjective Units of Disturbance and Validity of Cognition scales. All participants initially met two or more PTSD criteria. After EMDR treatment, this decreased to 25% in the EMDR group but remained at 100% in the wait-list group.


Both EMDR and stress inoculation therapy plus prolonged exposure (SITPE) produced significant improvement, with EMDR achieving greater improvement on PTSD intrusive symptoms. Participants in the EMDR condition showed greater gains at three-month follow-up. EMDR required three hours of homework compared to 28 hours for SITPE.
Funded by Kaiser Permanente. Results show that 100% of single-trauma and 80% of multiple-trauma survivors were no longer diagnosed with post-traumatic stress disorder after six 50-minute sessions.

Funded by Kaiser Permanente, follow-up evaluation indicates that a relatively small number of EMDR sessions result in substantial benefits that are maintained over time.

A comparison of “the efficacy and response pattern of a trauma-focused CBT modality, brief eclectic psychotherapy for PTSD with EMDR. Although both treatments are effective, EMDR results in a faster recovery compared with the more gradual improvement with brief eclectic psychotherapy.

Although preliminary, our findings support the utility of this treatment approach and suggest that Eye Movement Desensitization and Reprocessing therapy could be a promising and safe therapeutic strategy to reduce trauma symptoms and stabilize mood in traumatized bipolar patients with subsyndromal symptoms.

Both EMDR and exposure therapy plus cognitive restructuring (with daily homework) produced significant improvement. EMDR was more beneficial for depression and required fewer treatment sessions.

Three 90-minute sessions of EMDR eliminated post-traumatic stress disorder in 90% of rape victims.

In this NIMH funded study both treatments were effective: “An interesting potential clinical implication is that EMDR seemed to do equally well in the main despite less exposure and no homework. It will be important for future research to explore these issues.

Two sessions of EMDR reduced psychological distress scores in traumatized young women and brought scores within one standard deviation of the norm.

At 1 week posttreatment, the scores of the immediate treatment group were significantly improved on the IES-R compared to the waitlist/delayed treatment group, who showed no improvement prior to their treatment. At 3
months follow-up, results on the IES-R were maintained and there was a significant improvement on PHQ-9 scores.


Seminal study appeared the same year as first controlled studies of CBT treatments. Three-month follow-up indicated substantial effects on distress and behavioural reports. Marred by lack of standardized measures and the originator serving as sole therapist.


The addition of three sessions of EMDR resulted in large and significant reductions of memory-related distress, and problem behaviors by 2-month follow-up.


The only randomized study to show exposure statistically superior to EMDR on two subscales (out of 10). This study used therapist assisted “in vivo” exposure, where the therapist takes the person to previously avoided areas, in addition to imaginal exposure and one hour of daily homework (@ 50 hours). The EMDR group used only standard sessions and no homework.


Standard PE and EMDR therapy protocols are effective, safe, and feasible in patients with PTSD and severe psychotic disorders, including current symptoms. Additional evaluation indicated trauma-focused treatment was associated with significantly less exacerbation, less adverse events, and reduced revictimization compared with the WL condition: van den Berg D.P.G., et al. Trauma-focused treatment in PTSD-patients with psychosis: symptom exacerbation, adverse events, and revictimization. *Schizophrenia Bulletin*. doi: 10.1093/schbul/sbv172.


EMDR was superior to both control conditions in the amelioration of both PTSD symptoms and depression. Upon termination of therapy, the EMDR group continued to improve while the Fluoxetine participants again became symptomatic.


All treatments led to significant decreases in PTSD symptoms for subjects in the treatment groups as compared to those on a waiting list, with a greater reduction in the EMDR group, particularly with respect to intrusive symptoms. In the 2-3 weeks of the study, 40-60 additional minutes of daily homework were part of the treatment in the other two conditions.


Twenty-six children (average age 10.4 years) with behavioral problems were randomly assigned to receive
either 4 sessions of EMDR or CBT. Both were found to have significant positive effects on behavioral and self-esteem problems, with the EMDR group showing significantly larger changes in target behaviors.


Non-Randomized Studies


Devilly, G.J., & Spence, S.H. (1999). The relative efficacy and treatment distress of EMDR and a cognitive behavioral trauma treatment protocol in the amelioration of post-traumatic stress disorder. Journal of Anxiety Disorders, 13, 131-157. The only EMDR research study that found CBT superior to EMDR. The study is marred by poor treatment delivery and higher expectations in the CBT condition. Treatment was delivered in both conditions by the developer of the CBT protocol.

Fernandez, I. (2007). EMDR as treatment of post-traumatic reactions: A field study on child victims of an earthquake. Educational and Child Psychology. Special Issue: Therapy, 24, 65-72. This field study explores the effectiveness of EMDR and the level of post-traumatic reactions in a post-emergency context on 22 children victims of an earthquake. The results show that EMDR contributed to the reduction or remission of PTSD symptoms and facilitated the processing of the traumatic experience.


36 children and adolescents ranging in age from 1 year 9 months to 18 years 1 month were assessed at intake, post-waitlist/pretreatment, and at follow up. EMDR treatment resulted in significant improvement, demonstrating that children younger than 4 years of age showed the same benefit as the school-age children.

In this study, the EMDR-IGTP was applied during three consecutive days to a group of 20 adults during ongoing geopolitical crisis in a Central American country in 2009. Changes on the IES were maintained at 14 weeks follow-up even though participants were still exposed to ongoing crisis.

A study of 44 children treated with a group protocol after a flood in Mexico indicates that one session of treatment reduced trauma symptoms from the severe range to low (subclinical) levels of distress. Data from successful treatment at other disaster sites are also reported.

In this study the EMDR-IGTP was used with 16 bereaved children after a human provoked disaster in the Mexican State of Coahuila in 2006. Results showed a significant decrease in scores on the Child’s Reaction to Traumatic Events Scale that was maintained at 3-month follow-up.

EMDR-IGTP intensive therapy was administered for 3 consecutive days, twice daily. Results also showed an overall subjective improvement in the participants.

Results showed significant improvement for all the participants on the Child’s Reaction to Traumatic Events Scale (CRTES) and the Short PTSD Rating Interview (SPRINT), with treatment results maintained at follow-up.

Each individual client session lasted between 90 and 120 minutes. Results showed that one session of EMDR-PRECI produced significant improvement on self-report measures of posttraumatic stress and PTSD symptoms for both the immediate treatment and waitlist/delayed treatment groups.

Follow-up scores showed that the original treatment results were maintained, with a further significant reduction of self-reported symptoms of posttraumatic stress and PTSD between posttreatment and follow-up. Scores of all participants were far below PTSD cutoff level.

Data reported on a representative sample of 1500 earthquake victims indicated that five sessions of EMDR
successfully eliminated PTSD in 92.7% of those treated, with a reduction of symptoms in the remaining participants.


Results indicated that patients receiving EMDR had significantly fewer therapy sessions over 10 weeks but had significantly greater gains in their PCL–M scores than did individuals not receiving EMDR.


In this delayed treatment comparison, over half of the participants moved from clinical to normal levels on the Impact of Events Scale, and all but 3 showed at least partial symptom relief on several measures at 1-3 m following a single EMDR session.

Ribchester, T., Yule, W., & Duncan, A. (2010). EMDR for childhood PTSD after road traffic accidents: Attentional, memory, and attributional processes. Journal of EMDR Practice and Research,4(4), 138-147. EMDR was used with 11 children who developed posttraumatic stress disorder (PTSD) after road traffic accidents. All improved such that none met criteria for PTSD on standardized assessments after an average of only 2.4 sessions. . . Treatment was associated with a significant trauma-specific reduction in attentional bias on the modified Stroop task, with results apparent both immediately after therapy and at follow-up.


72 active-duty military personnel were treated with EMDR therapy by nine different therapists in actual clinic settings. Results indicated that “the disturbance associated with the targeted traumatic memories had been largely eliminated and a new more positive perspective had developed. These changes were corroborated with the IES-R and BDI scores falling from the severe range to the mild or subclinical range.” Average treatment time: 8.50 sessions if wounded and 3.82 sessions if nonwounded.


These findings suggest that benefits can be achieved with EMDR therapy for decreasing PTSD symptoms in a post-war, cross-cultural setting in a relatively short period (on average 4 treatment sessions over 13 days).


The analysis of an inpatient veterans’ PTSD program (n=100) found EMDR to be vastly superior to biofeedback and relaxation training on seven of eight measures.


Clients made highly significant positive gains on a range of outcome variables, including validated psychometrics and self-report scales. Analyses of the data indicate that EMDR is a useful treatment intervention both in the immediate aftermath of disaster as well as later.

60 railroad employees who had experienced fatal grade accident crossing accidents were evaluated for workshop outcomes, and for the additive effects of EMDR treatment. Although the workshop was successful, in this setting, the addition of a short session of EMDR (5-40 minutes) led to significantly lower, sub clinical, scores which further decreased at follow up.


In a multi-site study, EMDR significantly reduced symptoms more often than the CBT treatment on behavioral measures, and on four of five psychosocial measures. EMDR was more efficient, inducing change at an earlier stage and requiring fewer sessions.


*Our findings are consistent with the conclusion . . . that EMDR is effective for civilian PTSD, and it applies its treatment in a user-friendly manner . . . The results of the study demonstrated the effectiveness of EMDR in the treatment of PTSD in the experimental group compared to the control group.*


*Results indicate that the EMDR approach can be effective in a group setting, and in an acute situation, both in reducing symptoms of posttraumatic and peritraumatic stress and in “inoculation” or building resilience in a setting of ongoing conflict and trauma.*

### Adaptive Information Processing and EMDR Procedures

The Adaptive Information Processing model (Shapiro, 2001, 2002, 2007) is used to explain EMDR’s clinical effects and guide clinical practice. This model is not linked to any specific neurobiological mechanism since the field of neurobiology is as yet unable to determine this in any form of psychotherapy (nor of most medications). This section includes literature to provide an overview of the model and procedures, as well as selected research and case reports that demonstrate the predictive value of the model in the treatment of life experiences that appear to underlie a variety of clinical complaints.


*Harsh physical punishment [i.e., pushing, grabbing, shoving, slapping, hitting] in the absence of [more severe] child maltreatment is associated with mood disorders, anxiety disorders, substance abuse/dependence, and personality disorders in a general population sample.*


*Rape victims were successfully treated within three sessions using both individual and group protocols. They reported the simultaneous remission of back and abdominal pain. These processing results are consistent with the reported remission of PLP with EMDR therapy.*

Trauma characterized by intention to harm is associated with children’s reports of psychotic symptoms. Clinicians working with children who report early symptoms of psychosis should inquire about traumatic events such as maltreatment and bullying.


Processing of etiological disturbing memories, triggers and templates resulted in complete remission of Major Depressive Disorder in two teenagers. Treatment duration was 3-7 sessions and effects were maintained at follow-up.


20 EMDR sessions that focused on reprocessing the memories seemingly at the foundation of the pathology, along with triggers and future templates resulted in a complete remission of BPD, including symptoms of affect dysregulation, as measured on the Inventory of Altered Self Capacities.

Brown, K. W., McGoldrick, T., & Buchanan, R. (1997). Body dysmorphic disorder: Seven cases treated with eye movement desensitization and reprocessing. Behavioural and Cognitive Psychotherapy, 25, 203–207. Seven consecutive cases were treated with up to three sessions of EMDR. Complete remission of BDD symptoms were reported in five cases with effects maintained at one-year follow-up.


Three sessions of EMDR therapy memory processing resulted in remission of dental phobia. After 1 yr, 83.3% of the patients were in regular dental treatment (d = 3.20). The findings suggest that therapy aimed at processing memories of past dental events can be helpful for patients with dental phobia.


10 consecutive cases of phantom limb pain were treated with EMDR resulting in the reduction or elimination of pain in all but two cases. Results were maintained at 2.8-year follow-up.


As predicted by AIP, the processing of etiological events, triggers and memory templates was sufficient to alleviate the diagnosis without the use of treatment specific homework in contrast to the CBT group.
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study, there was “a continuing decrease in frequency of panic attacks for participants with PD or PDA in the EMDR condition at follow-up that was significantly greater than that found in the CBT treatment group.”


We found a strong dose response relationship between the breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults.


As predicted by AIP, the processing of etiological events, triggers and memory templates was sufficient to alleviate the diagnosis without the use of therapist-assisted in vivo exposure.


Four subjects were evaluated using a single case design with multiple baselines Results indicate that subsequent to targeting the experiential contributors, at posttreatment and at 2 months follow-up, all four participants no longer presented with GAD diagnosis.


[The non-Criterion A] group reported significantly greater severity of PTSD symptomatology than those who reported a Criterion A1 PTSD event. In addition, significantly more people in the DSM trauma-incongruent group met criteria for PTSD than those in the DSM trauma-congruent group.


The available data suggest that (1) early adverse experience contributes to the pathophysiology of depression, (2) there are neurobiologically different subtypes of depression depending on the presence or absence of early adverse experience, likely having confounded previous research on the neurobiology of depression, and (3) early adverse experience likely influences treatment response in depression.


Discordance in psychotic illness across related individuals can be traced to differential exposure to trauma. The association between trauma and psychosis is apparent across different levels of illness and vulnerability to psychotic disorder, suggesting true association rather than reporting bias, reverse causality, or passive gene-environment correlation.


EMDR processing of experiential contributors to bonding disruption, in addition to current triggers, and a memory template of an alternative/problem free pregnancy and birth resulted in the repair of maternal bonding, analogous to the positive findings with the repair of disrupted attachment.


EMDR treatment of four consecutive cases of ORS whose pathological symptoms had endured for 8–48 years resulted in a complete resolution of symptoms in all four cases, which was maintained at follow-up.

Supports a basic tenet of the Adaptive Information Processing model that “Life events can generate at least as many PTSD symptoms as traumatic events.” In a survey of 832 people, for events from the past 30 years the PTSD scores were higher after life events than after traumatic events.


There was significant difference between the mean Yale–Brown scores of the two groups after treatment and EMDR was more effective than citalopram in improvement of OCD signs.


A substantive body of work has established that environmental adversity can have a deleterious effect on children’s functioning” “Exposure to adverse, stressful events . . .has been linked to socioemotional behavior problems and cognitive deficits.


Reviews common errors and misperceptions of the procedures, research, and theory.


Specifically citing the hypothesis that EMDR induces processing effects similar to REM sleep (see also Stickgold, 2002, 2008), polysomnograms indicated a change in sleep patterns post treatment, and improvement on all measures including anxiety, depression, and quality of life after a mean of five sessions.


The authors note that the application of EMDR guided by the Adaptive Information Processing model appears to afford benefits to chronic pain patients not found in other treatments.


As predicted by the Adaptive Information Processing model the EMDR treatment of the molesters’ own childhood victimization resulted in a decrease in deviant arousal as measured by theplethysmograph, a decrease in sexual thoughts, and increased victim empathy. Effects maintained at one year follow up.


Research data indicated similar levels of posttrauma symptom severity for all three symptom clusters among people who had endorsed the experience of only a traumatic type event and people who had reported the experience of only stressful negative life events [e.g., loss of job, problems with school or work, or change in financial status].

Since September 2006, over 725 service-members from the global war on terrorism have survived combat-related traumatic amputations that often result in phantom limb pain (PLP) syndrome. . . . Four sessions of Eye Movement Desensitization and Reprocessing (EMDR) led to elimination of PLP, and a significant reduction in PTSD, depression, and phantom limb tingling sensations.


As predicted by the Adaptive Information Processing model the EMDR treatment of the event involving the limb loss, and the stored memories of the pain sensations, resulted a decrease or elimination of the phantom limb pain which was maintained at 1-year follow-up.


Detailed presentation of case treated by EMDR that resulted in complete elimination of PTSD, depression and phantom limb pain with effects maintained at 18-month follow-up.


EMDR is an eight-phase psychotherapy with standardized procedures and protocols that are all believed to contribute to therapeutic effect. This text provides description and clinical transcripts and an elucidation of the guiding Adaptive Information Processing model.


EMDR is an integrative approach distinct from other forms of psychotherapy. Experts of the major psychotherapy orientations identify and highlight various procedural elements.


Overview of EMDR treatment based upon an Adaptive Information Processing case conceptualization. Early life experiences are viewed as the basis of pathology and used as targets for processing. The three-pronged protocol includes processing of the past events that have set the foundation for the pathology, the current triggers, and templates for appropriate future functioning to address skill and developmental deficits.


Overview of Adaptive Information Processing model, including how the principles are reflected in the procedures, phases and clinical applications of EMDR. Comprehensive worksheets for client assessment, case formulation, and treatment as well as scripts for various procedures.


Research findings indicate that EMDR therapy and TF-CBT are based on different mechanisms of action in that EMDR therapy does not necessitate daily homework, sustained arousal or detailed descriptions of the event, and appears to take fewer sessions. EMDR is guided by the adaptive information processing model, which posits a wide range of adverse life experiences as the basis of pathology.

An overview of the substantial body of research demonstrating that adverse life experiences contribute to both psychological and biomedical pathology, as well as the research demonstrating the clinical effects of EMDR therapy as guided by the Adaptive Information Processing model.


*Using an Adaptive Information Processing conceptualization a wide range of family problems and impasses can be addressed through the integration of EMDR and family therapy techniques. Family therapy models are also useful for identifying the targets in need of processing for those engaged in individual therapy.*


*Our data suggest a high and continuous number of life events prior to affective episodes. Life events after the index episode worsened the course of bipolar I patients with more depressive episodes. This underlines the importance of detection and treatment of emerging life events.*


*This article provides a brief overview of some of the major precepts of the Adaptive Information Processing model, a comparison and contrast to extinction-based information processing models and treatment and a discussion of a variety of mechanisms of action.*


*These findings parallel results of previous reports of psychopathology associated with childhood exposure to parental verbal abuse and support the hypothesis that exposure to peer verbal abuse is an aversive stimulus associated with greater symptom ratings and meaningful alterations in brain structure.*


*The study evaluated the impact of EMDR treatment on bias mechanisms in depressed subjects in regard to negative emotional valence evaluation. “The results indicated that it generated important cognitive emotional changes in such mechanisms.”* Priming tests indicated changes in the negative valence evaluation of emotional information indicative of recovery with decreased reaction times in the neutral and positive stimuli processing.


*This pilot study shows that a short EMDR therapy is effective and safe in the treatment of PTSD in subjects with a psychotic disorder. Treatment of PTSD has a positive effect on auditory verbal hallucinations, delusions, anxiety symptoms, depression symptoms, and self-esteem.*


*These findings indicate that childhood adversity is strongly associated with increased risk for psychosis.*

Subsequent to EMDR treatment “all three patients made positive changes in attachment status as measured by the [Adult Attachment Inventory], and all three reported positive changes in emotions and relationships.


Five consecutive cases of phantom limb pain were treated with EMDR. Four of the five clients completed the prescribed treatment and reported that pain was completely eliminated, or reduced to a negligible level. . . The standard EMDR treatment protocol was used to target the accident that caused the amputation, and other related events.

Mechanism of Action

EMDR contains many procedures and elements that contribute to treatment effects. While the methodology used in EMDR has been extensively validated (see above), questions still remain regarding mechanism of action. However, since EMDR achieves clinical effects without the need for homework, or the prolonged focus used in exposure therapies, attention has been paid to the possible neurobiological processes that might be evoked. Although the eye movements (and other dual attention stimulation) comprise only one procedural element, this element has come under greatest scrutiny. Randomized controlled studies evaluating mechanism of action of the eye movement component follow this section.


The findings provide further evidence for the value of employing eye movements in EMDR treatments. The results also support the notion that EMDR is a suitable option for resolving disturbing memories underlying a broader range of mental health problems than PTSD alone.


Attentional bias toward aversive cues in PTSD has been hypothesized as being part of the dysfunction causing etiology and maintenance of PTSD. The aim of the present study was to investigate the cognitive strategy underlying attentional bias in PTSD and whether normal cognitive processing is restored after a treatment suppressing core PTSD symptoms.” An average of 4.1 EMDR sessions resulted in remission of PTSD. Post treatment “similarly to controls, EMDR treated patients who were symptom free had null e-Stroop and disengagement indices.


Changes in heart rate, skin conductance and LF/HF-ratio, finger temperature, breathing frequency, carbon dioxide and oxygen levels were documented during the eye movement condition. It was concluded the “eye movements during EMDR activate cholinergic and inhibit sympathetic systems. The reactivity has similarities with the pattern during REM sleep.

Recall-plus-music was added to investigate whether reductions in emotionality are associated with relaxation. Participants reported a greater decline in emotionality and concentration after eye movements in comparison to recall-only and recall-with-music. It is concluded that eye movements are effective when negative memories pertain to loss and grief.


EMDR treatment of autobiographic worries causing moderate distress resulted in an “increase in the smoothness of pursuit [which] presumably reflects an improvement in the use of visual attention needed to follow the target accurately. Perhaps EMDR reduces distress thereby activating a cholinergic effect known to improve ocular pursuit.


Results showed that vividness and emotionality ratings of the memory decreased significantly after eye movement and counting, and that eye movement produced the greatest benefit. Furthermore, eye movement facilitated greater decrease in vividness irrespective of the modality of the memory. Although this is not consistent with the hypothesis from a working memory model of mode-specific effects, it is consistent with a central executive explanation.


This study tested whether the content of participants’ responses during EMDR is similar to that thought to be effective for traditional exposure treatments (reliving), or is more consistent with distancing which would be expected given Shapiro’s proposal of dual focus of attention. Greatest improvement on a measure of PTSD symptoms occurred when the participant processed the trauma in a more detached manner, which indicates the underlying mechanisms of EMDR and exposure therapy are different.


This study provides corroborating evidence that EM during recall causes reductions in memory vividness and emotionality at a delayed post-test and that the magnitude of these effects is related to intervention duration.


Tested patients awaiting PTSD treatment and demonstrated that the eye movement condition had a significant effect on vividness of trauma memory and emotionality compared to counting and exposure only. In addition, “the counting task had no effect on vividness compared to exposure only, suggesting that the eye-movement task had a specific effect rather than serving as a general distractor” (p. 317).


One of a variety of articles positing an orienting response as a contributing element (see Shapiro, 2001 for comprehensive examination of theories and suggested research parameters). This theory has received controlled research support (Barrowcliff et al., 2003, 2004).

Specifically, the EM manipulation used in the present study, reported previously to facilitate episodic memory, resulted in decreased interhemispheric EEG coherence in anterior prefrontal cortex. Because the gamma band includes the 40 Hz wave that may indicate the active binding of information during the consolidation of long-term memory storage (e.g., Cahn and Polich, 2006), it is particularly notable that the changes in coherence we found are in this band. With regard to PTSD symptoms, it may be that by changing interhemispheric coherence in frontal areas, the EMs used in EMDR foster consolidation of traumatic memories, thereby decreasing the memory intrusions found in this disorder.


Theoretical, clinical, and procedural differences referencing two decades of CBT and EMDR research.

Rogers, S., Silver, S., Goss, J., Obenchain, J., Willis, A., & Whitney, R. (1999). A single session, controlled group study of flooding and eye movement desensitization and reprocessing in treating posttraumatic stress disorder among Vietnam war veterans: Preliminary data. Journal of Anxiety Disorders, 13, 119–130. This study was designed as primarily a process report to compare EMDR and exposure therapy. A different recovery pattern was observed with the EMDR group demonstrating a more rapid decline in self-reported distress.


During-session changes in autonomic tone were investigated in 10 patients suffering from single-trauma PTSD. Results indicate that information processing during EMDR is followed by during-session decrease in psychophysiological activity, reduced subjective disturbance and reduced stress reactivity to traumatic memory.

The psycho-physiological correlates of EMDR were investigated during treatment sessions of trauma patients. The initiation of the eye movements sets resulted in immediate changes that indicated a pronounced de- arousal.


Twenty-one patients with single-event PTSD (average IES: 49.5) received three consecutive sessions of EMDR with three different types of auditory and kinesthetic stimulation. All were clinically useful. However, alternating stimulation appeared to confer an additional benefit to the EMDR procedure.


Comprehensive explanations of mechanisms and the potential links to the processes that occur in REM sleep. Controlled studies have evaluated these theories (see next section; Christman et al., 2003; Kuiken et al. 2001-2002).

The article explores the differences between memory reconsolidation and extinction. This new area of investigation is worthy of additional attention. Reconsolidation may prove to be the underlying mechanism of EMDR, as opposed to extinction caused by prolonged exposure therapies. Memory reconsolidation after retrieval may be used to update or integrate new information into long-term memories . . . Brief exposure ... seems to trigger a second wave of memory consolidation (reconsolidation), whereas prolonged exposure . . . leads to the formation of a new memory that competes with the original memory (extinction).


EMs outperformed tones while it remained unclear if tones add to recall only. . . EMs were superior to tones in reducing the emotionality and vividness of trauma memories. [I]n contrast to EMs, tones hardly tax working memory and induce a smaller reduction in emotionality and vividness of aversive memories. Interestingly, patients’ preferences did not follow this pattern: the perceived effectiveness was higher for tones than for EMs. . . Clearly, the superior effects of EMs on emotionality and vividness of trauma memories were not due to demand characteristics.


Study involving biofeedback equipment has supported the hypothesis that the parasympathetic system is activated by finding that eye movements appeared to cause a compelled relaxation response. More rigorous research with trauma populations is needed.

Randomized Studies of Hypotheses Regarding Eye Movements

Numerous memory researchers have evaluated the eye movements used in EMDR therapy. A recent meta-analysis of the eye movement research has reported positive effects (Lee & Cuijpers, 2013) in both clinical and laboratory trials (see above). It is hypothesized that a number of mechanisms interact synergistically. The following studies have tested specific hypotheses regarding mechanism of action and found a direct effect on emotional arousal, imagery vividness, attentional flexibility, retrieval, distancing and memory association.


Tested cortical activation theories. Results provide indirect support for the orienting response/REM theories suggested by Stickgold (2002, 2008). Saccadic eye movements, but not tracking eye movements were superior to control conditions in episodic retrieval.

The results of the current Experiment 2 suggest that the eye movements employed in EMDR may induce a neurobiological change in interhemispheric interaction and an attendant psychological change in episodic retrieval.

This study examined whether eye movements reduce vividness and emotionality of visual distressing images about feared future events. . . Relative to the no-dual task condition, eye movements while thinking of future-oriented images resulted in decreased ratings of image vividness and emotional intensity.

Additional investigation of eye movements compared to Tetris from a working memory perspective.

Results showed that vividness of intrusive images was lower after recall with eye movement, relative to recall only, and there was a similar trend for emotionality.

Three studies were done that cumulatively support a working-memory account of the eye movement benefits in which the central executive is taxed when a person performs a distractor task while attempting to hold a memory in mind.

Tested the working memory theory. Eye movements were superior to control conditions in reducing within-session image vividness and emotionality. There was no difference one-week post.

Relative to the control condition (imagery only), those who made eye movements whilst holding a mental image of this scenario in-mind demonstrated a significant decrease in heart rate, which acted as a measure of emotionality.

Tested the orienting response theory related to REM-type mechanisms. Indicated that the eye movement condition was correlated with increased attentional flexibility. Eye movements were superior to control conditions.

Lee, C.W., & Drummond, P.D. (2008). Effects of eye movement versus therapist instructions on the processing of distressing memories. *Journal of Anxiety Disorders, 22*, 801-808. 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… . The results were consistent with other evidence that the mechanism of change in EMDR is not the same as traditional exposure.


Nieuwenhuis, S., Elzinga, B. M., Ras, P. H., Berends, F., Duijs, P., Samara, Z., & Slagter, H. A. (2013). Bilateral saccadic eye movements and tactile stimulation, but not auditory stimulation, enhance memory retrieval. *Brain and Cognition, 81*, 52-56. Increased memory retrieval in two experiments support “the possibility that alternating bilateral activation of the left and right hemispheres exerts its effects on memory by increasing the functional connectivity between the two hemispheres.

Parker, A., Buckley, S. & Dagnall, N. (2009). Reduced misinformation effects following saccadic bilateral eye movements. *Brain and Cognition, 69*, 89-97. Bilateral saccadic eye movements were compared to vertical and no eye movements. “It was found that bilateral eye movements increased true memory for the event, increased recollection, and decreased the magnitude of the misinformation effect.” This study supports hypotheses regarding effects of interhemispheric activation and episodic memory.

Parker, A. & Dagnall, N. (2007). Effects of bilateral eye movements on gist based false recognition in the DRM paradigm. *Brain and Cognition, 63*, 221-225. Bilateral saccadic eye movements were compared to vertical and no eye movements. Those in the bilateral eye movement condition “were more likely to recognise previously presented words and less likely to falsely recognize critical non-studies associates.”

Parker, A., Relph, S. & Dagnall, N. (2008). Effects of bilateral eye movement on retrieval of item, associative and contextual information. *Neuropsychology, 22*, 136-145. The effects of saccadic bilateral eye movement were compared to vertical eye movements and no eye movements on the retrieval of item, associative and contextual information. Saccadic eye movements were superior on all parameters in all conditions.


*EMDR* with eye movements led to greater reduction in distress than *EMDR* without eye movements. Heart rate decreased significantly when eye movements began; skin conductance decreased during eye movement sets; heart rate variability and respiration rate increased significantly as eye movements continued; and orienting responses were more frequent in the eye movement than no-eye movement condition at the start of exposure.


Results revealed a significant drop [in eyes moving condition] compared to the [eyes stationary] group in emotionality after 74 seconds compared to a significant drop in vividness at only 2 seconds into the intervention. These results support that emotionality becomes reduced only after vividness has dropped.


Tested their theory that eye movements change the somatic perceptions accompanying retrieval, leading to decreased affect, and therefore decreasing vividness. Eye movements were superior to control conditions in reducing image vividness. Unlike control conditions, eye movements also decreased emotionality.


Vividness of negative memories was reduced after both beeps and eye movements, but effects were larger for eye movements. Findings support a working memory account of *EMDR* and suggest that effects of beeps on negative memories are inferior to those of eye movements.

**Additional Psychophysiological and Neurobiological Evaluations of EMDR Treatment**

All psychophysiological studies have indicated significant de-arousal. Neurobiological studies have indicated significant effects, including changes in cortical, and limbic activation patterns, and increase in hippocampal volume.


### Treatment of Military Personnel

As noted in the WHO (2013) guidelines and the American Psychiatric Association Practice Guidelines (2004, p.18), in EMDR therapy “traumatic material need not be verbalized; instead, patients are directed to think about their traumatic experiences without having to discuss them.” Given the reluctance of many combat veterans to divulge the details of their experience, this factor is relevant to willingness to initiate treatment, retention and therapeutic gains. It may be one of the factors responsible for the lower remission and higher dropout rate noted in this population when CBT techniques are used.

As described previously, an RCT by Carlson et al. (1998) reported that after twelve EMDR treatment sessions, 77.7% of the combat veterans no longer met criteria for PTSD. There were no dropouts and effects were maintained at 3- and 9-month follow-up. In addition, the Silver et al., (1995) analysis of an inpatient veterans’ PTSD program (n = 100) found EMDR to be superior to biofeedback and relaxation training on seven of eight measures. Russell et al. (2007) evaluated 72 active-duty military personnel, 48 diagnosed with combat PTSD and reported that pre-post changes were significant on all measures. A recent program evaluation of active duty military by McLay et al. (2016) compared various forms of treatment and reported, “Results indicated that patients receiving EMDR had significantly fewer therapy sessions over 10 weeks but had significantly greater gains in their PCL–M scores than did individuals not receiving EMDR.”

All other RCT of veterans have used insufficient treatment doses to assess PTSD outcomes (e.g., two sessions; see ISTSS, 2000; DVA/DoD, 2004). Sufficient treatment time must be used for multiply traumatized veterans (e.g., see below: Russell et al., 2007). However, in a process analysis, Rogers et al. (1999) compared one session of EMDR and exposure therapy with inpatient veterans, and a different recovery pattern was observed. The EMDR group demonstrated a more rapid decline in self-reported distress (e.g., SUD levels decreased with EMDR and increased with exposure).

As stated in the American Psychiatric Practice Guidelines (2004, p. 36), if viewed as an exposure therapy, “EMDR employs techniques that may give the patient more control over the exposure experience (since EMDR is less reliant on a verbal account) and provides techniques to regulate anxiety in the apprehensive circumstance of exposure treatment. Consequently, it may prove advantageous for patients who cannot tolerate prolonged exposure as well as for patients who have difficulty verbalizing their traumatic experiences. Comparisons of EMDR with other treatments in larger samples are needed to clarify such differences.”

Such research is highly recommended. In addition, since EMDR utilizes no homework to achieve its effects it may be particularly suited for front line alleviation of symptoms (see Russell, 2006; Wesson & Gould, 2009). Further, the prevalent somatic and chronic pain problems experienced by combat veterans indicate the need for additional research based upon the reports of Russell (2008), Schneider et al., (2007, 2008) and Wilensky (2007), which demonstrate EMDR’s capacity to successfully treat phantom limb pain (see also Ray & Zbik, 2001). The ability of EMDR to simultaneously address PTSD, depression, and pain can have distinct benefits for DVA/DoD treatment.
The following contain clinically relevant information for the treatment of veterans, including therapy parameters.


