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EMDR: Trauma Research Findings and Further Reading

INTERNATIONAL TREATMENT GUIDELINES

American Psychiatric Association. (2004). *Practice guideline for the treatment of patients with acute stress disorder and posttraumatic stress disorder.* Arlington, VA: Author.

EMDR is recommended as an effective treatment for trauma.

Bleich, A., Kotler, M., Kutz, I., & Shalev, A. (2002). A position paper of the (Israeli) Navtional Council for Mental Health: Guidelines for the assessment and professional intervention with terror victims in the hospital and in the community. Jerusalem, Israel.

EMDR is one of three methods recommended for treatment of terror victims.

Chambless, D.L. et al. (1998). Update of empirically validated therapies, II. *The Clinical Psychologist, 51,* 3–16.

According to a task force of the Clinical Division of the American Psychological Association, the only methods empirically supported ("probably efficacious") for the treatment of any post-vwwtraumatic stress disorder population were EMDR, exposure therapy, and stress inoculation therapy. Note that this evaluation does not cover the last decade of research.

CREST. (2003). *The management of posttraumatic stress disorder in adults.* A publication of the Clinical Resource Efficiency Support Team of the Northern Ireland Department of Health, Social Services and Public Safety, Belfast.

EMDR and CBT were stated to be the treatments of choice.

Department of Veterans Affairs & Department of Defense. (2004). *VA/DoD clinical practice guideline for the management of post-traumatic stress.* Washington, DC: Veterans Health Administration, Department of Veterans Affairs and Health Affairs, Department of Defense. Office of Quality and Performance publication 10Q-CPG/PTSD-04.

EMDR was placed in the "A" category as "strongly recommended" for the treatment of trauma.

Dutch National Steering Committee Guidelines Mental Health Care. (2003). Multidisciplinary Guideline Anxiety Disorders. Quality Institute Heath Care CBO/Trimbos Institute. Utrecht, Netherlands.

EMDR and CBT both designated as treatments of choice for PTSD.

Foa, E. B., Keane, T. M., Friedman, M. J., & Cohen, J. A. (2009). *Effective treatments for PTSD*: *Practice guidelines from the International Society for Traumatic Stress Studies*. New York: Guilford Press.

EMDR was listed as an effective and empirically supported treatment for PTSD, and was given an AHCPR "A" rating for adult PTSD. This guideline specifically rejected the findings of the previous Institute of Medicine report, which stated that more research was needed to judge EMDR effective for adult PTSD. With regard to the application of EMDR to children, an AHCPR rating of Level B was assigned. Since the time of this publication, two additional randomized studies on EMDR have been completed (see below).

INSERM. (2004). *Psychotherapy: An evaluation of three approaches.* French National Institute of Health and Medical Research, Paris, France.

EMDR and CBT were stated to be the treatments of choice for trauma victims.

National Institute for Clinical Excellence. (2005). *Posttraumatic stress disorder (PTSD): The management of adults and children in primary and secondary care.* London: NICE Guidelines.

Trauma-focused CBT and EMDR were stated to be empirically supported treatments for choice for adult PTSD.

Therapy Advisor. (2004–2007): *www.therapyadvisor.com*

An NIMH-sponsored website listing empirically supported methods for a variety of disorders. EMDR is one of three treatments listed for PTSD.

United Kingdom Department of Health. (2001). Treatment choice in psychological therapies and counseling evidence-based clinical practice guideline. London, England.

Best evidence of efficacy was reported for EMDR, exposure, and stress inoculation.

META-ANALYSES

EMDR has been compared to numerous exposure therapy protocols, with and without CT techniques. It should be noted that exposure therapy uses 1 to 2 hours of daily homework and EMDR uses none. The most recent meta-analyses are listed here.

Bisson, J., & Andrew, M. (2007). Psychological treatment of post-traumatic stress disorder (PTSD). *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No. CD003388. DOI: 10.1002/14651858.CD003388.pub3.

"Trauma-focused cognitive behavioural therapy and eye movement desensitisation and reprocessing have the best evidence for efficacy at present and should be made available to PTSD sufferers."

Bradley, R., Greene, J., Russ, E., Dutra, L., & Westen, D. (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *American Journal of Psychiatry, 162,* 214–227.

EMDR is equivalent to exposure and other cognitive-behavioral treatments and all "are highly efficacious in reducing PTSD symptoms."

Davidson, P. R., & Parker, K. C. H. (2001). Eye movement desensitization and reprocessing (EMDR): A meta-analysis. *Journal of Consulting and Clinical Psychology, 69*, 305–316.

EMDR is equivalent to exposure and other cognitive-behavioral treatments.

Maxfield, L., & Hyer, L.A. (2002). The relationship between efficacy and methodology in studies investigating EMDR treatment of PTSD. *Journal of Clinical Psychology, 58*, 23–41.

A comprehensive meta-analysis reported the more rigorous the study, the larger the effect.

Rodenburg, R., Benjamin, A., de Roos, C., Meijer, A. M., & Stams, G. J. (in press). Efficacy of EMDR in children: A meta–analysis. *Clinical Psychology Review.*

"Results indicate efficacy of EMDR when effect sizes are based on comparisons between EMDR and non-established trauma treatment or no-treatment control groups, and incremental efficacy when effect sizes are based on comparisons between EMDR and established (CBT) trauma treatment."

Seidler, G. H., & Wagner, F. E. (2006). Comparing the efficacy of EMDR and trauma-focused cognitive-behavioral therapy in the treatment of PTSD: A meta-analytic study. *Psychological Medicine, 36,* 1515–1522.

"Results suggest that in the treatment of PTSD, both therapy methods tend to be equally efficacious."

RANDOMIZED CLINICAL TRIALS

Abbasnejad, M., Mahani, K. N., & Zamyad, A. (2007). Efficacy of "eye movement desensitization and reprocessing" in reducing anxiety and unpleasant feelings due to earthquake experience. *Psychological Research, 9* (3–4), 104–117.

"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 1-month follow-up."

Ahmad, A., Larsson, B., & Sundelin-Wahlsten, V. (2007). EMDR treatment for children with PTSD: Results of a randomized controlled trial. *Nordic Journal of Psychiatry, 61,* 349–54.

Thirty-three 6–16-year-old children with a DSM-IV diagnosis of PTSD were randomly assigned to 8 weekly EMDR sessions or the waiting-list control 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.

Carlson, J., Chemtob, C. M., Rusnak, K., Hedlund, N. L., & Muraoka, M. Y. (1998). Eye movement desensitization and reprocessing (EMDR): Treatment for combat-related post-traumatic stress disorder. *Journal of Traumatic Stress, 11,* 3–24.

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.

Chemtob, C. M., Nakashima, J., & Carlson, J. G. (2002). Brief-treatment for elementary school children with disaster-related PTSD: A field study. *Journal of Clinical Psychology, 58,* 99–112.

EMDR was found to be an effective treatment for children with disaster-related PTSD who had not responded to another intervention.

Cvetek, R. (2008). EMDR treatment of distressful experiences that fail to meet the criteria for PTSD. *Journal of EMDR Practice and Research, 2,* 2–14.

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 State–Trait Anxiety Inventory after memory recall.

Edmond, T., Rubin, A., & Wambach, K. (1999). The effectiveness of EMDR with adult female survivors of childhood sexual abuse. *Social Work Research*, *23*, 103–116.

EMDR treatment resulted in lower scores (fewer clinical symptoms) on all four of the outcome measures at the 3-month follow-up, compared to those in the routine treatment condition. The EMDR group also improved on all standardized measures at 18-month follow-up (Edmond & Rubin, 2004, Journal of Child Sexual Abuse*).*

Edmond, T., Sloan, L., & McCarty, D. (2004). Sexual abuse survivors' perceptions of the effectiveness of EMDR and eclectic therapy: A mixed-methods study. *Research on Social Work Practice, 14*, 259–272.

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.

Hogberg, G., et al., (2007). On treatment with eye movement desensitization and reprocessing of chronic post-traumatic stress disorder in public transportation workers: A randomized controlled study. *Nordic Journal of Psychiatry, 61,* 54–61.

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. Follow-up: Hogberg, G., et al. (2008). Treatment of post-traumatic stress disorder with eye movement desensitization and reprocessing: Outcome is stable in 35-month follow-up. Psychiatry Research, 159*, 101–108.*

Ironson, G. I., Freund, B., Strauss, J. L., & Williams, J. (2002). Comparison of two treatments for traumatic stress: A community-based study of EMDR and prolonged exposure. *Journal of Clinical Psychology, 58,* 113–128.

Both EMDR and prolonged exposure produced a significant reduction in PTSD and depression symptoms. This is the only research comparing EMDR and exposure therapy that equalized homework. The 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.

Jaberghaderi, N., Greenwald, R., Rubin, A., Dolatabadim, S., & Zand, S. O. (2004). A comparison of CBT and EMDR for sexually abused Iranian girls. *Clinical Psychology and Psychotherapy, 11,* 358–368.

Both EMDR and CBT produced significant reduction in PTSD and behavior problems. EMDR was significantly more efficient, using approximately half the number of sessions to achieve results.

Lee, C., Gavriel, H., Drummond, P., Richards, J., & Greenwald, R. (2002). Treatment of post-traumatic stress disorder: A comparison of stress inoculation training with prolonged exposure and eye movement desensitization and reprocessing. *Journal of Clinical Psychology, 58,* 1071–1089.

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 3-month follow-up. EMDR required 3 hours of homework compared to 28 hours for SITPE.

Marcus, S., Marquis, P., & Sakai, C. (1997). Controlled study of treatment of PTSD using EMDR in an HMO setting. *Psychotherapy, 34,* 307–315

Funded by Kaiser Permanente. Results show that 100% of single-trauma and 77% of multiple-trauma survivors were no longer diagnosed with post-traumatic stress disorder after six 50-minute sessions.

Marcus, S., Marquis, P., & Sakai, C. (2004). Three- and 6-month follow-up of EMDR treatment of PTSD in an HMO setting. *International Journal of Stress Management, 11,* 195–208.

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.

Power, K. G., McGoldrick, T., Brown, K., et al. (2002). A controlled comparison of eye movement desensitization and reprocessing versus exposure plus cognitive restructuring, versus waiting list in the treatment of post-traumatic stress disorder. *Journal of Clinical Psychology and Psychotherapy, 9,* 299–318.

Both EMDR and exposure therapy plus cognitive restructuring (with daily homework) produced significant improvement. EMDR was more beneficial for depression, and social functioning, and required fewer treatment sessions. Subsequent reevaluation of the data indicated that "For pre- to post-treatment IES mean change score, EMDR patients also appeared to have had better treatment outcome than E+CR patients" and EMDR therapy was a predictor of positive outcome: Karatzias, A., Power, K., McGoldrick, T., Brown, K., Buchanan, R., Sharp, D., & Swanson, V. (2006). Predicting treatment outcome on three measures for post-traumatic stress disorder. European Archives of Psychiatry and Clinical Neuroscience, 20*, 1–7.*

Rothbaum, B. (1997). A controlled study of eye movement desensitization and reprocessing in the treatment of post-traumatic stress disordered sexual assault victims. *Bulletin of the Menninger Clinic, 61,* 317–334.

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

Rothbaum, B. O., Astin, M. C., & Marsteller, F. (2005). Prolonged exposure versus eye movement desensitization (EMDR) for PTSD rape victims. *Journal of Traumatic Stress, 18,* 607–616.

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."

Scheck, M., Schaeffer, J. A., & Gillette, C. (1998). Brief psychological intervention with traumatized young women: The efficacy of eye movement desensitization and reprocessing. *Journal of Traumatic Stress, 11,* 25–44.

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

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

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

Soberman, G. B., Greenwald, R., & Rule, D. L. (2002). A controlled study of eye movement desensitization and reprocessing (EMDR) for boys with conduct problems. *Journal of Aggression, Maltreatment, and Trauma, 6,* 217–236.

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.

Taylor, S. et al. (2003). Comparative efficacy, speed, and adverse effects of three PTSD treatments: Exposure therapy, EMDR, and relaxation training. *Journal of Consulting and Clinical Psychology, 71, 330–338.*

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 (approximately 50 hours). The EMDR group used only standard sessions and no homework.

van der Kolk, B., Spinazzola, J., Blaustein, M., Hopper, J., Hopper, E., Korn, D., et al. (2007). A randomized clinical trial of EMDR, fluoxetine and pill placebo in the treatment of PTSD: Treatment effects and long-term maintenance. *Journal of Clinical Psychiatry, 68,* 37–46.

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.

Vaughan, K., Armstrong, M. F., Gold, R., O'Connor, N., Jenneke, W., & Tarrier, N. (1994). A trial of eye movement desensitization compared to image habituation training and applied muscle relaxation in post-traumatic stress disorder. *Journal of Behavior Therapy and Experimental Psychiatry, 25,* 283–291.

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.

Wanders, F., Serra, M., & de Jongh, A. (2008). EMDR versus CBT for children with self-esteem and behavioral problems: A randomized controlled trial. *Journal of EMDR Practice and Research, 2,* 180–189.

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.

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

Three sessions of EMDR produced clinically significant change in traumatized civilians on multiple measures.

Wilson, S., Becker, L .A., & Tinker, R. H. (1997). Fifteen-month follow-up of eye movement desensitization and reprocessing (EMDR) treatment of post-traumatic stress disorder and psychological trauma. *Journal of Consulting and Clinical Psychology*, 65, 1047–1056.

Follow-up at 15 months showed maintenance of positive treatment effects with 84% remission of PTSD diagnosis.

NONRANDOMIZED STUDIES

Aduriz, M. E., Bluthgen, C., & Knopfler, C. (2009). Helping child flood victims using group EMDR intervention in Argentina: Treatment outcome and gender differences. *International Journal of Stress Management. 16,* 138–153.

A comprehensive group intervention with 124 children who experienced disaster-related trauma during a massive flood utilizing a one-session group protocol. Significant differences were obtained and maintained at 3-month follow-up.

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.

This study found CBT superior to EMDR. The research is marred by 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 posttraumatic reactions in a postemergency 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.

Fernandez, I., Gallinari, E., & Lorenzetti, A. (2004). A school- based EMDR intervention for children who witnessed the Pirelli building airplane crash in Milan, Italy. *Journal of Brief Therapy, 2*, 129–136.

A group intervention of EMDR was provided to 236 schoolchildren exhibiting PTSD symptoms 30 days post-incident. At 4-month follow-up, teachers reported that all but two children evinced a return to normal functioning after treatment.

Grainger, R. D., Levin, C., Allen-Byrd, L., Doctor, R. M., & Lee, H. (1997). An empirical evaluation of eye movement desensitization and reprocessing (EMDR) with survivors of a natural catastrophe. *Journal of Traumatic Stress, 10,* 665–671.

A study of Hurricane Andrew survivors found significant differences on the Impact of Event Scale and subjective distress in a comparison of EMDR and no-treatment condition.

Hensel, T. (2009). EMDR with children and adolescents after single-incident trauma: An intervention study. *Journal of EMDR Practice and Research, 3*, 2–9.

Thirty-six 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.

Jarero, I., Artigas, L., & Hartung, J. (2006). EMDR integrative group treatment protocol: A post-disaster trauma intervention for children and adults. *Traumatology, 12,* 121–129.

A study of 200 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.

Konuk, E., Knipe, J., Eke, I., Yuksek, H., Yurtsever, A., & Ostep, S. (2006). The effects of EMDR therapy on post-traumatic stress disorder in survivors of the 1999 Marmara, Turkey earthquake. *International Journal of Stress Management, 13,* 291–308.

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.

Puffer, M., Greenwald, R., & Elrod, D. (1997). A single-session EMDR study with twenty traumatized children and adolescents. *Traumatology, 3*(2), Article 6.

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

Silver, S. M., Brooks, A., & Obenchain, J. (1995). Eye movement desensitization and reprocessing treatment of Vietnam war veterans with PTSD: Comparative effects with biofeedback and relaxation training. *Journal of Traumatic Stress, 8*, 337–342.

*One of only two EMDR research studies that evaluated a clinically relevant course of EMDR treatment with combat veterans (e.g., more than one or two memories; see Carlson et al., above). The analysis of an inpatient veterans' PTSD program (*n = *100) found EMDR to be superior to biofeedback and relaxation training on seven of eight measures.*

Silver, S. M., Rogers, S., Knipe, J., & Colelli, G. (2005). EMDR therapy following the 9/11 terrorist attacks: A community-based intervention project in New York City. *International Journal of Stress Management,* 12, 29–42.

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.

Solomon, R. M., & Kaufman, T. E. (2002). A peer support workshop for the treatment of traumatic stress of railroad personnel: Contributions of eye movement desensitization and reprocessing (EMDR). *Journal of Brief Therapy, 2,* 27–33.

Sixty railroad employees who had experienced fatal grade-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, subclinical, scores which further decreased at follow-up.

Sprang, G. (2001). The use of eye movement desensitization and reprocessing (EMDR) in the treatment of traumatic stress and complicated mourning: Psychological and behavioral outcomes. *Research on Social Work Practice*, *11*, 300–320.

In a multisite 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. Positive recall of the deceased was significantly greater posttreatment in the EMDR condition.

Zaghrout-Hodali, M., Alissa, F., & Dodgson, P. W. (2008). Building resilience and dismantling fear: EMDR group protocol with children in an area of ongoing trauma. *Journal of EMDR Practice and Research, 2,* 106–113.

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.

Bae, H., Kim, D., & Park, Y. C. (2008). Eye movement desensitization and reprocessing for adolescent depression. *Psychiatry Investigation, 5,* 60–65.

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

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 1-year follow-up.

Brown, S., & Shapiro, F. (2006). EMDR in the treatment of borderline personality disorder. *Clinical Case Studies, 5,* 403–420.

Twenty 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.

Gauvreau, P., & Bouchard, S. (2008). Preliminary evidence for the efficacy of EMDR in treating generalized anxiety disorder. *Journal of EMDR Practice and Research, 2,* 26–40.

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-month follow-up, all four participants no longer presented with GAD diagnosis.

McGoldrick, T., Begum, M., & Brown, K. W. (2008). EMDR and olfactory reference syndrome: A case series. *Journal of EMDR Practice and Research 2,* 63–68.

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.

Mol, S. S. L., Arntz, A., Metsemakers, J. F. M., Dinant, G., Vilters-Van Montfort, P. A. P., & Knottnerus, A. (2005). Symptoms of post-traumatic stress disorder after non-traumatic events: Evidence from an open population study. *British Journal of Psychiatry, 186,* 494–499.

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."

Perkins, B. R., & Rouanzoin, C. C. (2002). A critical evaluation of current views regarding eye movement desensitization and reprocessing (EMDR): Clarifying points of confusion. *Journal of Clinical Psychology, 58,* 77–97.

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

Raboni, M. R., Tufik, S., & Suchecki, D. (2006). Treatment of PTSD by eye movement desensitization and reprocessing improves sleep quality, quality of life, and perception of stress. *Annals of the New York Academy of Sciences, 1071,* 508–513.

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.

Ray, A. L., & Zbik, A. (2001). Cognitive behavioral therapies and beyond. In C. D. Tollison, J. R. Satterthwaite, & J. W. Tollison (Eds.), *Practical pain management* (3rd ed., pp. 189–208). Philadelphia: Lippincott.

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.

Ricci, R. J., Clayton, C. A., & Shapiro, F. (2006). Some effects of EMDR treatment with previously abused child molesters: Theoretical reviews and preliminary findings. *Journal of Forensic Psychiatry and Psychology, 17,* 538–562.

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 the plethysmograph, a decrease in sexual thoughts, and increased victim empathy. Effects maintained at 1-year follow-up.

Russell, M. (2008). Treating traumatic amputation-related phantom limb pain: A case study utilizing eye movement desensitization and reprocessing (EMDR) within the armed services. *Clinical Case Studies, 7,* 136–153.

"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."

Schneider, J., Hofmann, A., Rost, C., & Shapiro, F. (2007). EMDR and phantom limb pain: Case study, theoretical implications, and treatment guidelines. *Journal of EMDR Science and Practice, 1,* 31–45.

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.

Schneider, J., Hofmann, A., Rost, C., & Shapiro, F. (2008). EMDR in the treatment of chronic phantom limb pain. *Pain Medicine, 9,* 76–82.

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 in a decrease or elimination of the phantom limb pain which maintained at 1-year follow-up.

Shapiro, F. (2001). *Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures* (2nd ed.). New York: Guilford Press.

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.

Shapiro, F. (Ed.). (2002). *EMDR as an integrative psychotherapy approach: Experts of diverse orientations explore the paradigm prism.* Washington, DC: American Psychological Association Books.

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

Shapiro, F. (2006). *EMDR and new notes on adaptive information processing: Case formulation principles, scripts, and worksheets*. Camden, CT: EMDR Humanitarian Assistance Programs (*www.emdrhap.org*).

Overview of the 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.

Shapiro, F. (2007). EMDR, adaptive information processing, and case conceptualization. *Journal of EMDR Practice and Research, 1*, 68–87.

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.

Shapiro, F., Kaslow, F., & Maxfield, L. (Eds.). (2007). *Handbook of EMDR and family therapy processes*. Hoboken, NJ: Wiley.

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.

Solomon, R., & Shapiro, F. (2008). EMDR and the adaptive information processing model: Potential mechanisms of change. *Journal of EMDR Practice and Research, 2,* 315–325.

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.

Uribe, M. E. R., & Ramirez, E. O. L. (2006). The effect of EMDR therapy on the negative information processing on patients who suffer depression. *Revista Electrónica de Motivación y Emoción (REME), 9,* 23–24.

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."

Wilensky, M. (2006). Eye movement desensitization and reprocessing (EMDR) as a treatment for phantom limb pain. *Journal of Brief Therapy, 5,* 31–44.

"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.

Elofsson, U. O. E., von Scheele, B., Theorell, T., & Sondergaard, H. P. (2008). Physiological correlates of eye movement desensitization and reprocessing. *Journal of Anxiety Disorders, 22,* 622–634.

Changes in heart rate, skin conductance, LF/HF ratio, finger temperature, breathing frequency, and 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."

Lee, C. W., Taylor, G., & Drummond, P. D. (2006). The active ingredient in EMDR: Is it traditional exposure or dual focus of attention? *Clinical Psychology and Psychotherapy, 13*, 97–107.

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.

MacCulloch, M. J., & Feldman, P. (1996). Eye movement desensitization treatment utilizes the positive visceral element of the investigatory reflex to inhibit the memories of post-traumatic stress disorder: A theoretical analysis. *British Journal of Psychiatry, 169*, 571–579.

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).

Propper, R., Pierce, J. P., Geisler, M. W., Christman, S. D., & Bellorado, N. (2007). Effect of bilateral eye movements on frontal interhemispheric gamma EEG coherence: Implications for EMDR therapy. *Journal of Nervous and Mental Disease, 195*, 785–788.

"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."

Rogers, S., & Silver, S. M. (2002). Is EMDR an exposure therapy? A review of trauma protocols. *Journal of Clinical Psychology, 58,* 43–59.

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.

Sack, M., Hofmann, A., Wizelman, L., & Lempa, W. (2008). Psychophysiological changes during EMDR and treatment outcome. *Journal of EMDR Practice and Research, 2,* 239–246.

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.

Sack, M., Lempa, W., Steinmetz, A., Lamprecht, F., & Hofmann, A. (2008). Alterations in autonomic tone during trauma exposure using eye movement desensitization and reprocessing (EMDR): Results of a preliminary investigation. *Journal of Anxiety Disorders, 22,* 1264–1271.

The psychophysiological 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.

Servan-Schreiber, D., Schooler, J., Dew, M.A., Carter, C., & Bartone, P. (2006). EMDR for PTSD: A pilot blinded, randomized study of stimulation type. *Psychotherapy and Psychosomatics, 75*, 290–297.

Twenty-one patients with single-event PTSD (average Impact of Event Scale–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.

Stickgold, R. (2002). EMDR: A putative neurobiological mechanism of action. *Journal of Clinical Psychology, 58*, 61–75.

Stickgold, R. (2008). Sleep-dependent memory processing and EMDR action. *Journal of EMDR Practice and Research, 2*, 289–299.

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).

Suzuki, A., et al. (2004). Memory reconsolidation and extinction have distinct temporal and biochemical signatures. *Journal of Neuroscience, 24,* 4787–4795.

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)."

Wilson, D., Silver, S. M., Covi, W., & Foster, S. (1996). Eye movement desensitization and reprocessing: Effectiveness and autonomic correlates. *Journal of Behavior Therapy and Experimental Psychiatry, 27*, 219–229.

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

A number of international practice guideline committees have reported that the clinical component analyses reviewed by Davidson and Parker (2001) are not well designed (International Society for Traumatic Stress Studies [ISTSS], 2000; DoD/DVA, 2004). Davidson and Parker note that there is a trend toward significance for eye movements when the studies conducted with clinical populations are examined separately. Unfortunately, even these studies are methodologically flawed. As noted in the ISTSS guidelines (Chemtob et al., 2000), since these clinical populations received insufficient treatment doses to obtain substantial main effects, they are inappropriate for component analyses. However, as noted in the DoD/DVA (2004) guidelines, numerous memory researchers have evaluated the eye movements used in EMDR. These studies have found a direct effect on emotional arousal, imagery vividness, attentional flexibility, and memory association. In addition, a new study has examined the hypothesis that the eye movements cause a "distancing effect" (Lee & Drummond, 2008) and is listed below as well.

Andrade, J., Kavanagh, D., & Baddeley, A. (1997). Eye-movements and visual imagery: A working memory approach to the treatment of post-traumatic stress disorder. *British Journal of Clinical Psychology, 36,* 209–223.

Tested the working memory theory. Eye movements were superior to control conditions in reducing image vividness and emotionality.

Barrowcliff, A. L., Gray, N. S., Freeman, T. C. A., & MacCulloch, M. J. (2004). Eye-movements reduce the vividness, emotional valence, and electrodermal arousal associated with negative autobiographical memories. *Journal of Forensic Psychiatry and Psychology, 15,* 325–345.

Tested the reassurance reflex model. Eye movements were superior to control conditions in reducing image vividness and emotionality.

Barrowcliff, A. L., Gray, N. S., MacCulloch, S., Freeman, T. C. A., & MacCulloch, M. J. (2003). Horizontal rhythmical eye-movements consistently diminish the arousal provoked by auditory stimuli. *British Journal of Clinical Psychology, 42,* 289–302.

Tested the reassurance reflex model. Eye movements were superior to control conditions in reducing arousal provoked by auditory stimuli.

Christman, S. D., Garvey, K. J., Propper, R. E., & Phaneuf, K. A. (2003). Bilateral eye movements enhance the retrieval of episodic memories. *Neuropsychology, 17*, 221–229.

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.

Gunter, R. W., & Bodner, G. E. (2008). How eye movements affect unpleasant memories: Support for a working-memory account. *Behaviour Research and Therapy 46,* 913– 931.

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.

Kavanagh, D. J., Freese, S., Andrade, J., & May, J. (2001). Effects of visuospatial tasks on desensitization to emotive memories. *British Journal of Clinical Psychology, 40*, 267–280.

Tested the working memory theory. Eye movements were superior to control conditions in reducing within-session image vividness and emotionality. There was no difference 1-week post.

Kuiken, D., Bears, M., Miall, D., & Smith, L. (2001–2002). Eye movement desensitization reprocessing facilitates attentional orienting. *Imagination, Cognition and Personality, 21*(1), 3–20.

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."

Maxfield, L., Melnyk, W. T., & Hayman, C. A. G. (2008). A working memory explanation for the effects of eye movements in EMDR. *Journal of EMDR Practice and Research, 2,* 247–261.

In two experiments participants focused on negative memories while engaging in three dual-attention eye movement tasks of increasing complexity. Results support a working memory explanation for the effects of eye movement dual-attention tasks on autobiographical memory.

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.

Sharpley, C. F., Montgomery, I. M., & Scalzo, L. A. (1996). Comparative efficacy of EMDR and alternative procedures in reducing the vividness of mental images. *Scandinavian Journal of Behaviour Therapy, 25*, 37–42.

Eye movements were superior to control conditions in reducing image vividness.

van den Hout, M., Muris, P., Salemink, E., & Kindt, M. (2001). Autobiographical memories become less vivid and emotional after eye movements. *British Journal of Clinical Psychology, 40,* 121–130.

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.

ADDITIONAL PSYCHOPHYSIOLOGICAL AND NEUROBIOLOGICAL EVALUATIONS OF EMDR TREATMENT

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

Bossini, L., Fagiolini, A., & Castrogiovanni, P. (2007). Neuroanatomical changes after EMDR in Posttraumatic Stress Disorder. *Journal of Neuropsychiatry and Clinical Neuroscience, 19,* 457–458.

Kowal, J. A. (2005). QEEG analysis of treating PTSD and bulimia nervosa using EMDR. *Journal of Neurotherapy, 9*(Part 4), 114–115.

Lamprecht, F., Kohnke, C., Lempa, W., Sack, M., Matzke, M., & Munte, T. (2004). Event-related potentials and EMDR treatment of post-traumatic stress disorder. *Neuroscience Research, 49*, 267–272.

Lansing, K., Amen, D. G., Hanks, C., & Rudy, L. (2005). High-resolution brain SPECT imaging and EMDR in police officers with PTSD. *Journal of Neuropsychiatry and Clinical Neurosciences, 17,* 526–532.

Levin, P., Lazrove, S., & van der Kolk, B. A. (1999). What psychological testing and neuroimaging tell us about the treatment of posttraumatic stress disorder (PTSD) by eye movement desensitization and reprocessing (EMDR). *Journal of Anxiety Disorders, 13,* 159–172.

Oh, D.-H., & Choi, J. (2004). Changes in the regional cerebral perfusion after Eye Movement Desensitization and Reprocessing: A SPECT study of two cases. *Journal of EMDR Practice and Research, 1,* 24–30.

Pagani, M., et al. (2007). Effects of EMDR psychotherapy on 99mTc-HMPAO distribution in occupation-related post-traumatic stress disorder. *Nuclear Medicine Communications, 28,* 757–765.

Richardson, R., Williams, S. R., Hepenstall, S., Sgregory, L., McKie, S., & Corrigan, F. (2009). A single-case fMRI study EMDR treatment of a patient with posttraumatic stress disorder. *Journal of EMDR Practice and Research, 3,* 10–23.

Sack, M., Lempa, W., & Lemprecht, W. (2007). Assessment of psychophysiological stress reactions during a traumatic reminder in patients treated with EMDR. *Journal of EMDR Practice and Research, 1,* 15–23.

Sack, M., Nickel, L., Lempa, W., & Lemprecht, F. (2003). Psychophysiological regulation in patients suffering from PTSD: Changes after EMDR treatment. *Journal of Psychotraumatology and Psychological Medicine, 1,* 47–57. (German)

van der Kolk, B., Burbridge, J., & Suzuki, J. (1997). The psychobiology of traumatic memory: Clinical implications of neuroimaging studies. *Annals of the New York Academy of Sciences, 821,* 99–113.

COMBAT VETERAN TREATMENT

As noted in the American Psychiatric Association Practice Guidelines (2004, p. 18), in EMDR "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, Carlson et al. (1998) reported that after 12 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. All other randomized studies 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 re-

covery 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.

Carlson, J., Chemtob, C. M., Rusnak, K., Hedlund, N. L., & Muraoka, M. Y. (1998). Eye movement desensitization and reprocessing (EMDR): Treatment for combat-related post-traumatic stress disorder. *Journal of Traumatic Stress, 11,* 3–24.

Errebo, N., & Sommers-Flanagan, R. (2007). EMDR and emotionally focused couple therapy for war veteran couples. In F. Shapiro, F. Kaslow, & L. Maxfield (Eds.), *Handbook of EMDR and family therapy processes.* Hoboken, NJ: Wiley.

Lipke, H. (2000). *EMDR and psychotherapy integration.* Boca Raton, FL: CRC Press.

Russell, M. (2006). Treating combat-related stress disorders: A multiple case study utilizing eye movement desensitization and reprocessing (EMDR) with battlefield casualties from the Iraqi war. *Military Psychology, 18,* 1–18.

Russell, M. (2008). Treating traumatic amputation-related phantom limb pain: A case study utilizing eye movement desensitization and reprocessing (EMDR) within the armed services. *Clinical Case Studies, 7,* 136–153.

Russell, M. C. (2008a). War-related medically unexplained symptoms, prevalence, and treatment: utilizing EMDR within the armed services. *Journal of EMDR Practice and Research*, 2, 212–226.

Russell, M. C. (2008b). Scientific resistance to research, training, and utilization of eye movement desensitization and reprocessing (EMDR) therapy in treating post-war disorders *Social Science and Medicine*, *67,* 1737–1746.

Russell, M. C., & Silver, S. M. (2007). Training needs for the treatment of combat-related posttraumatic stress disorder. *Traumatology, 13*, 4–10.

Russell, M. C., Silver, S. M., Rogers, S., & Darnell, J. (2007). Responding to an identified

need: A joint Department of Defense–Department of Veterans Affairs training program in eye movement desensitization and reprocessing (EMDR) for clinicians providing trauma services. *International Journal of Stress Management, 14,* 61–71.

Silver, S. M., & Rogers, S. (2002). *Light in the heart of darkness: EMDR and the treatment of war and terrorism survivors*. New York: Norton.

Silver, S. M., Rogers, S., & Russell, M. C. (2008). Eye movement desensitization and reprocessing (EMDR) in the treatment of war veterans. *Journal of Clinical Psychology: In Session, 64,* 947–957.

Wesson, M., & Gould, M. (2009). Intervening early with EMDR on military operations: A case study. *Journal of EMDR Practice and Research, 3,* 91–97.

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EMDR-Evaluated Clinical Applications

EMDR is now widely recognized as a first-line treatment of trauma (e.g., American Psychiatric Association, 2004; Bisson & Andrew, 2007; Bleich, Kotler, Kutz, & Shalev, 2002; CREST, 2003; DVA/DoD, 2004; Foa, Keane, Friedman, & Cohen., 2009; INSERM, 2004; NICE, 2005).

EMDR clinical applications are based on the Adaptive Information Processing model (AIP; see Shapiro, 2001, 2002, 2006, 2007), which posits that the direct reprocessing of the stored memories of etiological events and other experiential contributors can have a positive effect in the treatment of most clinical complaints. This prediction has received support in case studies and open trials with a variety of diagnoses. Expanding the standard protocols (Shapiro, 1995, 2001), additional applications have been developed in clinical practice by experts and consultants in a number of specialty areas. To date, while numerous controlled studies have supported EMDR's effectiveness in the treatment of trauma and PTSD across the lifespan, other clinical applications are generally evaluated in case studies or open trials and are in need of further investigation.

As with all treatments for most of these disorders, little controlled research has been conducted, a state of affairs evident in an evaluation report by a task force set in motion by the Clinical Division of the American Psychological Association (Chambless et al., 1998). This report revealed that only about a dozen complaints, such as specific phobias and headaches, had empirically well-supported treatments. Many of the treatments listed as empirically validated had not been evaluated for the degree to which they provided substantial long-term clinical effects. For the latest listing see *www.therapyadvisor.com*.

While EMDR protocols for PTSD have been widely investigated by controlled research, it is hoped that additional promising applications will be thoroughly investigated. Suggested parameters have been thoroughly delineated (Shapiro, 2001, 2002). To aid researchers in identifying protocols available for study, and to assist clinicians in obtaining supervision for proposed applications, published materials and conference presentations are listed below. Many presentations have been taped and are available from the conference coordinators. Presenters may also be accessed directly through the EMDR International Association (*www.emdria.org*).

Another excellent resource is the Francine Shapiro Library (FSL), developed by Barbara Hensley, EdD, and hosted by Northern Kentucky University. It is the premier repository for scholarly articles and other important writings related to the AIP model and EMDR. The intent of the FSL is twofold: (1) to electronically house documents related to EMDR or AIP, and (2) to maintain a comprehensive, accurate, and up-to-date list of citations related to AIP and EMDR (*http://library.nku.edu/emdr/emdr_ data.php*).

Since the initial efficacy study (Shapiro, 1989a), positive therapeutic results with EMDR have been reported with a wide range of populations, including the following:

1. **Combat veterans from the Iraq Wars, the Afganistan War, the Vietnam War, the Korean War, and World War II who were formerly treatment resistant and who no longer experience flashbacks, nightmares, and other PTSD sequelae** (Blore, 1997a; Carlson, Chemtob, Rusnak, & Hedlund, 1996; Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1998; Daniels, Lipke, Richardson, & Silver, 1992; Lipke, 2000; Lipke & Botkin, 1992; Russell, 2006, 2008a; Russell, Silver, Rogers, & Darnell, 2007; Silver & Rogers, 2001; Silver, Rogers, & Russell, 2008; Thomas & Gafner, 1993; Wesson & Gould, 2009; White, 1998; Young, 1995; Zimmermann, Güse, Barre, & Biesold, 2005).

2. **Persons with phobias, panic disorder, and generalized anxiety disorder who revealed a rapid reduction of fear and symptoms** (De Jongh & ten Broeke, 1998; De Jongh, ten Broeke, & Renssen, 1999; De Jongh, van den Oord, & ten Broeke, 2002; de Roos & de Jongh, 2008; Doctor, 1994; Fernandez & Feretta, 2007; Feske & Goldstein, 1997; Gattinara, 2009; Gauvreau & Bouchard, 2008; Goldstein, 1992; Goldstein & Feske, 1994; Gros & Antony, 2006; Kleinknecht, 1993; Nadler, 1996; Newgent, Paladino, & Reynolds, 2006; O'Brien, 1993; Protinsky, Sparks, & Flemke, 2001a; Schurmans, 2007). Some controlled studies of spider phobics have revealed comparatively little benefit from EMDR (e.g., Muris & Merckelbach, 1997; Muris, Merkelbach, Holdrinet, & Sijsenaar, 1998; Muris, Merckelbach, van Haaften, & Nayer, 1997), but evaluations have been confounded by lack of fidelity to the published protocols (see De Jongh et al., 1999; Shapiro, 1999; and Appendix D in the book). One evaluation of panic disorder with agoraphobia (Goldstein, de Beurs, Chambless, & Wilson, 2000) also reported limited results (for comprehensive discussion per Shapiro, 2001, 2002; see also Appendix D in the book).

3. **Crime victims, police officers, firefighters, and field workers who are no longer disturbed by the aftereffects of violent assaults and/or the stressful nature of their work** (Baker & McBride, 1991; Dyregrov, 1993; Jensma, 1999; Kitchiner, 2004; Kitchiner & Aylard, 2002; Kleinknecht & Morgan, 1992; Lansing, Amen, Hanks, & Rudy, 2005; McNally & Solomon, 1999; Page & Crino, 1993; Rost, Hofmann, & Wheeler, 2009; Shapiro & Solomon, 1995; Solomon, 1995, 1998; Solomon & Dyregrov, 2000; Wilson, Becker, Tinker, & Logan, 2001).

4. **People relieved of excessive grief due to the loss of a loved one or to line-of-duty deaths, such as engineers no longer devastated with guilt because their train unavoidably killed pedestrians** (Gattinara, 2009; Lazrove, Triffleman, Kite, McGlasshan, & Rounsaville, 1998; Puk, 1991a; Shapiro & Solomon, 1995; Solomon, 1994, 1995, 1998; Solomon & Kaufman, 2002; Solomon & Rando, 2007; Solomon & Shapiro, 1997; Sprang, 2001).

5. **Children and adolescents healed of the symptoms, including depression, caused by disturbing life experiences** (Ahmad, Larsson, & Sundelin-Wahlsten, 2007; Bae, Kim, & Park, 2008; Bronner et al., 2009; Chemtob, Nakashima, Hamada, & Carlson, 2002; Cocco & Sharpe, 1993; Datta & Wallace, 1994, 1996; Fernandez, 2007; Fernandez, Gallinari, & Lorenzetti, 2004; Greenwald, 1994, 1998, 1999, 2000, 2002; Hensel, 2006, 2009; Jaberghaderi, Greenwald, Rubin, Dolatabadim, & Zand, 2004; Jarero, Artigas, & Hartung, 2006; Johnson, 1998; Korkmazler-Oral & Pamuk, 2002; Kraft, Schepker, Goldbeck, & Fegert, 2006; Lovett, 1999; Maxfield, 2007; Oras et al., 2004; Pellicer, 1993; Puffer, Greenwald, & Elrod, 1998; Rodenburg, Benjamin, Meijer, & Jongeneel, in press; Russell & O'Connor, 2002; Scheck, Schaeffer, & Gillette, 1998; Shapiro, 1991; Soberman, Greenwald, & Rule, 2002; Stewart & Bramson, 2000; Streeck-Fischer, 2005; Taylor, 2002; Tinker & Wilson, 1999; Tufnell, 2005; Wanders, Serra, & de Jongh, 2008; Zaghrout-Hodali, Alissa, & Dodgson, 2008).

6. **Sexual assault victims who are now able to lead normal lives and have intimate relationships** (Edmond, Rubin, & Wambach, 1999; Hyer, 1995; Kowal, 2005; Parnell, 1994, 1999; Puk, 1991a; Rothbaum, 1997; Rothbaum, Astin, & Marsteller, 2005; Scheck, Schaeffer, & Gillette, 1998; Shapiro, 1989b, 1991, 1994; Wolpe & Abrams, 1991).

7. **Victims of natural and manmade disasters who are now able to resume normal lives** (Chemtob et al., 2002; Colelli & Patterson, 2008; Fernandez, 2008; Fernandez et al., 2004; Gelbach, 2008; Grainger, Levin, Allen-Byrd, Doctor, & Lee, 1997; Jarero, Artigas, Mauer, Lopez Cano, & Alcala, 1999; Jayatunge, 2008; Knipe et al., 2003; Konuk et al., 2006; Shapiro & Laub, 2008; Shusta-Hochberg, 2003; Silver, Rogers, Knipe, & Colelli, 2005).

8. **Accident, surgery, and burn victims who were once emotionally or physically debilitated and who are now able to resume productive lives** (Blore, 1997b; Broad & Wheeler, 2006; Hassard, 1993; McCann, 1992; Puk, 1992; Softic, 2009; Solomon & Kaufman, 1994).

9. **Victims of family, marital, and sexual dysfunction who are now**

able to maintain healthy relationships (Bardin, 2004; Capps, 2006; Errebo & Sommers-Flanagan, 2007; Gattinara, 2009; Kaslow, Nurse, & Thompson, 2002; Keenan & Farrell, 2000; Knudsen, 2007; Koedam, 2007; Levin, 1993; Madrid, Skolek, & Shapiro, 2006; Moses, 2007; Phillips, Freund, Fordiani, Kuhn, & Ironson, 2009; Protinsky, Sparks, & Flemke, 2001b; Shapiro, Kaslow, & Maxfield, 2007; Snyder, 1996; Stowasser, 2007; Talan, 2007; Wernik, 1993; Wesselmann & Potter, 2009).

10. **Clients at all stages of chemical dependency, sexual deviation/addiction, and pathological gambling, who now show stable recovery and a decreased tendency to relapse** (Amundsen & Kårstad, 2006; Besson et al., 2006; Cox & Howard, 2007; Hase, Schallmayer, & Sack, 2008; Henry, 1996; Marich, 2009; Popky, 2005; Ricci, 2006; Ricci, Clayton, & Shapiro, 2006; Shapiro & Forrest, 1997; Shapiro, Vogelmann-Sine, & Sine, 1994; Vogelmann-Sine, Sine, Smyth, & Popky, 1998; Zweben & Yeary, 2006).

11. **People with dissociative disorders who progress at a rate more rapid than that achieved by traditional treatment** (Cohen, 2009; Fine, 1994; Fine & Berkowitz, 2001; Lazrove, 1994; Lazrove & Fine, 1996; Marquis & Puk, 1994; Paulsen, 1995; Rouanzoin, 1994; Twombly, 2000, 2005; Young, 1994).

12. **People with performance anxiety or deficits in school, business, performing arts, and sports who have benefited from EMDR as a tool to help enhance performance** (Barker & Barker, 2007; Crabbe, 1996; Foster & Lendl, 1995, 1996; Graham, 2004; Maxfield, 2000).

13. **People with somatic problems/somatoform disorders, including migraines, chronic pain, phantom limb pain, chronic eczema, gastrointestinal problems, chronic fatigue syndrome, psychogenic seizures, eating disorders, and negative body image who have attained a relief of suffering** (Bloomgarden & Calogero, 2008; Brown, McGoldrick, & Buchanan, 1997; Chemali & Meadows, 2004; Dziegielewski & Wolfe, 2000; Friedberg, 2004; Gattinara, 2009; Grant, 1999; Grant & Threlfo, 2002; Gupta & Gupta, 2002; Kelley & Selim, 2007; Kneff & Krebs, 2004; Kowal, 2005; Marcus, 2008; Mazzola et al., 2009; McGoldrick, Begum, & Brown, 2008; Ray & Zbik, 2001; Royle, 2008; Russell, 2008a, 2008b; Schneider, Hofmann, Rost, & Shapiro, 2007, 2008; Tinker & Wilson, 2006; Van Loey & Van Son, 2003; Wilensky, 2006; Wilson, Tinker, Becker, Hofmann, & Cole, 2000).

14. **Adults and adolescents successfully treated for diagnosed depression** (Bae, Kim, & Park, 2008; Broad & Wheeler, 2006; Gomez, 2008; Hogan, 2001; Manfield, 1998; Protinsky, Sparks, & Flemke, 2001a; Tanaka & Inoue, 1999; Uribe & Ramirez, 2006).

15. **Clients with acute trauma and a wide variety of PTSD and trauma-based personality issues who experience substantial benefit from EMDR** (Allen & Lewis, 1996; Bisson et al., 2007; Brown & Shapiro, 2006; Carbone, 2008; Cohn, 1993; Fensterheim, 1996; Forbes, Creamer, & Rycroft, 1994; Gelinas, 2003; Hogberg et al., 2007; Ironson, Freund, Strauss, & Williams, 2002; Kim & Choi, 2004; Kitchiner, 1999, 2000; Korn & Leeds, 2002;

Kutz, Resnik, & Dekel, 2008; Lee, Gavriel, Drummond, Richards, & Greenwald, 2002; Manfield, 1998b; Manfield & Shapiro, 2003; Marcus, Marquis, & Saki, 1997; Marquis, 1991; Maxwell, 2003; McCullough, 2002; McLaughlin, McGowan, Paterson, & Miller, 2008; Parnell, 1996, 1997; Pollock, 2000; Power et al., 2002; Protinsky, Sparks, & Flemke, 2001a; Puk,1991b; Raboni, Tufik, & Suchecki, 2006; Renfrey & Spates, 1994; Rittenhouse, 2000; Sandstrom, Wiberg, Wikman, Willman, & Hogberg, 2008; Schneider, Nabavi, & Heuft, 2005; Seidler & Wagner, 2006; Shapiro & Forrest, 1997; Shapiro & Laub, 2008; Spates & Burnette, 1995; Spector & Huthwaite, 1993; Sprang, 2001; van der Kolk et al., 2007; Vaughan et al., 1994; Vaughan, Wiese, Gold, & Tarrier, 1994; Wilson, Becker, & Tinker, 1995, 1997; Wolpe & Abrams, 1991; Zabukovec, Lazrove, & Shapiro, 2000).

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