APPENDIX F
Additional Research Summaries

Jarero, I., & Uribe, S., Artigas, L., Givaudan, M. (2015). EMDR protocol for recent critical incidents: A randomized controlled trial in a technological disaster context. *Journal of EMDR Practice and Research*, *9*, 166–173. *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.*

Kemp M., Drummond P., & McDermott B. (2010). A wait-list controlled pilot study of eye movement desensitization and reprocessing (EMDR) for children with post-traumatic stress disorder (PTSD) symptoms from motor vehicle accidents. *Clinical Child Psychology and Psychiatry, 15,* 5-25. "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."

Nijdam, M.J., Gersons, B.P.R, Reitsma, J.B., de Jongh, A. & Olff, M. (2012). Brief eclectic psychotherapy v. eye movement desensitization and reprocessing therapy in the treatment of post-traumatic stress disorder: Randomized controlled trial. *British Journal of Psychiatry, 200,* 224-231. 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 eclec*tic psychotherapy."

Shapiro, E., Laub, B. (2015). Early EMDR intervention following a community critical incident: A randomized clinical trial. *Journal of EMDR Practice and Research, 9,* 17-27. "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."

van den Berg, D.P.G., et al. (2015). Prolonged exposure versus eye movement desensitization and reprocessing versus waiting list for posttraumatic stress disorder in patients with a psychotic disorder: A randomized clinical trial. JAMA Psychiatry, 72(3):259-267. 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 re-victimization 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 re-victimization. *Schizophrenia Bulletin*. doi: 10.1093/schbul/sbv172

Adaptive Information Processing

Solomon, R. M. & 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.*

Shapiro, F. (2014). The role of eye movement desensitization & reprocessing (EMDR) therapy in medicine: Addressing the psychological and physical symptoms stemming from adverse life experiences. *The Permanente Journal, 18,* 71-77. *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.*

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

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.*

Faretta, E. (2013). EMDR and cognitive behavioral therapy in the treatment of panic disorder: A comparison. *Journal of EMDR Practice and Research, 7,* 121-133. *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.* In this RCT, 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."

Fernandez, I., & Faretta, E. (2007). EMDR in the treatment of panic disorder with agoraphobia. *Clinical Case Studies, 6,* 44-63. *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.*

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.

De Jongh, A., Ernst, R., Marques, L., & Hornsveld, H. (2013). The impact of eye movements and tones on disturbing memories of patients with PTSD and other mental disorders. *Journal of Behavior Therapy and Experimental Psychiatry, 44*, 447–483. "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".

El Khoury-Malhame, M. et al. (2011). Attentional bias in post-traumatic stress disorder diminishes after symptom amelioration. *Behaviour Research and Therapy 49,* 796-801. "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."

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 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."

Hornsveld, H. K., Landwehr, F., Stein, W., Stomp, M., Smeets, S., & van den Hout, M. A. (2010). Emotionality of loss-related memories is reduced after recall plus eye movements but not after recall plus music or recall only. *Journal of EMDR Practice and Research*, *4*, 106-112. "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."

Kapoula Z, Yang Q, Bonnet A, Bourtoire P, & Sandretto J (2010). EMDR effects on pursuit eye movements. *PLoS ONE 5(5): e10762*. doi: 10.1371/journal.pone.0010762 *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.*"

Kristjánsdóttir, K. & Lee, C. M. (2011). A comparison of visual versus auditory concurrent tasks on reducing the distress and vividness of aversive autobiographical memories.

Journal of EMDR Practice and Research, 5, 34- 41. "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."

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 woul*d 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.*

Leer, A., Engelhard, I. M., & van den Hout, M. A. (2014). How eye movements in EMDR work: changes in memory vividness and emotionality. *Journal of behavior therapy and experimental psychiatry*, *45,* 396-401. "[T]his 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."

Lilley, S.A., Andrade, J., Graham Turpin, G., Sabin-Farrell, R., & Holmes, E.A. (2009). Visuospatial working memory interference with recollections of trauma. *British Journal of Clinical Psychology, 48,* 309–321. *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 rat*her than serving as a general distractor" (p. 317)

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. 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."

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 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.*

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 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.*

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 e*xposure ... 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)."

van den Hout, M., Engelhard. I.M. Marleen M., Rijkeboer, M.M., Koekebakker, J., Hornsveld, H., Leer, A., et al. (2012). EMDR: Tones inferior to eye movements in the EMDR treatment of PTSD. *Behaviour Research and Therapy, 50,* 275-79. "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."

Treatment of Military Personnel

Cook, J.M., Biyanova, T., & Coyne, J.C. (2009). Comparative case study of diffusion of eye movement desensitization and reprocessing in two clinical settings: Empirically supported treatment status is not enough. *Professional Psychology: Research and Practice, 40,* 518–524.

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.* New York: Wiley

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. EMDR Therapy Research & Reading Page 36 of 36

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

Russell, M.C. & Figley, C.R. (2013). *Treating traumatic stress injuries in military personnel: An EMDR practitioner's guide*. New York: Routledge.

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.

Evidence-based Practice

American Psychiatric Association (2004). *Practice Guideline for the Treatment of Patients with Acute Stress Disorder and Posttraumatic Stress Disorder.* Arlington, VA: American Psychiatric Association Practice Guidelines. *EMDR is recommended as an effective treatment for trauma.*

California Evidence-Based Clearinghouse for Child Welfare (2010). Trauma Treatment for Children. http://www.cebc4cw.org. *EMDR and Trauma*-focused CBT are considered "Well-Supported by Research Evidence."

CREST (2003). *The management of post-traumatic 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 (2010). *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. *EMDR was placed in the* category of the most effective PTSD psychotherapies. This "A" category is described as "A strong recommendation that clin*icians provide the intervention to eligible patients. Good evidence was found that the intervention improves important health* outcomes and concludes that benefits substantially outweigh harm."

Foa, E.B., Keane, T.M., Friedman, M.J., & Cohen, J.A. (2009). *Effective treatments for PTSD: Practice Guidelines of 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 adu*lt 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, three 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 Collaborating Centre for Mental Health (2005). *Post-traumatic stress disorder (PTSD): The management of adults and children in primary and secondary care.* London: National Institute for Clinical Excellence. *Trauma-focused CBT and EMDR were stated to be empirically supported treatments for choice for adult PTSD.*

SAMHSA's National Registry of Evidence-based Programs and Practices (2011) http://nrepp.samhsa.gov/ViewIntervention.aspx?id=199 *The Substance Abuse and Mental Health Services Administration (**SAMHSA**) is an agency of the U.S. Department of Health and Human Services (HHS). This national registry (NREPP) cites EMDR as evidence-based practice for treatment of PTSD, anxiety, and depression symptoms. Their review of the evidence also indicated that EMDR leads to an improvement in mental health functioning.*

- **Therapy Advisor (2004-11): http://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 counselling evidence based clinical practice guideline. London,

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

- **World Health Organization (2013).** *Guidelines for the management of conditions that are specifically related to stress.* Geneva, WHO. *Trauma-focused CBT and EMDR are the only psychotherapies recommended for children, adolescents, and adults with PTSD.* "Like CBT with a trauma focus, EMD*R aims to reduce subjective distress and strengthen adaptive cognitions related to the traumatic event. Unlike CBT with a trauma focus, EMDR does not involve (a) detailed descriptions of the event, (b) direct challenging of beliefs, (c) extended exposure,* or (d) homework." *(p.1)*

Meta-analyses

EMDR therapy has been compared to numerous exposure therapy protocols, with and without CT techniques. It should be noted that EMDR uses no homework.

Bisson, J., Roberts, N.P., Andrew, M., Cooper, R. & Lewis, C. (2013). Psychological therapies for chronic post-traumatic stress disorder (PTSD) in adults. *Cochrane Database of Systematic Reviews* 2013, DOI: 10.1002/14651858.CD003388.pub4 *Research indicates that CBT and EMDR therapy are superior to all other treatments.*

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."

Lee, C.W. & Cuijpers, P. (2013). A meta-analysis of the contribution of eye movements in processing emotional memories. *Journal of Behavior Therapy & Experimental Psychiatry, 44,* 231-239. "The effect size for the additive effect of eye movements in EMDR treatment studies was moderate and significant (Cohen's d = 0.41). For the second group of laboratory studies the effect size was large and significant (d = 0.74)."

Rodenburg, R., Benjamin, A., de Roos, C, Meijer, A.M., & Stams, G.J. (2009). Efficacy of EMDR in children: A meta – analysis. *Clinical Psychology Review, 29*, 599-606. "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) tr*auma treatment."

Watts, B.V. et al. (2013). Meta-analysis of the efficacy of treatments for posttraumatic stress disorder. *Journal of Clinical Psychiatry*, 74, e541-550. doi: 10.4088/JCP.12r08225 "CBT *and eye movement desensitization and reprocessing were the most often-studied* types of psychotherapy. Both were effective."