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## EMDR 12 Years after Its Introduction: Past and Future Research



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Eye Movement Desensitization and Reprocessing (EMDR) was one of the first treatments of posttraumatic stress disorder (PTSD) to be evaluated in controlled research and has to date been empirically supported by 13 such studies. This article reviews the historical context and empirical research of EMDR over the past dozen years. Historically, EMDR's name has caused confusion in that "desensitization" is considered to be only a by-product of reprocessing and because the eye movement component of EMDR is only one form of dual stimulation to be successfully used in this integrative approach. Research is needed to determine the comparative efficacy of EMDR relative to cognitive-behavioral treatments of PTSD. However, this has been hampered by the lack of independent replication studies of the latter treatments. Current component analyses of EMDR have failed to effectively evaluate the relative weighting of its procedures. Parameters for future research and the testing of protocols for diverse disorders are suggested. © 2002 John Wiley & Sons, Inc. *J Clin Psychol* 58: 1-22, 2002.

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Although Eye Movement Desensitization and Reprocessing (EMDR) is widely known, the name has in many ways served to confuse. In fact, the eye movement is only one form of dual stimulation used, along with handtaps and tones (Shapiro, 1991b, 1994, 1995, 1999, 2001a). Dual stimulation is, in turn, only one of several components of a multifaceted approach. Further, the therapeutic goal of EMDR is not simply anxiety reduction, as the name "desensitization" would suggest, but also includes the elicitation of positive affects, evoked insights, belief alterations, and behavioral shifts. At the heart of EMDR, however, are not these behavioral indices. They are rather viewed as the by-products of

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the modification (reprocessing) of the maladaptive information upon which experientially forged psychopathology is assumed to be based. Thus, although the name and initials EMDR have been retained, the approach might more suitably be termed "Reprocessing Therapy."

Although sometimes described as a variant of cognitive-behavioral therapy (Foa & Meadows, 1997), EMDR has occasionally been characterized as a "unique treatment" (Frischholz, Kowall, & Hammond, 2001, p. 179) and frequently as an integrative psychotherapy (Fensterheim, 1996a; Norcross & Shapiro, in press; Wachtel, in press) that combines aspects of various orientations. EMDR entails an eight-phase approach guided by an information processing model that views pathology as based upon perceptual information that has been maladaptively stored (Shapiro, 1991a, 1999, 2001a). Consequently, EMDR treatment focuses on the perceptual components of experience (affective, cognitive, somatic) in order to expedite the accessing and processing of disturbing events and facilitate an attendant learning process. EMDR is also used specifically to strengthen internal resources so that the client is able to achieve desired behavioral and interpersonal change.

EMDR was originally applied to the anxiety associated with traumatic memories (Shapiro, 1989a), but is now used to address a wide range of experientially based disorders (Manfield, 1998; Shapiro, 1995, 2001a, in press; Zabukovec, Lazrove, & Shapiro, 2000). As an integrative approach, it aims to (a) facilitate resolution of memories (e.g., elicitation of insight, cognitive reorganization, adaptive affects, and physiological responses), (b) desensitize stimuli that trigger present distress as a result of second-order conditioning, and (c) incorporate adaptive attitudes, skills, and behaviors for enhanced functioning within larger social systems. These comprehensive treatment goals are attained through EMDR's standardized procedures and protocols (Shapiro, 1995, 1999, 2001a, in press), which incorporate aspects of a wide range of theoretical orientations. These include psychodynamic (Fensterheim, 1996a; Neborsky & Solomon, 2001; Wachtel, in press), cognitive-behavioral (Fensterheim, 1996a, 1996b; Smyth & Poole, in press; Wolpe, 1990; Young, Zangwill, & Behery, in press), physiological (Siegel, in press; van der Kolk, in press), experiential (Bohart & Greenberg, in press), and interactional therapies (Kaslow, Nurse, & Thompson, in press; Levin, Shapiro, & Weakland, 1996).

Eye movements have been reliably associated with higher cognitive processes and cortical function (Amadeo & Shagass, 1963; Antrobus, 1973; Gale & Johnson, 1984; Monty, Fisher, & Senders, 1978; Monty & Senders, 1976; Ringo, Sobotka, Diltz, & Bruce, 1994), and with shifts in cognitive content (Antrobus, Antrobus, & Singer, 1964); however, it is not the only form of "dual stimulation" to be found effective with EMDR. Rather, alternating taps and auditory tones have also been shown to be useful (Shapiro, 1991b, 1994, 1995, 2001a). To obtain positive therapeutic effects with EMDR, it is necessary to adapt its standard procedures to the unique needs and characteristics of the client and to apply different EMDR protocols for different pathologies.

It is vital that clinicians be guided by the empirical process in both choice and refinement of treatment. Therefore, since most of the research has centered on EMDR's application to posttraumatic stress disorder (PTSD), this article will (a) place EMDR within the context of other psychotherapies for this disorder, (b) review both past and current research regarding its various clinical applications, and (c) offer suggestions for the identification of mechanism of action and for procedural refinements.

## Historical Context

### *Early History*

EMDR was one of the first psychological treatments of PTSD to be empirically evaluated. When Shapiro (1989a) introduced this method for treating PTSD, only one other

controlled (non-pharmacological) clinical outcome study of this disorder had been published (Peniston, 1986). The Peniston study compared 45 sessions of relaxation and biofeedback-assisted desensitization to a non-treatment control and reported significant differences in muscle tension and in unstandardized measures of nightmares and anxiety. Shapiro (1989a) found substantial treatment effects (e.g., reduced self-reported distress) with EMDR (then called “EMD”) after only one session. However, additional procedures were used in this study to attain the optimal treatment effects (Shapiro, 1989a). “EMD” came to designate those studies that used only the procedural sections of the early published articles (Shapiro, 1989a, 1989b), and “EMDR” the studies that utilized the more comprehensive procedures. These principles and procedures were further refined in training sessions through 1990, codified in 1991, and published in 1995 (Shapiro, 1995).

In the same year as the Shapiro (1989a) study, three other controlled PTSD studies were published (Brom, Kleber, & Defares, 1989; Cooper & Clum, 1989; Keane, Fairbank, Caddell, & Zimering, 1989). The Brom et al. study compared the results of psychodynamic therapy, hypnotherapy, and desensitization based on a mean of 16 sessions. Equivalent clinically significant treatment effects were obtained with all three approaches in approximately 60% of the subjects as assessed by various measures. The Cooper and Clum study compared flooding to standard VA care and reported small clinical effects after 6–14 sessions, with a 30% patient drop-out rate. The Keane et al. study compared flooding to a wait-list control and reported small clinical effects after 14–16 sessions.

The positive effects reported in the Shapiro study attracted little attention, however, until it was supplemented by Joseph Wolpe’s editorial footnote regarding his own success with the method (Shapiro, 1989b) and his publication of a case utilizing the (EMD) procedures (Wolpe & Abrams, 1991). These events precipitated the publication of over 100 case studies (e.g., Cocco & Sharpe, 1993; Kleinknecht & Morgan, 1992; Marquis, 1991; McCann, 1992; Page & Crino, 1993; Puk, 1991; for a more complete listing see Shapiro, 1995, 2001a). The pronounced desensitization effect noted in these studies caused Wolpe to state that “Post-traumatic stress disorder is an exceptionally stressful syndrome to treat. . . . The prognosis was recently dramatically improved by the introduction of eye movement desensitization . . . [now being] used by a substantial number of behavior therapists, with highly gratifying results. There is often a marked decrease in anxiety after one session, and practically no tendency to relapse” (quoted in Butler, 1993, p. 24).

Unfortunately, the observation that a pronounced desensitization effect was often observable within a single session led some writers to state erroneously that EMDR was being advanced as a “one-session cure” (e.g., Herbert et al., 2000; Lohr, Tolin, & Lilienfeld, 1998; Rosen, 1999). These claims occurred despite the caveat in Shapiro’s (1989a, p. 221) initial report: “It must be emphasized that the EMD procedure, as presented here, serves to desensitize the anxiety related to traumatic memories, not to eliminate all PTSD-related symptomatology, and complications, nor to provide coping strategies to victims.” The failure to note this qualifying statement seems to have been the starting point for much unnecessary controversy, a not-uncommon occurrence with emerging psychotherapies (Fisch, 1965; Perkins & Rouanzoin, 2002). For instance, a small group of co-authors has published more than 20 articles questioning various aspects of EMDR procedures, research, and dissemination (e.g., Herbert et al., 2000; Lohr, Tolin, & Lilienfeld, 1999; Rosen, McNally, Lohr, Devilly, Herbert, & Lilienfeld, 1998). However, many of the arguments of these authors entail a variety of misunderstandings of both recent research and historical data (for detailed review see Lipke, 1999; Perkins & Rouanzoin, 2002; Shapiro, 1996; Spates, Waller, & Koch, 2000).

The misconceptions about EMDR have taken a variety of forms. For instance, it has been inferred by some that EMDR had been promoted over previously validated cognitive-behavioral treatments for PTSD (e.g., Herbert et al., 2000; Lohr et al., 1998).

This argument, however, is based on a false premise since there were, in fact, no well-established, empirically validated treatments for PTSD as late as 1998 (see Chambless et al., 1998). Three years after the introduction of EMDR to the clinical scene this dearth of controlled outcome studies for the treatment of PTSD was documented by Solomon, Gerrity, and Muff (1992) whose review of the research literature revealed only six (non-pharmacological) studies. They concluded that all of the experiments they evaluated “suffer from methodological limitations” and that “further research is needed before any of these approaches can be pronounced effective as lasting treatments of PTSD” (p. 637).

Given how little was known about the treatment of PTSD and other trauma-induced pathologies when EMDR first appeared, it was taught to interested clinicians as an “experimental method,” which required that they obtain informed consent from their clients, and to continue to do so until independent, controlled studies had been conducted. The promotion, training, and dissemination of EMDR were monitored during this time to encourage rigorous evaluation and to prevent the method from being used inappropriately (for a detailed delineation see Shapiro, 1998). Only after the publication of eight controlled studies was the label “experimental” removed from EMDR, a textbook of procedures published (Shapiro, 1995), and a professional association independent of the originator founded to establish standards for training and practice (EMDR International Association, 2000; Shapiro, 1998).

### *Current Status*

Understanding EMDR’s present status among PTSD treatments requires context. Since the 1992 Solomon et al. review, only four non-EMDR randomized efficacy studies of the other initially recommended treatments for chronic PTSD (excluding pharmaceuticals and machine-assisted biofeedback) have appeared. In two studies, seven sessions plus daily homework (Foa et al., 1999) and 16 sessions alone (Tarrier et al., 1999) of either cognitive therapy or imaginal exposure were administered. In both studies, these treatments resulted in a 42–60% remission of PTSD respectively.

In two studies, a combination of imaginal and therapist-assisted in vivo exposure was used with civilian trauma victims (Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998; Richards, Lovell, & Marks, 1994). Richards et al. reported that 100% of their single trauma victims no longer had PTSD at posttest after 50 prescribed hours of exposure treatment and homework. Marks et al. reported that 75% of their mixed sample (i.e., single and multiple trauma) no longer had PTSD at posttest after 120 prescribed hours of exposure treatment and homework. A 65% mean homework compliance was reported with better compliance associated with greater treatment effects. Similar results (65% remission in PTSD) were also reported with approximately the same amount of cognitive restructuring treatment and homework in the Marks et al. study.

In contrast, all but one of five recent EMDR controlled studies with civilian populations found that 77–100% of the single-trauma victims no longer met diagnostic criteria for PTSD after 3–6 hours of treatment (for detailed reviews see Allen, Keller, & Console, 1999; Chemtob, Tolin, van der Kolk, & Pitman, 2000; Feske, 1998; Maxfield & Hyer, 2002; Shapiro, 2001a; Spector & Read, 1998). Studies of EMDR with mixed samples of multiple-trauma victims (e.g., Lee, Gavriel, Drummond, Richards, & Greenwald, in press; Marcus, Marquis, & Sakai, 1997) have indicated 77–83% PTSD remission rate in up to 10 hours of treatment. All but one (Devilley & Spence, 1999) of the civilian controlled research studies (e.g., Ironson, Freund, Strauss, & Williams, 2002; Lee et al., in press;

Marcus et al., 1997, 2001; Rothbaum, 1997; Scheck, Schaeffer, & Gillette, 1998; Wilson, Becker, & Tinker, 1995, 1997) report that treatment effects have maintained or increased at follow-up.

With the publication of 13 supportive randomized controlled efficacy studies EMDR is now considered a standard form of treatment. In 1995 the APA Division of Clinical Psychology initiated a project to determine the degree to which extant therapeutic methods are supported by solid empirical evidence. Independent reviewers (Chambless et al., 1998) placed EMDR on a list of empirically supported treatments, as “probably efficacious for civilian PTSD.” At the same time, exposure therapy and stress inoculation therapy were described as “probably efficacious for PTSD.” No other therapies were judged to be empirically supported by controlled research for any PTSD population. After the examination of additional published controlled studies, the International Society for Traumatic Stress Studies (ISTSS) designated EMDR as efficacious for PTSD (Chemtob et al., 2000). Further, a meta-analysis of all published studies on psychological and drug treatments for PTSD reported: “The results of the present study suggest that EMDR is effective for PTSD, and that it is more efficient than other treatments” (Van Etten & Taylor, 1998, p. 140).

Many questions about EMDR remain. As with all therapies, a variety of issues have yet to be addressed. Among other things, it would be useful to carry out research to (a) determine in a definitive manner the comparative efficacy and efficiency of EMDR vis à vis other PTSD treatments, (b) identify the active mechanisms that contribute to the clinical results, (c) evaluate the clinical application of EMDR to disorders other than PTSD, and (d) assess the degree to which developmental and neurobiological deficits contributing to continued traumatization can be reversed.

The remainder of this article will trace research and offer parameters for these proposed investigations. The article then concludes with observations regarding future research directions.

### EMDR in Comparison to CBT Treatments for PTSD

EMDR has been compared to a number of treatments and controls in research to date. These include (a) wait list controls (Rothbaum, 1997; Wilson et al., 1995, 1997), (b) Veterans Administration (VA) standard care (Boudewyns & Hyer, 1996; Jensen, 1994), (c) biofeedback-assisted relaxation (Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1998), (d) muscle relaxation (Vaughan et al., 1994), (e) active listening (Scheck et al., 1998), (f) individual psychotherapy in an HMO environment (e.g., exposure, cognitive, psychodynamic; Marcus et al., 1997), (g) exposure therapies (Vaughan et al., 1994; Ironson et al., 2002; Rogers et al., 1999), and (h) combinations of exposure and cognitive therapies (Devilley & Spence, 1999; Lee et al., in press). This range of comparisons appears well matched to exposure therapy which has been compared to (a) wait list controls (Keane et al., 1989), (b) VA standard care (Boudewyns & Hyer, 1990; Cooper & Clum, 1989), (c) stress inoculation training and supportive counseling (Foa, Rothbaum, Riggs, & Murdock 1991; Foa et al., 1999), and (d) cognitive restructuring with or without a relaxation control (Marks et al., 1998; Tarrrier et al., 1999).

The combat veteran studies of all treatments have been generally hampered by methodological confounds (Feske, 1998; Shapiro, 1995, 1999, 2001a; Solomon et al., 1992), but the civilian studies indicate clear findings. In all but one study (Devilley & Spence, 1999), EMDR was found superior to its control conditions. Exposure therapy and stress inoculation therapy were shown to be equivalent to each other, and both were superior to supportive counseling or a wait list (Foa et al., 1991, 1999). Likewise, exposure and cognitive therapy were equivalent, but superior to relaxation (Marks et al., 1998).

The most rigorous EMDR civilian studies (e.g., Lee et al., 2002; Marcus et al., 1997; Rothbaum, 1997; Scheck et al., 1997; Wilson et al., 1995, 1997) have reported substantial clinical effects, and generally indicated that 77–90% of clients no longer suffer from PTSD in 3 to 10 hours of treatment. Large effect sizes have been reported on multiple measures with no relapse at 3–15-month follow-up (Maxfield & Hyer, 2002; Van Etten & Taylor, 1998). Direct randomized comparisons of EMDR to CBT treatments of PTSD have generally reported a superiority of EMDR on a few measures and equivalent effects on other measures (Ironson et al., 2002; Lee et al., 2002; Rogers et al., 1999; Vaughan et al., 1994) with greater efficiency (i.e., fewer treatment sessions and/or homework needed for clinical effects for EMDR).

While the aggregate is clear, suggestions for future research are detailed in the following section. Individual studies currently may be hampered by non-expert fidelity checks, or the lack of blind independent assessors (see Maxfield & Hyer, 2002). Among all EMDR randomized and non-randomized group studies of civilian PTSD, the Devilly and Spence (1999) study is alone in its rates of low remission, high attrition, and disintegration at follow-up. The effects of the comparison protocol will need to be replicated in studies that avoid its confounding, including lack of randomization, non-expert fidelity assessment, non-standardized administration of psychometrics, and expectancy effects (see Chemtob et al., 2000; Maxfield & Hyer, 2002).

A meta-analysis of all treatments for PTSD indicated that behavior therapy, SSRIs, and EMDR were the most effective forms of treatment (Van Etten & Taylor, 1998) and more controlled comparisons are needed. As previously noted, Van Etten and Taylor (1998, p. 140) also specified that EMDR appeared to be the “more efficient” form of therapy given that EMDR necessitated one-third the amount of time to achieve its effects, compared to outcomes reported in behavior therapy research. The question of efficiency is an important one given the exigencies of clinical practice and should be the subject of future research.

### *Standardization of Treatment Protocols*

Head-to-head comparisons of treatments can best answer questions of efficacy, and efficiency. Unfortunately, there is an inherent difficulty in identifying the specific cognitive-behavioral elements to use for definitive comparison purposes, since no two behavioral studies by independent research teams have used the same protocol.

The EMDR methodology has remained relatively stable since 1991. The codified procedures employ standardized elements of assessment and client preparation, specified alignment of perceptual/sensory information related to the trauma, small doses of direct attention and “exposure,” aspects of free association, sequential targeting of information, prescribed elements for cognitive reorganization, multiple methods of dual stimulation, and specific protocols for recent or distant trauma. Cognitive-behavioral treatments, on the other hand, have gone through various incarnations and continue to add new elements to their initial protocols.

For instance, the test of the first exposure treatment for civilian PTSD (Foa et al., 1991) recommended seven 90-minute imaginal exposure sessions with daily prescribed homework of imaginal exposure and, at the discretion of the therapist, the addition of in vivo exposure. The 25 hours of exposure therapy resulted in a 55% remission of PTSD (Foa et al., 1991). Subsequent implementation of the Foa protocol (Tarrier et al., 1999) used 16 one-hour sessions, introduced a specific hierarchy approach for some patients, and eliminated the homework portion. This study, too, reported a 59% elimination of

PTSD. The one other comparative study by a separate research team employing pure exposure therapy (Marks et al., 1998) supplemented the in-session imaginal exposure with therapist-assisted in vivo exposure and prescribed hour-long daily homework of a specified kind, which resulted in a total of 112 prescribed hours of exposure. This regimen led to an 75% elimination of PTSD diagnoses.

Similarly, the three research teams that evaluated a form of *cognitive* therapy (Foa et al., 1991, 1999; Marks et al., 1998; Tarrier et al., 1999) for PTSD also employed their own protocols. Of these, only the Marks et al. study, which employed prescribed daily homework, achieved an 65% remission of PTSD diagnosis. According to Marks et al., an approximately 50–65% compliance (56–73 hours of homework) was necessary for both conditions (together with therapist-assisted in vivo exposure for the exposure condition) to achieve the reported improvement rates. Like the studies described above, the five experiments in which cognitive-behavioral treatment *combinations* were evaluated (Devilly & Spence, 1999; Echeburua, de Corral, Zubizarreta, & Sarasua, 1997; Foa et al., 1999; Glynn et al., 1999; Marks et al., 1998) all utilized different protocols.

### *Recommendations for PTSD Treatment Research Comparing EMDR and CBT*

Obviously, to determine EMDR's comparative efficacy with respect to cognitive-behavioral therapy it is necessary for direct comparisons to be made. For EMDR to be adequately compared to the cognitive-behavioral therapies, exposure and cognitive therapy protocols will need to be standardized so that independent researchers can employ the same procedures to assess the same treatment.

It is also important to test the various treatments in light of the exigencies of clinical realities. For example, while Boudewyns and Hyer (1996) and Pitman et al. (1996) have reported research clinician preference for EMDR over exposure therapy, this has not been rigorously assessed. A variety of clinician-related factors, including the potential for vicarious traumatization, should be examined given reports of disturbance to research therapists who administered exposure therapy (Marks et al., 1998; Richards et al., 1994).

Specifically, the following suggestions are offered for the comparative testing:

1. Some attempt should be made to standardize the exposure and cognitive therapies advocated for clinical use so that the same protocols can be tested in multiple, independent studies.
2. The "gold standards" advocated by Foa and Meadows (1997) should be utilized. As underscored by Maxfield and Hyer (2002) expert fidelity assessment should be employed to determine that the method used in research is the one currently advocated for and used by practicing clinicians. Clinical researchers should be assessed for adequate knowledge of the principles, procedures, and protocols for the specific populations being evaluated.
3. Exposure therapy, cognitive therapy, SSRIs, and EMDR should be assessed comparatively with attention to efficacy, effectiveness, efficiency, attrition, clinician acceptance, and client preference (e.g., tolerance and comfort).
4. Sufficient follow-up assessment should occur to determine longevity of effects. While psychotherapy studies have included 3-, 6-, 9-, and 15-month follow-ups, this is especially indicated for pharmaceutical agents that have not been tested in follow-up studies of PTSD populations (Van Etten & Taylor, 1998). Further, measurements should be taken of the maintenance of treatment effects after patients have been weaned off of their medication.

5. When possible, practicing clinicians in field settings should be employed to maximize the external validity of the study. To date, this has been done in three EMDR studies (Ironson et al., 2002; Marcus et al., 1997; Scheck et al., 1998) and a number of pharmaceutical studies (e.g., Brady et al., 2000; Davidson et al., 1990; Kosten, Frank, Dan, McDougle, & Giller, 1991).
6. The number of treatment sessions should be tailored to the target population. For example, for multiply traumatized populations such as combat veterans, 12 sessions would be more appropriate than using only a dose recommended for single-trauma victims (e.g., 3–6 sessions; see Maxfield & Hyer, 2002; Shapiro, 1995, 1999, 2001a).
7. Studies should evaluate not only the specific effects on targeted symptomology, but also comprehensive effects such as self-attributions, self-efficacy, family relationships, social functioning, and life satisfaction.
8. When possible, neurophysiological and neurobiological data should be collected in order to illuminate the mechanisms underlying pathological and change processes (e.g., Heber, Kellner, & Yehuda, in press; Lansing, Amen, & Klindt, 2000; Levin, Lazrove, & van der Kolk, 1999).
9. The number of patients used should be sufficient to conduct internal analyses to determine the characteristics of those who respond differentially to the comparison conditions. It is important to begin to identify which clients respond best to which PTSD treatments.

### Component Analyses

Given EMDR's recent acceptance as an empirically supported treatment for PTSD (Chambless et al., 1998; Chemtob et al., 2000; Van Etten & Taylor, 1998), it is now appropriate to ask about the relative importance of the various procedural *components* with this population (Kazdin, 1992). As noted in the ISTSS treatment guideline summary: "Research suggests that EMDR is an effective treatment for PTSD. Whether its efficacy stems from the fact that it is yet another variant of exposure therapy (with some ingredients of cognitive therapy) or that it is based on new principles is unclear" (Shalev, Friedman, Foa, & Keane, 2000, p. 366). This question is of particular interest since EMDR calls for interrupted rather than prolonged exposure and elements of free association (Rogers et al., 1999; Rogers & Silver, 2002; Shapiro, 1995, 1999, 2001a), both of which are inconsistent with the principle and practice long espoused in the exposure literature (Boudewyns & Hyer, 1990, 1996; Chaplin & Levine, 1981; Chemtob et al., 2000; Eysenck, 1979; Foa, Steketee, & Rothbaum, 1989; Keane & Kaloupek, 1982; Lyons & Scotti, 1995; Marks, 1972; Marks et al., 1998; Rachman, 1980).

Any effective clinical method consists of a number of constituents whose relative weightings and mutual interactions are initially unknown. With respect to EMDR, it will be especially useful to determine the relative contributions of the prescribed client preparation procedures, sensory alignment, exposure, association, cognitive therapy elements, and dual attention stimulation (e.g., eye movements, taps, tones). It is assumed that these components each enhance information processing in distinct and various ways (see Shapiro, 1999, 2001a). However, as with any complex treatment, the elimination of a single component is likely to have little effect, and the importance of a given component is likely to vary with different clinical populations and the psychological domain being measured. These fine discriminations can only be done by means of controlled studies in which the *overall* treatment effects are maximized (Kazdin, & Bass, 1989).



Such studies are important both to identify mechanism of actions and to develop the most robust and efficient procedures for clinical use.

### *Recommendations for Component Research*

The following parameters are suggested for future studies on component analyses:

1. *PTSD diagnosis.* The patients should be clinically diagnosed with PTSD, rather than relying on analogue or subclinical subjects (usually students) suffering from a disturbing memory. Such subjects are likely to experience benefits from clinical treatment even if only one or two of the components of EMDR are used, while this will probably not be true for people suffering from PTSD, since they are considered especially resistant to treatment, as well as to the effects of placebos (e.g., Shalev, Bonne, & Eth, 1996; Solomon et al., 1992).
2. *Choice of participants.* Non-compensated, singly traumatized PTSD subjects should be used rather than multiply traumatized combat veterans. Studies with the latter population have been hampered by the use of very brief (e.g., two sessions) treatment periods (e.g., Boudewyns, Stwertka, Hyer, Albrecht, & Sperr, 1993; Devilly, Spence, & Rapee, 1998) and by targeting only one or two of the patients' many stressful memories (e.g., Boudewyns & Hyer, 1996; Pitman et al., 1996). Studies of this nature are especially unlikely to reveal positive therapeutic changes with global psychometrics (e.g., Mississippi Scale for Combat-related PTSD) typically used with this clinical population (see Fairbank & Keane, 1982).
3. *Sample size.* To date, EMDR component analyses using single-trauma victims have usually been so limited in sample size and statistical power that they have been unable to provide clear evidence of any differences among treatments. An example is the Renfrey and Spates (1994) study with 7 or 8 persons per group. Although large descriptive differences were observed (85% remission of PTSD in 3.9 EMDR sessions compared to only a 50% remission in 5.4 sessions for the analogue condition), the presence of such a small number of patients yielded marginal statistical significance. When attempting to measure the relative importance of the various components of any therapeutic procedure it is imperative that a sufficient number of research subjects (e.g., 25–40 per cell) be used to provide the statistical power to detect relatively small treatment effects (J. Cohen, 1988; Kazdin & Bass, 1989; Rossi, 1990).
4. *Choice of control condition.* The components being examined should be separate and distinct from those characterizing the comparison condition. These components should also be theoretically meaningful (Beutler, 1991; Norcross & Rossi, 1994). Some of these conditions will be reviewed below (for a detailed explication of components, experimental hypotheses, and suggested control conditions, see Shapiro, 2001a)
5. *Treatment fidelity.* The entire treatment should be used in adherence to published or manualized protocols (Foa & Meadows, 1997; Maxfield & Hyer, 2002). Although this may appear self-evident, an examination of the extant studies indicate that few of the component analyses have been performed with fidelity assessment.

Current research on the eye movement component of EMDR proves instructive. In the only component analysis study of diagnosed PTSD subjects (Montgomery & Ayllon, 1994) to evaluate the original “EMD” protocol (Shapiro, 1989a), it was necessary to

include the eye movement component to produce positive treatment effects. "The data indicate that with PTSD subjects the use of short duration repeated exposure and cognitive restructuring alone were insufficient for positive treatment gain." The addition of the eye movements in five of six subjects "resulted in the significant decreases in self-reports of distress previously addressed. These findings are reflected by decreases in psychophysiological arousal" (Montgomery & Ayllon, 1994, p. 228). However, because EMDR entails clinical refinements not found in the earlier and simpler EMD technique, it is likely that the procedure will have a robust therapeutic effect even without the eye movements (or other forms of dual attention). Therefore, the incorporation of the research parameters described above is strongly suggested.

Positive benefits of the eye movement component of EMDR compared to non-task and alternate task conditions have been reported with both group (e.g., Andrade, Kavanagh, & Baddeley, 1997; Christman & Garvey, 2000; Feske & Goldstein, 1997; D. Wilson, Silver, Covi, & Foster, 1996) and single-subject (e.g., Cerone, 2000; Lohr, Tolin, & Kleinknecht, 1995, 1996; Montgomery & Ayllon, 1994) studies. Unfortunately, many of these studies are beset by a number of methodological problems (Chemtob et al., 2000; Feske, 1998; Shapiro, 1995, 1996, 2001a; Smyth, 1999). Likewise, component treatment outcome studies that have failed to obtain differences between conditions (e.g., Dunn, Schwartz, Hatfield, & Wiegele, 1996; Pitman et al., 1996; Sanderson & Carpenter, 1992) are hampered by the use of subclinical populations, multiply traumatized populations, omitted standard EMDR procedures (see Fensterheim, 1996b; Shapiro, 1995, 1999, 2001a), and in other ways have been methodologically flawed (Chemtob et al., 2000; Feske, 1998; Shapiro, 1995, 1998, 1999, 2001a; Smyth, 1999).

Compounding this confusion, some component studies (e.g., Bauman & Melnyk, 1994) chose to use for their placebo conditions alternative stimuli that have actually been applied successfully by EMDR practitioners for many years as effective substitutes for eye movements. The failure in these studies to obtain a difference between the eye movements and control condition cannot be used as evidence that forms of stimulation are irrelevant components of EMDR.

In summary, the EMDR component analyses that have been carried out so far have generally provided inconclusive results. Clinically and scientifically valid research is needed before we can determine the relative importance of EMDR's various components.

Future researchers of the dual attention component must also give specific care to the nature of the control condition. Issues to be examined include (a) tests of whether dual attention tasks are superior to non-task conditions, (b) tests of whether there are differential effects among the various dual stimulation modalities, and (c) an identification of the underlying mechanisms contributing to clinical effectiveness.

Component analyses can include single-subject designs to more fully explore for differential treatment effects. The Lohr et al. (1995, 1996) studies found eye movements to be necessary for the reduction of subjective distress in phobia-related etiological memories but not in secondary related memories. Likewise, Montgomery and Ayllon (1994) found the eye movements necessary for treatment effects in most (five out of six) of their civilian PTSD patients. Cerone (2000) also reported a superiority of the eye movement condition with PTSD patients. The PTSD targets of these two latter studies were clearly of an etiological nature (as compared to a number of secondary targets used in the phobia research), and the high success rate reported in these component analyses underscores that possible differential outcomes may be correlated with the memories that are chosen to be treated and assessed.

These findings also underscore the advisability of using diagnosed single-trauma PTSD subjects for component analyses in order to maximize treatment effects. As summarized in the ISTSS Practice Guidelines:

the finding that a procedure employing multiple, brief, interrupted exposures to traumatic material can be efficacious, calls for a reexamination of traditional theoretical notions that prolonged, continuous exposure is required (Eysenck, 1979). Further investigations of such issues promises to deepen our understanding of trauma treatment mechanisms. Additional properly designed dismantling studies also need to be conducted in order to identify what components of EMDR are beneficial. Ideally, such studies should be conducted with patients who are likely to be responsive to treatment (e.g., single trauma, more acute), because it is difficult to compare differences in induced changes in minimally responsive patients. (Chemtob et al., 2000, pp. 151–152)

### Diverse Clinical Applications

Although controlled research has concentrated on the application of EMDR to PTSD, a number of studies have investigated EMDR's efficacy with other anxiety disorders as well as numerous reports of diverse clinical applications. The rationale for these applications is the observation that, like PTSD, many presenting complaints appear to have been based on or greatly influenced by earlier experiences. According to the information processing model (Shapiro, 1991a, 1995, 2001a, in press), these earlier events may be dysfunctionally stored in "state-dependent form" (see van der Kolk, Greenberg, Boyd, & Krystal, 1985), thus containing affective, physiological, and cognitive elements that were experienced at the time of the original event. Several controlled studies of subjects (including some not diagnosed with PTSD) who displayed the full range of traumatic sequelae (e.g., Scheck et al., 1998; Wilson et al., 1995, 1997) have reported on the basis of internal analyses that there is no discernible difference in EMDR's treatment effects between PTSD and non-PTSD subjects. It is conjectured that adequate processing of seminal events evinced in other disorders may also have a beneficial treatment effect.

Case reports have been published on the application of EMDR to the treatment of (a) personality disorders (Fensterheim, 1996a; Korn & Leeds, in press; Manfield, 1998), (b) dissociative disorders (Fine & Berkowitz, 2001; Lazrove & Fine, 1996; Paulsen, 1995; Twombly, 2000), (c) a variety of anxiety disorders (De Jongh & Ten Broeke, 1998; De Jongh, Ten Broeke, & Renssen, 1999; Goldstein & Feske, 1994; Lovett, 1999; Nadler, 1996; Shapiro & Forrest, 1997) and (d) somatoform disorders (Brown, McGoldrick, & Buchanan, 1997; Grant & Threlfo, 2002). However, controlled research is needed to evaluate the efficacy of these applications.

In designing the research the entire EMDR protocol should be evaluated within the context of the potential special needs of the particular population. For instance, Brown et al. (1997) evaluated the application of EMDR in seven consecutive cases of Body Dysmorphic Disorder (BDD), which has been reported to necessitate 8 to 20 sessions of cognitive behavior therapy with varying success rates (Neziroglu, McKay, Todaro, & Yaryura-Tobias, 1996; Veale et al., 1996; Wilhelm, Otto, Lohr, & Deckersbach, 1999). In contrast, Brown et al. reported the elimination of BDD in five of the seven consecutive cases in one to three sessions of EMDR through the processing of the etiological memory. While this result indicates that EMDR holds promise for the treatment of this disorder, future controlled research should include a greater number of sessions in order to evaluate the more comprehensive clinical picture. It is important, for example, to specify the degree to which the standard PTSD protocol is effective with this population, and whether or not special adjustment of targeting and preparation is needed.

Some of the research reporting results using EMDR has been fatally flawed by the incomplete application of the standardized treatment procedures. For instance, when all the published phobia studies that purported to use EMDR were evaluated by blind reviewers, it revealed an extremely low adherence to procedural fidelity (Shapiro, 1999), with

most of the studies (e.g., Bates, McGlynn, Montgomery, & Mattke, 1996; Lohr et al., 1995, 1996; Muris & Merckelbach, 1997; Muris, Merckelbach, Holdrinet, & Sijnsenaar, 1998; Muris, Merckelbach, van Haaften, & Nayer, 1997) applying only one to three steps of the 8-step phobia protocol (de Jongh et al., 1999; Shapiro, 1995, 1999, 2001a).

The rigors and realities of a scientific evaluation may at times necessitate the abbreviation of a particular protocol. This truncation may, however, reveal that the full protocol is necessary for successful implementation of the approach with specific populations. For instance, the standard application of EMDR includes a history-taking and preparation phase in which appropriate clients are chosen and primed for treatment. This selection and preparation process includes the utilization of a variety of self-control techniques for both in-session and between-session use as a prerequisite for processing. In the words of this author, "If the client is unable to use such self-control techniques, EMDR treatment should not be attempted. Clinicians should experiment with alternative methods until the client is able to reduce significant levels of disturbance. Inability to reduce disturbance can justifiably add to the client's fear when dysfunctional material is accessed, and can severely hamper positive treatment effects" (Shapiro, 1995, p. 92). It is further stated that "the use of self-control techniques is particularly important with phobic clients" (p. 223). These admonitions notwithstanding, many of the published phobia studies eliminated this phase altogether and achieved marginal results.

As another example, the differential effects of utilizing only one session for the preparation phase in time-controlled research, instead of a more open-ended approach may be particularly serious with certain types of anxiety disorders. The majority of civilian PTSD clients in controlled studies have been successfully treated under these conditions, with the general exception of those with secondary gains, complex PTSD, and current disturbances in family or social systems. One preparation session was also used in an evaluated protocol for panic-disordered clients (Feske & Goldstein, 1997; Goldstein & Feske, 1994), which achieved promising (albeit less pronounced) positive effects. However, this was not the case in a study of panic disorder clients with agoraphobia (Goldstein, de Beurs, Chambless, & Wilson, 2001), which used the same treatment protocol. As noted by its principal investigator (Goldstein, personal communication, September 3, 2000):

Evidence of consistent within-session processing that has been evident with adult onset PTSD clients that I have seen in therapy was not observed with clients in this study (Goldstein, deBeurs, Chambless, & Wilson). Some clients showed good within-session processing, but, on the whole, the clients processed slowly and incompletely. Some clients would go through a complete session without a decrement in emotional reaction to the beginning scene, even though they were emotionally aroused throughout.

This raises the question of how agoraphobic clients are different, from people with PTSD for example, in ways that might effect the process and outcome of EMDR treatment. Possible explanations include observations that people with agoraphobia are more avoidant of intense affect, that they have highly diffused fear networks, and that they have difficulty making accurate cause-effect attribution for anxiety and fear responses. It is my belief that they often come into therapy feeling overwhelmed and confused by seemingly inexplicable forces. The first order of business in therapy is to provide a lot of structure, reassurance and to focus on concrete anxiety management skills. In the early stage of therapy, perhaps they are not ready to engage in a process that is as emotionally provocative as is EMDR.

Accordingly, future studies of EMDR with agoraphobics must include a full preparation phase that may last over multiple sessions. The absence of preparation may have resulted in the inability to implement the remainder of the protocol. It is unknown what other populations might be similarly affected. The incremental effects of more recent protocols for enhanced stabilization (e.g., Fine & Berkowitz, 2001; Korn & Leeds, in

press; Phillips, 2001) in this phase should also be investigated. Likewise, the specific impact of eliminating the self-control techniques for outside session use, as was done in all the panic disorder studies to date, should be evaluated. On the other hand, it may be that certain anxiety disorders are more amenable to exposure treatments than to EMDR. Only careful articulation of experimental hypotheses in research that duplicates standard clinical care will be able to address these issues appropriately.

### Future Research Directions

EMDR applications to diverse clinical populations must be tested in controlled studies that combine the most rigorous level of scientific standards (Chemtob et al., 2000; Foa & Meadows, 1997; Maxfield & Hyer, 2002). This is advocated for all clinical methods as efficacy based upon statistical significance in rigorous studies (Chambless et al., 1998) must be combined with effectiveness based on clinical significance in the real world (Seligman, 1995).

Many citizens of developing and war-torn countries, as well as those in the inner cities, have been handicapped as a result of psychological and physical problems directly attributable to stress reactions. While the most obvious effects of exposure to traumatic events include intrusive thoughts of the event and an exaggerated startle response, there are many consequences of stressful conditions that may not be so easily recognized. In addition to testing its effects with diverse clinical populations, EMDR clinical research should be directed to developing the most efficient protocols for the amelioration of the effects of deprivation, violence, and/or social neglect in underserved populations. EMDR's rapid documented effects (e.g., Marcus et al., 1997; Rothbaum, 1997; Scheck et al., 1998; Wilson et al., 1995, 1997) and apparently transcultural effectiveness (e.g., Artigas, Jarero, Mauer, Lopez Canto, & Alcal, 1999; Bergh Johannesson, 2000; Cohen & Lahad, 2000; Hofmann, 1999; Ichii & Kumano, 1996; Inagawa, 1999; Lamprecht, 2000; Tanaka & Inoue, 1999; Wilson, Tinker, Hofmann, Becker, & Marshall, 2000) have allowed it to be used with populations in many of the underdeveloped countries. Ongoing evaluation of trainings and interventions provided by the nonprofit EMDR Humanitarian Assistance Programs (2000) is exploring the degree to which EMDR can be taught to indigenous clinicians. This may assist in alleviating the psychological suffering which, in addition to its obvious beneficial effects, can also assist in overcoming the recurring cycle of pain and violence.

Future research will hopefully be directed to two other critical needs. First, research should explore the degree to which successful trauma treatment decreases the amount of high-risk and perpetrator behavior (Greenwald, 1999; Scheck et al., 1999; Shapiro, 1995, 2001a, in press) and deters further victimization. Second, research should explore the degree to which neurobiological changes and cognitive deficits correlated with traumatization (Perry, 1997; Perry, Pollard, Blakley, Baker, & Vigilante, 1995; Schore, 1994, 1997, 2001; Seigel, 1999; van der Kolk, McFarlane, & Weisaeth, 1996) can be reversed with the judicious application of EMDR within a multidimensional treatment (Schore, Seigel, Shapiro, & van der Kolk, 1998).

### Summary and Conclusions

EMDR is a complex psychotherapeutic approach that integrates aspects of a variety of theoretical orientations. Evidence from PTSD controlled research indicates that it is capable of rapid clinical results that can both complement and expand outcomes achieved by other treatments (also see Norcross & Shapiro, in press). The large base of supportive empirical PTSD studies indicates that research can now fruitfully be directed at identi-

fyng the appropriate weighting of EMDR's various components with respect to this clinical population. Evaluation of a wide range of parameters can identify possible differential effects of various components on the change processes in PTSD, and determine whether reported client and clinician preferences for dual stimulation over other non-task conditions apply to non-PTSD populations as well. In addition, it is important to compare the efficacy and effectiveness of EMDR to that of other PTSD treatments and to examine the differential effects of various treatments as a function of identified client characteristics.

It is crucial that in the research (as well as clinical) use of EMDR, appropriate attention is paid to treatment fidelity. Studies on EMDR should always include evidence that the standardized procedures and protocols are being used. EMDR protocols for several disorders have received preliminary testing; however, controlled research is necessary to determine EMDR's effectiveness compared to other treatments, and the impact of proposed procedural alterations. With EMDR, as with any complex approach, there is the danger that untested additions to standardized protocols will diminish treatment effectiveness (Norcross & Shapiro, in press; Shapiro, 2001b). On the other hand, it is important that innovation not be stifled and refinements be encouraged.

The fruitful integration of science and practice is, in this author's view, the principal and most effective way to address pressing social needs. As an empirically supported, integrative approach, EMDR was designed not only to ameliorate experientially based psychological disorders, but also to optimize functioning and effect change in the emotional, cognitive and somatic domains. It is hoped that future evaluations, rigorous in nature and multiple in number, will explore expanded clinical applications, include component analyses, and refine established protocols.

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