

# Emotional Processing During Eye Movement Desensitization and Reprocessing Therapy of Vietnam Veterans With Chronic Posttraumatic Stress Disorder

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This study examined emotional processing and outcome in 17 Vietnam veterans with chronic posttraumatic stress disorder (PTSD) who underwent eye movement desensitization and reprocessing (EMDR) therapy, with and without the eye movement component, in a crossover design. Results supported the occurrence of partial emotional processing, but there were no differences in its extent in the eye-movement versus eyes-fixed conditions. Therapy produced a modest to moderate overall improvement, mostly on the Impact of Event Scale. There was slightly more improvement in the eyes-fixed than eye-movement con-

SINCE ITS INTRODUCTION several years ago, the novel psychotherapy currently referred to as eye movement desensitization and reprocessing (EMDR)<sup>1</sup> has captured the attention of the posttraumatic stress disorder (PTSD) clinical and research communities as has no other treatment. The procedure was discovered accidentally by Shapiro<sup>2</sup> when she noticed that her own recurrent, disturbing thoughts disappeared when she moved her eyes in a "multi-saccadic" manner. She subsequently devised a therapeutic procedure based on this observation, which involves inducing the patient to perform sets of eye movements tracking the therapist's hand as it travels back and forth in front of the patient's face, while the patient engages in therapist-assisted emotional and cognitive reprocessing of aspects of the traumatic event or other disturbing thoughts or memories. Shapiro and colleagues have trained thousands of therapists in the performance of EMDR, and its practice is now widespread.

The efficacy of EMDR in PTSD and related conditions is supported by numerous case reports, a growing number of case series,<sup>3-6</sup> and uncontrolled<sup>7</sup> and controlled<sup>8-10</sup> studies. However, not all studies have found EMDR helpful, especially in Vietnam combat veterans<sup>11,12</sup> and the more seriously mentally ill.<sup>13</sup> Studies of EMDR have been criticized on methodologic grounds,<sup>14,15</sup> and the therapy has even been likened to mesmerism.<sup>16</sup>

The therapeutic mechanism of EMDR remains unclear. Despite acknowledging the possible contributions of exposure, distraction, trance,

There was little association between the extent of emotional processing and therapeutic outcome. In our hands, EMDR was at least as efficacious for combat-related PTSD as imaginal flooding proved to be in a previous study, and was better tolerated by subjects. However, results suggest that eye movements do not play a significant role in processing of traumatic information in EMDR and that factors other than eye movements are responsible for EMDR's therapeutic effect.

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suggestion, and therapist "demand characteristics," Shapiro<sup>17</sup> assigned a pivotal role to the eye movements, speculating that these overcome "neural blockage" and reverse neural pathology set in motion by the traumatic incident. Shapiro proposed that "the rhythmic, multi-saccadic eye movements used in EMDR may be the body's natural inhibitory mechanism, similar or identical to the 'rapid eye movement' (REM) dream state of sleep, during which unconscious material surfaces and may be desensitized and integrated."<sup>17</sup> (p. 135) However, this analogy suffers from lack of phenomenologic correspondence between the rhythmic eye movements induced by the EMDR procedure and the spontaneous, arrhythmic, nonsaccadic eye movements that occur during REM sleep. Although REM sleep may serve a physiologic information processing function,<sup>18</sup> eye movements during REM sleep may represent only an epiphenomenon of dreaming—i.e., they result from, rather than induce, information processing. Other explanations advanced for the mechanism of action of the eye movements during EMDR include interference with the trace memory caused by neuronal

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bursts associated with the eye movements,<sup>17</sup> interference with the tracts connecting the frontal lobes with the hypothalamus and hippocampus by field currents generated by the eye movements,<sup>3</sup> and REM-induced muscular inhibition by way of the reticular formation.<sup>17</sup>

All neurophysiologic theories about the action of eye movements in EMDR are considerably blunted by dismantling studies that have shown that the eye movement component may be deleted from the procedure without loss of therapeutic benefit. In one study, 58 phobic subjects were treated with eye movement desensitization (EMD, an earlier version of EMDR) versus image confrontation (during which the eyes were closed and motionless). The two approaches were equally efficacious in reducing anxiety in a single-session crossover trial.<sup>19</sup> In another study, 23 subjects (21 of whom had PTSD) underwent therapy in three conditions: EMD, automated eye movements, and active visual attention without eye movements. Although the therapy was efficacious overall, there were no differences among conditions.<sup>20</sup> In another study, test anxiety in 15 pairs of students was treated in one of two conditions: EMD or finger tapping, an experimental substitute for eye movement. Both groups improved, but with no difference in conditions.<sup>21</sup>

Another investigation focused on the role of eye movements in the intratherapy process. Thirty-six normal subjects who reported distress after exposure to loud, aversive electronic sounds, followed by viewing a photograph of a mutilated corpse, were treated with brief, single sessions of rapid EMD, slow EMD, and stationary imagery performed during imagery of the aversive photograph. Subjective units of distress (SUDS; sometimes also called subjective units of disturbance or discomfort) ratings were elicited from subjects at 10-second intervals. Emotional processing, gauged by the course of SUDS ratings during the therapies, was significantly impaired in the rapid EMD compared to the slow EMD and stationary imagery groups. The investigators concluded that REM does not facilitate emotional processing.<sup>22</sup> However, the relevance of this study is limited by the use of normal subjects, a contrived stressor, and discrepancies between the rapid EMD method and the clinical EMDR procedure.

In contrast to the above dismantling studies that failed to find a contribution of eye movements to the procedure's therapeutic effect, in another study a nonsaccade treatment phase designed to control for the role of the eye movements preceded EMD treatment. Subjects only improved in the EMD phase.<sup>23</sup> However, the two phases in this study appear to have differed in important respects besides the presence of eye movements. For example, the control treatment was briefer and lacked instruction to blank out the stressful image used in the EMDR procedure. The control treatment also lacked motion of the therapist's hand in front of the patient's face, a gesture which may convey psychologic meaning apart from the intended effect of inducing eye movements. Another investigation found that either reprocessing or music, accompanying eye movements, equally reduced psychology students' reports of acute pain induced by hand exposures to ice water over a no-eye-movement control intervention that merely instructed subjects that they were participating in an experiment testing their ability to cope with acute pain.<sup>24</sup> Again, the control intervention differed from the two active interventions in important respects besides the inclusion of eye movements, e.g., the control intervention lacked the components of therapist hand movements, activity on the part of the subject, and distraction (via music or reprocessing) from the painful stimulus.

This last study<sup>24</sup> may also be viewed as a dismantling procedure for EMDR's reprocessing component. The finding that substituting music for reprocessing did not diminish beneficial effect led the authors to conclude that reprocessing operations were not responsible for the procedure's efficacy. The fact that some studies have removed eye movements and others have removed reprocessing from the EMDR procedure, without loss of efficacy, suggests that other unidentified factors, such as distraction, suggestion, and therapist "demand characteristics," may be contributing to EMDR's therapeutic effect.

A few studies have incorporated psychophysiologic measures in assessing EMDR. One study reported a mean 13 beat per minute drop in the highest pulse rate occurring during elicitation of the traumatic memory in a single EMD treat-

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