Is EMDR an Exposure Therapy? A Review of Trauma Protocols

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This article presents the well established theoretical base and clinical practice of exposure therapy for trauma. Necessary requirements for positive treatment results and contraindicated procedures are reviewed. EMDR is contrasted with these requirements and procedures. By the definitions and clinical practice of exposure therapy, the classification of EMDR poses some problems. As seen from the exposure therapy paradigm, its lack of physiological habituation and use of spontaneous association should result in negligible or negative effects rather than the well researched positive outcomes. Possible reasons for the effectiveness of EMDR are discussed, ranging from the fundamental nature of trauma reactions to the nonexposure mechanisms utilized in information processing models. J Clin Psychol 58: 43–59, 2002.

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In 1980, posttraumatic stress disorder (PTSD) was included in the *DSM-III* (American Psychological Association, 1980) as an anxiety disorder. Soon after, a conditioning model of the disorder was proposed (Keane, Zimering, & Caddell, 1985). This opened the door to the use of exposure therapies, with some modification, for the treatment of trauma. Case reports (Fairbank & Keane, 1982; Keane & Kaloupek,1982) and later controlled studies (Boudewyns & Hyer, 1990; Foa, Rothbaum, Riggs, & Murdock, 1991; Keane, Fairbank, Caddell, & Zimering, 1989; Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998) demonstrated that exposure therapy could result in decreases in the intrusive and arousal symptoms of PTSD. Effects on avoidance symptoms were less clear-cut.

In 1989, Eye Movement Desensitization and Reprocessing (EMDR) was introduced as a new treatment for psychological trauma (Shapiro,1989a, 1989b). Evaluative research suggests EMDR is an effective PTSD treatment (Carlson, Chemtob, Rusnack, Hedlund,

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& Muraoka, 1998; Rothbaum, 1997; S.A. Wilson, Becker, & Tinker, 1995). There is also some preliminary evidence suggesting that EMDR may be a more efficient treatment than previous exposure therapies (Ironson, Freund, Strauss, & Williams, 2002; Lee et al., 2002; Van Etten & Taylor, 1998; Vaughan et al., 1994). Two studies comparing EMDR to combined exposure/stress management treatments have had contradictory results, with one showing EMDR to be less effective (Devilly & Spence, 1999) and the other showing it to be more effective (Lee et al., 2002).

Recent dismantling studies have been conducted to identify the mechanisms underlying EMDR's effects. Much of the dismantling research has been focused on the eye movement component of the EMDR procedure. Most of these studies failed to demonstrate any difference in outcome when eye movements were omitted from the procedure, which raises the question of whether imaginal exposure is the sole mechanism of change in EMDR.

Craske (1999) defines exposure therapy as one that involves "systematic and repeated confrontation with phobic stimuli" (p. 107). The basic structure of the EMDR trauma protocol is certainly consistent with that definition. However, as noted by Shapiro (1995) and Feske (1998), the classification of EMDR as an exposure therapy becomes problematic when the EMDR methodology is contrasted with some of the historical assumptions and clinical practice of the leading exposure therapies, including the flooding/implosive procedure (Foa et al., 1991; Lyons & Keane, 1989) for anxiety treatment, and with aspects of the emotional processing model of Foa and Kozak (1986, 1998).

Exposure Therapy for Anxiety Disorders

Keane (1995) identifies exposure treatments as a subgroup of cognitive-behavioral therapy including flooding, implosion, and systematic desensitization. All of these techniques are predicated on the conceptualization of anxiety disorders as problems of learned anxiety and avoidance.

Flooding involves prolonged exposure to feared stimuli while avoidance is prevented. Initially developed for the treatment of phobias, the procedure has been modified for use with more complex disorders such as agoraphobia, obsessive-compulsive disorder, and PTSD. Implosion differs from flooding in that it may involve the presentation of hypothesized cues derived from psychodynamic theory. Both procedures are thought to work by means of habituation and/or extinction. Both habituation and extinction refer to the decrease in response upon repeated presentation of a feared or aversive stimulus. However, habituation was originally thought to be a transient process that affected unconditioned as well as conditioned stimuli. It may be the result of decreased efficiency in the transmission of information along a specific neural pathway, a kind of temporary "autonomic dampening" (Foa, 1979, p. 173). Extinction, on the other hand, was thought to be a long-term reduction in a conditioned response due to repeated presentation of the conditioned stimulus in the absence of the unconditioned stimulus and without reinforcement of avoidant behavior.

Both processes are thought to require long exposure times (Craske, 1999). In recent years the term habituation has also been applied to more long-term decrements in conditioned responses.

Desensitization involves the use of an anxiety-incompatible response, such as relaxation, subsequent to the presentation of feared stimuli. In treatment this is commonly done by eliciting a trained relaxation response as the client is gradually exposed to a hierarchy of increasingly anxiety-provoking stimuli. Desensitization (Wolpe, 1958) was originally posited to work by means of reciprocal inhibition, that is, the pairing of a

feared stimulus with a response that is incompatible with anxiety and that serves to "counter-condition" the stimulus. In contrast to flooding and implosion, desensitization utilizes very brief exposure times (10–15 s). However, such brief exposure are effective only with low-intensity stimuli and only at low arousal levels (Craske, 1999; Rachman, 1978). Wolpe's theory has been questioned, mainly due to the finding that exposure can work well without the addition of relaxation or hierarchies.

Case reports (Fairbank & Keane, 1982; Keane & Kaloupek, 1982) and later controlled studies (Boudewyns & Hyer, 1990; Foa et al., 1991; Keane et al., 1989) demonstrated that the use of flooding could result in decreases in the intrusive and arousal symptoms of PTSD. The results of early investigations of systematic desensitization for PTSD were equivocal (Brom, Kleber, & Defares, 1989; Kolb, 1984) and flooding came to be regarded by some as the treatment of choice for PTSD.

The Emotional Processing Model

The most clearly articulated theory of fear reduction in anxiety disorders is the Emotional Processing Model of Foa and Kozak (1986; see also Foa & Kozak, 1998). In this model, anxiety is considered to be the result of pathological "fear structures" held in memory. A fear structure is a propositional network of information that serves as a program to escape threat. It contains information about stimuli and responses as well as information about the meaning of the relationships between these elements. Pathological fear structures are characterized by excessive response elements, unrealistic evaluations about the probability of harm, and resistance to change. Individuals with anxiety disorders also have erroneous beliefs about the nature of anxiety. They tend to see anxiety as something that will persist until they escape the feared situation, that anxiety is physically or psychologically damaging, and that the consequences of being anxious are very aversive (negative valence). In this model, different anxiety disorders are characterized by different types of fear structures, with the structures underlying phobias being small and coherent and those underlying PTSD being larger and less coherent.

According to this model, the goal of treatment is the modification of the pathological fear structure. To accomplish this, the memory network must first be activated by the presentation of information that matches elements found in the fear structure. Next, "corrective information," information incompatible with the structure's pathological elements, must also be made available to the individual. When this corrective information is incorporated into the memory network, it will result in the dissociation (uncoupling) of stimulus and response elements, a change in meaning elements, decreased anxiety and behavior change. Treatment will be unsuccessful if the matching information presented by the therapist is insufficient to activate the fear structure, or if corrective information is not sufficiently incompatible to result in modification of the structure.

Foa and Kozak (1986) sought to explain how exposure therapy leads to the modification of fear structures:

> In summary, we propose that once a fear memory has been evoked by information that matches it, several mechanisms come into play. The information that short-term physiological habituation has occurred leads to dissociation of response elements from stimulus elements of the fear structure. The consequent lowered arousal in turn facilitates integration of corrective information about the meaning of feared stimuli and responses. Representations of lower potential harm and decreased negative valence obviate the disposition to avoid, thus reducing the associated preparatory physiology: across session habituation occurs. Long-term decreases in anxiety constitute additional information that accumulates to modify general beliefs and attitudes about the ability to cope with feared situations. (p. 29)

It is clear from this description that within-session habituation is viewed as the first link in any subsequent physiological, cognitive and behavioral effects.

> Because habituation is a gradual process, it is assumed that exposure must be prolonged to be effective. Prolonged exposure produces better outcome than does brief exposure, regardless of diagnosis (Chaplin & Levine, 1981; Rabavilas, Boulougouris, & Stefanis, 1976; Stern & Marks, 1973). During exposure sessions, most patients exhibit decreases in autonomic responding and reported fear and the magnitude of these changes predicts successful outcome. Habituation takes time. Changes in S-R associations typically require habituation of feared responses and this process unfolds gradually. Accordingly, long duration exposure is most likely to permit habituation, and thereby to abolish these dysfunctional associations. (Foa & McNally, 1996, pp. 334–335)

The pattern of within-session habituation observed during exposure sessions typically involves an increase in anxiety, followed by a plateau and a gradual decrease in anxiety, with imaginal exposure showing a more curvilinear pattern and in vivo exposure a more directly linear decrease (Foa & Chambless, 1978). This was assumed to be due to the time needed to fully experience a mental image as opposed to an actual stimulus. How long should habituation take? Estimates vary, according to the type of disorder. Foa, Steketee, and Rothbaum (1989) cite research showing decreases in anxiety after 20 minutes of imaginal exposure in specific phobias, 25 minutes in speech phobia, and up to 50–60 minutes in agoraphobia. Keane (1995) reports 100 or more minutes for flooding of trauma scenes before decreases in anxiety are seen.

It is also believed that prolonged and repeated exposure is necessary because it takes time for an individual to experience the disconfirmation of their erroneous beliefs about the negative consequences of being anxious. Foa et al. (1989) suggest that a single episode of desensitization may be insufficient for trauma survivors such as rape victims or veterans because they may dismiss the safety information in the encounter as mere luck. In short, the prevailing belief of exposure researchers is that the more pervasive and intense the anxiety, the longer the exposure time needed for habituation.

There is substantial empirical support for the superiority of long over short exposures during flooding (Chaplin & Levine, 1981; Marks, 1987; Marshall, 1985; Rabavilas et al., 1976; Stern & Marks, 1973). In fact, evidence exists that brief exposures to feared stimuli can actually increase anxiety (Miller & Levis, 1971; Stone & Borkovec, 1975).

> In vertebrates and invertebrates exposure gradually reduces defensive responses to cues to which the subject is exposed. This habituation depends on the dose of exposure. Continuous stimulation in neurons and immune and endocrine cells tends to dampen responses, and intermittent stimulation tends to increase them. (Marks et al., 1998, p. 324)

The idea that decreases in physiological arousal precede cognitive changes during exposure has also been empirically supported (Gauthier & Marshall, 1977; Lande, 1982; Shahar & Marks, 1980; Watson, Gaind, & Marks, 1971).

Foa and Kozak (1986) have identified several factors that can reduce the effectiveness of exposure, including procedural variables and client characteristics. Procedures in which clients' attention is diverted away from the details of the feared stimulus are thought to reduce habituation rates. Investigation of this dimension of exposure has yielded mixed results (Craske, Street, & Barlow, 1989; Grayson, Foa, & Steketee, 1982, 1986; Rodriguez & Craske, 1993).

Client variables observed to reduce the effectiveness of exposure include emotional states such as depression (Foa & Kozak, 1986), guilt, and anger (Meadows & Foa, 1998; Pitman et al., 1991); the presence of overvalued ideation that inhibits the incorporation of

corrective information (Foa & Kozak, 1986); and the use of cognitive avoidance strategies such as "pretending to be somewhere else, distorting a feared image, or concentrating on nonfeared elements of a situation" (Foa & Kozak, 1986; see also Marks, 1987). A significant proportion of clients simply fail to show evidence of across-session habituation for unknown reasons (Foa & Kozak, 1986; Jaycox, Foa, & Morral, 1998).

Recently, theorists have shown an increasing recognition of the importance of cognitive aspects of the trauma memory. In contemporary conceptualizations it has been suggested that exposure helps make trauma memories more organized, thereby facilitating integration into existing schemata, facilitates correction of maladaptive beliefs about the probability of harm, and allows individuals to more readily discriminate between danger and safety (Rothbaum & Foa, 1996).

Flooding for Trauma: Prolonged, Sequential, Directive

Despite theoretical changes over the past 20 years, exposure procedures for trauma have changed very little. Current flooding/implosive procedures used in PTSD treatment are strongly influenced by the work of Stampfl and Levis (1967). One of the ideas inherent in their model was that human conditioning involved not just a single discrete conditioned stimulus but a whole complex of external and internal cues. They assumed that these cues are serially ordered, with some being readily accessible and generating low levels of anxiety and others being less accessible and generating higher levels of anxiety. Since in the normal course of events, an individual is likely to respond to one of the earlier cues with avoidance, they might never get an opportunity for exposure to the later ones. As avoidance is prevented during flooding, anxiety to early cues is extinguished, making it possible to uncover the avoided ones.

A comprehensive description of the flooding/implosive procedure for posttraumatic stress disorder can be found in Lyons and Keane (1989). The therapist develops a script from the client's initial account of the stressor event and uses it to prompt the client as the client closes his or her eyes, speaks in present tense, and imaginally walks through the details of the event in chronological order, attending to sensory cues, thoughts, and emotions.

> Clinically, two mistakes are critical to avoid. First, the therapist generally should not ask the patient to be aware of something that requires him to take a third-person view of the scene, e.g., the therapist would not typically ask the patient to see his own facial expression. Second, the clinician must not allow the patient to reduce his anxiety by changing the scene or moving it ahead quickly in time to skim over the most traumatic point. The goal of implosive therapy is to obtain anxiety reduction (e.g., as indicated by SUDS ratings) by focusing on each element of the trauma until that element no longer elicits as much anxiety. To obtain anxiety reduction by shifting away from the most traumatic cues is no more effective in attaining extinction of the anxiety than past episodes of intrusive recall have been. Furthermore, such avoidance of the trauma under the guidance of the therapist could possibly be counter-therapeutic since it might strengthen the patient's belief that the trauma is too horrible to manage. . . . (Lyons & Keane, 1989, pp. 146–147)

During flooding, it is assumed that the best way to achieve presentation of the critical cues is to be directive and to maintain the client's focus on the details of the target event. When the client reports high levels of anxiety to a particular cue, they are encouraged to hold it in their minds until they experience a decrease in anxiety. The chronological recounting of the memory is repeated until the client is able to recall it with minimal anxiety. To this end, trauma narratives are often audiotaped and used for self-exposure

homework between sessions. Imaginal exposure can be accompanied by in vivo exposure to feared situations.

Given the assumptions of the Emotional Processing Model and the guidelines of the flooding procedure, it can be predicted that a procedure that uses brief exposures of highly distressing stimuli, that requires clients to split their attention between a motor task and the feared stimuli, and that allows clients to engage in cognitive avoidance strategies such as image distortion, skipping elements of the event, or concentrating on nonfeared elements of the memory should result in little decrease in fear.

EMDR's Nondirective Approach

As described by Shapiro (1995), EMDR is marked by a period of client preparation in which the procedure is explained with an emphasis on the methodology's client-centered nature. They are explicitly told that, while they initially will begin with a focus on the trauma experience (described below), they may notice changes in the picture, affect, cognitions, or physical sensations of that experience. They are also told they may notice the emergence of other memories, thoughts, feelings, and sensations not apparently related to the trauma experience. As the procedure takes place, the clients are instructed that whatever material comes into their awareness is legitimate and may be the target of subsequent eye movements.

Initially, clients are instructed to identify the part of the trauma experience that they find most distressing *in the present.* They are asked to identify the words that go with this picture, expressing a currently held irrational, self-limiting belief about themselves, as well as a desired positive belief. They are asked to rate the felt believability of the positive cognition while focusing on the trauma scene, using a 7-point Validity of Cognition (VOC) scale. They are then asked to identify the current emotion(s) related to the memory and their current level of distress measured on a 0–10 Subjective Units of Disturbance (SUD) scale, and the location of the physical sensation(s) related to the distress.

They are then asked to simultaneously focus on the image, the negative cognition, and the body sensation while following the therapist's finger with their eyes as it passes back and forth in front of their face for approximately 30 seconds. They are then instructed to pause, take a breath, and are asked, "What comes up?" Any reported changes in the memory, emergence of other memories, or any new material is targeted in subsequent sets. Shapiro (1995) describes progressions through chains of associations that may be linked in terms of shared sensations, cognitions, or emotions. The client is permitted to focus on these associations as they come up. When the associations seem to "run dry" and the client stops reporting change, they are instructed to return to the original experience, focus on that and report on what comes up and occasionally give the therapist a rating of intensity using the SUD scale.

This process is repeated until the client reports no disturbance for the memory. At that point clients are given an opportunity to revise their positive cognition, to focus on it and the original scene while more sets of eye movements and VOC ratings are done. After the client reports a VOC of 6 or 7 and reports no further changes in image, cognition, affect, or sensation, they are asked to hold the original scene in mind and scan their bodies for any residual physical sensations. Sets of eye movements are done on any sensations reported. The procedure is terminated when the client reports no further changes.

Does EMDR Work by Means of Habituation?

As previously stated, the emotional processing model states that habituation is a gradual process and predicts that the greatest success will be achieved with prolonged, continu-

ous exposures (20–100 minutes). Previous research suggests that repeated brief exposures only result in fear decrement when stimulus intensity and arousal are both low. Yet EMDR uses very brief (20–30-s) exposures. Stimulus intensities are high, since clients are asked to start by focus on the most distressing scene. Therapists make no attempt to minimize physiological arousal during EMDR.

Investigations of physiological responding during EMDR have had mixed results. D. Wilson, Silver, Covi, and Foster (1996) observed decreases in heart rate, blood pressure, and galvanic skin response during EMDR. Montgomery and Ayllon (1994) observed a nonsignificant trend toward decreased arousal. Lohr, Tolin, and Kleinknecht (1996) observed no change in arousal levels during EMDR, even though their subjects reported substantial decreases in subjective distress. The latter studies indicate that decreases in subjective distress precede decreases in physiological arousal, which conflicts with both the Emotional Processing Model and previous research on habituation.

Though EMDR has occasionally been identified as a variant of systematic desensitization (Craske, 1999; McNally, 1999), the argument that it works by means of counterconditioning lacks empirical support. In fact, a case study in which the EMDR protocol was followed improperly (with the subject being instructed to relax to baseline levels after every set of eye movements) showed the altered procedure to be completely ineffective (Acierno, Tremont, Last, & Montgomery, 1994). Further, the desensitization/deconditioning model presupposes the pairing of anxiety with relaxation, or other incompatible response, of equal valence to the conditioned stimulus. To date, the only support for this model would be the study of D. Wilson et al. (1996) which purported to identify a "compelled relaxation response" to the eye movement itself. Additionally, the EMDR treatment includes an element of free association not found in systematic desensitization or other exposure therapies.

Foa and McNally (1996) state that variables that promote attention to fear-relevant information should facilitate activation, habituation, and the modification of the fear structure. Therefore, treatment elements that distract the client from the feared stimulus should reduce the rate of habituation. Empirical support for this prediction is equivocal. Grayson et al. (1982) found that distracted exposure resulted in greater fear retention at the start of the second session than focused exposure. In a later study Grayson et al. (1986) found equal fear retention but greater within-session fear decrement with distracted exposure. Rodriguez and Craske (1995) found less within-session fear decrement with distracted exposure. Craske et al. (1989) found greater short-term but not long-term improvement with distracted exposure. Because of differences in population (simple phobia, obsessive-compulsive disorder, panic/agoraphobia), types of exposure (in vivo vs. imaginal), and distractors (motor tasks vs. cognitive tasks, viewing affective and neutral slides), it is difficult to draw conclusions from this line of research at present.

In EMDR clients are asked to split their attention between the memory and the motor task of following the therapist's hand with their eyes. If the assumptions underlying the emotional processing model are correct, this should have the effect of slowing the rate of fear decrement, and yet the rate of fear decrement in EMDR appear to be faster than that found during simple exposure (Rogers et al., 1999; Shapiro, 1989a, 1989b).

Does EMDR Promote Cognitive Avoidance?

Proponents of exposure therapy identify several client behaviors that are thought to be indicative of cognitive avoidance, including skipping over details of the memory, image distortion, and focusing on nonfeared elements of the memory. Lyons and Keane (1989) state that it is important that the client be exposed to each element of the trauma memory,

focusing on the related sensations, thoughts, and feelings, lingering on those details that generate the greatest amount of anxiety. As they are aware that the therapist is working with incomplete knowledge about which cues are important, they assume that a careful step-by-step review is likely to result in exposure to all of the critical details. They specifically caution therapists against allowing the client to avoid the most anxiety-eliciting details by skipping over parts of the event.

In EMDR, after initially being directed to simultaneously focus on a visual image along with the related cognition and sensation, clients are allowed to report on their experience with minimal guidance or probing from the therapist. This leaves them free to report on whatever details seem salient to them, to jump ahead in time, or even to jump from event to event. Rather than a chronological progression through the details of the traumatic event, the progression of EMDR is often saltatory, with the client's attention seeming to follow its own course, moving freely backward and forward in time. The net result is that clients often seem to achieve anxiety decreases without deliberately focusing on many of the details of the target event. This incomplete exposure is a practice that should render EMDR slower, if not ineffective according to the assumptions of the emotional processing model. Yet of the PTSD studies to directly compare EMDR with imaginal exposure, two have shown EMDR to have a greater effect on intrusive symptoms (Rogers et al., 1999; Vaughan et al., 1994), and two have shown EMDR and exposure to have comparable effects on global outcome with EMDR requiring less treatment time (Ironson, Freund, Strauss, & Williams, 2002; Vaughan et al., 1994).

It is common for clients to report spontaneous changes in the visual image of the target scene during EMDR. Not only can the image change, but it sometimes disappears altogether. Instead of being seen as a form of avoidance, this is regarded as an indicator of effective processing of the memory. This may be a natural consequence of the eye movements, consistent with the decreases in vividness and distressfulness of negative mental images found by Andrade, Kavanagh, and Baddely (1997).

The clinician using EMDR makes no judgment concerning the historical accuracy of any emerging memory. Instead, any material coming into awareness is regarded as representative of encoded information and, as such, may not be and need not be historically accurate. This willingness to work with material which may be symbolic of issues not held in consciousness rather than relying on suggested, hypothesized cues is in contrast to the procedures of exposure therapies (Levis & Hare, 1977; Shapiro, 1995).

Case Example

A case report on the use of EMDR in the treatment of posttraumatic stress disorder (Kleinknecht & Morgan, 1992) illustrates several of these points. The client sought treatment for PTSD eight years after he was shot while intervening in a house burglary. Prior to treatment he met full diagnostic criteria for PTSD, had comorbid depression with reactivity to the sight of handguns, depictions of violence, damp weather, and the sound of ambulances. He also reported a "pressing need to tell the story."

The first of three EMDR sessions targeted this incident. After a single set of eye movements the client reported that the image had faded and most of the anxiety sensations had dissipated. The second set focused on the residual sensations, after which he reported that the image had gone completely and he was unable to reconstruct it. At that point the anxiety gave way to a sense of loss and the emergence of a memory of an automobile accident four years before the shooting in which his wife and unborn child had died. This incident was treated in the second session. During the second session he

reported experiencing many of the sensations associated with the accident. He again reported that the original image of the crash became unclear, his sense of safety increased, and he felt that he no longer needed to replay the incident. At the end of the session he reported viewing the incident from a third-person perspective. During the third session, a sense of aloneness led to another earlier trauma, the sudden death of his father and his choice to become a conscientious objector to military service without the support of his family. Much of the session was focused on his fear of imprisonment and his recognition that he had coped well with this difficult time.

At this point he was unable to identify any other distressing memories and treatment was terminated. Treatment resulted in a substantial decrease in symptoms as indicated by the client's self-report and several standardized scales. An eight-month follow-up showed maintenance of treatment effects and a continued inability to reconstruct the original vivid images of the shooting.

This case illustrates rapid symptom relief despite the presence of several factors thought to impede the effectiveness of exposure therapy. The client reported the elimination of anxiety related to the first incident after two 30-second periods of exposure. This rapid change is unlikely to be the result of habituation. The client also reported distortion and disappearance of trauma imagery. Though Lyons and Keane (1989) identify taking a third-party perspective of the trauma as a form of avoidance, it appeared to happen spontaneously in this case and occurred with the resolution of the experience. He was not exposed to many of the details of the shooting and yet reported rapid desensitization of this memory. His depression, which should have been another inhibiting factor, did not appear to interfere with the effectiveness of EMDR. Though EMDR does not always result in such rapid resolution of trauma, the behaviors observed in this case are commonly observed by therapists using EMDR (Greenwald, 1999; McCann, 1992; Shapiro, 1989a, 1995; Thomas & Gafner, 1993; Tinker & Wilson, 1999; Wolpe & Abrams, 1991) while the comparatively rapid elimination of PTSD symptomatology (e.g., within three sessions) has been documented in repeated controlled studies (e.g., Ironson et al., 2002; Rothbaum, 1997; S.A. Wilson et al., 1995).

Spontaneous Associating during Exposure

There is general agreement among proponents of exposure therapy that allowing clients to focus on "irrelevant" details is counterproductive. Yet therapists and clients are admittedly hindered by an incomplete knowledge of the contents of the emotional network. Given the premise that a clinician can tell that the fear structure is being activated when anxiety is elicited, exposure therapists have often allowed themselves to be guided by client's self-reported levels of distress, by non-verbal indicators of arousal, by physiological measures of anxiety such as heart rate and blood pressure, and occasionally by theoretical hypothesis-testing. Yet there are indicators in the clinical literature that these are not always the best guides to treatment.

Lyons and Scotti (1995) give a detailed account of the use of flooding in the treatment of a motor vehicle accident survivor. After achieving initial reductions in anxiety, they found their client's progress halted. After repeatedly attempting to introduce a hypothesized cue (that he had been intoxicated at the time of the accident) and failing to obtain further desensitization, they noticed that the client seemed preoccupied with one detail of the memory, the whereabouts of the watch of one of the victims. They decided to let him focus on this detail and he recalled finding the watch after the accident and keeping it. Desensitization proceeded smoothly after the incorporation of this detail. In this case it was clear that the client's preoccupation was more productive than the clinician's hypothesis.

Therapists treating anxiety disorders with exposure often have observed their clients accessing unexpected new details of the target memory or even previously unreported memories during treatment (Boulougouris & Bassiakos, 1973; Foa & Steketee, 1977; Grigsby, 1987; Hafner, 1978; Levis, 1995; Marks, 1987; Seagraves & Smith, 1975). In many cases they observed decreases in anxiety and in symptoms after this new material had been reported. They have occasionally noted that these new associations may be the focus of further exposure (Stampfl & Levis, 1967), yet the highly directive chronological recounting of a traumatic event currently favored by many cognitive-behavioral therapists may actually inhibit such associating.

The fact that positive clinical results can be achieved when clients are allowed to follow associations runs counter to the assumption that individuals will naturally avoid the most distressing and therefore the most potent details of the trauma. Grigsby (1987) and Levis (1995) both observed an increase in the effectiveness of exposure when they adopted a less directive approach and permitted their clients to follow associations. This would not be expected if the associating was a form of avoidance. The efficiency of EMDR may be due in part to the fact that clients are able to access material they would get to more slowly, if at all, in more directive approaches.

In contemplating the relative efficacy of in vivo and imaginal exposure, Richards and Rose (1991) suggest that imaginal exposure may be superior in that it allows for the inclusion of critical elements, particularly those related to meaning, which are difficult to present in vivo. If meaning is important, and the meaning the individual attributes to a particular event depends to some extent on their other life experiences, it may be beneficial to allow clients to go beyond the boundaries of the trauma memory during processing. Perhaps cognitive-behavioral models should be expanded so that trauma networks include not only links between elements within a particular memory, but links *between* memories as well.

What Is the Role of Anxiety in PTSD?

The use of flooding for PTSD is predicated on the idea that it, like other anxiety disorders, is based largely on conditioned anxiety and reinforced avoidance. Lyons and Keane (1989) state that the critical factor in cue selection for flooding is whether it elicits anxiety. However, trauma reactions often involve a complex array of emotions which can come up unexpectedly for therapists who see anxiety as being central to PTSD symptomatology.

Pitman et al. (1991) describe encountering complications in 6 of 20 veterans during a study of flooding. In one case the client, who had a history of major depression and agoraphobia, experienced panic symptoms during flooding. The other five clients, after reporting decreases in anxiety, accessed feelings of shame and guilt. These feelings did not seem to respond to further exposure to the narrative and were often accompanied by relapses in alcohol abuse and suicidal ideation. Flooding was discontinued in these cases and the clients were returned to supportive counseling. Pitman et al. describe the course of treatment for one of these veterans who during flooding of a combat incident, identified an action he might have taken to save the life of a friend:

> As the flooding progressed, he quickly became more and more preoccupied with this supposed oversight, and what started as an incidental idea quickly became an obsession. The more he was flooded, the more he flagellated himself with his perceived failure. He also ruminated about it between sessions. He developed an eczema with prominent excoriated lesions. He missed the 11th session. Although he was determined to complete the 12th (final) session, he interrupted it before its conclusion. (p. 18)

Meadows and Foa (1998) describe a similar phenomenon in the treatment of a rape victim. Anxiety symptoms responded well to exposure, but the client showed an increasing tendency to "interrupt her narrative" to berate herself for having been at the bar where she was assaulted. They report that these feelings of guilt and shame were not alleviated by further exposure to the assault narrative. They also identify anger as an emotion that does not seem to habituate during exposure and suggest that therapists encourage their clients to "put aside their anger and return to scene exposure."

Lyons and Keane (1989) state that it is not unusual to encounter feelings of shame and guilt among veterans and advise extending the range of exposure to incorporate the period immediately following the stressor event. By so doing, they may increase the likelihood of addressing the posttrauma period where survivors are particularly vulnerable to developing negative evaluations of themselves and their response to the stressor.

Foa and McNally (1996) speculate that, although exposure may have a deconditioning effect on such primary emotions as anxiety, it may not have this effect on other emotions such as guilt. It has been suggested that combat veterans and rape victims (who often have a tendency toward self-blame as well as anxiety) should be treated with a combination of exposure and cognitive processing (Foa & Rothbaum, 1998). Oddly, the research on the combination of exposure and cognitive therapy for PTSD has shown that both approaches are effective (though not completely so), but the combination of the two does not enhance treatment effects (Foa et al., 1999; Marks et al., 1998).

In contrast to flooding, EMDR is not specifically focused on anxiety. At the beginning of the desensitization phase, clients are asked to identify the emotion or emotions that are currently elicited by the memory and changes in emotion are readily incorporated during the procedure. A study on EMDR's effects on guilt suggests that the procedure results in significant changes in this aspect of trauma (Cerone, 2000).

Although anxiety is assuredly part of PTSD, the emotional response to trauma may involve more complex emotional responses and more pervasive negative self-appraisals. The tendency to explain negative experiences in terms of a defect in oneself may actually be a central aspect of the disorder and must be addressed if therapy is to be successful. The flexibility of EMDR, which can shift from one emotion to another within the same protocol, may yield some real advantages in addressing this aspect of PTSD.

Where Does Corrective Information Come from?

Foa and Kozak (1986) state that for successful therapeutic effects with exposure therapy it is necessary for information that is incompatible with elements of the fear structure to become integrated into the trauma memory. They focus mainly on estimates of the probability of harm, beliefs about the predictability and controllability of events, and about the consequences of being anxious. They identify the sources of corrective information as being the therapeutic situation (the client's beliefs about dangers in the environment are disconfirmed by the absence of unconditioned stimuli during exposure), and the effect of the habituation (the client's beliefs about the consequences of being anxious are disconfirmed by decreasing arousal). Shapiro (1995) states that during EMDR, changes in cognition, affect, and sensation appear to occur concurrently.

The cognitive shifts observed during EMDR show that clients can access corrective information not only from the therapeutic context, but also from their own life experiences, and link it to the trauma memory without therapist prompting. One Gulf War veteran, processing the memory of his panicked state when he woke to the sound of a SCUD missile exploding nearby, originally attached to this scene the negative cognition of "I'm a coward." After a few minutes of EMDR, he spontaneously began to recall how

he had calmed himself and begun to issue orders a short time later. Having accessed this part of the experience and connected it to the initial scene, his distress to that scene was completely eliminated.

While it is possible to explain the accessing of further negative details of the trauma and other forgotten traumatic experiences as a form of state-dependent recall, during EMDR clients also generate strings of associations to positive material as well as negative. In fact, what happens during EMDR more closely resembles assimilation and accommodation than it does habituation. Shapiro's (1995) Accelerated Information Processing model, with its emphasis on moving through associative links between and within memories, and the integration of a memory into existing schema, is consistent with this view.

Assimilation and accommodation reflect a bilateral restructuring. On the one hand, the perspective and meaning of an experience may change as additional information is integrated with the experience, permitting its assimilation into the existing cognitive structures—world views, value and belief systems, self appraisal, and so on—of the individual. On the other hand, those existing cognitive structures may be modified, slightly or radically, to accommodate the targeted experience. This is exactly what takes place in a human's continuous learning process in life with each new experience. This learning or information processing is not extinguishing of negative affect through repeated and maintained exposure. In fact, the desensitization effects of EMDR appear to be the result, not the cause, of the information processing.

The insights clients report during EMDR raise the question of whether the procedure is more akin to cognitive therapies than to exposure therapies. However, cognitive therapy usually involves training clients to identify their irrational beliefs and to apply a process of logical argumentation to them, while in EMDR cognitive shifts appear to happen spontaneously with minimal therapist prompting.

Case Example

The client was an African American veteran who had been a teacher prior to being drafted. While in Vietnam, he began to spend his free time helping younger GIs improve their reading skills. After one of these men was killed, he stopped giving individual lessons and began to withdraw socially, fearing that he was somehow responsible for the death. Prior to his first EMDR session, he stated that his most intrusive memory was of his last meeting with his school superintendent (who had refused to sign his draft deferment papers) before he reported for induction, remarking that none of his subsequent war experiences would have happened if it had not been for this individual. At the start of processing, he identified the negative cognition associated with this scene as "I'm helpless," the desired positive cognition was "I can handle things," and his SUD was 8. After 4 minutes of processing using several eye movement sets of about 25–30 seconds each and during which he reported decreasing feelings of anger and tension, he was asked to return to the target scene again.

> I don't feel quite as helpless, (smiles), like "We Shall Overcome."
>
> (Therapist asks him to focus on that and begins eye movements [EM].)
>
> It wasn't about him or me, it was about what I needed to do. Dang, maybe that's true. Maybe I went to Vietnam for a reason . . . to work with different people. It's about something that needed to be done.
>
> [EM]
>
> Interesting. I flashed back to the young man I lost, then something told me about the ones I saved. I lost one or two, I saved quite a few. They used to call me "Papa."

[EM]

(Laughs) I'm thinking about Jesse Jackson . . . "It's morning time and everything's going to be all right." He comes to our church sometimes.

[EM]

I can see my minister giving a sermon on "If only Tupac knew it was going to be all right."

[EM]

It's going to be all right. It may take some time.

(Therapist instructs him to return to the scene in the superintendent's office. He reports a SUD of 3.)

But he's still overshadowing my power.

[EM]

It's like he was a lieutenant colonel and I was a private. I needed more rank.

[EM]

I could have dealt with him later. I did, when I got to be a principal, but not as a new teacher.

[EM]

Now I have the power.

[EM]

More powerful, almost arrived.

(Therapist asks him to return to the target scene and report SUD.)

Real low.

This case demonstrates a rapid decrease in distress to the targeted experience as well as a profound shift in the client's perception of the meaning of the traumatic event as he spontaneously accesses corrective information from his own experiences. He is soon able to integrate the memory of the men he lost with those he helped. The fact that he uses the phrase "something told me" suggests that he is uncertain about how this sudden shift in attention is occurring. The next few associations are positive ones. The effect of this brief string of associations is a 50% decrease in SUD related to the target scene in approximately 7 minutes. The second string of associations is linked by the theme of power. After recognizing the power he has acquired since the target incident, he reports minimal distress. Recheck on the memory one week later yielded a SUD of zero.

Noteworthy in this example is the small amount of time spent focusing on the specific trauma experience. Prior to his return to the targeted scene, his 4 minutes of processing were clearly insufficient to produce desensitization through habituation. In fact, the therapist followed his report after each set of eye movements and asked him to focus on whatever he reported, usually decreasing feelings of anger and tension, with little specific reference to the confrontation with the supervisor or the deaths in Vietnam.

Conclusions

Much of the recent discussion about EMDR has been focused on whether it is actually a novel treatment or simply a "re-engineering" of existing exposure therapies. The fact that several dismantling studies have failed to support an active role for the eye movements has added weight to the latter argument. However, most of these studies have relied on samples that were too small to allow for adequate between-group discriminations, most have used very brief treatment trials, and several have used nonclinical subjects. This question can be more definitively addressed with studies using large samples of single-stressor PTSD subjects. The fact that a non-EM analog also produces unexpectedly rapid

treatment effects demands fuller consideration. It is possible that the procedure, absent the eye movements, still represents an improvement over known exposure therapies. A direct comparison of flooding and a non-EM analog would help clarify the issue.

The EMDR procedure is consistent with the basic principles of the Emotional Processing Model to the extent that it appears to facilitate the accessing of emotional networks and the incorporation of corrective information. This could be said of many therapies. However, EMDR conflicts with some of the specific assumptions of the Emotional Processing Model, with several of the procedural guidelines for exposure therapy for trauma, and with previous exposure research. It produces symptom relief by using brief, high-intensity exposures, by using incomplete exposure to the details of the target experience, and by using a nondirective approach that allows client behaviors previously thought to reduce treatment effectiveness. The structure of EMDR is unlike that of flooding/implosion, systematic desensitization, or cognitive therapy. It appears to be a distinctive clinical entity worthy of investigation in its own right. The results of this review support Shapiro's decision to classify EMDR as an information processing, rather than an exposure, therapy.

References

Acierno, R., Tremont, G., Last, C., & Montgomery, D. (1994). Tripartite assessment of the efficacy of eye-movement desensitization in a multi-phobic patient. Journal of Anxiety Disorders, 8, 259–276.

American Psychological Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, DC: Author.

Andrade, J., Kavanagh, D., & Baddely, 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.

Boudewyns, P.A., & Hyer, L.A. (1990). Physiological response to combat memories and preliminary treatment outcome in Vietnam veteran PTSD patients treated with direct therapeutic exposure. Behavior Therapy, 21, 63–87.

Boulougouris, J.C., & Bassiakos, L. (1973). Prolonged flooding in cases with obsessive-compulsive neurosis. Behavioral Research & Therapy, 11, 227–231.

Brom, D., Kleber, R.J., & Defares, P.B. (1989). Brief psychotherapy for posttraumatic stress disorders. Journal of Consulting and Clinical Psychology, 57, 607–612.

Carlson, J., Chemtob, C., Rusnack, K., Hedlund, N., & Muraoka, M. (1998). Eye movement desensitization and reprocessing (EMDR) treatment for combat-related posttraumatic stress disorder. Journal of Traumatic Stress, 11, 3–24.

Cerone, M. (2000). Eye movement desensitization and reprocessing in the treatment of combat-related guilt: a study of the effects of eye movements. Paper presented at International Society for Traumatic Stress Studies, San Antonio, TX.

Chaplin, E.W., & Levine, B.A. (1981). The effects of total exposure duration and interrupted versus continuous exposure in flooding therapy. Behavior Therapy, 12, 360–368.

Craske, M.G. (1999). Anxiety disorders: Psychological approaches to theory and treatment. Boulder, CO: Westview.

Craske, M.G., Street, L., & Barlow, D.H. (1989). Instructions to focus upon or distract from internal cues during exposure treatment of agoraphobic avoidance. Behaviour Research & Therapy, 27, 663–672.

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 posttraumatic stress disorder. Journal of Anxiety Disorders, 13, 131–157.

Fairbank, J.A., & Keane, T.M. (1982). Flooding for combat-related stress disorders: Assessment of anxiety reduction across traumatic memories. Behavior Therapy, 13, 499–510.

Feske, U. (1998). Eye movement desensitization and reprocessing treatment for posttraumatic stress disorder. Clinical Psychology: Science and Practice, 5, 171–181.

Foa, E.B. (1979). Failure in treatment of obsessive-compulsives. Behaviour Research & Therapy, 17, 169–176.

Foa. E.B., & Chambless, D.L. (1978). Habituation of subjective anxiety during flooding in imagery. Behavioral Research & Therapy, 16, 391–399.

Foa, E.B., Dancu, C.V., Hembree, E.A., Jaycox, L.H., Meadows, E.A., & Street, G.P. (1999). A comparison of exposure therapy, stress inoculation training, and their combination for reducing posttraumatic stress disorder in female assault victims. Journal of Consulting and Clinical Psychology, 67, 194–200.

Foa, E.B., & Kozak, M.J. (1986). Emotional processing of fear: Exposure to corrective information. Psychological Bulletin, 99 (1), 20–35.

Foa, E.B., & Kozak, M.J. (1998). Clinical applications of bioinformational theory: Understanding anxiety and its treatment. Behavior Therapy, 29, 675–690.

Foa, E.B., & McNally, R.J. (1996). Mechanisms of change in exposure therapy. In R.M. Rapee (Ed.), Current controversies in the anxiety disorders (pp. 329–343). New York: Guilford.

Foa, E.B., & Rothbaum, B.O. (1998). Treating the trauma of rape: Cognitive-behavioral therapy for PTSD. New York: Guilford.

Foa, E.B., Rothbaum, B.O., Riggs, D.S., & Murdock, T.B. (1991). Treatment of posttraumatic stress disorder in rape victims: A comparison between cognitive-behavioral procedures and counseling. Journal of Consulting and Clinical Psychology, 59, 715–723.

Foa, E.B., & Steketee, G. (1977). Emergent fears during treatment of three obsessive compulsives: symptom substitution or deconditioning. Journal of Behavior Therapy and Experimental Psychiatry, 8, 353–358.

Foa, E.B., Steketee, G., & Rothbaum, B.O. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. Behavior Therapy, 20, 155–176.

Gauthier, J., & Marshall, W. (1977). The determination of optimal exposure to phobic stimuli in flooding therapy. Behaviour Research & Therapy, 15, 403–410.

Grayson, J.B., Foa, E.B., & Steketee, G. (1982). Habituation during exposure treatment: Distraction vs. Attention-focusing. Behaviour Research & Therapy, 20 (4), 323–328.

Grayson, J.B., Foa, E.B., & Steketee, G. (1986). Exposure in vivo of obsessive-compulsives under distracting and attention-focusing conditions: Replication and extension. Behaviour Research & Therapy, 24, 475–479.

Greenwald, R. (1999). Eye movement desensitization and reprocessing (EMDR) in child and adolescent psychotherapy. Northvale, NJ: Aronson.

Grigsby, J.P. (1987). The use of imagery in the treatment of posttraumatic stress disorder. Journal of Nervous and Mental Disease, 175 (1), 55–59.

Hafner, J. (1978). Catharsis during prolonged exposure for snake phobia. American Journal of Psychiatry, 135, 247–248.

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(1), 113–128.

Jaycox, L.H., Foa, E.B., & Morral, A.R. (1998). Influence of emotional engagement and habituation on exposure therapy for PTSD. Journal of Consulting and Clinical Psychology, 66, 185–192.

Keane, T.M. (1995). The role of exposure therapy in the psychological treatment of PTSD. National Center for PTSD Clinical Quarterly, 5(4), 1–6.

Keane, T.M., Fairbank, J.A., Caddell, J.M., & Zimering, R.T. (1989). Implosive (flooding). therapy reduces symptoms of PTSD in Vietnam combat veterans. Behavior Therapy, 20, 245–260.

Keane, T.M., & Kaloupek, D.G. (1982). Implosive flooding in the treatment of a posttraumatic stress disorder. Journal of Consulting and Clinical Psychology, 50, 138–140.

Keane, T.M., Zimering, R.T., & Caddell, J.M. (1985). A behavioral formulation of posttraumatic stress disorder in Vietnam veterans. Behavior Therapist, 8, 9–12.

Kleinknecht, R.A., & Morgan, M.P. (1992). Treatment of posttraumatic stress disorder with eye movement desensitization. Journal of Behavior Therapy & Experimental Psychiatry, 23, 43–49.

Kolb, L.C. (1984). The post-traumatic stress disorders of combat: a subgroup with a conditioned emotional response. Military Medicine, 149, 237–243.

Lande, S.D. (1982). Physiological and subjective measures of anxiety during flooding. Behaviour Research & Therapy, 20 (1), 81–88.

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, this issue.

Levis, D.J. (1995). Decoding traumatic memory: Implosive theories of psychopathology. In W. O'Donohue & L. Kramer (Eds.), Theories of behavior therapy (pp. 180–206). Washington, DC: American Psychological Association.

Levis, D.J., & Hare, N.A. (1977). Review of the theoretical rationale and empirical support for the extinction approach of implosive (flooding). therapy. In M. Hersen, R.M. Eisler, & P.M. Miller (Eds.), Progress in behavior modification (Vol. 4; pp. 92–151). New York: Academic.

Lohr, J., Tolin, D., & Kleinknecht, R. (1996). An intensive investigation of eye movement desensitization and reprocessing of claustrophobia. Journal of Anxiety Disorders, 10, 73–88.

Lyons, J.A., & Keane, T.M. (1989). Implosive therapy for the treatment of combat-related PTSD. Journal of Traumatic Stress, 2, 137–152.

Lyons, J.A., & Scotti, J.R. (1995). Behavioral treatment of a motor vehicle accident survivor: an illustrative case of direct therapeutic exposure. Cognitive and Behavioral Practice, 2, 343–364.

Marks, I.M. (1987). Fears, phobias and rituals. New York: Oxford University Press.

Marks, I., Lovell, K., Noshirvani, H., Livanou, M., & Thrasher, S. (1998). Treatment of posttraumatic stress disorder by exposure and/or cognitive restructuring. Archives of General Psychiatry, 55, 317–325.

Marshall, W.L. (1985). The effects of variable exposure in flooding therapy. Behavior Therapy, 16, 117–135.

McCann, D. (1992). Post-traumatic stress disorder due to devastating burns overcome by a single session of eye movement desensitization. Journal of Behaviour Therapy and Experimental Psychiatry, 23, 319–323.

McNally, R.J. (1999). Research on eye movement desensitization and reprocessing (EMDR). as a treatment for PTSD. PTSD Research Quarterly, 10, 1–2.

Meadows, E.A., & Foa, E.B. (1998). Intrusion, arousal, and avoidance: Sexual trauma survivors. In V.M. Follette, J.I. Ruzek, & F.R. Abueg (Eds.), Cognitive-behavioral therapies for trauma (pp. 100–123). New York: Guilford.

Miller, B.V., & Levis, D.J. (1971). Effect of varying short visual exposure times to a phobic test stimulus on subsequent avoidance behavior. Behaviour Research & Therapy, 9, 17–21.

Montgomery, R.W., & Ayllon, T. (1994). Eye movement desensitization across images: a single case design. Journal of Behavior Therapy and Experimental Psychiatry, 25, 23–28.

Pitman, R.K., Altman, B., Greenwald, E., Longpre, R.E., Machlin, M.L., Poire, R.E., & Steketee, G.S. (1991). Psychiatric complications during flooding therapy for posttraumatic stress disorder. Journal of Clinical Psychiatry, 52, 17–20.

Rabavilas, A.D., Boulougouris, J.C., & Stefanis, C. (1976). Duration of flooding sessions in the treatment of obsessive-compulsive patients. Behaviour Research & Therapy, 14, 349–355.

Rachman, S. (1978). Fear and courage. New York: Freeman.

Richards, D.A., & Rose, J.S. (1991). Exposure therapy for post-traumatic stress disorder: Four case studies. British Journal of Psychiatry, 158, 836–840.

Rodriguez, B.I., & Craske, M.G. (1993). The effects of distraction during exposure to phobic stimuli. Behaviour Research & Therapy, 31, 549–558.

Rogers, S., Silver, S.M., Goss, J., Obenchain, J., Willis, A., & Whitney, R. (1999). A single session, controlled group study of exposure and Eye Movement Desensitization and Reprocessing in treating posttraumatic stress disorder among Vietnam war veterans: preliminary data. Journal of Anxiety Disorders, 13, 119–130.

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

Rothbaum, B.O., & Foa, E.B. (1996). Cognitive-behavioral therapy for posttraumatic stress disorder. In B.A. van der Kolk, A.C. McFarlane, & L. Weisaeth, (Eds.), Traumatic stress: The effects of overwhelming experience on mind, body and society (pp. 491–509). New York: Guilford.

Seagraves, R.T., & Smith, R.C. (1975). Treatment of neurotic outpatients by concurrent psychotherapy and behavior therapy. Paper presented at the American Psychiatric Association Conference, Anaheim, CA.

Shahar, A., & Marks, I.M. (1980). Habituation during exposure treatment of compulsive rituals. Behavior Therapy, 11, 397–401.

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

Shapiro, F. (1989b). Eye Movement Desensitization: A new treatment for post-traumatic stress disorder. Journal of Behavior Therapy & Experimental Psychiatry, 20, 211–217.

Shapiro, F. (1995). Eye movement desensitization and reprocessing: Basic principles, protocols and procedures. New York: Guilford.

Stampfl, T.G., & Levis, D.J. (1967). Essentials of implosive therapy: A learning-theory-based psychodynamic behavioral therapy. Journal of Abnormal Psychology, 72, 496–503.

Stern, R., & Marks, I. (1973). Brief and prolonged flooding: a comparison in agoraphobic patients. Archives of General Psychiatry, 28, 270–276.

Stone, N.M., & Borkovec, T.D. (1975). The paradoxical effect of brief CS exposure on analogue phobic subjects. Behaviour Research & Therapy, 13, 51–54.

Thomas, R., & Gafner, G. (1993). PTSD in an elderly male: treatment with eye movement desensitization and reprocessing. Clinical Gerontologist, 14, 57–59.

Tinker, R.H., & Wilson, S.A. (1999). Through the eyes of a child: EMDR with children. New York: Norton.

Van Etten, M., & Taylor, S. (1998). Comparative efficacy of treatments for post-traumatic stress disorder: A meta-analysis. Clinical Psychology and Psychotherapy, 5, 126–144.

Vaughan, K., Armstrong, M.S., 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.

Watson, J.P., Gaind, R., & Marks, I.M. (1971). Prolonged exposure: A rapid treatment for phobia. British Medical Journal, 1, 13.

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

Wilson, S.A., Becker, L.A. & Tinker, R.H. (1995). Eye movement desensitization and reprocessing (EMDR) treatment for psychologically traumatized individuals. Journal of Consulting and Clinical Psychology, 65, 1047–1056.

Wolpe, J. (1958). Psychotherapy by reciprocal inhibition. Stanford, CA: Stanford University Press.

Wolpe, J., & Abrams, J. (1991). Post-traumatic stress disorder overcome by eye movement desensitization: a case report. Journal of Behaviour Therapy & Experimental Psychiatry, 22, 39–43.