From Eye Movement Desensitization and Reprocessing to Exposure Therapy: A Review of the Evidence for Shared Mechanisms

C. RICHARD SPATES
Western Michigan University

ELLEN I. KOCH
University of Michigan Health System

Abstract

Posttraumatic stress disorder (PTSD) is a condition that affects people in all cultures and throughout the lifespan. Since the introduction of posttraumatic stress disorder into diagnostic practice, a great deal of research has addressed its epidemiology, pathophysiology, and psychological and physiological mechanisms, as well as its treatment. A behavioral formulation of the disorder has prevailed among leading researchers in the field, and has proved heuristic in leading to efficacious treatments, e.g., exposure therapy. Eye movement desensitization and reprocessing (EMD/R), a recently developed intervention that claims to be a departure from this formulation, has received empirical support for its efficacy. The present article reviews the evidence supporting a behavioral formulation of eye movement desensitization and reprocessing, and suggests that it shares common mechanisms of action with exposure therapy. Greater research attention should be given to examining ways of rendering exposure-based therapies for posttraumatic stress disorder more tolerant and acceptable to clients and practitioners.

Key Words  eye movement desensitization and reprocessing (EMD/R), exposure therapy, posttraumatic stress disorder (PTSD), trauma, behavior therapy, behavior analysis

Introduction

Posttraumatic stress disorder is a condition that affects individuals across the lifespan when they encounter trauma of sufficient magnitude and personal impact. It affects approximately 7% of the general population in North America, but the rates are much higher in at-risk populations. For example, estimates of the rate for residents in the New York City area 4 to 5 months following the terrorist attack on the World Trade Center ranged up to twice that expected in the general population (Tokarski, 2002; Barclay, 2002).

Posttraumatic stress disorder is marked by persistent symptoms of re-experience, hyperarousal, and avoidance behavior, especially in the presence of reminders of the traumatic episode. The disorder can be diagnosed only after a combination of such symptoms has been maintained for at least 30 days following the trauma. This, in part, recognizes the fact that although most people will undergo a transient reaction in the wake of a significant trauma, they will overcome these reactions and move on to adaptive living, e.g., meeting life’s usual demands. For those who develop posttraumatic stress disorder, symptoms of the disorder reveal a failure in their capacity to adapt related to the interference. People with this disorder are sometimes unable to concentrate or to manage strong emotions, may suffer significant sleep problems, and might experience a variety of reactions, including avoidance and re-living of the traumatic event, which may render it extremely difficult for affected people to meet the normal expectations of daily living. When these symptoms lead to impairment in social and occupational functioning and/or significant personal distress, the diagnosis of posttraumatic stress disorder is appropriate (American Psychiatric Association, 1994).

First recognized in the Third Edition of the official American Psychiatric Association (1980) diagnostic manual, the diagnosis has undergone refinement and updating since then. A plethora of research addressing its epidemiology, pathophysiology (Schnurr, Friedman, & Bernardy, 2002), and treatment (Foa & Meadows, 1997) has emerged in the intervening years. Its recogni-
tion across cultures (Perkonigg, Kessler, Storz, & Wittchen, 2000; Thulesius & Hakansson, 1999) and across the lifespan (Donnelly & Amaya-Jackson, 2002) has also received research attention. Explanatory models, both animal (Adamec, 1991) and human (Nadel & Jacobs, 1996; Van der Kolk & Fisher, 1993), have been advanced to assist an understanding of the condition. Recent investigations have also explored the underlying psychological and biological mechanisms of action of the disorder (Rauch et al., 2000), and related psychological mechanisms that may account for treatment efficacy (Keane, 1998).

It is last category of research to which the present paper is addressed. Following a brief summary of a behavior analytic interpretation of posttraumatic stress disorder, we will focus on exposure therapy for posttraumatic stress disorder and provide a detailed review of findings on a relatively new treatment for this condition called “eye movement desensitization and reprocessing” (EMD/R). Exposure therapy and eye movement desensitization and reprocessing have become the leading therapies for posttraumatic stress disorder, and are supported by most empirical research (Foia, Keane, & Friedman, 2000; Van Etten & Taylor, 1998; Waller, Mulick & Spates, 2000). While proponents of eye movement desensitization and reprocessing claim it to be a radical departure from the prevailing behavioral conceptualization of exposure therapy in general (Shapiro, 1995), in our summary of the efficacy research on both techniques, we will point to empirical data that support their shared behavior analytic underpinnings.

**Posttraumatic Stress Disorder: A Behavior Analytic Interpretation of the Disorder**

To the degree that learning implies the acquisition of a pattern of behavior or emotions as a result of experience, posttraumatic stress disorder can be said to be the result of learning under conditions of or as the result of significant aversive conditions. These conditions may occur in the lives of individuals confronted by either planned (war, terrorism) or adventitious (natural disaster, automobile crashes) occurrences. At the core of posttraumatic stress disorder is the continued unintentional evocation of stress reactions that first arose in the traumatic context, but which continue long after the traumatic event has ceased. In essence, the strong emotional, behavioral and physiological reactions come to be under the control of trauma-associated stimuli, and for these individuals, are difficult to extinguish in the course of ordinary living. Barlow (1988) has referred to similar conditioned reactions as “false alarms”.

The variables relevant to the acquisition of posttraumatic stress disorder for any given individual can range from subtle to explicit ones. For example, some individuals during the course of a trauma engage a reaction known as peritraumatic dissociation (Braun, 1988), that is, they lose awareness of details surrounding the trauma and may report a concurrent subjective experience of numbing, characterized by loss of sensitivity in certain areas of the body, or the failure to experience expected emotions. In some people, these dissociative experiences reach the level of depersonalization, whereby they report a subjective experience of total disconnection from their physical bodies (Brett, 1996; Spiegel, 1988).

Having such dissociative reactions occur during a traumatic event is predictive of later psychopathology in the form of posttraumatic stress disorder (Bremmer & Brett, 1997).

In another type of symptom associated with posttraumatic stress disorder, the person’s behavior comes under the control of almost unnoticeable features of stimuli associated with the trauma, such as when a motor vehicle crash victim subsequently displays a startle reaction to a subtle odor or the flash of a color that first appeared in association with the accident. The individual will sometimes be unable to account for the source of the reaction, especially if it first appears at a time distant from the accident. The person may report it as an unexplained modest to severe discomfort (i.e., arousal), or simply seek to escape or avoid the situation in which the stimuli arise (Herman, 1992).

At the opposite end of the continuum, some responses are quite vigorous, with quite explicit associated stimuli. For example, accident victims who witness a televised rendering of a car crash or an actual car crash may experience a major flashback to the scene of their own accident, autonomic hyperarousal, and a concurrent tendency to escape the situation. This hyperarousal may persist for days or weeks after the reminder. Another example is when combat veterans, hearing the sound of a civilian helicopter overhead, engage in self-protective behaviors reminiscent of their war-related survival behavior. Such reactions are more likely after a considerable period of quiet in which no reminders have emerged.

Apart from the emotional experience of fear, which is central to this disorder, other emotions may arise, which are secondary to the persistence of complex symptoms and resulting interference. When unable to return to their normal way of functioning, some individuals develop a major depressive disorder in addition to behavior symptomatic of posttraumatic stress disorder (Keane & Kaloupek, 1997; Silove, Sinnerbrink, Field, Manicavasagar, & Steel, 1997). In essence, they “give
up,” and are unable to derive pleasure from customary activities in which they once took part.

Co-morbid depression with posttraumatic stress disorder has been documented in upwards of a third to nearly two-thirds of diagnosed cases (Keane, Taylor, & Penk, 1997; Blanchard, Hickling, Taylor, & Loos, 1995; Paunovic, 1999). This pattern has led some investigators to wonder if the two disorders really represent a single condition, rather than two distinct disorders (Constans, Lenhoff, & McCarthy, 1997; Neria & Bromet, 2000).

Several other co-morbid conditions have been documented (Brady, 1997). A leading co-morbid disorder is alcohol abuse (Keane, Gerardi, Lyons, & Wolfe, 1998), which has been diagnosed in a large percentage of posttraumatic stress disorder cases. This is believed to serve the function of self-medication for the associated distressing anxiety.

In short, the vigorous symptomatic behavior and emotional reactions of an individual diagnosed with posttraumatic stress disorder are often under the control of either subtle or explicit stimuli which acquired such control in the moments of the traumatic experience or in the enduring wake of symptom activation thereafter. As such, the goal of therapy for these individuals is to accomplish extinction of such control, and, if maladaptive behaviors have been acquired in an attempt at coping with the distressing symptoms, the replacement of these with more adaptive, less self-destructive behaviors.

Treatment of Posttraumatic Stress Disorder: Empirically Supported Interventions

The first systematic review of treatments for posttraumatic stress disorder appeared in an article by Solomon, Gerrity, and Muff (1992), in which they reviewed the published literature in order to identify those psychological and pharmacological treatments that appeared to have demonstrated efficacy. Solomon et al.’s (1992) conclusion was that behavior therapies were more efficacious than pharmacological therapies, and that, among behavior therapies, exposure-based therapies were more efficacious than psychodynamic and other non-behavioral interventions.

With the advent of meta-analytic reviews, Van Etten and Taylor (1998) produced the first comprehensive meta-analysis of treatments for posttraumatic stress disorder. By the time of their review, however, a fair amount of evidence had accumulated in support of a new treatment, eye movement desensitization and reprocessing (EMDR). That treatment and exposure therapy were identified as the two treatments for this disorder that had the most consistent empirical support (Van Etten & Taylor, 1998). Addressing roughly similar literature as the Van Etten and Taylor (1998) review, Waller et al. (2000)’s meta-analysis reached the same conclusions and, in addition, evaluated the “quality” of the research carried out on eye movement desensitization and reprocessing and exposure therapy. Although popular debate at the time (e.g., Lohr, Tolin, & Lilienfeld, 1998) seemed to suggest that research on eye movement desensitization and reprocessing was of lesser quality, as reflected in a number of research “gold standards” (Foa & Meadows, 1997), Waller et al. (2000) concluded that the research was of comparable quality, both in terms of the “gold standards” and in terms of the size of effect achieved for the respective treatments (see Table 1).

Spates, Waller, and Koch (2000) suggested that, if attention were focused on the substance of the research, rather than on the founder of the new technique and the manner in which it was introduced, there was every reason to believe these two interventions shared common mechanisms of action. Further, these authors suggested that the field could benefit greatly from improvements in the user-friendliness of exposure-based interventions for posttraumatic stress disorder, because evidence suggested that the dropout rates remain unacceptably high for these treatments, and that they were not extensively adopted by practitioners, despite their demonstrated efficacy (Zayfert, 2000).

Despite this shortcoming, both exposure therapy and eye movement desensitization and reprocessing for posttraumatic stress disorder have been supported by sufficient empirical evidence to be identified by the American Psychological Association’s Task Force on the Identification and Dissemination of Efficacious Treatments, as “empirically supported”. They are the only two such interventions for posttraumatic stress disorder so identified.

In the remainder of this paper, we review evidence from our laboratory that implies that there is a behavioral foundation for both of these treatments, and we argue the case that they may simply be variations of the same intervention. Finally, we support Spates, Waller, and Koch’s (2000) call for additional research examining ways in which these and related treatments can achieve greater tolerance and acceptability by patients and utilization by therapists.

Exposure Therapy: A Basic Summary

Since the late sixties, exposure therapy for the treatment of posttraumatic stress disorder, formulated either as an adjunct therapy or as a stand-alone treatment for trauma victims, has been variously referred to as “direct
therapeutic exposure” (Boudewyns, Hyer, Woods, Harrison, & McCranie, 1990), “flooding” (Keane & Kaloupek, 1982), and “implosion therapy” (Stampfl & Levis, 1967; Boyd & Levis, 1983). In the early nineties, it was re-introduced by Foa and her colleagues (Foa, Rothbaum, Riggs, & Murdock, 1991), and, designated as “prolonged exposure,” has been utilized most extensively in the treatment of civilian traumas, especially rape victims.

The common denominator across these various exposure-based techniques is the client’s direct confrontation of the feared situation until such time as reports of subjective anxiety are significantly reduced.

The treatment is explained behaviorally as accomplished by the extinction of arousal and escape behaviors that comprise the targeted disorder. This is done by repeated presentation of conditioned aversive stimuli, while encouraging alternative responses that do not involve avoidance or escape. In addition to its use for treatment of posttraumatic stress disorder, exposure therapy has been used with almost every known anxiety disorder, with at least modest success. The technique has undergone an evolution over the years, in which it has become less therapist-dictated, and the results have proved more efficacious over time.

The lower half of Table 1 lists most of the well-
controlled research studies that have investigated exposure therapy for posttraumatic stress disorder, along with the number and total quantity of "gold standards" for outcome research associated with each investigation. As can be seen, the work has been prodigious; the quality of the research is reasonably good. There is little or no debate regarding the behavioral foundations of exposure therapy, although there has been a constructive debate as to the role of emotional processing versus cognitive processing and the role of physiological response systems (e.g., Lang, 1979; Foa & Kozak, 1986; Barlow, 1988).

Eye movement desensitization and reprocessing, which was introduced by Shapiro (1989, 1991) as a treatment for traumatic stress, entails several unusual procedural features, which Shapiro (1991) claimed were responsible for the positive outcomes. For example, positive outcomes were said to be achieved in a single treatment session. Shapiro (1991) also declared that eye movement desensitization and reprocessing represented a "new" paradigm, which was a significant departure from the conceptual model of exposure therapy. Among the features designated as essential to treatment outcome with eye movement desensitization and reprocessing was the systematic induction of saccadic eye movements while clients were recalling elements of a pivotal traumatic experience. At the time, no theory existed to account for these dramatic claims or to justify these procedures.

Eye Movement Desensitization (EMD) and Reprocessing: A Review of the Evidence

In the next few years immediately after the introduction of eye movement desensitization and reprocessing (Shapiro, 1989) 1, much of the available evidence supporting it was comprised of case studies (Kleinke, Morgan, 1992; Lipke & Botkins, 1992; Marquis, 1991; McCann, 1992; Puk, 1991, Shapiro, 1989; Wolfe & Abrams, 1991). This early work was criticized by Herbert and Muser (1992) as lacking essential features of outcome research, such as random assignment, use of standardized measures, and appropriate control procedures. In short, although the technique was interesting in terms of these findings, they were more of the order of testimonials, and did not supply strong experimental evidence regarding efficacy.

Beginning around 1993, controlled investigations on this topic began to be published. Much of their focus centered on dismantling the procedure to determine which of the treatment components were necessary. This work was driven by the procedural element of inducing rhythmic bilateral eye movements, which, although many investigators considered it to be rather unusual, Shapiro (1991) had suggested was responsible for the observed outcomes. No existing theory could account for the contributions of this element, and, further, the prevailing evidence regarding interventions for posttraumatic stress disorder was more clearly consistent with a behavioral formulation of the condition (Keane, 1998).

Renfrey and Spates (1994) assessed the efficacy of eye movement desensitization treatment with and without the eye movement component. This dismantling study utilized a standard treatment intervention (eye movement desensitization) and two comparison interventions (light-bar facilitated eye movements and a fixed gaze on a non-moving light stimulus at the center of the same light bar). The therapist participating in the study had received formal training in conducting eye movement desensitization. Assessments occurred before and after treatment and in one follow-up session (after intervals ranging from 30-90 days).

Twenty-one participants, diagnosed at pretreatment with full posttraumatic stress disorder, using a standardized structured interview, and all of whom were currently experiencing intrusive symptoms, were randomly assigned to treatment conditions based on gender. Potential participants were excluded if they demonstrated significant psychotic or paranoid thinking, or had experienced the traumatic event within the most recent three months, or if they reported current or anticipated financial or social benefits that would terminate upon successful treatment. Participants had experienced a variety of traumatic events; 7 participants had complicated posttraumatic stress disorders (Herman, 1992).

Treatment lasted for up to 6 sessions; the treatment did not attempt to limit the number or character of memories addressed. The dependent measures administered at pretreatment and follow-up sessions included: (a) the Clinician-Administered PTSD Scale (CAPS), (b) the Impact of Events Scale (IES), and (c) the Symptom Checklist-90-Revised (SCL-90-R). At the first and last treatment sessions and at follow-up, an assessment was also completed for positive and negative cognitions, including: (a) subjective units of distress (SUDs), (b) validity of cognition (VoC), and (c) heart rate reactivity (target heart rate minus baseline heart rate). In addition, any change in posttraumatic stress disorder status was recorded at follow-up.

The participants in the Eye Movement Desensitization, Light Tracking, and Fixed Eye conditions required 3.9, 4.3, and 5.4 sessions, respectively, for treatment, with no statistical differences among groups in the number of sessions. For all groups, the results revealed a sig-
significant reduction in mean heart rate reactivity and subjective units of distress from pre to post assessment, and a significant positive change in the validity of the desired cognition. Significant improvement was found from pretest to posttest on all standardized dependent measures used (the Impact of Events Scale, the Symptom Checklist-90-Revised, and the Clinician-Administered PTSD Scale). No differences were found between groups, nor were there any interaction effects. The significant changes from pre to post assessment were maintained at follow-up (30-90 days). At follow-up, 18 participants no longer met posttraumatic stress disorder criteria. (See Figure 1.)

Renfrey and Spates' (1994) study had a small sample, including persons who had suffered incest, combat, auto accidents, rape, non-rape physical assaults, and childhood physical and emotional abuse, which reflected the generalized recruitment strategies utilized. However despite this apparent shortcoming, the findings suggest a strong effect of the treatment for chronic posttraumatic stress disorder symptoms.

In an attempt to replicate the primary findings concerning eye movements, and to determine if the findings would generalize to a more modestly traumatized group, Foley and Spates (1995) conducted another dismantling study. This study involved 40 college students with public-speaking anxiety who had suffered at least a moderate traumatizing experience (judged using the Anxiety Disorders Interview Schedule- Revised; DiNardo & Barlow, 1988) in relation to public speaking. Participants were randomly assigned (10 per group) to one of four conditions: (a) standard eye movement desensitization and reprocessing, (b) an eye movement desensitization and reprocessing-like procedure with eye movements replaced by a bilaterally presented audio stimulus, (c) an eye movement desensitization and

Figure 1. Results from Renfrey & Spates (1994). A=Clinician-Administered PTSD Standard (Z) Scores: Pretest and follow-up; B=Heart Rate Reactivity (target heart rate-baseline heart rate) : Pretest, posttest, and follow-up; C=Impact of Event Scale Scores: Pretest and follow-up; D=Subjective Units of Distress at pretest and follow-up.
reprocessing-like procedure with the participant’s eyes resting on their hands, and (d) a no-treatment control condition. In the no-treatment condition, participants reported to the initial pretest session and follow-up sessions for assessment purposes only. That is, no placebo or contact-only treatment was offered. Treatment participants received one or two treatment sessions; the therapist was institute-trained in conducting eye movement desensitization and reprocessing therapy.

Participants completed the assessments at pretest and posttest, and at a one week follow-up. The following measures were utilized: Personal Report of Communication Anxiety-24 (PRCA-24), Personal Report of Public Speaking Anxiety (PRPSA), and the Behavioral Assessment of Speech Anxiety (BASA). These are all standardized self-report measures used in evaluating public speaking anxiety and the resulting behavioral problems. In addition, heart rate reactivity was measured, along with therapist’s and clients’ ratings of the treatment effects. The Anxiety Disorders Interview Schedule-Revised (ADIS-R), a structured clinical interview for rendering a formal diagnosis, was completed at pretest to assess diagnostic status. Individuals who endorsed symptoms related to public speaking anxiety, with a previous speech-related traumatic event and at least moderately intense physical symptoms, were included in this study. Subjective distress and the validity of cognitions associated with client change during treatment were also monitored as per the eye movement desensitization procedure.

All treatment groups improved significantly as measured on the Personal Report of Communication Anxiety-24, the Personal Report of Public Speaking Anxiety, and the Behavioral Assessment of Speech Anxiety scores, as well as on post-treatment ratings of subjective units of distress and the validity of cognition. There were no differences among the active treatment conditions. The control group did not change significantly over time on any measure. All treatment improvements were maintained at the one-week follow-up. No significant change in heart rate reactivity occurred over this time for either the active treatment or control groups. There was a trend for participants to improve on the Behavioral Assessment of Speech Anxiety even when they did not receive formal treatment, which suggests that a practice effect may have partially contributed to the outcomes on this measure (see Fig. 2). This is possible insofar as all groups, including the no-treatment control participants, were required to provide a public speech sample at pretest and follow-up sessions,
during which time heart rate was monitored.

The Eye Movement Desensitization and Reprocessing and Eyes Resting groups were rated as significantly better for treatment effectiveness than the no-treatment control condition. The Eyes-Resting treatment was rated as significantly better than the Audio Stimulus intervention. Clinically significant improvements were found in the Personal Report of Communication Anxiety-24 scores at the 1-week follow-up in that participants reports that they were functioning within the normal range on that measure after treatment compared to pretreatment.

Renfrey and Spates’ (1994) study provided further support for the position that eye movements are not an essential component of the eye movement desensitization and reprocessing treatment procedure. Additionally, their results suggested that the act of giving a public speech in the course of treatment might contribute to improved performance on the post assessment of Behavioral Assessment of Speech Anxiety as well as on a standardized measure of public speaking anxiety. The brief follow-up period (1 week) used limited conclusions regarding the durability of the intervention.

If eye movements are not essential features of eye movement desensitization and reprocessing, then it is possible that the mechanism of action of eye movement desensitization and reprocessing is much like that of exposure therapy. In other words, it is possible that, during the course of eye movement desensitization and reprocessing treatment, participants undergo extinction or habituation (or both), which weakens the control exerted by stimuli that are reminders of their trauma-related experiences. The critical feature of such an extinction operation would likely entail sustained confrontation of the reminders, while the participant fails to or is prevented from reacting in customary symptomatic fashion, during which time the participants’ anxiety is reduced and alternative behaviors effectively acquired. Alternatively (or additionally), the mechanism might entail, as suggested by Barlow (1988) in relation to panic treatment, the substitution of an alternative action tendency (response) in the presence of these triggering stimuli, thus establishing new behavior under the control of these once aversive stimuli. From a behavior analytic perspective, either analysis might lead to asymptomatic behavior and decreased arousal. If this is true, then one question is whether it matters whether the confrontation occurs through the verbal/vocal presentations of reminders (as is the usual situation in behavior therapy) or whether alternative means (e.g., production of textual stimuli) could function as effectively for achieving extinction.

To investigate the above question, Largo and Spates (2002) utilized a pretest-posttest comparison group design to evaluate the possibility of conducting exposure treatment in a written modality. The study sought to determine how the outcome would compare to the outcome from eye movement desensitization and reprocessing. The presumption was that both procedures operated by the same mechanism of action so that the outcomes should be similar. Although structured writing had not been used for treatment of posttraumatic stress disorder, the intervention is well established in terms of its positive effects on health-related behavior and distressing state anxiety (Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Pennebaker, Barger & Tiebout, 1989; Pennebaker, 1993; 1998).

Largo and Spates’ (2002) study included 24 participants randomly assigned to either eye movement desensitization and reprocessing or a structured writing treatment modeled after Pennebaker (1989). The participants were offered up to three treatment sessions; both therapists were trained by Shapiro in conducting eye movement desensitization and reprocessing therapy.

Six participants met partial diagnostic criteria for posttraumatic stress disorder at pretreatment. Most of these participants were male; they were assigned to the writing therapy condition. The other 18 participants met full diagnostic criteria for posttraumatic stress disorder at pretest.

The screening measures consisted of the Computerized Diagnostic Interview Schedule (CDIS), Personality Disorders Questionnaire-Revised (PDQ-R), and Symptom Checklist-90-Revised (SCL-90-R). Individuals were excluded from participation if they met criteria for an Axis II diagnosis or Obsessive Compulsive Disorder. In addition, individuals with a history of psychotic episodes, a lack of reality-orientation, or significant paranoid ideation were also excluded. The dependent measures, completed at pretest, posttest, and 1-month follow-up, consisted of the State-Trait Anxiety Inventory (STAI) state sub-scale, Impact of Events Scale (IES), and treatment expectation rating.

A significant improvement on all dependent measures occurred for both treatment conditions; the gains were maintained at the 1-month follow-up. Both treatment conditions were equally effective in alleviating symptoms (see Fig. 3). No differences were found in the number of treatment sessions or outcome measures between participants who had had full or partial posttraumatic stress disorder diagnostic status at pretest. In addition, no correlation was found between treatment outcome and hypnotizability level or treatment expectation, two hypotheses that had been offered (Kirsch,
1990) as possible explanations for treatment outcomes with posttraumatic stress disorder-diagnosed individuals.

Largo and Spates’ (2002) results suggested that the effectiveness of exposure treatment was not specific to one modality of implementation, and that, for the participants in their study, hypnotizability and treatment expectations were not related to treatment outcome. Their results further suggested that the basic parameters of an effective intervention for posttraumatic stress disorder entail confronting the trauma memories without allowing participants to resort to their customary escape or avoidance behavior, until such time as their arousal and the tendency towards escape decreases. Conclusions from Largo and Spates (2002) are limited, however, because of the lack of long-term follow-up to determine treatment durability over time.

In another controlled experiment, Cusack and Spates (1999) addressed the question of whether the cognitive elements of eye movement desensitization and reprocessing, that is, the reprocessing component, were essential to treatment outcome. Reprocessing was added to the original procedure between the time of its introduction and 1993. No empirical evidence had been published in support of this change, and in fact, prior evidence called into question the role of cognitive elements in exposure therapy more generally (Barlow, 1988). Barlow (1988) suggested:

When more direct comparisons are undertaken, cognitive therapy does not fare as well. For example, when cognitive therapy of whatever form is compared with structured direct exposure, exposure treatments are consistently more effective (Biran & Wilson, 1981; Emmelkamp, Kuipers & Eggeraat, 1978). Of course, even the most ardent cognitive therapist would not suppose that cognitive therapy alone would outshine exposure-based treatment in a direct comparison (Ellis, 1979). But cognitive therapists do believe that cognitive therapy should make exposure-based exercises more effective and efficient. Therefore a more interesting question concerns the potential benefit of adding cognitive procedures to exposure therapy (p. 426).

This was the question addressed in the Cusack and Spates (1999) investigation. Twenty-seven individuals were randomly assigned to either standard eye movement desensitization and reprocessing treatment or an analogue treatment in which the identifiable cognitive elements of the standard procedure were eliminated while all remaining features were retained. Standardized...
measures were used to diagnose and assess treatment outcome, including the Structured Interview for PTSD, Impact of Events Scale, Symptom Checklist-90 Revised, and the Behavioral Assessment of Speech Anxiety. Participants were reevaluated at 1 and 2 months post-treatment.

Both treatments were equally effective in reducing symptoms of posttraumatic stress disorder, including re-experiencing, avoidance, and hyperarousal (see Fig. 4).

Direct observation of anxiety-related behavior during the report of the participants' traumatizing experience as measured by the Behavioral Assessment of Speech Anxiety also showed significant reductions that were of equal magnitude for both interventions. Not shown in Figure 4 are similar reductions for self-reported subjective units of distress and depression. Both interventions also led to improved cognitions as reflected in Shapiro's measure of validity of cognitions, despite the explicit cognitive elements of the therapy having been eliminated in the eye movement desensitization treatment procedure. Cusack and Spates (1999) concluded that cognitive elements play no role in enhancing the measured effects for these traumatized individuals, either immediately or by at two-month follow-up.

In the final study to be reported here, Baranyai, Burnette, and Spates (1994) asked whether saccadic eye movements could stimulate a counter-anxiety reaction like relaxation, on the theory that a "not very well understood" super-desensitization process might explain the observed effects of eye movement desensitization and reprocessing. In other words, their question was whether any independently measured autonomic correlates of saccadic eye movements might produce decrements in customary measures of autonomic nervous system activity.

Specifically, non-traumatized individuals were subjected to repetitive saccadic eye movements in a pattern identical to that involved with eye movement desensitization and reprocessing, for a period of approximately 1 hour, under laboratory conditions, while electromyographic response (EMG), heart rate (HR), muscle tension (MT), and respiration rate (RR) were measured. Participants were college students who did not report experiencing a significant trauma and who had had no reported trauma in the past 6 months. They were randomly assigned to either a saccadic eye movement condition (EM) or a non-eye movement condition in which they sat with an experimenter in the same lab space as participants in the eye movement condition. They were also asked to report on positive and negative moods.
along a uni-dimensional scale from 1 to 10, with higher scores indicating greater amounts of the indexed mood, e.g., boredom, happiness, and relaxation.

The findings revealed no differences between the eye movement and non-eye movement groups on any measure except boredom. The non-eye movement group reported significantly greater boredom than did the eye movement group. In one sense, this finding served as a validity check for an intuitive expectation, given the experimental arrangements.

Overall, in this series of investigations, no autonomic effects due to eye movements were found. The cognitive elements of the intervention did not contribute to the observed effects in subjective reports, standardized measures, or behavioral observations. The eye movements did not contribute to the observed physiological and standardized psychological measures, nor to subjective reports. And, finally, comparable outcomes were noted whether participants engaged in standard eye movement desensitization and reprocessing or in structured writing as a means of confronting their traumatic experiences in the course of treatment. These observations strongly suggest that a shared mechanism of action accounts for the effect of both exposure and eye movement desensitization and reprocessing treatment.

Shared Mechanisms

Litz and Keane (1989) proposed:

Several of the defining features of posttraumatic stress disorder are symptoms that reflect problems related to perception, attention, and memory processes (hypervigilance, flashbacks, nightmares, psychogenic amnesia, and concentration difficulties). Although there have been attempts to explain such phenomena through facets of cognitive psychology, little empirical work has been completed to confirm or explicate such processes in PTSD (p. 243).

To date, the most parsimonious explanation for most of the symptoms of posttraumatic stress disorder is provided by a behavior analytic account like that offered in the introduction to this article. In our view, the problems are best viewed as entailing maladaptive stimulus control. It is likely, though it is yet to be confirmed empirically, that this maladaptive reaction results in part from initial efforts at avoidance, either deliberate or involuntary.

In support of this position, the published literature confirms that individuals who engage in peri-traumatic dissociation (a type of avoidance reaction) and those who are depressed at the time of trauma onset (a condition of near-total avoidance) are at high risk for the development of posttraumatic stress disorder (Blanchard et al., 1996; Bremmer & Brett, 1997). What is learned under such avoidance conditions is not likely to bear a clear or exclusive relation to the external events unfolding during the trauma. Many sources of stimulation arise via sense modalities throughout the body, including touch, sound, smell, and proprioception, as well as private images of uncertain dimension. Subsequent fear-related responses to these sources of stimulation are what define or give structure to posttraumatic stress disorder.

That the controlling relations governing such responses do not undergo extinction in the months following the trauma makes them interesting from the perspective of attempts to ameliorate the disorder. For most individuals, it seems that “life” (i.e., everyday experience in the natural environment) provides sufficient opportunities to enable them to overcome any tendency toward the long-term maladaptive learning that constitutes posttraumatic stress disorder. For those who go on to develop the disorder, it becomes necessary to impose a therapeutic structure within which re-learning can take place, that is, eliminating maladaptive controlling relations (conditioned but false threats) and replacing them with more functional relations.

Such a structure is provided by behavior therapy in the form of exposure interventions, which essentially attempt to reproduce a critical mass of stimulus features associated with the trauma through revivification of trauma reactions in a safe environment. This method assures maximum replication of private sources of stimulation that may exert subtle control over posttraumatic stress disorder symptoms. By constraining the person’s responses in this situation to those specified by the therapy process, the essential focus is on the substitution of alternate non-dysfunctional responses to these once avoided/escaped sources of stimulation. Whether nondysfunctional responses entail simply observing one’s emotional reactions as in image habituation training, or engaging in active (dysfunctional) response-prevention while the reminder stimuli are evoked, the basic process is the same. As suggested by Barlow (1988), “prevention of behavioral responses (including facial expressions) associated with fear and anxiety, and the substitution of action tendencies associated with alternative emotions, may account for the effectiveness of this (exposure) technique,” (p. 313).

This mechanism seems equally as applicable to eye movement desensitization and reprocessing as it is to exposure therapy. The evidence from the present review suggests that many features of eye movement desensitization and reprocessing treatment play no essential role in the outcome, and that what is left after dismantling
the components of the treatment are core elements of exposure therapy, administered in a dosed fashion, rather than continuously, as is more typically done with exposure therapy. Both interventions, as indicated, have been shown to be effective (Foa et al., 1991; Rothbaum, 1997; Wilson, Becker, & Tinker, 1995) and durable (Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1998; Wilson, Becker, & Tinker, 1997).

This having been said, it is important to examine another feature of both eye movement desensitization and reprocessing and exposure therapy in pointing the direction for future research. This feature concerns the acceptability of exposure therapies to the persons receiving and the therapists implementing the techniques.

Recommendations for Future Research

Zayfert (2000) presents data that suggest that clinicians and patients do not tolerate exposure therapy for posttraumatic stress disorder. "Despite the significant empirical support, ET remains an underutilized treatment modality for posttraumatic stress disorder, even among clinicians trained to implement the procedure," (Zayfert 2000, p. 168). In Zayfert’s (2000) study, the largest single category of obstacles to implementation was "Unknown," followed by “Refusal to engage the memory,” both together accounting for approximately 43% of the obstacles listed.

This should perhaps come as no surprise given that avoidance constitutes a central feature of the diagnosis and, perhaps more importantly, a central pre-morbid characteristic of those who go on to develop posttraumatic stress disorder in the first place. That they continue to avoid when presented with a therapy that requires them to confront stimulus features of their disorder seems quite natural. The challenge for behavior therapists is to engage in the necessary dissemination-related research, and to do treatment surveillance studies, in order to pinpoint ways to circumvent this problem so that a greater number of posttraumatic stress disorder-diagnosed individuals can benefit from these therapies. For example careful examination of client distress during treatment might provide a baseline against which to measure as to whether selected procedural elements could be brought to the treatment process in order to reduce dropout.

Conclusions

Since the Solomon et al. (1992) review of efficacious treatments for posttraumatic stress disorder, a great deal of research has been published on this disorder. There is every reason to believe that we will soon understand more completely the biological as well as the psychological mechanisms of the disorder. In the meantime, the empirical literature provides us with ample evidence supporting behavioral treatments that work to alleviate the suffering of persons diagnosed with the condition. The treatments are relatively uncomplicated and rely on concepts and theory that have a long history of empirical support.

Whatever features may be added to the core elements (cognitive elements, eye movement, breathing retraining, etc.), the essential feature that determines efficacy is behavioral extinction. We propose that careful attention be utilized in supplementing this core process in order to assure a yield of important effects on measured outcomes and/or acceptability to clients and therapists. In any event, the arbitrary addition of treatment elements on grounds other than their demonstrated relation to outcome or acceptability seems wasteful at least and misguided at best.

REFERENCES


Spates, C. R., Koch, E. I.: From EMDR to Exposure Therapy

Academy of Sciences, 821, 24-34.


Footnote

1) The technique was first referred to as eye movement desensitization (EMD) ; the reprocessing feature was added by Shapiro several years later.

2003.5.23 受稿、2003.10.10 受理