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Psychological and Behavioral Treatments of Post-Traumatic Stress Disorder

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Several Type 1 and Type 2 random clinical trials (RCTs) have confirmed exposure therapy (including systematic desensitization, flooding, prolonged exposure, and implosive therapy) and, to a lesser extent, anxiety management techniques (using both cognitive and behavioral strategies) as the psychosocial treatments of choice for post-traumatic stress disorder (PTSD).

Eye-movement desensitization and reprocessing (EMDR), a recently introduced approach to the treatment of PTSD, has shown some promise, although its research base to date, consisting largely of open clinical trials, is inadequate.

PHENOMENOLOGY

When individuals are exposed to life-threatening events or other catastrophic stressors, some can develop a persistent and potentially debilitating syndrome known as post-traumatic stress disorder (PTSD). The syndrome is often characterized by high levels of anxiety and depression, but its distinctive symptomatology includes (a) reliving experiences such as intrusive thoughts, nightmares, dissociative flashbacks to elements of the original traumatic event, and psychophysiological reactivity to cues of the traumatic event and preoccupation with that event; (b) avoidance of thoughts, people, and places that resemble the traumatic event, emotional numbing that is tantamount to an absence of emotional attachments, and an inability to feel the range of positive emotions that contributes to the complete human experience; and (c) symptoms of hyperarousal, including heightened startle sensitivity, sleep problems, attentional difficulties, hypervigilance, and the presence of irritability, anger, or rage (cf. *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. [*DSM-IV*], American Psychiatric Association [APA], 1994).

PREVALENCE

Post-traumatic stress disorder occurs in contemporary society at high rates. Recent epidemiological studies indicate that in the United States prevalence rates for exposure to traumatic stressors may be as high as 70% of the adult population (Norris, 1992; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993); corresponding rates for the development of PTSD indicate that at least 8% of the general population ultimately develops PTSD (Breslau, Davis, Andreski, & Peterson, 1991; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Such estimates conservatively yield 20 million cases of PTSD (current or lifetime) in the United States alone. Perhaps most important is the recognition that violence in the home and the community continues

unabated in society, that almost daily we learn of newly occurring natural or technological disasters, and that the presence of armed conflicts across the world adversely affects the lives of many more individuals and their families.

General population statistics, of course, do not provide a comprehensive view of the nature of trauma exposure and PTSD. Inspection of special groups at elevated risk provides an important perspective on the depth of the problem. To do so, we must rely again on statistics from the United States since the strongest methodological studies have been completed there. Among American women, approximately 13% have experienced a completed rape; 31% of these women (for a total of about 4% of the general population) developed PTSD following the assault (Kilpatrick, Edmonds, & Seymour, 1992).

Similarly, in the most comprehensive study of the effects of war on its combatants, the National Vietnam Veterans Readjustment Study (NVVRS; Kulka et al., 1990) found a lifetime rate of PTSD of 30% and a current rate of PTSD of 15%. Moreover, in a national study of women, Resnick et al. (1993) estimated prevalence rates of current PTSD to be 5%, with lifetime rates of 12%.

Examination of the rates of trauma exposure and PTSD across studies does yield interesting gender differences. It seems that while men report higher rates of exposure to traumatic events, women report more PTSD. Many possible explanations exist for these observed differences. Women may be more susceptible to PTSD due to a possible link to factors associated with the gender differences in depression. Alternatively, the types of stressors to which women are differentially exposed (e.g., sexual assault) may be those most strongly related to the development of PTSD irrespective of gender. More research to illuminate further the underlying factors responsible for these observations is clearly needed.

ETIOLOGY

While the occurrence of a traumatic event that evokes feelings of terror, horror, or helplessness is essential for conferring the diagnosis of PTSD, it is clearly only one of the factors associated with the development of PTSD. Clearly, not everyone exposed to a potentially traumatic event develops PTSD. To explain this, psychopathologists have evoked the concept of individual differences. The classic paradigm on the effects of life stressors, initially proposed by Dohrenwend and Dohrenwend (1981), indicates the relative importance of (a) the stimulus component of the stressor in affecting outcome, (b) the ongoing situational context within which the event occurs, and (c) the personal characteristics, including biological and psychological factors, exposure to previous traumatic events, and an individual's coping style in the development of PTSD.

King, King, Foy, and Gudanowski (1996) conducted supplementary analyses of the NVVRS data in an effort to understand more fully the etiological factors associated with the development of combat-related PTSD. These analyses identified wartime traumatic stressors as the primary contributor to PTSD, as predicted. They also found that prior exposure to traumatic events, age at the time of combat exposure, and premilitary family instability added significantly to their understanding of who develops PTSD, as did postmilitary factors such as social support, the presence of additional life stressors, and personal hardiness.

While many factors are involved in the etiology of PTSD, Sutker, Allain, and Johnson (1993) provided a brilliant example of the primary importance of trauma exposure in the development of PTSD. In a case study, two identical twins who were raised, educated, and trained together as aviator pilots, but who were discordant for combat exposure and prisoner-of-war status, were administered a comprehensive psychological and neuropsychological examination. The results indicated that the former POW reported symptoms of PTSD, several other psychiatric diagnoses, intellectual performance deficits, as well as significant cognitive defects. None of these was observed in his identical twin. The findings point directly to the pathogenic effects of war zone stress exposure.

Clearly, the etiology of PTSD is a complex phenomenon. To appreciate fully the factors involved in its development requires an understanding of the event itself, the context in which the event occurs in the life of the individual, the resources and deficits the individual brings to it, as well as the post-trauma environment. Advances in structural equation modeling have helped us to begin to understand how, in aggregate, traumatic events affect the lives of those exposed (Fontana & Rosenheck, 1993; King et al., 1996).

HISTORICAL PRECEDENTS OF CURRENT PSYCHOLOGICAL TREATMENTS

Historically, the works of Janet (1889) and Freud (1936) have most influenced the treatment of PTSD. The objectives of each approach share much in common with contemporary models of treatment, and thus current treatments owe a substantive debt to these pioneers. As presented by Fenichel (1945), there are two components to the psychoanalytic treatment of "traumatic neurosis": (a) attempts to quiet the high levels of anxiety and reactivity to the event and (b) attempts to reconstruct the details of the event with the accompanying emotional reactions to promote mastery over memories of the event.

Janet's (1889) contributions, reanalyzed and discussed frequently since the inclusion of PTSD in the *DSM* in 1980, focus on the idiographic phenomenology and the psychological symptoms often observed in traumatized patients. The inclusion of hypnosis as a viable treatment for traumatized people added a systematic and technical approach to achieving the psychoanalytic objective of reconstructing details of the event in order to achieve mastery.

In the aftermath of World War II, the use of sodium amytal interviews to recreate and to recall details of traumatic war events became increasingly widespread. Again, the objective of these interviews was to identify critical elements of traumatic war events that were not reported by the patients so that efforts to address the psychological sequelae of these events could begin. Typically, the events involved human devastation, atrocities, anxiety in the face of death and danger, and helplessness.

Today, the issue of traumatic memories has entered contemporary study of PTSD, with some denying the idea that memories of traumatic events have distinctive characteristics in comparison to memories of other life events, some challenging the nature of the constructs often invoked to explain traumatic memories (e.g., dissociation or repression), while others are vigorously holding to scientific standards recognizing that work in this area has only attained the scientific status of clinical observation. Despite the debate, which has at times reached vitriolic dimensions, it is clear that thousands of clinicians over the lengthy history of psychotherapy have noted that, during therapy, traumatized patients do indeed come to understand the nature and details of past traumatic events, whether these events occurred in childhood, as in the case of incest, or in adulthood, as with war veterans. Additional research directly on the issue of traumatic memory would contribute immeasurably to our understanding of developmental psychopathology and to the treatment of PTSD.

CURRENT TREATMENTS OF CHOICE FOR POST-TRAUMATIC STRESS DISORDER

Largely driven by the psychological and social problems of returning American Vietnam veterans, mental health practitioners established treatment programs to treat traumatic disorders (e.g., Keane & Kaloupek, 1982). Concomitantly, clinical researchers began to understand more fully the psychological consequences of exposure to sexual assault and rape (Burgess & Holmstrom, 1974; Kilpatrick, Veronen, & Resick, 1979) and to develop treatments for these problems.

At the outset, conceptual models of PTSD borrowed from Mowrer's (1960) two-factor learning theory (Fairbank & Keane, 1982; Keane, Zimering, & Caddell, 1985; Kilpatrick, Resick, & Veronen, 1981), which posits that fear and other aversive emotions are learned through association via classical conditioning mechanisms. This is the first factor in the acquisition of aversive emotions. The second factor is that individuals will do whatever is necessary to escape from and to avoid cues that stimulate these aversive emotions.

Recent theoretical models have grown to increasingly accommodate cognitive factors (Foa, Steketee, & Rothbaum, 1989; Lang, 1977; Litz & Keane, 1989), yet the treatments that evolved from the two-factor learning theory model remain among those most widely practiced and researched. Specifically, exposure therapy and anxiety management techniques have evolved as two of the most accepted treatments for PTSD patients. Although group therapies, both structured and unstructured, and psychodynamically informed psychotherapy are also widely used to treat PTSD, there are few studies in the literature that document the clinical efficacy of these approaches. However, the parallels between the objectives of psychoanalytic approaches as delineated above and those of anxiety management and exposure therapy are unmistakable (i.e., directly reducing anxiety to cues of the event and mastering the memory).

A more recent approach to treating PTSD is eye-movement desensitization and reprocessing (EMDR; Shapiro, 1989). This is essentially an atheoretical technique that was accidentally discovered to alter disturbing thoughts, feelings, and images (Shapiro, 1995). It has been applied to a broad range of psychological problems, but the only available research on its efficacy is with PTSD, so it is discussed in this chapter. Accordingly, the focus of this section of the chapter on psychological treatments of PTSD examines the data supporting the use of exposure therapies, anxiety management therapies, their combination, and EMDR.

Exposure Therapies

There is a long, rich tradition for treating anxiety disorders with one or another of the exposure therapies, whether it be systematic desensitization, flooding, prolonged exposure, implosive therapy, or the like (e.g., Barlow, 1988; Levis, 1980; Rachman, 1980). Keane and colleagues were among the first to apply exposure therapy to the treatment of PTSD. Initially, this application took the form of single-subject designed studies to document the effects of systematic exposure to memories of the traumatic events experienced by combat veteran patients (Black & Keane, 1982; Fairbank & Keane, 1982; Keane & Kaloupek, 1982). Significant reductions in anxiety and other related symptoms were noted as a function of these interventions. These Type 3 studies were instructive because they employed a consistent conceptual model of PTSD in the implementation of a treatment, utilized systematic diagnostic measures for case identification, and measured outcome in replicable, standardized ways.

This preliminary work led to the development of a randomized clinical trial (RCT; Type 1) that compared two active treatments (exposure therapy and anxiety management therapy) to a waiting list condition in the treatment of combat-related PTSD in Vietnam veterans. The results of this study were clear-cut. Compared to the wait-list condition, those patients receiving imagery-based exposure therapy showed reductions on standard psychometrics and on clinician ratings of symptoms at the posttreatment assessment. Changes on these measures were maintained at a 6-month follow-up evaluation. Interestingly, the less-intensive treatment (anxiety management) experienced so many treatment dropouts that insufficient data were available for analyses (Keane, Fairbank, Caddell, & Zimering, 1989).

In the Netherlands, Brom, Kleber, and Defares (1989) also conducted a Type 1 RCT comparing three active treatments for 112 patients who had experienced a traumatic event and were seeking psychotherapy. The treatments were exposure therapy (i.e., systematic desensitization), hypnotherapy, and psychodynamic treatment. Patients were evaluated before treatment, immediately after treatment, and at a 3-month follow-up using standardized psychometric instruments. The patients receiving exposure therapy showed a reduction in symptoms at posttest that was maintained at the 3-month follow-up. While comparable levels of change were noted in the other two active treatment groups, all three groups demonstrated greater change than the waiting list condition.

In possibly the most methodologically rigorous Type 1 RCT for PTSD, Foa, Rothbaum, Riggs, and Murdock (1991) examined exposure therapy, an anxiety management condition termed stress inoculation, supportive counseling, and a wait-list condition for the treatment of rape-induced PTSD. Measures included clinical ratings of symptoms and standardized psychometric inventories, all administered at pretreatment, posttreatment, and at a 3.5-month follow-up. The stress inoculation treatment was superior to the counseling and wait-list conditions at posttest. However, at the follow-up the patients receiving exposure therapy performed the best on measures of PTSD compared to all other conditions.

Two additional studies with combat veterans with PTSD also demonstrate the salutary effects of exposure therapy. Boudewyns and Hyer (1990) and Cooper and Clum (1989), in Type 1 RCTs, demonstrated that the addition of exposure therapy to available treatments of PTSD improved outcome for patients.

In what may ultimately prove to be the most instructive lesson for the treatment of individuals exposed to traumatic events, Foa, Hearst-Ikeda, and Perry (1995) examined the efficacy of a brief intervention to prevent the development of chronic PTSD. For women who had been recently raped, the authors developed a program based on that which worked so well in earlier trials with chronic PTSD (Foa et al., 1991). Exposure therapy figured prominently in the package of treatments assembled. This package also included elements of education, breathing retraining, and cognitive restructuring. Compared to a matched control group, this Type 2 study found that at 2 months

postintervention only 10% of the treated group met criteria for PTSD, while 70% of the untreated comparison group did.

In another Type 2 study, Frank and Stewart (1983) reported the effects of systematic desensitization on women who had been raped and who developed significant psychological symptomatology. Compared to an untreated comparison group, those women treated with graduated exposure improved most on a range of anxiety and depression symptom measures.

Richards, Lovell, and Marks (1994; Type 2) compared imaginal and in vivo exposure in a randomized study of survivors of diverse traumatic events. At the 12-month follow-up, patients reported consistent reductions in PTSD symptoms and improved social adjustment. These data further substantiate the effectiveness of exposure therapy for some patients and also suggest that improvements in symptoms are also reflected in critical domains of life functioning.

In summary, the extant data support the use of exposure therapy in the treatment of PTSD. In a previous review of this literature (Type 5 study), Solomon, Gerrity, and Muff (1992) derived the same conclusion from data available at that time. Similar conclusions were drawn by Otto, Penava, Pollack, and Smoller (1996) in a more recent review (Type 5) of the literature.

As data continue to accrue on exposure therapy, there is a distinct need for studies to examine combinations of treatments, employ measures that assess social and occupational functioning, and employ a broader range of patient types (i.e., beyond combat and rape PTSD). At this time, samples examined in many of the studies have necessarily been small, so larger samples need to be treated.

Although definitive studies have not yet been conducted in this area, clearly the available efficacy studies demonstrate the value of extending exposure therapies to PTSD patients. With a rich tradition deeply rooted in experimental psychology and tested in the treatment of many anxiety disorders, exposure therapy in its many formats should be given priority by clinicians encountering patients with PTSD.

Anxiety Management Training

Typically, anxiety management training (AMT) involves teaching patients an assortment of behavioral and cognitive strategies to enhance their capacity to manage the emotions associated with PTSD. Such skills might be relaxation training, breathing retraining, trauma education, guided self-dialogue, cognitive restructuring, and communication skills training. Some programs for PTSD have emphasized the incorporation of anger management training as a part of the skills taught to patients (Chemtob, Novaco, Hamada, & Gross, 1997; Keane et al., 1989) given the saliency of this interpersonal problem among patients with PTSD.

Studies described above by Foa et al. (1991) and Keane et al. (1989) compared exposure therapy to AMT. In the Keane et al. study, therapists were instructed to explicitly avoid discussing or processing the traumatic events of the patients in an effort to minimize the amount of exposure provided in this treatment condition. Perhaps this severe restriction led to the high rate of dropouts in the AMT condition. While the treatment appeared to be face valid in its emphasis on treating the precise symptoms of PTSD, it evidently did not provide sufficient relief to the combat veterans enrolled in this trial. However, this treatment did result in significant reductions in symptoms for female rape victims in the Foa et al. (1991) study, as discussed above. The long-term effects were just not as strong as those found for exposure therapy.

Some studies primarily employed one form of AMT rather than a multifaceted treatment package. For example, Peniston (1986) conducted a Type 1 project examining the effects of biofeedback-assisted relaxation treatment for veterans with combat-related PTSD. This form of AMT did result in significant short-term positive effects for the experimental group.

Similarly, Chemtob et al. (1997) presented data on the treatment of anger and rage in PTSD veterans. Although the sample size of this Type 2 study was small, behavioral treatment employing an anger-focused version of AMT yielded impressive reductions on psychometric measures of anger and on laboratory measures (behavioral) of anger reactivity. Importantly, these changes were associated with reductions in reexperiencing symptoms of PTSD.

Clearly, there is evidence to suggest that a skills training approach such as AMT can have a favorable impact on symptoms of PTSD. While the data are neither as strong nor as consistent as those for exposure therapy, it seems reasonable to conclude that there is some empirical validation for the use of AMT in treat-

ing PTSD. Possibly the strongest potential application for treating PTSD is within a package combining exposure therapy with AMT. There are ample precedents in the mental health literature for combining techniques to yield stronger therapeutic effects (cf. Barlow, 1988).

Combinations of Exposure Therapy and Anxiety Management Training

Resick and Schnicke (1992) have proffered a multidimensional behavioral treatment package for women who have rape-related PTSD. This package, entitled cognitive processing therapy (CPT), combines elements of exposure therapy, AMT, and cognitive restructuring. In a Type 2 evaluation of CPT, the authors compared outcomes at pretreatment, posttreatment, 3 and 6 months for a treatment group, and a wait-list comparison group (no random assignment was used). On clinician ratings and psychometric inventories of PTSD, the patients receiving CPT improved markedly. At the posttreatment assessment, impressively, none of the treated patients met criteria for PTSD.

This form of psychological treatment combination promises to strengthen the resources available to clinicians to treat PTSD. Comparisons of CPT to exposure therapy are ongoing in this research laboratory and will evaluate the extent to which CPT leads to greater improvement than exposure therapy alone. Extensions of its use to other forms of PTSD will then be warranted.

Eye-Movement Desensitization and Reprocessing

Eye movement desensitization and reprocessing (EMDR) is a technique designed by Shapiro (1989, 1995) that has received considerable attention from practitioners and academics alike. Worldwide training institutes are well attended by clinicians seeking to learn about EMDR and its use in PTSD. While Shapiro (1995) alleges that this technique is helpful for treating a range of disorders, its use is often directly associated with PTSD.

Since the first publication described the technique (Shapiro, 1989), a series of single subject cases and open clinical trials has suggested that this approach to treating the psychological effects of trauma exposure may promote recovery. From an operational perspective, the essence of EMDR seems to be (a) the evocation of trauma-relevant images and memories, (b) the psychological evaluation of the aversive qualities of these images/memories, (c) the identification (with or without therapist assistance) of an alternative cognitive appraisal of the image/memory, (d) examination of physiological reactions to the image/memory, (e) focusing on the idiographically determined positive appraisal of the image/memory, and (f) repeated sets of lateral eye movements while the patient is focusing on elements of the traumatic response.

Examining the efficacy and effectiveness of EMDR is challenging. Its mechanism of action is not, realistically, based on any contemporary theories of human behavior, learning, or cognitive science, although some discussion of Pavlovian neurophysiology is provided across publications (Shapiro, 1989, 1995). For this reason, it has been seriously criticized in the scientific literature (Herbert & Mueser, 1992; Lohr, Kleinknecht, Tolin, & Barrett, 1995). Yet, the absence of theory or a conceptual foundation is not sufficient to dismiss totally the preliminary findings of the technique. If there is efficacy, then serious scholars can assume responsibility for identifying the precise mechanism responsible for any effects observed. The questions are, therefore, is there evidence for EMDR's efficacy? and, most importantly, is EMDR more effective or efficient than tested techniques?

Probably because EMDR is not based on any existing theoretical or treatment literature, there is a surprisingly large number of case studies in the literature. Reviewing this literature comprehensively is beyond the scope of this chapter. Rather, the focus is on those studies and reviews of the literature that provide the nexus for an evaluation. Only one of the existing studies meets criteria for a solid Type 1 designation (Carlson, Chemtob, Rusnak, Hedlund, & Muraoka, 1995). In that study, EMDR was compared to biofeedback-assisted relaxation training and routine clinical care. The authors reported that at the 180-day follow-up the group receiving EMDR showed greater clinical improvement than either of the two comparison groups on self-reported, psychometric, and clinician-rated measures of PTSD.

Wilson, Becker, and Tinker (1995; Type 2) reported on the treatment of traumatic memories in a heterogeneous sample of individuals recruited through newspaper advertisements and other means. Half of their subjects received EMDR, while the remaining

half were placed on a waiting list. Of the 80 subjects in this study, less than half reached *DSM* criteria for PTSD. Following three sessions of EMDR, the treated group demonstrated a greater reduction on psychometric measures and clinician ratings of symptoms than did the wait-list subjects.

Other studies on EMDR's efficacy have been less encouraging. Projects by Boudewyns, Stwertka, Hyer, Albrecht, and Sperr (1993), Jensen (1994), and Vaughan et al. (1994) found only modest effects for EMDR. These studies all have significant methodological limitations (Type 2 studies), but they are comparable in quality and design to those projects providing the empirical support for this technique. One study by Renfrey and Spates (1994; Type 2) found no differences between a group receiving the eye movements compared to a similar group that did not, thus challenging the eye movements' role in the treatment.

In summary, much work needs to be done before research will firmly support the use of EMDR for the treatment of PTSD. Unlike exposure therapy, which has a long tradition of ameliorating a range of anxiety-mediated clinical problems and is embedded in the rich conceptual tradition of experimental psychology, EMDR falters seriously at the theoretical level and has limited scientific support. Needed are basic studies to examine the effects of eye movements (or other laterally alternating stimuli), small-scale, well-controlled efficacy studies that meet contemporary standards for treatment outcome research, and the formulation of a testable theory for the technique. Implicit in this last recommendation is the development of a conceptual model of PTSD and how EMDR attempts to correct either the deficits or excesses involved in this disabling psychological condition.

In concluding this review of EMDR, it may be valuable to delineate the possible strengths of this technique. First, EMDR does share some components of exposure therapy and cognitive therapy. These overlapping components should be identified and be made operational to promote our ability to study the approach more fully. Second, the technique builds assessment into the ongoing therapy process. Third, EMDR suggests that instructions to modify images and alter cognitive self-statements may be a reasonable treatment objective for PTSD patients. Fourth, the training programs established for technique dissemination and supervision are enviable. And, fifth, Shapiro and colleagues have always promoted the need for empirical documentation to support their perspective on treating PTSD.

The primary weakness of EMDR stems from a distinct lack of integration with existing psychological models of psychopathology and psychotherapy. While existing models may have their own failings, it is incumbent on the proponents of EMDR to postulate how their view of the problems associated with PTSD differs from other views and how this technique can allay specific targeted symptoms of this multidimensional disorder.

Future Treatments of Choice

There is much to be learned about the treatment of PTSD. To be sure, there will be no simple answers for treating people who have experienced the most horrific events life offers. Undoubtedly, combinations of treatments as proposed by Keane (1995), Foa et al. (1991), and Resick and Schnicke (1992) may prove to be the most powerful interventions.

As these treatment packages are developed, there is a need for additional work from perspectives other than the cognitive-behavioral one. Interpersonal therapy (Klerman, Weissman, Rounsaville, & Chevron, 1984) and other short-term psychodynamically informed treatments need to be developed, evaluated, and then compared to existing behavioral and cognitive-behavioral treatments to determine which patients benefit most from these methods.

Similarly, there is a need to develop psychopharmacological interventions further so that they can be compared and contrasted with effective psychological methods, both individually and in combination. The PTSD research in this area is only in the nascent stages of development.

Finally, there is an assumption of uniformity of traumatic events that strings throughout this review. While it is reasonable to speculate fundamental similarities among patients who have experienced diverse traumatic events and then develop PTSD, whether these patients respond to clinical interventions in the same way is an empirical question that has yet to be addressed. Studies posing a question such as this would be a welcome addition to the clinical literature.

The problems associated with war, rape, violence, criminal assault, and disaster do not appear to be declining. As a result, sound public policy is needed to guide society's response to survivors of these experi-

ences. Post-traumatic stress disorder in its most chronic form is a debilitating condition that affects individuals, their families, their communities, and the nation. Those who are the targets of violence may ultimately become perpetrators, thus contributing to the cycle of violence initially documented by Widom (1989). If this is so, then interventions need to be implemented to prevent the occurrence of violence (primary prevention) or to mitigate its effects once it occurs (secondary prevention). Reliance on sound empirical work to devise and implement these prevention efforts may ultimately be the best solution to the problems associated with PTSD.

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