POSTTRAUMATIC STRESS DISORDER

A Behavioral Approach to Assessment and Treatment

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ALLYN AND BACON
Boston London Toronto Sydney Tokyo Singapore

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A Division of Simon & Schuster, Inc.
160 Gould Street
Needham Heights, MA 02194

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Printed in the United States of America

10 9 8 7 6 5 4 3 2 96 95 94 93 92

ISBN 0-205-14553-7

Library of Congress Catologing-in-Publication Data

Posttraumatic stress disorder : a behavioral approach to assessment and treatment / edited by Philip A. Saigh.
p. cm. -- (Psychology practioner guidebooks)
Includes indexes.
1. Post-traumatic stress disorder. 2. Behavior therapy. 3. Cognitive therapy. I. Saigh, Philip A. II. Series.
[DNLM: 1. Behavioral Therapy. 2. Stress Disorders, Post-Traumatic. WM 170 P857]
RC552.P67P6678 1991
616.85'21--dc20
DNLM/DCL
for Library of Congress

91-1953
CIP

Chapter 3

Assessment of Posttraumatic Stress Disorder

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The psychological assessment of individuals who have been traumatized by extreme stressors is a challenging and multidimensional process. It includes not only a delineation of symptoms, but also an evaluation of the nature of people's traumatic experience, their unique mode of adaptation, and their methods of coping with the often-debilitating symptoms of posttraumatic stress disorder (PTSD). The assessment is also a valuable time for the patient. It is during the initial assessment that many individuals will, for the first time, discuss their trauma with a helping professional who is capable of providing a conceptualization about the development and course of his or her unique manifestation of PTSD. The assessment of PTSD can also be considered as a collaborative endeavor between clinician and patient that requires sensitivity and empathy and provides the necessary context to facilitate the positive expectancies and motivation required for the strenuous treatment tasks ahead.

Due to the diversity of stressful events over a person's life span and the myriad ways in which people cope with traumatic events, which by definition overwhelm them, the assessment of PTSD is a complex enterprise. The clinician is required to gather a great deal of information about stress-

ful life events in the past and about the parameters of a person's past and current adjustment. This is accomplished by obtaining multiple sources of assessment data that increase the validity of diagnostic classification and treatment planning (Keane, Wolfe, & Taylor, 1987).

In this chapter we describe in detail three methods of obtaining assessment data: the structured clinical interview, psychometric inventories, and psychophysiological measurement. The goal of the assessment of PTSD is to gather data regarding (a) differential diagnosis and classification of PTSD and co-occurring or previously existing DSM disorders, (b) a functional analysis of the person's interpersonal behavior (e.g., social withdrawal), (c) an assessment of the nature of a patient's intrapersonal experiences, which often serve as targets for treatment (e.g., nightmares, intrusive trauma-related memory reactivations), (d) the delineation and prioritization of targets for treatment, and (e) decision making about appropriate treatment strategies (e.g., stress management techniques and exposure therapies). We have designed this chapter to provide the clinician with a detailed literature review about empirically validated instruments and effective assessment strategies that have utility in achieving these objectives.

We describe methods of classifying PTSD utilizing structured clinical interview formats and then offer practical guidelines for the clinician when interviewing prospective PTSD patients. This is followed by a detailed description of available psychometric instruments that measure PTSD symptoms. We then discuss psychophysiological methods that can be used as an adjunct to interview and paper-and-pencil measures in the diagnosis of PTSD. Finally, we provide the reader with several heuristics that can guide clinical decision making and the behavioral treatment planning of PTSD.

CLINICAL EVALUATION METHODS

While considerable progress has been made in the psychological assessment of PTSD (Fairbank, Keane, & Malloy, 1983; Keane, Malloy, & Fairbank, 1984), there is currently no gold standard for diagnosing the disorder. Rather, a multimethod approach, incorporating information obtained from a variety of sources, has been advocated to establish a PTSD diagnosis (Lyons, Gerardi, Wolfe, & Keane, 1989; Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar, & Weiss, 1988). The cornerstone of such an approach is the clinical interview. The clinician's task in diagnosing a patient with PTSD is to establish a link between traumatic experiences and subsequent PTSD symptomatology, to classify coexisting diagnoses, and

to determine other, associated disturbances that are troubling for the individual.

Structured Diagnostic Interviews

Several structured clinical interviews have been used in the diagnosis of PTSD. Perhaps the most widely used of these instruments is the *Structured Clinical Interview for DSM-III-R* (SCID; Spitzer & Williams, 1985). The SCID was developed for use by trained mental health professionals familiar with the DSM-III-R. The interview is divided into several sections, each of which assesses for a particular Axis I disorder. Each section of the SCID begins with an introductory statement that helps to orient the patient to a particular area of inquiry. A series of symptom-specific questions are then provided that allow the interviewer to confirm or reject that diagnostic category. The interviewer is also asked to make a judgment about the quality of the patient's self-report. Each patient response is rated as "true" (clearly representative of a particular symptom), "false" (not reported), "subthreshold" (nearly representative of a symptom), or providing "inadequate information" (insufficient data).

Several features recommend the SCID. The format of the interview is easy to follow. Suggested phrasing of questions is provided along with the DSM-III-R criteria for establishing both Axis I and Axis II diagnoses. There is also a branching built into the interview such that, if a patient denies a given key or necessary symptom (e.g., extended periods of sadness for the depression section), the interviewer can move to the next section. In this way, not every question of every section needs to be asked, saving considerable time. In addition, the clinician is encouraged to ask as many questions as necessary to determine the presence or absence of a given symptom. This feature distinguished the SCID from other diagnostic interviews. Finally, Spitzer and his colleagues provide seminars and videotaped instructions to train clinicians in the use of the SCID. (Data are presented on the reliability and validity of the PTSD sections of the SCID in the psychometric considerations section of this chapter.)

The *Diagnostic Interview Schedule* (DIS; Robins, Helzer, Croughan et al., 1981) is a lay-administered, structured interview that assesses DSM-III-R diagnostic categories, including PTSD. When the DIS was utilized in a recent epidemiological study, it estimated the prevalence of civilian-trauma-related PTSD to be 1 percent, and combat-related PTSD to be 3½ percent in the general population (Helzer, Robins, & McEvoy, 1987). Regarding the DIS's capacity to classify combat-related PTSD, the results of the National Vietnam Veterans Readjustment Study (NVVRS) indi-

cated that the DIS underestimated the prevalence of PTSD in Vietnam veterans (Kulka et al., 1988; Keane & Penk, 1989). Consequently, the DIS should be used with caution when applied to the diagnosis of PTSD until modifications are made.

The *Jackson Interview for Combat-Related PTSD* is a semistructured interview developed to diagnose combat-related PTSD and collateral difficulties (Keane, Fairbank, Caddell, Zimering, & Bender, 1985). In addition to assessing specific symptoms of PTSD, the Jackson Interview evaluates an individual's premilitary, military, and postmilitary functioning across the life span. This developmental approach permits clinicians to examine *changes* (or at least differences) in psychosocial functioning before and after the trauma.

From their premilitary history, veterans are asked about family and peer relationships, school performance and behavior, and physical health. The military history includes branch of service, years of service, duties, and frequency and intensity of combat experienced based upon the *Combat Exposure Scale* (Keane, Fairbank, Caddell, Zimering, Taylor, & Mora, 1989). The postmilitary history includes questions about job performance and family and interpersonal relationships. Veterans are also asked about the occurrence of traumatic events, significant losses, legal infractions, drug and alcohol use, and frequency and severity of specific DSM-III-R PTSD symptoms across the three time frames. These are obtained and recorded as therapist ratings.

Another structured interview that has received some empirical support in the area of PTSD diagnosis is the *Anxiety Disorders Interview Schedule* (ADIS; DiNardo, O'Brien, Barlow, Waddell, & Blanchard, 1983). The ADIS was developed to aid in the differential diagnosis of anxiety disorders. It includes sections for ruling out psychosis, major depression, and substance abuse disorders. The ADIS also contains the Hamilton Anxiety and Depression Inventories. In a recent study (Blanchard, Gerardi, Kolb, & Barlow, 1986), Vietnam veterans were independently interviewed by two clinicians using the ADIS. Interrater agreement on the diagnosis of PTSD chronic or delayed, PTSD in remission, or no PTSD was 93% (kappa = .857).

Examined from a child clinical perspective, the *Children's PTSD Inventory* (CPTSDI; Saigh, 1989a) was constructed on the basis of the DSM-III (APA, 1980) criteria for formulating a PTSD diagnosis. The instrument consists of four subtests that are scored on a dichotomous basis (i.e., 1 for the presence and 0 for the absence of symptoms). The first subtest assesses traumatization through experiential, vicarious, or verbal mediation. The second subtest assesses unwanted anxiety-evoking recollections, and the third subtest assesses general affect. Finally, the fourth subtest assesses for

divergent symptoms that were apparent before the trauma. Examined psychometrically, English, French, and Arabic versions of the Children's PTSD Inventory have been validated as based on the responses of Lebanese children. Viewed in this context, the test-retest reliability of the instrument in terms of kappa coefficients ranges from .77 to .88. The validity of the instrument as based on examiner-criterion agreements ranges from .78 to .81.

In sum, no single best clinical interview instrument recommends itself in the diagnosis of PTSD. However, there are several structured clinical interviews that, in the hands of a trained clinician, can yield reliable diagnoses (Kulka et al., 1988). Clearly, the population with which one is working will have some bearing on the choice of an instrument. For example, the Jackson Interview would be useful in evaluating PTSD in veterans but would need adaptation for use with civilians, whereas the SCID, DIS, ADIS, or CPTSDI may be easily applied. Unfortunately, the SCID and ADIS are limited in that they ask questions strictly about symptoms required for diagnostic classification and omit information regarding the stressful experience that led to symptom development. They would be valuable for diagnosis but less valuable for treatment planning.

We advocate the use of structured clinical interviews chiefly because they provide a framework by which the clinician can obtain reliable data for the targeted disorder and other concurrent psychological conditions (however, this approach is not universally recommended [Arnold, 1985; Atkinson, Sparr, Sheff, White, & Fitzsimmons, 1984]). There are several advantages for the clinician. They combine a standardized assessment method with the skills and decision making of a trained clinician. The use of structured interviews also evaluates a broad spectrum of symptoms ensuring the clinician of a comprehensive understanding of the patient's condition. This allows for enhanced reliability and at the same time creates a clinical context whereby the interviewer can explore with the patient the psychological impact of various symptoms and life events. Thus, despite the structure imposed on the clinician, the experienced clinician can bring flexibility to the interview situation.

It should be stressed that these instruments are tools intended to help structure the clinical inquiry. Structured interviews do not readily lend themselves to the kinds of functional analyses of controlling factors responsible for PTSD symptoms. They are not substitutes for skillful and detailed investigation into a person's unique problem areas. The SCID, for example, is a measurement tool for dichotomously classifying patients' adjustment problems both historically and posttrauma; it does not yield a dimensional picture of patients' traumas or their unique forms of coping over time. Finally, no structured interviews to date have response set

measures built into them. Thus, the clinician must be well trained to offset distortions from over- and underreporting of symptoms. The instrument should be administered only by a specially trained clinician.

Moreover, clinical interviewing is never limited to diagnosis and classification. A traumatized person, for example, will typically present him- or herself with an array of problem areas. Some of these problems will reflect the nomothetic and defining symptoms of PTSD, which can be readily evaluated using any of the structured instruments described above, while others will reveal the person-specific constellation of collateral difficulties that require exploration. These latter problems are likely to reflect either a patient's idiographic response to the experience of posttrauma events (e.g., self-medication; Keane, Gerardi, Lyons, & Wolfe, 1988), some exacerbation of a longstanding coping deficit, or a prior chronic, or comorbid manifestation of psychopathology (see Bromet, Schulberg, & Dunn, 1982; Kilpatrick, Best, Veronen, Amick, & Vileponteaux, 1985; Kulka et al., 1988; Solomon, Mikulincer, & Avitzur, 1988; Steketee & Foa, 1987), or an environmental deficiency of some kind (e.g., inadequate social support, see Keane, Scott, Chavoya, Lamparski, & Fairbank, 1985; Solomon & Mikulincer, 1987; Stretch, 1985; Wirtz & Harrell, 1987).

The clinician's task is further complicated in the interview in that PTSD patients will seek psychological assistance at varying points in time after their trauma, often after an extended period of effective functioning (see Keane, Litz, & Blake, 1990). Typically, some kind of life crisis situation precipitates the patient's desire for treatment. These crises initially may seem unrelated to the trauma (e.g., a dissolving marriage, loss of a loved one, loss of a job, retirement). However, after a detailed interview, the stressful life experience that prompted help-seeking is likely to have an important thematic connection to a previous traumatic event and thus serves to reactivate a network of painful memories that trigger PTSD symptomatology (Litz & Keane, 1989).

For example, a World War II combat veteran recently sought treatment after many years of effective functioning. The patient was complaining of problems with sleeping and depressive symptoms after he viewed on television the accidental gun-turret explosion aboard the battleship United States Iowa. The patient had served on a similar battleship in World War II and had witnessed a similar incident. Upon evaluation, it was clear that the patient met diagnostic criteria for PTSD.

The following guidelines are recommended as ways of increasing the reliability and validity of structured clinical interviews. These suggestions should also serve to increase a clinician's sensitivity toward traumatized patients while ascertaining information about important collateral problems.

CLINICAL INTERVIEWING GUIDELINES

Delineate the Influences of Pre- and Posttrauma History

Although converging data suggest that the nature and extent of a person's trauma predominantly account for the emergence of PTSD (Foy, Carroll, & Donahoe, 1987; Kulka et al., 1988), many associated problem areas can reflect either chronic pretrauma difficulties or some other form of learned, maladaptive, posttrauma behavior. It is essential for any PTSD interview to include specific questions about a person's early learning history as well as inquiries into any posttrauma complications (Keane et al., 1985). The goal here is to differentiate significant contributing events in each period of time that may interact in the development of both PTSD and associated maladaptive behaviors. The tracing of the temporal parameters of collateral problem areas can lead to more effective treatment planning. In determining which experiences have affected the course of an individual's disorder over time, the clinician has the additional responsibility to determine the strengths that a person brings to the clinical setting. These strengths, once identified, can be useful in treatment planning as well.

Essential areas to address in an interview for each time period (pre- and posttrauma) are: (a) Is there any history of extreme or overwhelming levels of stress, especially physical or sexual abuse? While backgrounds of abuse are frequently observed in clinic patients (Herman, Perry, & van der Kolk, 1989), it is clear that people who seek help for PTSD may have been exposed to multiple traumatic events in their lives. Information about specific events as well as how those stressors were subjectively appraised is important to gather. The use of the DSM-III-R "severity of psychosocial stressors scale" (Axis IV) is one empirical method of quantifying the extent of stressful life events (e.g., Saigh, 1989a). Questions about how previous extreme stressors were appraised and managed can provide data about a person's specific coping style. (b) What was (is) the family/home environment like? (e.g., was there any history of mental illness or substance abuse in the family? How did role models cope with stress?) (c) Is there any history of academic, social, or occupational impairment or deficits? (e.g., any antisocial behaviors?) (d) Is there any history of drug or alcohol abuse or dependence? (e) Is there any history of head injury or cognitive impairment? (f) What have been the person's relative cognitive and behavioral strengths? (e.g., what part of a person's behavioral repertoire can be augmented or enhanced in treatment?) This is particularly important informa-

tion to be identified in reference to the PTSD patient who is also depressed and socially isolated. The prompting or promoting of behaviors and activities that had formerly been mood enhancing and pleasurable can aid in the treatment of depressive affect (cf. Lewinsohn, Munoz, Youngren, & Zeiss, 1986).

Monitor Cognitive Factors

It has been noted in both clinical and research contexts that individuals with PTSD are likely to perceive and interpret their environments in characteristic and often distorted ways. It appears that attention is drawn selectively to potential threat stimuli, which in turn act as retrieval cues activating frightening trauma-related memories. Researchers have also suggested that PTSD patients are likely to exaggerate the probability of threat in their environments and experience higher levels of psychophysiological reactivity in various life situations that prompts them to look for evidence of threat in order to confirm their expectations of fear and to construct an explanation or attribution for their arousal (see Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1989; Foa, Steketee, & Olasov Rothbaum, 1989; Litz & Keane, 1989). These cognitive processes in turn facilitate the behavioral avoidance and withdrawal often seen in PTSD (e.g., Penk, Peck, Robinowitz, Bell, & Little, 1988).

Thus, each traumatized individual, depending on the nature and extent of his or her learning history, possesses a distinctive network of trauma-related memories. This network primes the cognitive processing of environmental information and biases it toward its threatening potential, which in turn, contributes to the expressed symptom picture in PTSD. Furthermore, this affects a person's ability to cope with future stressors. Finding any confirming evidence of threat also reinforces this distorted model of thinking and relating to the person's environment. These person variables are important to identify in the assessment of PTSD (Keane et al., 1989). A useful scheme that can guide clinicians' thinking about cognitive factors in posttrauma adjustment can be extrapolated from Walter Mischel's work (1973; see Evans & Litz, 1987). These are *construction competencies* (e.g., a person's general knowledge base, problem-solving abilities [Nezu & Carnevale, 1987]); *encoding strategies* (how stressful situations are appraised, or misperceived as personally threatening; see Chemtob et al., 1989; and Litz & Keane, 1989, for a discussion of information-processing factors in the development and maintenance of PTSD); *expectancies* (both outcome and self-efficacy confidence judgments in specific high-fear situations); *values and preferences* (e.g., judgments of the valence of key reinforcing and aversive stimuli; see Foa et al., 1989, for a discussion of these factors

in the development of PTSD), and *self-regulatory systems and plans* (coping style, e.g., Solomon, Mikulincer, & Avitzur, 1988; arousal management ability; characteristic self-statements).

Attention given to cognitive factors in the assessment and conceptualization of individual PTSD cases is particularly useful for those therapists who take a stress inoculation approach to the treatment of PTSD (e.g., Kilpatrick, Veronen, & Resick, 1982; Veronen & Kilpatrick, 1983). Through the active self-monitoring of characteristic modes of responding and modification of the coping repertoires (e.g., getting a patient to change self-statements and cognitive appraisals regarding trauma-related information), idiosyncratic cognitive responses in high-risk situations (e.g., a lunch date for a victim of a rape) can be specifically targeted in treatment.

Expect Comorbidity

Epidemiological and clinical research (chiefly with combat veterans) suggests that PTSD co-occurs with some other Axis I disorder in approximately 60 to 100% of cases (Helzer et al., 1987; Keane & Wolfe, in press; Kulka et al., 1988; Sierles, Chen, McFarland, & Taylor, 1983; Sierles, Chen, Messing, Besyner, & Taylor, 1986). The single most common co-occurring diagnosis is some form of substance abuse or dependence that often serves to quell intrusive cognitive experiences, promote sleep, or alleviate arousal states (Keane et al., 1988). Other common disorders include major depression, dysthymia, generalized anxiety disorder, and panic disorder.

The use of a structured clinical interview that assesses Axis I and Axis II disorders is a recommended tool for the assessment of comorbidity in PTSD. The structured interview phase of the PTSD evaluation is also an opportunity for the clinician to get a broader picture of a person regarding his or her current problems, any etiological and controlling factors responsible for those problems (e.g., family history), and previous coping or treatment efforts (e.g., the efficacy of prior psychological or pharmacological interventions, a history of suicidal or other self-destructive behavior, any history of treatment noncompliance).

Evaluate Ethnic and Cultural Factors

The most comprehensive epidemiological study of PTSD to date has been the NVVRS (Kulka et al., 1988). These researchers found some striking differences in the prevalence of PTSD among the different ethnic groups that served in combat: caucasians, 14%; blacks, 21%, and Hispanics, 28%. Although much research remains to be done on the factors that might account for these differences, this preliminary information should

begin to influence the development of assessment and treatment programs specifically geared to these minority populations.

While many treatment programs for minorities are being developed, the majority of treatment for these populations is provided in nonspecialized programs by nonminority clinicians. Several general principles must be considered in the successful evaluation and treatment of a minority person who has been traumatized. First, it is important for the clinician to explore whether the minority patient finds it difficult to talk to a clinician who does not share the same cultural background. We have found that this strategy gives permission to the patient to openly address any concerns about communication in the assessment. Second, a patient with a different cultural and ethnic background is likely to feel unable to relate well to or trust a clinician who does not share the same background. This latter factor is always present to some degree in all traumatized populations, but it is likely to impinge on the assessment process to a greater extent for minorities who are interviewed by a nonminority individual. Third, it is likely that a patient from a different culture will use a personal idiom, especially in expressing emotionally significant events. The clinician can enlist the support of the patient in helping him or her to understand the nuances of the self-report and self-representation. It is also helpful to use words that are comfortable for the patient from a different background to increase ease of understanding in a nonpatronizing way.

Fourth, a person from a nonwhite background may have learned a reporting style that is different from the "representative" sample of individuals who make up standardization samples on psychological tests. Cultural differences, for example, are critical to examine when using the MMPI (Dahlstrom, Lachar, & Dahlstrom, 1986). This necessity led Butcher and his colleagues to develop culture-specific norms for the MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989). Individuals from different cultures are likely to underreport or overreport their symptoms, which has implications for diagnosis and treatment planning.

Assess the Needs of Significant Others

Couples' and family problems are common among traumatized individuals (Carroll, Rueger, Foy, & Donahoe, 1985; Resick, Calhoun, Atkeson, & Ellis, 1981; Roberts, Penk, Gearing, Robinowitz, Dolan, & Patterson, 1982). It is important to include significant others, whenever possible, in the assessment of PTSD patients. We have found that the following assessment goals can be accomplished when a significant other or family member is invited to be part of a PTSD evaluation: (a) corroboration of patient's self-reported PTSD symptoms; (b) assessment of the treatment needs of family members; (c) provision of information and education

about the psychological aftereffects of traumatization (e.g., an explanation about the symptoms of PTSD, the role the trauma plays in the victim's [and his or her family's] life, and the reason why PTSD symptoms are likely to be expressed in certain situations); (d) reduction in any blaming or misplaced responsibility for certain problems in the home (e.g, parenting deficits); and (e) training of family members or significant others in supporting and coping with treatment efforts.

Evaluate Ongoing Litigation

Litigation frequently surrounds the events that lead to PTSD. Questions about patient's attempts to get compensation for their trauma or victimization experiences should be part of a PTSD interview. The clinician can provide a useful service by helping the patient to separate out compensation and treatment issues and make clear their role as treatment providers. A discussion of these secondary gain issues in the beginning stages of the assessment can also improve the reliability of self-report data. For a more thorough discussion of the impact of compensation seeking on assessment data, the reader is referred to Atkinson, Henderson, Sparr, and Deale (1982); Fairbank, McCaffrey, and Keane (1985); Gerardi, Blanchard, and Kolb (1989); Hyer, Fallon, Harrison, and Boudewyns (1987); Lynn & Belza (1984); and Sparr and Pankratz (1983).

Realize that PTSD Assessments Can Be Stressful

Divulging painful, often-avoided material is threatening for patients. Some patients express concerns about going "crazy" or losing control or acting violently. Moreover, there is frequently some manifestation of difficulty in trusting others as well.

Sensitivity to the stress that the assessment process can provoke for patients is especially important for those patients at risk for alcohol or drug abuse. It is important to monitor the emotional reactions of patients during the PTSD assessment process as well as to monitor the patient's urge to use substances to reduce aversive affect. The clinician will at times need to decide, along with the patient, whether it would be prudent to suspend the assessment until the patient has learned some relapse-prevention skills or provide the patient with some arousal-reducing strategies during the assessment (e.g., muscle relaxation, deep breathing, allowing the patient time to recuperate after an assessment session). Pacing the assessment process to suit the needs of the individual patient is an important task for the clinician.

The above guidelines are specifically tailored to the interview situation. They will apply equally well, however, to the administration of psychological tests that have been designed to assess PTSD.

PSYCHOMETRIC CONSIDERATIONS

This section reviews psychometric developments in assessing PTSD. Because most work in psychometric development has centered, until recently, on evaluating men who fought in Vietnam, the presentation focuses upon PTSD that is combat related. Knowledge gained from such landmark studies as Legacies of Vietnam (Egendorf, Kadushin, Laufer, Rothbart, & Sloan, 1981) and the NVVRS (Kulka et al., 1988) serve as benchmarks for guiding future psychometric development in measuring PTSD, particularly PTSD produced by exposure to civilian trauma. The review is organized to answer two questions:

1. What progress has been made in developing psychometrically based instruments for reliably and validly measuring PTSD, and how can current psychometric instruments be used in everyday practice?
2. What problems need to be resolved to improve measurement of PTSD, and how do such strategies and tactics influence the current practice of assessing PTSD?

In answering these two general questions, with a view toward improving psychological assessment, it is necessary to consider the psychometrics of PTSD measurement within the following context.

First, although psychometrics have not always been highly regarded in behavioral assessment, behaviorally oriented clinicians, in practice, do indeed use findings from traditional assessment measures, particularly when psychometric scores reflect observable behaviors or when scores are competency based. Thus, many behaviorially oriented clinicians do not eschew opportunities to integrate psychometric results with other ways of learning about patients.

Second, psychometric development of PTSD measures will lag behind clinical progress in diagnosing PTSD simply because it is far less complicated to clinically describe a phenomenon than it is to develop reliable and valid measures. Practical ways to overcome the limitations of descriptive criteria and incomplete psychometric measures of PTSD are to administer many measures in many forms over many occasions (cf. Keane et al., 1987).

Third, it is not surprising to learn that many clinicians are impatient with psychometrics. Some simply do not believe that psychometric measures of any disorder are important in devising treatment plans. Others

would rather act from clinical intuition quickly formed rather than proceed through the tedium of obtaining psychometric measures. However, the implications of misdiagnosis or misclassification for secondary gain considerations alone should encourage careful assessment. PTSD is a disorder for which financial compensation often results (as occurs in veterans compensation, civil litigation, or in product liability cases). Diagnostic accuracy is essential, not only to avoid inappropriately burdening society with unnecessary depletion of its limited resources, but also to ensure that patients are given accurate information about their psychological condition.

Fourth, assessment of any psychological disorder requires obtaining information from many different sources as well as using many different kinds of measures. This does not mean that psychometrics are any less or any more important than behavioral or other forms of information. Rather, what it does mean is that clinicians can use psychometric results for help in classifying disorders and for planning treatment.

Fifth, even though there are many strengths in the psychometric developments in measuring PTSD, this review of PTSD measures in clinical practice is written very early in the development of psychometrics in PTSD. At the outset, it must be appreciated that more research is needed. The decade of the eighties began with the promulgation of descriptive criteria for classifying PTSD (i.e., DSM-III, 1980, with DSM-III-R to follow in 1987). Most PTSD measurement was based upon adaptation of existing assessment procedures that were developed to evaluate other disorders. By the end of the 1980s, however, the picture had changed markedly: Behavioral and psychometrically based assessment procedures were constructed that precisely evaluated PTSD.

Finally, it is likely that the next battleground for establishing the validity of PTSD as a disorder will also shift in the eighties from the clinic and the hospital to the courts. Already there are many challenges to the psychometrics of PTSD in the scientific literature that can be answered only by rigorously implementing a system of classifying instruments according to their predictive validity and clinical utility (Dawes, Faust, & Meehl, 1989; Faust, 1984; Gerardi, Keane, and Penk, 1989; Swets, 1988).

Progress in Developing Psychometrically Based PTSD Measures

The development of PTSD measures has moved quickly from the promulgation of descriptive criteria in DSM-III (1980) to the development of several reliable and valid measures of PTSD. The most that any clinician had for measuring PTSD at the beginning of the 1980s was a few check-

lists, such as Figley's (1978) Vietnam Veteran's Questionnaire; Wilson and Krauss's (1985) Vietnam Stress Inventory; the Legacies of Vietnam scales (Egendorf et al., 1981). All of these instruments received some refinement over the decade, as reported in the prospective-like study of Card (1983) using the Figley scales, and in research from the Forgotten Warrior's Project (e.g., Wilson & Krauss, 1985).

However, none of the studies met essential criteria for adequately developing sound psychometric measures of PTSD. One such set of criteria for the development of reliable and valid assessment measures can be found in Denny, Robinowitz, and Penk (1987). In addition to the standard features of reliability and validity associated with test development, clinical research studies also need to supply diagnostic accuracy measures (e.g., hit rates, sensitivity and specificity statistics, with PTSD base rates among populations where PTSD diagnoses are being classified). All of these criteria must be met in any research so that trauma-PTSD links are solidly forged and not attributable to factors other than the trauma hypothesized to cause PTSD symptoms.

Few psychometrically based PTSD measures have been derived under rigorous conditions in which all of the foregoing criteria have been met and in which possibly confounding influences have been ruled out when developing PTSD measures. This section on psychometrics will focus on those PTSD measures developed under the most rigorous psychometric conditions.

The more robust adult measures of PTSD were cross-validated in the Pre-Test Validation phase of the NVVRS (Kulka et al., 1989). Table 3.1 is a table of diagnostic accuracy that permits comparison, since all of the instruments were administered to the same subjects. (Thus, this table from the NVVRS represents the only available comparison of the major (adult) psychometrically based PTSD measures administered to the same subjects.)

Impact of Event Scale. The Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) is a 15-item scale on which subjects rate the impact of a traumatic (or stressful) event. The scale is administered by having the respondent specify an event that was traumatic (or stressful), thereby leaving the respondent free to select and nominate the event that is being rated. Then the patient rates seven items that represent episodes of intrusion (e.g., "I thought about it when I didn't mean to") and eight items demonstrating avoidance symptoms (e.g., "I tried to remove it from memory").

The IES has acceptable test-retest reliability (.87) and internal consistency (e.g., Cronbach's alpha, .78 for the intrusion score and .82 for the avoidance items, with a split-half reliability correlation of 0.86). As shown

Table 3.1. Relative Diagnostic Accuracy of PTSD Measures

Measure	Percentage Correctly Classified[a]	Kappa[b]	Sensitivity[c]	Specificity[d]
Mississippi PTSD Scale for Combat-Related PTSD (Keane et al., 1988)	88.9	.753	94.0	79.7
NVVRS PTSD Diagnostic Interview (Kulka et al., 1988), DIS-based, sum of positive items	87.5	.714	95.5	72.6
PTSD Checklist (based on DSM-III-R)	84.9	.672	88.3	78.9
NVVRS PTSD DIS-like Scale, using DSM-III-R, 1987, decision rules	83.5	.639	87.2	72.6
MMPI PTSD Scale (Keane et al., 1984)	81.5	.605	90.1	68.8
Impact of Event Scale (Horowitz et al., 1979)	81.6	.565	91.7	61.8

[a]Percentage Correctly Classified is the percentage of the entire sample (true cases and true noncases) that are correctly classified by the survey measure.
[b]Kappa is a measure of the extent of agreement between two assessments corrected for the effects of chance. (Kappas above .75 are considered to indicate excellent agreement; those between .40 and .75, fair to good agreement; and those below .40, poor agreement).
[c]Sensitivity is the percentage of "true" cases that are classified as cases by the survey measure.
[d]Specificity is the percentage of "true" noncases that are classified as noncases by the survey measure.

in Table 3.1, the IES achieved good diagnostic accuracy. But, although it is able to correctly classify "true" cases of PTSD with excellent sensitivity, it is appreciably less proficient in identifying noncases of PTSD.

What also recommends the IES is that it is one of the few PTSD scales with acceptable psychometric properties in which the standardization samples were women and in which the standardization samples had experienced civilian (noncombat) traumas. The scale has also been validated on combat veterans (Kulka et al., 1988; Schwarzwald, Solomon, Weisenberg, Mikulincer, 1987; Weisenberg, Solomon, Schwarzwald, & Mikulincer, 1987).

What is less attractive about the IES is that it does not yield definitive cutting scores to specify the presence or absence of PTSD. Moreover, the IES contains few items about the fourth set of PTSD criteria: psychophysiological reactivity and arousal. Another problematic aspect of the IES is that test administration does not specify how to distinguish between traumatic levels of stressful life events and other forms of non-life-threatening stress. This deficiency can be compensated for if the examiner carefully interviews to determine whether an event meets the first criterion of PTSD as being beyond the range of ordinary human experience and being life-threatening. Perhaps the major limitation of the IES is that it does not contain any psychometrically controlled response set indicators. Again, this is not a fatal flaw, but a weakness that is readily overcome by adding psychometrically based validity indicators from other well-established tests such as the MMPI.

Structured Interviews—The SCID and DIS. Both of these instruments have already been described in preceding sections. However, it must be noted that the test developers who constructed these interviews followed well-established psychometric procedures in regard to test development. A brief note is indicated regarding their utility in diagnosing PTSD, recalling that each is a global measure yielding presence-absence PTSD classification and current and lifetime distinctions (although, in the NVVRS, Kulka et al. [1988], have now driven the SCID in the direction of a "partial" PTSD classification that goes beyond the dichotomy developed originally by Spitzer & Williams, 1985).

Kulka et al. (1988), after finding that the DIS was promising in their pretest validation study, discovered that the DIS-type instrument did not perform well in the NVVRS study. When compared to clinician's interviews, kappa for the DIS dropped into the poor range (.26). Whereas its specificity was excellent (97.9% correct identification of noncases), its sensitivity was poor (21.5% correct identification of PTSD cases). Kulka et al. (1988) have cautioned clinical researchers about the continued use of DIS-type instruments, although their cautionary remarks have not been extended to other psychiatric categories.

Whereas a DIS-type interview did not work well, at least for the NVVRS in studying combat-related PTSD (Kulka et al., 1988), the SCID lived up to its pretest validation promise in the larger National Vietnam Veterans Readjustment Study. The SCID also proved to be a diagnostically accurate instrument across ethnic groups (i.e., white, black, and Hispanic).

Thus, the SCID emerges as the preferred structured interview to be used in diagnosing PTSD. The SCID surveys all the elements comprising PTSD criteria. Its kappa coefficient was quite robust as based on comparisons between expert clinician classification and SCID NVVRS interviews (i.e., .93). The SCID also yields classification of other Axis I disorders. Recently, a section for classifying Axis II disorders was added to the interview format (but its reliability and validity are still under evaluation). Table 3.2 presents NVVRS sensitivity and specificity information about the SCID for the clinical subsample (i.e., those who met PTSD criteria in the field interviews) of the NVVRS. One significant finding from the NVVRS was that diagnostic accuracy was superior when several PTSD measures were used in combination. Such data underscore the basic recommendation advocated in this chapter—namely, using several diagnostic measures together yields greater diagnostic sensitivity and specificity.

MMPI PTSD Subscales. Two scales have been developed from an existing psychometrically sound instrument, the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1951). One is the Keane et al. (1984) MMPI PTSD subscale, and the other is the Schlenger & Kulka (1989) PTSD subscale for the recently revised MMPI, or MMPI-2, as it is

being called (Butcher et al., 1989). Both scales are derived from instruments that have built-in validity indicators, a feature that enables the examiner to determine whether or not scores are indeed valid (a feature that has not been built into the DIS, SCID, IES, or any other instrument for classifying PTSD). Moreover, reliability of the MMPI in general, and for the PTSD subscales, is excellent.

The Keane et al. (1984) MMPI PTSD subscale items were retained in the revision of the MMPI to create MMPI-2. Whereas the Keane MMPI PTSD subscale can be calculated from either the original MMPI or the new MMPI-2, the Schlenger-Kulka MMPI PTSD is obtainable only from the MMPI-2. The Keane scale contains 49 items; the Schlenger-Kulka scale contains 102 items. Neither scale is readily distorted by the face-valid, transparent nature of their items, since both scales were devised using empirical methods (i.e., the classic contrasted-group approach). It is unlikely that most test-takers would be able to say which of the 566 MMPI items comprises either scale.

The Keane et al. (1984) MMPI PTSD subscale was developed by identifying items that differentiated psychiatric patients with PTSD from psychiatric patients without PTSD (a cutoff score of 30 had been able to sucessfully identify PTSD patients in 82% of the cases examined in the original validation study). The Schlenger-Kulka (1989) scale was developed from the non-treatment-seeking combat veterans randomly identified in the stratified sample that comprised the NVVRS. As a consequence, one would expect that the Keane scale would perform more accurately with psychiatric clinical samples, and the Schlenger-Kulka scale would perform better with non-treatment-seeking groups. Actually, in practice, the Keane et al. (1984) has worked well with a wide range of samples in the many cross-validating efforts that have been published (see Penk, Keane, Robinowitz, Fowler, Bell, & Finkelstein, 1988, for an updated review of PTSD assessment using the MMPI, as well as Denny, Robinowitz, & Penk, 1987).

If there are any limitations in the MMPI PTSD subscales (after the many improvements in rewriting, restandardizing, and renorming the MMPI-2), they will probably arise from the unspecified role of civilian (noncombat) traumas and their impact in scale development. Other limitations may arise from demographic differences among subjects—such as uncontrolled ethnic and gender differences that, as yet, may not have been taken into account in MMPI PTSD scale development (or in any other PTSD scales that have been developed for other instruments). Perhaps the most complicated question to answer will be the contributions of comorbidity to MMPI PTSD scale development—specifically, the differential role of co-occurring disorders that are documented as meeting criteria before or after onset of PTSD (especially substance abuse). Many of these questions can

be answered as data analysis proceeds apace from the comprehensive results produced by the NVVRS.

A major advantage of using PTSD scales from the MMPI (and now MMPI-2) is that the MMPI has been translated into more than 100 languages. This multilingual feature of the MMPI recommends it as highly desirable and will enable investigators to study PTSD resulting from comparable civilian traumas across many cultures. The MMPI is an untapped and underutilized diagnostic procedure for studies of civilian trauma across many languages and many cultures.

MMPI configurational analysis (one example of which is the F, 2, 8 configuration first proposed by Keane et al., 1984) is still used but is not attracting as much attention as has MMPI PTSD scale development. One problem facing PTSD classification based upon MMPI configuration profile analysis (where classification is based upon original validity and clinical scales) is that no prototypical or modal MMPI profile has emerged characterizing the disorder. As examiners amass a large number of MMPI (or other instrument) profiles, one quickly finds from profile classification that no one profile appears any more frequently than any other (see Penk et al., 1988, for a fairly even distribution of frequencies across 20 major categories of MMPI codetypes, using the Gilberstadt-Duker, 1965, form of profile analysis.). As of this writing, MMPI configurational profile analysis does not appear promising—until, perhaps, cluster analyses have been conducted where potentially confounding influences in profiles have been ruled out or neutralized. Work in this area of PTSD analysis portends greater attention to the influence of comorbidities.

Mississippi Scale for Combat-Related PTSD. A useful psychometric instrument developed for measuring war-related PTSD is the Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1988). This is a 35-item scale on which subjects rate each of the items on a 5-point Likert scale. Items were generated by clinicians who had extensive experience in treating patients with PTSD. In the original standardization studies, the Mississippi Scale had an internal consistency coefficient of .94. Factor analysis of the 35 items yielded six factors—one for intrusive memories and depressive symptomatology, a second for interpersonal adjustment problems, a third representing lability of affect and memory, the fourth and fifth for registering ruminative features of PTSD, and the sixth factor for sleep problems. Validation studies have suggested a cutoff score of 107 to be used when identifying combat-related PTSD patients; this cutoff score yielded a hit rate of 90%, with a sensitivity of .93 and a specificity of .89. Alternate forms of the Mississippi scale have been developed, quite successfully, for use with female veterans and for civilians.

One limitation of the Mississippi measure of PTSD is the failure to

contain response validity indicators. Test-givers are recommending that clinicians and researchers use the Mississippi Scale with some kind of validity indicators and most certainly with some sort of cross-checking through interview or through review of records. The Mississippi can be readily improved by adding response set scales; currently, it is a face-valid measure that clinicians and researchers should interpret only when one is certain that the person responding has experienced life-threatening, traumatic events and when one has assessed possibilities of secondary gain in symptom reporting.

Table 3.2 presents NVVRS results of the better-performing tests in the diagnostic comparison trials and shows that several instruments used together are diagnostically more accurate than any one of the better instruments.

These findings, among the first to permit comparison of different PTSD measures administered to the same patients, provide a comparison of diagnostic accuracy of measures used separately and in combination. The findings are based upon 252 patients identified as meeting PTSD criteria in the epidemiological survey of a stratified sampling of more than 3,000 combat male veterans. The recommended battery of psychometric-based instruments consists of the SCID, the Mississippi Scale, and the Keane et al. (1984), along with the Schlenger & Kulka (1988) MMPI PTSD scales. The clinician should also use some scale that quantifies the nature of the traumatic experience. These are discussed next.

Combat Exposure Scales. Recently, some progress has been made in the quantification and measurement of the traumatic event itself. This development was prompted by converging evidence that the nature and extent of the trauma account for the greatest variance in etiological models of combat-related PTSD (Foy et al., 1987; Penk et al., 1981). By today's standards, early primitive scales were developed by Figley (1978), Laufer et al. (1981), Boulanger and Kadushin (1986), and Wilson and Krauss (1985). These early scales have been the source for many items used in later, more psychometrically sound scales. Foy et al. (1987) have published results of a Combat Exposure Scale (which was cross-validated using Card's [1983] *Lives after Vietnam* data—see Foy and Card, 1987). This was followed by the development of a Combat Exposure Scale for use in psychiatric settings

Table 3.2. Comparison of Separate and Combined NVVRS PTSD Diagnoses

Instrument	Sensitivity	Specificity	Kappa
Mississippi PTSD Scales	82.4	86.4	.644
SCID PTSD	81.2	97.6	.821
MMPI PTSD	81.6	87.7	.649
Any two of the above instruments combined	92.1	94.1	.832

(Keane et al., 1989), a scale with excellent internal stability and test-retest reliability.

None of these scales has built-in validity indicators, but any one may be used in conjunction with response set measures, such as the validity scales of the MMPI. Because these are self-report measures, answers to items may be influenced by respondents' biased recollection of the past or some hidden motive about present circumstances (a cry for help or compensation seeking). Assessment tactics should strive to delineate objective aspects of the traumatic stressor as well as a person's appraisal of it (see Gleser, Green, & Winget, 1981; and Wilson, Smith, & Johnson, 1985; for a conceptual scheme depicting dimensions of traumatic stress). Furthermore, independent verification of the traumatic event is a needed addition to the traumatized person's report about the traumatic event and their reactions to it.

The concept that trauma must be differentiated into component parts has guided the thinking and practice of many clinicians and researchers who are all striving toward the unfulfilled dream of eventually being able to create a taxonomy of trauma with quantifiable stress reactions (e.g., Brett & Ostroff, 1985; Gleser et al., 1981; Keane, 1989). Another excellent step has been taken in this direction by Kulka and Schlenger, with their recent creation of a 98-item War Zone Stressor Scale, differentiated for males and females, and featuring such factors as Exposure to Combat, Exposure to Abusive Violence and Related Conflicts, Deprivation, Loss of Meaning and Control, and Prisoner of War subscales. These subscales justify the need to design research that breaks down the global dichotomies of our thinking about trauma and PTSD until we can differentiate the relevant dimensions comprising the disorder.

FUTURE DEVELOPMENTS IN PTSD PSYCHOMETRICS

We will now briefly consider psychometrics of PTSD from the perspective from which problems must be resolved in order to improve the assessment of PTSD in the future.

First and foremost, clinical researchers must extend psychometrics from combat-related PTSD to civilian (noncombat) PTSD. The latest epidemiological data suggest that PTSD is about as prevalent as schizophrenia in the general population (1%, or approximately 2,400,000 cases at any point in time; Helzer et al., 1987). Intuitively, most clinicians understand that trauma caused by early sexual abuse evokes different reactions and different coping than a car accident; surviving a tornado is different from being tortured as a political prisoner. Trends in the research completed to date

indicate that each class of trauma demands its own form of special assessment. Thus it is crucial that the practicing clinician have some form of readily available psychometric device or devices that can measure PTSD from a variety of events.

Work on developing instruments to assess civilian-related PTSD is well underway (e.g., Black, Penk, Robinowitz, Dolan, Bell, Rubenstein, & Skinner, 1984). Even though the prevalence of noncombat trauma is high, few of the civilian trauma studies have approached the scope or sophistication of combat trauma studies. Nor have investigators studying psychometric measurement of civilian trauma evaluated their assessment instruments by reference to principles of diagnostic accuracy advocated here (i.e., obtaining measures of sensitivity and specificity).

The practicing clinician has two basic strategies in regard to psychometric evaluation of civilian-related PTSD. One is the use of a general-purpose, global and dichotomous measure like the SCID (suggesting presence or absence of PTSD). The other is an adjunctive measure specifically tailored for a particular form of trauma. In practice, we recommend using both approaches—that is, to begin by surveying the incidence of trauma followed by an examination of details of both the stimulus conditions as well as the person's coping response.

General PTSD instruments are just beginning to be developed. Saigh (1989) is developing an Adult Trauma Inventory that, like the IES, can be used as a general-purpose instrument for assessing civilian trauma-related PTSD. Black et al. (1984) are developing a checklist of civilian traumatic events that could be used by clinicians in varied mental health settings.

Progress has also been made in specific trauma inventories as well. Kilpatrick, Amick, Lipovsky, and Resick (1989) are developing instruments for use in criminal victimization-related PTSD, as well as adapting existing instruments such as the SCL-90 and the Fear Survey Schedule (Resick, Veronen, Kilpatrick, Calhoun, & Atkeson, 1986). They have devised an Incident Classification Interview that gathers data about the key aspects of a crime episode, akin to a trauma exposure scale. These researchers have also developed a checklist for assessing one particular kind of crime—rape (Kilpatrick, Veronen, & Best, 1985). In addition, Davidson, Fleming, and Baum (1987) have summarized the many instruments that can be used to evaluate the reactions of victims to disasters created by human failure (e.g., Three Mile Island). Green, Grace, Lindy, Titchner, and Lindy (1983) have also presented some instrumentation for assessing reactions to catastrophic environmental events. Finally, a civilian form of the Mississippi Scale was developed for use in the NNVRS.

Second, as illustrated in the instance of developing refined measures of Combat Exposure scales, psychological assessment of PTSD in the 1990s will need to feature even greater differentiated measures of specific PTSD

dimensions, with increasing attention to the separate areas of avoidance symptoms, intrusive reexperiencing symptoms and psychophysiological reactivity. From a clinical perspective, it appears that PTSD is both a chronic and a phasic disorder consisting of both positive and negative symptoms (Keane, 1989). Thus, psychometric instruments in the future should be sensitive to changes in the quality of PTSD symptoms over time. Such differentiation of measures may eventually produce a multidimensional PTSD profile (or "multiphasic" profile, if shifts in symptoms across time and events can be empirically demonstrated). Multidimensional analysis of PTSD will then permit developing a typology of PTSD. By producing a multidimensional PTSD profile, the clinical therapist may then be able to write a treatment plan that prioritizes a hierarchical list of preferred problems for treatment. Such plans may preclude the current "shotgun" approach to treating traumatized persons.

PSYCHOPHYSIOLOGICAL METHODS OF ASSESSMENT

Psychophysiological methods have played a major role in our understanding of anxiety disorders in general (Lang, 1977b) and PTSD in particular. Physiological reactivity is a salient diagnostic feature of PTSD, and assessment of this phenomenon presents the rare opportunity to obtain information on a disorder that is not reliant solely upon the self-report of the patient. The basic paradigm entails the presentation of trauma-relevant stimuli (and some neutral or control stimuli) concurrent with the measurement of multimodal response channels: the physiological response (e.g., heart rate); the self-report of arousal, often measured in Subjective Units of Distress (SUDS); and an instrumental or behavioral response (e.g., termination/avoidance of the assessment procedure once it has begun).

Despite the importance of such physiological measurement in PTSD, most clinicians are not in a position to obtain these data. For many clinicians, equipment costs and expertise required to operate and maintain the equipment make obtaining physiological measures prohibitive. Despite these apparent impediments, it may be possible for clinicians in some settings to obtain some physiological data at little cost. Blanchard et el. (1986) have suggested the use of heart rate alone, which can be obtained in any hospital setting with a simple EKG machine. Research has shown that several methods of stimulus presentation may be used (auditory, audiovisual, narrative descriptions of the traumatic event) in the assessment of PTSD. In the absence of any psychophysiological assessment capabilities, the clinician may, with the patient's consent, obtain physiological information (heart rate, systolic and diastolic blood

pressure) from medical records. There is some evidence that individuals with PTSD may be chronically hyperaroused (or hyperreactive), even in situations unrelated to traumatic events (Gerardi, Keane, Cahoon, & Klauminzer, 1989).

Numerous psychophysiological laboratory studies have been conducted with veterans with combat-related PTSD, and different paradigms have emerged. These studies are presented in detail in the following sections. It is noteworthy that despite the variety of stimuli presented (auditory, audiovisual, imaginal), the paradigm employed, and the types of control groups used, veterans with PTSD are consistently found to be more physiologically reactive to trauma-related cues.

Blanchard et al. (1982) compared 11 Vietnam veterans diagnosed with PTSD with 11 age- and sex-matched nonveterans. Subjects listened to an audiotape consisting of five trials of 30 seconds of music, 30 seconds of silence, and 30 seconds of combat sounds. The volume was increased on each trial. Results indicated that veterans experienced significantly greater increases in heart rate, systolic and diastolic blood pressure, and forehead EMG relative to nonveterans. A discriminant analysis using heart rate alone correctly classified 21 of the 22 subjects (95.5%). These effects have been replicated in several subsequent studies.

Pallmeyer, Blanchard, and Kolb (1986) assessed 12 Vietnam veterans with PTSD, 10 Vietnam veterans with no psychiatric disorder, 5 Vietnam veterans with other psychiatric disorders, 5 Vietnam era veterans with no psychiatric disorders and no combat experience, and 8 nonveterans with specific phobias. Once again, the veterans with PTSD appeared to be the most reactive to the combat stimuli. On the basis of heart rate alone, 75% of the veterans with PTSD and 100% of the combat veterans without PTSD were correctly classified. When all subjects were included in the analysis, 67% of the PTSD veterans and 86% of all the others were correctly classified. Finally, these authors examined subjects' heart rate reactivity to combat stimuli relative to their responses to a mental arithmetic task. At a cutoff of -3.5 beats per minute (bpm) (i.e., response to mental arithmetic is ≥ 3.5 bpm higher than the maximum response to combat sounds), 83.3% of PTSD veterans and 89.3% of all other subjects were correctly classified.

In a second replication, Blanchard et al. (1986) assessed 57 Vietnam veterans with PTSD and 34 Vietnam veterans with no mental disorder. Using subjects' single largest heart rate response (the change in heart rate from music to combat sounds on the same trial) and a cutoff score of 7 bpm, 88% of veterans with PTSD and 70% of veterans without PTSD were correctly classified. The authors then calculated a difference score by subtracting the heart rate response to mental arithmetic from the single largest heart rate response to the combat sounds. Using a cutoff greater

than zero, this single index correctly classified 73% of subjects with PTSD and 88% of subjects without PTSD.

In a separate research laboratory, Malloy, Fairbank, and Keane (1983) compared the heart rate and skin resistance responses of 10 Vietnam veterans with PTSD, 10 Vietnam-era inpatient psychiatric controls, and 10 normal Vietnam veteran controls. Subjects were exposed to audiovisual cues consisting of nine neutral scenes and nine combat scenes. A discriminant function analysis of four physiological measures (mean heart rate, mean skin resistance level, mean number of skin resistance responses, and mean skin resistance magnitude) correctly classified 80% of the total sample. When self-report (SUDS ratings) and behavioral (amount of tape viewed) data were included, 100% of the subjects were correctly classified as PTSD or non-PTSD.

In an excellent study designed to individually tailor the combat stimuli to the experiences of the subject, Pitman, Orr, Forgul, and de Jong (1987) exposed 15 Vietnam veterans with PTSD and 18 Vietnam veterans without PTSD to a series of 30-second audiotaped scripts. The scripts consisted of individualized descriptions of the two most stressful combat experiences recalled by each subject. The authors measured heart rate, skin conductance, and EMG from the left corrugator, lateral frontalis, and zygomatic facial muscles. Correct classifications of subjects based on psychophysiological responses to the scripts were as follows: heart rate, 64%; skin conductance, 73%; and EMG, 67%. All measures combined correctly classified 100% of the PTSD subjects but only 61% of the non-PTSD subjects.

Pitman et al.'s (1987) study determined that imaginal exposure to scripts depicting idiographic trauma cues can elicit a reliable psychophysiological response in PTSD patients. Their data suggest that a practicing clinician does not have to have specially validated and generic trauma cues to present to patients to conduct a psychophysiological assessment. Clinicians can save time and resources by simply generating individualized scripts based on the person's traumatic experience(s), regardless of the type of trauma. In addition, since Blanchard et al.'s (1986) data suggest that heart rate reactivity is the single best predictor of PTSD, a practicing clinician interested in assessing psychophysiological responsivity in PTSD may choose to employ a single channel monitor.

Finally, it should be noted that the direct measurement of psychophysiological reactivity can be used as a method of testing hypotheses about malingering in PTSD patients. But can psychophysiological reactivity in PTSD be faked? To address this question, Gerardi, Blanchard, and Kolb (1989) examined the ability of veterans to fake their responses during a psychophysiological assessment. Subjects with PTSD were asked to control or decrease their physiological responses, and subjects without the disorder were asked to increase their physiological responses to the combat

sounds. Results indicated that veterans with PTSD could not significantly alter their psychophysiological responses. However, the non-PTSD group was actually quite good at increasing their physiological responses during the combat sounds. Using heart rate accelerations alone and the 7 bpm cutoff score recommended by Blanchard et al. (1986), only two of nine veterans were correctly classified as non-PTSD. However, when baseline heart rate and heart rate change scores were considered together, six out of nine (66.7%) veterans attempting to fake PTSD and 83% of all subjects were then correctly classified.

The data that have emerged from the various laboratories described above validated psychophysiological measurement as an accurate diagnostic tool in the assessment of PTSD. Consistent findings of situationally specific fear responses to trauma-related cues have also served to confirm the cognitive-behavioral conceptualization of PTSD as a learned, trauma-related response pattern (Keane, Zimering, & Caddell, 1985). An assessment finding of psychophysiological reactivity to generalized trauma-related cues can be utilized by the behavioral clinician as data that suggest that some form of exposure treatment may be indicated to reduce this conditioned emotional response. It is to these decision-making factors in the behavioral assessment of PTSD that we now turn.

CLINICAL DECISION MAKING

The assessment of PTSD can be characterized then, not only by the types of interview-based, psychometric, and psychophysiological information obtained from a patient, but also by the decision-making strategies of the therapist (see Evans & Litz, 1987; Evans & Wilson, 1983; Kanfer, 1985). The behavioral assessor's task is to base his or her clinical judgments about a given patient on a theoretical model of PTSD that incorporates empirically derived cognitive-behavioral principles (Fairbank & Nicholson, 1987; Foa et al., 1989; Keane et al., 1985; Levis, 1980; Litz & Keane, 1989). In this regard, diagnostic, psychometric, and psychophysiological data are useful inasmuch as they aid in hypothesizing about the functional nature and controlling characteristics of a PTSD patient's unique difficulties, in helping to identify targets and strategies for treatment, and in monitoring meaningful clinical change (cf. Nelson & Barlow, 1981). Those clinical decision-making factors that affect treatment planning are discussed next.

Prioritizing Targets for Change

A clinical diagnosis of PTSD, based on DSM-III-R criteria, can direct the clinician toward nomothetic areas to be addressed in treatment. Compre-

hensive psychological treatments of PTSD usually entail multiple techniques and strategies that target specific clusters of symptoms (Keane et al., 1985). Reexperiencing symptoms may be treated with direct therapeutic exposure of traumatically conditioned cues in imagery; avoidance symptoms are primarily treated by gradually encouraging the person to increase the range of his or her interpersonal contacts and activities coupled with the application of learned coping skills. Hyperarousal symptoms are primarily addressed by training in stress management skills. However, for many patients with PTSD, there is typically some preponderance of either *positive symptoms* (reexperiencing coupled with psychophysiological hyperreactivity symptom clusters) or *negative symptoms* (avoidance behaviors, numbness, withdrawal) that can guide the choice of initial treatment strategies (cf. Keane, 1989).

Since some kind of direct therapeutic exposure or processing of trauma-related information in imagery is indicated for PTSD patients with severe positive symptoms, it is crucial to systematically assess the nature and extent of a person's trauma in a manner that can guide the course of such treatment (Fairbank & Brown, 1987; Keane et al., 1985; Keane, Fairbank, Caddell, & Zimering, 1989). Foa and Kozak (1986), in their expansion of Lang's (1977a, 1985) conceptualization of the fear network model, provide a useful scheme for assessing the nature of traumatic memories. They argue that a fear network is comprised of information about stimulus cues that elicit fear (e.g., sights, smells, sounds associated with the trauma), information about cognitive, motor, and psychophysiological responses engendered during the traumatic stressor (e.g., co-occurring thoughts, actions, affects), and information that defines the meaning of the stimulus cues and responses for the person (e.g., "Everything in life is unfair and unpredictable; I'm going to go crazy and lose control if I allow myself to think about what happened to me"). Thus it is important for the clinician to gather information about these three categories of conditioned stimuli, for they will guide the direct therapeutic exposure of traumatic memories.

In those PTSD cases in which the assessment yielded a symptom picture with a preponderance of negative symptoms (social isolation, anhedonia), a clinician might begin treatment by focusing on efforts to increase interpersonal risk taking and to fashion success experiences through in vivo exercises coupled with a skills training program. Increases in social contacts and the greater expression of affect may lead a patient to recall more details of the trauma that may then be addressed through exposure treatment.

When Is Exposure Treatment Indicated?

As mentioned previously, the systematic therapeutic processing of traumatic events utilizing systematic desensitization, flooding in imagery, or

implosive therapy has been hypothesized as a viable treatment for certain PTSD cases (Keane et al., 1985; Keane et al., 1989). Until recently, the research that has supported this thesis has been primarily case studies (Fairbank & Keane, 1982; Keane & Kaloupek, 1982; Rychtarik, Silverman, Van Landingham, & Prue, 1984; Saigh, 1986). However, Keane et al. (1989) completed a randomized clinical trial that indicated that exposure treatments can lead to considerable improvement for many PTSD patients. A recent replication by Cooper and Clum (1989) provided further substantiation of this approach. Exposure treatments, however, are rigorous and require a good deal of resources on the part of the patient and the therapist. Thus, deciding whether exposure treatment is indicated for a given patient-therapist combination is a critical task in the assessment of PTSD.

Several conditions are necessary for a therapist to consider exposure treatments. First, the patient must meet the boundary conditions of the technique (e.g., ability to imagine; see Boudewyns & Shipley, 1983; Levis, 1980). Second, the patient must be able to tolerate the intense levels of arousal associated with exposure treatment, as well as the possible increase in PTSD symptoms that occurs in the short run. In regard to the first factor, a PTSD patient should report reexperiencing symptoms and exhibit some level of anxious arousal in response to reminders of their trauma. PTSD patients appropriate for exposure treatments should be able to follow the therapist's instructions as well as clearly imagine various stimuli.

When deciding whether a PTSD patient can handle the intense levels of arousal generated during exposure treatment, the therapist should be concerned about the potential for dropouts. We have found it to be important for the patient to be in relatively good health (especially no cardiovascular disease), have a stable living environment (or some consistent and available social supports during extratherapy hours), and not be involved in substance abuse.

While no empirical data support the necessity of the above conditions for the use of direct therapeutic exposure, these decision rules are conventions that have been derived from clinical experience. One preliminary study, however, sought to delineate the manner in which expert behavioral clinicians working in the area of PTSD made decisions about the appropriateness of exposure treatments for particular types of patient presentations (Litz, Blake, Gerardi, & Keane, 1990). They found that 42% of the PTSD cases that expert clinicians treated over the years were *not* treated with exposure therapy. The following factors were used to preclude exposure treatments for these behavior therapists: 91% judged that severe levels of psychological impairment and comorbidity, such as poor cognitive functioning or severe depression, ruled out the use of exposure treatment. Concurrent personality disorder or substance abuse disorder (27% agreement), treatment noncompliance (27% agreement), unresolved life crises

(18% agreement), and poor physical health (18% agreement) were judged as additional rule-out factors.

SUMMARY AND FUTURE DIRECTIONS

This chapter has described state-of-the-art methods for evaluating the psychological status of individuals who have suffered through severe forms of stress. We have advocated the use of multiple sources of assessment data (interview, psychometric, and psychophysiological) to increase diagnostic validity as well as to aid in the accurate understanding of PTSD patients' unique form of adaptation over time. We have also provided clinical guidelines and decision-making heuristics that will help the clinician in gathering assessment data and assisting in behavioral treatment planning.

Many theoretical, empirical, and practical assessment issues remain for PTSD researchers to explore. Several of these issues were raised in the preceding sections (e.g., the need for the development of specific PTSD assessment instruments related to civilian trauma; greater attention to the special needs of minorities in the assessment of PTSD). As final comments, we add a brief discussion of future research needs in the assessment of PTSD.

One pressing need in the assessment of PTSD is for measures that assess the severity of PTSD symptoms and their impact on social adjustment. To date, the majority of instruments that have been developed to assess PTSD have used a total score to reflect PTSD symptomatology globally and categorically (e.g., the SCID, the Mississippi Scale). What is needed is structured interview-formatted and paper-and-pencil instruments that measure the subjective intensity of specific symptoms of PTSD as well as measures of the extent to which symptoms interfere in an individual's functioning, in both qualitative and quantitative terms (e.g., CAPS; Blake, Weather, Nagy, Kaloupek, Klauminzer, Charney, & Keane, 1990). Such measures will foster the gathering of data that will likely influence future definitional models of PTSD (e.g., DSM IV), and our understanding of the underlying processes of the disorder.

For example, correlating the nature of traumatic experiences and symptom severity and impact over time may lead to subtyping of the disorder (e.g., positive vs. negative symptom clusters or subtypes are likely to have distinct effects on a traumatized person's adaptation), or to the conceptual development of clinical models that describe specific types of PTSD syndromes that relate to specific types or degrees of traumatization (criminal victimization vs. natural disaster, etc.), or the analysis of the variable

nature of certain PTSD symptoms and the stable course of others. If clinicians can empirically assess the severity and impact of PTSD symptoms, they will be better able to plan treatments that would be geared toward a patient's specific manifestation of PTSD as well as the potential maladaptive effect those symptoms have on the environment (e.g., family conflict that stems from a patient's avoidance symptoms).

Another major area that needs to be explored in the future is the utility of the newly revised and restandardized MMPI in the assessment of PTSD (MMPI-2; Butcher, Dahlstrom, Graham, Tellegan, & Kaemmer, 1989). This is a particularly important issue to be explored empirically because of the proven utility of the original MMPI and its PTSD scale in the assessment of PTSD. Although preliminary research has suggested that the MMPI-2 is highly comparable to the original MMPI in its applicability to the assessment of combat-related PTSD (Litz, Penk, Walsh, Hyer, Blake, Marx, Keane, and Bitman, 1991), much remains to be explored. For example, does the MMPI-2 PTSD subscale have as high a degree of utility as the original MMPI in the diagnosis of PTSD (in combat-related and civilian-related cases)? Is the MMPI-2 any more helpful in determining the validity of self-report due to the addition of new scales that are purported to assess consistency, diligence, underreporting, or exaggeration in test-taking behavior (thus reflecting on the usefulness or validity of a patient's self-report in the diagnosis of PTSD).

Finally, measurement strategies are needed that will facilitate data collection on the course of PTSD and the psychosocial effects of PTSD as it occurs in different developmental phases. The development of generic PTSD assessment instruments and also methods to assist clinicians in disentangling the effects of an extremely stressful discrete event from a lifetime of chronic stressors will be a challenging and formidable task for future research. Success in these areas will promote both theoretical and clinical advances in the field.

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