

Treatment of Posttraumatic Stress Disorder in Rape Victims: A Comparison Between Cognitive-Behavioral Procedures and Counseling

Edna B. Foa, Barbara Olasov Rothbaum, David S. Riggs, and Tamera B. Murdock
Department of Psychiatry, Medical College of Pennsylvania

Rape victims with posttraumatic stress disorder (PTSD; $N = 45$) were randomly assigned to one of four conditions: stress inoculation training (SIT), prolonged exposure (PE), supportive counseling (SC), or wait-list control (WL). Treatments consisted of nine biweekly 90-min individual sessions conducted by a female therapist. Measures of PTSD symptoms, rape-related distress, general anxiety, and depression were administered at pretreatment, posttreatment, and follow-up ($M = 3.5$ months posttreatment). All conditions produced improvement on all measures immediately posttreatment and at follow-up. However, SIT produced significantly more improvement on PTSD symptoms than did SC and WL immediately following treatment. At follow-up, PE produced superior outcome on PTSD symptoms. The implications of these findings and direction for treatment and future research are discussed.

The psychological sequelae of rape have been conceptualized as posttraumatic stress disorder (PTSD). In a prospective study, Rothbaum, Foa, Murdock, Riggs, and Walsh (1990) found that shortly after the assault, 94% of rape victims met symptomatic criteria for PTSD; 3 months after the assault, 47% of victims still suffered from the disorder. An average of 17 years after the assault, 16.5% of rape victims had PTSD (Kilpatrick, Saunders, Veronen, Best, & Von, 1987). Recent studies have estimated that approximately 25% of American women experienced rape at some point in their lifetime (Koss, 1983). It is therefore imperative that effective therapeutic procedures for PTSD following rape be developed.

PTSD was introduced into the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., *DSM-III*; American Psychiatric Association, 1980) as an anxiety disorder. Therefore, the literature on the treatment of PTSD is sparse. However, two types of cognitive-behavioral procedures developed for the treatment of other anxiety disorders have been applied to PTSD sufferers: exposure treatments, in which patients are confronted with the feared memory or situation, and anxiety management training, in which patients are taught a variety of skills to manage anxiety in daily life.

Only one controlled study has been published on the behavioral treatment of PTSD (Keane, Fairbank, Caddell, & Zimering, 1989). In that study, Vietnam veterans either received treatment that included relaxation and imaginal exposure or were assigned to a wait-list control condition. Treated subjects showed a decrease in reexperiencing symptoms, as well as decreased startle reactions, memory and concentration problems,

impulsivity, and irritability. The remaining symptoms of PTSD did not improve.

Before the sequelae of rape were conceptualized as PTSD, Veronen, Kilpatrick, and Resick (1978) adapted a cognitive-behavioral treatment program, called *stress inoculation training* (SIT, Meichenbaum, 1974), for rape victims who exhibited persistent fear. Uncontrolled investigations have demonstrated the efficacy of this program in diminishing victims' rape-related fear, anxiety, and depression (Veronen & Kilpatrick, 1982).

In a well-controlled study of three types of group therapy for rape victims, SIT was compared with assertion training, supportive psychotherapy, and a wait-list control group (Resick, Jordan, Girelli, Hutter, & Marhoefer-Dvorak, 1988). All three treatments were equally effective in reducing rape-related symptoms. Improvement was noted on measures of general psychopathology, general fear, and specific fear, as well as intrusion and avoidance symptoms, but not on measures of depression, self-esteem, and social fears. The wait-list control group did not evidence change.

Exposure (systematic desensitization) and anxiety management techniques (cognitive-behavioral therapy) were compared in an uncontrolled study with rape victims (Frank et al., 1988). Both treatments were effective in reducing anxiety and depression with no differences evident between treatments.

Several problems limit the conclusions that can be drawn from the above studies. The Keane et al. (1989) study did not incorporate a control group for nonspecific therapeutic factors. Thus, it is not clear whether improvement was due to the specific procedures employed in the treatment or to nonspecific factors such as therapist contact. The Veronen and Kilpatrick (1982) investigation was uncontrolled and did not include measures of PTSD symptoms. Although Resick et al.'s (1988) study included the necessary experimental conditions, it did not include measures of PTSD symptoms, nor did it control the overlap of potentially important procedures among the various treatment conditions (e.g., elements of exposure were included

Preparation of this article was supported by National Institute of Mental Health Grant MH42178 awarded to Edna B. Foa.

Correspondence concerning this article should be addressed to Edna B. Foa, Medical College of Pennsylvania at Eastern Pennsylvania Psychiatric Institute, 3200 Henry Avenue, Philadelphia, Pennsylvania 19129.

in two treatments). Frank et al. (1988) did not assign patients randomly to treatments, had no control group, and failed to exclude patients who had been raped shortly before treatment.

The present study sought to address these limitations. We compared the effectiveness of three treatments for reducing posttraumatic stress disorder in rape victims to a wait-list control group (WL). The treatments examined included prolonged exposure (PE), stress inoculation training (SIT), and supportive counseling (SC). SC was included to control for nonspecific therapy effects. There was no overlap of procedures among the treatment conditions. We predicted that both PE and SIT would significantly reduce PTSD symptoms, more than would SC and WL.

Method

Subjects

Subjects were 45 female victims of rape or attempted rape who met *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev., *DSM-III-R*; American Psychiatric Association, 1987) diagnostic criteria for PTSD and who had been raped at least 3 months before participation in the study. The range of time since assault was 3 months to 12 years with a mean of 6.2 years (*SD* 6.7 years). Patients were recruited from three sources: referrals from local professionals and victim assistance agencies, recruitment by local newspaper advertisements, and patients from an assessment study of the response to rape (Rothbaum et al., 1990) who met PTSD criteria 3 months postassault. Diagnoses of PTSD were made by Barbara Olasov Rothbaum on the basis of *DSM-III-R* criteria. Demographic and assault characteristics for the treatment groups are presented in Tables 1 and 2, respectively. Chi-square analyses and analyses of variance (ANOVAs) revealed no differences among the four treatment groups on any demographic measures. ANOVAs on time since assault and on age did not reveal group differences in mean values or variances. With respect to assault characteristics, only one significant difference was detected: Fewer patients who received SIT reported that they had been injured during the assault, $\chi^2(3, N = 45) = 15.33, p < .01$.

Exclusion criteria were current or previous diagnosis of organic mental disorder, schizophrenia, or paranoid disorders as defined in the *DSM-III-R*; depression severe enough to require immediate psychiatric treatment, bipolar depression, or depression accompanied by delusions, hallucinations, or bizarre behavior; current alcohol or drug abuse; assault by spouse or other family member; or illiteracy in English. Eligibility for the study was determined through an interview with a master's- or PhD-level psychologist.

Measures

Assessments at pretreatment, posttreatment, and follow-up consisted of clinical interviews¹ conducted by an independent assessor, who was blind to treatment conditions, and self-report questionnaires.

Interviews

Initial interview. The initial interview, lasting approximately 90 min, was conducted at the first assessment only. It contained 305 questions used in previous studies of rape victims (e.g., Resick, 1987). Questions assessed demographics, current daily functioning, PTSD symptoms, alcohol and drug use, assault characteristics, and immediate reaction to the rape. The reliability of the initial interview was established on a pilot sample of 12 victims not included in the current study. Interrater reliability (*kappa*) was .81.

Assault reaction interview. The assault reaction interview, lasting 30 min, was conducted at each of the remaining assessments. It contained 117 questions selected from the initial interview. These questions assessed PTSD symptoms, changes in life style, sexual behavior, physical and psychiatric problems, and legal issues. Interrater reliability (*kappa*) was .76.

PTSD severity. Severity of PTSD was calculated by adding the interviewer's severity rating of the following PTSD symptoms: reliving experiences, nightmares, flashbacks, avoidance of reminders and thoughts of the assault, impaired leisure activities (e.g., reduced socializing), sense of detachment, blunted affect, disturbed sleep, memory and concentration difficulties, hyperalertness, increased startle response, feelings of guilt, and increased fearfulness.

A standardized interview of PTSD symptom severity was derived from interview items included in the present study. The reliability of this interview was established on a sample of 28 assault victims not included in the present study. Interrater reliability (*kappa*) of PTSD diagnosis was .90.

Self-Report Measures

Rape Aftermath Symptom Test (RAST; Kilpatrick, 1988). The RAST is a 70-item self-report inventory that differentiates rape victims from nonvictims. Internal consistency was .95 and test-retest reliability was .85 over a 2½-week interval.

State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). The STAI contains 20 items for state anxiety and 20 items for trait anxiety. Test-retest reliability for state anxiety was .40. Internal consistency ranged from .83 to .92. The trait-anxiety scale was not included in the study because it is designed to measure a stable characteristic that was not hypothesized to respond to a short-term intervention.

Beck Depression Inventory (BDI; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961). The BDI is a 21-item inventory measuring depression. Split-half reliability was .93. Correlations with clinician ratings of depression ranged from .62 to .66.

Expectancy of therapeutic outcome. The perceived credibility of each active treatment was assessed by questions that were rated on a 1-9 Likert type scale. The total score ranged between 3 and 27.

Motivation for Behavior Change Scale (MBCS; Cautela, 1977). The MBCS is an 8-item scale completed by the therapist to assess the degree of motivation and compliance exhibited by the patient during treatment.

Procedure

Assessment

Evaluations. Eligible patients were randomly assigned to one of the four conditions. After 10 patients were entered into the wait-list condition, subsequent admissions were randomly assigned to one of the three treatment groups. The assigned treatment was described to the patients, and the pretreatment assessment was conducted. Additional assessments were conducted at posttreatment and approximately 3 months (*M* = 106.33 days, *SD* = 34.65) after treatment.

Treatment

Treatment was conducted by six female therapists with master's or doctoral degrees in psychology or clinical social work who were hired specifically for this project. Therapists were trained in the various

¹ Copies of the interviews are available from Edna B. Foa.

Table 1
Demographic Characteristics by Treatment Group

Variable	Treatment group				
	Total (N = 45)	SIT (n = 14)	PE (n = 10)	SC (n = 11)	WL (n = 10)
Race (%)					
Black	25.0	15.4	30.0	27.3	30.0
White	72.7	84.6	70.0	63.6	70.0
Hispanic	2.3	0.0	0.0	9.1	0.0
Marital status (%)					
Single	52.3	53.8	50.0	45.5	60.0
Married	22.7	23.1	30.0	18.2	20.0
Cohabiting	2.3	7.7	0.0	0.0	0.0
Divorced/separated	22.7	15.4	20.0	36.4	20.0
Income (%)					
Greater than \$30,000	25.0	7.7	40.0	36.4	20.0
\$20,000-30,000	11.4	15.4	10.0	9.1	10.0
\$10,000-20,000	34.1	38.5	10.0	36.4	50.0
Less than \$10,000	29.5	38.5	40.0	18.2	20.0
Occupation (%)					
White-collar	29.3	33.3	33.3	20.0	30.0
Secretarial	24.4	33.3	11.1	40.0	10.0
Blue-collar	12.2	8.3	11.1	20.0	10.0
Homemaker	9.8	0.0	11.1	10.0	20.0
Student	24.4	25.0	33.3	10.0	30.0
Time since assault (days)					
M	2,262	1,446	1,981	3,394	2,464
SD	2,484	1,573	2,981	3,156	1,798
Age (years)					
M	31.8	29.3	32.7	34.2	32.0
SD	8.2	6.3	7.3	9.8	9.6

Note. SIT = stress inoculation training; PE = prolonged exposure; SC = supportive counseling; WL = wait-list control.

treatments² by Edna B. Foa and Barbara O. Rothbaum. Specifically, exposure treatment was taught by Foa, a recognized expert in this type of treatment. Foa and Rothbaum were trained by Kilpatrick and his colleagues, who developed the SIT program for rape victims. Foa and Rothbaum were also trained by a therapist affiliated with the Philadelphia Chapter of Women Organized Against Rape to learn supportive counseling for rape victims. The remaining therapists were trained by Foa and Rothbaum through direct observation of ongoing treatment. Therapists differed with respect to their theoretical orientation and treatment preferences but were assigned randomly to treatment conditions in the current study.

Treatment sessions were conducted individually and consisted of nine biweekly 90-min sessions, lasting 4½ weeks. Control subjects were placed in a wait-list condition for the same length of time. To ensure the integrity of the treatment procedures, therapists were supervised biweekly by Foa. Each therapy session was monitored during supervision to examine possible deviations from protocol. No gross deviations were detected; subtle deviations were noted, and suggestions for correction were provided by the supervisor. Nonparametric (Kruskal-Wallis) tests were conducted to examine possible therapist effects. The therapists did not differ in the percentage of improvement demonstrated by their patients on any of the seven outcome measures used in the current study.

Prolonged exposure (PE). The first two sessions were devoted to information gathering through the initial interview described above, explanation of treatment rationale, and treatment planning. The next seven sessions were devoted to reliving the rape scene in imagination (imaginal exposure). Patients were instructed to relive the assault by

imagining it as vividly as possible and describing it aloud using the present tense. The patient repeated the rape scenario several times for a total of 60 min per session. The patient's narratives were tape-recorded, and patients were instructed to listen to the tape at least once daily as homework. Additional homework involved in vivo exposure to feared and avoided situations judged by the patient and the therapist to be safe.

Stress inoculation training (SIT). The procedures included in this treatment program were adapted from Veronen and Kilpatrick (1983). The first session was devoted to information gathering through the initial interview described above. The session terminated with breathing exercises to diminish anxiety that may have been elicited by the interview. During the second session, the treatment method was described to the patient, a rationale for treatment was given, and an explanation for the origin of fear and anxiety was presented.

The next seven sessions were devoted to instruction in coping skills. During the third and fourth sessions, the patients were taught deep muscle relaxation and controlled breathing. In the fifth session, they were taught thought stopping to counter ruminative or obsessive thinking (Wolpe, 1958). The sixth session was devoted to cognitive restructuring (Beck, Rush, Shaw, & Emery, 1979; Ellis, 1977), the seventh to guided self-dialogue (Meichenbaum, 1977), the eighth to covert modeling, and the ninth to role playing. No instructions for exposure were included.

Supportive counseling (SC). Supportive counseling followed the

² Treatment manuals are available from Edna B. Foa.

Table 2
Assault Characteristics by Treatment Group (in Percentages)

Variable	Total (N = 45)	SIT (n = 14)	PE (n = 10)	SC (n = 11)	WL (n = 10)
Injury					
No	13.3	42.9	0.0	9.0	0.0
Yes	86.7	57.1	100.0	100.0	100.0
Relationship of assailant					
Stranger	55.6	50.0	50.0	63.6	60.0
Acquaintance	44.4	50.0	50.0	36.4	40.0
Duration of assault					
1 min or less	6.7	0.0	0.0	9.1	20.0
2-10 min	15.6	35.7	10.0	0.0	10.0
11-29 min	22.2	14.3	20.0	27.3	30.0
30-59 min	20.0	21.4	20.0	27.3	10.0
60-90 min	8.9	0.0	0.0	18.2	20.0
More than 90 min	26.7	28.6	50.0	18.2	10.0
Weapon used					
No	44.4	42.9	30.0	45.5	60.0
Yes	55.6	57.1	70.0	54.5	40.0
Perception of life threat					
Unlikely	17.8	14.3	20.0	27.3	10.0
Somewhat likely	8.9	14.3	10.0	0.0	10.0
Quite likely	24.4	21.4	20.0	27.3	30.0
Convinced of it	48.9	50.0	50.0	45.5	50.0

Note. SIT = stress inoculation training; PE = prolonged exposure; SC = supportive counseling; WL = wait-list control.

nine-session format, gathering information through the initial interview in the first session and presenting the rationale for treatment in the second session. During the remaining sessions, patients were taught a general problem-solving technique. Therapists played an indirect and unconditionally supportive role. Homework consisted of the patient's keeping a diary of daily problems and her attempts at problem solving. Patients were immediately redirected to focus on current daily problems if discussions of the assault occurred. No instructions for exposure or anxiety management were included.

Wait-List Control (WL). WL subjects were informed that they would receive treatment in 5 weeks. During this period, they were contacted by a therapist between assessments to determine whether emergency services were required. Following an assessment at the end of the wait-list period, patients were randomly assigned to either PE or SIT.

Results

Preliminary Analyses

Sixty-six victims met inclusion criteria and were offered treatment; 11 victims refused treatment and did not return for pretreatment assessment. Of the 55 victims who began treatment, 17 were assigned to SIT, 14 to PE, 14 to SC, and 10 to WL. Dropout rates were not significantly different across the treatment groups, $\chi^2(3, N = 55) = 3.34, p > .30$, and were as follows: PE 28.6%, SIT 17.6%, SC 21.4%, and WL 0%. The 10 dropouts differed from completers on three variables: A greater percentage of them had an income less than \$10,000, $\chi^2(3, N = 55) = 10.95, p < .05$, and were blue-collar workers, $\chi^2(5, N = 55) = 10.34, p < .05$. Dropouts also scored higher on the RAST than did completers, $F(1, 53) = 10.72, p < .01$. Subsequent analyses were conducted on data from the 45 completers. Analyses of variance (ANOVAs) revealed no significant differences among

groups on initial severity of PTSD symptoms, other measures of psychopathology, or expectancy of treatment outcome for the active treatments.

Treatment Effects

Analyses were conducted in two stages. The immediate effects of treatment on the measures of psychopathology were examined with a 2×4 multivariate analysis of variance (MANOVA; Occasion [pretreatment, posttreatment] \times Treatment [SIT, PE, SC, WL]), with occasion as a repeated measure. This was followed by a series of 2×4 ANOVAs. Effects of treatment at follow-up were examined with a 3×3 MANOVA (Occasion [pretreatment, posttreatment, follow-up] \times Treatment [SIT, PE, SC]). This was followed by a series of 3×3 ANOVAs. Patients who were initially on WL were excluded from the latter analyses.

Immediate effects of treatment. Means and standard deviations for each of the dependent measures at pre- and posttreatment are presented in Table 3. The MANOVA on the outcome measures revealed a significant main effect of occasion, $F(1, 36) = 60.76, p < .001$, and a significant Measure \times Occasion interaction, $F(6, 216) = 28.52, p < .001$.

The ANOVA on PTSD severity revealed a significant main effect of occasion, $F(1, 41) = 101.69, p < .001$, modified by a significant Treatment \times Occasion interaction, $F(3, 41) = 5.38, p < .005$. Simple effects analyses revealed a significant difference among treatment groups at posttreatment, $F(3, 40) = 3.04, p < .05$, but not at pretreatment. Post hoc pairwise comparison using Tukey's HSD test indicated that the SIT group showed greater symptom reduction than did the SC and WL groups. Simple effects analyses also revealed significant pre-post

Table 3
Pretreatment and Posttreatment Means and Standard Deviations

Measure	SIT (n = 14)	PE (n = 10)	SC (n = 11)	WL (n = 10)
PTSD severity				
Pretreatment				
<i>M</i>	24.48	25.78	24.39	24.43
<i>SD</i>	6.62	5.01	6.62	4.64
Posttreatment				
<i>M</i>	11.07	15.40	18.09	19.50
<i>SD</i>	3.97	11.09	7.13	7.18
Avoidance symptoms				
Pretreatment				
<i>M</i>	6.48	6.50	5.42	5.70
<i>SD</i>	2.02	3.13	2.76	2.01
Posttreatment				
<i>M</i>	2.43	4.10	5.18	6.00
<i>SD</i>	1.95	4.33	2.56	2.62
Intrusion symptoms				
Pretreatment				
<i>M</i>	5.64	5.28	5.17	5.30
<i>SD</i>	1.92	1.02	2.67	2.26
Posttreatment				
<i>M</i>	1.64	3.40	3.82	3.90
<i>SD</i>	1.28	3.17	2.44	1.45
Arousal symptoms				
Pretreatment				
<i>M</i>	11.24	12.27	12.09	11.47
<i>SD</i>	2.22	1.58	2.40	2.43
Posttreatment				
<i>M</i>	6.36	7.20	8.27	8.50
<i>SD</i>	2.84	3.55	2.94	3.87
RAST				
Pretreatment				
<i>M</i>	141.00	141.69	124.00	131.60
<i>SD</i>	22.46	48.66	39.21	31.32
Posttreatment				
<i>M</i>	91.20	88.70	98.91	102.22
<i>SD</i>	36.72	60.92	54.40	58.80
STAI-state				
Pretreatment				
<i>M</i>	54.39	58.10	55.40	57.10
<i>SD</i>	6.90	11.72	11.30	13.20
Posttreatment				
<i>M</i>	37.15	41.50	43.73	49.90
<i>SD</i>	7.58	13.77	16.80	13.80
BDI				
Pretreatment				
<i>M</i>	19.43	19.60	18.01	19.90
<i>SD</i>	10.99	9.41	10.62	8.67
Posttreatment				
<i>M</i>	9.86	13.40	15.36	15.40
<i>SD</i>	6.76	14.22	13.96	9.71

Note. SIT = stress inoculation therapy; PE = prolonged exposure; SC = supportive counseling; WL = wait-list control. PTSD = posttraumatic stress disorder; RAST = Rape Aftermath Symptom Test; STAI = State-Trait Anxiety Inventory; BDI = Beck Depression Inventory.

changes for all four groups, $F(1, 41) = 75.67, p < .001$; $F(1, 41) = 32.38, p < .001$; $F(1, 41) = 13.10, p < .002$; and $F(1, 41) = 7.30, p < .02$, for SIT, PE, SC, and WL, respectively.

The effects of treatment on each of the three PTSD symptom clusters (avoidance, intrusion, arousal) were also examined. An ANOVA on avoidance symptoms revealed a main effect of occasion, $F(1, 41) = 22.27, p < .001$, modified by a Treatment \times Occasion interaction, $F(3, 41) = 9.56, p < .001$. Simple effects

analyses revealed significant group differences at posttreatment, $F(3, 41) = 3.43, p < .05$, but not at pretreatment. Post hoc tests on posttreatment data indicated that patients in the SIT group were less avoidant than were those in the SC and WL groups. Simple effects analyses also revealed pre-post differences for the SIT and PE groups, $F(1, 41) = 45.34, p < .001$, and $F(1, 41) = 11.39, p < .005$, respectively, but not for the SC or WL groups.

Analysis of intrusion symptoms also showed a significant effect of occasion, $F(1, 41) = 28.82, p < .001$, modified by a Treatment \times Occasion interaction, $F(3, 41) = 2.81, p = .05$. Simple effects analyses revealed significant group differences at posttreatment only, $F(3, 41) = 3.07, p < .05$. However, post hoc comparisons failed to detect differences among groups. Simple effects analyses revealed significant occasion differences for the SIT and PE groups only, $F(1, 41) = 31.39, p < .001$, and $F(1, 41) = 4.97, p < .05$, respectively. A significant main effect of occasion was revealed for the arousal symptoms, $F(1, 41) = 107.82, p < .001$. No significant treatment main effect or Treatment \times Occasion interaction was detected.

Self-report measures of psychopathology were also examined using 2×4 ANOVAs: Occasion (pretreatment, posttreatment) \times Treatment (SIT, PE, SC, WL), with occasion as a repeated measure. ANOVAs revealed main effects of occasion on the RAST, $F(1, 37) = 39.06, p < .001$; BDI, $F(1, 41) = 25.94, p < .001$; and STAI, $F(1, 40) = 49.23, p < .001$. No main effects of treatment or Occasion \times Treatment interactions were detected, suggesting that all groups improved equally on these measures.

Effects of treatment at follow-up. Only patients with follow-up data were included in these analyses, and patients previously on the waiting-list were excluded. Means and standard deviations for the dependent measures at pretreatment, posttreatment, and follow-up are presented in Table 4. A 3×3 MANOVA: Occasion (pretreatment, posttreatment, follow-up) \times Treatment (SIT, PE, SC), with occasion as a repeated measure, revealed a significant main effect of occasion, $F(2, 38) = 19.69, p < .001$, modified by both a significant Scale \times Occasion interaction, $F(12, 228) = 8.91, p < .001$, and a significant Treatment \times Measure \times Occasion interaction, $F(12, 228) = 2.27, p < .005$.

A 3×3 ANOVA conducted on PTSD symptom severity revealed a significant effect of occasion, $F(2, 48) = 51.25, p < .001$, modified by a significant Treatment \times Occasion interaction, $F(4, 48) = 2.67, p < .05$. Simple effects analyses revealed that all three groups improved significantly, $F(2, 48) = 24.14, p < .001$; $F(2, 48) = 23.87, p < .001$; $F(2, 48) = 8.59, p < .002$, for SIT, PE, and SC, respectively, over the course of the study. The three groups differed significantly in the severity of PTSD symptoms only at the posttreatment assessment, $F(2, 24) = 4.51, p < .03$. Post hoc tests revealed that all three groups improved between pretreatment and posttreatment assessments. None of the groups improved significantly between posttreatment and follow-up; however, the PE group showed a trend ($p < .07$) toward improvement.

The ANOVA on avoidance symptoms revealed a significant main effect of occasion, $F(2, 48) = 18.43, p < .001$, modified by a significant Treatment \times Occasion interaction, $F(4, 48) = 3.62, p < .02$. Simple effects analysis indicated that all three groups improved significantly from pretreatment to follow-up, $F(2, 48) = 14.98, p < .001$; $F(2, 48) = 7.30, p < .005$; $F(2, 48) = 3.38, p < .05$, for SIT, PE, and SC, respectively. Post hoc analyses revealed that SIT and PE groups improved significantly between pretreatment and posttreatment. None of the groups changed significantly between posttreatment and follow-up. Again, the groups differed significantly only at the posttreatment assessment, $F(2, 24) = 3.47, p < .05$.

Results of the analyses of the intrusive and arousal symptoms

clusters revealed main effects of occasion, $F(2, 48) = 17.61, p < .001$; $F(2, 48) = 51.06, p < .001$, respectively. Post hoc tests revealed that the groups improved significantly between pretreatment and posttreatment assessments but not between posttreatment and follow-up. No significant changes were detected on the RAST, STAI, or BDI between posttreatment and follow-up.

Clinical significance of treatment effects. Treatment response was also examined through a series of chi-square tests comparing the percentage of patients in each of the treatment groups who showed clinically significant improvement on PTSD symptoms. Following the suggestion of Jacobson and Traux (1991), a patient was designated as significantly improved if her posttreatment (follow-up) scores were more than two standard deviations below the mean of the pretreatment sample. At posttreatment, all four groups were included in the analyses. At follow-up, waiting-list patients were excluded from the analyses, and the three treatments (SIT, PE, SC) were compared.

At posttreatment, the four groups differed in the percentage of patients who improved on PTSD symptoms, $\chi^2(3, N = 45) = 9.61, p < .05$: 71% ($n = 10$) of the SIT patients and 40% ($n = 4$) of the PE patients were significantly improved at posttreatment. In contrast, only 18% ($n = 2$) of the SC and 20% ($n = 2$) of the WL group showed significant improvement in PTSD symptoms. At the follow-up assessment, the three treatment groups (SIT, PE, SC) did not differ with respect to the number of improved patients. Sixty-seven percent ($n = 6$) of the SIT group, 56% ($n = 5$) of the PE group, and 33% ($n = 3$) of the SC group were significantly improved at follow-up. These results converge with those obtained through ANOVAs.

Similar chi-square analyses were conducted to examine differences comparing the percentage of patients in each group who did not meet diagnostic criteria for PTSD at the posttreatment and at follow-up assessments. Again, wait-list patients were excluded from the follow-up analyses.

At posttreatment, the four groups differed significantly in the percentage of patients who met diagnostic criteria for PTSD $\chi^2(3, N = 45) = 10.18, p < .05$. Fifty percent ($n = 7$) of the SIT patients and 40% ($n = 4$) of PE patients no longer met criteria for PTSD. In contrast, 90% ($n = 10$) of the SC group and all of the WL patients retained the diagnosis at posttreatment. The three treatment groups (SIT, PE, SC) did not differ in the percentage of PTSD patients at follow-up. In both the SIT and PE groups, 55% ($n = 5$) of the patients did not meet PTSD criteria; 45% ($n = 4$) of the SC group did not meet diagnostic criteria for the disorder.

Using Spearman-Brown and Pearson correlations, the demographic and assault characteristics presented in Tables 1 and 2 were correlated with all outcome variables at posttreatment and follow-up in a search for potential outcome predictors. Similarly, therapist ratings of treatment compliance were correlated with outcome measures. None of these variables were significantly correlated with treatment outcome.

Discussion

We examined the relative efficacy of three treatments in ameliorating chronic posttraumatic stress disorder in rape victims and compared them with a wait-list control condition. We hy-

Table 4
 Posttreatment and Follow-Up Means and Standard Deviations

Measure	SIT (n = 9)	PE (n = 9)	SC (n = 9)	Measure	SIT (n = 9)	PE (n = 9)	SC (n = 9)
PTSD severity				Arousal symptoms <i>(continued)</i>			
Pretreatment				Follow-up			
<i>M</i>	24.30	25.01	25.25	<i>M</i>	6.44	5.00	7.56
<i>SD</i>	6.10	4.64	6.33	<i>SD</i>	4.67	3.00	3.97
Posttreatment				RAST			
<i>M</i>	9.89	13.56	19.78	Pretreatment			
<i>SD</i>	4.20	10.00	5.65	<i>M</i>	139.83	146.24	129.88
Follow-up				<i>SD</i>	20.86	42.95	37.40
<i>M</i>	12.33	10.44	16.11	Posttreatment			
<i>SD</i>	9.59	8.22	9.37	<i>M</i>	96.50	89.00	109.38
Avoidance symptoms				<i>SD</i>	48.14	65.94	57.82
Pretreatment				Follow-up			
<i>M</i>	6.41	6.09	5.44	<i>M</i>	86.50	61.00	123.38
<i>SD</i>	2.35	3.01	2.53	<i>SD</i>	50.37	62.09	72.50
Posttreatment				STAI-state			
<i>M</i>	2.11	3.44	5.78	Pretreatment			
<i>SD</i>	2.26	4.04	2.33	<i>M</i>	54.44	58.62	58.42
Follow-up				<i>SD</i>	6.39	10.53	9.68
<i>M</i>	2.44	3.00	3.67	Posttreatment			
<i>SD</i>	2.74	3.12	2.74	<i>M</i>	36.67	41.62	47.38
Intrusion symptoms				<i>SD</i>	7.62	14.23	18.17
Pretreatment				Follow-up			
<i>M</i>	5.82	5.48	5.32	<i>M</i>	37.56	32.38	50.00
<i>SD</i>	1.98	.85	2.92	<i>SD</i>	15.36	6.99	19.35
Posttreatment				BDI			
<i>M</i>	1.67	2.89	4.11	Pretreatment			
<i>SD</i>	1.41	2.89	2.32	<i>M</i>	15.11	19.88	21.38
Follow-up				<i>SD</i>	9.17	10.62	8.28
<i>M</i>	2.89	2.00	4.11	Posttreatment			
<i>SD</i>	3.02	2.40	3.66	<i>M</i>	6.78	12.75	19.00
Arousal symptoms				<i>SD</i>	6.48	15.97	14.40
Pretreatment				Follow-up			
<i>M</i>	11.11	12.00	12.48	<i>M</i>	10.33	6.38	15.88
<i>SD</i>	2.27	1.42	1.86	<i>SD</i>	11.68	7.56	10.20
Posttreatment							
<i>M</i>	5.56	6.78	8.90				
<i>SD</i>	2.24	3.49	1.86				

Note. SIT = stress inoculation therapy; PE = prolonged exposure; SC = supportive counseling; WL = wait-list control. PTSD = posttraumatic stress disorder; RAST = Rape Aftermath Symptom Test; STAI = State-Trait Anxiety Inventory; BDI = Beck Depression Inventory.

pothesized that stress inoculation training (SIT) and prolonged exposure (PE) would relieve trauma-related symptoms more effectively than would supportive counseling (SC) or no treatment (WL). The results partially supported our hypothesis. SIT was the most effective treatment in reducing PTSD symptomatology immediately after treatment. PE was also found to be an effective treatment. Unexpectedly, SC and WL conditions improved arousal symptoms of PTSD, but not intrusion and avoidance symptoms. Three and one-half months after treatment termination, PE appeared to be the superior treatment. Thus, although SIT appeared to be the most effective treatment in the short term, PE appeared to be the most effective treatment in the long term.

The superiority of SIT and PE over the other two conditions was evidenced only on PTSD symptoms. On other measures of psychopathology, no significant group differences emerged. Nevertheless, means of the four psychopathology measures in the present study (PTSD, RAST, STAI, BDI) revealed a consistent picture: Immediately after treatment, patients who re-

ceived SIT showed the least pathology, followed by PE, SC, and WL, respectively. However, at follow-up, patients who received PE evidenced the most improvement, followed by those who received SIT, with patients receiving SC showing the least improvement.

How can this reversal between PE and SIT be explained? We suggest that the procedures included in SIT produce immediate relief, as they are aimed at anxiety management. It is conceivable that after treatment terminated, some patients did not continue to employ SIT techniques, as is necessary for lasting improvement. The procedures utilized in PE, on the other hand, are expected to produce temporarily high levels of arousal, as patients are asked to repeatedly confront the rape memory. These procedures, however, are thought to lead to permanent change in the rape memory and hence to durable gains. The mechanisms by which exposure treatments have been hypothesized to produce change in the trauma memory, referred to as emotional processing, have been discussed at length elsewhere (Foa, Steketee, & Rothbaum, 1989; Rachman, 1980). They in-

clude habituation to feared stimuli, reevaluation of the probability of threat in feared situations, and changes in the negative valence associated with fear responses.

Depression and anxiety decreased significantly following all treatments as well as during the wait-list period. These results seem to indicate that mere contact with a therapist is sufficient to ameliorate nonspecific distress. Whereas such contact may help to reduce general distress, the results of our study indicate that it is not sufficient for alleviating PTSD symptoms.

Our finding that SIT was effective in reducing rape-related psychopathology is consistent with those of Veronen and Kilpatrick (1982) and of Resick et al. (1988). Also consistent with our findings are Resick et al.'s results indicating no difference between counseling and SIT on measures of general psychopathology. However, Resick et al.'s results differ from ours in two ways. First, they did not detect the posttreatment trend for SIT's superiority over other treatments, possibly due to the overlap of procedures mentioned earlier. And second, they did not find improvement during the wait-list period, perhaps because their WL patients were not contacted as frequently as were ours.

The finding that PE was effective in ameliorating PTSD is consistent with Keane et al.'s (1989) results. However, in our study, PE reduced all three symptom clusters of PTSD, whereas Keane et al.'s Vietnam veterans evidenced improvement on intrusion and arousal symptoms but not on avoidance. This may be due to procedural differences in administering the exposure treatment. In the present study, PE consisted of recounting the trauma imaginatively without relaxation and of confronting feared situations in vivo; Keane et al.'s treatment included imaginal recounting of the traumatic experience combined with relaxation and no in vivo exposure. Perhaps the relaxation hindered patients from experiencing high anxiety during exposure and thereby diminished the efficacy of treatment. Indeed, anxiety reaction and its decrease during exposure treatments have been found to be positively related to treatment outcome (Kozak, Foa, & Steketee, 1988; Lang, Melamed, & Hart, 1970). Additionally, the absence of improvement in avoidance symptoms in the Keane et al. study may have been due to the absence of in vivo exposure, which is thought to be the most active ingredient in the reduction of avoidance in anxiety-disordered individuals (Marks, 1987).

Two issues inherent in the study of rape victims should be noted. Approximately half of the women scheduled for initial evaluations did not attend their scheduled appointments, and 19% of those offered treatment declined. This reluctance may be due to a tendency of rape victims to avoid confrontation with the rape memory, which is one of the symptoms of PTSD (for a more extensive discussion see Rothbaum & Foa, in press). Additionally, unlike other anxiety-disordered individuals (e.g., obsessive-compulsives, agoraphobics), rape victims do not seem to define themselves as "patients." Consequently, they seem less likely to comply with therapeutic demands including timely appearance in the therapist's office. It should also be noted that rape is underreported, and many rape victims are reluctant to seek treatment for their symptoms. This seems to be particularly true for lower socioeconomic status individuals. Therefore, the extent to which the present results can be extended to other samples of rape victims is unknown.

In interpreting the current results, two possible limitations

should be considered: First, the use of only female therapists in the study limits its generalizability. However, this issue may not pose a serious limitation because most rape victims' treatment centers employ primarily women as therapists. More important, the fact that the principal authors provided training and supervision in all of the treatments may have introduced experimental bias effects. Also, it is difficult to assess the impact of the fact that therapists conducted therapies that may have been contrary to their preferences.

Two issues have arisen from the present study that need to be addressed in future research. First, the findings that SIT produced superior immediate symptom reduction and PE seemed to produce superior improvement at follow-up suggest that an optimal program should combine both treatments. Such a program is presently being investigated. Second, SIT, as practiced by rape researchers, includes several procedures, but no data about their relative efficacy is presently available. The administration of SIT might become more efficient if inert procedures were eliminated.

References

- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford Press.
- Beck, A. T., Ward, C. H., Mendelsohn, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561-571.
- Cautela, J. R. (1977). *Behavior analysis forms for clinical interventions*. Champaign, IL: Research Press.
- Ellis, A. (1977). The basic clinical theory and rational-emotive therapy. In A. Ellis & R. Grieger (Eds.), *Handbook of rational-emotive therapy* (pp. 3-34). New York: Springer.
- Foa, E. B., Steketee, G., & Rothbaum, B. O. (1989). Behavioral/cognitive conceptualization of posttraumatic stress disorder. *Behavior Therapy*, 20, 155-176.
- Frank, E., Anderson, B., Stewart, B. D., Dancu, C., Hughes, C., & West, D. (1988). Efficacy of cognitive behavior therapy and systematic desensitization in the treatment of rape trauma. *Behavior Therapy*, 19, 403-420.
- Jacobson, N. S., & Traux, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59, 12-19.
- Keane, T. M., Fairbank, J. A., Caddell, J. M., & Zimering, R. T. (1989). Implosive (flooding) therapy reduces symptoms of PTSD in Vietnam combat veterans. *Behavior Therapy*, 20, 245-260.
- Kilpatrick, D. G. (1988). Rape aftermath symptom test. In M. Hersen & A. S. Bellack (Eds.), *Dictionary of behavioral assessment techniques* (pp. 366-367). Oxford, UK: Pergamon Press.
- Kilpatrick, D. G., Saunders, B. E., Veronen, L. J., Best, C. L., & Von, J. M. (1987). Criminal victimization: Lifetime prevalence, reporting to police, and psychological impact. *Crime and Delinquency*, 33, 479-489.
- Koss, M. P. (1983). The scope of rape: Implications for the clinical treatment of victims. *The Clinical Psychologist*, 38, 88-91.
- Kozak, M. J., Foa, E. B., & Steketee, G. (1988). Process and outcome of exposure treatment with obsessive-compulsives: Psychophysiological indicators of emotional processing. *Behavior Therapy*, 19, 157-169.
- Lang, P., Melamed, B., & Hart, J. D. (1970). A psychophysiological

- analysis of fear modification using automated desensitization. *Journal of Abnormal Psychology*, 31, 220-234.
- Marks, I. M. (1987). *Fears, phobias, and rituals: Panic, anxiety, and their disorders*. Oxford, UK: Oxford University Press.
- Meichenbaum, D. (1974). *Cognitive behavior modification*. Morristown, NJ: General Learning Press.
- Meichenbaum, D. (1977). *Cognitive-behavior modification: An integrative approach*. New York: Plenum Press.
- Rachman, S. (1980). Emotional processing. *Behaviour Research and Therapy*, 18, 51-60.
- Resick, P. A. (1987). *Reactions of female and male victims of rape and robbery* (Final Report, NIJ Grant No. MH37296). Washington, DC: National Institute of Justice.
- Resick, P. A., Jordan, C. G., Girelli, S. A., Hutter, C. K., & Marhofer-Dvorak, S. (1988). A comparative outcome study of behavioral group therapy for sexual assault victims. *Behavior Therapy*, 19, 385-401.
- Rothbaum, B. O. & Foa, E. B. (in press). Exposure therapy for rape victims with post-traumatic stress disorder. *The Behavior Therapist*.
- Rothbaum, B. O., Foa, E. B., Murdock, T., Riggs, D., & Walsh, W. (1990). Post traumatic stress disorder in rape victims. (Unpublished manuscript).
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory (self-evaluation questionnaire)*. Palo Alto, CA: Consulting Psychologists Press.
- Veronen, L. J., & Kilpatrick, D. G. (1982, November). *Stress inoculation training for victims of rape: Efficacy and differential findings*. Presented in a symposium entitled "Sexual Violence and Harassment" at the 16th Annual Convention of the Association for Advancement of Behavior Therapy, Los Angeles, CA.
- Veronen, L. J., & Kilpatrick, D. G. (1983). Stress management for rape victims. In D. Meichenbaum & M. E. Jaremko (Eds.), *Stress reduction and prevention* pp. 341-374. New York: Plenum Press.
- Veronen, L. J., Kilpatrick, D. G., & Resick, P. A. (1978, November). *Stress inoculation training for victims of rape*. Paper presented at the Association for the Advancement of Behavior Therapy, Chicago.
- Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition*. Stanford, CA: Stanford University Press.

Received August 8, 1990

Revision received March 28, 1991

Accepted April 23, 1991 ■

Call for Nominations for the *Journal of Psychopharmacology*

The Publications and Communications (P&C) Board has opened nominations for the editorship of the *Journal of Psychopharmacology*, a new journal in development by APA. The preliminary editorial policy includes coverage of laboratory studies (both animal and human) and research in clinical settings, as well as theoretical and review articles on the behavioral and biological mechanisms of drugs, drug discrimination, drug dependence, and studies of psychotherapeutic agents.

Candidates must be members of APA and should be available to start receiving manuscripts in the fall of 1992. Please note that the P&C Board encourages more participation by members of underrepresented groups in the publication process and would particularly welcome such nominees. To nominate candidates, prepare a statement of one page or less in support of each candidate. Submit nominations to

J. Bruce Overmier
Elliott Hall—Psychology Department
University of Minnesota
75 East River Road
Minneapolis, Minnesota 55455

First review of nominations will begin January 15, 1992.