Psychotherapy Volume 38/Summer 2001/Number 2

POSTTRAUMATIC STRESS DISORDER PATIENTS' READINESS TO CHANGE ALCOHOL AND ANGER PROBLEMS

CRAIG S. ROSEN
National Center for Posttraumatic Stress Disorder, Menlo Park, California
Stanford University School of Medicine

RONALD T. MURPHY
Dillard University

HELEN C. CHOW
VA Palo Alto Health Care System

KENT D. DRESCHER
GIL RAMIREZ
ROBYN RUDDY
FRED GUSMAN
National Center for Posttraumatic Stress Disorder, Menlo Park, California

Recovery from combat-related Posttraumatic Stress Disorder (PTSD) is often complicated by unacknowledged problems with alcohol and anger. Male combat veterans (n = 102) entering a residential PTSD rehabilitation program completed University of Rhode Island Change Assessment (URICA) and process-of-change questionnaires based on Prochaska and DiClemente's transtheoretical model (TTM; Prochaska, DiClemente, & Norcross, 1992). Separate assessments were made for alcohol abuse and anger control. Four motivational subtypes were identified for both problems. Motivation to change alcohol problems was independent of that for anger. Relative to less-motivated peers, highly motivated patients were more likely to spontaneously identify alcohol or anger as problems in their life and made greater use of change strategies specified by the TTM. These results support extension of the TTM to anger management and to PTSD management. Treatment implications are discussed.

Preparation of this article was supported in part by the Department of Veterans Affairs (VA) Health Services Research and Development Service, National Center for Posttraumatic Stress Disorder Clinical Laboratory and Education Division, VA Office of Academic Affiliations, VA Mental Health Strategic Health Group, VA Palo Alto Health Care System, and VA Sierra-Pacific Network Mental Illness Research, Education and Clinical Center. The views expressed in this article are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs.

The authors thank Rebecca Cameron for her input on the anger process-of-change questionnaire, Mark Greenbaum for help extracting patient data, and John Finney for his helpful comments.

Correspondence regarding this article should be addressed to Craig Rosen, National Center for PTSD, 795 Willow Road (352-117), Menlo Park, CA 94025. E-mail: crosen@stanford.edu.

Recovery from prolonged posttraumatic stress disorder (PTSD) is often complicated by comorbid problems and long-standing patterns of maladaptive behavior. Symptoms of PTSD include reexperiencing of traumatic memories, emotional numbing, avoidance of trauma-related cues, and hyperarousal (American Psychiatric Association, 1994). Trauma victims' functioning is often further impaired by behaviors developed in response to these symptoms, including self-isolation, suspiciousness, verbal or physical hostility, and substance abuse (Flack, Litz, & Keane, 1998).

Many treatment programs for combat-related PTSD have shifted toward a rehabilitation model,

with the goal of helping patients cope more adatively with what are likely to be continuing symptoms (Mellman, Kutcher, Santiago, & David, 1999; Shalev, 1997). One barrier to PTSD rehabilitation can be patients' reluctance to give up maladaptive ways of managing their symptoms. We elsewhere have discussed a motivational intervention we developed in response to this problem (Murphy, Cameron, Sharp, & Ramirez, 1999). Preliminary data on this intervention indicated that patients who were eager for relief of symptoms such as nightmares, disturbed sleep, and anxiety, were often ambivalent about whether habitual anger, self-isolation, distrust, alcohol use, and drug use were problems they wanted to change (Murphy et al., 2001).

The present study further examines PTSD patients' readiness to address two common problems, alcohol abuse and anger management. Roughly 60% to 80% of veterans seeking PTSD treatment have concurrent substance abuse diagnoses, most often alcohol abuse or dependence (Bremner, Southwick, & Charney, 1996; Sharansky, Brief, Pierce, Meehan, & Manix, 1999; Stine & Kosten, 1995). Patients with comorbid PTSD and substance use disorders have poorer clinical outcomes than do those with either disorder alone (Kofoed, Friedman, & Peck, 1993; Ouimette, Finney, & Moos, 1999; Zlotnick et al., 1999). Veterans with PTSD also often have anger problems that severely disrupt their occupational functioning or family relationships (Novaco & Chemtob, 1998).

Although PTSD rehabilitation programs may include substance use and anger management components (Boudewyns, Woods, Hyer, & Albrecht, 1991; Chemtob, Novaco, Hamada, & Gross, 1997; Reilly, Clark, Shropshire, Lewis, & Sorensen, 1994), these are unlikely to be effective if patients are not motivated to change. Substance abusers often minimize negative consequences of their addiction (Miller & Rollnick, 1991). Patients with habitual anger problems typically attribute their rage to provocations by other people and discount how their own behavior creates or escalates conflict (DiGiuseppe, 1995). If patients are uncommitted to changing behaviors such as alcohol use and aggression, they are less likely to learn adaptive symptom management skills and are more likely to relapse to old behaviors after discharge from treatment.

One framework for understanding motivation for change is Prochaska and DiClemente's transtheoretical model (TTM; Prochaska et al., 1992). This model specifies five stages of change: precontemplation (being unaware of or denying personal relevance of the problem), contemplation (considering changing), preparation (taking initial steps), action (changing behavior), and maintenance (sustaining changes over time). Several studies have applied the TTM to motivation for substance abuse treatment and for psychotherapy, including psychotherapy for sexual abuse (Koraleski & Larson, 1997; Rosen, 2000). However, none have specifically addressed combat-related PTSD. Deffenbacher (1999) has suggested the TTM as a conceptual framework for addressing motivation in anger management, but we are not aware of any empirical studies applying the TTM to anger problems. The present study therefore sought to determine whether there were distinct subgroups of combat PTSD patients that differed in their readiness to change alcohol or anger problems.

A second issue is whether motivation is problem-specific. Clinical experience suggests patients are often more ready to work on some problems than on others. However, studies of motivation in psychotherapy have typically assessed overall readiness for treatment rather than motivation to address specific problems (see Abellanas & McLellan, 1993, for a notable exception). We therefore evaluated whether levels of readiness to change alcohol and anger problems were independent, or whether both were reflections of a generalized readiness for treatment.

Distress is typically thought to be an important factor in motivation. We theorized that patients with the most severe problem histories would be more highly motivated to change. We also were interested in whether patients' levels of motivation to change alcohol or anger problems, as assessed by standardized instruments, would be consistent with their own identification of alcohol or anger as problems they wanted to work on in treatment.

Finally, we were interested in how motivation impacted the processes or strategies patients used in working at recovery from PTSD. The TTM specifies 10 processes that people use in making lifestyle changes. People in different stages are expected to use different strategies (Prochaska et al., 1992). Behaviorally oriented strategies are typically used most by people in the action or maintenance stages of change. These strategies include committing to change, stimulus control

(controlling cues), counterconditioning (substituting alternative behaviors), reinforcement management, and helping relationships (using social support). Cognitive-affective strategies are used most during the contemplation and preparation stages (before quitting) in overcoming addictive behaviors, but are often used during action and maintenance stages of exercise or diet change (Rosen, 2000). Such strategies include consciousness-raising (seeking information), self-reevaluation (reconsidering consequences of the behavior on oneself), environmental reevaluation (reconsidering consequences of the behavior on others), dramatic relief (experiencing and expressing affect), and social liberation (being aware of changing social norms supporting change). Three more strategies have been proposed as factors in overcoming substance abuse: receiving feedback, interpersonal stimulus control (avoiding people who abuse substances), and physical methods such as taking medications (Snow, Prochaska, & Rossi, 1994).

No prior studies have assessed processes of change for anger. Several studies have examined how alcohol abuser's use of change strategies varies by their readiness for change, however they are all unpublished doctoral dissertations (Rosen, 2000). We therefore wanted to determine whether PTSD patients' use of the behavioral and cognitive-affective change strategies for alcohol or anger problems was related to their readiness for change.

In summary the present study tested five hypotheses among combat veterans participating in a PTSD rehabilitation program. Our first hypothesis was that cluster-analysis of patients' responses to University of Rhode Island Change Assessment (URICA) questionnaires for alcohol and for anger would divide PTSD patients into motivational subgroups that were clinically meaningful and consistent with the transtheoretical model. Our second hypothesis was that readiness to change would be problem-specific, that is, that URICA scores and cluster-group assignments for alcohol would be independent of those for anger. Our third hypothesis was that patients in the more highly motivated clusters (i.e., those in the action or maintenance stages of change) would have more severe problem histories than would those in less-motivated clusters (i.e., those in the precontemplation stage). Our fourth hypothesis was that more highly motivated patients would be more likely to self-identify alcohol or anger as problems when they entered treatment. Our final hypothesis was that patients in the more-motivated clusters would use change strategies specified by the TTM more frequently than would patients in the less-motivated clusters.

Method

Sample

Participants were male combat veterans entering a 45- to 60-day residential rehabilitation program for chronic, combat-related PTSD. A total of 102 successive patients entering the program between February and July 1999 completed measures assessing their readiness to change problems with alcohol (n = 92) and anger control (n = 90). The age of the veterans ranged from 42 to 63 years (mean = 51). Roughly half (52%) were White, 18% were Hispanic, 16% were African-American, 4% were Native American, and the remainder came from other or mixed ethnic backgrounds. Eleven percent had never married, 36% were currently married, 2% were living with a partner, 44% were divorced, 6% were separated, and 1% were widowed.

Most (92%) were veterans of the Vietnam War. About one-third had been wounded in combat. Over 60% of patients had a service-connected psychiatric disability, usually for PTSD. In addition to a diagnosis of PTSD, 84% of the veterans had one or more (mean = 2.4) other psychiatric diagnoses. The most common comorbid diagnoses were for mood disorders (48% of all patients), personality disorders (28%), other anxiety disorders (16%), and psychotic disorders (95%). Although current substance abusers were excluded from the program, over 90% of these veterans had lifetime histories of alcohol abuse or dependence, and at least 35% had diagnoses for drug abuse or dependence in remission.

Measures

PTSD, alcohol, and anger problems. Clinical symptom measures were collected as part of routine intake assessment. Patients' PTSD symptoms were assessed with the Mississippi Scale for Combat-Related PTSD (Keane, Cadell, & Taylor, 1988). Lifetime and current substance abuse problems were assessed with the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, 3rd ed.-rev. (DSM-III-R) (SCID; Spitzer, Williams, Gibbon, & First, 1990), Alcohol Dependence Scale (ADS: Kivla-

han, Sher, & Donovan, 1989), and Drug Abuse Screening Test (DAST: Skinner, 1982). Anger was assessed with the State-Trait Anger Inventory (STAI; Spielberger, 1983). Sixty-nine patients (68%) also completed the Warzone Stress Intake Questionnaire (WSIQ; Fontana & Rosenheck, 1997), a self-administered measure that included some items regarding violent behavior, recent alcohol use, and use of alcohol or other substances to manage PTSD symptoms. Because patients were required to be alcohol-free for 1 month prior to entering the program, the WSIQ asked about alcohol use during the period 60 to 31 days before entering PTSD rehabilitation.

Alcohol and anger readiness for change. Patients' readiness to change was assessed with the University of Rhode Island Change Assessment (URICA; McConnaughy, Prochaska, & Velicer, 1983). This self-report measure generates continuous scores on four scales: precontemplation (don't see any problem), contemplation (thinking about changing), action (making changes), and maintenance (concerned about avoiding relapse).[1] The URICA questionnaire has been used to assess motivation among psychotherapy clients, including survivors of sexual abuse (Greenstein, Franklin, & McGuffin, 1999; Koraleski & Larson, 1997; McConnaughy, DiClemente, Prochaska, & Velicer, 1989), and among both veterans and nonveterans in substance-abuse treatment (Carney & Kivlahan, 1995; DiClemente & Hughes, 1990). The URICA questionnaires used in this study were modified by substituting the words "my alcohol problem" or "my temper" for "my problem."

Alcohol and anger change strategies. Patients' frequency of using 13 change strategies for alcohol were assessed using a questionnaire developed by Snow et al. (1994) with additional items suggested by DiClemente (1999). An anger process-of-change questionnaire was developed for this study. Four of the authors (CR, RM, GR, and RR) and another psychologist familiar with both the PTSD program and TTM generated a list of specific behaviors corresponding to the 10 change strategies and three negative anger behaviors (acting out, angry rumination, and using substances to manage angry feelings). They then selected 78 of these items for inclusion in the questionnaire. Respondents indicated their frequency of engaging in each behavior using a scale from 1 (*rarely*) to 5 (*repeatedly*). Copies of this measure are available from the first author.

Self-identified problems. Sixty-six patients participated in one or more sessions of a motivation-enhancement group and self-generated lists of issues they perceived to be definite and possible ("might or might not be") problems in their life during the first session. We used a coding scheme developed by Murphy et al. (1998) to determine whether patients listed any issues related to alcohol or anger.

Data Analysis

Psychometric analysis. The samples for psychometric analyses were supplemented by an additional 35 subjects for the anger measures and 13 subjects for the alcohol measures. These pilot subjects were excluded from the main study because they were assessed more than 2 weeks after intake or because they lacked trait anger data.

Internal consistency reliabilities of the URICA and processes-of-change questionnaire subscales were assessed with Cronbach's alpha. Confirmatory factor analysis was conducted using the AMOS 4 computer program (Arbuckle, 1994) to see whether responses to the alcohol processes of change questionnaire fit a model with two correlated higher-order factors, a cognitive-affective factor and a behavioral factor. A confirmatory factor analysis was also performed on the anger processes-of-change questionnaire positing three correlated factors: cognitive-affective strategies, behavioral strategies, and negative anger behaviors.

Readiness-for-change profiles. Patients were included in the analyses for alcohol if they had a lifetime diagnosis of alcohol abuse or dependence on the SCID or (if SCID data were unavailable) had an ADS score over 13. Patients' alcohol URICA scores were standardized relative to alcohol URICA scores obtained by DiClemente and Hughes (1990, cited in Rothfleisch, 1997) for patients entering alcoholism treatment. Patients were categorized into groups using hierarchical clustering of their URICA subscale scores. The clustering algorithm used Ward's method based on squared Euclidean distances. These groups were then compared on problem history variables, self-identification of alcohol as a problem, and use of change strategies using either chi-square or ANOVA. Follow-up t tests were used for pair-

[1] High scores on both the contemplation and action scales of the URICA indicate membership in the preparation stage, a later addition to the TTM.

wise comparisons if the ANOVA proved significant.

Patients were included in the anger analyses if they had trait anger scores of 26 or higher. This score is comparable to the 94th percentile of all adult males (Spielberger, 1988). We selected a cut-point with high specificity (at the expense of low sensitivity) to be sure that all patients had significant anger problems. Because there are no URICA norms for anger problems, scores were standardized relative to all patients in this sample who had high trait anger scores. The clustering procedure used for alcohol was repeated with the anger URICA scores. The resulting groups were again compared on other variables using chi-square or ANOVA with follow-up *t* tests. To reduce Type I error, MANOVA was used when multiple items within the same measure assessed related constructs (i.e., for state and trait anger subscales on the STAI, and for four measures of violent behavior on the WSIQ).

Results

Psychometric Analyses of the Measures

Before trying to identify clusters of patients with differing motivational profiles, we analyzed the psychometric properties of the URICA and processes-of-change questionnaires.

Alcohol and anger URICA questionnaires. Cronbach's alpha for the four alcohol URICA subscales ranged from .76 to .88, indicating adequate internal consistency reliability. Subscales on the anger URICA also had good internal consistency, with Cronbach's alpha ranging from .70 to .84.

Alcohol process-of-change questionnaire. All subscales of the alcohol processes-of-change questionnaire had good internal consistency reliability (Cronbach's alphas = .80 to .95), with one exception. The physical means subscale, which included items such as taking tranquilizers, taking Antabuse, smoking, and eating instead of drinking, had a Cronbach's alpha of .69 and was not used in subsequent analyses.

A confirmatory factor analysis tested how well the alcohol processes loaded on two correlated factors. The cognitive-affective factor was expected to encompass the strategies of consciousness-raising, dramatic relief, self-reevaluation, environmental reevaluation, social liberation, and feedback. Commitment, counterconditioning, stimulus control, reinforcement management, helping relationships, interpersonal stimulus control, and physical methods were expected to load on the behavioral factor. The initial model produced an unsatisfactory fit to the data (GFI = .80, χ^2_{54} = 159.8). The specification of 9 additional correlations among subscales produced a better-fitting model (GFI = .92, χ^2_{45} = 65.7). However, the cognitive-affective or behavioral factors were correlated .93, indicating that a one-factor model was most parsimonious. Subsequent analysis therefore averaged the scores for all of the 12 alcohol change strategies into a single dependent variable.

Anger processes-of-change questionnaire. Based on pilot data from the 35 pilot participants, the stimulus control (Cronbach's alpha = .55) and substance use (Cronbach's alpha = .44), subscales were deleted from the anger processes-of-change questionnaire, and one item was dropped from the angry rumination subscale. The revised anger processes-of-change subscales had good internal consistency (Cronbach's alpha .71 to .93) in the full sample. Alphas for the negative anger behavior subscales were lower (.71 for acting out and .64 for angry rumination), partly because they contained only 4 and 3 items, respectively.

Another confirmatory factor analysis was performed to test how the anger processes data fit a model with three correlated factors. These factors were cognitive-affective strategies (consciousness-raising, dramatic relief, self-reevaluation, environmental reevaluation, and social liberation), behavioral strategies (commitment, counterconditioning, reinforcement, and helping relationships), and negative behaviors (acting out and angry rumination). The fit of the initial model was unsatisfactory (GFI = .80, χ^2_{43} = 158.3), but was improved with the addition of 9 more correlations among subscales (GFI = .91, χ^2_{34} = 69.4). The cognitive-affective and behavioral factors correlated .99, indicating they composed a single factor. Negative anger behavior was uncorrelated with either the cognitive-affective (r = .13, ns) or behavioral (r = .03, ns) factors. Subsequent analysis therefore used the average of the nine change strategies and the average of the two negative behavior scores as dependent variables.

Alcohol Readiness for Change

Can we identify alcohol readiness-for-change clusters? Eighty-four (91%) of the 92 patients who completed the alcohol readiness measures at

intake had a history of alcohol dependence or abuse. These patients' URICA scores were subjected to a hierarchical cluster analysis. After examination of three, four, and five-cluster solutions, a four-cluster solution was selected as the most meaningful based on the distinctiveness of the cluster profiles, their interpretability in terms of TTM, and the number of patients in each cluster.

Twenty-three patients (27%) formed a cluster that replicated the "participation" profile found in previous studies of patients in substance-abuse treatment (Carney & Kivlahan, 1995; DiClemente & Hughes, 1990). This cluster, consistent with being in the action or maintenance stages of change, is characterized by low scores on the precontemplation subscale and high scores on the action and maintenance subscales (see Figure 1).

Fifteen patients (18%) formed a cluster that replicated the "precontemplation" profile found in previous studies, with elevated precontemplation scores, very low contemplation scores, and below-average action and maintenance scores.

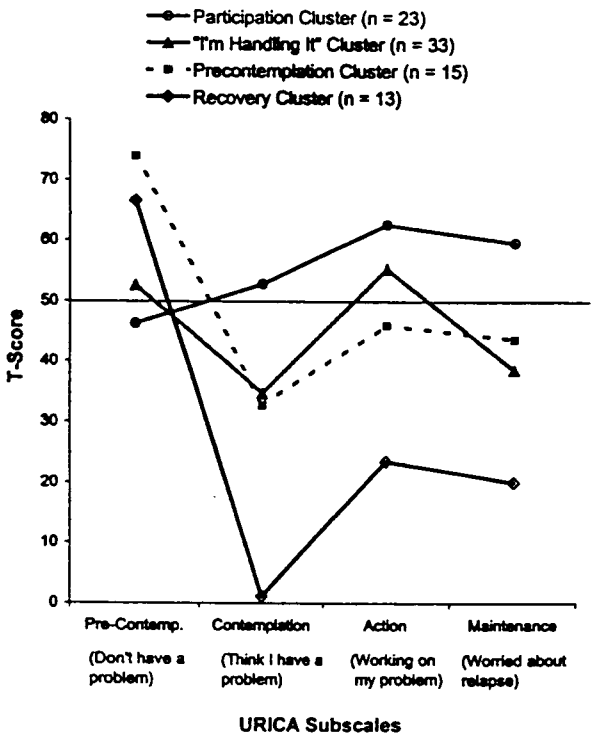

Figure 1. Alcohol URICA profiles for four clusters of combat posttraumatic stress disorder (PTSD) patients. Subscale T-scores (mean = 50, *SD* = 10) are standardized relative to norms for patients entering substance-abuse treatment (DiClemente & Hughes, 1990).

Another 13 patients (15%) formed a cluster that had a profile similar to the precontemplation cluster, but with more extreme negative (less motivated to change) scores. For reasons discussed below, these patients appeared to be in long-term recovery rather than in denial and were named the "recovery" cluster.

Patients in the final cluster, which we named "I'm handling it" (n = 33), were similar to the "noncontemplative action" profile of psychotherapy patients reported by McConnaughy et al. (1983). These patients perceived themselves as working at sobriety (above-average action scores), but minimized the severity of their drinking problems (above-average precontemplation and below-average contemplation scores). These patients are in an action stage of change, but are at risk for relapse (below-average maintenance scores).

Clusters differences in alcohol problem history. People in different alcohol readiness clusters had similar PTSD symptoms as indicated by the Mississippi combat PTSD scale ($F_{3,71}$ = 1.0, ns). Alcohol problem history varied significantly by cluster, even though all patients had a lifetime history of an alcohol disorder and had been alcohol-free for at least 30 days. Nearly all the patients in the recovery cluster were in sustained remission (alcohol-free for over 1 year), and nearly half had not had a drink in 5 years (see Table 1). In contrast, about half the patients in the precontemplation and "I'm handling it" clusters and nearly three-quarters of the patients in the participation cluster were in either early or partial remission. As predicted, the participation cluster had the most severe lifetime history of alcohol and drug problems as indicated by the ADS and DAST. Patients in different clusters were similar in the numbers of days they consumed alcohol in the month prior to the 30-day abstinence period required for entry into the program. However, patients in the participation and precontemplation clusters reported more days of problems, such as withdrawal or craving, during that period. Patients in the "I'm handling it" cluster reported using substances to manage PTSD symptoms more frequently than did patients in the recovery cluster.

Cluster differences in identifying alcohol as a problem. Among the 57 patients with alcohol abuse histories who participated in the motivation enhancement group, only one-third initially listed alcohol as a definite (28%) or possible (5%) prob-

TABLE 1. Alcohol History and Readiness-for-Change Variables by Cluster

	Readiness-for-Change Cluster								
	Recovery (13)		Precontemplation (15)		I'm Handling It (33)		Participation (23)		
(*n*) Variables	*m*	(*SD*)	*m*	(*SD*)	*m*	(*SD*)	*M*	(*SD*)	Significance
Mississippi	140.3	(16.1)	136.4	(13.3)	136.8	(17.4)	144.2	(16.9)	$F_{3,71} = 1.0$
ADS	15.0^{a}	(11.3)	19.6^{a}	(13.2)	18.6^{a}	(10.5)	31.0^{b}	(8.6)	$F_{3,74} = 8.1^{**}$
Days drank	1.1	(3.3)	3.7	(9.0)	2.0	(5.8)	5.2	(9.1)	$F_{3,56} = 0.9$
Alcohol problems	$0.0^{a,b}$	(0.0)	8.8^{b}	(13.8)	0.1^{a}	(0.4)	7.4^{b}	(11.4)	$F_{3,56} = 4.4^{**}$
Substances for PTSD	2.9^{a}	(1.9)	$3.6^{a,b}$	(1.3)	4.4^{b}	(1.2)	$3.9^{a,b}$	(1.3)	$F_{3,56} = 2.7^{*}$
DAST	7.5^{a}	(6.5)	9.2^{a}	(7.8)	11.5^{a}	(8.7)	16.2^{b}	(9.1)	$F_{3,70} = 3.2^{*}$
Change processes	2.6^{a}	(1.0)	$2.9^{a,b}$	(1.1)	$3.4^{b,c}$	(.8)	3.8^{d}	(.6)	$F_{3,79} = 6.9^{**}$
Alcohol as problem (%)	$20^{a,b}$		0^{a}		36^{b}		53^{b}		$\chi^2_{3,53} = 8.4^{*}$
Time alcohol free									
1–12 months (%)	8		50		55		73		$\chi^2_{6,75} = 18.4^{**}$
1–5 years (%)	46		36		18		27		
6+ years (%)	46		14		27		—		

Note. Groups with different superscripts had significantly different scores ($p < .05$) in follow-up paired comparisons. Mississippi = Mississippi combat PTSD scale. ADS = Alcohol Dependence Scale. Days drank = number of days drank in 30-day period ending 1 month prior to entering program. (Patients were required to be alcohol-free for 30 days before entering program). Alcohol problems = number of days experienced craving, withdrawal, or other alcohol problems during that period. Substances for PTSD = frequency (1 = never, 5 = frequently) of using alcohol or other drugs to manage PTSD symptoms. DAST = (lifetime) drug abuse screening test. Change processes = Mean frequency (1 = never, 5 = repeatedly) on alcohol processes-of-change questionnaire. Alcohol as problem = list alcohol as problem subjects "might" or "definitely" have at start of motivation enhancement group. Time alcohol free = length of time alcohol free at start of program.

* $p < .05$.

** $p < .01$.

lem in their life. As hypothesized, patients in the participation cluster were the most likely to list alcohol as a possible or definite problem, whereas those in the recovery and precontemplation clusters were least likely to do so (see Table 1).

Cluster differences in use of change strategies. As predicted, patients in the participation cluster made the most frequent use of change strategies specified by the transtheoretical model. Patients in the recovery and precontemplation clusters used these change strategies least often.

Post-hoc analysis of patients in early remission. To focus on patients for whom alcohol problems were most current, the cluster analysis was repeated including only patients who were alcohol-free for less than 1 year ($n = 41$). The results broadly replicated the original clusters minus the recovery cluster. The participation cluster ($n = 17$) included patients in the action or maintenance stages. Their mean precontemplation subscale score (PC) was 45.9, their mean contemplation score (C) was 51.2, and their mean action (A) and maintenance (M) scores were 60.9 and 59.1, respectively. Patients in the "I'm handling it" cluster ($n = 9$) perceived themselves as taking action yet minimized their concerns about possible relapse (PC = 47.8, C = 33.3, A = 57.2, M = 35.6). Patients in the precontemplation cluster ($n = 15$) minimized their alcohol problems (PC = 65.7, C = 37.0, A = 50.0, M = 46.0). Group contrasts showed that patients in the participation cluster had a more severe history of alcohol problems than did veterans in the precontemplation or "I'm handling it" clusters ($t_{39} = 2.3$, $p < .05$ for ADS scores; $t_{29} = 2.9$, $p < .05$ for alcohol problems on the WSIQ). As predicted, patients in the participation cluster used change strategies more frequently than did patients in the other two clusters ($t_{39} = 2.5$, $p < .05$). Contrasts between the precontemplation and "I'm handling it" clusters were not significant.

Anger Readiness for Change

Can we identify anger readiness-for-change clusters? Of the 90 patients who completed both the STAI and readiness for change measures within the first two weeks of treatment, 60 (67%) had trait anger scores of 26 or higher. Their

URICA scores were used in a hierarchical cluster analysis. After examining URICA profiles for three, four, and five-cluster solutions, we choose a four-cluster solution as the most meaningful. We included a fourth cluster, even though it contained only three patients, because its profile was clinically distinct and consistent with TTM.

Twenty-four patients (40%) formed a cluster with a "participation" profile similar to that seen for alcohol (see Figure 2). These were patients predominantly in the action or maintenance stages of change. Another 15 patients (25%) formed a cluster with a classic "precontemplation" profile (above-average scores on the precontemplation scale; below-average scores on all other scales). Eighteen patients (30%) formed a cluster consistent with the "preparation" stage of change, with average to above-average scores on both the contemplation and action scales. Three patients (5%) formed a "contemplation/inactive" cluster. These patients are in a contemplation stage of change (high contemplation scores) but are not progressing toward preparation or action (extremely low action scores).[2]

Are readiness-for-change clusters for alcohol and anger independent? Cross-tabulation supported our prediction that anger cluster membership and alcohol cluster membership were not significantly related (χ^2_9 = 13.9, ns). We also used a variant of trait-method analysis to determine whether scores on the Precontemplation, Contemplation, Action, and Maintenance subscales of the URICA were problem-specific or reflected global readiness for change. Correlations between different URICA subscales within the same problem (e.g., between Contemplation and Action scores for alcohol) ranged from .26 to .79 (mean = .50).[3] Correlations between URICA scores on the same subscale but for different problems (e.g., between Contemplation scores for alcohol and for anger) were .00 to .24 (mean = .10). Correlations between URICA scores on different subscales across problems (e.g., Contemplation score for alcohol and Action score for anger) correlated .00 to .21 (mean = .09). The weak correlations of scores across problems confirmed our hypothesis that URICA scores for alcohol were relatively independent of those for anger.

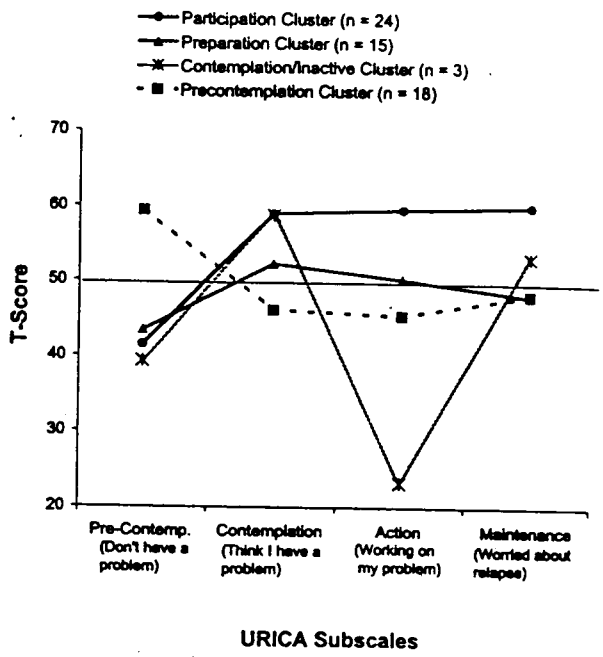

Figure 2. Anger URICA profiles for four clusters of combat posttraumatic stress disorder (PTSD) patients. Subscale T-scores (mean = 50, *SD* = 10) are standardized relative to all patients in the sample with trait anger scores of 26 or higher.

Cluster differences in severity of anger problems. Patients in different anger clusters did not vary significantly in their Mississippi PTSD scale, ADS, or DAST scores. Due to our screening criteria, mean trait and stage anger scores in all four clusters were at last two *SD* above the norm for adult males (see Table 2). At least half the patients in all clusters reported threatening someone in the previous 4 months. MANOVA indicated no significant differences in state and trait anger scores by cluster (Hotellings $F_{15,125}$ = 1.4, ns). However, violent behavior varied by cluster (Hotellings $F_{12,95}$ = 2.4, $p < .01$), with patients in the precontemplation and contemplation clusters the most likely to report destroying property (see Table 2). This was contrary to our prediction that anger problems would be most severe among patients most motivated for change.

Cluster differences in identification of anger as a problem. Among the 37 patients with high

[2] Patients in this cluster differed from the contemplation profile found in other studies in that their action scores were extremely low.

[3] This analysis was based on 49 patients who completed readiness-for-change measures and met screening criteria for problems with both alcohol and anger. Reported correlations are absolute values of the correlation coefficients because scores on the Precontemplation scale were negatively correlated with scores on the other scales.

TABLE 2. Anger Problems and Readiness-for-Change Variables by Cluster

	Readiness-for-Change Cluster								
	Precontemplation (18)		Contemplation (3)		Preparation (15)		Participation (24)		
(*n*) Variables	*m*	(*SD*)	*m*	(*SD*)	*m*	(*SD*)	*m*	(*SD*)	Significance
Mississippi	143.9	(14.6)	163.0	(12.5)	144.3	(13.4)	145.3	(14.9)	$F_{3,56} = 1.6$
State anger	21.1	(10.7)	32.0	(8.9)	20.5	(7.1)	24.3	(9.6)	$F_{3,56} = 1.7$
Trait anger	32.9^{a}	(4.3)	39.0^{b}	(1.7)	$33.1^{a,c}$	(4.3)	$35.2^{b,c}$	(4.6)	$F_{3,56} = 2.5$#
Change processes	$3.1^{a,b}$	(0.8)	2.2^{a}	(0.4)	3.3^{b}	(0.5)	3.6^{c}	(0.6)	$F_{3,56} = 6.0$**
Negative anger	3.3	(0.6)	3.5	(0.2)	3.5	(0.5)	3.5	(0.9)	$F_{3,56} = 0.4$
4-month violence									
Destroy property (%)	75^{a}		100^{a}		30^{b}		20^{b}		$\chi^2_{3,36} = 12.7$**
Threaten (%)	92^{a}		100^{a}		$60^{a,b}$		53^{b}		$\chi^2_{3,36} = 6.4$#
Physical fight (%)	58		0		30		27		$\chi^2_{3,36} = 5.1$
Threat w/weapon (%)	50		0		30		20		$\chi^2_{3,36} = 4.3$
Anger as problem	(*n* = 13)		(*n* = 3)		(*n* = 8)		(*n* = 13)		
Definite problem	54^{a}		100^{b}		50^{a}		100^{b}		$\chi^2_{6,33} = 11.0$#
Possible problem	15		—		25		—		

Note. Groups with different superscripts had significantly different scores ($p < .05$) in follow-up paired comparisons. Mississippi = Mississippi combat PTSD scale. State anger = state anger score on State-Trait Anger Inventory (STAI). Trait anger = trait anger score on STAI. Change processes = mean frequency (1 = never, 5 = repeatedly) of using strategies on anger processes-of-change questionnaire. Negative anger = mean frequency (1 = never, 5 = repeatedly) of negative anger behaviors on anger processes of change questionnaire. 4-month violence = reports of violent behavior in past 4 months on Warzone Stress Intake Questionnaire. Anger as problem = list anger as problem "might" or "definitely" have at start of motivation enhancement group.

# $p < .10$.
* $p < .05$.
** $p < .01$.

trait anger who participated in the motivation enhancement group, 84% listed anger as a definite (73%) or possible (11%) problem in their life. Differences by cluster approached significant ($p < .10$) and were consistent generally with our hypothesis. All patients in the participation and contemplation clusters (the clusters with the highest contemplation and maintenance scores) listed anger as a definite problem, compared to about half of those patients in the precontemplation cluster and the preparation clusters (see Table 2).

Cluster differences in use of change strategies. As predicted, patients in the participation cluster used change strategies specified by the TTM most frequently. Unexpectedly, patients in the contemplation cluster used them least often. The four clusters did not differ in their negative expression of anger (angry rumination or acting out).

Discussion

The present study confirms that patients with chronic PTSD vary in their readiness to address problems with alcohol and with anger. Most of our hypotheses were supported. URICA scores could be used to identify different motivational clusters within this population. In contrast to the findings of Abellanas and McLellan (1993), we were able to differentiate readiness for change for two specific problems, alcohol and anger control. The validity and clinical utility of the motivational clusters for alcohol and for anger were supported by their convergence with patients' problem history, patients' self-identification of alcohol or anger as problems in their lives, and patients' use of change strategies to promote recovery from PTSD.

Implications for Treatment Planning

Patients with combat-related PTSD commonly present with maladaptive patterns of behavior that impair their functioning. Patients' level of motivation to address alcohol and anger problems may not be readily apparent from their behavior during rehabilitation, because patients are required to be

alcohol-free and to avoid engaging in disruptive hostile behavior as conditions of remaining in treatment. However, patients who fail to recognize significant alcohol or anger problems are less likely to benefit from skills-building interventions and are likely to relapse to old behaviors after leaving a structured program.

The present study provides an example of how motivational assessment can identify patients' levels of readiness to address specific problems in treatment. Such information has several potential uses. Clinicians and clients may decide to focus first on goals that the patient is most motivated to change. Motivational assessment may be used to identify patients who are ready for a given intervention or to indicate to payers that a patient is likely to benefit from a particular treatment. Motivational profiles may also inform interventions to promote patients' readiness for change. Although it is unclear whether the specific clusters found in this study would be replicated in other patient populations, we suggest below some ways in which motivational assessments might be used to inform treatment decisions for combat-related PTSD.

Alcohol problems. With regard to alcohol problems, the present study identified four clusters of combat PTSD patients. Patients in the participation cluster, who were actively working at recovery, seemed most ready to learn and apply relapse prevention skills and symptom management techniques they could use instead of self-medicating their PTSD symptoms with alcohol. Patients in the "I'm handling it" cluster were working at recovery but complacently assumed that their recent sobriety meant they were no longer at risk. Relapse prevention training is critical for this group. Patients in the precontemplation cluster minimized their alcohol problems, and were likely to benefit from motivational interviewing. Patients in the recovery cluster initially appeared similar to those in precontemplation. However, their length of sobriety appeared to validate their self-perception that they were currently not having problems with alcohol. This indicates the importance of combining any motivational assessment with knowledge of the patient's history. Patients in recovery can benefit from clinicians and peers reinforcing their success and not treating their confidence for denial.

Anger management. In the present study, nearly three-quarters of patients identified anger as a problem they "definitely have." This likely reflects the very high STAI screening criterion and the fact that all patients were sufficiently motivated to attend a residential PTSD rehabilitation program. Nonetheless, even within this relatively highly motivated population, there were substantial differences in patients' readiness to address difficulties with anger that have potential implications for treatment.

Patients in the participation cluster seemed ready to benefit from anger management and conflict resolution skills training. Patients in the preparation cluster, who were working on managing their anger to a lesser degree, appeared likely to benefit from both skills-building and motivational interventions. It is likely that patients in the precontemplation cluster, even if aware of negative consequences from their anger, tended to externalize blame rather than take responsibility for how they respond to perceived provocations. Such patients are likely to benefit from motivational interviewing or other interventions that highlight their having choices about how they respond and that help them reassess whether they misperceive neutral events as personal attacks. Patients in the contemplation-inactive cluster were well aware of their problems in handling anger but appeared too overwhelmed to change. Such patients can benefit from controlled mastery experiences to enhance their self-efficacy for applying anger-management skills.

Limitations of the Present Study

Generalization to other populations. The combat veterans in the present study represent a somewhat unique group. These clients had been struggling for up to 30 years with chronic mental illness and multiple life stressors, yet still had enough hope to participate in an intensive rehabilitation program. Motivational clusters identified in this sample may not be replicated among clients in outpatient psychotherapy for PTSD, clients with other mental disorders, or female clients. Nonetheless, the process we used to develop problem-specific motivational profiles may well be applicable in treatment planning for other client populations.

Differentiation of change strategies. We had hoped to differentiate the various change strategies and to determine whether people used particular strategies during particular stages of change. However, our confirmatory factor analyses failed to differentiate cognitive-affective strategies from behavioral ones. This may reflect limitations of

our measures. The anger processes-of-change questionnaire was developed for this study, and only one prior study used the alcohol processes-of-change questionnaire (Snow et al., 1994). It may also reflect differences between processes in health promotion and in psychotherapy and substance abuse. A distinction between cognitive-affective and behavioral change strategies has been shown in studies of smoking, exercise, and diet change (Kristeller, Rossi, Ockene, Goldberg, & Prochaska, 1992; Marcus, Rossi, Selby, Niaura, & Abrams, 1992; O'Connor, Carbonari, & DiClemente, 1996; Rossi, Rossi, Rossi-DelPrete, & Prochaska, 1994) but has yet to be confirmed among psychotherapy patients or alcohol abusers. Studies of methadone maintenance patients (Belding, Iguchi, Lamb, Lakin, & Terry, 1995; Tejero, Trujols, Hernandez, de los Cobos, & Casa, 1997) have suggested a three or four factor model in which behavioral strategies are further divided onto different factors, but post-hoc analyses in our data did not support this model.

Utility of the URICA to assess motivation for multiple problems. The present study showed that the URICA can assess motivation to address specific problems, not only overall readiness for treatment. However, the URICA's length (32 items) makes it impractical for assessing more than one or two presenting problems. The scoring procedures for URICA data are also too complex for use as a practical triage or goal-setting tool. An important area for further study is developing simpler instruments, such as stage-of-change algorithms, measures of intent to change, or patient-generated problem lists, that can be used to quickly assess readiness to change for multiple problems in psychotherapy.

Summary

This study supports the applicability of TTM to recovery from combat-related PTSD and to anger management, two areas to which it has not been previously applied. The results confirm that veterans with combat PTSD enter rehabilitation programs at different points of recovery for PTSD-related problems such as alcohol abuse or poor anger control. Our findings also indicate that TTM can be a useful framework for assessing not only general readiness for treatment, but also motivation to address specific problems such as alcohol abuse or anger. Such information can potentially be used to prioritize treatment goals and to match treatments. Further research is needed to determine whether matching interventions for alcohol and anger problems to patients' readiness to change can enhance rehabilitation from chronic PTSD.

References

Abellanas, L., & McLellan, A. T. (1993). "Stage of change" by drug problem in concurrent opioid, cocaine, and cigarette users. *Journal of Psychoactive Drugs, 25*, 307–313.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington, DC: Author.

Arbuckle, J. L. (1994). AMOS (Version 4.0) [Computer software]. Chicago, IL: SmallWaters Corporation.

Belding, M. A., Iguchi, M. Y., Lamb, R. J., Lakin, M., & Terry, R. (1995). Stages and processes of change among polydrug users in methadone maintenance treatment. *Drug and Alcohol Dependence, 39*, 45–53.

Boudewyns, P. A., Woods, M. G., Hyer, L., & Albrecht, J. W. (1991). Chronic combat-related PTSD and concurrent substance abuse: Implications for treatment of this frequent "dual diagnosis." *Journal of Traumatic Stress, 4*, 549–560.

Bremner, J. D., Southwick, S. M., & Charney, D. S. (1996). Chronic PTSD in Vietnam combat veterans: Course of illness and substance abuse. *American Journal of Psychiatry, 153*, 369–375.

Carney, M. M., & Kivlahan, D. R. (1995). Motivational subtypes among veterans seeking substance abuse treatment: Profiles based on stages of change. *Psychology of Addictive Behaviors, 9*, 135–142.

Chemtob, C. M., Novaco, R. W., Hamada, R. S., & Gross, D. M. (1997). Cognitive-behavioral treatment for severe anger in posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 65*, 184–189.

Deffenbacher, J. L. (1999). Cognitive-behavioral conceptualization and treatment of anger. Special issue: Treating anger in psychotherapy. *Journal of Clinical Psychology, 55*, 295–309.

DiClemente, C. C. (1999). *Process of change*. Unpublished measures on University of Rhode Island Cancer Prevention Research Center web site. Available: http://www.uri.edu/research/cprc/Measures.

DiClemente, C. C., & Hughes, S. O. (1990). Stages of change profiles in outpatient alcoholism treatment. *Journal of Substance Abuse Treatment, 2*, 217–235.

DiGiuseppe, R. (1995). Developing the therapeutic alliance with angry clients. In H. Kassinove (Ed.), *Anger disorders: Definition, diagnosis, and treatment* (pp. 131–150). Philadelphia: Taylor & Francis.

Flack, W. F., Litz, B. T., & Keane, T. M. (1998). Cognitive-behavioral treatment of war-zone-related posttraumatic stress disorder. In V. M. Follette, J. I. Ruzek, & F. R. Abueg (Eds.), *Cognitive-behavioral therapies for trauma* (pp. 77–99). New York: Guilford.

Fontana, A., & Rosenheck, R. (1997). Effectiveness and cost of the inpatient treatment of posttraumatic stress disorder: Comparison of three models of treatment. *American Journal of Psychiatry, 154*, 758–765.

Greenstein, D. K., Franklin, M. E., & McGuffin, P. (1999). Measuring motivation to change: An examination of the University of Rhode Island Change Assessment Questionnaire (URICA) in an adolescent sample. *Psychotherapy, 36*, 47–55.

Keane, T. M., Cadell, J. M., & Taylor, K. L. (1988). Mississippi scale for combat-related PTSD: Three studies in reliability and validity. *Journal of Consulting and Clinical Psychology, 56*, 85–90.

Kivlahan, D. R., Sher, K. J., & Donovan, D. M. (1989). The Alcohol Dependence Scale: A validation study among inpatient alcoholics. *Journal of Studies on Alcohol, 50*, 170–175.

Kofoed, L., Friedman, M. J., & Peck, R. (1993). Alcoholism and drug abuse in PTSD. Special issue: Contemporary topics in drug dependence and alcoholism. *Psychiatric Quarterly, 64*, 151–171.

Koraleski, S. F., & Larson, L. M. (1997). A partial test of the transtheoretical model in therapy with adult survivors of childhood sexual abuse. *Journal of Counseling Psychology, 44*(3), 302–306.

Kristeller, J. L., Rossi, J. S., Ockene, J. K., Goldberg, R., & Prochaska, J. O. (1992). Processes of change in smoking cessation: A cross-validation study in cardiac patients. *Journal of Substance Abuse, 4*, 263–276.

Marcus, B. H., Rossi, J. S., Selby, V. C., Niaura, R. S., & Abrams, D. B. (1992). The stages and processes of exercise adoption and maintenance in a worksite sample. *Health Psychology, 11*(6), 386–395.

McConnaughy, E. A., DiClemente, C. C., Prochaska, J. O., & Velicer, W. F. (1989). Stages of change in psychotherapy: A follow-up report. *Psychotherapy, 26*, 494–503.

McConnaughy, E. A., Prochaska, J. O., & Velicer, W. F. (1983). Stages of change in psychotherapy: Measurement and sample profiles. *Psychotherapy: Theory, Research, & Practice, 20*, 368–375.

Mellman, T. A., Kutcher, G. S., Santiago, L., & David, D. (1999). Rehabilitative treatment for combat-related PTSD. *Psychiatric Services, 50*, 1363–1364.

Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York: Guilford.

Murphy, R. T., Cameron, R. P., Sharp, L., & Ramirez, G. (1999). Motivating veterans to change PTSD symptoms and related behaviors. *PTSD Clinical Quarterly, 8*(2), 32–36.

Murphy, R. T., Cameron, R. P., Sharp, L., Ramirez, G., Rosen, C. S., Drescher, K. D., & Gusman, F. (2001). *Readiness to change PTSD symptoms and related behaviors among veterans participating in a motivation enhancement group*. Manuscript submitted for publication.

Novaco, R. W., & Chemtob, C. C. (1998). Anger and trauma: Conceptualization, assessment, and treatment. In V. M. Follette, J. I. Ruzek, & F. R. Abueg (Eds.), *Cognitive-behavioral therapies for trauma* (pp. 162–190). New York: Guilford.

O'Connor, E. A., Carbonari, J. P., & DiClemente, C. C. (1996). Gender and smoking cessation: A factor structure comparison of processes of change. *Journal of Consulting and Clinical Psychology, 64*, 130–138.

Ouimette, P. C., Finney, J. W., & Moos, R. H. (1999). Two-year posttreatment functioning and coping of substance abuse patients with posttraumatic stress disorder. *Psychology of Addictive Behaviors, 13*, 105–114.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*, 1102–1114.

Reilly, P. M., Clark, H. W., Shropshire, M. S., Lewis, E. W., & Sorensen, D. J. (1994). Anger management and temper control: Critical components of posttraumatic stress disorder and substance abuse treatment. *Journal of Psychoactive Drugs, 26*, 401–407.

Rosen, C. S. (2000). Is the sequencing of change processes by stage consistent across health problems? A meta-analysis. *Health Psychology, 19*, 593–604.

Rossi, S. R., Rossi, J. S., Rossi-DelPrete, L. M., & Prochaska, J. O. (1994). A processes of change model for weight control for participants in community-based weight loss programs. *International Journal of the Addictions, 29*(2), 161–177.

Rothfleisch, J. (1997). Comparison of two measures of stage of change among drug abusers. (Doctoral dissertation, University of Houston). *Dissertation Abstracts International, 59*, AAG9835762.

Shalev, A. Y. (1997). Discussion: Treatment of prolonged posttraumatic stress disorder—learning from experience. *Journal of Traumatic Stress, 10*, 415–423.

Sharansky, E. J., Brief, D. J., Pierce, J. M., Meehan, J. C., & Manix, L. M. (1999). Substance abuse patients with posttraumatic stress disorder (PTSD): Identifying specific triggers of substance use and their associations with PTSD symptoms. *Psychology of Addictive Behaviors, 13*, 89–97.

Skinner, H. A. (1982). The drug abuse screening test. *Addictive Behaviors, 7*, 363–371.

Snow, M. G., Prochaska, J. O., & Rossi, J. S. (1994). Processes of change in Alcoholics Anonymous: Maintenance factors in long-term sobriety. *Journal of Studies on Alcohol, 55*, 362–371.

Spielberger, C. D. (1983). *Manual for the State-Trait Anger Inventory: STAI (Form Y)*. Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C. D. (1988). *Manual for the State-Trait Anger Expression Inventory: STAXI*. Odessa, FL: Psychological Assessment Resources.

Spitzer, R. L., Williams, J. B. W., Gibbon, M., & First, M. B. (1990). *User's guide for the structured clinical interview for DSM-III-R: SCID*. Washington, DC: American Psychiatric Press.

Stine, S. M., & Kosten, T. R. (1995). Complications of chemical abuse and dependency. In M. J. Friedman, D. S. Charney, & A. Y. Deutch (Eds.), *Neurobiological and clinical consequences of stress: From normal adaptation to posttraumatic stress disorder* (pp. 447–464). Philadelphia: Lippincott-Raven.

Tejero, A., Trujols, J., Hernandez, E., de los Cobos, J. P., & Casas, M. (1997). Processes of change assessment in heroin addicts following the Prochaska and DiClemente transtheoretical model. *Drug & Alcohol Dependence, 47*, 31–37.

Zlotnick, C., Warshaw, M., Shea, M. T., Allsworth, J., Pearlstein, T., & Keller, M. B. (1999). Chronicity in posttraumatic stress disorder (PTSD) and predictors of course of comorbid PTSD in patients with anxiety disorders. *Journal of Traumatic Stress, 12*, 89–100.