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TRAUMA, PTSD, AND SUBSTANCE ABUSE

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For anyone working in the field of trauma and PTSD, the role of substance use and abuse may seem obvious. Yet despite the prevalence and clinical significance of substance use disorders in individuals with PTSD, relatively little is actually known about the comorbidity of these disorders. The majority of published papers on this topic are based on clinical experience and/or theory, with little empirical research to support them. Within the empirical literature, studies have varied widely in their approach to examining this problem. Moreover, many studies have examined substance use only as a secondary outcome within a larger analysis of trauma, PTSD, and related disorders. With these caveats in mind, this issue of the *PTSD Research Quarterly* provides an overview of the research literature on PTSD and substance abuse (PTSD/SA) comorbidity. In attempting to better understand this complex literature, the review is organized using the following heuristic framework: (a) substance abuse problems in individuals with PTSD, (b) trauma and PTSD symptoms in substance abuse patients, (c) "self-medication" and prediction of substance use based on pre-, peri-, and post-trauma factors, (d) moderating variables, and (e) symptom overlap. Results of studies using both clinical and epidemiologic samples are reviewed and compared. Methodologic issues are addressed and directions for future research are discussed.

Prevalence of Substance Use Disorders in PTSD Patients. Studies of individuals seeking treatment for PTSD have consistently found a high prevalence of drug and/or alcohol abuse. For example, in their oft-cited paper, Keane et al. (1988) summarized results of previous studies as well as their own data by suggesting that 60-80% of treatment-seeking Vietnam combat veterans with PTSD also met criteria for current alcohol and/or drug abuse. In a subsequent well-controlled study, Boudewyns et al. (1991) reported that 91% of their inpatient PTSD sample met lifetime criteria for a substance use disorder. In the largest and most recent study of 5,338 veterans seeking treatment within the Department of Veterans Affairs specialized outpatient PTSD programs, Fontana et al. (1995) reported that 44% met criteria for alcohol abuse/dependence and 22% for drug abuse/dependence. These somewhat

lower prevalence estimates may reflect both outpatient versus inpatient presentation as well as differences in assessment methodologies.

The high level of comorbidity may be influenced in part by selection bias, as problems with substance use may increase the likelihood of treatment seeking in general. This argument is supported by Helzer et al.'s (1987) epidemiologic survey data from civilian PTSD, which suggested only a small increase in risk for substance abuse. In contrast, Kessler et al. (1995) reported higher comorbidity prevalence estimates in a representative community sample of 5,877 persons. Using the DIS, they found that 52% of men and 28% of women with PTSD also met lifetime criteria for alcohol abuse or dependence. For drug abuse, the numbers were 35% and 27%, respectively. These rates reflected significant increase in risk for comorbid SA over individuals from the same sample who did not have PTSD. Despite these elevated prevalence estimates, community-based estimates among combat veterans are higher still. For example, using the NCVRS epidemiologic data, Kulka et al. (1990) reported that 73% of Vietnam veterans with PTSD met lifetime criteria for alcohol abuse or dependence. In sum, data from both epidemiologic and clinical studies support the increased prevalence of substance use disorders associated with PTSD. Although the epidemiologic data on civilian trauma are less clear, several studies of civilian trauma in clinical samples (e.g., sexual abuse victims) suggest increased prevalence of substance abuse (see recent review in Stewart, 1996).

Prevalence of Trauma and PTSD in Substance Abuse Patients. An alternative paradigm for examining comorbidity has been to study trauma exposure and PTSD symptoms in individuals engaged in substance abuse treatment. These studies have tended to focus on civilian trauma, thus making comparison with studies of combat-related PTSD difficult. For example, Brown et al. (1995) studied 84 men and women in an inpatient substance abuse treatment program and found that 43% of women and 12% of men met criteria for PTSD based on the civilian version of the Mississippi scale. Women reported an average of 2.1 traumas in their lifetime compared to an average of 1.1 for men, with a greater occurrence of sexual abuse, physical abuse, and rape. In a similar study with a more urban and impoverished sample of women drug users, Fullilove et al. (1993) reported a mean of five traumatic experiences and a PTSD prevalence of 59% based on SCID diagnoses.

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Avoiding some of the biases in clinic-based research, Cottler et al. (1992) analyzed data from 2,263 respondents participating in a large epidemiologic survey of substance use and psychiatric illness in the general population. The Diagnostic Interview Schedule was used to assess both substance use and PTSD. Substance users reported having experienced more traumatic events than non-users. Opiate and cocaine users reported the greatest prevalence of traumas, and 19% of these users met criteria for PTSD. Interestingly, regression analyses suggested that cocaine/opiate use among women was a risk factor for PTSD independent of trauma exposure. Although PTSD prevalence estimates were much lower than those reported in treatment-seeking samples, they significantly exceeded estimates among non-substance users in terms of both trauma exposure and PTSD. Thus, data from both clinical and epidemiologic sources support the high prevalence of PTSD comorbidity among substance users.

The Self-Medication Model and Prediction of Substance Use. The comparison of these two approaches to comorbidity begs the question of primacy of one disorder over the other. Many theories and studies of substance abuse comorbidity in PTSD have assumed, either implicitly or explicitly, that PTSD is the primary disorder and that substance use reflects a "self-medication" of symptoms. The model is based loosely on Khantzian's (1985) notion that psychoactive drugs serve to reduce negative affect, and that this reduction negatively reinforces continued substance use. Models of alcohol's reinforcing properties via stress reduction, such as Conger's (1956) tension reduction hypothesis and the more sophisticated stress response dampening model (Levenson et al., 1980), are also consistent with this view.

A number of studies have yielded data that bear either directly or indirectly on the self-medication hypothesis. Two studies examining age of onset in Vietnam combat veterans (Davidson et al., 1990; Bremner et al., 1996) suggest that PTSD and substance abuse have concurrent onset. In addition, data from Bremner and colleagues (1996) suggest that PTSD symptoms and substance abuse not only emerged simultaneously but followed a relatively parallel course over time. Data from Cottler et al.'s (1992) community-based study suggest that drug and alcohol abuse symptoms developed prior to PTSD symptoms; unfortunately, age at traumatic event was not accounted for. In contrast, Kessler et al.'s (1995) epidemiologic data suggest that the occurrence of trauma related to subsequent PTSD development was significantly more likely to precede substance abuse, particularly for women. Differences in sample characteristics, nature of trauma, and assessment methodologies are all likely contributors to these varying results.

Other investigators have provided data on self-medication by using multiple regression models in an effort to identify trauma-related and PTSD-related predictors of substance abuse. Green et al. (1989) focused on the role of trauma type in predicting PTSD and comorbid disorders in 196 Vietnam combat veterans. They found that exposure to

grotesque death (e.g., mutilation) and/or graves registration was predictive of alcohol abuse; the presence of a pre-war psychiatric condition also contributed significantly and independently to alcohol abuse comorbidity. McFall and colleagues (1992) examined substance abuse patterns in a sample of 108 combat veterans and 151 non-combat controls. Results of regression equations indicated that drug and alcohol abuse was associated with both PTSD severity and combat-related variables. Interestingly, specific PTSD symptom patterns were predictive of substance use patterns; elevated arousal symptoms were associated with alcohol problems, whereas avoidance/numbing was associated with drug abuse.

Two epidemiologic studies of veterans have also evaluated the contribution of trauma and PTSD-related variables to substance use. Reifman and Windle (1996) used data from the CDC Vietnam experience study of 2,490 Army veterans. Drug use while in the Army was the single best predictor of recent drug use. Combat exposure also predicted recent drug use but, contrary to predictions, this relationship was not mediated by PTSD. The authors interpret this negative finding as a failure to support the self-medication hypothesis. Interestingly, Boscarino (1995) used the same data set in an examination of the role of social support in PTSD but failed to find a relationship between combat exposure and drug use. In his analyses, premorbid factors such as childhood delinquency emerged as the best predictors of recent drug and alcohol use.

Potential Moderators of Self-Medication. The extent to which the self-medication model is useful in explaining comorbidity may be moderated by individual differences, including differences in sociodemographics, treatment history, and family history for substance use and anxiety disorders. Moreover, attitudes and beliefs about drug effects on emotional regulation may be a significant moderator. For example, investigators examining cognitive factors in alcohol use demonstrated that *belief* in alcohol's tension reducing effect was the best predictor of problem drinking and treatment adherence (Brown, 1985). Cognitive factors such as *attention* are also thought to play a role in alcohol's effects. For example, Steele and Josephs (1988) demonstrated that alcohol decreased anxiety related to an impending stressor when attention was focused on a distracting activity; in contrast, alcohol *increased* anxiety in the absence of distraction. Such attentional effects may account in part for the alcohol-induced exacerbation in distress and intrusion symptoms often observed in patients with PTSD.

Symptom Overlap. Additional factors related to commonalities between the two disorders must also be considered in any comprehensive model. First, intoxication and withdrawal states can mimic arousal symptoms of PTSD. In support of this argument, Saladin et al. (1995) found increased hyperarousal symptoms in the early stage of abstinence in PTSD alcohol abusers as compared to individuals with PTSD and comorbid cocaine abuse (see also McFall et al., 1992). Second, a large literature has documented coping skills deficits and a tendency to use avoidant coping

among substance abusers. This avoidant coping style, particularly vis-à-vis traumatic material, is also characteristic of PTSD. Third, a common biologic substrate involving catecholamine dysregulation and locus ceruleus activation may contribute to both disorders independently (Kosten & Krystal, 1988). These and other areas of overlap must be considered in accounting for rates and mechanisms of comorbidity.

Future Directions. Future research must be both specific and comprehensive if we are to advance our understanding of PTSD/SA comorbidity. Laboratory studies using drug/alcohol challenge paradigms and self-administration paradigms will increase our knowledge of the parameters of self-medication (see Stewart, 1996). Studies based on cue conditioning models of symptom and substance use interaction, including both laboratory cue reactivity studies and field studies using "on-line" monitoring of symptoms, urges, and substance use, will also contribute to this effort. At the same time, large studies incorporating multiple predictors of PTSD and SA will account for more covariance in these two disorders. However, studies that do not adequately control for specific features of the population, the trauma, the PTSD, or the substance use patterns are likely to contribute little new information. Finally, prospective studies of individuals at risk for trauma (e.g., military personnel, young substance users) will assist in further elucidating this complex relationship.

SELECTED ABSTRACTS

BOSCARINO, J.A. (1995). **Post-traumatic stress and associated disorders among Vietnam veterans: The significance of combat exposure and social support.** *Journal of Traumatic Stress, 8*, 317-336. The hypothesis is tested that individuals exposed to traumatic stress who currently have lower social support have higher rates of post-traumatic stress and associated disorders. To test this, the current prevalence of five psychiatric disorders, including post-traumatic stress, generalized anxiety, depression, alcohol abuse, and drug abuse, were studied among a random sample of veterans who served in Vietnam (N = 2,490) and a random sample of "era" veterans who did not (N = 1,972). Logistic regression was used to analyze each disorder, controlling for past combat exposure, current social status, childhood delinquency, military adjustment, and current social support. Combat exposure was the best predictor of post-traumatic stress and was also associated with anxiety and depression, but not alcohol or drug abuse. Substance abuse was associated with childhood delinquency, and the best predictor of drug abuse was illicit Army drug use. Lower social support was associated with all disorders, except drug abuse. Although the causal nexus is not clear in this case, this study suggests that future research and clinical interventions should not overlook the significance of social support among victims of traumatic stress.

BOUDEWYNS, P.A., WOODS, M.G., HYER, L.A., & 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. Vietnam combat veterans suffering from PTSD who had re-

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- BROWN, S.A. (1985). **Reinforcement expectancies and alcoholism treatment outcome after a one-year follow-up.** *Journal of Studies on Alcohol, 46*, 304-308.
- CONGER, J.J. (1956). **Reinforcement theory and the dynamics of alcoholism.** *Quarterly Journal of Studies on Alcohol, 17*, 296-305.
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- LITT, M.D., COONEY, N.L., KADDEN, R.M., & GAUPP, L. (1990). **Reactivity to alcohol cues and induced moods in alcoholics.** *Addictive Behaviors, 15*, 137-146.
- SAYETTE, M.A. & WILSON, G.T. (1991). **Intoxication and exposure to stress: Effects of temporal patterning.** *Journal of Abnormal Psychology, 100*, 56-62.
- STEELE, C.M. & JOSEPHS, R.A. (1988). **Drinking your troubles away II: An attention-allocation model of alcohol's effect on psychological stress.** *Journal of Abnormal Psychology, 97*, 196-205.

requested treatment through a special VA-sponsored PTSD treatment program were evaluated using the Diagnostic Interview Schedule (DIS). Based on the DIS, 91.12 percent of the sample had a lifetime diagnosis of substance abuse or dependence and this was, by far, the most frequent co-diagnosis in the sample. The most common reason for patients not completing the treatment program was for use of illegal substances or alcohol while in the program, even though they were aware that to do so meant that they would be either discharged or transferred to another unit. The percentage of other co-diagnoses, and an estimate of currentness for all Axis I diagnoses were also presented on the sample of 102 patients. It was determined that for this population, the symptoms of substance abuse were chronic and were inextricably intertwined with PTSD symptoms and with the initial stressor (combat). Treatment process implications were discussed.

BREMNER, J.D., SOUTHWICK, S.M., DARNELL, A., & CHARNEY, D.S. (1996). **Chronic PTSD in Vietnam combat veterans: Course of illness and substance abuse.** *American Journal of Psychiatry, 153*, 369-375. The purpose of this study was to measure the longitudinal course of specific symptoms of PTSD and related symptoms of alcohol and substance abuse and the effects of alcohol and substances on the symptoms of PTSD. A structured interview for the assessment of PTSD and alcohol and substance abuse, as well as other factors such as life stressors and treatment, was administered to 61 Vietnam combat veterans with PTSD. Onset of symptoms typically occurred at the time of exposure to combat trauma in Vietnam and increased rapidly during the first few years after the war. Symptoms plateaued

within a few years after the war, following which the disorder became chronic and unremitting. Hyperarousal symptoms such as feeling on guard and feeling easily startled developed first, followed by avoidant symptoms and finally by symptoms from the intrusive cluster. The onset of alcohol and substance abuse typically was associated with the onset of symptoms of PTSD, and the increase in use paralleled the increase of symptoms. Patients reported a tendency for alcohol, marijuana, heroin, and benzodiazepines to make PTSD symptoms better, while cocaine made symptoms in the hyperarousal category worse. There was no relationship between treatment interventions and the natural course of PTSD. These findings suggest that symptoms of PTSD begin soon after exposure to trauma, that hyperarousal symptoms are the first symptoms to occur, that the natural course of alcohol and substance abuse parallels that of PTSD, and that specific substances have specific effects on PTSD symptoms.

BROWN, P.J., RECUPERO, P.R., & STOUT, R. (1995). **PTSD substance abuse comorbidity and treatment utilization.** *Addictive Behaviors, 20*, 251-254. The present study investigates the prevalence of PTSD among a sample of treatment-seeking substance abusers and examines the relationship between PTSD comorbidity and rates of inpatient substance abuse treatment. 84 patients (48 male and 36 female) admitted for detoxification at a private hospital were administered self-report measures of lifetime stressor events, PTSD symptomatology, and prior treatment history. Approximately one quarter of the sample was found to present with significant PTSD symptomatology. Women were more likely than men to have been physically and sexually abused, and women reported experiencing a greater number of traumatic events. Consequently, more women than men were classified as having possible PTSD. With respect to inpatient substance abuse treatment admission rates, the PTSD group reported a greater number of hospitalizations than their non-PTSD counterparts. Implications of these findings for routine trauma screening and more effective treatment for substance abusers with concomitant PTSD are highlighted.

COTTLER, L.B., COMPTON, W.M., MAGER, D., SPIITZNAGEL, E.L., & JANCA, A. (1992). **Posttraumatic stress disorder among substance users from the general population.** *American Journal of Psychiatry, 149*, 664-670. The purpose of the study was to evaluate the prevalence of PTSD among substance users in the general population. The St. Louis Epidemiologic Catchment Area study, a survey of psychiatric illness in the general population, collected data on PTSD and substance use with the Diagnostic Interview Schedule. Among the 2,663 respondents, 430 reported a traumatic event that could qualify for PTSD; however, the rate of PTSD was low, 1.35 percent overall. To evaluate the relationship between PTSD and substance use, respondents were hierarchically classified into one of four substance use categories ranging from polydrug use to alcohol use only. Substance users from each category as well as substance users in general were compared with persons who did not meet the substance use threshold (comparison subjects). Findings indicate that cocaine/opiate users are over three times as likely as comparison subjects to report a traumatic event, report more symptoms and events, and are more likely to meet diagnostic criteria for PTSD. Physical attack, but not combat-related events, was the most prevalent event reported among cocaine/opiate users. Onset of substance use preceded onset of posttraumatic symptoms, suggesting that substance use predisposes the individual to exposure to traumatic events. When other variables - including antisocial behavior - were controlled, female gender and use of cocaine / opiates predicted PTSD. These analyses of the

co-occurrence of substance abuse and PTSD warrant further study and suggest that PTSD is much more common among substance abusers than was previously known.

DAVIDSON, J.R.T., KUDLER, H.S., SAUNDERS, W.B., & SMITH, R.D. (1990). **Symptom and comorbidity patterns in World War II and Vietnam veterans with posttraumatic stress disorder.** *Comprehensive Psychiatry, 31*, 162-170. Abstracted in *PTSD Research Quarterly, 2*(1), 1991.

FULLILOVE, M.T., FULLILOVE, R.E., SMITH, M., WINKLER, K., MICHAEL, C., PANZER, P.G., & WALLACE, R. (1993). **Violence, trauma, and post-traumatic stress disorder among women drug users.** *Journal of Traumatic Stress, 6*, 533-543. In order to examine the association between the experience of violent events, trauma, and PTSD among women drug users, 105 women in treatment for addictive disorders were interviewed. 104 of the study participants reported trauma in 1 or more of 14 categories of traumatic events, 59 percent of whom reported symptoms consistent with a diagnosis of PTSD. Among those with PTSD, 97 percent reported one or more violent traumas as compared with 73 percent of those without PTSD. The likelihood of PTSD was strongly associated with the number of violent traumas reported by a woman. Women in recovery from drug addiction are likely to have a history of violent trauma and are at high risk for PTSD. Screening for PTSD among women with an addictive disorder should become part of the diagnostic and treatment routine.

GREEN, B.L., LINDY, J.D., GRACE, M.C., & GLEESER, G.C. (1989). **Multiple diagnoses in posttraumatic stress disorder: The role of war stressors.** *Journal of Nervous and Mental Disease, 177*, 329-335. Prior studies have shown that PTSD in Vietnam veterans is associated with various aspects of war stressors and that other diagnoses often co-occur with PTSD in this population. The present report examines the prediction of other diagnoses, in combination with PTSD, from a variety of war stressor experiences in a broad sample of veterans recruited from clinical and nonclinical sources. The results show that PTSD with panic disorder is better explained by war stressors than other diagnostic combinations and that high-risk assignments and exposure to grotesque deaths were more salient than other stressor experiences in accounting for different diagnostic combinations. Implications of the findings for PTSD's placement in the DSM-III-R and for psychological and pharmacological treatments were discussed.

HELZER, J.E., ROBINS, L.N., & MCEVOY, L. (1987). **Post-traumatic stress disorder in the general population: Findings of the Epidemiologic Catchment Area survey.** *New England Journal of Medicine, 317*, 1630-1634. Abstracted in *PTSD Research Quarterly, 1*(3), 1990.

KEANE, T.M., GERARDI, R.J., LYONS, J.A., & WOLFE, J. (1988). **The interrelationship of substance abuse and posttraumatic stress disorder: Epidemiological and clinical considerations.** In M. Galanter (Ed.), *Recent developments in alcoholism, Vol. 6* (pp. 27-48). New York: Plenum. This chapter reviews the data available on the relationship of substance abuse and PTSD. Delimiting the review to those studies of Vietnam veterans, we found that levels of combat exposure seemed to be positively related to subsequent alcohol use, although not all studies confirmed this relationship. When studies of patients seeking treatment for PTSD were examined, we learned that 60 to 80 percent of these patients had concurrent diagnoses of substance abuse, alcohol abuse, or dependence. Methodological limitations of all the studies are discussed and conclusions regarding the status of

the PTSD-substance abuse relationship are drawn cautiously. Alternative suggestions for treatment are presented and discussed.

KESSLER, R.C., SONNEGA, A., BROMET, E.J., HUGHES, M., & NELSON, C.B. (1995) **Posttraumatic stress disorder in the National Comorbidity Survey.** *Archives of General Psychiatry*, 52, 1048-1060. Data were obtained on the general population epidemiology of DSM-III-R PTSD, including information on estimated lifetime prevalence, the kinds of traumas most often associated with PTSD, sociodemographic correlates, the comorbidity of PTSD with other lifetime psychiatric disorders, and the duration of an index episode. Modified versions of the DSM-III-R PTSD module from the Diagnostic Interview Schedule and of the Composite International Diagnostic Interview were administered to a representative national sample of 5877 persons aged 15 to 54 years in the part II subsample of the National Comorbidity Survey. The estimated lifetime prevalence of PTSD is 7.8 percent. Prevalence is elevated among women and the previously married. The traumas most commonly associated with PTSD are combat exposure and witnessing among men and rape and sexual molestation among women. PTSD is strongly comorbid with other lifetime DSM-III-R disorders. Survival analysis shows that more than one third of people with an index episode of PTSD fail to recover even after many years. PTSD is more prevalent than previously believed, and is often persistent. Progress in estimating age-at-onset distributions, cohort effects, and the conditional probabilities of PTSD from different types of trauma will require future epidemiologic studies to assess PTSD for all lifetime traumas rather than for only a small number of retrospectively reported "most serious" traumas.

KOSTEN, T.R. & KRYSTAL, J.H. (1988). **Biological mechanisms in posttraumatic stress disorder: Relevance for substance abuse.** In M. Galanter (Ed.), *Recent developments in alcoholism*, Vol. 6 (pp. 49-68). New York: Plenum. Recent studies suggest a significant biological contribution to PTSD. In particular, central catecholamine and endogenous opioid systems have been implicated both in this syndrome and in substance abuse. We review relevant animal and human studies that support these hypotheses and suggest that this overlap may contribute to the incidence of substance abuse in PTSD. The animal studies have primarily employed the learned helplessness and conditioned emotional response models and have included assessments of brain catecholamines, locus ceruleus activity, and behavioral correlates in rodents and nonhuman primates. Human studies have used only indirect measures to assess these variables. However, both therapeutic approaches and attempts at self-medication for PTSD have supported this hypothesis.

KULKA, R.A., SCHLENGER, W.E., FAIRBANK, J.A., HOUGH, R.L., JORDAN, B.K., MARMAR, C.R., & WEISS, D.S. (1990). *Trauma and the Vietnam War generation: Report of findings from the National Vietnam Veterans Readjustment Study.* New York: Brunner/Mazel. Abstracted in *PTSD Research Quarterly*, 1(3), 1990.

MCFALL, M.E., MACKAY, P.W., & DONOVAN, D.M. (1992). **Combat-related posttraumatic stress disorder and severity of substance abuse in Vietnam veterans.** *Journal of Studies on Alcohol*, 53, 357-363. This study examined the effects of Vietnam war-zone duty and combat-related PTSD on severity of drug- and alcohol-abuse disorders among veterans seeking treatment for substance dependence. Combat-exposed Vietnam-theater veterans (N = 108) were compared with Vietnam-era veterans without war-zone duty (N = 151) on psychometric measures of drug and

alcohol abuse. There were no differences between theater and era veterans on these measures. However, Vietnam-theater veterans with PTSD experienced more severe drug- and alcohol-abuse problems than did theater veterans without PTSD and were at greater risk for having both forms of substance abuse. Further analyses showed that PTSD was significantly related to some dimensions of drug- and alcohol-abuse problems but not to other dimensions. These findings indicate that PTSD, rather than combat stress per se, is linked to severity of substance abuse. Finally, reexperiencing and avoidance/numbing components of PTSD were more strongly associated with drug abuse than alcohol abuse, but physiological arousal symptoms of PTSD were more highly correlated with alcohol abuse.

REIFMAN, A. & WINDLE, M. (1996). **Vietnam combat exposure and recent drug use: A national study.** *Journal of Traumatic Stress*, 9, 557-568. Traumatic life experiences may have long-term adverse psychological consequences, including illicit drug use. We analyzed data from the 1985-1986 Centers for Disease Control Vietnam Experience Study to investigate this issue. Over 2,400 Vietnam veterans indicated the amount of combat to which they had been exposed, and reported on their drug use while in the Army and during the year interval prior to the interview. Combat exposure was significantly related to recent drug use, even when Army drug use and demographic factors were controlled statistically.

SALADIN, M.E., BRADY, K.T., DANSKY, B.S., & KILPATRICK, D.G. (1995). **Understanding comorbidity between PTSD and substance use disorders: Two preliminary investigations.** *Addictive Behaviors*, 20, 643-655. While there is high level of comorbidity of PTSD and substance use disorders (SUDs), little research has focused on the overlapping symptom constellation characteristic of both PTSD and substance use/withdrawal. This report describes two preliminary investigations that address this area. In the first study, the pattern of PTSD symptoms in a sample of women (n = 28) seeking treatment for a SUD and comorbid with PTSD was compared with the symptom pattern of a sample of women (n = 28) with PTSD only. The PTSD + SUD group evidenced significantly more symptoms in the avoidance and arousal symptom clusters than the PTSD-only group. At the individual symptom level, the PTSD + SUD group reported significantly more sleep disturbance than the PTSD-only group. It was also determined that the PTSD + SUD group reported greater traumatic-event exposure than the PTSD-only group. In the second study, PTSD symptoms were compared in a sample of alcohol-dependent and a sample of cocaine-dependent individuals with PTSD. The alcohol-dependent group exhibited significantly more arousal symptoms than the cocaine-dependent group. Implications of the results for the assessment of individuals with comorbid PTSD and SUDs are discussed.

STEWART, S.H. (1996). **Alcohol abuse in individuals exposed to trauma: A critical review.** *Psychological Bulletin*, 120, 83-112. In this article, the author critically reviews studies on the relationship between exposure to trauma, PTSD, and alcohol abuse. After establishing that strong relationships exist between exposure to traumatic events and alcohol problems, and particularly between the diagnoses of PTSD and alcoholism, the author discusses various factors, theories, and possible mechanisms to account for these associations. Moreover, she discusses applications of these findings to the assessment and treatment of people exposed to trauma who abuse alcohol. Finally, the author outlines novel methods for testing theoretical hypotheses and makes suggestions for methodological improvements in future research.

ADDITIONAL CITATIONS

Annotated by the Editors

- ABUEG, F.R. & FAIRBANK, J.A. (1992). **Behavioral treatment of posttraumatic stress disorder and co-occurring substance abuse.** In P.A. Saigh (Ed.), *Posttraumatic stress disorder: A behavioral approach to assessment and treatment* (pp. 111-146). Boston: Allyn & Bacon.
- Presents a behavioral model for treating substance abuse in PTSD. The treatment process is conceptualized as consisting of five stages, each of which has specific goals. The authors discuss application of the following techniques: direct therapeutic exposure, problem-solving skills training, and relapse prevention.
- BRADY, K.T., KILLEEN, T., SALADIN, M.E., DANSKY, B.S., & BECKER, S. (1994). **Comorbid substance abuse and posttraumatic stress disorder: Characteristics of women in treatment.** *American Journal on Addictions, 3*, 160-164.
- Studied female substance abuse patients, 30 of whom had PTSD and 25 of whom did not. Women with PTSD were more likely than women without PTSD to have experienced sexual and physical abuse, especially during childhood. Women with PTSD also were more symptomatic and less compliant with aftercare.
- BRESLAU, N., DAVIS, G.C., ANDRESKI, P., & PETERSON, E. (1991). **Traumatic events and posttraumatic stress disorder in an urban population of young adults.** *Archives of General Psychiatry, 48*, 216-222.
- Estimated the prevalence of PTSD in 1007 adults (age 21-30) who were randomly sampled from members of a Health Maintenance Organization. The lifetime prevalence of PTSD was 9.2%. A history of alcohol problems doubled the odds of PTSD.
- BRIERE, J. & ZAIDI, L.Y. (1989). **Sexual abuse histories and sequelae in female psychiatric emergency room patients.** *American Journal of Psychiatry, 146*, 1602-1606.
- Examined charts of 100 female nonpsychotic emergency room patients. Prevalence of abuse history was 6% in 50 charts that were drawn at random and 70% in 50 charts written by clinicians who had been asked to inquire about sexual abuse. Abuse was associated with drug but not alcohol problems. Longer duration of abuse and greater severity of abuse were correlated with mention of drug problems in the charts.
- BRINSON, T. & TREANOR, V. (1988). **Alcoholism and post-traumatic stress disorder among combat Vietnam veterans.** *Alcoholism Treatment Quarterly, 5*(314), 65-82.
- Encourages increased recognition of the relationship between alcohol problems and PTSD among Vietnam veterans. The authors discuss reasons for the relationship between alcoholism and PTSD and propose a synergistic relationship between the two disorders. Treatment recommendations are provided.
- FONTANA, A., ROSENHECK, R., SPENCER, H., & GRAY, S. (1995). **The long journey home IV: The fourth progress report on the Department of Veterans Affairs specialized PTSD programs.** West Haven, Connecticut: Department of Veterans Affairs, Northeast Program Evaluation Center.
- Reports results of evaluation of VA's specialized PTSD programs. Over 5,000 veterans were studied. A history of alcohol problems was present in 38% veterans in PTSD programs and in 76% of veterans in PTSD/Alcohol programs.
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RESEARCH AT THE NATIONAL CENTER FOR PTSD: BEHAVIORAL SCIENCE DIVISION

Danny Kaloupek, PhD

The Behavioral Science Division was one of the original sites of the National Center consortium when it began in 1989. The Division developed as an outgrowth of a clinical research program established at the Boston VA Medical Center by Dr. Terence Keane, one of the VA pioneers in assessment and treatment of PTSD.

Dr. Keane, along with Dr. Lawrence Kolb, launched the first major research initiative of the Division, DVA Cooperative Study #334. This 15-site study administered an extensive diagnostic protocol and a multicomponent psychophysiological challenge task to approximately 1300 veterans who had served in the Vietnam theater. The findings, which are under review for publication, provide the strongest evidence to date regarding the diagnostic performance of psychophysiological indices.

Dr. Brett Litz conducts studies of cognitive and psychophysiological aspects of emotional-processing in PTSD, particularly the symptom of emotional numbing. This theoretically-driven research has significant potential for clinical application. More recently, he has worked in collaboration with Readjustment Counseling Service and Department of Defense to conduct surveys of veterans returned from Operation Desert Storm, and from peace-keeping efforts in Somalia and Bosnia.

Dr. Frank Weathers worked closely with former Division member, Dr. Dudley Blake, to develop and validate the Clinician Administered PTSD Scale. This widely-used interview has several strengths including behaviorally-referenced ratings for each symptom and the ability to provide both dichotomous and continuous symptom scores. His current grant-funded research examines the cognitive (semantic) structures which underlie PTSD and distinguish it from Major Depression.

Dr. Karen Krinsley is working to improve measurement of retrospective accounts of potentially traumatic experiences by developing and testing the psychometric performance of the Evaluation of Lifetime Stressors (ELS). Initial analysis of data from 76 Vietnam-era veterans indicates moderate-to-high test-retest reliability and, in those instances where independent information (e.g., family members, military records) could be obtained, substantial corroboration of veterans' reports of their experiences. The ELS has been adopted by investigators outside VA for major studies focusing on health implications of psychological trauma and transgenerational impact of traumatic experiences.

Dr. David Riggs has developed a hybrid research program that examines marital relationships in relation to the PTSD status of couples. His current focus is on communication patterns within the relationships of male Vietnam veterans and their female spouses or partners, with particular emphasis on the implications for domestic violence.

Dr. Daniel King continues to conduct secondary analyses on data from the National Vietnam Veterans Readjust-

ment Study. This work examines the role of resilience and recovery variables in reducing the deleterious effects of exposure to traumatic events in the war-zone, tests a comprehensive model of the etiological factors in PTSD, and examines the role of PTSD in linking war-zone experience with (deleterious) health outcomes and (poor) physical functioning.

Several research projects build directly upon the clinical activities in the Division. Dr. Jeffrey Knight has collected extensive neuropsychological data on veterans with PTSD, with emphasis on tests of memory and concentration performance, as well as information about learning disabilities, attention deficit disorder, substance abuse, and closed head injury. Findings suggest neurocognitive deficits related to PTSD.

Dr. Barbara Niles, working in collaboration with Drs. Lisa Fisher and Elana Newman, completed a follow-up evaluation of Vietnam veterans who were evaluated at our PTSD clinic between 1985 and 1990. Findings highlight the extreme impairment of some veterans with PTSD, including some who may be at risk for early death.

Dr. Danny Kaloupek is leading an investigation into the impact of PTSD on patients who are served by primary care medical clinics at the Boston VAMC. The eventual aim is to identify primary care patients who might benefit from mental health services which, in turn, could reduce their use of expensive medical services.

Finally, the Division is expanding through a new NIMH-funded post-doctoral training program. Division staff also are developing ever-widening collaborations with investigators both within and outside the National Center network. In these ways we hope to contribute to the bright future of traumatic stress research.

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PILOTS UPDATE

Dartmouth College, whose Library Online System serves as host to the PILOTS database, is making some changes to access procedures. These are intended to increase network security and make the system more user-friendly.

The first of these changes may have been implemented by the time this issue appears. Dial-in modem access to the Dartmouth College Library Online System (DCLOS) will no longer be available to users unaffiliated with Dartmouth College. This change is being made to protect the Dartmouth computer system from unauthorized use, and will affect only those who use their modems to dial directly to Dartmouth via telephone lines. *It does not affect those who use the Internet to connect to DCLOS and the PILOTS database.*

Most PILOTS database users have already switched to using the Internet, as this eliminates the cost of a long-distance telephone connection to Hanover, New Hampshire. But some Internet users have discovered that their Internet service provider (ISP) does not provide access to all methods of using the Internet. America Online (AOL) and some other ISPs do not support the "telnet" protocol that is used for interactive communication with host computers. As this protocol is required for searching online catalogs and databases, anyone intending to use the Internet for this purpose should either obtain the necessary software for the purpose (which can be obtained free of charge from several sites on the World Wide Web) or choose an ISP that supports the telnet protocol. (Users who have

received an "access permission denied" message when attempting to search the PILOTS database should determine whether their ISP supports telnet. In some cases, telnet is available, but the Web browser software needs to be informed through its "preferences" menu that telnet is to be used.)

Many PILOTS database users are linked to DCLOS from the National Center's home page on the World Wide Web, or from other Web sites offering such a link. By clicking on the link they are in fact setting up a telnet connection to DCLOS. If their Web browser software does not support telnet or is not configured to use telnet, they will not be able to complete the link. Here, too, the solution to the problem is to obtain the necessary telnet module.

The increasing popularity of the World Wide Web, and the convenience of using a graphical interface rather than relying on a command- or menu-driven one, is leading Dartmouth College to provide a Web interface to the Library Online System. This is currently under development, and is expected to become available for public use sometime next year. One advantage it will offer is seamless online access to the *PILOTS Database User's Guide* and other aids to searching. We hope to work with Dartmouth to provide other refinements as well. We shall announce its availability in the *PTSD Research Quarterly*, on our Web site, and on the opening screen seen by PILOTS database users.

IMPORTANT NOTICE TO OUR VA SUBSCRIBERS: KEEP YOUR RESEARCH QUARTERLY COMING

If you are receiving a copy of the *PTSD Research Quarterly* personally addressed to you at your VA address, and the code 98 appears on the mailing label on your copy of this issue, you need to let us know that your address is correct and that you wish to continue receiving the *Research Quarterly*. To do this, just photocopy this page, which includes your mailing label, and return it to us (at the return address shown below). If you need to correct your VA address, please type or print the new address next to the old one.

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