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Posttraumatic stress disorder and other psychopathology in substance abusing patients

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Abstract

Studies demonstrating greater problem severity in substance abuse patients with posttraumatic stress disorder (PTSD) versus those without have rarely considered other co-occurring psychiatric disorders. This study of 466 male veterans recently admitted to outpatient substance abuse treatment attempts to identify problems associated with PTSD versus those associated with other nonsubstance use Axis I disorders. Problem severity, particularly psychiatric, was examined across four groups of patients with substance use disorders (SUDs). Those with: 1. SUDs only (SU-Only); 2. PTSD, but no other Axis I disorders (SU+PTSD); 3. PTSD and other Axis I disorders (SU+PTSD+Axis I); and 4. no PTSD, but other Axis I disorders (SU+Other-Axis I). Results suggested a hierarchy of psychiatric, and to a lesser extent, other life problem severities associated with these diagnostic groupings. The most severe group was SU+PTSD+Axis I, followed in decreasing severity by the SU+Other-Axis I, SU+PTSD, and SU-Only groups. Additional analyses comparing the SU+PTSD+Axis I patients with a subgroup of Axis I patients with more than one Axis I disorder (SU+Multiple-Axis I) revealed few group differences except for more lifetime suicide attempts and psychiatric hospitalizations in the SU+PTSD+Axis I group. The findings suggest that it is not PTSD *per se*, but the frequent co-occurrence of PTSD and other psychopathology that largely accounts for previously reported greater problem severity of SUD patients with PTSD.

Keywords

Posttraumatic Stress Disorder (PTSD); Alcohol Dependence; Drug Dependence; Psychiatric Comorbidity

1. Introduction

Posttraumatic stress disorder (PTSD) is reported with considerable frequency in patients with psychoactive substance use disorders (SUDs) and has been associated with more severe patient status and poorer treatment outcomes (Brown and Wolfe, 1994). Research has found that patients with SUDs and comorbid PTSD utilize costly addiction treatment services,

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particularly inpatient substance abuse treatment, significantly more than their nonPTSD counterparts (Brown et al., 1995; Brown et al., 1999). Results from the National Institute on Drug Abuse (NIDA) Collaborative Cocaine Treatment Study indicate that patients with SUDs and PTSD enter treatment with higher rates of interpersonal and medical problems, more resistance to treatment, and greater levels of psychopathology than patients without PTSD (Najavits et al., 1998). Brady and colleagues (Brady et al., 1994) found that women with SUDs and comorbid PTSD had higher scores on the Addiction Severity Index (ASI; McLellan et al., 1992), drug composite score (CS), were more likely to have co-morbid affective disorders, and were less likely to comply with aftercare. More recently, Back et al. (2000) reported that SUD patients with PTSD were much more likely to qualify for both Axis I and Axis II psychopathology and that they had more employment problems, as indicated by their ASI employment CS. Read et al. (2004) also found significantly higher rates of Axis I disorders in SUD patients with concurrent PTSD. Trafton et al. (2006) discovered that recent admissions to VA methadone maintenance (MM) treatment with PTSD had significantly more years of heroin and alcohol use than those without PTSD. In this study, the PTSD patients also had more psychiatric disorders, higher ASI psychiatric CSs, and poorer mental health as measured by the SF-36 mental health summary score. Finally, Ouimette et al. (2006) found more chronic cardiovascular and neurological problems in patients with PTSD who also reported more body pain, poorer current general physical health and more current emotional problems than in SUD patients without PTSD.

As many as 82% of patients with SUDs and comorbid PTSD have additional nonsubstance use Axis I disorders (Brady et al., 1994; Brown et al., 1995; Cacciola et al., 2001; Najavits et al., 1998; Labate et al., 2004; Wasserman et al., 1997). As a result, in the existing research that has compared patients in substance abuse treatment with and without PTSD, a substantial percentage of those patients with PTSD very likely have additional Axis I disorders. Furthermore, many of the patients without PTSD are likely to have other Axis I disorders as well, since co-occurring Axis I disorders are common in patients in substance abuse treatment (Cacciola et al., 2001). Consequently, in most of the PTSD research conducted with SUD patients, the nonPTSD groups include many patients with other Axis I disorders. Therefore, the diagnostic heterogeneity of both of the two typical comparison groups, PTSD and nonPTSD, limits our understanding of the unique contribution of PTSD to the problem profile of patients.

A level of sophistication was added to the above PTSD versus nonPTSD categorization in several studies by Ouimette and colleagues (Ouimette et al., 1997, 1998; Ouimette et al., 1999) who split the nonPTSD group in two, one with SUDs only and a second group with other co-occurring Axis I disorders. The third SUD group in their research had a PTSD diagnosis. These three groups were compared in terms of during-treatment response (Ouimette et al., 1998), one-year outcomes (Ouimette et al., 1997), and two-year outcomes (Ouimette et al., 1999). This design therefore provided a diagnostically cleaner grouping of nonPTSD patients, by distinguishing between patients with and without a co-occurring Axis I disorder. In general, these studies found that the treatment response of the PTSD group was worse than that of the SUD only group in terms of more treatment service use, greater psychological distress, and less employment. The PTSD group also had poorer psychosocial and substance use outcomes than the other Axis I group.

The current study of patients in substance abuse treatment further explores the association of PTSD to problem severity at the point of treatment entry and attempts to identify the problems uniquely associated with PTSD. Specifically, while the Ouimette et al. (1997, 1998, 1999) research design represents an improvement over the coarser PTSD versus nonPTSD distinction found in other studies, it fails to distinguish between two important subgroups of individuals under the PTSD umbrella, those with and without other

nonsubstance use Axis I disorders. This distinction allows for the possibility to examine the extent to which the reported severity of SUD patients with PTSD is attributable specifically to the PTSD or to PTSD in conjunction with other Axis I disorders which often co-occur with PTSD. Our study therefore compares problem severity among four subgroups that are more diagnostically homogeneous than those examined in prior PTSD studies. The four group breakdown is as follows: 1-substance use disorders only (SU-Only); 2-substance use disorders and PTSD (SU+PTSD); 3-substance use disorders, PTSD, and additional nonsubstance use Axis I disorders (SU+PTSD+Axis I); and 4-substance use disorders and nonsubstance use Axis I disorders other than PTSD (SU+Other-Axis I). This design separates PTSD patients with and without Axis I disorders, a distinction which has been confounded in all prior research. Additionally, in a subsequent series of analyses, we compare the problem severity of the SU+PTSD+Axis I patients to that of a fifth group, the subset of the SU+Other-Axis I patients with more than one Axis I disorder (SU+Multiple-Axis I). Thus, two groups that are similar in number of Axis I disorders, but differ with regard to PTSD, can be compared.

Psychiatric comorbidity is under-identified and of clinical importance, with such comorbidity having a strong relationship with severity of mental illness (Kessler et al., 2005; Zimmerman et al., 2007). This is the case whether or not the comorbidity includes a substance use disorder diagnosis. Additionally, there is an extensive line of research indicating greater problem severity and chronicity of “dual-diagnosis” patients, those with a combination of SUDs and other psychiatric disorders (Compton et al. 2003; Flynn & Brown, 2008; Kessler, 2004). Moreover, PTSD in psychiatric outpatients is associated with higher rates of comorbidity than most other diagnoses (Zimmerman et al., 2007), and high rates of patients with SUDs and comorbid PTSD have additional nonsubstance use Axis I disorders (Brady et al., 1994; Najavits et al., 1998; Labate et al., 2004). This context reveals a gap in the previous research with PTSD and SUDs that our examination of the groups constructed for this study attempts to address. Also, this prior research suggests that the SU-Only group will be the least severe and the SU+PTSD+Axis I and SU+Multiple-Axis I groups will be the most severe (by nature of their having a minimum of three disorders); the SU+PTSD and SU+Axis I groups are expected to intermediate and comparable. Finally, this study may reveal specific severities associated with a PTSD diagnosis such as suicide attempts, which have been noted by others (e.g., Kessler, 2000).

2. Method

2.1. Participants

Participants were 466 male veterans enrolled in several research studies within the first week of admission to outpatient substance abuse treatment clinics at the Philadelphia Veterans Affairs Medical Center (PVAMC). In order to maximize external validity, there were few exclusionary criteria. Patients with psychotic signs/symptoms, cognitive deficits, or lack of proficiency in speaking English that impeded the ability to obtain informed consent or valid assessment data were excluded. Eligible individuals agreeing to participate underwent full informed consent procedures approved by the PVAMC Institutional Review Board. Of the 466 participants, 243 entered outpatient treatment for alcohol and/or cocaine dependence and 223 entered a methadone maintenance (MM) program for opiate addiction. The mean age of participants was 42.5 ($SD=7.0$) years and 72% were African American, 25% were Caucasian, and 3% self-identified as another ethnic/racial background. The sample had a mean of 12.6 ($SD=1.5$) years of education, 44% were employed at least part-time, and 23% were currently married. The most common military service of the participants was Vietnam-era.

2.2. Diagnostic Groups

Participants were categorized into mutually exclusive and exhaustive diagnostic groups based on the lifetime presence/absence of psychoactive substance use and other Axis I disorders. The first group, SU-Only, was comprised of participants with only SUDs ($n=222$; 47.6%). The second group, SU+PTSD, was comprised of participants with PTSD and SUDs, but no other Axis I disorders ($n=21$; 4.5%). The third group, SU+PTSD+Axis I, consisted of participants with PTSD, SUDs, and additional Axis I disorders ($n=61$; 13.1%). Finally, the fourth group, SU+Other-Axis I, included participants with SUDs and Axis I disorders other than PTSD ($n = 162$; 34.8%). These four groups were utilized in the first series of analyses. Including PTSD, the majority of the sample (52%) was diagnosed with at least one lifetime nonsubstance use Axis I disorder. This rate of Axis I disorders is consistent with those reported by others (Brooner et al., 1997; Ziedonis et al., 1994). The overall rate of lifetime PTSD in this sample (18%) is somewhat low relative to the prevalence reported in the literature (Brady et al., 2004), but is consistent with the proportions of patients with PTSD found in male veterans with substance use disorders (Ouimette et al., 1997, 1998, 1999).

There were no significant differences ($p<.05$) among the four diagnostic groups on any demographic variables, with the exception of age ($F=11.25$, $df=3$, $p<.001$). Post hoc tests revealed that participants in the SU+Other-Axis I group were the youngest ($M=40.1$, $SD=5.7$ years). Additionally, those in the SU-Only group ($M=41.8$, $SD=6.4$) were younger than participants in both PTSD groups [i.e., SU+PTSD ($M=44.0$, $SD=4.9$), SU+PTSD+Axis I ($M=46.4$, $SD=5.0$)].

In the overall sample, the most frequently occurring Axis I disorder was major depression (34%). All other disorders occurred in $\leq 6\%$ of the overall sample, and in decreasing order of frequency were; panic, social phobia, dysthymic, bipolar/other bipolar, simple phobia, obsessive-compulsive, agoraphobia, generalized anxiety, and somatoform disorders. Major depression occurred in greater than 70% of both the SU+PTSD+Axis I and the SU+Other-Axis I groups (78% and 73%, respectively); all other disorder occurred in less than 20% of either group. There were no significant differences between the two groups for any of these Axis I disorders.

2.3. Measures

The Structured Clinical Interview for DSM-IIIIR (SCID-IIIIR) was used to diagnose Axis I disorders including mood, psychotic, substance use, anxiety (including PTSD), somatoform, eating, and adjustment disorders (Spitzer et al., 1992). The SCID is a semi-structured interview with demonstrated reliability used extensively in research settings to diagnose psychiatric disorders (Williams et al., 1992). In the present study the SCID Axis I diagnoses were used to compose and define the diagnostic groups described above. All diagnosticians had an advanced degree in psychology (M.A. or Ph.D.), were intensively trained in the use of the SCID, and received ongoing supervision from an expert diagnostician (JSC).

The Addiction Severity Index (ASI) was used to assess recent and global problem severity. The ASI is a semi-structured clinical and research interview used to evaluate problem severity in seven life areas: medical, employment, drug, alcohol, legal, family/social, and psychiatric (McLellan et al., 1980; McLellan et al., 1992). The ASI is considered reliable and valid when used by trained interviewers (Cacciola et al., 1999; McLellan et al., 1985; McDermott et al., 1996). In the present study, the diagnostic groups were compared on their ASI composite scores (CSs). ASI Composite Scores (CSs) are mathematically derived summary scores that use select ASI items to indicate problem severity in each ASI area (McLellan et al., 1985). The CSs reflect past 30 day functioning in each ASI area and range from 0.00 to 1.00 with higher scores indicating greater problem severity and frequency. ASI

CSs, in each of the seven ASI areas, were used to compare current problem severity among the diagnostic groups. The ASI was administered at treatment admission by an interviewer with a minimum of a bachelor's degree in the behavioral sciences. All ASI interviewers received intensive training and ongoing monitoring and supervision by an expert interviewer.

2.4. Data Analysis

Multivariate analysis of variance (MANOVA) tests were used to test potential differences among the diagnostic groups on the ASI CS. The Wilks' Lambda statistic was used to compute the F values on the MANOVA tests. MANOVAs that indicated significant group differences were followed by univariate one-way tests (ANOVAs) for each of the seven ASI CSs. ANOVAs that revealed significant group differences were followed by Tukey's HSD post hoc tests to determine specifically where the group differences exist.

Group comparisons on individual ASI items were done using one-way ANOVAs for continuous items and 2×4 Pearson Chi-square tests for dichotomous items. ANOVAs that revealed significant differences for the continuous ASI items were followed by Tukey's HSD post hoc analyses, and the 2×4 Chi-square tests that revealed significant differences for the dichotomous items were followed by individual 2×2 Chi-squares.

Due to the exploratory nature of the study, significance was set at $p < .05$ throughout. Additionally, because of the relatively small sample sizes of the two PTSD groups, effect size analyses were also conducted to supplement the formal statistical significance testing.

3. Results

3.1. Comparison of the Four Groups on ASI CSs: Group Differences

The MANOVA for the CSs was statistically significant ($F = 4.06$; $df = 21/1229.5$; $p < .0001$). Given this overall significant difference, an ANOVA was calculated for each ASI CS to determine significant group differences in each problem area. Significant differences were found in three areas: psychiatric ($F = 18.81$, $df = 3$, $p < .01$); medical ($F = 5.71$, $df = 3$, $p < .01$); and family/social ($F = 5.93$, $df = 3$, $p < .01$). Analyses of the CSs revealed no significant differences among groups in terms of alcohol or drug use severity.

Post hoc tests (Table 1) indicated that, at admission to treatment, the SU+PTSD+Axis I group had significantly greater psychiatric severity as measured by the CS ($M = .40$) than the SU+Other-Axis I ($M = .31$) and SU-Only ($M = .18$) groups. Additionally, and as expected, the psychiatric CS of the SU+Other-Axis I group ($M = .31$) was significantly higher than that of the SU-Only group. Although the psychiatric CS of SU+PTSD group ($M = .31$) did not differ significantly from that of the other groups, it appeared to be comparable to that of the SU+Other-Axis I group.

Statistically significant group differences among the diagnostic groups were found in medical and family/social problem severity. The SU+PTSD+Axis I group reported significantly greater medical severity ($M = .54$) than the SU+Other-Axis I ($M = .35$) and SU-Only ($M = .32$) groups. While the SU+PTSD group medical CS ($M = .46$) did not differ significantly from that of the other groups, its results appeared to be intermediate between those of the SU+PTSD+Axis I and SU+Other-Axis I groups. Recent family/social problems were significantly more severe for the SU+Other-Axis I group ($M = .28$) than for the SU-Only group ($M = .18$). Generally, the family/social problems of the two PTSD groups were similar to those of the SU-Only group.

3.2 Comparison of the Four Groups on ASI CSs: Effect Size Analyses

Since the sample size of the SU+PTSD group was too small to enable a definitive statistical data analysis, we also conducted effect size analyses (Cohen's d ; Cohen, 1988) in order to provide additional perspective. An effect size $>.50$ is considered to be large, one between .30-.50 moderate, and $<.30$ small. Findings are presented in Table 2 and described for each of the ASI problem areas; keeping in mind, however, that the major focus is to clarify the extent of differences between the SU+PTSD group and the other three groups.

Examination of Table 2 reveals that meaningful group differences ($d \geq .30$) were not apparent in the employment and alcohol problem areas, findings consistent with the formal significance testing analyses. Moderate and large effect sizes were apparent in the medical area. Although the prior analyses failed to reveal differences between the SU+PTSD group and the other three groups, the effect size between the SU+PTSD and SU-Only groups was moderate ($d = .36$) and suggested greater medical problems for the SU+PTSD group. The effect size analyses did not suggest meaningful differences between the two PTSD groups. Finally, comparisons of the SU+PTSD+Axis I group with the other two groups revealed moderate/large effect sizes (SU+Other-Axis I comparison, $d = .47$; SU-Only comparison, $d = .56$). These latter two findings are consistent with those of the formal significance testing analyses indicating greater medical problems in the SU+PTSD+Axis I group.

In the drug area, the comparison of the SU+PTSD group with the SU-Only group yielded a small effect size ($d = .26$). However, the drug CS of the SU+PTSD group was lower than that of both the SU+PTSD+Axis I group ($d = .41$) and the SU+Other-Axis I group ($d = .50$). Moderate and large effect sizes were also found when comparing the legal CS of the SU+PTSD group with that of the SU-Only group ($d = .42$), the SU+PTSD+Axis I group ($d = .62$) and the SU+Other-Axis I group ($d = .57$). The legal CS of the SU+PTSD group was lower than that of each of the other groups. The findings of the effect size analyses in the drug and legal areas do not agree with the previous analyses which did not reveal any significant group differences.

Previously, only the comparison of recent family/social problems between the SU+Other-Axis I and the SU-Only groups was found to be statistically significant. Moderate effect sizes, however, were found between the SU+Other-Axis I group and both the SU-Only ($d = .43$) and the SU+PTSD ($d = .48$) groups. The two sets of analyses indicated greater problems in the SU+Other-Axis I group.

Effect size comparisons of the psychiatric CS of the SU+PTSD group with that of the other three groups suggested that the SU+PTSD group had more recent psychiatric problems than the SU-Only group ($d = .63$), fewer psychiatric problems than the SU+PTSD+Axis I group ($d = .39$), and no difference with the SU+Other-Axis I group ($d = .00$). In the earlier analyses, no significant psychiatric CS differences between the SU+PTSD group and the other groups were obtained.

3.3 Lifetime Psychiatric Symptom and Treatment History

Since the study groups were defined on the basis of psychiatric diagnoses and since the psychiatric CSs, which represent recent status, significantly differed among groups, individual ASI items describing serious lifetime psychiatric symptoms and psychiatric treatment history were examined. As can be seen in Table 3, the SU+PTSD+Axis I group had significantly higher values than all or virtually all of the other groups depending upon the psychiatric variable. For example, the SU+PTSD+Axis I group (56%) was significantly more likely to have had a suicide attempt than the SU+Other-Axis I group (21%) while this latter group was more likely to have attempted suicide than either the SU-Only group (9%) or the SU+PTSD group (0%). Similar findings were obtained for suicidal ideation.

Regarding treatment, the SU+PTSD+Axis I group (61%) was significantly more likely to have taken psychiatric medication than the SU+Other-Axis I (34%) or SU+PTSD (27%) group; these two groups were both significantly more likely to have taken medication than the SU-Only group (14%). As another example, the SU+PTSD+Axis I group averaged more inpatient psychiatric hospitalizations ($M = 1.59$) than any of the other groups, which did not differ significantly from each other (SU+Other-Axis I: $M = 0.45$; SU+PTSD: $M = 0.76$; SU-Only: $M = 0.17$).

3.4. PTSD+Axis I versus Multiple Axis I Disorders

Overall, the analyses indicated that: the SU+PTSD+Axis I group was most problematic, particularly with regard to psychiatric and medical function; the SU+Other-Axis I group was somewhat less problematic but had the greatest family/social problems; the SU+PTSD group was generally less problematic than the SU+PTSD+Axis I and SU+Other-Axis I groups; and the SU-Only group was generally the least severe. Unanswered is whether the greater problem severity of the SU+PTSD+Axis I group derives from the mere presence of multiple nonsubstance use Axis I disorders rather than PTSD (since the SU+PTSD+Axis I group, by definition, required multiple Axis I disorders), or derives specifically from the presence of PTSD in combination with another Axis I disorder(s).

In an effort to empirically explore this, we compared participants in the SU+PTSD+Axis I group to a subset of participants from the SU+Other-Axis I group who had more than one nonsubstance use disorder, henceforth designated as the SU+Multiple-Axis I group. The formation of this group was designed to yield participants comparable in Axis I psychopathology to those of the SU+PTSD+Axis I group, but without PTSD. The SU+PTSD+Axis I group ($n = 61$, mean number of Axis I disorders = 2.49) and the SU+Multiple-Axis I group ($n = 34$, mean number of Axis I disorders = 2.24) were compared on the seven ASI CSs and lifetime psychiatric items, using t-test and Chi-square statistics as appropriate.

The SU+PTSD+Axis I group and the SU+Multiple-Axis I group were not significantly different on any of the CSs. Additionally, the effect sizes between these two groups were uniformly small, ranging from .04 to .22. These findings indirectly suggest that the existence of multiple Axis I disorders, rather than PTSD *per se*, contributes to much of the greater recent problem severity noted earlier for the SU+PTSD+Axis I participants. Nonetheless, analysis of lifetime psychiatric items revealed two significant group differences. First, more SU+PTSD+Axis I participants (41%) attempted suicide than did SU+Multiple-Axis I participants (21%; $\chi^2 = 4.07$, $df = 1$, $p < .05$). Finally, the SU+PTSD+Axis I group had more episodes of inpatient psychiatric treatment ($M = 1.59$) than did the SU+Multiple-Axis I group ($M = 0.65$; $t = 2.69$, $df = 93$, $p < .01$).

4. Discussion

This study attempted to identify problems associated with PTSD versus problems associated with other nonsubstance use Axis I disorders by comparing diagnostic groups in a substance abuse treatment sample; SU-Only, SU+PTSD, SU+PTSD+Axis I, and SU+Other-Axis I. The SU+PTSD+Axis I group was most problematic, particularly with regard to psychiatric and medical function; the SU+Other-Axis I group was somewhat less problematic but had the greatest family/social problems; the SU+PTSD group was generally less problematic than those two groups; and, as might be expected, the SU-Only group was generally the least severe. When the SU+PTSD+Axis I group was compared to an enhanced SU+Other-Axis I subgroup, i.e., the SU+Multiple-Axis I group (defined by having more than one nonsubstance use Axis I disorder), few group differences remained. The exceptions were more suicide attempts and psychiatric hospitalizations in the SU+PTSD+Axis I group.

In this sample of patients with SUDs, the results show that uncomplicated PTSD in SUD patients (i.e., SU+PTSD) was not associated with problem severity to any greater extent than were other nonsubstance use Axis I disorders (typically depressive disorders) and suggest that the greater problem severity of the SU+PTSD+Axis I group was related largely to the presence of multiple nonsubstance use Axis I disorders. The SU+PTSD+Axis I participants, however, did have more suicide attempts and psychiatric hospitalizations than even the SU+Multiple-Axis I group. Both are particularly serious problems, and their strong association with the SU+PTSD+Axis I group merits further investigation. Neither is surprising, however, as the risk of suicide attempts is reportedly high among PTSD patients, and greater service utilization is associated with comorbidity (Kessler, 2000; Kessler et al., 2005; Zimmerman et al., 2007). Nonetheless, these were the only indicators of severity that had an increased association with PTSD that were not reasonably attributable to the existence of multiple Axis I disorders. Thus, more generally the findings suggest that it is not PTSD *per se* but the existence of multiple psychiatric disorders, consisting of PTSD and other Axis I disorders, that largely accounts for the previously reported greater severity in substance abuse patients with PTSD. In other words, the existence of Axis I disorders in addition to PTSD may account for the levels and types of problem severity reported by PTSD patients in previous substance abuse research. One factor that has possibly contributed to this perception is that most (about 80%) substance abuse patients presenting with PTSD also have additional Axis I pathology. Thus, clinicians and researchers may have focused on the PTSD and attributed the difficulties of these patients to the PTSD. The current work provides preliminary evidence that PTSD substance abuse patients without additional Axis I disorders are much less severe than the PTSD patients with other psychopathology. The distinction between these two PTSD groups may have important treatment implications.

The results suggest that at least among male veterans entering outpatient substance abuse treatment there may be a hierarchy of psychiatric and perhaps other life problem severities that are associated with broad diagnostic groupings. Using our categories, this hierarchy from most to least severe is: SU+PTSD+Axis I, SU+Multiple-Axis I, SU+Other-Axis I, SU+PTSD, and SU-Only. This hierarchy may reflect primarily the additive effect of the increasing number of disorders on general severity as others have noted (e.g., Kessler et al., 2005), but there is also evidence, and it makes sense, that the specific disorder(s) have an impact on the manifestations of specific pathology or other indicators of severity. In the case of the SU+PTSD+Axis I group, for example, more suicide attempts and psychiatric hospitalizations. There is also the possibility of other variables or vulnerabilities that place individuals at risk for multiple Axis I disorders and perhaps also for problems in other functional domains [e.g., personality disorders (Cacciola et al., 2001), adverse life situations (Kessler, 2004)].

While there is evidence that patients in substance abuse treatment with PTSD have poorer outcomes (Brady et al., 1994; Hien et al., 2000; Mills et al., 2005; Ouimette et al., 1997, 1998, 1999, 2006), it is an open empirical question whether the proposed diagnostic groupings might provide more prognostic precision and warrant specific treatment recommendations. For example, our findings suggest that the relatively small subgroup of substance abuse patients with uncomplicated PTSD may be able to respond more favorably to substance abuse treatment, compared to the larger subgroup of substance abuse patients with PTSD and other Axis I pathology. This question has not been examined in prior research and is certainly worthy of further inquiry. Additionally, since most substance abuse patients with PTSD also have other psychiatric disorders, it is possible that adjunctive treatments designed to treat PTSD specifically may not be as effective as desired, if they do not treat the other psychopathology. The relatively modest results obtained thus far with PTSD treatment for substance abuse patients lend some support to this conclusion (Brady et al., 2001; Hien et al., 2004).

It is important to note several study shortcomings which limit the confidence that can be placed in the findings. The relatively small sample size of the SU+PTSD group resulted in limited statistical power to ascertain whether this group differed significantly from that of the other groups, although a number of statistically significant group differences were revealed in comparison to SU+PTSD+Axis I group for lifetime psychiatric problems. Effect size analyses further supported the differentiation in severity between the two PTSD groups (and among the four primary diagnostic groups overall). It would have been desirable to determine whether the results would be consistent for both the alcohol/cocaine and MM subject samples, if analyzed separately, but the limited numbers made these comparisons unfeasible. Additionally, the sample sizes of the PTSD groups precluded conducting analyses based on current diagnoses as well as on lifetime diagnoses. There is often difficulty in conducting research in small population subsamples. Clearly, a larger total sample with a greater number of participants especially within the SU+PTSD group would allow for more sophisticated statistical analyses and more confidence in the results. Hopefully, this line of inquiry and the issues it has raised can be pursued in further research in substance abuse treatment populations. For example, to more definitively determine whether there are at least two distinctive subgroups of PTSD patients, and to untangle the impact of various combinations of psychopathology are obvious next steps. Regarding the latter issue, this could include specific Axis I disorders as well as Axis II personality disorders.

Several other limitations that bear on the interpretation of the findings should also be mentioned. These data are cross-sectional and differences in problem severity across groups could be a contributing factor as well as an effect of the diagnoses themselves. Moreover, it is important to emphasize that our research is preliminary in nature and was limited to the examination of the correlations of one PTSD-related typology. Given this context, we recognize that other sources of variation such as the severity and chronicity of PTSD, and the nature of the trauma experienced may help to explain the differences obtained between the two PTSD groups evaluated in our research; or may independently represent other important aspects of PTSD associated with problems and functional status. Similarly, typologies and models that include the severity/type of the SUD(s) as well as of the other Axis I and II disorders would, as alluded to earlier, provide more precise and elaborated findings. Again, small sample sizes and unavailability of certain variables limited our ability for more finegrained analyses. Also, the SCID was used to derive the diagnosis of PTSD because the studies from which the data were drawn did not focus primarily on PTSD. The Clinician-Administered Posttraumatic Stress Disorder Scale (CAPS; Weathers, et al., 1999) is currently favored as the instrument of choice for the determination of PTSD and its severity. It is possible that the findings may have differed somewhat if the CAPS had been employed.

Finally, further research from a larger study would also be necessary in order to generalize the findings to women and to non-veterans as our findings are limited to male veterans. Nevertheless, although the United State military has increasingly employed women in general and in combat, this research with male veterans is very timely since the United States is at war with still mostly male troops.

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Table 1

Baseline ASI Composite Scores in Four Diagnostic Groups

Composite Scores	Group A	Group B	Group C	Group D	<i>Post hoc</i> analyses
	SU-Only (n = 236)	SU+PTSD (n = 21)	SU+PTSD+Axis I (n = 61)	SU+Other-Axis I (n = 154)	
	M (SD)	M (SD)	M (SD)	M (SD)	
Medical	0.32 (0.36)	0.46 (0.42)	0.54 (0.42)	0.35 (0.38)	C>D,A
Employment	0.66 (0.30)	0.66 (0.26)	0.69 (0.29)	0.67 (0.29)	
Alcohol	0.23 (0.27)	0.27 (0.29)	0.25 (0.27)	0.26 (0.31)	
Drug	0.22 (0.15)	0.18 (0.16)	0.27 (0.15)	0.26 (0.16)	
Legal	0.12 (0.21)	0.05 (0.11)	0.17 (0.25)	0.15 (0.22)	
Family/Social	0.18 (0.21)	0.17 (0.21)	0.21 (0.24)	0.28 (0.25)	D> A
Psychiatric	0.18 (0.21)	0.31 (0.20)	0.40 (0.26)	0.31 (0.24)	C>D>A

Table 2

Effect Sizes of Difference - Diagnostic Group Comparisons

ASI CSs	SU-Only vs. SU+PTSD		SU-Only vs. SU+PTSD+Axis I		SU-Only vs. SU+Other-Axis I		SU+PTSD vs. SU+PTSD+Axis I		SU+PTSD vs. SU+Other-Axis I		SU+PTSD+Axis I vs. SU+Other-Axis I	
	SU-Only	SU+PTSD	SU-Only	SU+PTSD+Axis I	SU-Only	SU+Other-Axis I	SU+PTSD	SU+PTSD+Axis I	SU+PTSD	SU+Other-Axis I	SU+PTSD+Axis I	SU+Other-Axis I
Medical	-.36		-.56		-.08		-.19		.27		.47	
Employment	.00		-.10		-.03		-.11		-.04		-.07	
Alcohol	-.14		-.07		-.10		.07		.03		-.03	
Drug	.26		-.33		-.26		-.41		-.50		.06	
Legal	.42		-.22		-.14		-.62		-.57		.08	
Family/Social	.05		-.13		-.43		.13		-.48		-.29	
Psychiatric	-.63		-.93		-.58		-.39		0.00		.36	

- (minus) preceding effect size value indicates that first group has a smaller mean than the second group

bold values indicate a moderate to large effect size, i.e., $d \geq .30$

Table 3

Individual Baseline Psychiatric Items of Four Diagnostic Groups

Individual Items	Group A	Group B	Group C	Group D	Post hoc analyses
	SU-Only (n = 230)	SU+PTSD (n = 21)	SU+PTSD+Axis I (n = 61)	SU+Other Axis I (n = 154)	
% Lifetime Violent Impulses	31	37	53	38	C>A,D
% Lifetime Suicide Ideation	21	19	56	41	C>D>A,B
% Lifetime Suicide Attempts	9	0	41	21	C>D>A,B
% Lifetime Psychiatric Medications	14	27	61	34	C>B,D>A
Lifetime Inpatient Psychiatric Treatments ^a	0.17 (0.62)	0.76 (1.34)	1.59 (2.21)	0.45 (1.19)	C>A,B,D
Lifetime Outpatient Psychiatric Treatments ^a	0.11 (0.37)	0.38 (0.59)	1.59 (6.52)	0.47 (1.35)	C>A,B,D

^a = mean (standard deviation)