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Depression, PTSD, and Comorbidity in United States Corrections Professionals:

Prevalence and Impact on Health and Functioning

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Abstract

The purpose of this study was to estimate prevalence rates for depression, post-traumatic stress disorder (PTSD), and comorbid PTSD/depression in corrections professionals, and to explore the relationship between particular disorder conditions and a variety of variables including job type and numerous indices of health, well-being, and life functioning (e.g., number of doctor visits, number of absences from work, extent of substance use, satisfaction with life, job functioning, and other variables). A large number of continuous and dichotomous variables were also assessed for their ability to replicate diagnoses and classifications of PTSD, depression, and comorbid PTSD/depression coming from established clinical assessment and screening tools. Using a secure online application, a nationwide sample of corrections professionals (N=3599) completed the PTSD Checklist-Civilian Version (PCL-C), the Depression, Anxiety, Stress Scale-21 (DASS-21), the Impact on Functioning Scale (IOFS), and the Satisfaction with Life Scale (SWLS). Participants responded to additional questions indicating the degree to which they witnessed or experienced a variety of types of workplace violence, injury and death (VID) events and related emotions, and whether and/or the degree to which they experienced various health-related conditions, behaviors, and functional impairments. Results indicated rates of depression, PTSD, and comorbid PTSD/depression that far exceed general population rates. Males and individuals in security/custody roles demonstrated the highest disorder rates. The condition of Comorbid PTSD/depression demonstrated a particularly strong relationship to worse outcomes and statuses on a large number of variables reflecting health and functioning. Parsimonious sets of public domain assessment items were identified that offer promise as screening items for determining the prevalence of common disorder conditions in corrections professional populations. Implications are discussed in relation to the need for, and best focus of, systemic assessment and interventions in correctional environments and in regard to the need for improvement of corrections employee health and functioning.

Introduction

Depression is a serious illness, characterized by some combination of symptoms that often include: feeling down, loss of interest or pleasure in previously enjoyed activities, decreased energy, low self-worth, disturbed sleep and/or appetite, poor concentration, or suicidal thoughts. Depression affects daily functioning, and it often co-exists with other psychological disorders and physical illnesses (e.g., Baum & Polsuszny, 1999; Cassano & Fava, 2002). Clinically diagnosed depression is known as Major Depressive Disorder (MDD) or Major Depressive Episode (MDE), with the latter representing a single occurrence. In the general population, it has been observed that women tend to suffer depressive disorders comparably more often than men (US Centers for Disease Control and Prevention, US-CDC; 2010). This has also been found to be true in workplace settings (Substance Abuse and Mental Health Services, SAMHSA; 2008a).

Depression is both biological and psychological in nature, coming into being in response to distressing life circumstances or events, and involving altered brain chemistry and behavior. Research indicates that some people may be particularly vulnerable to the disorder based on genetic predisposition. The United States Centers for Disease Control and Prevention (US-CDC) found a prevalence rate of depression for adults aged 18 to 65+, in the general population, to be 8.0% for men, 10.2% for women, and 9.1% overall. According to SAMHSA (2008a), an average of 7.0% of full-time workers aged 18 to 64 have experienced a major depressive episode (MDE) in the past year, and up to 10% of adults suffering from a past-year MDE are estimated to die by suicide (SAMHSA, 2008b).

Research indicates that the incidence of depression in the workplace is costly. According to the World Health Organization (2012), depression is the leading cause of disability worldwide in terms of total years lost due to disability. It is also projected to become the second leading cause of the global burden of disease by 2020. MDD in the workplace has been associated with reduced productivity, increased disability claims, more missed work days (Kessler & Frank, 1997), and premature retirement (Wang, 2004). Mental Health America (2013) summarized findings from numerous studies and indicated that, among other findings, depression (1) is as costly as heart disease or AIDS to the US economy, (2) costs the U.S. over $51 billion in absenteeism from work and lost productivity, (3) costs the U.S. $26 billion in direct treatment costs, and (4) ranks among the top three reasons employees seek help from employee assistance professionals, following only family crisis and stress.

Other interesting correlates of depression have been reported, such as in imaging and postmortem studies that document for individuals with MDD lower average brain volume, smaller brain size, and lower density of neurons in certain areas of the brain (Drevets, 2000; Stockmeier & Rajkowska, 2004). In animal studies, high-

level stress has been identified as a cause of brain volume reduction or hippocampal cell loss, resulting in behavioral symptoms akin to depression (Golden, et al., 2013).

While high trauma jobs are widely known to be associated with the development of PTSD, high stress jobs have been found to contribute to the development of MDD (Melchior, et al., 2007; Paterniti, Niedhammer, Lang, & Consoli, 2002; Blackmore, et al., 2007). In addition, several particular work-related factors have been identified by researchers as likely precursors to depressive symptoms in workers, including high psychological and physical demands of the job (e.g., time pressure, high work load), low social support, and low decision latitude. The latter refers to low decision authority (i.e., narrow space/latitude for independent judgments/decisions) and low skill discretion (i.e., low variability in job activities over time and little opportunity to actualize broader skill sets/potential). High strain jobs, defined as those with both high work demands and low decision authority, have been found to be associated with an increased risk of depressive symptoms (Mausner-Dorsch & Eaton, 2000; Melchior, et al., 2007; Niedhammer, Goldberg, Leclerc, Bugel, & David, 1998; Paterniti, et al., 2002; Blackmore, et al, 2007; Stansfeld, Fuhrer, Shipley & Marmot, 1999). By contrast, high levels of decision latitude combined with social support have been found to generate resilience against depressive symptoms (i.e., they represent "protective factors"), as documented in both cross-sectional (Mausner-Dorsch & Eaton, 2000; Blackmore, et al., 2007) and longitudinal studies (Niedhammer, et al., 1998; Paterniti, et al., 2002; Stansfeld, et al., 1999).

In a study of Australian correctional officers, the impact of psychosocial aspects of corrections work on staff was investigated (Dollard & Winefield, 1998). Results showed that job types characterized by a combination of high demands, low control, and low support were associated with psychological distress, job dissatisfaction, and negative emotions. Job posts involving a combination of high demands and high control were associated with certain desirable worker behaviors, such as feedback seeking and seeing difficult work tasks not just as burdens but more positively as worthwhile goals to pursue and conquer. Corrections officers in high isolation and high strain jobs, and with the longest years of service, showed higher levels of strain and more negative emotional experiences than did officers working in the same job for shorter periods. In conclusion, the authors of this research suggested that, over time, negative work experiences and resulting psychological distress may have a cumulative impact that shapes personality adversely and causes individuals to develop a more pervasively negative outlook.

The above-reporting findings, overall, are not inconsistent with findings from studies performed with corrections professionals specifically. Working in the field of corrections, especially for individuals in custody/security roles, has long been recognized as highly and chronically stressful, and characterized by high

rates of sick leave and turnover (Finn, 2000; Finn, Talucci, and Wood, 2000; Schaufeli & Peeters, 2000). In part due to its hierarchical and paramilitary structure typical of corrections institutions, and the nature of the environment (e.g., often involving poor staff to inmate ratios, requiring overtime work, and involving shift work), corrections workplaces fit the profile of being workplaces with: (1) high job demands, (2) low decision latitude, (3) low skill discretion, and (4) low social support. Yet few rigorous studies have investigated the rates of depression in corrections professionals in the United States.

The few studies that have been completed include a Canadian study of corrections officers (Samak, 2003), a French study of corrections professionals of all types (David, Landre, Goldberg, Dassa & Fuhrer, 1996), and a study of U.S. corrections officers (Obidoa, Reeves, Warren, Reisine, & Cherniack, 2011). All studies reported higher rates of depressive symptoms among corrections personnel compared to the general population for both males and females, but even more so for males. This pattern is the reverse in the general population, where it's been well established that females more often suffer from depression than males. The authors of the Canadian study reported that 23% of corrections professional participants indicated they had been formally diagnosed with depression during the last 10 years. Reports of having been diagnosed increased with years of experience, such that 30% of officers with 15 or more years' experience reported having been so diagnosed, as did 23% of officers with 5-10 years, and 13% of those with less than two years of experience. These findings support a cumulative negative impact of corrections work, resulting in depression.

In the French study (David et al., 1996), researchers used a French version of the Center for Epidemiologic Studies Depression Scale (CES-D, Andresen, Malmgren, Carter, & Patrick, 1994) to determine that 24.0% of all corrections staff of several disciplines met criteria for depression, with 24.9% being men and 21.4% women. For corrections officers specifically, 24.9% of men and 19.5% of women met criteria for depression. Among administrative staff, men demonstrated a 25.5% depression rate, and women 25.1%. Management staff showed the lowest incidence of depression, with rates of 20.3% for men and 7.4% for women. Depressive symptoms were also found to be associated with stressful work conditions, security level of institution, unsatisfactory alternating tasks, problems with inmate behavior, difficult schedules, poor job satisfaction, and/or negative professional image. Attributes of consideration and support in the workplace appeared to operate as protective factors and were associated with less depression.

The third study cited above, of Corrections Officers (Obidoa, et al., 2011) utilized a short form of the CES-D to measure depression symptoms quantitatively. It was found that, on average, participants in the sample demonstrated symptoms in the moderate depression range, with about a third of them (31%) demonstrating symptoms in the clinical (i.e., severe) depression range, according to established clinical cut-points applied to

participant scores. Additional findings indicated that "work-originated stress" negatively impacted home life more than "home-originated stress" impacted work life.

A high degree of comorbidity (co-occurrence) has been repeatedly identified for PTSD and depression. Studies have estimated 30% to 75% comorbidity rates, depending on the population, such as military personnel, 9/11 clean-up crews, and other groups (Campbell, et al., 2007; Cukor, et al., 2011; Dobie, et al., 2006; Erickson, Wolfe, King, King & Sharkansky, 2001; Oquendo, et al., 2005; Shalev, et al., 1998). Developing PTSD following traumatic exposure has been found to significantly increase the risk of experiencing a major depressive episode for the first time in adults (Breslau, Davis, Peterson, & Schultz, 2000). A longitudinal study (Erickson, et al., 2001) of military combat personnel found that their timeline for development of PTSD and depression was bi-directional. In some cases PTSD was the first disorder to develop and in other cases depression developed first. Comorbidity also may occur due to a shared psychological distress factor (Henry & Crawford, 2005; Marshall, Schell & Miles, 2010), shared vulnerabilities between the two disorders (Breslau, et al., 2000), and/or common brain structures that are adversely affected by both conditions (Kroes, Rugg, Whalley & Brewin, 2011).

Research has shown that PTSD and depression contribute independently to suicidal behavior (Davidson, Hughes, Blazer, George, 1991; Freeman, Roca & Moore, 2000; Marshall, et al., 2001; Oquendo, et al., 2003; Sareen, Houlahan, Cox, & Asmundson, 2005; Sareen et al., 2007). A recently published longitudinal study of PTSD showed that elevated lifetime rates of full and partial PTSD were associated with elevated suicide rates (Pietrzak, Goldstein, Southwick, and Grant, 2011). Given the reported high rates of PTSD and depression among corrections professionals, it is no surprise that corrections staff exhibit unusually high suicide rates. The New Jersey Police Suicide Task Force (2009) reported that for the years 2003-2007, the suicide rate for men aged 25-64 years was 14 per 100,000. For police officers the suicide rate was found to be 15.1 per 100,000. For correctional officers it was found to be more than double that—34.8 per 100,000. Stack & Tsoudis (1997) examined Corrections Officer suicide rates at the national level using the 1990 National Mortality Detail File (U.S. Public Health Service, 1994). Based on analysis of death certificate data from 21 states that provided information on the occupation of the deceased, it was determined that Corrections Officers' risk of suicide was 39% higher than that of the rest of all other professions combined.

Spinaris, Denhof, & Kellaway (2012) reported the first rigorous, nationwide assessment of PTSD prevalence for corrections professionals and its relation to health-related variables. Overall PTSD prevalence was estimated to be 27%, which is highly elevated compared to the general population. In addition, PTSD prevalence rates were estimated to be 30.5% for men, 21.7% for women, 34.1% for security/custody staff, and

21.5 % for non-security staff. A Canadian study (Stadnyk, 2003) has reported a PTSD rate estimate for corrections officers of 26%.

The current study represents a second, expanded set of analyses based on the same large data set (*N*=3,599) collected by Spinaris et al. (2011). Additional analyses were performed in this case to: (1) estimate the prevalence of depression and comorbid PTSD/depression in among corrections professionals, (2) to explore the relationship between particular disorder conditions and a variety of variables including job type and numerous indices of health, well-being, and life functioning (e.g., number of doctor visits, number of absences from work, extent of substance use, satisfaction with life, job functioning, and other variables), and (3) to evaluate the ability of a large variety of continuous and dichotomous assessment variables to reproduce/replicate diagnoses and classifications of PTSD, depression, and comorbid PTSD/depression that were previously obtained through established clinical assessment and screening tools.

Method

Participants

The study's participants consisted of *N*=3599 corrections professionals currently working in the field of corrections at any of numerous types of corrections facilities, in a wide variety of corrections disciplines, and at a broad variety of locations around the United States. Prior to data collection, the data collection plan was screened by an independent human subjects review agency and granted exempt status due to the determination of minimal risk to participants. Participation in the study was offered as voluntary and with no incentives provided. The offer of participation was made through direct communications to jails, prisons, corrections professional associations, corrections departments, and corrections unions, and through advertising in online corrections publications, based on professional contacts and networking. The researchers communicated with department administrators, association managers, and union leaders who, in turn, passed on participation requests to their bodies of constituent employees/members via bulk email distributions. All participants were required to electronically certify their status as active/employed corrections professionals and electronically agree to an informed consent to participate. The formal presentation of the study (i.e., its purpose, required certification and consents, and its assessment components) was identical for all participants, and delivered using a secure, web-based application.

Participants came from a total of 49 different states within the United States and 3 U.S. territories, and with the highest concentrations coming from Missouri (40.3%), Ohio (21.2%), and Kansas (9.7%), and the remaining

states and territories (28.8% in aggregate). Participants consisted of 54.9% men and 45.1% women, mostly White (89.4%), and with 4.4% being African-American, 2.1% Latino/a, 1.2% Native American, .3% Asian, and 2.6% multiple-ethnicity/other. An average age of 40.1 was reported, and 71.5% of participants indicated they were either married or cohabiting.

The four largest subsets of participants indicated being employed as security/custody personnel (43.2%), followed by managerial/supervisory staff (10.8%), parole/probation personnel (10.6%), and clerical staff (6.6%). Participants reported having been employed in one or more of the following types of corrections settings during the course of their corrections careers: Community Corrections (44.5%), Corrections Diagnostic Centers (42.7%), Jails (30.9%), Youth Corrections Facilities (18.1%), Federal Maximum Security Prisons (14.3%), Federal Medium Security Prisons (13.2%), Federal Minimum Security Prisons (12.0%), State Maximum Security Prisons (10.6%), State Medium Security Prisons (7.8%), Private Minimum Security Prisons (7.2%), and 10 other specifically named facility types (.8 to 3.7% per type). Participants had an average of 12.7 years of work experience in the field of corrections at the time of participation, with an average of 2.3 different corrections-related positions held, past and present.

Measures

Data for this study were collected anonymously via a secure web application with built-in error correction functions to ensure the collection of permissible response values only. Demographic information was collected, along with measures to assess PTSD, depression, anxiety, stress, impact on functioning, and satisfaction with life. Additional assessment items pertained to work-related VID experiences, sick days, doctor visits, health conditions, substance use, and potential coping behaviors such as tobacco and alcohol use, social activity, and spiritual/religious practice. The total number of assessment items covering all of the above was tallied at 152.

Depression, Anxiety, Stress Scale-21 (DASS-21)

The DASS-21 is a shortened but psychometrically sound version (Henry & Crawford, 2005) of an original 42-item DASS questionnaire (Lovibond & Lovibond, 1995). The DASS-21, upon scoring, generates three seven-item scales targeting depression, anxiety, and stress. Assessment items consist of statements to be evaluated for the extent to which they apply to the person assessed over the past week, and based upon a four-point rating scale (0 to 3).

The DASS-21 Depression, Stress, and Anxiety scales have been found in previous research to demonstrate adequate internal consistency reliability, with α estimates ranging from .82 to .93. The factor structure of the DASS-21 has been assessed through factor analysis and measurement model comparisons, with results supporting the convergent and discriminant validity of the DASS items (Antony, Bieling, Cox, Enns, &

Swinson, 1998; Henry & Crawford, 2005; Lovibond & Lovibond, 1995). DASS-21 scales have also been found to tap a global "general psychological distress" construct (Henry & Crawford, 2005). The DASS-21 is widely used for clinical and research purposes.

Posttraumatic Stress Disorder Checklist-Civilian Version (PCL-C)

The PCL-C is a 17-item questionnaire (Weathers, Litz, Herman, Huska, & Keane, 1994) based upon the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) criteria for PTSD (American Psychiatric Association, 1994). The PCL-C utilizes a Likert-type rating scale for each item, where respondents indicate the extent of symptoms experienced during the past 30 days along a continuum spanning from one to five. Item ratings of 3 or higher are considered symptomatic or clinically substantial.

The PCL-C can be scored in two ways, using either (1) a total score cut-off method, where a summation of all item scores greater than or equal to 44 defines someone as PTSD-positive, or (2) a symptom cluster method (SCM), where DSM-IV criteria for PTSD are met based on DSM-IV criteria B, C, and D: requiring at least one cluster B item (questions 1-5) with a score of three or higher, plus at least three cluster C items (questions 6-12) with a score of three or higher, plus at least two cluster D items (questions 13-17) with a score of three or higher. While more complicated to score, the SCM method was selected for use in this study because results arrived at by this method ensure that DSM-IV criteria B, C, and D are met, and because DSM criteria serve as a diagnostic standard.

The quality of measurement characteristics of the PCL-C (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Orsillo, 2001; Ruggiero, Del Ben, Scotti, & Rabalais, 2003) and its diagnostic utility (Bertelson, Brasel, & deRoon, 2011; Gardner, Knittel-Keren, & Gomez, 2012; Keen, Kutter, Niles, & Krinsley, 2008; McDonald & Calhoun, 2010) are well substantiated. The PCL-C is among the most widely used PTSD screening devices in clinical and research settings (Elhai, Gray, Kashdan, & Franklin, 2005). Results from the PCL-C have been found to compare favorably with clinician-performed diagnostic approaches, such as the Clinician Administered PTSD Scale (CAPS) (Bollinger, Cuevas, Vielhauer, Morgan, & Keane, 2008; Forbes, Creamer, & Biddle, 2001). The PCL-C is particularly amenable to screening of large populations, due to its self-administrable format. Internal consistency reliability (α) for the entire scale has been estimated at .96, and from .89 to .91 for individual symptom clusters (Weathers, et al., 1994). Evidence of convergent validity with the Minnesota Multiphasic Personality Inventory PTSD scale has been documented (Weathers, et al., 1994). In addition, many assessments of the PCL-C's psychometric properties have been found to replicate across multiple samples (Blanchard, et al., 1996; Ruggiero, et al., 2003).

Satisfaction With Life Scale (SWLS)

The SWLS was developed to measure perceptions of life satisfaction (Diener, Emmons, Larsen, & Griffen, 1985). It is a five-item scale that requires respondents to assess various dimensions of satisfaction with life, using a seven-point response scale. Respondents are presented with statements pertaining to life satisfaction and asked to indicate the extent to which they agree with each statement. The scores for each item are aggregated to produce a satisfaction with life total score, ranging from 5 to 35, where a higher total score indicates a higher sense of life satisfaction.

The SWLS has been translated into several languages and researched using a variety of populations including outpatient counseling clients, prisoners, and college students. The psychometric properties of the SWLS include: internal consistency reliability (α) estimates ranging from .79 to .89, test-retest reliabilities ranging from .5 (10 months) to .83 (two weeks), evidence of convergent and criterion-related validity (Pavot & Diener, 1993), and factorial validity (Shevlin, Brunsden & Miles, 1998).

Impact on Functioning Scale (IOFS)

The IOFS consists of a set of five items created by the authors as measures of the degree to which exposure to work-related events in a corrections setting (over the past month) have negatively impacted key areas of life functioning. The scale consists of five items targeting one's ability to: function on the job, maintain family or personal relationships, enjoy leisure time, care for dependents, and carry out personal responsibilities. Respondents make ratings using a five-point scale, to indicate the extent of impact on functioning in each area, if any. The average of the five item scores can be used as an overall measure of impact on functioning. Individual item scores can be used to discern where potential dysfunctions are most concentrated.

The internal consistency reliability (α) of the IOFS was calculated to be .90 based on the current study's sample (N=3599). The Statistical Package for the Social Sciences' (SPSS Version 20.0) random case selection function was used to generate seven additional random subsamples (n=500 per subsample) to assess replicability of the original α estimate. The resulting estimates ranged from .88 to .91, and averaged .89 across the seven subsamples, supporting the accuracy of the original estimate to within .1.

Substantial support was found in the current study for the convergent and discriminant validity of IOFS items through factor analysis and group comparisons of scores according to PTSD status (i.e., positive vs. negative, as determined by the PCL-C). Item-level exploratory factor analyses were performed by analyzing numerous assessment items concurrently from the IOFS, PCL-C, and SWLS. IOFS items demonstrated a recoverable factor consisting of IOFS items with strong and distinctive loadings, which supports the discriminant and convergent validity of the IOFS items. Subsequent factor analyses were run, based on

randomly selected subsamples (n=500 each), and the results of the initial analysis were found replicable. Additional evidence of convergent and discriminant validity of items was found through comparisons of mean IOF item scores across PTSD+/- and Depression+/- groups, such that all IOFS items demonstrated significantly higher means (p<.001) for individuals in PTSD+ and Depression+ groups compared to those for individuals in PTSD- and Depression- groups (p<.001; based on independent sample t-tests).

Results

Data Screening

All analyses were based on complete data, with the exception of one variable assessing frequency of daily tobacco use. The response scale for this variable was adjusted after 508 participants had begun or completed participation. The adjustment was prompted by the authors' observation that the original range of this item's response options might be too narrow (i.e., limiting responses to a maximum of seven tobacco uses per day). The 1-7-item response scale was replaced with a 1-100+ uses per day scale, and the original 508 responses to the original scale were deleted. The discarded data were expected to be inconsequential, as a large number of additional participants were anticipated, and more than enough for calculation of accurate parameter estimates.

Statistical Assumptions

The distributional characteristics of variables were assessed both visually through histograms and statistically through Kolmogorov-Smirnov and Shapiro-Wilk tests. Levene's test was also employed to assess for homogeneity of variance prior to assessing for the significance of differences in means.

Departures from normality were found to be fairly prevalent, based on visual inspection and statistical estimators. This finding was not unexpected given that many variables were clinical in nature and often targeted relatively rare events. Lack of variance homogeneity was also frequently detected among variables to be compared. Nevertheless, significance testing was expected to be robust given the unusually large sample size ultimately obtained in this study.

Effect sizes are included in results to assist with gauging the practical significance of findings and to facilitate comparisons with findings from other studies. Mean differences are accompanied by Cohen's d. Relative risk ratios are reported in relation to results involving proportions.

Depression and PTSD Prevalence

For measurement purposes in this paper, the presence of depression was defined in terms of a DASS-21 depression score falling into the Moderate-to-Extreme symptom severity range (hereafter referred to in short as Depression+), according to DASS-21 interpretive cut-points and categories. A lack of depression was defined in terms of scores that fall in the None-to-Mild symptom severity range (hereafter referred to as Depression-). PTSD+ was based on the PCL-C SCM method of predicting PTSD.

The overall Depression+ prevalence rate for the entire sample was calculated to be 25.7%. The prevalence of depression for male and female corrections professionals was found to be 28.7% and 22.1%, respectively, a statistically significant difference in proportions (χ^2=20.04; *df*=1; *p*<.000). For the security staff subgroup of participants, the prevalence of Depression+ was 31%, and for non-security staff (i.e., all other job types) 22.1% (χ^2=35.86; *df*=1; *p*<.000).

Out of theoretical interest, depression rates were examined for individuals who reported having no VID experiences during their career versus those who reported experiencing one or more VID events. VID experiences have been associated with the development of PTSD and might also play a role in the development of comorbid PTSD/depression and/or depression independent of PTSD. A large difference was found in depression rate for the subgroup of corrections professionals who reported zero VID events versus those reporting one or more VID events over their careers. Individuals reporting zero VID events showed a Depression+ rate of 13%, and those who reported one or more VID events showed a rate of 27.6%, a statistically significant difference in proportions (χ^2=44.87; *df*=1; *p*<.000).

Another subgroup assessed for depression prevalence was corrections professionals who reported past military service—the largest subgroup of participants among various subgroups that reported past occupations with high stress/trauma potential (i.e.., police, firefighters, EMT workers). Among participants with prior military experience, the Depression+ rate was calculated to be 30.1%, compared to 24.7% for all other participants (i.e., individuals with no reported past military experience), a statistically significant difference in rate (χ^2=8.52; *df*=1; *p*<.004).

Given that Depression and PTSD often occur together, based on existing literature, and based on analysis of the current data set, PTSD rates are also being reported here. The status of Comorbid PTSD/Depression was also incorporated into further analyses, and results reported in this paper as the interaction of the two proved noteworthy. The prevalence of PTSD within the entire sample was found to be 27%. The rate for males was found to be 30.5% and for females 21.7%, a statistically significant difference in proportions (χ^2=35.34; *df*=1;

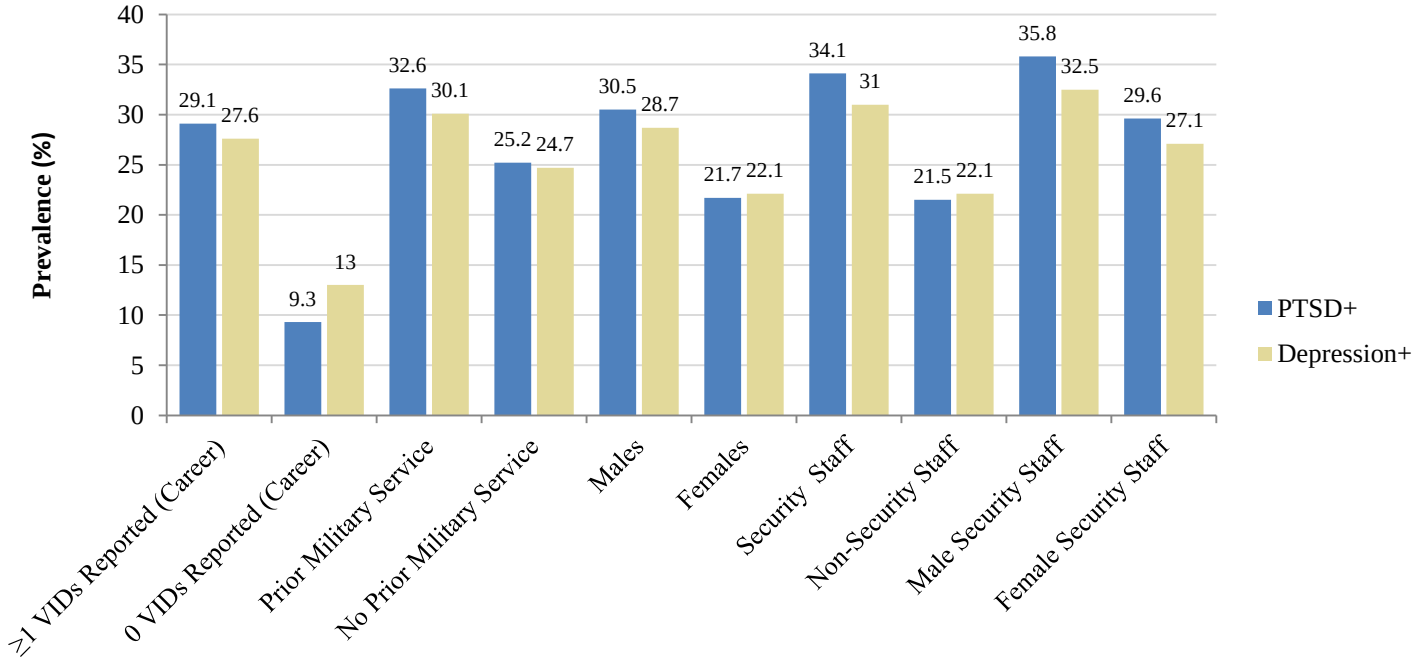
p<.000); for security staff 34.1%[1] and non-security staff 21.5% (χ^2=70.93; df=1; p<000); for male security staff 35.8% and female security staff 29.6% (χ^2=4.81; df=1; p<.000); for those reporting one or more career VIDs 29.1% and no VIDs 9.3% (χ^2=80.91; df=1; p<.000); for those with prior military service 32.6% and no military service 25.2% (χ^2=15.69; df=1; p<.000).

Among all participants in the sample found to be Depression+ (n=925), 67% of them were also found to be PTSD+. Among those who were found to be PTSD+ (n=956), 65% were also found to be Depression+. Thus a high degree of comorbidity was confirmed to be present among corrections professionals in the total sample (N=3,599).

The estimated prevalence rates of depression and PTSD among subgroups of corrections professionals are illustrated in Figure 1.

Figure 1

Estimated Prevalence (%) of Disorders among Various Subgroups of Corrections Professionals



[1] Note: In Spinaris et al.'s 2012 study of PTSD this figure was initially reported in error as 31% (reflecting the rate for participants who worked in the security role *prior to* their current role, rather than the rate for individuals currently working as security staff). The correct PTSD+ rate for security staff is 34.1%, which has been amended in the 2012 paper. Additional figures based on the same error included the previously reported non-security staff rate, and the figures for the combined subgroups of male security staff and female security staff, which were slightly underestimated.

Disorder by Job Type

In order to compare the prevalence of PTSD and depression by Job Type, and Comorbid PTSD/depression by Job Type, prevalence figures were calculated separately for each different job type subgroup. Only subgroups with $n \geq 95$ representative cases were included for analysis. Table 1 shows prevalence figures for a variety of job type subgroups organized by the magnitude of disorder prevalence in each of five disorder categories: Comorbid (i.e., individuals who were found to be PTSD+ and Depression+ concurrently), PTSD Only (i.e., individuals who were found to be PTSD+ and Depression-), Depression Only (i.e., individuals who were found to be Depression+ and PTSD-), PTSD+ (i.e., all individuals who were found to be PTSD+ regardless of depression status—a broader category that includes instances of comorbid PTSD+/Depression+ and PTSD+/Depression-) and Depression+ (i.e., all individuals who were found to be Depression+ regardless of PTSD status—a broader category that includes instances of comorbid PTSD+/Depression+ and Depression+/PTSD-). The variety of disorder categories was employed with interest in comparisons, differential effects, and possible interaction effects.

As indicated in Table 1, the job role of Security/Custody Staff demonstrated the highest disorder prevalence in all categories except the Depression+ Only category. Medical Health Care staff constituted the second most affected group, in all categories except the PTSD+ Only category. The Classification staff job type was distinctive in showing a larger proportion of individuals suffering from depression in the absence of PTSD, relative to other job types. The Probation and Security/Custody job types showed a relatively high proportion of individuals with PTSD in the absence of Depression relative to other groups. Executive staff, overall, showed the lowest prevalence of disorders overall.

Table 1

Disorder Condition Prevalence by Job Type

Comorbidity+ Only[1] Prevalence	(%)	PTSD+ Only[2] Prevalence	(%)	Depression+ Only[3] Prevalence	(%)	PTSD+[4]	(%)	Depression+[5]	(%)
Security/Custody Personnel	21.9	Security/Custody Personnel	12.2	Classification	17.5	Security/Custody Personnel	34.1	Security/Custody Personnel	31.0
Medical Health Care Provider	19.6	Probation	11.2	Medical Health Care Provider	9.3	Medical Health Care Provider	24.7	Medical Health Care Provider	28.9
Manager/Supervisor	16.7	Manager/Supervisor	7.7	Security/Custody Personnel	9.1	Manager/Supervisor	24.4	Classification	27.2
Parole	14.6	Parole	7.3	Parole	8.7	Probation	23.6	Manager/Supervisor	23.8
Probation	12.4	Classification	5.8	Probation	8.1	Parole	21.9	Parole	23.3
Mental/Beh. Health Provider	10.2	Medical Health Care Provider	5.2	Clerical	8.1	Classification	15.5	Probation	20.5
Classification	9.7	Clerical	4.7	Mental/Beh. Health Provider	7.6	Mental/Beh. Health Provider	13.6	Mental/Beh. Health Provider	17.8
Clerical	8.5	Executive Staff	3.8	Manager/Supervisor	7.2	Clerical	13.1	Clerical	16.5
Executive Staff	6.7	Mental/Beh. Health Provider	3.4	Executive Staff	5.7	Executive Staff	10.5	Executive Staff	12.4

[1] Concurrent PTSD+ & Depression+ Only; [2]PTSD+ without Depression+ ; [3]Depression+ without PTSD+; [4]PTSD+ regardless of Depression status; [5]Depression+ regardless of PTSD status
Note: Only Job Types with $n \geq 95$ in the total sample are listed.

Breaking out variables into numerous disorder categories and job types, expectedly resulted in subsample sizes lending to weak statistical power for specific job type and disorder category comparisons (i.e., low ability to detect real differences even when they in fact exist). Thus statistical testing was not performed at a granular level. Pearson Chi-square tests were performed, however, as an overall assessment of differences between the categorical variables of Job Type and individual dichotomized disorder categories (e.g., PTSD+ Only versus not, Depression+ Only versus not, etc.). Comparing the proportion of Depression+ Only individuals to non-Depression+ Only individuals across the numerous job type subgroups simultaneously indicated non-significant differences overall (χ^2=12.85; *df*=7; *p*<.08). Comparing across the job types the proportion of PTSD+ Only to non-PTSD+ Only individuals (χ^2=32.24; *df*=7; *p*<.000) and the proportion of Comorbid Only to non-Comorbid Only individuals (χ^2=54.85; *df*=7; *p*<.000) indicated significant differences in both cases. Comparing across the job type subgroups the proportion of PTSD+ individuals to non-PTSD+ individuals (χ^2=97.66; *df*=7; *p*<.000) and the Depression+ individuals to non-Depression+ individuals (χ^2=48.30; *df*=7; *p*<.000) also revealed statistically significant differences in both cases. Thus it was found that depression by itself did not vary that much by job type, while cases of PTSD by itself or cases of combined PTSD and depression did vary significantly by job type.

In order to gain a sense of which job types are associated with the highest vulnerability to disorder, each job type was ranked according to prevalence figures associated with the following three conditions: PTSD+ Only, Depression+ Only, and Comorbid PTSD+/Depression+. Prevalence figures were combined and aggregate scores plotted to illustrate the rankings visually, as shown in Figure 2. Rankings revealed that, as expected, Security/Custody personnel ranked highest in overall vulnerability to assessed disorders, followed by Medical Health Care Providers, Classification staff, Probation staff, and Manager/Supervisors. Executive staff demonstrated the least overall vulnerability to measured disorders.

Health-related Variable Scores in Relation to Depression, PTSD, Both, and Neither

A variety of mean scores on several health-related variables were examined for their magnitude in relation to four categories/conditions of study participants: Depression+ Only (individuals found to be Depression+ and PTSD-), PTSD+ Only (individuals found to be PTSD+ and Depression-), Both (individuals found to be both Depression+ and PTSD+), and Neither (individuals found to be PTSD- and Depression-).

Lines were plotted to illustrate mean scores on the various health-related variables within each of the four conditions as shown in Figure 3. Separation is evident in the elevation of lines representing each condition, suggesting a patterned differential impact of the four conditions. The green line representing mean scores from

corrections professionals in the Both (i.e., Comorbid PTSD+/Depression+) category demonstrates the highest (i.e., most negative) statuses across the numerous variables assessed. Participants falling into the PTSD+ Only and Depression+ Only categories demonstrated similarly negative scores, as indicated by the interwoven red and blue middle lines. Participants in the Neither category (i.e., no disorders) represented by the purple line, demonstrated the lowest scores and the healthiest profile across the numerous measures.

Figure 2.

Overall Disorder Vulnerability by Job Type

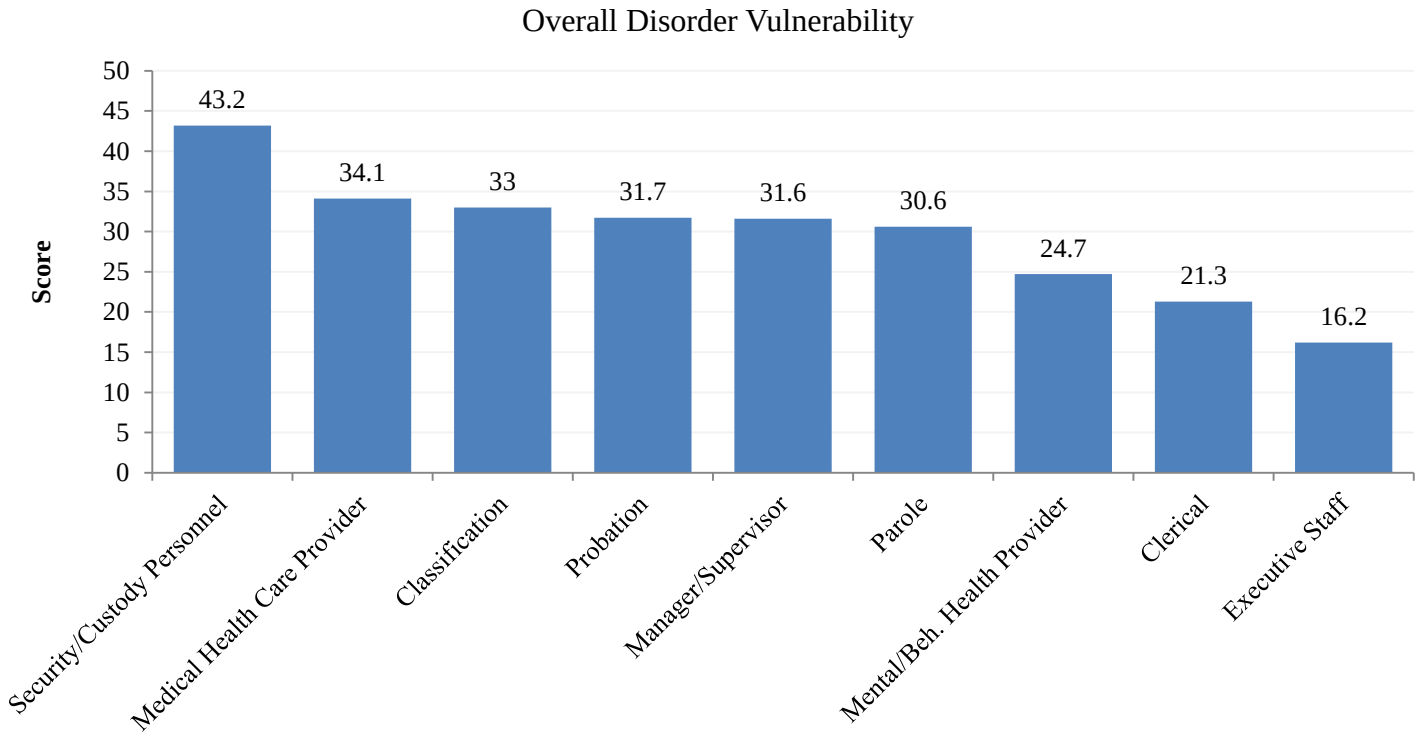


Figure 4 illustrates a comparison of the relationship between three variables considered to be potential protective factors (i.e., factors with potential to offset negative consequences of PTSD and Depression) across the four conditions. These were plotted separately as they provided scores in the reverse direction of the other health-related variables assessed. The plotted bar elevations illustrate a pattern of higher scores for individuals in the Neither condition (i.e., individuals who were concurrently PTSD- and Depression-). These individuals reported engaging in exercise, social activity, and spiritual activity more often than other groups. Bar elevations also indicate that individuals in the Both condition (i.e., who were PTSD+ and Depression+) engaged in social and spiritual activities less often than individuals in the Neither condition. Bar elevations for individuals in the

Figure 3

Impact of Depression+ Only, PTSD+ Only, and Comorbid PTSD+/Depression+ on Various Health-related Variables

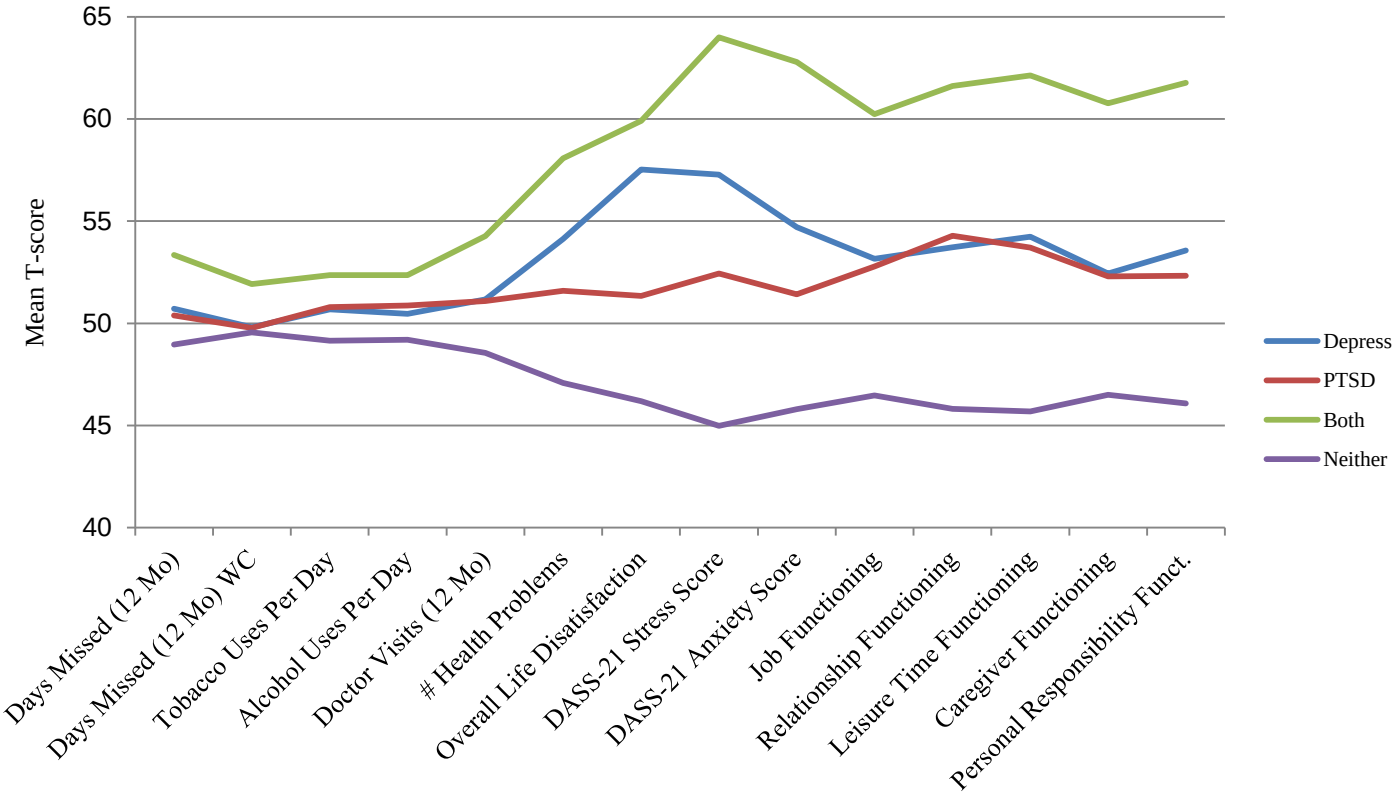
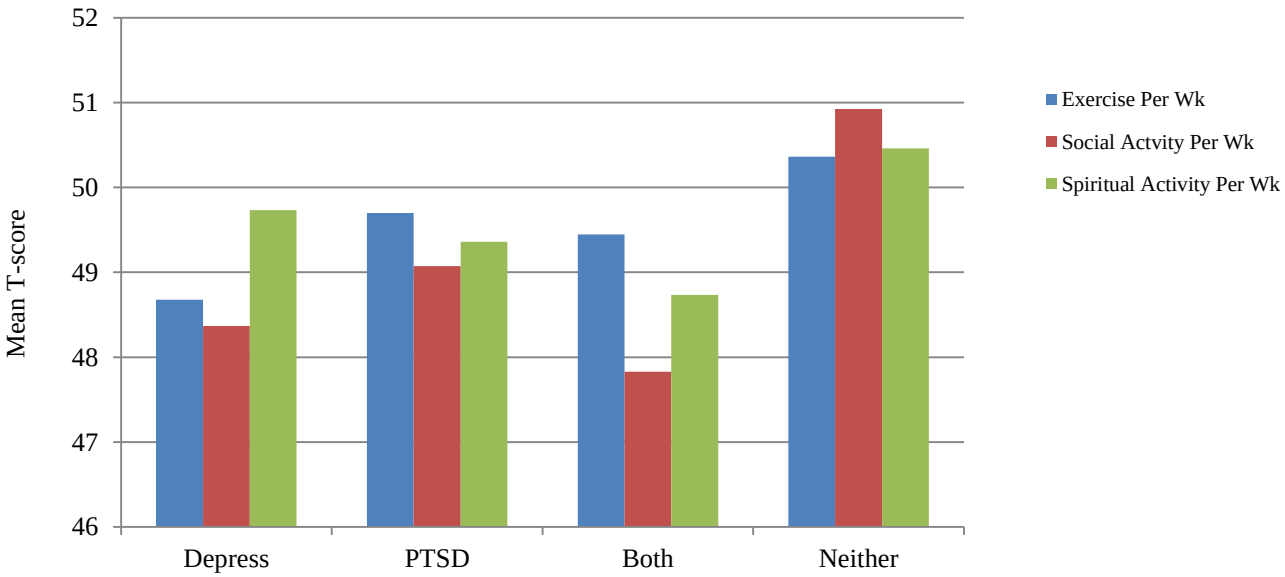


Figure 4

Impact of Depression+ Only, PTSD+ Only, and Comorbid PTSD+/Depression+ on Potential Protective Factor Variables



PTSD+ Only (i.e., PTSD+ and Depression-) and Depression+ Only (i.e., Depression+ and PTSD-) groups in most cases demonstrated bar elevations falling somewhere between those from individuals representing the Neither and Both conditions.

A series of One-Way ANOVAs were performed to statistically compare mean scores for 17 health-related variables across the four disorder conditions. Significant Omnibus F-tests were followed by Games Howell-corrected paired comparisons to get more specific information on differences between particular means. All 17 Omnibus F-tests were found to be statistically significant at $p<.01$ to $p<.000$, with the vast majority significant at $p<.000$, supporting the presence of real differences in mean scores on the several health-related variables across the four disorder conditions. See Table 2 in Appendix A for main ANOVA results. Post-hoc comparisons of mean scores across six pairs of different disorder condition combinations were performed for each of 17 health-related variables: PTSD+ Only versus Depression+ Only, PTSD+ Only versus Both, PTSD+ Only versus Neither, Depression+ versus Both, Depression+ versus Neither, and Both versus Neither. Means, effects sizes, and confidence intervals for all comparisons are listed in Table 3.

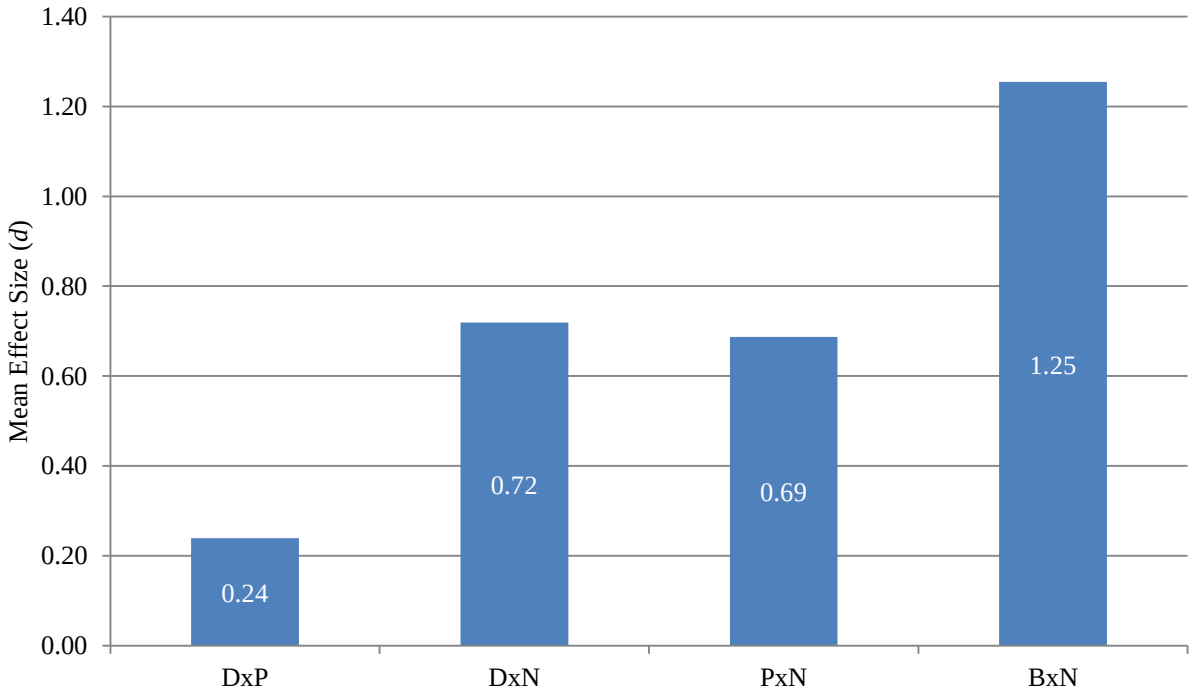
When comparing health-related variable mean scores from the PTSD+ Only versus Depression+ Only conditions, only four of 17 comparisons (23.5%) showed statistically significant means differences ($p<.05$), suggesting a similar impact of Depression+ Only status and PTSD+ Only Status upon the majority of the health-related variables assessed. When comparing mean health-related variables scores across the PTSD+ Only and Both conditions, a more substantial 12 of 17 comparisons (70.6%) were found to be statistically significant ($p<.05$) and such that mean scores were more negative for the Both condition, suggesting a particularly detrimental impact of Comorbid PTSD+/Depression+ upon the health-related variables. Comparing mean scores from the Depression+ Only and Both conditions showed a similar pattern as for the comparison between the PTSD+ Only and Both conditions, such that the Both condition again demonstrated more negative mean scores and with 11 of 17 mean differences (64.7%) being statistically significant ($p<.05$). Comparing health-related variable mean scores between the Depression+ Only versus Neither categories and the PTSD+ Only versus Neither categories showed 13 of 17 (76.5%) and 14 of 17 (82.4%) differences to be statistically significant, respectively, indicating a high percentages of significant mean differences on health-related variables for individuals with either PTSD+ Only or Depression+ Only compared to those in the Neither category. In all cases mean scores were found to be more negative for individuals with PTSD+ Only or Depression+ Only versus those in the Neither category. A final set of comparisons was made between mean scores on health-related variables for individuals in the Both and Neither conditions, contrasting individuals with Comorbid PTSD+/Depression+ and individuals in the Neither category. This comparison revealed a very

large proportion (16 of 17 or 94.1%) of statistically significant differences ($p<.05$), and with mean scores that tended to be much larger for individuals in the Both disorder condition.

Figure 5 illustrates the mean effect sizes across all health-related variables in aggregate, based on comparisons of differences in scores from (1) the Depression+ Only category versus the PTSD+ Only category, (2) the Depression+ Only category versus the Neither disorder category, (3) The PTSD+ Only category versus the Neither disorder category, and (4) the Both disorder category versus the Neither disorder category. Mean differences in health-related variable scores from individuals in the Depression+ Only category versus individuals in the PTSD+ Only category demonstrated a small mean effect size, due to relatively small (d=.24) differences in mean scores between individuals representing these two categories. Differences in mean scores from individuals in the Depression+ Only category versus those in the Neither disorder category demonstrated an approximately large mean effect size (d=.72), due to relatively large differences. Mean scores from individuals in the PTSD+ Only category versus those in the Neither disorder category demonstrated a similarly large mean effect size (d=.69). Finally, the differences in mean scores from individuals in the Both and Neither categories demonstrated a very large mean effect size (d=1.25) as these two groups had the most opposite of disorder statuses.

Figure 5

Mean Effect Sizes for PTSD+ Only, Depression+ Only, Neither, and Both Conditions Compared



Note: D=Depression+ Only, P=PTSD+ Only, B=Both Depression+ and PTSD+, N=Neither

Table 3

Mean Scores for Specific Health-Related Variables by Disorder Condition Subgroups

						95% CI	
		N	*M*	*SD*	*Cohen's d*	Lower	Upper
# of days missed over last 12 months	Depression	308	11.81BN	24.544	DxP= .03	-1.72	1.79
	PTSD	339	11.09B	21.117	DxN= .21	-.46	.89
	Both	617	17.48DPN	32.824	PxN= .18	-.47	.83
	Neither	2335	8.03DB	16.526	BxN= .45	-.31	1.21
# of days missed over last 12 month (for workers comp)	Depression	308	1.60	18.321	DxP= .00	-1.14	1.15
	PTSD	339	1.54B	10.798	DxN= .03	-.56	.62
	Both	617	5.58PN	31.120	PxN= .03	-.52	.58
	Neither	2335	1.14B	14.917	BxN= .23	-.47	.93
# of tobacco uses per day	Depression	276	4.36	7.596	DxP= -.01	-.65	.63
	PTSD	291	4.44N	7.885	DxN= .18	-.11	.46
	Both	533	5.70N	11.219	PxN= .19	-.10	.48
	Neither	1991	3.13PB	6.916	BxN= .32	.01	.63
# of alcoholic drinks consumed per week	Depression	308	4.13	9.294	DxP= -.04	-.73	.66
	PTSD	339	4.46N	8.828	DxN= .14	-.14	.42
	Both	617	5.67N	10.537	PxN= .19	-.11	.48
	Neither	2335	3.09PB	6.990	BxN= .33	-.12	.45
# of doctor visits over last 12 months	Depression	308	6.03BN	6.226	DxP= .01	-.24	.25
	PTSD	339	5.98BN	6.380	DxN= .30	.10	.51
	Both	617	7.94DPN	8.120	PxN= .29	.09	.49
	Neither	2335	4.42DPB	5.230	BxN= .59	.38	.81
# of health conditions	Depression	308	2.20PBN	1.420	DxP= .27	.16	.37
	PTSD	339	1.83DBN	1.373	DxN= .82	.78	.87
	Both	617	2.78DPN	1.576	PxN= .53	.49	.58
	Neither	2335	1.164DPB	1.234	BxN= 1.23	1.18	1.28
SWLS Global: life dissatisfaction overall	Depression	308	15.60PBN	6.755	DxP= -.72	-1.23	-.21
	PTSD	339	20.37DBN	6.502	DxN= -1.35	-1.60	-1.10
	Both	617	13.76DPN	5.996	PxN= -.62	-.86	-.37
	Neither	2335	24.34DPB	6.435	BxN= -1.67	-1.90	-1.44
DASS anxiety score	Depression	308	8.32PBN	6.159	DxP= .39	-.04	.81
	PTSD	339	6.18DBN	4.868	DxN= 1.53	1.39	1.68
	Both	617	13.55DPN	8.296	PxN= 1.02	.89	1.16
	Neither	2335	2.54DPB	3.342	BxN= 2.29	2.11	2.46
DASS stress score	Depression	308	18.26PBN	6.740	DxP= .69	.21	1.18
	PTSD	339	13.92DBN	5.851	DxN= 1.98	1.76	2.19
	Both	617	24.30DPN	7.727	PxN= 1.22	1.02	1.43
	Neither	2335	7.23DPB	5.414	BxN= 2.86	2.65	3.08
Job functioning	Depression	308	1.97BN	.990	DxP= .03	-.05	.11
	PTSD	339	1.94BN	.992	DxN= .93	.90	.96
	Both	617	2.67DPN	1.197	PxN= .88	.86	.91
	Neither	2335	1.32DPB	.651	BxN= 1.70	1.67	1.72
Relationship functioning	Depression	308	2.19BN	.960	DxP= -.05	-.13	.02
	PTSD	339	2.24BN	.980	DxN= 1.19	1.16	1.21
	Both	617	2.99DPN	1.120	PxN= 1.25	1.22	1.27
	Neither	2335	1.39DPB	.628	BxN= 2.11	2.09	2.14
Leisure time functioning	Depression	308	2.29BN	1.047	DxP= .06	-.01	.14
	PTSD	339	2.23BN	.907	DxN= 1.28	1.25	1.31
	Both	617	3.11DPN	1.114	PxN= 1.23	1.20	1.25
	Neither	2335	1.39DPB	.646	BxN= 2.24	2.21	2.27
Caregiver functioning	Depression	308	1.75BN	.862	DxP= .02	-.04	.09
	PTSD	339	1.73BN	.867	DxN= .89	.87	.91
	Both	617	2.46DPN	1.113	PxN= .85	.83	.88
	Neither	2335	1.24DPB	.524	BxN= 1.77	1.74	1.79
Functioning-personal responsibilities	Depression	308	1.97BN	.934	DxP= .13	.07	.20
	PTSD	339	1.85BN	.858	DxN= 1.17	1.15	1.19
	Both	617	2.73DPN	1.142	PxN= .98	.96	1.01
	Neither	2335	1.27DPB	.540	BxN= 2.06	2.04	2.09
# of times per week engaging in athletic or physical exercise	Depression	308	2.71N	2.085	DxP= -.15	-.32	.02
	PTSD	339	3.05	2.345	DxN= -.18	-.30	-.06
	Both	617	2.96	4.246	PxN= -.07	-.19	.05
	Neither	2335	3.26D	3.189	BxN= -.09	-.21	.04
# of times per week engaging in social activities	Depression	308	1.46N	1.540	DxP= -.11	-.24	.01
	PTSD	339	1.64N	1.650	DxN= -.32	-.40	-.25
	Both	617	1.32N	4.270	PxN= -.23	-.31	-.16
	Neither	2335	2.11DPB	2.063	BxN= -.30	-.39	-.20
# of times per week engaging in spiritual/religious activities	Depression	308	0.91	1.645	DxP= .06	-.06	.19
	PTSD	339	0.81N	1.549	DxN= -.06	-.17	.04
	Both	617	0.66N	1.511	PxN= -.10	-.20	.00
	Neither	2335	1.08PB	2.815	BxN= -.16	-.26	-.07

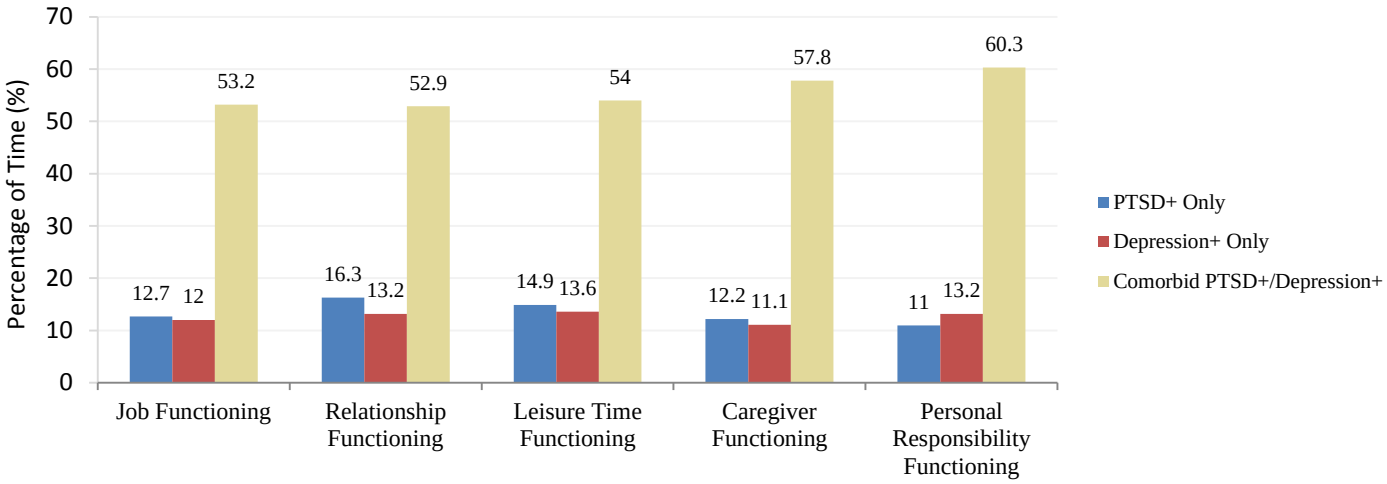
D=differed significantly from Depression condition mean (p<.05); P=differed significantly from PTSD condition mean (p<.05); B=differed significantly from Both condition mean (p<.05); N=differed significantly from Neither condition mean (p<.05)

Impact of Depression+ Only, PTSD+ Only, Comorbid PTSD+/Depression+ Statuses Upon Life Functioning

In an attempt to illuminate the interaction between Depression and PTSD, and its relationship to five important areas of life functioning (i.e., job functioning, relationship functioning, leisure time functioning, caregiver functioning, and personal responsibility functioning), the frequency of reported substantial impairment in each area was plotted for Depression+ Only, PTSD+ Only, and Comorbid PTSD+/Depression+ conditions. "Substantial Impairment" was operationally defined in terms of a score of three or higher on IOFS measurement scales which span from one to five. An IOFS score of three indicates that corrections professional participants indicated that functional impairment was present for them a "Fair Amount" of the time. A score of four indicates that functional impairment was present for participants "A Lot" of the time. A score of five indicates that impairment was said to be present "All the Time". As illustrated in Figure 6, functional impairment was found to be present dramatically more often for individuals in the Comorbid PTSD+/Depression+ category compared to individuals in the Depression+ Only or PTSD+ Only categories.

Figure 6.

Percentage of Time Functional Impairments Reported as Being Experienced "Frequently"



Note: "Frequently" was operationally defined for analysis in terms of IOFS scores of 3 or more, indicating a particular type of impairment was experienced "A Fair Amount" of the time or more often, based on the IOFS's response scale: Not at All (1), A Little (2), A Fair Amount (3), A Lot (4), All the Time (5).

Individuals who screened positive for Comorbid PTSD+/Depression+ were found to report the "frequent experience" of various functional impairments significantly more often than individuals with PTSD+ Only or Depression+ Only, and in all IOFS areas assessed, including job functioning (χ^2=655.6; *df*=1; *p*<.000), relationship functioning (χ^2=799.1; *df*=1; *p*<.000), parental/caregiver functioning (χ^2=575.3; *df*=1; *p*<.000),

personal responsibility functioning (i.e., ability to handle personal responsibilities) (χ^2=793.4; *df*=1; *p*<.000), and leisure time functioning (i.e., ability to enjoy leisure time away from work) (χ^2=928.4; *df*=1; *p*<.000). Relative risk ratios were also calculated and showed that individuals screening positive for Comorbid PTSD+/Depression+ demonstrated substantially higher risk levels for frequent functional impairment across all assessed areas. Compared to individuals not Comorbid PTSD+/Depression+, Comorbid PTSD+/Depression+ individuals were found to experience: frequently impaired job functioning 5.5 times more often than individuals not Comorbid PTSD+/Depression+, frequently impaired relationship functioning 5.4 times more often, frequently impaired parenting/caregiver functioning 6.6 times more often, frequently impaired personal responsibility functioning 7.4 times more often, and frequently impaired leisure time functioning 5.7 times more often.

Disorder Status and Predictive Value of Health-related Assessment Items

A series of SPSS 21 Classification and Regression Tree (CRT) analyses were performed to explore the relative predictive power of health-related variables/assessment items (as independent variables) in relationship to Depression, PTSD, and Comorbid PTSD+/Depression+ statuses (as dependent variables). PTSD+ was determined based on the PCL-C SCM method and Depression+ was determined by scores falling in the Moderate to Severe range on the DASS-21 Depression scale. CRT analysis uses a binary tree algorithm and recursive partitioning to split data into accurate homogenous subsets that maximize differences on the target/dependent variable.

Each set of analyses examined the contribution of two sets of items/variables to a single target dependent variable: (1) all health-related (loosely defined) assessment items/variables in the study excluding assessment scale items used in the original determination of disorder status (i.e., PCL-C or DASS-21 Depression scale items), and (2) only scale items used in the original determination of disorder status (i.e., PCL-C or DASS-21 Depression scale items). The interest was in identifying top predictive items among numerous potentially predictive items, and to get a fair ranking among items within each set analyzed in terms of predictive utility (i.e., ability to match/reproduce the classifications of individuals as PTSD+ and/or Depression+ as was determined using the PCL-C and DASS-21 methods).

In the first CRT analysis, Depression+ status was targeted for prediction, based only upon DASS-21 Depression scale items. The interest here was whether Depression+ determinations that had been derived through the full set of DASS-21 Depression scale items could be reasonably well approximated or matched using some smaller subset of DASS-21 items combined with a different configuration of cut-points and decision tree rules. As indicated in Table 4, it was discovered that Depression status could be determined with 92.1% accuracy overall, based solely on a small number of DASS-21 Depression scale items, and an optimal set of

scoring decision rules derived through CRT analysis. It was found that Depression+ status could be accurately determined 89.0% of the time and Depression- status 93.2% of the time. In order to check the stability of the newly derived decision tree (i.e., assess for replicability of findings), cross-validation was performed by taking 10 randomly selected subsamples within the total sample to generate an average misclassification risk figure based on 10 sampling folds. An average misclassification rate figure across the folds was found to be 8%, supporting the accuracy of the original estimate, and differing from it by only 1%. The classification tree pictured in Figure 7 of Appendix B summarizes the discovered set of decision rules, along with specific scoring cut-points which, together, allow the described level of classification accuracy. Horizontal bar elevations shown in Figure 8 also illustrate the relative importance of different DASS-21 Depression items for accurately classifying depression status. Among all DASS-21 Depression scale items, those with the following content demonstrated the highest predictive utility: (1) depressed mood, (2) lack of enthusiasm, (3) devalued sense of self, and (4) perceived lack of life meaning.

Table 4

Classification/Predictive Accuracy for Depression Status: DASS-21 Depression Scale Items

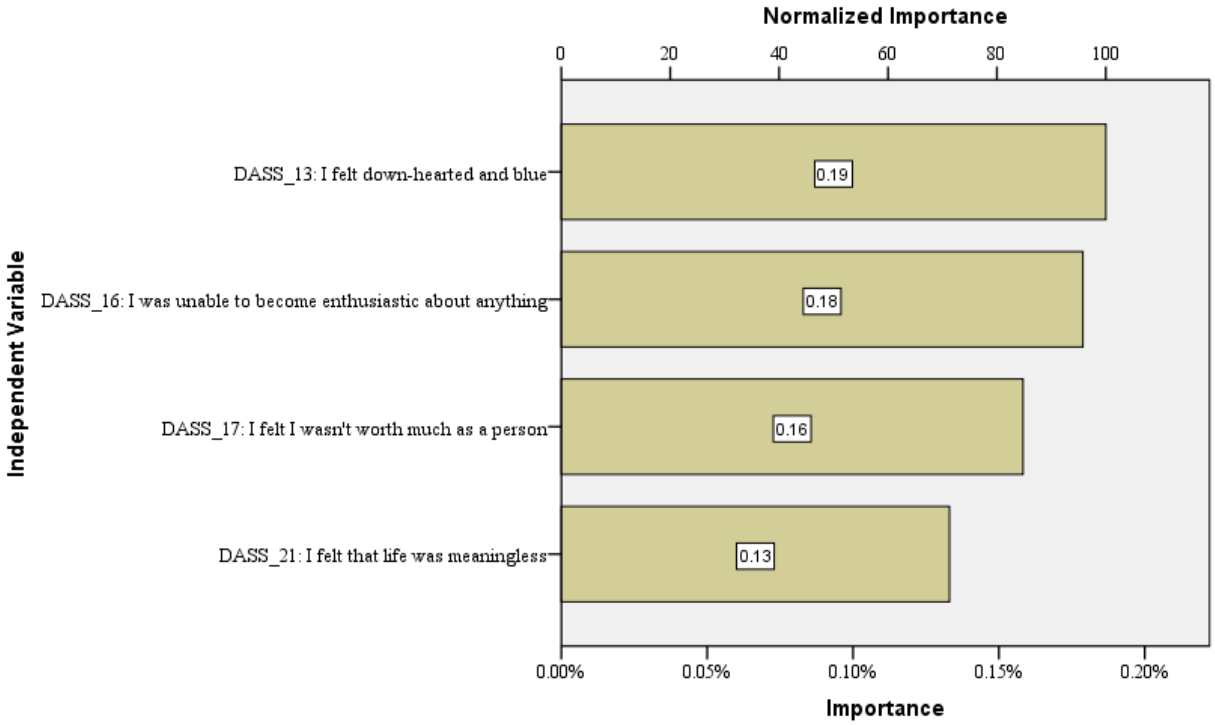
	Predicted		
Observed	Moderate to Extreme	Normal to Mild	Percent Correct
Moderate to Extreme	823	102	89.0%
Normal to Mild	182	2492	93.2%
Overall Percentage	27.9%	72.1%	92.1%

Note: Dependent variable=Depression status (None-Mild or Moderate-Extreme)

Next, all health-related variables *other than* DASS-21 Depression items were assessed for their ability to accurately predict/classify Depression status. As indicated in Table 5, Depression status could be predicted with 82.4% accuracy overall, based solely on a small number of items from the SWLS, PCL-C, and IOFS. Depression+ status was predicted with 86.9% accuracy and Depression- status with 80.8% accuracy based on the 4-item model and particular scoring decision rules depicted in Figure 9 of Appendix C. Cross-validation was performed by taking 10 randomly selected subsamples to generate an average misclassification risk figure based on the 10 sampling folds. The average misclassification rate figure across the folds was found to be 21%, supporting the accuracy of the original estimate, and differing from it by only 2% approximately.

Figure 8

Importance of DASS-21 Depression Scale Variables for Prediction of Depression Status



Horizontal bar elevations shown in Figure 10 illustrate the relative importance of items from the SWLS, PCL-C, and IOFS that enabled the described predictions/classifications. Among a large pool of candidate predictor variables, the items selected out for their predictive utility had the following content: (1) ability to handle personal responsibilities, (2) overall satisfaction with life, (3) feeling socially isolated/cut-off, and (4) ability to enjoy leisure time.

Next, the ability to predict PTSD status was assessed based solely on PCL-C items. As indicated in Table 6, PTSD status could be predicted with 93.1% accuracy overall, making use of a small number of top PCL-C scale items and particular decision rules derived through CRT analysis. The ability to correctly classify individuals into PTSD+ and PTSD- categories was 88.2% and 94.8%, respectively. Cross-validation was performed by taking 10 randomly selected subsamples to generate an average misclassification risk figure based on the 10 sampling folds. The average misclassification rate figure across the folds was found to be 8%, supporting the accuracy of the original estimate, and differing from it by only 1% approximately. Figure 11 in Appendix D summarizes the specific decision tree and scoring cut-offs used to predict PTSD status. Horizontal bar elevations in Figure 12 illustrate the relative importance of different PCL-C items for predicting PTSD+ status.

Among all PCL-C scale items, those with the following content demonstrated the highest predictive utility: (1) social isolation, (2) loss of interest in normally enjoyed activities, (3) physiological reactions in response to reminders of past stressful experiences, (4) repeated experience of disturbing memories, thoughts, or images of past stressful experiences, and (5) getting upset in response to reminders of past stressful experiences.

Table 5

Classification/Predictive Accuracy for Depression Status: PCL-C, SWLS, and IOFS Items

	Predicted		
Observed	Moderate to Extreme	Normal to Mild	Percent Correct
Moderate to Extreme	721	160	81.8%
Normal to Mild	316	1283	80.2%
Overall Percentage	41.8%	58.2%	80.8%

Note: Dependent variable= Depression status (None-to-Mild Symptoms vs. Moderate-to-Extreme)

Table 6

Classification/Predictive Accuracy for PTSD Status: PCL-C Scale Items

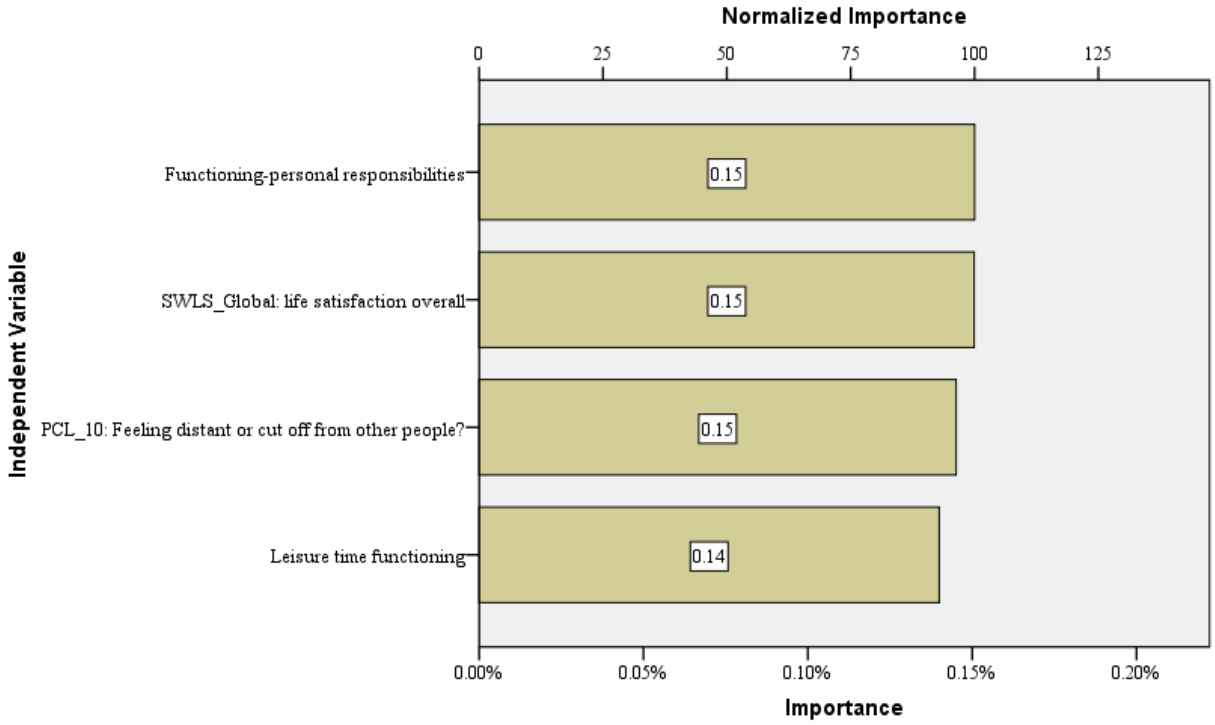
	Predicted		
Observed	Met	Not Met	Percent Correct
Met	820	136	85.8%
Not Met	107	2536	96.0%
Overall Percentage	25.8%	74.2%	93.2%

Note: Dependent variable=PTSD status (positive or negative)

CRT analysis was performed on all health-related variables/items other than PCL-C items. As indicated in Table 7, PTSD status could be predicted with 80.0% accuracy overall, based solely on four DASS-21 Stress and Depression Scale items and two IOFS items. The ability to correctly classify individuals in the PTSD+ and PTSD- categories was 79.8% and 80.1%, respectively. Cross-validation was performed by taking 10 randomly

Figure 10

Importance of Variables for Accurate Prediction/Classification of Depression Status (DASS-21 Depression Items Excluded)



selected subsamples to generate an average misclassification risk figure based on the 10 sampling folds. The average misclassification rate figure across the folds was found to be approximately 22%, supporting the accuracy of the original estimate, and differing from it by only 2%. Figure 13 in Appendix E summarizes the decision rules and scoring cut-offs that were used to predict PTSD status in classification tree form. Horizontal bar elevations in Figure 14 illustrate the relative importance of the particular items for predicting PTSD status.

Among six variables in the decision tree, content areas consisted of (1) ability to enjoy leisure time, (2) ability to relax, (3) relationship functioning, (4) ability to wind down, (5) ability to experience positive feeling states, and (6) ability to take initiative.

CRT analysis was performed to identify Comorbid PTSD+/Depression+ status through an optimal set of predictor variables, among PCL-C and DASS-21 Depression scale items only. As indicated in Table 8, Comorbid PTSD+/Depression+ status could be predicted with 92.4% accuracy overall, based on nine DASS-21

Figure 12

Importance of Variables for Accurate Prediction/Classification of PTSD Status (based solely on PCL-C items)

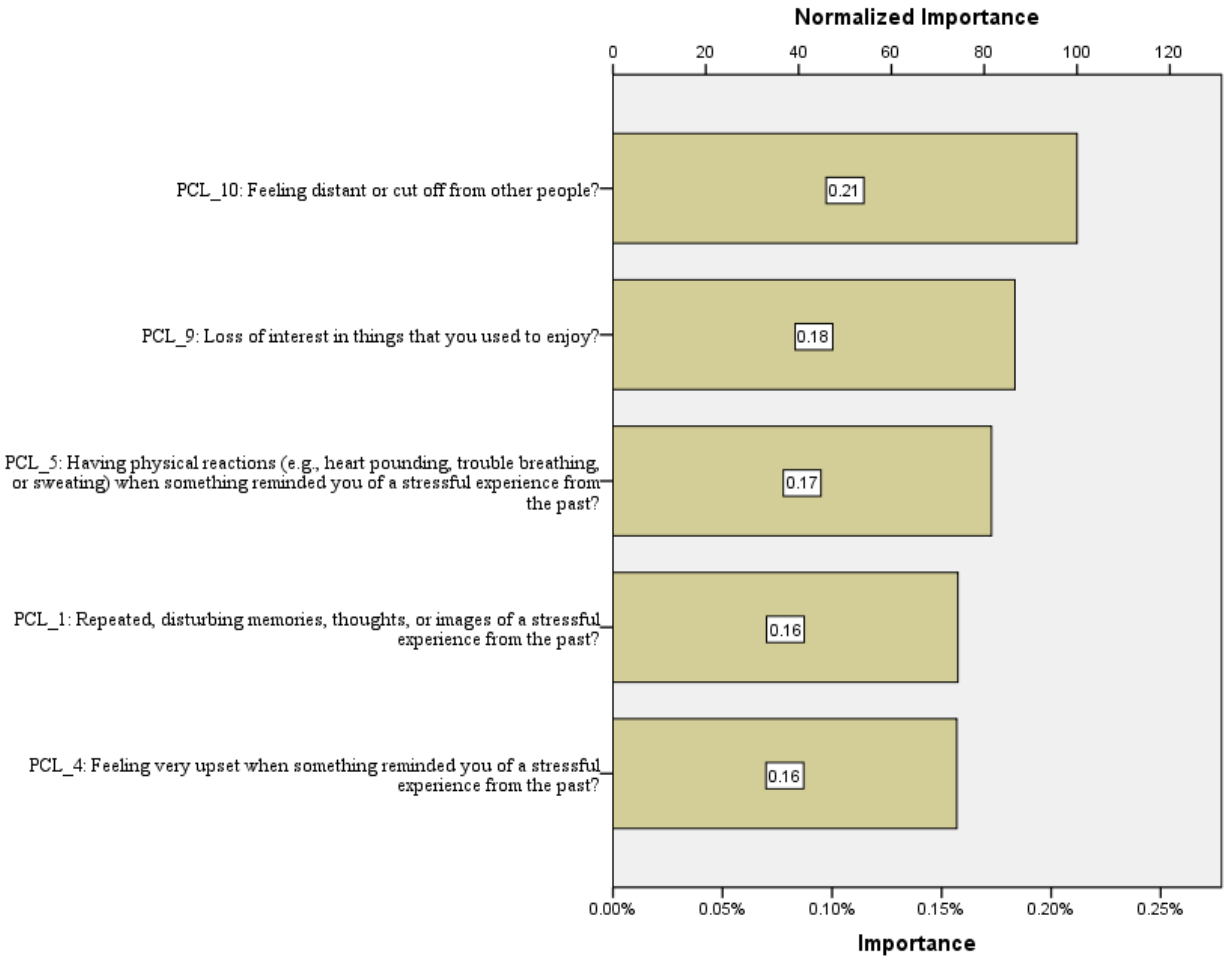


Table 7

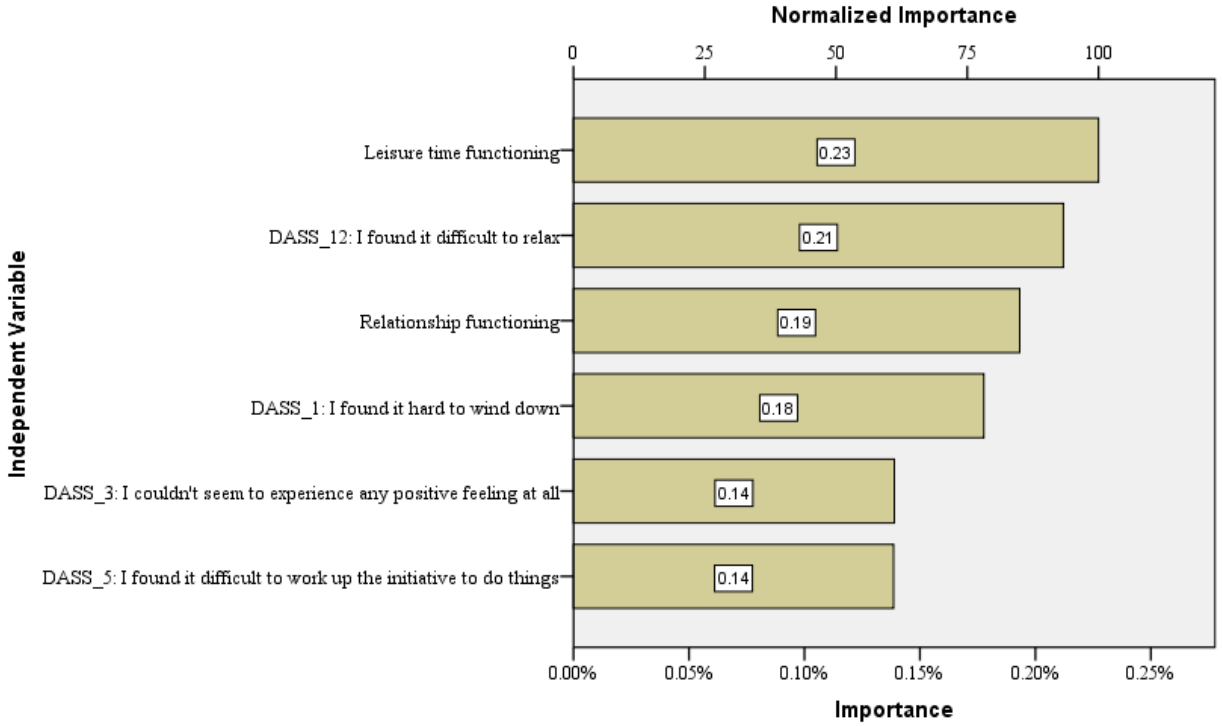
Classification/Predictive Accuracy for PTSD Status: DASS-21 Depression, DASS-21 Stress, and IOFS Items

Observed	Predicted		
	Met	Not Met	Percent Correct
Met	414	105	79.8%
Not Met	176	708	80.1%
Overall Percentage	42.1%	57.9%	80.0%

Note: Dependent variable= PTSD Status (Positive or Negative)

Figure 14

Importance of Variables for Accurate Prediction/Classification of PTSD Status (excluding PCL-C items)



Depression scale and PCL-C items. The ability to correctly classify individuals as Comorbid PTSD+/Depression+ versus not was 71.5% and 96.7%, respectively. Cross-validation was performed by taking 10 randomly selected subsamples to generate an average misclassification risk figure based on the 10 sampling folds. The average misclassification rate figure across the folds was found to be approximately 10%, supporting the accuracy of the original estimate, and differing from it by approximately 2%. Figure 15 in Appendix F summarizes optimal decision rules and scoring cut-offs used to predict Comorbid PTSD+/Depression+ status. Horizontal bar elevations in Figure 16 illustrate the relative importance of different PCL-C and DASS Depression scale items for predicting Comorbid PTSD+/Depression+ status. Among the nine variables in the model, content areas included (1) ability to be enthusiastic, (2) depressed mood, (3) ability to experience positive feelings, (4) ability to feel optimistic about the future, (5) having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when reminded of a stressful experience from the past, (6) feeling isolated/cut-off socially, (7) difficulty concentrating, (8) lack of a sense of life meaning, and (9) feeling worthless.

Table 8

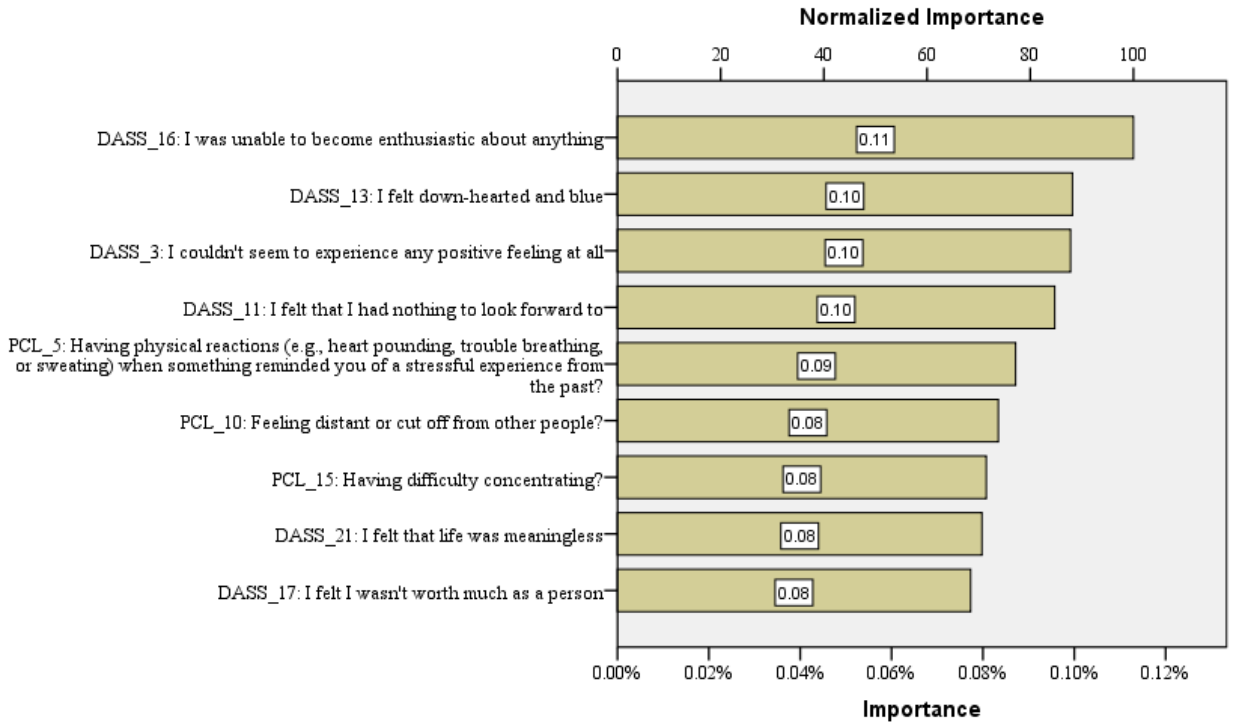
Classification/Predictive Accuracy for Comorbid PTSD+/Depression+ Status: DASS-21 Depression and PCL-C items only

Observed	Predicted		
	Met	Not Met	Percent Correct
Met	441	176	71.5%
Not Met	98	2884	96.7%
Overall Percentage	15.0%	85.0%	92.4%

Note: Dependent variable= Comorbid PTSD and Depression

Figure 16

Importance of Variables for Accurate Prediction/Classification of Comorbid PTSD+/Depression+ Status (based on DASS-21 Depression scale and PCL-C items only)



Finally, CRT analysis was performed to identify Comorbid PTSD+/Depression+ status through examination of all health-related variables/items other than PCL-C and DASS-21 Depression scale items. As indicated in Table 9, Comorbid PTSD+/Depression+ status could be predicted with 83.2% accuracy overall, based solely on

four particular IOFS items and the SWLS overall score. The ability to correctly classify individuals as Comorbid PTSD+/Depression+ versus not was 70.0% and 87.5%, respectively. Cross-validation was performed by taking 10 randomly selected subsamples to generate an average misclassification risk figure based on the 10 sampling folds. The average misclassification rate figure across the folds was found to be approximately 18%, supporting the accuracy of the original estimate, and differing from it by approximately 1%. Figure 17 in Appendix G summarizes optimal decision rules and scoring cut-offs used to predict Comorbid PTSD+/Depression+ status. Horizontal bar elevations in Figure 18 illustrate the relative importance of the four IOFS and the SWLS items used to predict Comorbid PTSD+/Depression+ status. Among the items in the model, content areas included (1) leisure time functioning, (2) relationship functioning, (3) job functioning, and (4) overall satisfaction with life.

Table 9

Classification/Predictive Accuracy for Comorbid PTSD+/Depression+ Status: All variables excluding DASS-21 Depression and PCL-C items

Observed	Predicted		
	Met	Not Met	Percent Correct
Met	240	103	70.0%
Not Met	133	927	87.5%
Overall Percentage	26.6%	73.4%	83.2%

Note: Dependent variable= Comorbid PTSD and Depression

Figure 19 provides a visual grand summary of the top predictive assessment item content for PTSD+ status, Depression+ status, and Comorbid PTSD+/Depression+ status. The spiral shapes convey how symptoms and circumstances can be understood to accumulate and condense into disorder conditions for corrections professionals over time.

Figure 18

Importance of Variables for Accurate Prediction/Classification of Comorbid PTSD+/Depression+ Status (based on all variables/items excluding DASS-21 Depression scale and PCL-C items)

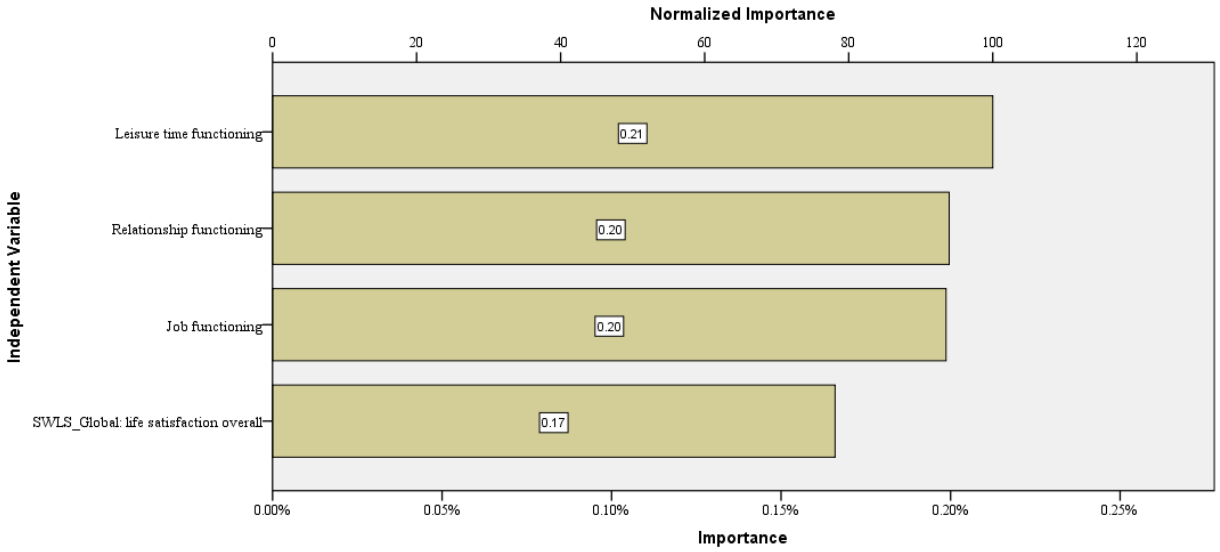
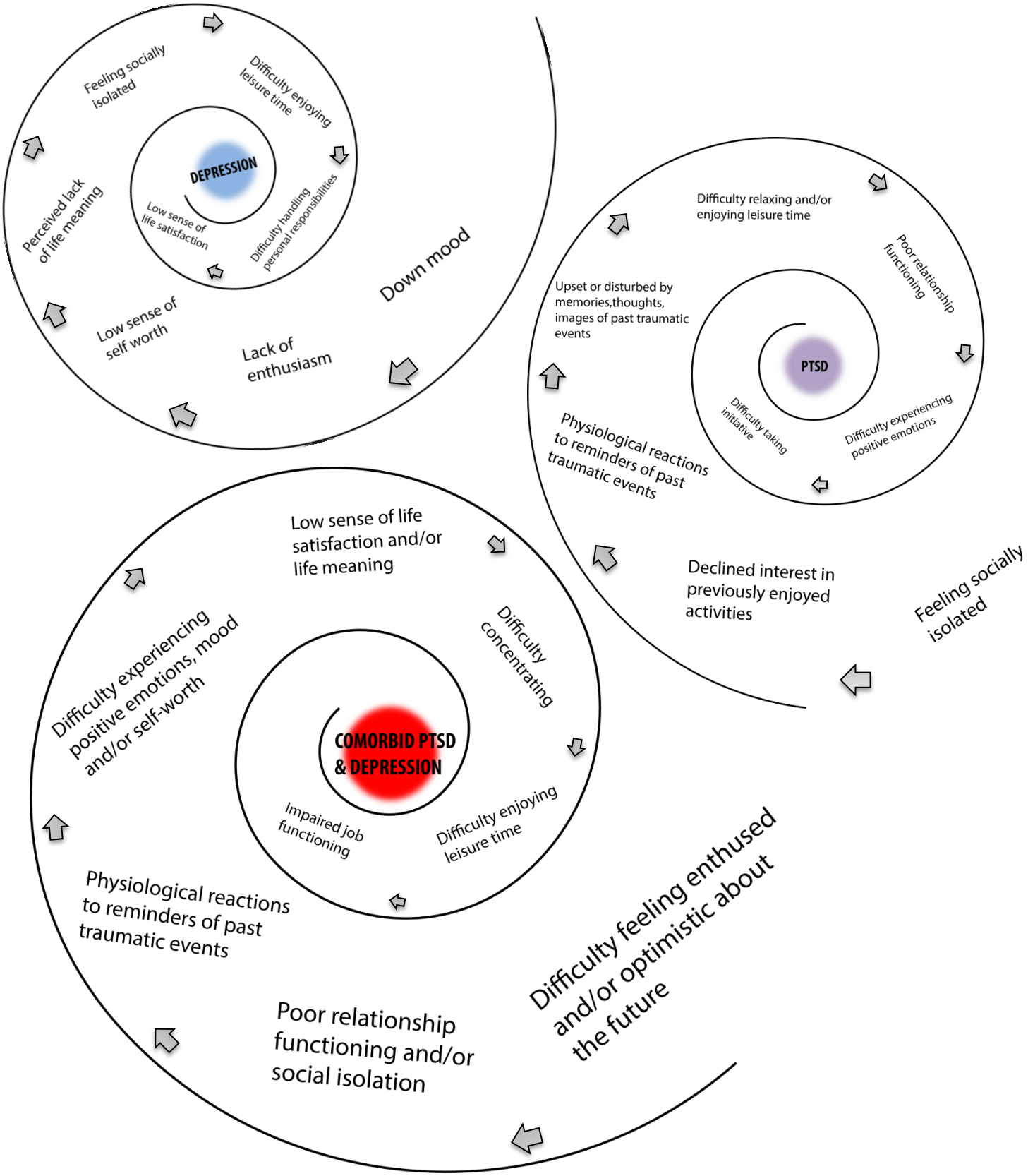


Figure 19

Top Assessed Symptoms Sets Predictive of Depression, PTSD, and Comorbidity



Discussion

The prevalence of Depression for corrections professionals was assessed for the 3,599 corrections professional participants based on scores from the DASS-21 Depression scale. Twenty-six percent (25.7%) of corrections professionals were found to have DASS-21 Depression scale scores that fell in the Depression+ group, indicating symptom severity in the moderate to severe range. While few estimates have been obtained and published for United States corrections professionals, the finding of 26% prevalence is close to that obtained for depression prevalence among corrections professionals in France (David et al., 1996), of 24%. The estimate of 25.7% is almost three times the current depression prevalence rate established for the adult general population in the United States (9.1%—US-CDC, 2010), and over three times the rate established for full-time adult workers (7.0%—SAMHSA, 2008a).

Twenty-nine percent (28.7%) of the male participants and 22.1% of the females met Depression+ criteria. The finding that male corrections professionals had significantly higher depression rates than the females is consistent with findings from David et al.'s (1996) French prison personnel study in which males were also found to demonstrate higher rates than females. Given that the reverse pattern exists among males and females in the general population, the potency of occupational factors operating to produce the reversal is strongly suggested. It has also been hypothesized that the rate reversal is due to more frequent exposure to VID events for male corrections professionals (Spinaris, et al., 2012), which is supported by the data, and as illustrated in Figure 1.

In addition to the described gender differences, the Depression+ rate was found to be significantly higher for individuals in the security/custody staff job role (31%) than for non-security/custody staff (21.5%). This rate difference is likely due to the circumstance of Security/Custody staff being routinely exposed to more VID events on the job compared to individuals working other corrections job roles and/or based upon more salient/recent VID exposures associated with current Security/Custody job role status. The estimate of 31% for security/custody staff in the current study matches an estimate of 31% obtained for clinical depression among corrections officers by Obidoa, et al. (2011).

Another hypothesis that has been proposed about the source of elevated depression rate in the work environment is that it is a consequence of a combination of job-specific constraints: low decision latitude/control, high demands, and low social support. Security/custody staff operate in paramilitary, hierarchical work environments, in facility units/pods, or in the community (probation or parole), often alone, and overseeing offenders for most or the entirety of their shifts. These psychosocial aspects of corrections work—low control, high demands and low social support—have been found to be associated with increased

psychological distress, job dissatisfaction, and negative emotions among corrections officers (Dollard & Winefield, 1998). The CRT analyses performed in the current study support this view, as the variable "feeling socially isolated" was found to be among the top variables predictive of Depression+ status. High strain jobs, defined as involving both high work demands and low decision authority, have also been found to be associated with an increased risk of depressive symptoms in non-corrections work environments (Melchior, et al., 2007; Paterniti, et al, 2002; Blackmore, et al, 2007).

In the current study, sixty-seven percent of all Depression+ individuals were also found to be PTSD+, and 65% of all found to be PTSD+ were also found to be Depression+, highlighting the presence of substantial comorbidity. Seventeen percent of the total sample had both PTSD and Depression concurrently. Without regard to setting or population, the co-occurrence of Depression and PTSD is commonly encountered (Campbell, et al., 2007; Cukor, et al., 2011; Dobie, et al., 2006; Erickson, et al., 2001; Oquendo, et al., 2005). The high rates discovered for both disorders among corrections professionals is, however, striking relative to general population rates, and compares to those found in other high-trauma exposure occupations (e.g., Dobie et al., 2006). It would seem particularly noteworthy to also mention that depression and PTSD, particularly in combination, have been associated with elevated suicide rates (Davidson, et al. 1991; Freeman, Roca & Moore, 2000; Marshall, et al., 2001; Oquendo, et al., 2003; Sareen, et al., 2005; Sareen, et al., 2007). Therefore the extent of comorbid Depression/PTSD within a corrections workforce needs to be taken seriously.

An overall assessment of Depression, PTSD, and Comorbid Depression/PTSD prevalence by job type was performed, according to nine different corrections job positions. This was done in order to address the general question of whether disorder prevalence varies significantly by job type. Variability among proportions of positive to negative disorder status was assessed through the Pearson Chi-square test, as an overall assessment of the presence of significant differences among the several job type groupings. This analysis was performed for subgroups of participants falling into several different disorder group conditions. Two Disorder conditions were assessed separately for depression, the Depression+ Only group (Depression in the absence of PTSD) and the more general Depression+ (with or without PTSD) group. Two disorder conditions were assessed for PTSD, the PTSD+ Only group (PTSD in the absence of depression) and the more general PTSD+ (with or without Depression) group. Finally, the Comorbid PTSD/Depression group was assessed for differences according to job type. While reliable comparisons of depression prevalence via significance testing was not feasible between the numerous specific pairs of job type subgroups, due to sample size and statistical power limitations, the expectation was that differences would exist among job types, such that jobs known to involve more direct and/or frequent exposure to VID events. The potential influence of lower decision latitude, higher work demands, and/or more social isolation, were also considered as having potential to moderate disorder rates.

An ordering of disorder prevalence rates by job type supported the expected pattern such that the most "frontline" job roles (i.e., involving higher VID exposure) demonstrated the highest rates of disorder. Security/Custody staff showed the highest prevalence of each disorder group, with the exception of the Depression+ Only group. For the Depression+ (with or without PTSD) group, a rate of 31% was found for security/custody staff, followed fairly closely by Medical Health Staff at 28.9%, and then Classification staff, at 27.2%. For PTSD+ (with or without depression), security/custody staff showed a rate of 34.1% with the next highest rate coming from Medical Health Care Providers at 24.7%. Comparing the range and variability of rates between the Depression+ and PTSD+ groups, it can be seen that there is more variability for PTSD by job type than for depression by job type. This is consistent with theory, in that it is well established that PTSD requires traumatic exposure, while depression does not require it. PTSD has been attributed to VID exposure much more often in the literature than has depression. It is also logical to expect depression to be based on a greater variety of potential sources compared to PTSD, since PTSD diagnostically requires exposure to events of a more specific type and nature.

One stand-out finding that seemed anomalous at first glance was that Classification staff demonstrated a prevalence within the Depression+ Only (17.5%) condition that was at least double the rate of any other job type. One possible explanation for the distinctively higher rate of Depression+ Only (i.e., not accompanied by PTSD) for Classification staff, is that while classification staff have a high level of potentially taxing direct contact with offenders (given their responsibility to assess, interview, and determine level of custody and cell placements), classification staff also tend to experience fewer VID events compared to other "frontline" sorts of job types. For example, in the data set upon which the current study is based, classification staff reported, on average, experiencing about half as many career VID experiences (M=21.5) as did security/custody staff (M=38.5). Thus even though it might be true that both frequency of direct contact with offenders and VID events correlate positively with both PTSD and Depression symptoms, PTSD is still expected to be more specifically contingent upon VID events than is depression.

In addition to the above factors, the salience/recency of staff's experiences is also likely to be important. Executive staff, for instance, reported having the third highest average number of career VID exposures (M=36.3), but also demonstrated the lowest disorder rates in almost all disorder categories assessed. Individuals in executive staff roles may have worked their way up through the system and accumulated a good share of VID experiences over a long period of time, but in their current executive roles are unlikely to be directly or recently exposed to VID events. Moreover, the protective factors of decision latitude and social interaction are higher for executive staff, and as stated previously, this has been associated with less disorder (e.g., Dollard & Winefield, 1998).

In order to explore the relationship and potential impact of PTSD, Depression, and Comorbid PTSD/Depression (as independent variables) to a spectrum of other continuous health-related variables as dependent variables (e.g., days missed, daily uses of tobacco, daily uses of alcohol, doctor visits, total number of health problems, etc.), participants/cases were organized for analysis into four distinct subgroups: Depression+ Only (i.e., Depression+ and PTSD-), PTSD+ Only (i.e., PTSD+ and Depression-), Both (i.e., Depression+ and PTSD+), and Neither (i.e., Depression- and PTSD-). Organizing mean scores for the variety of health-related variables into tables and plots, according to the four conditions/categories, revealed clear and distinctive patterns. Significance testing further supported expected relationships. Namely, corrections professionals in the Neither disorder category showed uniformly better (i.e., more favorable) mean scores on the numerous health-related variables measured. Participants in either the Depression+ Only or PTSD+ Only categories showed uniformly less favorable mean scores across the numerous health-related variables compared to those who were in the Neither category. Participants who concurrently met criteria for Depression+ and PTSD+ (i.e., Comorbid status) showed uniformly and distinctively worst health-related variable scores. These patterns indicate that PTSD alone and Depression alone are associated with worse health statuses across a range of health-related variables compared to disorder free individuals, and that Comorbid PTSD/Depression is particularly detrimental and associated with distinctively worst status across numerous health-related measures. The latter finding is consistent with that reported by other researchers who explored the interaction of Depression and PTSD (e.g., Campbell, et al., 2007) within other populations. It also highlights the importance of Comorbid PTSD/ Depression status as a particularly high priority target for systemic health maintenance interventions or programs in corrections settings.

In regard to effect sizes, comparing differences in mean health-related variable scores across the four categories/conditions (i.e., Depression+ Only, PTSD+ Only, Neither, and Both) revealed substantial effect sizes and differences that were conceptually meaningful. The Neither (i.e., no disorder) category served as a baseline figure. The mean effect size of differences in health-related variable scores from individuals in the Depression+ Only category versus scores from those in the Neither category, was moderately large (d=.69), suggesting a substantial and clinically significant relationship between Depression+ Only status and the various health-related measures. The mean effect size of differences in health-related variable scores from individuals in the PTSD+ Only category versus those from individuals in the Neither category, was similar and moderately large (d=.72), also suggesting a substantial and clinically significant relationship between PTSD+ Only status and the various health-related measures. The mean effect size observed when comparing health-related variable scores from the comorbid PTSD+/Depression+ (i.e., Both) category to those from the Neither category revealed an even larger mean effect size (d=1.25), indicating again a substantial and clinically significant relationship

between Comorbid status and the numerous health-related variable scores. The particularly large mean effect size observed for individuals in the Comorbid category further evidences an interaction between depression and PTSD that is particularly detrimental to overall health.

In order to explore the relative predictive value of 152 continuous and dichotomous health-related variables to (1) PTSD status (PTSD+ with or without accompanying Depression+ status), (2) Depression status (i.e., Depression+ with or without accompanying PTSD+ status), and (3) comorbid Depression+/PTSD+ status (i.e., all cases being PTSD+ and Depression+ concurrently), several classification and regression tree (CRT) analyses were performed. The term "health-related variables" in this case refers to an even broader spectrum of assessed variables to include not just continuous variables as analyzed previously but also additional dichotomous variables (e.g., particular job classifications held [yes/no], particular health conditions experienced [yes/no], presence or absence of particular health conditions [yes/no], whether certain experiences were had or not [yes/no], etc.). All variables were considered to be either directly health-related in content or having potential to influence health indirectly. Classification tree analyses were performed with a two-fold purpose: (1) to identify variables with top predictive value in relation to PTSD, Depression, and/or Comorbid status, and (2) to identify parsimonious sets of assessment items that could potentially be effectively appropriated for efficient/feasible screening of corrections populations in regard to PTSD, Depression, and Comorbid status.

Because determinations of PTSD and Depression status were based on PCL and DASS-21 Depression scale items exclusively, using established diagnostic or scoring criteria, the dependent variables of interest in the data (i.e., Depression+/Depression- and PTSD+/PTSD-) were expected to be unduly influenced by constituent scale items involved in their determination. Yet the interest in performing the CRT analyses was to examine not only variables represented by PCL-C and DASS-21 Depression scale items, but *all* variables assessed in the study that might figure into true PTSD, Depression, or Comorbid PTSD/Depression statuses. Thus in order to get unbiased rankings of variable importance to prediction/classification of disorder status, separate CRT analyses were performed using (1) PCL-C and DASS-21 constituent items only and then separately again using (2) all other potential predictor variables assessed in the study *other than* PCL-C and DASS-21 Depression scale items. In this way, CRT analysis results would include bias-free rank orderings of variables within each separate analysis.

CRT analyses resulted in generation of six decision tree models able to correctly classify cases of Depression, PTSD, and Comorbid status with respectable accuracy based upon relatively small and efficient sets of top assessment items with unique sets of scoring cut-points and decision rules. The best performing items ended up being all continuous variables from one or some combination of the following sources: PCL-C,

DASS-21, IOFS, and SWLS. Worthy of note is the fact that all of these tools and their constituent items are available through the public domain and therefore could potentially be appropriated for assessment purposes without having to purchase copies. Basing facility-wide screenings on the relatively small sets/combinations of predictor items represents a potentially practical approach to estimating prevalence of disorders within large populations and assessing need for systemic interventions, depending upon available resources. The identified content areas reflected in the top predictive variables also represent useful guides for future investigations and research, as they help clarify useful/effective measurement areas in the context of assessment. Not all known diagnostic criteria for disorders are as amenable to measurement through self-report formatted assessments as are others. Thus the items identified through the CRT analyses can be understood as promising best candidates for assessment purposes.

Among the spectrum of health-related variables compared across Depression+ Only, PTSD+ Only, Both, and None categories, one particularly noteworthy finding was the observed mean differences in corrections professionals' number of *Days Missed Per 12 Months* (i.e., sick days from work). Individuals in the Depression+ Only and PTSD+ Only categories averaged approximately 30% more missed work days (M=11.8; M=11.1, respectively) than did individuals in the None (i.e., disorder free) category (M=8.0). Individuals with Comorbid PTSD+/Depression+ demonstrated an average of more than double the number of missed work days (M=17.5) of None (i.e., disorder-free) individuals (M=8.0). Using these figures, total costs of sick days could be estimated due to the non-overlapping contribution of Depression+ Only, PTSD+ Only, and Comorbid Depression+/PTSD+ statuses. Assuming an average wage of $22.00 per employee, sick days cost institutions approximately $540.00 per employee per year for Depression+ Only individuals, $665.00 per employee per year for PTSD+ Only individuals, and $1,660.00 per employee per year for cases of Comorbid PTSD+/Depression+ individuals. Based on the disorder rates reported in this study, this equates to a total cost of nearly $393,000.00 per year per 1000 employees for all three conditions combined (for straight time), and $590,000.00 per year per 1000 employees for all three conditions when factoring in time and half payment for overtime hours. These estimates are due to increased use of sick days alone, and the consequences of PTSD, Depression, and Comorbidity clearly manifest in a variety of other ways such as impaired work performance, elevated turnover rate, interpersonal conflict, etc. Thus the provided financial cost estimates are likely to represent quite conservative estimates of the broader costs of elevated and unaddressed disorder prevalence in correctional settings.

The analysis of the relationship between disorder categories and functional impairments in important areas of life functioning also appears worthy of mention, due to the magnitude of results. Individuals with either Depression or PTSD in isolation reported being "frequently" functionally impaired in several contexts of life

functioning 11.0 to 16.3% of the time. When individuals with Depression and Comorbid PTSD/Depression are considered, the frequency inflates to an astounding 53 to 60% of the time. These results suggest both the magnitude and pervasiveness of detrimental effects.

Study Limitations

Inviting numerous corrections agencies nationwide to participate in an internet-based survey anonymously, as was done in this study, did not allow for the calculation of response rate, as it was not possible to determine how many corrections professionals saw the invitation. Therefore, it was not possible to determine the proportion of individuals who *actually* participated in a study to those *offered* participation. Nevertheless, this approach arguably involved more advantages than disadvantages, as it allowed for the collection of scarcely available data and allowed for the collection of an unusually large and rich sample of corrections professionals—well represented across gender and age categories, job roles, professional settings, security levels, and numerous U.S. states and territories. Broad and large samples are well known for their benefit to generalizability of results and for robust and accurate statistical calculations. Thus while information on response rate was unavailable given the study's design, the same design included other, even more compelling indicators of sample quality than a simple response rate statistic.

Considering the serious implications of disorder rates reported in this study, concerns about the stability of the reported rates across geographic locations might be of interest to some readers. While data were contributed by participants from most of the U.S. states and territories, there were also particularly high concentrations of participants from some Midwestern region states, including Missouri, Ohio, and Kansas. To shed additional light on the stability of reported rates, rates for the three most prevalent disorder conditions (i.e., PTSD+ with or without Depression+, Comorbid PTSD+/Depression+, and Depression+ with or without PTSD+) were recalculated separately by geographic location for comparison. Calculations were made for individual states with at least n=300 representative participants and with data from the remaining states pooled into an aggregated fourth comparison group, and with the latter including 49 U.S. states/territories, and averaging 22 participants per state/territory.

The Pearson Chi-square test was used to compare the proportion of individuals testing positive for each disorder to those testing negative. For participants screening positive for Comorbid PTSD+/Depression+, prevalence ranged from 15.8% (Missouri) to 16.9% (Kansas) to 17.9% (Ohio) to 18.8% (All other states/territories in aggregate). Differences between groups were not found to vary significantly (χ^2=3.70; df=3, p=.30). For participants screening positive for Depression (with or without accompanying PTSD), prevalence

ranged from 24.1% (All other states/territories in aggregate) to 24.7% (Missouri) to 27.8% (Ohio) to 30.0% (Kansas). Differences were not statistically significant (χ^2=7.35; *df*=3; *p*=.06). For participants screening positive for PTSD (with or without accompanying Depression), prevalence ranged from 24.3% (Missouri) to 25.4% (Kansas) to 28.4% (All other states/territories in aggregate) to 28.9% (Ohio). Differences in rate were found to vary significantly (χ^2=7.98; *df*=3; *p*=.05). Thus while Depression and Comorbid PTSD/Depression did not vary significantly by location, PTSD did vary significantly, though only to a small/modest degree of 4.6% between lowest and highest prevalence rates. Notably, even the lowest disorder rates by location for corrections professional participants remain in a range that far exceeds general population rates.

Another issue that could be raised in regard to reported results, and PTSD rates in particular, is the possibility that disorder rates discovered in this study might be due to, or bolstered by, pre-existing disorder conditions within participants that entered the corrections field after prior exposure/s to traumatic events experienced within other high-stress occupations they held. Hiring practices in the field of corrections would naturally favor candidates with similar work experience, and military service in particular. This possibility was anticipated by the researchers and a question was included in the assessment battery to address it. Specifically, participants were asked if they had engaged previously in non-corrections occupations that exposed them to life-threatening situations or violence, such as emergency medical work, firefighting, military service, police or Sheriff's deputy work. Data from this question allowed separate estimates of disorder rates to be calculated for individuals from both groups (i.e., those with and without non-corrections prior occupational exposure).

It was found that a substantial proportion of corrections professionals in the sample reported having worked previously in non-corrections occupations involving exposure to potentially traumatic incidents (43%). This subgroup of corrections professionals showed slightly higher disorder rates than corrections professionals who reported no previous high trauma occupations prior to corrections work. Among the individuals within the total sample who reported having worked in another high trauma occupation prior to their corrections work, those who were PTSD+ (with or without accompanying depression) demonstrated a PTSD rate (29.3%) that was 4.8% higher than those who reported no prior high trauma occupation work, a statistically significant difference (χ^2=10.59; *df*=1; *p*=.001). Depression+ (with or without accompanying PTSD) participants with prior high trauma occupations demonstrated a rate (27.3%) that was 2.8% higher, a statistically insignificant difference (χ^2=3.70; *df*=1; *p*=.06). Comorbid Depression+/PTSD+ participants with prior high trauma occupations demonstrated a rate (18.8%) that was 2.8% higher, a statistically significant difference (χ^2=4.92; *df*=1; *p*=.03). In sum, while findings here indicate prior high trauma occupational work lends to increased disorder prevalence for corrections professionals, the increase is relatively small/modest and it remains true that corrections

professionals, even without prior high trauma occupational activity, still demonstrate highly elevated disorder rates relative to the general population.

A final area of potential concern worth addressing is the issue of whether self-administrable, diagnostic screening tools are an adequate or sufficiently accurate substitute for clinician-administered diagnostic interviews. While this is a complex subject and beyond the scope of this paper to address in depth, the short response to this issue is to just point out that each of the clinical assessment and screening tools used in this study have been and continue to be widely and effectively used in clinical and research contexts, and have well-established psychometric properties. Further, while semi-structured diagnostic interviews are often considered the gold standard, there is also a compelling accumulation of literature supporting the equivalence and/or superiority of highly structured and statistically-driven assessment approaches (e.g., such as self-administrable assessment screening tools) to those relying more heavily on clinical judgments (Meehl, 1954, 1986; Grove, et al., 2000). This is especially the case in the context of large scale assessment needs, and when in-person clinical interviews are seldom practically feasible options.

Future Directions

The data and analyses presented in this paper highlight three occupational hazards in the field of corrections—PTSD, Depression, and Comorbid PTSD/Depression. PTSD and Depression are frequently intertwined and represent a particularly deleterious combination. Results showed that both disorders and their co-occurrence in particular (Comorbid PTSD/Depression) are associated with a broad spectrum of negative health conditions and factors, and impaired life functioning for the affected individuals.

The results highlighted in this study suggest the need for system-wide screening of employee health in corrections and system-wide interventions to address elevated levels of Depression, PTSD, and Comorbidity. Relatively brief sets of assessment items show potential applicability for economical and feasible group-level screenings and as a means of estimating disorder prevalence when lack of resources might otherwise prohibit large-scale assessment requirements. Rates that substantially exceed general population rates can be understood as occupation-related problems and should be addressed through systems-level employee health initiatives, such as programs designed to: (1) increase employee insight into the mechanics of common and unhealthy aspects of corrections work culture, (2) educate on symptoms and signs of mental health-related conditions that occur at elevated rates in the field of corrections so they can be recognized and treated in their early stages or prevented altogether, (3) encourage effective self-help activities for individuals, (4) optimize healthy and supportive coworker interactions and ideology, and (5) promote critical role modeling of healthy and effective attitudes and behavior by those in leadership positions.

As suggested earlier, the elevated rates of Depression and Comorbid PTSD/Depression reported in this paper help explain the highly elevated suicide rates that have been documented for correctional officers. While suicide rates for correctional officers have been reported, additional information on conditions associated with elevated suicide risk within the corrections occupation remain to be collected, such as rates broken out by facility/agency type, job role/type, and work environment conditions (e.g., level of exposure to VID experiences, job and work environment attributes, such as social support, decision latitude, and workload). This type of additional information is likely to be useful for purposes of understanding more fully the precursors to suicide for corrections professionals and also for efficient channeling of efforts and resources to the most needed targets and locations with the goal of deterring future suicides.

There is growing recognition of the effectiveness of evidence-based treatment systems for trauma-exposed individuals suffering from PTSD and Depression. A recent publication by the RAND Corporation (2008) indicated that improving access to evidence-based systems of care can be cost-effective and improve recovery rates for U.S. service-members returning from combat with PTSD or Depression. While similar data for the corrections industry are currently unavailable, it is not much of a leap to expect that evidence-based systems of care would similarly benefit corrections professionals since strong evidence indicates that corrections professionals are exposed to similarly traumatic experiences, and over extended periods of time in the workplace. Thus, the pursuit of evidence-based systems of care for corrections professionals is highly likely to be a worthwhile pursuit.

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Appendix A

Table 2

ANOVA

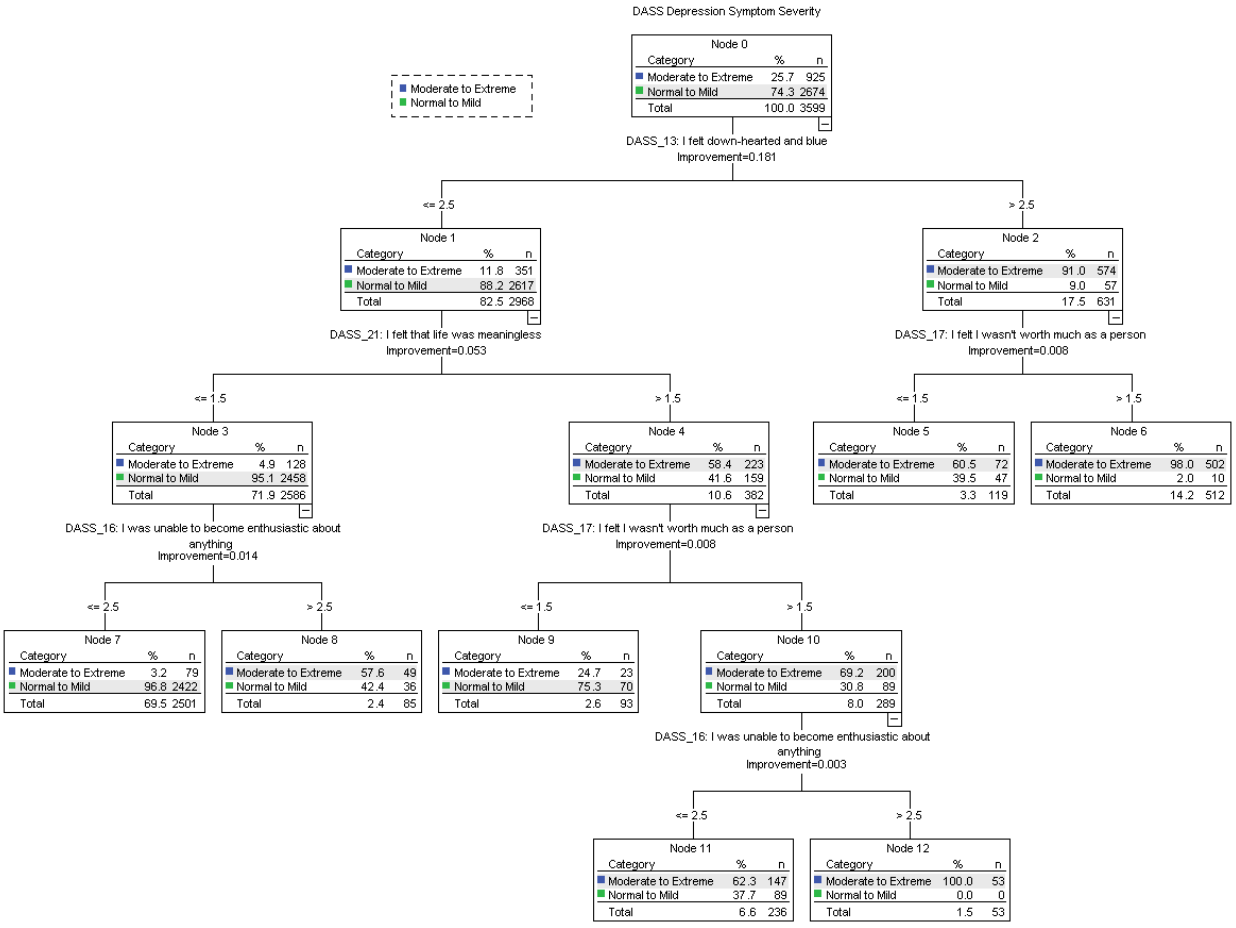
	Sum of Squares	df	Mean Square	F	Sig.
Number of days missed over last 12 months	1636765.198	3595	455.289		
	44755.033	3	14918.344	32.767	.000
	1681520.231	3598			
Number of days missed over last 12 month (for workers comp)	1258378.728	3595	350.036		
	9747.581	3	3249.194	9.282	.000
	1268126.310	3598			
Number of tobacco uses per day	196048.672	3087	63.508		
	3041.127	3	1013.709	15.962	.000
	199089.799	3090			
Number of alcoholic drinks consumed per week	235287.212	3595	65.448		
	3499.721	3	1166.574	17.824	.000
	238786.934	3598			
Number of doctor visits over last 12 months	130121.268	3595	36.195		
	6428.577	3	2142.859	59.203	.000
	136549.845	3598			
Number of VID exposures - career	7764566.198	3595	2159.824		
	156467.476	3	52155.825	24.148	.000
	7921033.674	3598			
Number of different VID-related emotions experienced	19327.361	3595	5.376		
	2789.762	3	929.921	172.971	.000
	22117.123	3598			
Number of health conditions	6340.409	3595	1.764		
	1427.174	3	475.725	269.735	.000
	7767.583	3598			
SWLS Global: life satisfaction overall	147107.719	3595	40.920		
	66896.194	3	22298.731	544.934	.000
	214003.913	3598			
DASS anxiety score	88115.268	3595	24.511		
	62824.987	3	20941.662	854.395	.000
	150940.255	3598			
DASS stress score	130712.309	3595	36.359		
	159631.013	3	53210.338	1463.452	.000
	290343.322	3598			
Job functioning	2506.911	3595	.697		
	956.885	3	318.962	457.402	.000

	3463.795	3598			
Relationship functioning	2301.757	3595	.640		
	1373.894	3	457.965	715.272	.000
	3675.651	3598			
Leisure time functioning	2352.506	3595	.654		
	1574.481	3	524.827	802.018	.000
	3926.987	3598			
Caregiver functioning	1886.686	3595	.525		
	766.186	3	255.395	486.645	.000
	2652.872	3598			
Functioning-personal responsibilities	2001.777	3595	.557		
	1094.578	3	364.859	655.252	.000
	3096.355	3598			
Number of times per week engaging in athletic or physical exercise	38042.337	3595	10.582		
	113.242	3	37.747	3.567	.014
	38155.579	3598			
Number of times per week engaging in social activities	22811.290	3595	6.345		
	388.192	3	129.397	20.393	.000
	23199.482	3598			
Number of times per week engaging in spiritual/religious activities	21546.976	3595	5.994		
	99.076	3	33.025	5.510	.001
	21646.052	3598			
Number of types of VID exposures	50703.400	3595	14.104		
	3416.993	3	1138.998	80.758	.000
	54120.392	3598			

Appendix B

Figure 7

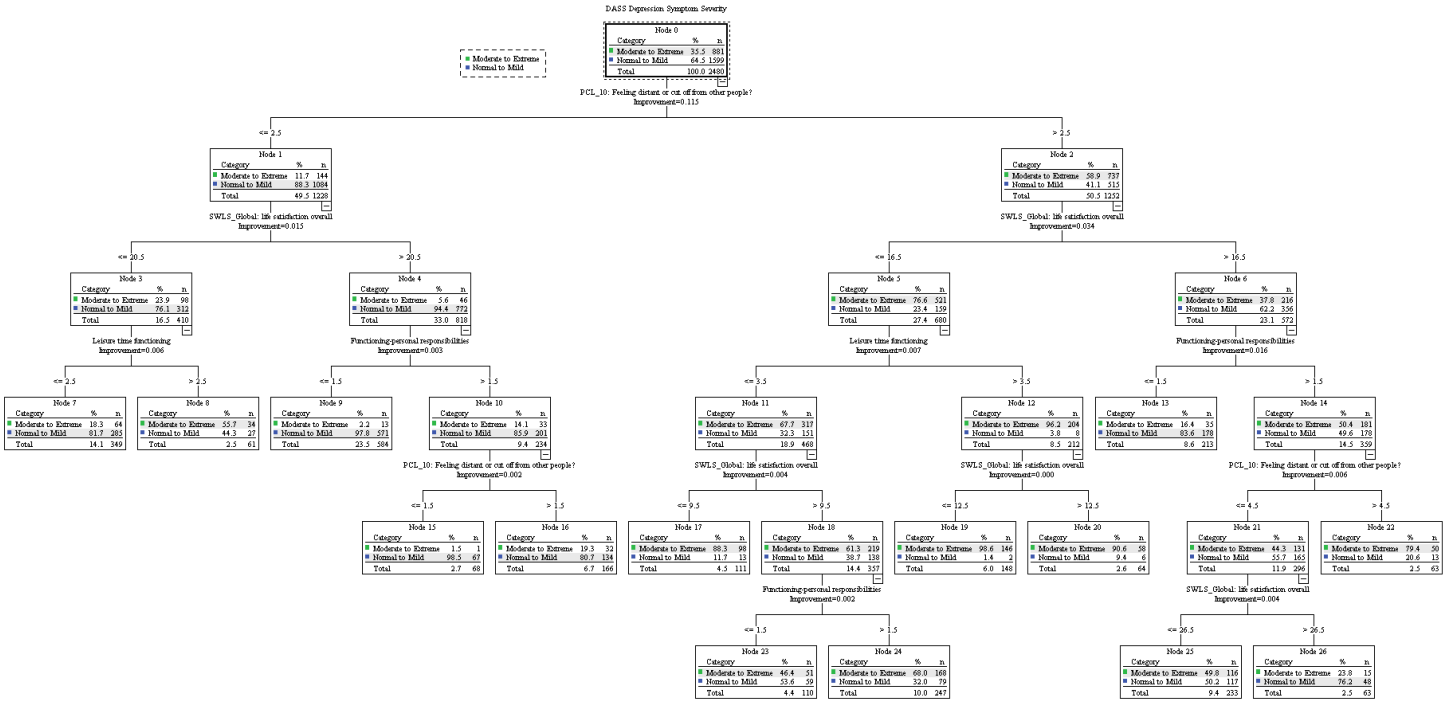
CRT Decision Rules for Classification/Prediction of Depression Status (DASS-21 Depression Scale Items)



Appendix C

Figure 9

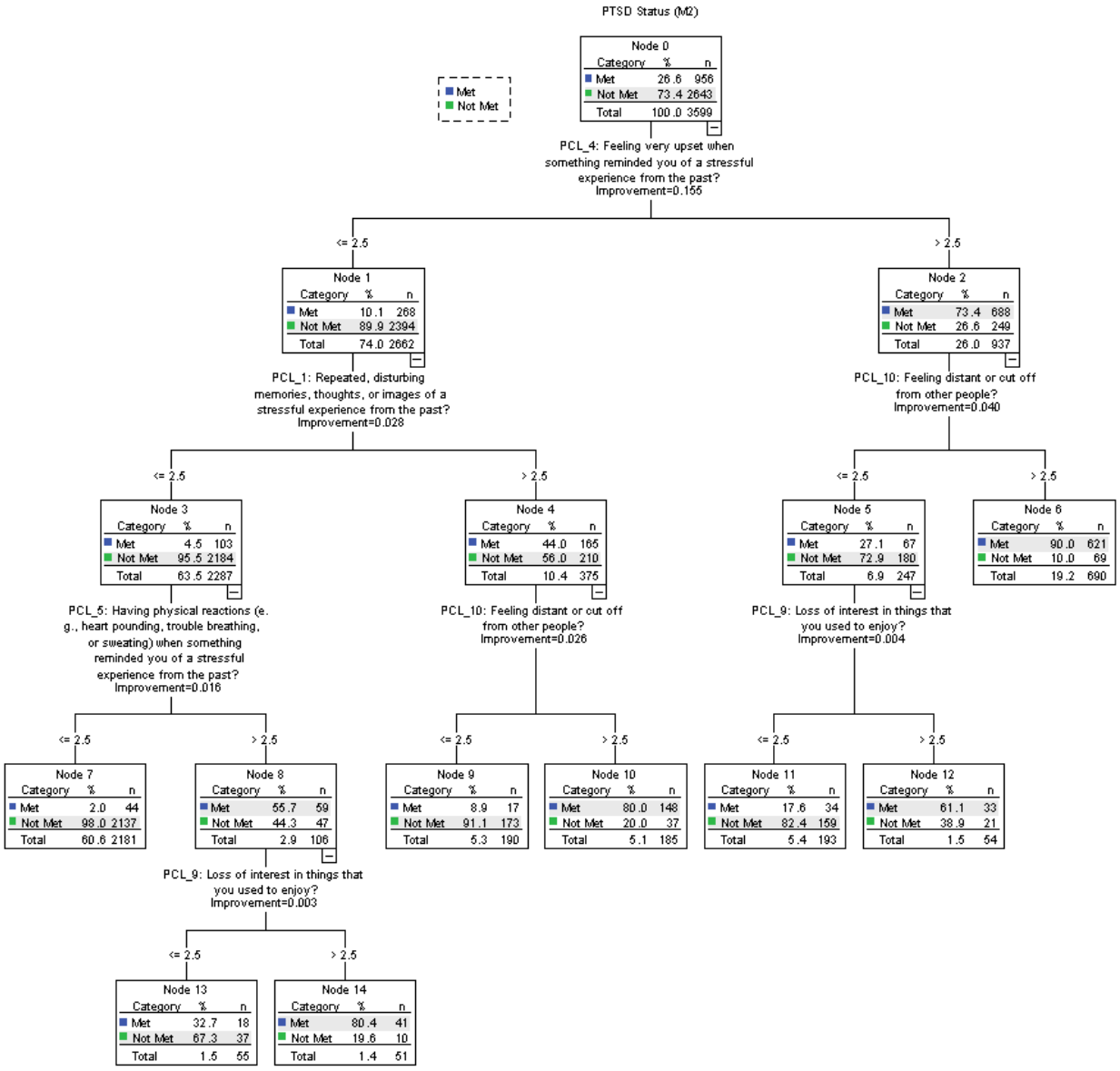
CRT Decision Rules for Classification/Prediction of Depression Status (DASS-21 Depression scale items excluded)



Appendix D

Figure 11

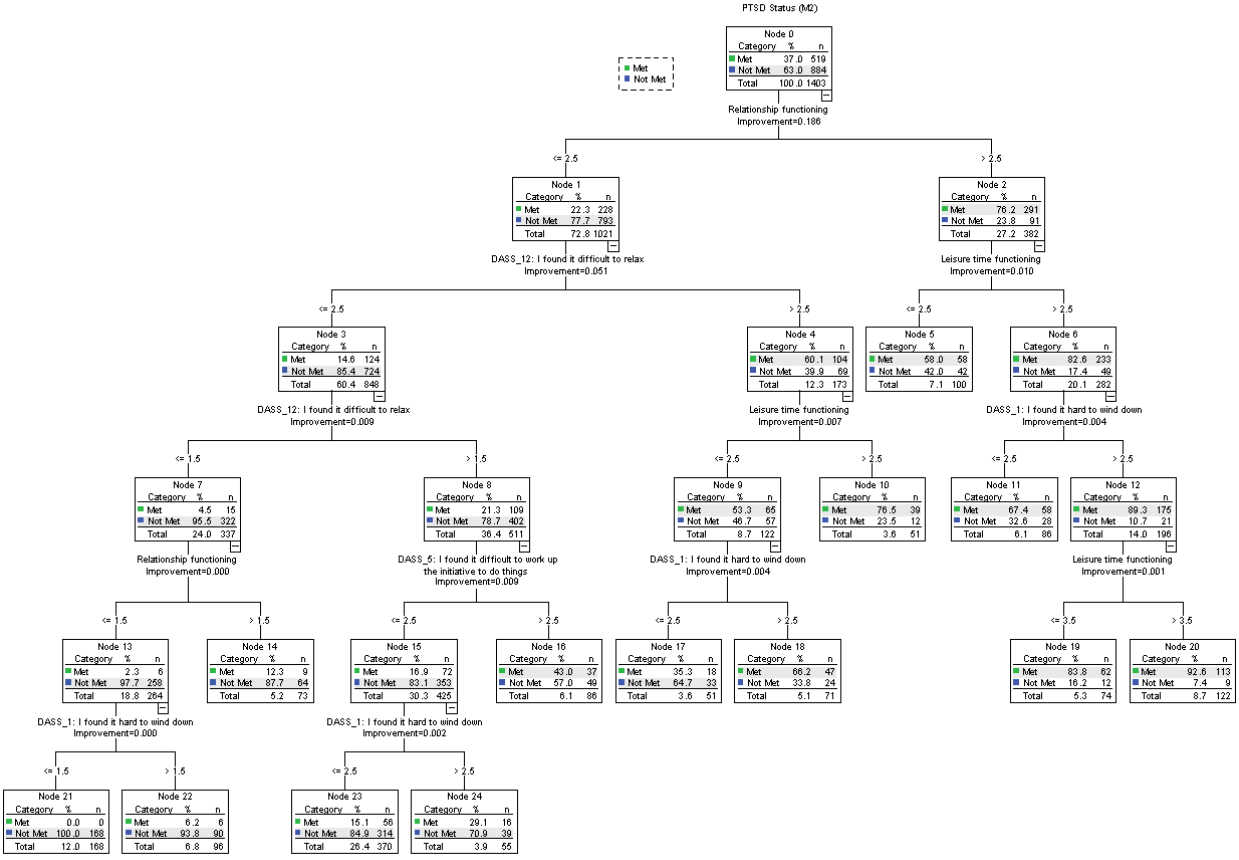
CRT Decision Rules for Classification/Prediction of PTSD Status (based solely on PCL-C items)



Appendix E

Figure 13

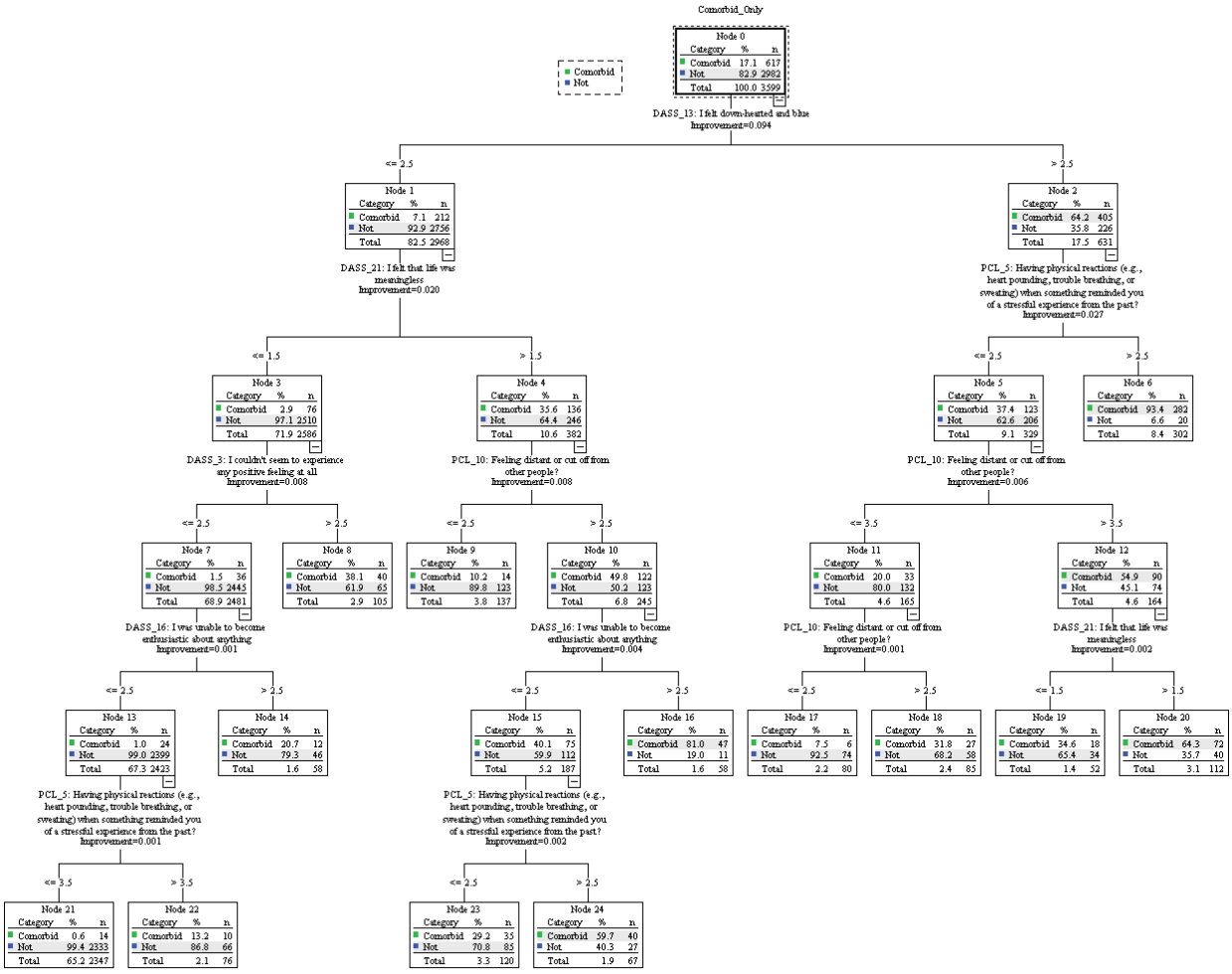
CRT Decision Rules for Classification/Prediction of PTSD Status (excluding PCL-C items)



Appendix F

Figure 15

CRT Decision Rules for Classification/Prediction of Comorbid PTSD and Depression Status (based on PCL-C and DASS-21 Depression scale items only)



Appendix G

Figure 17

CRT Decision Rules for Classification/Prediction of Comorbid PTSD and Depression Status (based on all variables/items excluding PCL-C and DASS-21 Depression scale items)