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The Relationship of Impairment to Personality Disorder Severity Among Individuals with Specific Axis I Disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions

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Abstract

The present study examined one dimensional approach to personality disorders (PDs) in a large (n=43,093), nationally representative sample of the U.S. population. Respondents were classified in four personality severity categories (no PD, subthreshold PD, simple PD, complex PD). Linear regression analyses were conducted to examine mental disability by PD severity for major DSM-IV substance use, mood and anxiety disorders. Significant increases in disability were observed between no PD and simple PD and between simple PD and complex PD for each Axis I disorder except drug dependence, but few differences in disability were found between no PD and subthreshold PD. This study found support for the clinical utility of the dimensional classification of PD severity with regard to the distinction between simple and complex PD and for a combined no PD-subthreshold PD level of severity. Future planned analyses will address the clinical utility of the classification prospectively, with a full battery of all Axis II PDs.

Axis II Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV: American Psychiatric Association, 1994) personality disorders are highly comorbid with Axis I disorders in both clinical (Dolan-Sewell et al., 2001; McGlashan et al., 2000) and epidemiological studies (Grant et al., 2005; Hasin et al., 2007). Less extensive research on comorbidity among Axis II disorders has shown strong associations among personality disorders (Grant et al., 2005; Grilo, Sanislow & McGlashan, 2002; Oldham et al., 1995; Pfohl et al., 1986; Stuart et al., 1998). Personality disorders (PDs) are also highly disabling, with numerous clinical studies showing significant impairment among individuals with PDs compared with others (Drake & Vaillant, 1985; McGlashan, 1986; Skodol et al., 2002). Other studies have shown the adverse effects of PD comorbidity on Axis I disorder severity (Johnson et al., 1996; Ozkan & Altindag, 2005; Reich & Troughton, 1988; Zlotnick et al., 2003) and course (Gunderson et al., 2004; Shea et al., 2004).

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The magnitude of comorbidity between and among DSM-IV Axis I and Axis II disorders, and the growing recognition of limitations of categorical models of personality disorder classification (Clark et al., 1997; Cloninger, 2000, First et al., 2002; Livesley, 2003; Rounsaville et al., 2002) have led to several proposals for dimensional classifications. Several approaches have been proposed, differing in both their scope and complexity, from proposals to provide dimensional representations (Tyrer & Johnson 1996; Westen & Shedler, 2000) or reorganizations (Livesley, 2003; Shedler & Westen, 2004) of existing diagnostic categories to proposals to integrate Axis II with dimensional models of general personality structure (Cloninger, 2000; Millon et al., 1996; Zuckerman, 2002) to more ambiguous attempts to integrate Axis I and II disorders with reference to common spectra (Siever & Davis, 1991; Krueger, 2002, 2005).

With few exceptions, most of the work on functional impairment and alternative dimensional approaches to personality disorders (PDs) has been carefully conducted in clinical samples. Impairment and comorbidity may be higher in these samples, because patients are likely to have more severe disorders and individuals with more than one disorder are more likely to seek treatment. Thus, it is also important to examine dimensional models of PDs in large epidemiological samples of the general population.

This study extends the clinical work on functional impairment and co-morbidity of PDs by assessing the relationship between functioning among individuals with specific Axis I disorders across levels of PD severity defined dimensionally. Specifically, the present study examines one dimensional approach to PDs proposed by Tyrer and his associates (Tyrer et al., 1997a, 1997b; Tyrer & Johnson, 1996), using a large (n=43,093), nationally representative survey of the U.S. general population (Grant et al., 2001). The sample size was large enough to assess a broader array of Axis I disorders than has been examined in previous clinical studies. In Tyrer and associates' (1997a, 1997b) original scheme, severity of PDs is classified according to the three major groups, that is, 0=no PD, 1=subthreshold criteria for one or more PDs, 2=simple PD (one or more PD in one cluster) and 3=complex or diffuse PD (PDs in more than one cluster). It was hypothesized that the prevalences of specific Axis I disorders would significantly increase with levels of severity of PD as conceptualized by Tyrer and associates and that an independent measure of mental impairment would be significantly related to increased severity of PD for each specific Axis I disorder.

METHODS

SAMPLE

The NESARC is a nationally representative face-to-face survey of 43,093 respondents 18 years or older. The target population of the NESARC was the civilian noninstitutionalized population living in households and group quarters in the United States, including the District of Columbia, Hawaii, and Alaska. Details of the NESARC sample have been published elsewhere (Grant et al., 2004a). The overall response rate was 81%. The NESARC sample was weighted to adjust for probabilities of selection of a sample housing unit or housing unit equivalent, nonresponse at the household and person levels, the selection of one person per household, and the oversampling of Blacks, Hispanics, and adults aged 18 to 24 years. The weighted data were poststratified and adjusted to match the target population based on the 2000 decennial census in terms of region, age, sex, race, and ethnicity.

DSM-IV PERSONALITY DISORDERS

The diagnoses presented in this report were made by the *NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV)*, a state-of-art

structured diagnostic interview designed for use by experienced lay interviewers (Grant et al., 2001). Personality disorders assessed in the NESARC included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial. Because of time and space constraints, borderline, schizotypal, and narcissistic PDs were not assessed in the Wave 1 NESARC. The decision to exclude these 3 PDs was based on the large number of symptom items required to operationalize them (n = 57). However, in the follow-up Wave 2 of the NESARC, borderline, schizotypal, and narcissistic PDs will be assessed.

The diagnosis of DSM-IV PDs requires an evaluation of the individual's long-term patterns of functioning. Diagnoses of PDs in the AUDADIS-IV were made accordingly. Respondents were asked a series of personality symptom questions about how they felt and acted most of the time throughout their lives regardless of the situation or whom they were with. They were instructed not to include symptoms limited to times when they were depressed, manic, anxious, drinking heavily, using medicines or drugs or experiencing withdrawal symptoms (defined earlier in the interview), or during times when they were physically ill. To receive a DSM-IV PD diagnosis, respondents needed to endorse the requisite number of DSM-IV symptom items for the particular PD and at least 1 positive symptom must have caused social or occupational dysfunction or both (Grant, 2004b, 2004c).

The reliability of AUDADIS-IV categorical diagnoses of each PD was assessed in a test-retest study conducted as part of the NESARC survey proper (Grant et al., 2003). A random subsample of 282 respondents was reinterviewed with the antisocial PD module, and another subsample of 315 respondents was reinterviewed with the AUDADIS-IV modules containing the remaining PD measures. All reinterviews were conducted by interviewers blind to the results of the original interview approximately 10 weeks after the NESARC interviews. The reliability of the PD diagnoses in these community samples ranged from fair to good, from $\kappa = 0.40$ for histrionic PD to $\kappa = 0.67$ for antisocial PD. Corresponding reliabilities for subthreshold, simple, and complex PD were 0.50, 0.62, and 0.73, respectively. Test-retest reliabilities for each dimensional PD symptom scale were much greater (intraclass correlation coefficients = 0.50–0.79). The reliabilities of the AUDADIS-IV PD diagnoses compare favorably with those found in short-term test-retest studies using semistructured personality interviews in treated samples of patients (Zimmerman, 1994).

Evidence for the convergent validity of AUDADIS-IV PDs was assessed in a series of linear regression analyses, using the NESARC data, which examined the associations between each PD and 3 mental disability scores of the Short-Form 12-Item Health Survey, Version 2 (SF-12v2) (Ware et al., 2002), controlling for age, all other PDs, and 12-month comorbid DSM-IV substance use disorders and anxiety and mood disorders. All PDs, except histrionic, were shown to be highly significant ($P<.01$ to $P<.0001$) predictors of the mental component summary, social functioning and role emotional function SF-12v2 scores. Respondents with these PDs had significantly greater disability and social and occupational dysfunction than respondents who did not have PD.

In this study, all NESARC respondents were classified into four mutually-exclusive severity categories of PDs as conceptualized by Tyrer and his associates (Tyrer & Johnson, 1996). Respondents who had at least two DSM-IV PDs each from more than one cluster were classified with complex PD. Respondents who met criteria for one or more DSM-IV PD within a single cluster were classified with simple PD. The subthreshold PD category included those respondents who had 1 or 2 symptoms less than the required diagnostic threshold of any PD with at least one clinically significant criterion. For antisocial PD, subthreshold disorder included all respondents with a clinically significant conduct disorder, who had 1 or 2 symptoms less than required of adult antisocial behaviors as described in the

context of antisocial PD. Finally, the no personality disorder group included all respondents who did not meet any of the criteria above.

OTHER DSM-IV PSYCHIATRIC DISORDERS

Anxiety (panic disorder with and without agoraphobia, social phobia, specific phobia, generalized anxiety disorder) and mood (major depressive disorder, dysthymia, bipolar I, bipolar II) disorders in this report are DSM-IV primary diagnoses. In DSM-IV, "primary" excludes mental disorders that are substance induced or due to a general medical condition (APA, 1994) All mood and anxiety disorders also satisfied the DSM-IV clinical significance criterion.

AUDADIS-IV questions operationalize DSM-IV criteria for alcohol and drug-specific dependence for ten drug classes (aggregated in this report; Grant et al., 2004b). Alcohol dependence diagnosis required at least three of seven DSM-IV criteria for dependence during the past year. Drug dependence and nicotine dependence (Compton et al., 2004; Grant et al., 2004d) diagnoses used the same algorithms.

As reported in detail elsewhere, test-retest reliability was good to excellent for substance use disorders ($\kappa > 0.74$), and fair to good ($\kappa = 0.40–0.67$) for other anxiety, mood and personality disorders (Grant et al., 1995, 2003a, 2004a, 2004b, 2004c; Canino et al., 1999; Compton et al., 2004; Chatterji et al., 1997; Cottler et al., 1997; Hasin et al., 1997a, 1997b, [1999], [2003]; Hasin & Paykin, 1999; Nelson et al., 1999; Pull et al., 1997; Ustun et al., 1997; Vrasti et al., 1997). Convergent validity was good to excellent for other anxiety, mood and personality disorders (Grant et al., 2004b, 2005, 2004e), and selected diagnoses show good agreement ($\kappa = 0.64–0.68$) with psychiatrist reappraisals (Hasin et al., 1997; Canino et al., 1999).

DISABILITY

Disability/impairment was assessed using the Mental Component Summary Scale (MCS) of the Short-Form-12v2, a reliable and valid measure of disability used in population surveys. (Ware et al., 2002). The MCS measures social role and emotional functioning and is a norm-based scale with a mean of 50 and a standardized range of 0 to 100. Lower scores indicate greater disability.

STATISTICAL ANALYSES

Weighted means and percentages were computed to derive prevalences and disability for each current (12-month) substance use, mood and anxiety disorder across levels of personality severity. Chi-square tests were used to assess differences between prevalences of each Axis I disorder across PD severity categories. Multivariate linear regression analyses that controlled for sociodemographic characteristics (age, sex, ethnicity, marital and educational status, income, region and urbanicity) and other comorbid disorders were conducted to determine differences for each Axis I disorder by level of PD severity. All standard errors were generated using SUDAAN (Research Triangle Institute, 2004), a software program that uses appropriate statistical techniques to adjust for the sample design characteristics of the NESARC.

RESULTS

In this general population sample, the prevalences of DSM-IV PDs were: 2.4% (n = 995) for avoidant PD; 0.5% (n = 208) for dependent PD; 7.9% (n = 3,261) for obsessive-compulsive PD; 4.4% (n = 2,105) for paranoid PD; 3.1% (n = 1,425) for schizoid PD; 1.8% (n = 808) for histrionic PD; and 3.6% (n = 1,422) for antisocial PD.

In general, prevalence and disability significantly ($p < 0.001$) increased as a function of PD severity for each substance use, mood and anxiety disorder (Tables 1 and 2).

Linear regression analyses of disability by PD severity for each Axis I disorder, controlling for sociodemographic characteristics and other comorbid disorders, are shown in Table 3. Disability associated with subthreshold PD was only significantly greater than disability associated with no PD for major depressive disorder, panic disorder with agoraphobia and specific phobia. In contrast, disability associated with simple PD was significantly greater relative to disability among those respondents with no PD for most psychiatric disorders, with the exception of drug dependence, dysthymia and bipolar I disorder. For each psychiatric disorder, except bipolar I and panic disorder without agoraphobia, disability was not significantly different among respondents classified with simple and subthreshold PD. With a few exceptions, disability associated with complex PD was significantly greater than disability associated with no PD, subthreshold PD and simple PD among individuals with each Axis I disorder. This result did not generalize to drug dependence for which there were no significant differences in disability across PD severity.

DISCUSSION

A crucial feature of PDs is that of impairment or dysfunction (Hill & Rutter, 1994; Tyrer & Alexander, 1979), and this study has importantly shown that PD severity, was strongly related to an independent measure of mental impairment. However, disability increased from no PD to subthreshold PD only for major depressive disorder, panic disorder with agoraphobia and specific phobia, findings that only partially support the distinction between no PD and subthreshold PD in this classification. Similarly, disability associated with simple PD was significantly greater than disability associated with subthreshold PD only among individuals with bipolar I disorder and panic disorder without agoraphobia again signaling even less support for the validity of the dimensional PD classification with regard to the subthreshold PD versus simple PD distinction. In contrast there was strong support for the complex PD versus other levels of PD distinction, since disability associated with complex PD, with few exceptions, was greater than that associated with simple, subthreshold and no PD. It is possible that planned replications of these findings using all 10 DSM-IV PDs assessed in the Wave 2 NESARC will find stronger support for the no PD versus subthreshold PD and subthreshold PD versus simple PD distinctions.

The disability results of this study mirror those of prospective study of patients with anxiety and mood disorders (Seivewright, Tyrer & Johnson, 2004). In this study global outcome and social function at 12 year follow-up were indistinguishable between no PD and subthreshold PD, somewhat greater for simple PD versus no PD and subthreshold PD and substantially worse for complex PD versus other levels of PD severity. Taken together, these findings suggest collapsing the no PD and subthreshold PD levels of this severity classification. If this were done, one would expect to find significant increases in disability in the combined no PD-subthreshold PD level relative to the simple PD level, a result not observed in this study for any Axis I disorder except bipolar I disorder and panic disorder without agoraphobia. Substantial increases in disability were also associated with complex PD compared with all less severe levels of this classification highlighting the important contribution of diffuse personality psychopathology to disability among individuals with Axis I disorders. Further research examining disability and these proposed new levels of PD severity for specific psychiatric disorders appears warranted.

One disparate finding in this study was that disability was not associated with level of PD severity among individuals with drug use disorders, a result not found for alcohol or nicotine dependence or any mood or anxiety disorder. This result suggests that disability associated

with drug use disorders may be so great that incremental increases in disability due to increases in severity of PDs has little effect on impairment. Alternatively, the omission of narcissistic, borderline and schizotypal PD assessment may have contributed to the results, if these 3 PDs are highly comorbid with drug use disorders in the general population. Further research should address the important difference in observed disability with respect to PD severity among individuals with drug use disorders.

As Verheul (2005) has emphasized, it is the clinical utility of any PD association that will carry the most weight in clinical practice. Although the present cross-sectional study found support for the utility of the dimensional classification proposed by Tyrer and associates with regard to the distinction between complex PD and simple PD and for a combined no PD-subthreshold PD level of severity, a stronger test of its clinical utility is best addressed prospectively. The Wave 2 NESARC, currently in the data preparation status, will importantly address this limitation of the present study by allowing for an examination of the impact of PD severity at baseline on disability at 3-to-4 year follow-up for a broad range of Axis I disorders. The NESARC samples are large enough to examine this relationship among individuals who have and those who have not received treatment over the follow-up period. If these associations are confirmed, and disability and impairment do not improve among those who received treatment, attention to the personality dysfunction might be considered to promote better long-term functioning among individuals with Axis I disorders. Planned Wave 2 NESARC analyses will also address another limitation of this study, that is, the exclusion of 3 DSM-IV PDs (narcissistic, schizotypal and borderline) not measured in the Wave 1 NESARC, allowing a more complete classification of PD severity.

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Table 1

Prevalences of 12-month DSM-IV substance use, mood and anxiety disorders by Personality Disorder Severity

Disorder	No PD (n=32,774) % (SE)	Subthreshold PD (n=4,024) % (SE)	Simple PD (n=4,249) % (SE)	Complex PD (n=2,046) % (SE)
Alcohol dependence	2.48 (0.12)	4.48 (0.45)	8.28 (0.52)	14.27 (1.11)
Drug dependece	0.18 (0.03)	0.54 (0.12)	1.98 (0.27)	5.03 (0.65)
Nicotine dependence	9.39 (0.34)	17.00 (0.79)	23.58 (0.86)	35.45 (1.57)
Major depressive disorder	3.20 (0.13)	9.01 (0.53)	11.82 (0.58)	17.25 (1.13)
Dysthymia	0.67 (0.06)	2.21 (0.30)	3.11 (0.33)	6.13 (0.71)
Bipolar 1 disorder	0.46 (0.04)	2.52 (0.32)	5.97 (0.43)	17.72 (1.07)
Bipolar 2 disorder	0.34 (0.04)	1.02 (0.17)	2.22 (0.33)	5.23 (0.58)
Panic disorder				
With agoraphobia	0.18 (0.03)	0.42 (0.10)	1.58 (0.22)	4.96 (0.54)
Without agoraphobia	0.82 (0.06)	2.58 (0.32)	3.53 (0.33)	7.00 (0.78)
Social phobia	0.98 (0.07)	3.53 (0.33)	7.80 (0.51)	19.09 (1.2)
Specific phobia	4.47 (0.20)	10.72 (0.68)	14.80 (0.75)	26.47 (1.28)
Generalized anxiety disorder	0.65 (0.06)	3.38 (0.33)	5.74 (0.43)	14.3 (1.04)

Table 2

Mean disability scores* among individuals with DSM-IV psychiatric disorders by different levels of Personality Disorder Severity

Disorder	No PD Mean (SE)	Subthreshold PD Mean (SE)	Simple PD Mean (SE)	Complex PD Mean (SE)
Alcohol dependence	50.33 (0.43)	47.85 (0.85)	46.58 (0.83)	39.45 (1.07)
Drug dependence	43.72 (2.00)	40.51 (2.81)	43.66 (2.24)	39.67 (2.17)
Nicotine dependence	51.23 (0.22)	48.96 (0.51)	47.41 (0.45)	41.24 (0.75)
Major depressive disorder	44.17 (0.48)	42.47 (0.67)	40.84 (0.65)	36.12 (0.74)
Dysthymia	39.70 (1.09)	37.86 (1.66)	39.37 (1.48)	33.56 (1.40)
Bipolar 1 disorder	44.25 (1.05)	44.82 (1.16)	40.31 (0.98)	36.69 (0.90)
Bipolar 2 disorder	49.68 (0.93)	44.59 (1.41)	43.71 (1.25)	38.98 (1.31)
Panic disorder				
With agoraphobia	49.15 (1.94)	44.03 (2.40)	36.92 (1.91)	31.88 (1.53)
Without agoraphobia	46.55 (0.80)	43.57 (1.50)	39.99 (1.26)	37.55 (1.57)
Social phobia	49.38 (0.73)	47.78 (0.86)	44.71 (0.77)	36.77 (0.90)
Specific phobia	51.71 (0.28)	48.63 (0.53)	46.68 (0.55)	40.12 (0.79)
Generalized anxiety disorder	41.74 (0.99)	41.18 (1.08)	37.63 (1.08)	33.58 (0.99)

*Norm-based mental component score based on the SF12v2 disability scale, where lower scores indicate greater impairment.

Table 3

Linear regression analyses of disability by Personality Disorder Severity for each Axis I disorder

Disorder	Subthreshold PD		Simple PD			Complex PD			
	Beta (SE)	p[a]	Beta (SE)	p[a]	p[b]	Beta (SE)	p[a]	p[b]	p[c]
Alcohol dependence	−1.55 (0.85)	0.0728	−1.70 (0.77)	0.0311	0.8644	−5.94 (1.13)	0.0000	0.0011	0.0013
Drug dependence	−0.37 (4.15)	0.9299	0.93 (2.92)	0.7520	0.7371	0.72 (2.72)	0.7911	0.7652	0.9308
Nicotine dependence	−0.88 (0.51)	0.0863	−1.65 (0.48)	0.0009	0.1975	−5.35 (0.71)	0.0000	0.0000	0.0000
Major depressive disorder	−1.90 (0.78)	0.0175	−2.79 (0.75)	0.0004	0.3281	−6.44 (0.84)	0.0000	0.0000	0.0004
Dysthymia	−2.35 (1.54)	0.1319	−1.41 (1.64)	0.3938	0.6070	−6.88 (1.49)	0.0000	0.0178	0.0037
Bipolar 1 disorder	1.90 (1.46)	0.1954	−1.97 (1.41)	0.1678	0.0051	−5.05 (1.40)	0.0006	0.0000	0.0111
Bipolar 2 disorder	−3.53 (1.78)	0.0511	−4.99 (1.59)	0.0025	0.4039	−9.02 (1.66)	0.0000	0.0025	0.0113
Panic disorder									
With agoraphobia	−5.59 (2.57)	0.0330	−7.39 (2.33)	0.0023	0.4848	−11.49 (2.17)	0.0000	0.0128	0.0481
Without agoraphobia	−0.91 (1.34)	0.5021	−4.32 (1.43)	0.0037	0.0409	−5.61 (1.74)	0.0020	0.0113	0.5055
Social phobia	−1.61 (1.06)	0.1343	−2.84 (1.00)	0.0060	0.2034	−8.06 (1.21)	0.0000	0.0000	0.0000
Specific phobia	−1.64 (0.57)	0.0054	−2.94 (0.55)	0.0000	0.0808	−7.07 (0.81)	0.0000	0.0000	0.0000
Generalized anxiety disorder	−1.42 (1.38)	0.3079	−3.19 (1.39)	0.0254	0.2111	−7.34 (1.24)	0.0000	0.0000	0.0019

Note: Beta parameter indicates difference in score from referent group (no personality disorder) adjusted for sex, age, race-ethnicity, education, marital status, income, urbanicity, region and other comorbid substance use, mood and anxiety disorders..

[a]Significance of difference relative to No Personality Disorder group.

[b]Significance of difference relative to Subthreshold Personality Disorder group.

[c]Significance of difference relative to Complex Personality Disorder group.