The Fundamental Structure of Axis II Personality Disorders Assessed in the National Epidemiologic Survey on Alcohol and Related Conditions

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Objective: Little is known about the fundamental structure of core personality disorder psychopathology in the general population. The current study employed confirmatory factor analysis to evaluate competing models of patterns of personality disorder diagnoses in a nationally representative sample.

Method: DSM-IV and alternate models of the structure of personality disorder psychopathology were evaluated using data from the National Epidemiologic Survey on Alcohol and Related Conditions conducted between 2001 and 2002 (N = 43,093). Dimensional versus categorical representations of DSM-IV personality disorder structure were also tested. Face-to-face interviews were conducted in the United States. Participants were community-based respondents aged 18 years and older. Diagnoses and dimensional scores were made for antisocial, avoidant, dependent, histrionic, obsessive-compulsive, paranoid, and schizoid personality disorders.

Results: Multiple goodness-of-fit indicators provided support for a DSM-IV–based hierarchical model of personality disorders. In this model, the individual personality disorders were viewed as belonging to 1 of 3 latent factors or clusters (A, B, or C). In all of the models, the individual personality disorders were allowed to be an indicator for only a single latent cluster, and errors were not allowed to correlate with each other. In turn, these 3 clusters were viewed as comprising a single higher-order "Axis II personality disorder factor." The DSM-IV model was largely invariant across gender, Axis I comorbidity, and treatment-seeking status. A dimensionally based form of assessment of the DSM-IV personality disorders produced excellent goodness-of-fit indicators and produced low Akaike information criterion values (which are indicative of better-fitting models).

Conclusions: The results from this confirmatory factor analysis in a large, nationally representative mental health survey supported the DSM-IV hierarchical organization of Axis II personality disorders. This model was significantly superior to viable alternative models of Axis II personality psychopathology. There was also evidence to suggest this model could obtain even stronger support if a dimensionally based form of diagnostic assessment was adopted in place of the dichotomous form of assessment (presence/absence) of personality disorders currently in use in the DSM-IV.

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Recent advancements in statistical methodology, along with the availability of new large-scale epidemiologic surveys in public-use format, have led to increased understanding of the structure or organization of core psychopathology. A good example of this approach comes from a frequently cited study by Krueger[1] that employed confirmatory factor analysis using data from the National Comorbidity Survey[2] (N = 8098) to examine the structure of the 10 common Axis I psychiatric disorders assessed in that survey. The structural equation model that provided the best fit to the data was a 3-factor solution comprising an externalizing factor and a higher-order internalizing factor that was made up of 2 correlated lower-order factors (fear disorders and anxious/misery disorders).

To date, this type of approach has largely been restricted to Axis I disorders, and there has been only limited research of this nature applied to the basic organization of Axis II disorders. Instead, most of the available research has been restricted to selective treatment-seeking clinical samples,[3] college student samples,[4] small community samples,[5] or a mixture of the above samples.[6,7] This paucity of empirical research is especially important

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given the fact that diagnoses of personality disorders convey a great deal of clinically valuable information about an individual, and yet these disorders are difficult to assess compared with the Axis I clinical disorders.[8] In order to make a personality disorder diagnosis, clinicians are required to "assess the stability of personality traits over time and across different situations."[8(p686)] The DSM-IV further goes on to note that it is often necessary to conduct more than one diagnostic interview, to space these interviews over time, and to gather supplementary information from other informants. In fact, with the exception of antisocial personality disorder, there has been little research conducted on Axis II disorders in large nationally representative surveys. In this context, a major development in the epidemiologic study of Axis II personality disorders comes from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).[9]

The NESARC was the largest and one of the most comprehensive mental health surveys ever conducted and included more than 43,000 respondents. The survey utilized in-person interviews using highly trained interviewers and a detailed and reliable diagnostic instrument[10] to assess the prevalence and nature of many DSM-IV Axis I and II psychiatric disorders. In short, strong confidence can be placed on the assessment used in the NESARC because of the extensive interrater and test-retest reliability employed in its development and evaluation. Coupled with the very large sample size used in the NESARC, substantial confidence can be placed on the prevalence figures for the various personality disorders as reported by Grant et al.[9] Not surprisingly, the NESARC has produced a wealth of new knowledge on the prevalence and co-occurrence of substance abuse and other disorders, including personality disorders.[11–13] However, much of the valuable data collected in the NESARC survey has yet to be examined, particularly in relation to the structure of covariance among the personality disorders. A preliminary report[14] has suggested that there is a great deal of co-occurrence between the personality disorders both within and across clusters A, B, and C. We therefore sought to extend the innovative and important methodological approach pioneered by Krueger[1] with Axis I disorders in the National Comorbidity Survey[2] and apply it to the personality disorder diagnoses assessed in the NESARC.

Three models were tested in the current study. The first model was the DSM-IV hierarchical model for the Axis II personality disorders, which defines personality disorders as maladaptive, enduring sets of behaviors that are pervasive and inflexible. The disorders have an onset in adolescence or early adulthood, are stable over time, and lead to distress or impairment.[8]

In this hierarchical model, the individual personality disorders in Axis II load onto 3 latent factors corresponding to clusters A, B, and C. This clinical classification system dates back to the DSM-III,[15] although little rationale or description of these clusters has ever been provided. Cluster A is defined as "odd or eccentric disorders"[8(p685)] (paranoid and schizoid disorders were assessed in the NESARC). Cluster B disorders are characterized by "dramatic, emotional, and erratic behaviors"[8(p685)] (antisocial and histrionic personality disorders are in this cluster and were assessed in the NESARC). Cluster C is composed of "anxious and fearful personality disorders"[8(p686)] (avoidant, dependent, and obsessive-compulsive personality disorders were assessed in the NESARC). Finally, in this hierarchical model, these 3 clusters are in turn seen as loading onto a single higher-order Axis II personality disorder factor. The second model was an independent cluster model, in which the multiple individual diagnoses load onto their respective clusters, but the clusters in turn are not viewed as being correlated. This second model is different from the first in that it does not view the 3 clusters as correlated and loading onto a single Axis II personality disorder factor as described in the DSM-IV. The third model tested was for that of a single underlying factor of personality psychopathology.

The rationale for the second model of uncorrelated independent Axis II clusters comes from the observation in the DSM-IV-TR[8] that the Axis II personality disorders are qualitatively distinct and are characterized by very different behavioral and psychological traits. There is great range or variance in the makeup of the individual diagnoses, ranging from overly dramatic behaviors (e.g., histrionic personality disorder), reluctance to confide in others (e.g., avoidant personality disorders), and shared traits of suspiciousness, interpersonal aloofness, and paranoid ideation (e.g., schizotypal personality disorder).[8]

The rationale for the third model is based on the fact that all of the personality disorders are classified on a single axis. Available evidence using confirmatory factor analysis based on a community sample found evidence that some personality disorders loaded onto a single underlying factor (while at the same time, some support was also obtained for the "Big 5" model of personality).[16] Further suggestive evidence for this alternate model comes from preliminary analysis of the NESARC data in which personality disorders were found to co-occur not only within clusters but also across clusters.[14]

A long-standing controversy in the field of personality disorders concerns the potential benefit of dimensional representation of personality disorders in contrast to recent DSM categorical approaches to assessment of personality disorders. The current DSM-IV-TR represents the categorical perspective but does recognize that an alternative dimensional perspective also exists, noting that the dimensional perspective is an area under active investigation.[8]

Strong evidence for a dimensional representation of personality disorders was obtained in an exploratory factor analysis of personality disorder traits in samples of 656 personality-disordered patients, 939 general population subjects, and 686 twin pairs.[17] Widiger and colleagues[18] have stressed that setting a future research agenda would be the most effective way in leading the field toward a dimensional classification of personality disorders. A previous factor analysis of DSM-IV personality disorders in 431 consecutively admitted psychiatric patients[19] concluded that the DSM-IV should include a dimensional model in the diagnostic assessment of personality disorders.

The current study therefore had 2 primary objectives. First, we sought to evaluate a DSM-IV–based hierarchical model of personality disorder structure and 2 alternative models using confirmatory factor analysis in the NESARC. The second objective was to evaluate both dimensional and categorical models of representation of DSM-IV personality disorders using the same dataset. In the past, the NESARC has been used successfully to test categorical versus dimensional models of externalizing disorders[20] and seems well suited to this purpose with respect to personality disorders.

The 3 specific objectives were as follows: (1) to determine if the DSM-IV hierarchical model of personality disorder categories provides a better fit to the data than does a single-factor model or a 3-factor uncorrelated model, (2) to determine if the DSM-IV categorical factor structure is invariant across several subsamples (i.e., men and women, those with a past-year Axis I diagnosis, and those currently seeking treatment for an Axis I diagnosis), and (3) to determine if a DSM-IV dimensional model of personality disorders would provide a particularly strong fit to the data.

METHOD

Sample

The NESARC was conducted by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) between the years 2001 and 2002.[11] It was a nationally representative face-to-face survey of 43,093 civilian, noninstitutionalized respondents residing in the United States, aged 18 years and older. The housing unit sampling frame was derived from the U.S. Census Bureau Census 2000 Supplementary Survey, and the group quarters sampling frame was derived from the 2000 Decennial Census.[21] The survey response rate was 81%.

Diagnostic Assessment

Interviews were conducted in person using laptop computer–assisted software that included built-in skip, logic, and consistency checks. On average, the interviewers had 5 years experience working on census and other health-related national surveys. Regional supervisors recontacted a random subsample of 10% of all respondents for quality control purposes. In these quality control interviews, a series of questions were reasked to verify that respondents had received the entire interview and that the questionnaire had been administered properly. There was no case in which it was determined that the interview had been conducted in any manner that was inconsistent with the interviewer's extensive training.

Diagnostic assessments of personality disorders were made using the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version[10] (AUDADIS-IV). Respondents were asked a series of DSM-IV personality disorder symptom questions about how they felt or acted most of the time throughout their lives regardless of the situation or whom they were with. They were reminded on 20 occasions throughout the personality disorder section not to include times when they were depressed, manic, anxious, drinking heavily, using medicines or drugs, or experiencing withdrawal symptoms or times when they were physically ill.

To receive a DSM-IV diagnosis, respondents had to endorse the requisite number of DSM-IV symptoms for the particular personality disorder, and at least 1 positive symptom item must have caused social or occupational dysfunction. The following symptom items were used to assess each personality disorder: avoidant (N = 7), dependent (N = 8), obsessive-compulsive (N = 10), paranoid (N = 9), schizoid (N = 10), histrionic (N = 11), and antisocial (N = 33). These symptom items closely correspond to the DSM-IV criteria for each of the personality disorders. Some personality disorders (i.e., borderline, schizotypal, and narcissistic) were not assessed in the survey due to the large number of items needed to operationalize the disorders relative to the other disorders.[10]

A subsample of 2657 respondents were contacted for a reinterview study, which served as an additional check on survey data quality and test-retest reliability.[9] There were between 82 and 114 interviewers who administered the test interview and between 14 and 36 interviewers who administered the retest interview within each study site. These retests were randomized among the interviewers, and retest intervals varied between 3 and 20 weeks (mean of 10.2 weeks). In the current study, dimensional scores for each of the Axis II personality disorders were created as a sum of the symptom items contained in the NESARC survey. In some instances, multiple symptom items were used to operationalize the complex diagnostic criteria of the Axis II personality disorders, and in these cases, each symptom item was treated as an individual symptom. For all of the Axis II dimensional scores, those items that assessed lifetime symptoms were used. The test-retest reliability of the diagnosis of personality disorders using the AUDADIS-IV has been assessed[10] and has shown fair to good[22] reliability with κ values ranging

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from 0.40 for histrionic personality disorder to 0.67 for antisocial personality disorder (median $\kappa = 0.53$). Intraclass correlation coefficients for personality symptom scales in this study ranged from 0.50 for histrionic personality disorder to 0.79 for antisocial personality disorder. In short, strong confidence can be placed on the assessment used in the NESARC because of the extensive interrater and test-retest reliability employed in its development and evaluation, and this was one of the reasons why it was published in such a highly regarded clinical journal. In a related vein, the large nationally representative sample and the extensive development and evaluation of the AUDADIS-IV might explain some occasional discrepant findings on the prevalence of various personality disorders reported by Grant et al.[9] and that from previous studies.

Statistical Analysis

For all models evaluated in the current study, weighted correlation matrices were generated and used as input for the structural models. For the categorical diagnosis data, the PRELIS program[23] was used to generate a weighted polychoric matrix that served as the input for the structural models. For the dimensional variables, a weighted Pearson correlation matrix was generated in SPSS (SPSS Inc., Chicago, Ill.) and served as input for the structural models. The EQS 6.1 program[24] was used to analyze all of the structural models because it is able to perform structural equation analyses with categorical data.

Three models of personality disorders assessed in the NESARC were evaluated. The first model was based on the DSM-IV.[25] This model represents a hierarchical structure of personality disorders. The individual personality disorders are viewed as belonging to 3 separate higher-order factors or clusters (A, B, or C). These 3 clusters or factors are in turn believed to load onto a single underlying latent factor that represents Axis II psychopathology. In the NESARC, the 3 latent clusters comprised the following DSM-IV Axis II personality disorders: paranoid and schizoid as indicators for cluster A, antisocial and histrionic as indicators for cluster B, and avoidant, dependent, and obsessive-compulsive as indicators for cluster C.

The second model tested treated the 3 Axis II clusters as separate and uncorrelated factors, and there was no higher-order factor specified. The third model tested was an alternative single-factor model, in which all of the Axis II disorders were treated as indicators of a single latent factor of personality disorder. This single-factor model was based on the same logic as the Krueger[1] confirmatory factor analysis of Axis I disorders in the National Comorbidity Survey. The rationale is that overall severity of maladjustment recorded on the separate axes may represent a single unitary dimension of personality psychopathology.

In all of the models, the personality disorders were allowed to be an indicator for only a single latent cluster, and errors were not allowed to correlate with each other. A maximum likelihood estimation procedure was used to obtain parameter estimates and fit indices.

Because of the large size of the NESARC sample, the χ^2 value would be significant even for trivial differences between the sample and population covariance matrices[26,27] and therefore was not used to compare the 3 models. Instead, fit indices not susceptible to this sample size problem were chosen. The following indices were employed to evaluate the adequacy of model fit: the goodness-of-fit index[28] (GFI), the comparative fit index[29] (CFI), the standardized root mean square residual[26] (RMR), and the Akaike information criterion[26] (AIC). Each of these indices is commonly used to assess model fit in confirmatory factor analysis models. Each index also provides a complementary perspective on the fit of a confirmatory factor model. The GFI is an index of the proportion of variance accounted for by a model, and larger values of the GFI are indicative of better-fitting models. The CFI assesses fit relative to a baseline model of independence. Larger values of the CFI are associated with better-fitting models. The standardized RMR indexes how far off the model-estimated correlations are from sample-derived correlations (on average) and should be small for well-fitting models. The following frequently used cutoffs were used to evaluate the adequacy of the fit of the models to the actual data: GFI score > .90, CFI score > .90, and standardized RMR score ≤ .05.[26,29–31]

However, the χ^2 statistic was used to compare the relative strength of the models through the use of the χ^2 difference test.[26] In models with identical degrees of freedom, AIC values were used for this purpose.

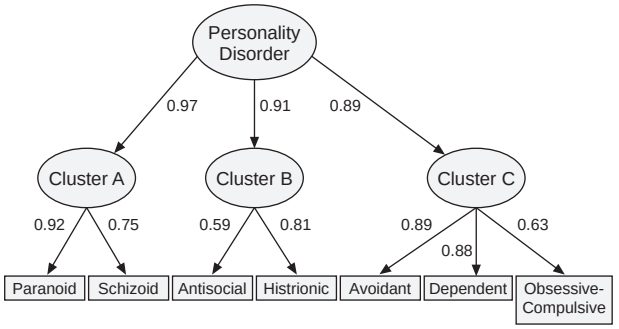
To assess the stability of the best-fitting model, several subsamples were selected to determine factor structure invariance. These included gender (male = 43%, female = 57%), any past-year Axis I disorder (no = 76.9%, yes = 23.1%), and treatment seeking for any past-year Axis I disorder (no = 71.9%, yes = 17.8%). The Axis I disorders considered were alcohol dependence, drug dependence, dysthymia, mania, major depression, panic, social phobia, specific phobia, generalized anxiety disorder, and gambling.

RESULTS

DSM-IV Hierarchical Model

The standardized parameter estimates and fit indices for the DSM-IV hierarchical model using the total NESARC sample are presented in Figure 1. This model showed adequate fit on 2 of the fit indices (GFI = 0.90, CFI = 0.90), was very close to the criteria for adequate fit on the third fit index (standardized RMR = 0.06), and had an AIC value of 17911.56.

Figure 1. Confirmatory Factor Analysis of a DSM-IV Hierarchical Categorical Model of the Axis II Personality Disorders in the NESARC (N = 43,093) Using Maximum Likelihood Estimation[a,b]



[a]Fit indices: χ^2 = 17933.56, df = 11; comparison-of-fit index = 0.90; goodness-of-fit index = 0.90; standardized root mean square residual = 0.06; and Akaike information criterion = 17911.56.
[b]All standardized path estimates are significant at the $p < .01$ level.
Abbreviation: NESARC = National Epidemiologic Survey on Alcohol and Related Conditions.

Alternative Models

The second model tested was a 3-factor model, with separate and uncorrelated Axis II clusters. This model did not show adequate fit on any of the fit indices (GFI = 0.68, CFI = 0.54, standardized RMR = 0.41). A comparison of this model with the DSM-IV model showed that the DSM-IV model demonstrated significantly improved model fit to the data (χ^2 difference = 66145.06, df = 3, $p < .01$).

The single-factor model did not show adequate fit on 2 of the fit indices (GFI = 0.88, CFI = 0.87) but did show adequate fit on the remaining fit index (standardized RMR = 0.05). A comparison of this single-factor model with the DSM-IV model showed that the DSM-IV model demonstrated significantly improved model fit to the data (χ^2 difference = 6172.80, df = 3, $p < .01$).

To summarize, the DSM-IV hierarchical model consistently showed the best overall fit to the NESARC data, with higher GFI and CFI values and lower χ^2 values than the 1-factor and 3-factor uncorrelated models. Standardized RMR values were consistently lowest for the 1-factor model but were very similar to the standardized RMR values obtained for the DSM-IV model. The 3-factor uncorrelated model showed the worst fit of all 3 hypothesized models.

DSM-IV Hierarchical Model: Invariance Across Gender, Past-Year Axis I Comorbidity, and Treatment-Seeking Status

To test the invariance of the model structure across gender, a subsample analysis tested the models separately for men and women. The DSM-IV hierarchical model for both men and women demonstrated fair to good fit to the data on all of the fit indices. For women, these were GFI = 0.91, CFI = 0.91, and standardized RMR = 0.05, and for men these were GFI = 0.88, CFI = 0.88, and standardized RMR = 0.07.

A second subsample analysis using the DSM-IV hierarchical model was between those participants with a past-year diagnosis of an Axis I disorder and those without a past-year Axis I diagnosis. The DSM-IV model for both those with a past-year Axis I diagnosis and those without a past-year Axis I diagnosis showed good fit on only one of the fit indices. Fit indices for the sample without a past-year Axis I diagnosis were GFI = 0.87, CFI = 0.83, and standardized RMR = 0.08 and for the sample with a past-year Axis I diagnosis were GFI = 0.90, CFI = 0.87, and standardized RMR = 0.07.

Similar to the approach in Krueger's[1] analysis of Axis I disorders, a final subsample analysis was performed for those NESARC respondents who had or had not sought treatment for a past-year Axis I disorder. For those individuals who sought treatment, the DSM-IV hierarchical model demonstrated good fit on the 3 fit indices (GFI = 0.91, CFI = 0.90, and standardized RMR = 0.07). The model for those individuals who had not sought treatment for a past-year Axis I disorder also showed good fit on all of the fit indices (GFI = 0.91, CFI = 0.88, and standardized RMR = 0.06).

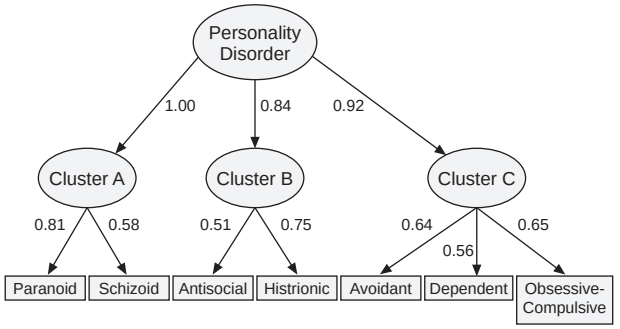
Dimensional DSM-IV Hierarchical Model

The DSM-IV hierarchical model was also assessed using the dimensional symptom scales of the Axis II personality disorders. For the total sample, this model showed very strong fit on all of the fit indices (GFI = 0.96, CFI = 0.93, standardized RMR = 0.05) and had a low AIC value of 4826.19 (low AIC values are indicative of better-fitting models). The standardized parameter estimates and fit indices for the dimensional DSM-IV hierarchical model using the total NESARC sample are presented in Figure 2.

DISCUSSION

This article examined the factor structure of 7 Axis II personality disorders in the NESARC. This study used confirmatory factor analysis in the largest mental health survey ever conducted and the first epidemiologic survey ever to assess personality disorders. A DSM-IV hierarchical model was supported in which individual personality disorders loaded onto correlated but separable clusters (A, B, and C). These clusters were in turn seen to load onto a single Axis II personality disorder factor. This hierarchical model was significantly superior to both a 3-factor uncorrelated model and a 1-factor model and was invariant across several subsamples (gender, Axis I comorbidity, and treatment seeking). A dimensional representation of DSM-IV Axis II disorders was also supported.

Figure 2. Confirmatory Factor Analysis of a DSM-IV Hierarchical Dimensional Model of the Axis II Personality Disorders in the NESARC (N = 43,093) Using Maximum Likelihood Estimation[a,b]



[a]Fit indices: χ^2 = 4848.19, df = 11; comparison-of-fit index = 0.93; goodness-of-fit index = 0.96; standardized root mean square residual = 0.05; and Akaike information criterion = 4826.19.
[b]All standardized path estimates are significant at the $p < .01$ level.
Abbreviation: NESARC = National Epidemiologic Survey on Alcohol and Related Conditions.

It is quite remarkable that the descriptively based and clinically derived organization of personality disorders in the DSM-III and its successors showed a strong and consistent fit to the data in this nationally representative sample and several of its subsamples. The DSM-IV hierarchical model in which each disorder loaded onto its respective cluster was significantly superior to the 1-factor and 3-factor uncorrelated models. This is despite the fact that a previous initial study found that the personality disorders frequently co-occurred across clusters in the NESARC.[14] Further, the DSM-IV hierarchical model was largely invariant across gender, individuals with a past-year diagnosis of an Axis I disorder, and those seeking treatment for a past-year Axis I disorder. The finding that the DSM-IV personality disorders model had good fit in the noncomorbid and non–treatment-seeking subsamples suggests that the model is invariant across a continuum ranging from individuals with no Axis I clinical psychopathology to those seeking treatment for mental health problems to the most seriously mentally ill individuals in the general population. This invariance is a major clinical implication of the current findings. A second major clinical implication in the context of evidence-based clinical practice is that it is essential to demonstrate strong empirical support for the diagnostic organization and structure of personality disorders in the general population. Finally, the results from our study underscore the importance of assessing each personality disorder individually. It is not informative to simply remark that features of personality dysfunction or characterological disturbance were present. Each personality disorder should be carefully assessed using a structured diagnostic interview such as the one employed in the NESARC.

The hierarchical model supported in the current study demonstrated that the 3 clusters load onto a single higher-order "Axis II" factor. This type of model invariance is similar to the findings Krueger obtained with the 3-factor hierarchical model of Axis I disorders identified in his study[1] using data from the National Comorbidity Survey.

The DSM-IV model of Axis II personality disorders in its current form was clearly supported unlike the Krueger[1] and Cox et al.[32] studies of DSM-III-R Axis I clinical disorders in which the anxiety disorder and mood disorder classifications or clusters were not clearly supported by the National Comorbidity Survey data. Specifically, Kreuger specified a model, based on patterns of correlations, in which generalized anxiety disorder loaded onto a mood disorders factor comprised of major depression and dysthymia, instead of onto a factor defined by other anxiety disorders such as panic disorder and the phobic disorders. Krueger specified, using confirmatory factor analysis, a single internalizing Axis I psychopathology disorders factor with 2 highly correlated anxious-misery and fear factors at a lower-order level. Similarly, Cox and colleagues extended this work by showing that posttraumatic stress disorder, which is officially classified as an anxiety disorder, in fact loaded onto the factor defined primarily by mood disorders rather than the panic and phobic disorders factor. The fact that we did not need to make any of these types of modifications in the current study may be a reflection of the chronic and persistent nature of Axis II personality disorders.

Despite the strong support for the organizational structure of the DSM-IV personality disorders category, the DSM-IV hierarchical dimensional model showed a particularly strong fit to the data and had a lower AIC value compared with the DSM-IV hierarchical categorical model. It may be tempting to conclude that dimensional assessment of personality disorders is significantly superior to categorical assessment. Widiger and Samuel[33] have noted that diagnostic categories can be inaccurate and that the adoption of a dimensional model could be more valid and internally consistent with respect to classification of psychopathology. However, dimensional assessment of personality disorders is a complicated effort.[34] Further, one must also bear in mind that a direct comparison of the latent structure would ideally involve using the same estimator fit to the same data.[20] The design of the current study required us to employ Pearson correlation coefficients for the dimensional assessment of personality disorders and polychoric correlation coefficients for the categorical assessment in the evaluation of our models. If there is clear room for improvement in future DSMs, it is based on the fact that the dimensional assessment model appears to offer a very strong fit to the data. This is in fact consistent with clinical practice and even in the DSM-IV to some degree, whereby clinicians

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often refer to personality disorder traits rather than full-blown personality disorder diagnoses, implying a continuum of severity.

Strengths of the current study include the use of a very large epidemiologic sample, reliable diagnostic interview, and rigid statistical methodology. However, there were also a number of limitations that must be borne in mind. Specifically, because of space limitations and danger of respondent fatigue due to the large number of items required for a diagnosis of borderline personality and narcissistic personality disorder, these diagnoses were not assessed in the NESARC. This major limitation has been noted in previous personality disorder studies using the NESARC survey.[9,14,35] We do not know whether borderline personality disorder or narcissistic or schizotypal personality disorder would have loaded onto their respective or completely different factors or clusters. Finally, we acknowledge that the dimensional model might not have fit the data so nicely if these disorders had been assessed.

Further, as noted elsewhere,[1] the NESARC and many other large-scale epidemiologic mental health surveys[1,2] relied on the use of lay interviewers. There is evidence from a previous factor analytic study[36] using a small sample of Chinese psychiatric patients that stronger empirical support was obtained for a DSM-IV–based model of personality disorders in interviewer-based assessment compared with self-report questionnaire. Finally, the cross-sectional design of the NESARC cannot inform us about stability over time in the personality disorders.

Future Directions

An important direction for future research is to compare the DSM-IV hierarchical model of personality disorders with alternative models of personality such as the Big 5.[37] Available evidence based largely on twin studies[17] suggests that higher-order traits of personality disorder strongly resemble dimensions of normal personality, and this topic warrants further investigation in large-scale epidemiologic investigations in representative general population samples.

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