Published in final edited form as:

Personal Disord. 2013 January ; 4(1): 43–54. doi:10.1037/a0027416.

An Item Response Theory Analysis of *DSM–IV* Diagnostic Criteria for Personality Disorders: Findings From the National Epidemiologic Survey on Alcohol and Related Conditions

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Abstract

The purpose of this study was to evaluate the psychometric properties of *DSM–IV* symptom criteria for assessing personality disorders (PDs) in a national population and to compare variations in proposed symptom coding for social and/or occupational dysfunction. Data were obtained from a total sample of 34,653 respondents from Waves 1 and 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). For each personality disorder, confirmatory factor analysis (CFA) established a 1-factor latent factor structure for the respective symptom criteria. A 2-parameter item response theory (IRT) model was applied to the symptom criteria for each PD to assess the probabilities of symptom item endorsements across different values of the underlying trait (latent factor). Findings were compared with a separate IRT model using an alternative coding of symptom criteria that requires distress/impairment to be related to each criterion. The CFAs yielded a good fit for a single underlying latent dimension for each PD. Findings from the IRT indicated that *DSM–IV* PD symptom criteria are clustered in the moderate to severe range of the underlying latent dimension for each PD and are peaked, indicating high measurement precision only within a narrow range of the underlying trait and lower measurement precision at lower and higher levels of severity. Compared with the NESARC symptom coding, the IRT results for the alternative symptom coding are shifted toward the more severe range of the latent trait but generally have lower measurement precision for each PD. The

IRT findings provide support for a reliable assessment of each PD for both NESARC and alternative coding for distress/impairment. The use of symptom dysfunction for each criterion, however, raises a number of issues and implications for the *DSM-5* revision currently proposed for Axis II disorders (American Psychiatric Association, 2010).

Keywords

personality disorders; *DSM-IV* PD symptom criteria; *DSM-IV* distress/impairment requirement; epidemiology; item response theory

While earlier national psychiatric epidemiologic surveys provided extensive information on Axis I disorders, their coverage of personality disorders (PDs) was limited generally to antisocial personality disorder (ASPD). More recently, the National Comorbidity Survey Replication (NCS-R) (Lenzenweger, Lane, Loranger, & Kessler, 2007) included information for the three *Diagnostic and Statistical Manual of Mental Disorders*, 4th Edition (*DSM-IV*) PD Classes A, B, and C, in addition to specific antisocial and borderline PDs. In contrast, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) has provided extensive information for all 10 *DSM-IV* PDs in the general population, including their prevalence, correlates, and comorbidity (Eaton, Krueger, Keyes, et al., 2011; Grant, Hasin, Stinson, et al., 2004; Grant, Hasin, Stinson, et al., 2005; Grant, Stinson, Dawson, et al., 2004b; Grant, Stinson, Dawson, et al., 2005; Pulay, Stinson, Dawson, et al., 2009), and the important role that PDs play in the incidence and persistence of other disorders (Hasin, Fenton, Skodol, et al., 2011; Skodol, Grilo, Keyes, et al., 2011). The relationships shown in this burgeoning literature could not have emerged if the PD measures had poor psychometric properties. While NESARC studies have demonstrated fair to good reliability for *DSM-IV* PDs in the general population (Grant, Dawson, Stinson, et al., 2003; Ruan, Goldstein, Chou, et al., 2008), there has been limited research on the psychometric properties of the *DSM-IV* symptom criteria operationalized in the NESARC. Item Response Theory (IRT) analysis is one commonly used approach to provide information on the severity of and discrimination for each criterion of common psychiatric disorders. However, this information is lacking on the criteria of the *DSM-IV* PDs in the general population.

Recently, Trull, Jahng, Tomko et al. (2010) noted that PD-specific prevalence in the NESARC was considerably higher than in other recent surveys (Coid, Yang, Tirer, et al., 2006; Lenzenweger et al., 2007) and suggested that the differences stemmed from overly inclusive NESARC PD diagnostic procedures regarding distress and/or impairment. In *DSM-IV*, Criterion C for PDs states that clinically significant distress or impairment in function is required to make a PD diagnosis, similar to the analogous criterion for other *DSM-IV* disorders. In the NESARC, PD diagnoses are made when at least one of the symptom criteria endorsed by a respondent is associated with social and/or occupational dysfunction in the respondent. Trull et al. (2010) have suggested an alternative approach requiring each criterion to be specifically associated with dysfunction/distress to be counted as positive toward a PD diagnosis. As expected, this more stringent procedure, not specifically required by *DSM-IV*, yields prevalence estimates lower than standard NESARC estimates and more in line with those reported for clinical samples. Little psychometric information is available on this more stringent approach. It might be noted that concerns with high rates of mental disorders in general population surveys is not specific to PD. When broadly defined assessments of clinical impairment are linked to *DSM-IV* symptom criteria, prevalence rates are reduced. Narrow, Rae, Robins, and Regier (2002) applied measures of disability and treatment utilization to national estimates for *DSM-IV* disorders and reported lower prevalences for a wide range of mental disorders. Wakefield and Spitzer

(2002) have argued that this approach ignores the underlying complexity of associations between symptoms, disability, distress, and treatment utilization.

Given the growing recognition of the importance of PDs and the gaps in knowledge regarding the structure and characteristics of their criteria, the present study had three main aims: (1) To evaluate the performance of the *DSM-IV* symptom criteria for each PD using IRT analyses. (2) To extend the IRT analyses to the more restrictive set of symptom criteria proposed by Trull and colleagues (2010) and to compare the information from the two models. (3) To examine variations in reported social and/or occupational dysfunction by type of PD. Because the NESARC requires one or more PD symptom criteria accompanied by dysfunction, it is important to examine the actual distributions according to how many such criteria occurred and whether they vary by type of personality pathology.

Method

Study Design

Data came from the NESARC, a national survey designed by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The NESARC Wave 1 used a sample of 43,093 respondents representing the civilian, noninstitutionalized population, 18 years of age and older, in the United States, including all 50 States and the District of Columbia. Military personnel living off base and residents in noninstitutionalized group housing, such as boarding houses, shelters, and dormitories, were also included in the sampling frame. Blacks, Hispanics, and young adults ages 18 to 24 were oversampled. The overall response rate was 81%. Data collection was conducted through face-to-face interviews by highly trained interviewers in 2001–2002. The data were weighted to account for oversampling, nonresponses, and the selection of one person per household. The weighted data were further adjusted to match the civilian, noninstitutional population on socioeconomic variables based on the U.S. 2000 Census.

All respondents from Wave 1—except those who died, were institutionalized, left the country, or entered the military—were eligible for reinterview approximately 3 years later (2004–2005) in Wave 2 ($n = 39,959$). The reinterview rate was 86.7%, yielding a total of 34,653 respondents for Wave 2. The analysis presented here drew upon the total Wave 2 sample of 34,653 respondents and applied the sampling weights as for Wave 1 to ensure that the weighted Wave 2 sample represented the original population of 2001–2002. Details about the NESARC sampling design and methodology are described elsewhere (Grant, Stinson, Dawson, et al., 2004a; Grant, Goldstein, Chou, et al., 2009).

Measures for PDs

Seven PDs were assessed in the Wave 1 NESARC (paranoid, schizoid, histrionic, antisocial, avoidant, dependent, and obsessive–compulsive PDs). Borderline, schizotypal, and narcissistic PDs were assessed in the Wave 2 NESARC (Grant, Chou, Goldstein, et al., 2008; Pulay et al., 2009; Stinson, Dawson, Goldstein, et al., 2008). The data on PDs were collected using the Alcohol Use Disorder and Associated Disabilities Interview Schedule—*DSM-IV* (AUDADIS-IV) (Grant, Dawson, & Hasin, 2001; Ruan et al., 2008).

Using the AUDADIS, the diagnosis of each PD, except antisocial PD, required an evaluation of each individual's long-term pattern of functioning (American Psychiatric Association, 1994). Accordingly, respondents were asked a series of PD 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 instructed not to include symptoms limited to times when they were depressed, manic, drinking heavily, using medicines or drugs, or experiencing withdrawal symptoms, or during times when they were otherwise physically

ill. The minimum number of required symptom criteria endorsements is as follows: paranoid (four of seven); schizoid (four of seven); schizotypal (five of nine); histrionic (five of eight); antisocial (three of seven); borderline (five of nine); narcissistic (five of nine); avoidant (four of seven); dependent (five of eight); obsessive–compulsive (four of eight). Multiple symptom questions were used to operationalize the more complex criteria associated with certain PDs. For Wave 1 PDs the number of symptom items was similar to the number of criteria, with the exception of antisocial PD, which includes large numbers of items for social-norm violations. Wave 2 PDs required a larger number of items to operationalize criteria (average two to three items for each criterion). Consistent with *DSM-IV*, diagnoses of antisocial PD required the requisite number of criteria for antisocial PD, in addition to the specified number of criteria for conduct disorder before the age of 15, to merit a diagnosis. Reliability for the NESARC PDs ranges from fair (histrionic $\kappa = .40$) to good (borderline $\kappa = .67$) (Grant, Dawson, Stinson, et al., 2003; Ruan et al., 2008). To receive a *DSM-IV* PD diagnosis in the present study, respondents needed to endorse the requisite number of *DSM-IV* symptom items for the particular PD. Additionally, at least one positive symptom criterion must have caused social and/or occupational dysfunction. The *DSM-IV* distress/impairment criterion does not apply to antisocial personality disorder.

For each endorsed symptom criterion the following question was used to measure symptom dysfunction: “Did this [symptom] ever trouble you or cause problems at work or school, or with your family or other people?” Because IRT analysis in this study was based on symptom criteria and not *DSM-IV* diagnosis, this qualification was applied to the measurement of each criterion. For each PD set of symptom criteria, at least any one positive symptom criterion had to have caused social and/or occupational dysfunction. For the separate analysis of the alternative coding of symptom criteria proposed by Trull et al. (2010), each symptom criterion had to have been associated with social and/or occupational dysfunction.

Analytic Plan

As a preliminary step to the IRT analysis, exploratory factor analysis (EFA) was conducted in both one-factor and two-factor solutions to examine the unidimensionality of each set of PD criteria. Once the unidimensionality was established by the goodness-of-fit statistics for one-factor confirmatory factor analysis (CFA), a two-parameter logistic IRT model was applied to the symptom criteria (i.e., items in IRT terminology) for each PD to assess the probabilities of symptom criterion endorsements across different values of the underlying trait (latent factor). Similar analyses were conducted for the alternative coding of symptom criteria proposed by Trull et al. (2010), in which each symptom criterion was associated with social and/or occupational dysfunction.

Briefly, a two-parameter logistic IRT model includes two key parameters, item threshold (difficulty/severity) and item discrimination for each item; the probability can be represented by $P(\theta) \equiv 1/(1 + \exp(-1.7 * \text{DISCRIMINATION} * (\theta - \text{DIFFICULTY})))$, where θ is the underlying trait. Item threshold is the level at which the underlying trait corresponds to a 50-percent chance of endorsing the item. Higher item thresholds indicate greater severity. Item discrimination (proportional to the slope of the logistic function at the inflection point) indicates the accuracy of an item in distinguishing individuals with different levels of severity along the underlying trait continuum. These parameters are presented graphically in an item response curve (IRC) for each of the PD symptom criteria. In addition, item information curves that correspond to these IRCs were summed to produce test information curves (TIC), which are also presented graphically in this study. TICs embody the overall precision of these criteria in assessing a given level of the PD severity (latent trait). If a test is informative, the associated latent trait estimate is less variable and has smaller standard error. The TICs can be used to compare two tests of the same trait to determine how

effectively they measure the trait at certain levels. For the purpose of the present study, the TICs were used to compare information from two different diagnostic models, that of NESARC and that of Trull et al. (2010). The more informative test is the one that is relatively efficient and does not require as many items as does the less informative test.

Based on the distributions of the factor scores produced by the IRT models we estimated the percentages of the U.S. population having “severe” PD traits. PD traits were scaled as z-scores (−3 to +3), and “severity” was defined as individuals having scores greater than 2 standard deviations above 0. Frequency distributions of symptoms for social and/or occupational dysfunction were used to examine variations by type of *DSM-IV* PD diagnosis.

The IRT analyses were conducted using the statistical modeling program Mplus (Muthén and Muthén, 1998–2010). The two-parameter logistic models were estimated by the use of maximum likelihood estimation with robust standard errors. Sampling weights and design effects of the NESARC were taken into account for parameter estimation as well as standard error and model fit calculations.

Results

Results from the EFA for each PD showed that the eigenvalues for the second factor were all below 1, with very high ratios of first to second eigenvalues ranging from 6 for antisocial PD to 20 for narcissistic PD. The CFAs yielded a good fit for a single underlying latent dimension for each PD and ranged from antisocial PD (CFI/TLI = 0.99; RMSEA = 0.02) to schizoid PD (CFI/TLI = 0.99; RMSEA = 0.01). These findings provided strong justification for the IRT analyses.

Item prevalence, discrimination, and difficulty for each of the PD criteria are shown in Table 1. The IRCs and TICs are shown in Figures 1 and 2, respectively.

Paranoid PD—Symptom criteria #6 (unrealistic perceptions of attacks on character) and #7 (unrealistic suspiciousness of spouse/sexual partner) have relatively high thresholds (item difficulty) but low discrimination. As shown in the IRC, these symptom criteria lie well to the right, in the more severe range of the PD severity continuum. Symptom criteria #1 (suspiciousness of others), #2 (preoccupied with unjustified doubts), #3 (reluctant to confide in others), #4 (reads threatening meanings into benign remarks), and #5 (bears grudges) have relatively good discrimination and moderately high thresholds. In the IRC, they are grouped in the moderate range of PD severity. The TIC indicates measurement precision at moderate to high severity.

Schizoid PD—All of the criteria have good item discrimination and difficulty, though relative to the other criteria, symptom criteria #3 (little interest in sexual activity) and #4 (takes pleasure in few activities) have lower discrimination. Criteria #5 (lacks close friends) and #6 (indifferent to praise/criticism) have relatively low item difficulty. As shown in the IRCs, all of the symptom criteria lie well to the right in the moderate to severe range of the PD severity continuum. The TIC indicates measurement precision at moderate to high severity.

Schizotypal PD—Symptom criteria #6 (constricted affect) and #9 (excessive social anxiety) have lower discrimination relative to the other criteria. Symptom criteria #1 (ideas of reference) and #9 (excessive social anxiety) have the highest thresholds, whereas #6 and #8 (lack of close friends) have the lowest thresholds. In the IRCs, all of the criteria lie well to

the right in the moderate to severe range of the PD severity continuum. The TIC indicates measurement precision at moderate to high severity.

Histrionic PD—The symptom criterion #8 (intimate relationships) has the highest discrimination and lowest threshold. Symptom criterion #4 (physical appearance) has the highest threshold and the second highest discrimination. As shown in the IRCs, the remaining criteria are grouped in the moderate to severe range of the PD severity continuum. The TIC indicates measurement precision at moderate to high severity.

Antisocial PD—All of the symptom criteria have good item discrimination and difficulty, though relative to the other criteria, criteria #1 (failure to conform to social norms) and #6 (irresponsibility) have the highest discrimination and lowest thresholds. Criteria #2 (deceitfulness), #3 (impulsivity), and #7 (lack of remorse) have relatively high thresholds and moderate discrimination. As shown in the IRCs, all of the criteria lie well to the right on the more moderate range of the PD severity continuum. The TIC indicates high measurement precision at moderate severity.

Borderline PD—Symptom criteria #6 (affective instability) and #7 (feelings of emptiness) have the highest discrimination and relatively high thresholds. Symptom criterion #4 (impulsivity) has the lowest threshold. Criterion #5 (suicidal/self-mutilation) has the highest threshold. In the IRCs, the criteria are loosely grouped in the moderate range of severity. The TIC indicates measurement precision at moderate severity.

Narcissistic PD—All of the symptom criteria have high discrimination except for criterion #9 (arrogant/haughty), which has the lowest discrimination and highest threshold. Symptom criterion #3 (believes self to be special/unique) has the lowest threshold. Criteria #2 (preoccupied with fantasies), #4 (excessive admiration), and #6 (exploitative) have both relatively high discrimination and thresholds. As shown in the IRCs, the criteria are loosely grouped in the moderate range of severity. The TIC indicates measurement precision at moderate severity.

Avoidant PD—Criterion #1 (avoids interpersonal contacts) has the highest threshold and lowest discrimination. Criterion #4 (preoccupied with being criticized) has the highest discrimination and lowest threshold. The remaining criteria have generally good discrimination and thresholds. As shown in the IRCs, the criteria are loosely grouped in the high range of severity. The TIC indicates measurement precision at high severity.

Dependent PD—In general, all of the symptom criteria have good item discrimination and difficulty. Criterion #8 (fears of being left alone) has the highest discrimination. Criteria #1 (difficulty making decisions), #6 (feels helpless when alone), and #7 (seeks another relationship when one ends) have relatively high thresholds. In the IRCs, the criteria are grouped in the severe range of severity. The TIC indicates measurement precision at high severity.

Obsessive-Compulsive PD—Symptom criteria #8 (rigidity/stubbornness) and #1 (preoccupied with details/rules/lists/organization) have the highest discrimination and lowest thresholds. Criterion #7 (miserly spending style) has the lowest discrimination and the highest threshold. Criteria #4 (overconscientious) and #6 (reluctant to delegate tasks) have good discrimination and comparatively lower thresholds. As shown in the IRCs, the criteria are loosely grouped in the moderate to severe range of severity. The TIC indicates measurement precision at moderate severity.

By contrast, Table 2 shows findings based on the IRT analysis using the alternative coding in which each of the positive symptom criteria must be associated with social/occupational dysfunction. Consistent with the lower symptom criteria prevalence, item threshold (i.e., difficulty) is higher when compared with the criteria in Table 1. Item discrimination in Table 2, however, is lower when compared with Table 1. As shown in Figure 2, the TICs for the alternative coding are slightly shifted toward the more severe range of the latent trait compared with the NESARC symptom coding, but generally have lower measurement precision for each PD.

Latent Trait/PD Severity

The distributions of the factor scores produced by the IRT models representing the latent PD severity or traits are shown in Figure 3. The PD traits are scaled as z-scores and exhibit positively skewed distributions regardless of the type of PD, with the majority of individuals having scores below 0 and few having scores above 0. The distributions appeared very similar whether the factor scores were derived from the IRT models based on the NESARC symptom coding or the alternative symptom coding proposed by Trull et al. (2010).

Using the NESARC symptom coding and assuming that scores greater than 0 indicate a response to PD traits and scores greater than 2 indicate “severe” PD traits, we estimated that the percentages of U.S. population responding to PD traits and having “severe” PD were, respectively, 13.2% and 1.7% for paranoid PD, 6.5% and 3.1% for schizoid PD, 10.5% and 0.6% for schizotypal PD, 10.9% and 1.4% for histrionic PD, 4.5% and 0.3% for antisocial PD, 20.0% and 1.0% for borderline PD, 15.8% and 1.0% for narcissistic PD, 6.3% and 2.7% for avoidant PD, 3.6% and 2.4% for dependent PD, and 16.2% and 0.6% for obsessive–compulsive PD.

Social/Occupational Dysfunction

The proportions of respondents with *DSM-IV* PDs who reported a given number of symptom criteria that were associated with social and/or occupational dysfunction are shown in Table 3. According to the NESARC operationalization to meet *DSM-IV* criteria for PD diagnosis, at least one of the endorsed symptom criteria must have caused social and/or occupational dysfunction. As shown in Table 3, the percentage of respondents with the respective PD diagnosis who reported just one social and/or occupational dysfunction varies by type of PD, from 11% for borderline to 50% for schizoid PD. Particularly high proportions of respondents with borderline (89%), dependent (87%), avoidant (80%) and paranoid (80%) PDs reported two or more symptom criteria associated with social/occupational dysfunction. Correlations between the number of PD symptom criteria and related social/occupational dysfunctions are as follows: borderline, 0.78; paranoid, 0.69; avoidant, 0.66; dependent, 0.66; obsessive–compulsive, 0.55; narcissistic, 0.52; schizotypal, 0.51; histrionic, 0.49; and schizoid, 0.31.

Discussion

The major objective of this study was to evaluate the psychometric properties of *DSM-IV* criteria for assessing PDs in the U.S. general population. To our knowledge, this is the first IRT analysis of the complete set of PD symptom criteria. The large sample size of the NESARC allowed for examination of specific *DSM-IV* symptom criteria for each of the 10 PDs.

In general, item discrimination and threshold (difficulty) for each PD were good. The IRCs indicate that the majority of symptom criteria are clustered in the moderate to severe range of the underlying latent dimension for each PD, indicating that the criteria carry similar

information on case severity. The TICs are peaked, indicating high measurement precision only within a narrow range of the underlying trait, with lower measurement precision at both lower and higher levels of severity. The TICs for antisocial, schizoid, and schizotypal PDs have higher peaks, indicating high measurement precision in a relatively narrow range of the trait when compared with the other PDs.

Individual criteria differed with respect to their utility in the identification of cases with different levels of severity. Overall, for almost all PDs the individual criteria differed with respect to their discrimination and threshold. Only for dependent PD, all criteria gave a relatively uniform assessment of severity. Several criteria—such as paranoid PD criterion “preoccupation with unjustified doubts,” borderline PD criterion “affective instability,” and dependent PD criterion “preoccupied with fears of being left to care for oneself”—provided good assessments for high levels of severity. Other criteria also had both relatively high discrimination and threshold, which are relevant to identifying severe cases in the general population. However, the IRT analysis also identified a number of criteria with low thresholds (lower item difficulty), which serve as bridging items between low and high severity and are important for broader epidemiological purposes of screening, prevention, and establishing base rates for prospective studies. These included paranoid PD criterion “persistently bears grudges,” schizoid PD criterion “indifferent to praise/criticism,” schizotypal PD criterion “lack of close friends/confidants,” histrionic PD criterion “considers relationships more intimate than they are,” antisocial PD criterion “consistent irresponsibility,” borderline PD criterion “impulsivity,” narcissistic PD criterion “believes self to be special/unique,” avoidant PD criterion “preoccupied with being criticized/rejected,” and obsessive–compulsive PD criterion “rigidity/stubbornness.”

A related objective of this study involved examining the application of *DSM-IV* symptom distress, impairment, or dysfunction to the number of symptom criteria met (i.e., one or more symptoms vs. all of them). In addressing a concern regarding the high symptom prevalence in the NESARC, Trull et al. (2010) proposed that each symptom criterion should reflect significant distress or impairment, thereby generating a lower symptom prevalence estimate comparable to clinical studies and, presumably, indicating greater severity. The IRT findings presented here provide support for the Trull et al. (2010) approach for a reliable assessment of PDs that is compatible with clinical severity. Based on this alternative coding for all criteria, our IRT analysis yielded higher item thresholds (i.e., difficulty) but lower item discrimination (see Table 3) compared with the NESARC coding (see Table 1). The overall measurement precision of the alternative coding was shown to be lower for the majority of PDs, though comparable for paranoid and borderline PDs (see Figure 2). The lower precision reflects that the application of social/occupational dysfunction to each item yields a small group of individuals who have more severe symptoms (high item difficulty) but less discrimination between the symptoms. When compared with the current NESARC application for social/occupational dysfunction, the coverage at higher levels of severity, however, varies by type of PD and is higher for schizoid, schizotypal, histrionic, narcissistic, and obsessive–compulsive PDs.

While the use of symptom dysfunction may help to obtain a more reliable assessment of PD, it raises a number of issues. First, assessments of social/occupational dysfunction are based on respondents’ self-assessments, which have been shown to vary by type of PD. The application of symptom-specific dysfunction criteria may exclude respondents with comparable symptom severity. The global assessment of dysfunction in the present study may not be sensitive to different types of symptom pathology in these PDs. Therefore, further studies are required to assess whether these variations are related to the global assessment in NESARC, unique personality pathology, variation in respondent awareness of dysfunction, or some combination thereof. Second, although proposals for the forthcoming

DSM-5 involve separation of dysfunction from traits, the Trull et al. (2010) application is NESARC-specific and intended to yield prevalence more in accord with clinical studies of PD. There are, however, other analytic choices for establishing PD severity based on just the symptom criteria. As demonstrated in the present study, the distributions of the factor scores produced by the IRT models representing the latent PD severity or traits provided estimates of greater severity among the subset of respondents who met *DSM-IV* diagnoses. Alternatively, the current binary approach could be expanded to include variations in severity based on the number of endorsed symptom criteria. Third, approaches that lower PD prevalence may increase the proportion of subclinical patients (individuals who have some symptom criteria but are below the threshold for a *DSM-IV* diagnosis). This subclinical group is often referred to as diagnostic orphans in research of substance use disorders (Hasin & Paykin, 1998). A study by Blagov, Bradley, and Westen (2007) on a subclinical group of PD patients has identified several personality constellations that can affect mental health and quality of life. Finally, the use of social and/or occupational dysfunction for the selection of symptom criteria obfuscates the study of associations between symptom pathology and disability/distress.

Several limitations of this study should be noted. First, assessments for PD symptom criteria are based on self-reports and the use of lay interviewers. Despite this potential reporting bias, the comparability of these findings to previous factor analytic studies using clinical assessment of PDs (Fossati, Maffei, Bagnato, et al., 2000; Huprich, Schmidt, Richard, et al., 2010) and prior NESARC studies relating PDs to other major mental disorders and disability assessments provides support for the validity of our results. Second, while both the *DSM-5* proposal and the NESARC separate dysfunction from symptom criteria, the ordering of the diagnostic steps differs in the NESARC in that an assessment of dysfunction is obtained for each endorsed symptom. The inclusion of symptom-specific dysfunction contrasts with the *DSM-5* proposal of a more holistic assessment prior to symptom articulation. Third, findings from this study are a function of symptom selection by the NESARC to operationalize the *DSM-IV* criteria. For the majority of PDs the numbers of symptom items were similar to the numbers of criteria, although some PDs required a larger number of items to operationalize criteria (average two to three items for each criterion). Fourth, although the IRT models assessed each PD separately, the PDs were assessed at different time periods (Wave 1 and Wave 2).

In conclusion, findings from this study provide strong support for a single underlying latent dimension for each *DSM-IV* PD. The IRT findings provide some support for the Trull et al. (2010) approach for the assessment of more severe forms of PDs. However, the NESARC coding requiring social dysfunction for only one or more symptom criteria casts a wider net for assessing PD in the general population, providing greater information for the identification of individuals who are also at risk for negative consequences associated with PD. There is growing debate over proposed revisions for *DSM-5* PDs (American Psychiatric Association, 2010) centering on retention of clinical syndromes and multidimensional assessments of trait dimensions (Shedler, Beck, Fonagy et al., 2010). Our findings offer further support for the measurement of distinct PDs in the general population, but a number of issues beyond the scope of this study need to be addressed in subsequent analyses. These include further study of the associations between symptom criteria and self-reports of symptom distress, impairment, or dysfunction; determining the presence of noninvariance of measurements of PD symptom criteria across population groups (i.e., gender and age); associations between *DSM-IV* PDs and subclinical populations (i.e., diagnostic orphans); and the role of PD as either moderating or mediating the course of Axis I disorders over time.

Acknowledgments

This research was supported in part by the Intramural Research Program of the National Institute on Alcohol Abuse and Alcoholism (NIAAA), National Institutes of Health (NIH); by the Alcohol Epidemiologic Data System funded by NIAAA Contract No. HHSN267200800023C to CSR Incorporated; and by U01AA018111, K05AA014223, and the New York Psychiatric Institute (Hasin). The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of the sponsoring organizations, agencies, or the Federal Government.

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Figure 1. Item characteristics curves for *DSM-IV* personality disorder symptom criteria. See Table 1 footnote for a list of symptom criteria for each *DSM-IV* PD.

Figure 2.

Test information curves for *DSM-IV* personality disorder symptom criteria: NESARC diagnoses versus the alternative diagnoses proposed by Trull et al. (2010).

Figure 3.
Kernel density estimation of the distribution of *DSM-IV* personality disorder severity:
NESARC diagnoses versus the alternative diagnoses proposed by Trull et al. (2010).

Table 1

Item Discrimination and Item Difficulty for DSM-IV Personality Disorder Symptom Criteria

DSM-IV PD	DSM-IV personality disorder symptom criteria ^d								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Paranoid									
Prevalence (%)	7.09	4.10	5.01	5.37	8.05	4.71	3.93		
Item discrimination	2.79	3.39	3.39	3.12	2.14	1.94	1.53		
Item difficulty	1.60	1.83	1.75	1.73	1.58	1.91	2.13		
Schizoid									
Prevalence (%)	2.59	2.75	2.97	1.88	4.46	4.45	3.53		
Item discrimination	3.69	3.39	2.56	3.09	3.18	3.56	3.06		
Item difficulty	2.09	2.08	2.09	2.23	1.86	1.86	1.98		
Schizotypal									
Prevalence (%)	2.73	4.27	4.52	3.87	5.38	6.91	4.37	7.41	2.87
Item discrimination	3.16	3.67	3.74	4.20	3.79	2.94	4.47	3.79	2.82
Item difficulty	1.82	1.64	1.62	1.66	1.55	1.46	1.62	1.40	1.83
Histrionic									
Prevalence (%)	3.22	3.63	4.37	1.21	3.47	4.29	3.77	8.22	
Item discrimination	2.53	2.44	2.36	2.85	2.05	2.67	2.76	3.17	
Item difficulty	1.99	1.95	1.87	2.28	2.03	1.85	1.90	1.50	
Antisocial									
Prevalence (%)	3.25	1.79	2.05	2.72	2.93	3.68	1.82		
Item discrimination	6.95	4.69	4.52	6.16	5.56	7.15	4.37		
Item difficulty	1.45	1.67	1.63	1.52	1.50	1.39	1.67		
Borderline									
Prevalence (%)	7.64	9.48	9.17	13.65	3.30	5.04	6.36	9.78	5.70
Item discrimination	2.29	2.26	2.46	2.56	1.84	2.80	2.95	2.40	2.23
Item difficulty	1.58	1.47	1.47	1.22	2.07	1.73	1.62	1.44	1.73
Narcissistic									
Prevalence (%)	8.34	6.10	9.06	6.15	8.87	5.46	9.16	8.21	3.17
Item discrimination	2.62	2.85	3.32	2.71	3.10	2.83	2.77	2.76	2.35

<i>DSM-IV PD</i>		<i>DSM-IV personality disorder symptom criteria^a</i>								
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Item difficulty		1.51	1.65	1.45	1.66	1.46	1.70	1.46	1.52	1.96
<i>Avoidant</i>										
Prevalence (%)		2.11	2.01	3.69	3.90	3.22	1.81	2.61		
Item discrimination		2.15	2.97	2.41	3.92	3.33	3.07	3.04		
Item difficulty		2.33	2.25	2.03	1.93	2.03	2.29	2.14		
<i>Dependent</i>										
Prevalence (%)		0.70	1.27	1.97	1.23	1.44	0.54	0.56	1.03	
Item discrimination		2.88	2.85	2.36	2.62	2.41	3.00	2.75	3.16	
Item difficulty		2.61	2.41	2.30	2.45	2.42	2.68	2.70	2.46	
<i>Obsessive-Compulsive</i>										
Prevalence (%)		10.34	4.55	4.82	7.07	6.63	7.85	3.76	12.80	
Item discrimination		3.48	2.39	2.17	2.69	2.27	2.93	1.95	3.91	
Item difficulty		1.36	1.80	1.81	1.58	1.65	1.52	1.96	1.23	

^aSymptom criteria are qualified by the presence of at least one criterion associated with social and/or occupational dysfunction within each PD. Specific symptom criteria for each PD are listed below.

Paranoid PD criteria: (1) unrealistic suspiciousness of others; (2) preoccupied with unjustified doubts; (3) reluctant to confide in others; (4) reads demeaning/threatening meanings into benign remarks; (5) persistently bears grudges; (6) unrealistic perception of attacks on character/reputation; (7) unrealistic suspiciousness of spouse/sexual partner. *Schizoid PD criteria:* (1) neither desires/enjoys close relationships; (2) almost always chooses solitary activities; (3) little, if any, interest in sexual activity; (4) takes pleasure in few, if any, activities; (5) lacks close friends/confidants other than relatives; (6) indifferent to praise/criticism; (7) emotional coldness/detachment/flattened affect. *Schizotypal PD criteria:* (1) ideas of reference; (2) odd beliefs/magical thinking; (3) unusual perceptual experiences; (4) odd thinking/speech; (5) suspiciousness/paranoid ideation; (6) inappropriate/constricted affect; (7) odd behavior/appearance; (8) lack of close friends/confidants; (9) excessive social anxiety. *Histrionic PD criteria:* (1) uncomfortable when not center of attention; (2) sexually seductive/provocative behavior; (3) rapidly shifting/shallow emotions; (4) use physical appearance to gain attention; (5) style of speech impressionistic/lacking in details; (6) self-dramatization/exaggerated emotion; (7) suggestibility; (8) considers relationships more intimate than they are. *Antisocial PD criteria:* (1) failure to conform to social norms; (2) deceitfulness; (3) impulsivity; (4) irritability/aggressiveness; (5) reckless disregard for safety of self/others; (6) consistent irresponsibility; (7) lack of remorse. *Borderline PD criteria:* (1) frantic efforts to avoid real/imagined abandonment; (2) unstable/intense interpersonal relationships; (3) identity disturbance; (4) impulsivity; (5) suicidal/self-mutilation behavior; (6) affective instability; (7) chronic feelings of emptiness; (8) inappropriate/intense anger; (9) stress-related paranoid ideation. *Narcissistic PD criteria:* (1) grandiose sense of self-importance; (2) preoccupied with fantasies; (3) believes he/she is special/unique; (4) requires excessive admiration; (5) sense of entitlement; (6) interpersonally exploitative; (7) lack of empathy; (8) envious; (9) arrogant/haughty behaviors/attitudes. *Avoidant PD criteria:* (1) avoids activities involving interpersonal contact; (2) unwilling to get involved unless certain of being liked; (3) restraint within intimate relationships; (4) preoccupied with being criticized/rejected; (5) inhibited in new interpersonal situations; (6) views self as socially inept/unappealing/inferior; (7) reluctant to take personal risks. *Dependent PD criteria:* (1) difficulty making decisions without advice; (2) needs others to assume responsibility; (3) difficulty expressing disagreement; (4) difficulty initiating projects; (5) goes to excessive lengths to obtain nurturance; (6) feels uncomfortable/helpless when alone; (7) seeks another relationship when one ends; (8) preoccupied with fears of being left to care for self. *Obsessive-Compulsive PD criteria:* (1) preoccupied with details/rules/lists/organization; (2) perfectionism interferes with task completion; (3) devoted to work to exclusion of leisure activities/friends; (4) overconscientious/scrupulous/inflexible; (5) unable to discard worn-out/worthless objects; (6) reluctant to delegate tasks; (7) miserly spending style toward self/others; (8) rigidity/stubbornness.

Table 2

Item Discrimination and Item Difficulty for DSM-IV Personality Disorder Symptom Criteria Based on Alternative Coding Proposed by Trull et al. (2010)

DSM-IV PD	DSM-IV personality disorder symptom criteria ^d								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Paranoid									
Prevalence (%)	5.07	2.61	2.35	3.21	6.03	3.40	3.49		
Item discrimination	1.89	2.80	2.58	2.28	1.33	1.43	0.95		
Item difficulty	1.89	2.08	2.15	2.05	1.99	2.28	2.73		
Schizoid									
Prevalence (%)	1.00	1.34	1.10	0.96	1.40	2.36	2.47		
Item discrimination	2.13	1.87	1.07	2.16	1.46	1.41	1.61		
Item difficulty	2.61	2.56	3.30	2.62	2.74	2.50	2.37		
Schizotypal									
Prevalence (%)	0.94	1.18	0.97	1.33	3.59	5.68	1.76	2.20	1.31
Item discrimination	1.61	1.71	1.74	2.34	1.84	1.08	2.30	1.36	1.90
Item difficulty	2.84	2.68	2.76	2.44	2.09	2.21	2.32	2.58	2.56
Histrionic									
Prevalence (%)	1.30	1.84	3.19	0.30	1.04	2.10	0.82	6.30	
Item discrimination	1.55	1.14	1.54	2.11	1.18	1.46	1.62	1.23	
Item difficulty	2.72	2.88	2.26	3.06	3.16	2.53	2.89	2.01	
Borderline									
Prevalence (%)	5.41	7.05	4.44	9.37	2.40	3.71	3.72	7.76	3.59
Item discrimination	1.58	1.54	1.59	1.31	1.48	2.10	2.44	1.72	1.87
Item difficulty	1.94	1.79	2.04	1.69	2.43	2.00	1.94	1.67	2.07
Narcissistic									
Prevalence (%)	4.47	1.18	2.33	1.83	5.33	2.70	6.73	3.63	0.89
Item discrimination	1.11	1.47	1.16	1.68	1.62	1.61	1.35	1.28	1.55
Item difficulty	2.35	2.82	2.72	2.48	1.93	2.31	1.90	2.34	2.90
Avoidant									
Prevalence (%)	1.24	1.16	2.90	2.81	2.31	1.14	1.76		
Item discrimination	1.66	2.14	1.51	2.82	2.43	2.52	2.25		

<i>DSM-IV PD</i>	<i>DSM-IV personality disorder symptom criteria^a</i>								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Item difficulty	2.72	2.58	2.35	2.09	2.22	2.51	2.37		
Dependent									
Prevalence (%)	0.51	0.77	1.68	0.99	1.03	0.38	0.43	0.66	
Item discrimination	2.31	2.03	1.78	1.84	1.85	2.17	2.01	2.38	
Item difficulty	2.83	2.75	2.49	2.71	2.68	2.98	2.99	2.72	
Obsessive-Compulsive									
Prevalence (%)	3.40	2.45	3.61	3.65	3.15	4.78	1.59	7.83	
Item discrimination	1.52	1.66	1.22	1.50	1.06	1.63	1.25	1.42	
Item difficulty	2.23	2.34	2.38	2.20	2.64	1.99	2.84	1.77	

^a Each symptom criterion is qualified by the presence of associated social and/or occupational dysfunction. See Table 1 footnote for list of symptom criteria for each *DSM-IV PD*.

Table 3

Proportions of Respondents With DSM-IV Personality Disorders by the Reported Number of Symptom Criteria That Were Associated With Social and/or Occupational Dysfunction

DSM-IV PD ^a	Number of reported DSM-IV personality disorder symptom criteria with social and/or occupational dysfunction									
	1	2	3	4	5	6	7	8	9	n
Paranoid %	20.65	18.37	18.85	18.28	12.13	8.17	3.54			1,689
Schizoid %	49.98	21.17	13.13	7.11	4.98	3.06	0.58			1,144
Schizotypal %	37.62	21.32	16.49	8.91	5.66	3.53	2.50	2.57	1.42	1,534
Histrionic %	35.40	21.91	16.52	12.62	8.27	4.55	0.51	2.21		651
Borderline %	10.70	11.92	15.40	15.60	17.84	12.38	7.68	5.84	2.65	2,231
Narcissistic %	35.70	22.09	16.31	10.46	7.89	3.50	1.82	1.79	0.45	2,449
Avoidant %	18.08	15.01	19.71	20.82	12.58	8.23	5.56			821
Dependent %	13.27	9.16	10.03	11.64	21.22	14.71	14.39	5.59		147
Obsessive-compulsive %	35.53	23.53	18.05	13.08	5.59	2.71	1.02	0.49		2,753

^a Because antisocial PD is not qualified by the presence of social and/or occupational dysfunction, it is not included in the table.