Prevalence, Correlates, Disability, and Comorbidity of DSM-IV Schizotypal Personality Disorder: Results From the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions

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Objective: To present nationally representative findings on the prevalence, correlates, and comorbidity of and disability associated with DSM-IV schizotypal personality disorder (SPD).

Method: This study used the 2004–2005 Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions, which targeted a nationally representative sample of the adult civilian population of the United States aged 18 years and older and residing in households and group quarters. In Wave 2, attempts were made to conduct face-to-face reinterviews with all respondents to the Wave 1 interview.

Results: Lifetime prevalence of SPD was 3.9%, with significantly greater rates among men (4.2%) than women (3.7%) ($p < .01$). Odds for SPD were significantly greater among black women, individuals with lower incomes, and those who were separated, divorced, or widowed; odds were significantly lower among Asian men (all $p < .01$). Schizotypal personality disorder was associated with substantial mental disability in both sexes. Co-occurrence rates of Axis I and other Axis II disorders among respondents with SPD were much higher than rates of co-occurrence of SPD among respondents with other disorders. After adjustment for sociodemographic characteristics and additional comorbidity, associations remained significant in both sexes between SPD and 12-month and lifetime bipolar I disorder, social and specific phobias, and posttraumatic stress disorder, as well as 12-month bipolar II disorder, lifetime generalized anxiety disorder, and borderline and narcissistic personality disorders (all $p < .01$).

Conclusions: Common and unique factors may underlie associations of SPD with narcissistic and borderline personality disorders, whereas much of the comorbidity between SPD and most mood and anxiety disorders appears to reflect factors common to these disorders. Some of the associations with SPD were sex specific. Schizotypal personality disorder and dependent, avoidant, and borderline personality disorders were associated with the occurrence of schizophrenia or psychotic episode. Schizotypal personality disorder is a prevalent, fairly stable, highly disabling disorder in the general population. Sex differences in associations of SPD with other specific Axis I and II disorders can inform more focused, hypothesis-driven investigations of factors underlying the comorbid relationships. Schizotypal as well as borderline, dependent, and avoidant personality disorders may be components of the schizophrenia spectrum.

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Schizotypal personality disorder (SPD) is a serious psychiatric disorder, the essential feature of which is a pervasive pattern of social and interpersonal deficits marked by acute discomfort with and reduced capacity for close relationships and cognitive or perceptual distortions and eccentricities.[1] Schizotypal personality disorder has been associated with severe reductions in quality of life,[2]

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- Although schizotypal personality disorder (SPD) is more prevalent among men than women, it is associated with significant disability and is highly comorbid with Axis I and II disorders in both sexes.
- Managing male and female patients with SPD may require different treatment strategies due to the sex-specific pattern of co-occurring psychiatric disorders.
- Patients with SPD, as well as those with borderline, dependent, and avoidant personality disorders, should be carefully monitored for psychotic episodes and for development of schizophrenia.

functional impairment,[3,4] and high rates of comorbidity with many substance use, mood, anxiety, psychotic, and other personality disorders.[5–14]

Schizotypal personality disorder is becoming increasingly important in its own right as a significant personality disorder and as a disorder that may provide important insights into the origins of schizophrenia.[15,16] The cognitive-perceptual and interpersonal disturbances, together with disorganized speech and behavior, of SPD have been viewed as a premorbid or prodromal stage of this major psychotic disorder.[17–19] This view is supported by the increased frequency of SPD in families of patients diagnosed with schizophrenia and in the adopted-away offspring of mothers with schizophrenia spectrum disorder[20–25] and by an increasing use of SPD criteria in the development of structured prodromal screening criteria for schizophrenia.[26–28]

Despite considerable research devoted to identifying individuals predisposed to schizophrenia, very little is known about the prevalence, correlates, disability, and comorbidity of SPD in large general population samples. Earlier community surveys were geographically restricted to states, and usually cities, in addition to being limited by small sample sizes (N = 133 to 799).[3,29–39] Others preselected individuals from larger general population samples based on responses to personality disorder screening scales or psychopathology in general, further limiting the sample sizes on which the prevalence estimates were based.[34,40–42] Although 1 larger general population survey (N = 2053),[43] compromised by a low response rate (57%), together with 4 other smaller studies[34,35,39,40] have provided basic sociodemographic data on SPD (sex, age, marital status, urbanicity), none were large enough to provide detailed information on characteristics such as race-ethnicity or socioeconomic status. Moreover, only 1 prior epidemiologic study[39] has examined disability and comorbidity of SPD with other Axis I and II disorders.

To fill this gap in the personality disorder literature, the major objective of this study was to present current, comprehensive, and detailed information on the prevalence, correlates, disability, and comorbidity of SPD in the United States using the 2004–2005 Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).[44] The Wave 2 NESARC covered DSM-IV alcohol and specific drug use disorders as well as mood and anxiety disorders assessed in the 2001–2002 Wave 1 NESARC,[45,46] in addition to SPD and borderline and narcissistic personality disorders, and posttraumatic stress disorder. The remaining DSM-IV personality disorders (avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial) were assessed in the Wave 1 NESARC. The sample size and high response rate of the Wave 2 NESARC allow for reliable and precise estimation of lifetime prevalence of SPD, especially among important sociodemographic subgroups of the population. The sample size also enabled the examination of comorbidity of SPD with specific Axis I and II disorders with control for both sociodemographic characteristics and additional psychiatric disorders, thereby allowing the determination of the unique relationship of each specific disorder to SPD. The importance of controlling for other disorders that are highly comorbid with one another represents an advance in our understanding of comorbidity recently highlighted in the epidemiologic literature.[47,48] This study also provides information on mental disability associated with SPD. All analyses of prevalences, correlates, disability, and comorbidity were conducted separately for men and women.

Because so little is known about the relationship between SPD and schizophrenia in large general population samples, the association of SPD with the occurrence of schizophrenia or psychotic episode was examined. If SPD reflects the phenotypic expression of a genetic predisposition to schizophrenia, it would be expected that SPD would be highly and significantly associated with this diagnosis. Associations of other DSM-IV personality disorders with schizophrenia or psychotic episode, some of which have been shown to have greater prevalences in relatives of probands with schizophrenia compared with relatives of controls, are also assessed in this study.

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METHOD

Sample

The 2004–2005 Wave 2 NESARC[44] is the second wave following upon the Wave 1 NESARC that was conducted in 2001–2002 and described in detail elsewhere.[45,46] The Wave 1 NESARC was a representative sample of the adult population of the United States. The target population was the civilian population, 18 years and older, residing in households and group quarters. Face-to-face interviews were conducted with 43,093 respondents. The NESARC oversampled blacks, Hispanics, and young adults aged 18 to 24 years. The overall response rate was 81.0%.

In Wave 2, attempts were made to conduct face-to-face reinterviews with all 43,093 respondents to the Wave 1 interview. Excluding respondents ineligible for the Wave 2 interview because they were deceased, deported, on active military duty throughout the follow-up period, or mentally or physically impaired, the Wave 2 response rate was 86.7%, reflecting 34,653 completed Wave 2 interviews. The cumulative response rate at Wave 2 was the product of the Wave 2 and Wave 1 response rates, or 70.2%. As in Wave 1, the Wave 2 NESARC data were weighted to reflect design characteristics of the survey and account for oversampling. Adjustment for nonresponse across sociodemographic characteristics and presence of any lifetime Wave 1 substance use disorder or psychiatric disorder was performed at the household and person levels to ensure that the sample approximates the target population, i.e., the original sample minus attrition between the 2 waves due to death, institutionalization or incapacitation, deportation or permanent departure from the United States, and military service for the full length of the Wave 2 interviewing period. To test whether this nonresponse adjustment was successful, we compared Wave 2 respondents with the target population comprising Wave 2 respondents and eligible nonrespondents in terms of numerous baseline (Wave 1) sociodemographic and diagnostic measures. These comparisons indicated no statistically significant differences between Wave 2 respondents and the target population on age, race-ethnicity, sex, socioeconomic status, or the presence of any lifetime substance use, mood, anxiety, or personality disorder, or schizophrenic or psychotic episode (each examined separately). Weighted Wave 2 data were then adjusted to be representative of the civilian population on socioeconomic variables including region, age, race-ethnicity, and sex on the basis of the 2000 Decennial Census.

Personality Disorders and Schizophrenia or Psychotic Episode

Diagnoses were made using the Wave 2 Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version (AUDADIS-IV),[49,50] a fully structured diagnostic interview designed for use by experienced lay interviewers. Avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial personality disorders were assessed in the Wave 1 NESARC and are described in detail elsewhere.[51–53] Borderline, schizotypal, and narcissistic personality disorders were assessed in Wave 2. All personality disorder diagnoses were assessed on a lifetime basis.

The diagnosis of personality disorders requires evaluation of long-term patterns of functioning.[1] Diagnoses of SPD in the AUDADIS-IV were made accordingly. All NESARC respondents were asked a series of SPD 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 occurring only when they were depressed, manic, anxious, drinking heavily, using medicines or drugs, experiencing withdrawal symptoms (defined earlier in the interview), or physically ill. To receive a diagnosis of SPD, respondents had to endorse the requisite number of DSM-IV symptom items, at least 1 of which must have caused social or occupational dysfunction. Diagnoses of other personality disorders were made similarly except for antisocial personality disorder, for which respondents needed to endorse the requisite number of symptom items occurring both before and since age 15 years.

Multiple symptom items were used to operationalize the more complex criteria associated with DSM-IV personality disorders, including SPD (17 items). Personality disorder symptom items[50] were similar to those appearing in the Structured Clinical Interview for DSM-IV Disorders II,[54] the International Personality Disorder Examination,[55] and the Diagnostic Interview for DSM-IV Personality Disorders.[56]

Due to concerns about the feasibility of assessing psychotic diagnoses in general population surveys[57,58] as well as the length of the interview, probable schizophrenia and psychotic episodes were assessed by asking each respondent if he or she was ever told by a doctor or other health professional that he or she had schizophrenia or a psychotic disorder.

The reliability of AUDADIS-IV personality disorder diagnoses and symptom scales was assessed in large test-retest studies conducted as part of the Wave 1 and Wave 2 NESARC surveys. Reliability of SPD was 0.67; reliabilities ranged from fair to good ($\kappa = 0.40$ to 0.71) for other personality disorders and from 0.79 to 0.83 for schizophrenia or psychotic episode.[59,60] Reliabilities of the associated dimensional symptom scales (i.e., scales formed by summing all positive symptom items) were much higher, with intraclass correlation coefficients ranging from 0.50 to 0.83. Reliabilities of the AUDADIS-IV personality disorder diagnoses compare favorably with

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those obtained in short-term test-retest studies using semistructured personality interviews in treated samples of patients.[61] Convergent validity of personality disorders assessed in Wave 1 was good to excellent and is reported in detail elsewhere.[51–53]

Other Psychiatric Disorders

Wave 2 AUDADIS-IV measures of substance use disorders (alcohol and drug-specific abuse and dependence and nicotine dependence), mood disorders (major depressive disorder, dysthymia, and bipolar I and II disorders), and anxiety disorders (panic disorder with and without agoraphobia, social phobia, specific phobia, and generalized anxiety disorder) were identical to those obtained in Wave 1 except for the time frames. Wave 2 diagnoses of these disorders were made for 2 time periods between Waves 1 and 2: (1) the year preceding the Wave 2 interview and (2) the "intervening" period of approximately 2 years following the Wave 1 interview but before the year preceding the Wave 2 interview. For this study, 12-month diagnoses reflect disorders occurring during the year preceding the Wave 2 interview, whereas lifetime diagnoses reflect those occurring over the life course assessed in both Wave 1 and Wave 2. Past year and lifetime posttraumatic stress disorder were assessed at Wave 2.

Extensive questions covered DSM-IV criteria for alcohol and drug-specific abuse and dependence, including sedatives, tranquilizers, opioids other than heroin, cannabis, cocaine or crack, stimulants, hallucinogens, inhalants and solvents, heroin, and other illicit drugs. Drug-specific abuse and dependence were aggregated in this study to yield diagnoses of any drug abuse and any drug dependence.

The reliability of AUDADIS-IV alcohol and drug diagnoses is documented in clinical and general population samples,[59,60,62–65] with test-retest reliability ranging from good to excellent ($\kappa = 0.70$ to 0.91). Convergent, discriminant, and construct validity of AUDADIS-IV substance use disorder diagnoses were good to excellent,[66–70] including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,[71–76] in which clinical reappraisals documented good validity of DSM-IV alcohol and drug use disorder diagnoses ($\kappa = 0.54$ to 0.76).[62,71]

Mood disorders included DSM-IV primary major depressive disorder (MDD), dysthymia, and bipolar I and bipolar II disorders. Anxiety disorders included DSM-IV primary panic disorder with and without agoraphobia, social and specific phobias, and generalized anxiety disorder. AUDADIS-IV methods to diagnose these disorders are described in detail elsewhere.[46,77–82] In DSM-IV,[1] "primary" excludes substance-induced disorders and those due to general medical conditions. Diagnoses of MDD also ruled out bereavement. In addition, past-year and prior-to-the-past-year diagnoses of posttraumatic stress disorder were assessed in the Wave 2 NESARC.

Test-retest reliabilities for AUDADIS-IV mood and anxiety diagnoses in general population and clinical samples were fair to good ($\kappa = 0.40$ to 0.77).[59,60,62] Convergent validity was good to excellent for all mood and anxiety diagnoses,[77–80] and selected diagnoses showed good agreement ($\kappa = 0.64$ to 0.68) with psychiatrist reappraisals.[62]

Disability

Disability was determined with the Short Form-12 Health Survey, version 2 (SF-12v2).[83] The SF-12v2 yields 3 profile scores that measure dimensions of mental disability: social functioning, role emotional functioning (measuring role impairment), and mental health. Standard norm-based scoring techniques were used to transform each score (range, 0–100) to achieve a mean of 50 and a standard deviation of 10 in the general U.S. population. Lower scores indicate greater disability.

Statistical Analysis

All analyses presented here were conducted for the total sample and by sex. Weighted frequencies and cross-tabulations were computed to calculate (1) lifetime prevalences of SPD by sociodemographic characteristics, (2) prevalences of SPD among respondents with other psychiatric disorders, and (3) prevalences of other psychiatric disorders among respondents with SPD. Adjusted odds ratios, derived from single multiple logistic regression analyses, assessed associations of SPD with sociodemographic characteristics. χ^2 statistics were used to determine sex differences in rates of co-occurrences of SPD with other psychiatric disorders.

Associations of SPD with psychiatric comorbidity were examined 2 ways. The first controlled for sociodemographic characteristics, comparable with other reports on comorbidity. The second way further controlled for all other Axis I and II psychiatric disorders. This analysis addresses the fact that analyses controlling only for sociodemographic characteristics do not yield information on the unique relationships of SPD to other disorders that themselves have considerable comorbidity. Thus, control for other psychiatric disorders was necessary because the comorbidity among other disorders confounds the relationship of SPD to each specific target diagnosis.

Multiple linear regression analyses examined the relationship of SPD to each of the 3 SF-12v2 disability scores, first controlling only for all sociodemographic characteristics and second, additionally adjusting for other psychiatric disorders to determine the independent contribution of SPD to disability.

All standard errors and 99% confidence intervals were estimated using SUDAAN,[84] which adjusts for design characteristics of complex surveys like the NESARC.

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Table 1. Lifetime Prevalence and Odds Ratios of DSM-IV Schizotypal Personality Disorder and Sociodemographic Characteristics by Sex[a,b]

	Total		Men		Women	
Characteristic	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)
Total	3.9 (0.16)	…	…	…	…	…
Sex						
Men	4.2 (0.23)	**1.3** (1.06 to 1.54)	…	…	…	…
Women	3.7 (0.18)	1.0[b]	…	…	…	…
Age, y						
20–29	5.7 (0.43)	**4.7** (3.17 to 6.92)	6.5 (0.65)	**6.0** (3.25 to 10.86)	4.8 (0.51)	**3.8** (2.14 to 6.58)
30–44	4.5 (0.28)	**4.5** (3.06 to 6.49)	4.6 (0.39)	**5.1** (3.14 to 8.43)	4.4 (0.34)	**4.0** (2.33 to 6.69)
45–64	4.0 (0.23)	**3.7** (2.64 to 5.25)	4.3 (0.33)	**4.4** (2.76 to 7.07)	3.7 (0.30)	**3.2** (1.96 to 5.20)
65+	1.5 (0.17)	1.0[b]	1.4 (0.22)	1.0[b]	1.7 (0.25)	1.0[b]
Race-ethnicity						
White	3.5 (0.17)	1.0[b]	4.0 (0.24)	1.0[b]	3.1 (0.20)	1.0[b]
Black	6.8 (0.44)	**1.4** (1.14 to 1.77)	7.1 (0.69)	1.3 (0.96 to 1.82)	6.6 (0.49)	**1.6** (1.16 to 2.09)
Native American	6.6 (1.04)	1.6 (0.99 to 2.53)	7.5 (1.71)	1.6 (0.83 to 3.16)	5.8 (1.39)	1.6 (0.78 to 3.22)
Asian	2.1 (0.46)	0.6 (0.29 to 1.03)	1.3 (0.41)	**0.3** (0.12 to 0.71)	2.8 (0.87)	0.9 (0.37 to 2.08)
Hispanic	3.9 (0.42)	0.8 (0.58 to 1.15)	3.9 (0.62)	0.7 (0.43 to 1.15)	3.9 (0.47)	1.0 (0.63 to 1.51)
Family income, $						
0–19,999	6.6 (0.38)	**3.1** (2.24 to 4.21)	7.8 (0.70)	**3.4** (2.18 to 5.15)	5.9 (0.40)	**2.7** (1.72 to 4.35)
20,000–34,999	4.1 (0.30)	**1.9** (1.35 to 2.68)	5.2 (0.52)	**2.5** (1.54 to 4.09)	3.2 (0.31)	1.4 (0.90 to 2.18)
35,000–69,999	3.8 (0.24)	**1.7** (1.29 to 2.27)	4.1 (0.33)	**1.8** (1.26 to 2.63)	3.5 (0.32)	**1.6** (1.04 to 2.37)
≥ 70,000	2.2 (0.19)	1.0[b]	2.2 (0.24)	1.0[b]	2.2 (0.27)	1.0[b]
Marital status						
Married/cohabiting	2.9 (0.15)	1.0[b]	3.0 (0.22)	1.0[b]	2.8 (0.20)	1.0[b]
Separated/widowed/divorced	5.4 (0.33)	**1.7** (1.41 to 2.15)	7.3 (0.72)	**2.0** (1.48 to 2.79)	4.5 (0.35)	**1.5** (1.15 to 2.07)
Never married	6.0 (0.38)	**1.3** (1.02 to 1.62)	6.4 (0.55)	1.3 (0.87 to 1.86)	5.5 (0.47)	1.3 (0.91 to 1.75)
Education						
Less than high school graduate	4.6 (0.41)	1.1 (0.82 to 1.44)	5.4 (0.66)	1.1 (0.75 to 1.69)	3.9 (0.44)	1.0 (0.69 to 1.47)
High school graduate	4.2 (0.26)	1.0 (0.83 to 1.29)	4.5 (0.40)	1.0 (0.70 to 1.37)	3.9 (0.32)	1.1 (0.81 to 1.46)
Some college or higher	3.6 (0.19)	1.0[b]	3.8 (0.28)	1.0[b]	3.5 (0.23)	1.0[b]
Urbanicity						
Urban	3.9 (0.17)	1.0 (0.78 to 1.30)	4.2 (0.25)	1.0 (0.67 to 1.44)	3.7 (0.20)	1.0 (0.72 to 1.45)
Rural	3.9 (0.32)	1.0[b]	4.4 (0.54)	1.0[b]	3.5 (0.39)	1.0[b]
Region						
Northeast	3.7 (0.32)	0.8 (0.61 to 1.11)	3.6 (0.43)	0.7 (0.48 to 1.08)	3.7 (0.39)	0.9 (0.61 to 1.38)
Midwest	3.8 (0.33)	0.9 (0.65 to 1.15)	4.4 (0.57)	0.9 (0.61 to 1.41)	3.3 (0.37)	0.8 (0.54 to 1.19)
South	3.8 (0.23)	0.8 (0.67 to 1.05)	4.1 (0.33)	0.8 (0.60 to 1.11)	3.5 (0.26)	0.9 (0.63 to 1.17)
West	4.4 (0.30)	1.0[b]	4.8 (0.44)	1.0[b]	4.1 (0.37)	1.0[b]

[a]Estimates in boldface are statistically significant ($p < .01$).
[b]Referent category.
Symbol: … = not applicable.

RESULTS

Prevalence and Sociodemographic Characteristics by Sex

The prevalence of SPD in the NESARC sample was 3.9% (Table 1). Rates of SPD were significantly greater among men (4.2%) than women (3.7%). For the total sample, a modest inverse association of prevalence with age was observed. The odds of SPD were also significantly ($p < .01$) greater among blacks. Respondents in the 3 lowest income brackets and those who were never married or who were separated, divorced, or widowed were more likely to have SPD.

With few exceptions, sex-specific results for both men and women mirrored those found in the total sample. However, the rates of SPD were not significantly elevated among those who were never married for either men or women. Significantly elevated odds of SPD were observed only among black women; significantly lower odds were found among Asian men, but not Asian women.

Co-Occurrence of DSM-IV Lifetime SPD and 12-Month Axis I Psychiatric Disorders by Sex

Rates of co-occurrence of lifetime SPD among respondents with other 12-month Axis I psychiatric disorders are shown in Table 2 for the total sample and by sex. For the total sample, the prevalences of SPD among respondents with mood, anxiety, and substance use disorders were 17.2%, 13.7%, and 8.2%, respectively. Within these broad categories, rates of SPD were greatest among respondents with 12-month bipolar I (31.2%), panic disorder with agoraphobia (33.1%), and drug dependence (29.4%). The prevalence of SPD was significantly greater ($p < .01$) among men than among women with MDD and bipolar I disorder.

Rates of any 12-month substance use, mood, and anxiety disorder among respondents with lifetime SPD were 44.1%, 44.4%, and 56.6%, respectively. Nicotine dependence (31.1%), bipolar I disorder (22.3%), and posttraumatic stress disorder (29.6%) were the most prevalent disorders in their classes among respondents with SPD.

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Table 2. Co-Occurrence Rates of DSM-IV Lifetime Schizotypal Personality Disorder and 12-Month Axis I Psychiatric Disorders by Sex

	Prevalence of Schizotypal Personality Disorder Among Respondents With Axis I Psychiatric Disorders			Prevalence of Axis I Psychiatric Disorders Among Respondents With Schizotypal Personality Disorder		
Psychiatric Disorder	Total, % (SE)	Men, % (SE)	Women, % (SE)	Total, % (SE)	Men, % (SE)	Women,% (SE)
Any substance use disorder	8.2 (0.41)	8.1 (0.55)	8.4 (0.61)	44.1 (1.72)	50.4 (2.46)	37.4 (2.28)[a]
Any substance abuse	7.0 (0.74)	6.7 (0.84)	7.7 (1.28)	11.6 (1.18)	15.6 (1.81)	7.2 (1.24)[a]
Any substance dependence	15.1 (1.12)	14.8 (1.36)	15.6 (1.94)	18.6 (1.38)	23.9 (2.18)	12.9 (1.68)[a]
Any alcohol use disorder	8.4 (0.60)	8.3 (0.73)	8.4 (1.09)	20.6 (1.35)	28.4 (2.16)	12.2 (1.57)[a]
Alcohol abuse	3.9 (0.56)	4.2 (0.67)	3.1 (0.81)	5.3 (0.75)	8.1 (1.26)	2.3 (0.60)[a]
Alcohol dependence	13.7 (1.08)	13.7 (1.36)	13.8 (1.86)	15.3 (1.22)	20.3 (2.01)	10.0 (1.38)[a]
Any drug use disorder	20.3 (1.77)	18.3 (2.06)	24.4 (3.45)	12.4 (1.19)	14.3 (1.69)	10.3 (1.69)
Any drug abuse	16.7 (1.95)	14.9 (2.29)	20.7 (3.67)	7.2 (0.93)	8.6 (1.36)	5.7 (1.11)
Any drug dependence	29.4 (3.68)	28.2 (4.46)	31.4 (6.06)	6.1 (0.84)	6.6 (1.21)	5.3 (1.29)
Nicotine dependence	8.8 (0.50)	9.3 (0.73)	8.3 (0.67)	31.1 (1.54)	34.0 (2.24)	28.0 (1.95)
Any mood disorder	17.2 (0.79)	22.9 (1.61)	14.1 (0.82)[a]	44.4 (1.66)	39.5 (2.53)	49.7 (2.30)[a]
Major depressive disorder	10.7 (0.94)	15.6 (2.05)	8.7 (0.97)[a]	15.5 (1.27)	12.9 (1.71)	18.2 (1.82)
Dysthymia	21.3 (2.56)	24.2 (4.84)	19.9 (2.82)	6.3 (0.84)	4.4 (0.98)	8.4 (1.25)
Bipolar I disorder	31.2 (1.74)	37.5 (3.24)	27.0 (1.86)[a]	22.3 (1.30)	20.7 (1.98)	24.1 (1.74)[a]
Bipolar II disorder	23.4 (2.89)	28.7 (5.80)	20.7 (2.91)	5.1 (0.73)	4.1 (0.99)	6.2 (1.01)
Any anxiety disorder	13.7 (0.58)	18.3 (1.06)	11.4 (0.61)[a]	56.6 (1.58)	48.3 (2.05)	65.4 (2.09)[a]
Panic with agoraphobia	33.1 (3.58)	23.6 (5.30)	36.9 (4.19)	6.7 (0.77)	2.6 (0.61)	11.0 (1.48)[a]
Panic without agoraphobia	17.7 (1.81)	23.1 (3.96)	14.9 (2.14)	8.0 (0.86)	6.9 (1.28)	9.3 (1.38)
Social phobia	30.1 (1.90)	36.3 (3.39)	26.1 (2.16)	19.4 (1.47)	17.9 (1.88)	21.1 (1.88)
Specific phobia	13.4 (0.86)	16.3 (1.67)	12.1 (0.90)	25.6 (1.62)	18.7 (1.82)	33.0 (2.28)[a]
Generalized anxiety disorder	20.8 (1.38)	27.5 (2.79)	17.8 (1.55)	20.0 (1.27)	15.6 (1.56)	24.6 (2.02)[a]
Posttraumatic stress disorder	17.9 (0.96)	22.5 (2.02)	15.9 (0.97)	29.6 (1.47)	21.6 (1.81)	38.1 (2.24)[a]

[a]Prevalence for women significantly different from prevalence for men ($p < .01$).

Alcohol abuse and dependence, but not drug use disorders or nicotine dependence, were significantly more prevalent among men than among women with SPD, whereas women with SPD had higher rates than men with SPD of bipolar I disorder, panic disorder with agoraphobia, specific phobia, generalized anxiety disorder, and posttraumatic stress disorder.

Co-Occurrence of DSM-IV Lifetime SPD and Other Lifetime Psychiatric Disorders by Sex

Prevalences of SPD among respondents with other lifetime disorders were somewhat lower than the corresponding rates for 12-month disorders (Table 3). In the total sample, prevalences of SPD among respondents with lifetime mood, anxiety, and substance use disorders were 10.3%, 9.6%, and 5.9%, respectively. Within these broad categories, rates of SPD were highest among respondents with bipolar I disorder (22.1%), panic disorder with agoraphobia (25.9%), and drug dependence (19.4%). Rates of SPD were consistently higher among men than women with lifetime MDD, panic disorder without agoraphobia, specific phobia, generalized anxiety disorder, and posttraumatic stress disorder. The rate of SPD among respondents with any other personality disorder was 15.6%. Prevalence of SPD among women with any lifetime Cluster B personality disorder was 24.4%, significantly greater than the corresponding rate among men (20.3%).

Prevalences of lifetime substance use, mood, anxiety, and personality disorders among respondents with SPD were 67.5%, 67.6%, 72.3%, and 82.7%, respectively. Within each class of disorder, nicotine dependence (42.4%), bipolar I disorder (29.3%), specific phobia (38.4%), and borderline personality disorder (54.9%) were the most prevalent among respondents with SPD. Prevalences of all substance use disorders except drug dependence were significantly greater ($p < .01$) among men than among women with SPD, whereas the opposite was true for most mood and anxiety disorders except bipolar I and II disorders and panic disorder without agoraphobia. Women with SPD were more likely than men with SPD to have paranoid personality disorder, whereas men with SPD were more likely than women with SPD to have antisocial personality disorder.

Associations of SPD and Other 12-Month and Lifetime Psychiatric Disorders by Sex

Associations between lifetime SPD and each specific 12-month Axis I disorder, controlling for sociodemographic characteristics and additional Axis I and II comorbidity, are depicted in Table 4. When only sociodemographic characteristics were controlled for, approximately 98.0% of all associations between SPD and other specific disorders were positive and significant ($p < .01$), both for the total sample and among men and women.

Odds ratios were reduced when additional comorbidity was controlled for. For the total sample, lifetime SPD remained associated with drug abuse, MDD, bipolar disorders, and all anxiety disorders, but with lower ORs. These

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Table 3. Co-Occurrence Rates of DSM-IV Lifetime Schizotypal Personality Disorder and Other Lifetime Psychiatric Disorders by Sex

	Prevalence of Schizotypal Personality Disorder Among Respondents With Other Psychiatric Disorders			Prevalence of Other Psychiatric Disorders Among Respondents With Schizotypal Personality Disorder		
Psychiatric Disorder	Total, % (SE)	Men, % (SE)	Women, % (SE)	Total, % (SE)	Men, % (SE)	Women, % (SE)
Any substance use disorder	5.9 (0.26)	5.6 (0.33)	6.4 (0.37)	67.5 (1.67)	74.4 (2.22)	60.2 (2.13)[a]
Any substance abuse	5.5 (0.32)	5.2 (0.40)	6.1 (0.50)	37.0 (1.73)	44.5 (2.46)	28.9 (2.00)[a]
Any substance dependence	9.3 (0.53)	8.6 (0.63)	10.6 (0.87)	38.4 (1.86)	45.0 (2.68)	31.5 (2.21)[a]
Any alcohol use disorder	6.0 (0.28)	5.6 (0.34)	6.7 (0.46)	52.5 (1.71)	63.4 (2.33)	40.9 (2.16)[a]
Alcohol abuse	3.7 (0.29)	3.5 (0.35)	4.0 (0.46)	17.9 (1.26)	21.9 (1.87)	13.8 (1.50)[a]
Alcohol dependence	8.9 (0.51)	8.4 (0.63)	10.0 (0.84)	34.6 (1.76)	41.6 (2.61)	27.1 (2.02)[a]
Any drug use disorder	10.5 (0.63)	10.0 (0.80)	11.4 (1.04)	32.1 (1.75)	37.9 (2.56)	26.0 (2.19)[a]
Any drug abuse	9.2 (0.63)	8.9 (0.83)	9.7 (0.97)	23.8 (1.57)	29.2 (2.38)	17.9 (1.74)[a]
Any drug dependence	19.4 (1.60)	18.3 (2.08)	21.2 (2.52)	16.6 (1.35)	18.9 (2.04)	14.2 (1.76)
Nicotine dependence	7.2 (0.37)	7.6 (0.53)	6.8 (0.46)	42.4 (1.70)	47.2 (2.40)	37.4 (2.05)[a]
Any mood disorder	10.3 (0.41)	12.8 (0.75)	8.9 (0.47)[a]	67.6 (1.41)	61.0 (2.30)	74.7 (1.98)[a]
Major depressive disorder	6.6 (0.42)	8.4 (0.83)	5.7 (0.47)[a]	27.6 (1.49)	22.3 (2.05)	33.2 (2.07)[a]
Dysthymia	10.1 (1.09)	11.7 (2.18)	9.3 (1.14)	8.8 (0.92)	6.5 (1.15)	11.3 (1.31)[a]
Bipolar I disorder	22.1 (1.17)	24.1 (1.94)	20.4 (1.36)	29.3 (1.39)	27.7 (2.11)	31.0 (1.88)
Bipolar II disorder	14.2 (1.68)	14.7 (2.76)	13.9 (1.91)	6.2 (0.79)	4.9 (1.03)	7.5 (1.11)
Any anxiety disorder	9.6 (0.40)	12.7 (0.76)	8.0 (0.41)[a]	72.3 (1.65)	65.5 (2.22)	79.5 (1.81)[a]
Panic with agoraphobia	25.9 (2.19)	26.3 (4.27)	25.7 (2.44)	12.4 (1.08)	7.1 (1.33)	18.0 (1.82)[a]
Panic without agoraphobia	12.1 (0.82)	16.0 (1.81)	10.2 (0.96)[a]	18.0 (1.14)	15.0 (1.52)	21.2 (1.78)
Social phobia	18.5 (1.04)	20.6 (1.73)	17.0 (1.21)	33.0 (1.68)	29.0 (2.17)	37.2 (2.25)[a]
Specific phobia	10.0 (0.57)	12.5 (1.07)	8.8 (0.59)[a]	38.4 (1.87)	30.1 (2.26)	47.3 (2.44)[a]
Generalized anxiety disorder	15.6 (0.82)	19.2 (1.62)	14.0 (0.93)[a]	30.4 (1.38)	22.6 (1.70)	38.7 (2.20)[a]
Posttraumatic stress disorder	15.4 (0.77)	20.1 (1.68)	13.4 (0.79)[a]	37.2 (1.54)	28.3 (2.10)	46.7 (2.30)[a]
Any other personality disorder	15.6 (0.59)	15.3 (0.81)	16.0 (0.73)	82.7 (1.19)	81.0 (1.89)	84.6 (1.47)
Any other Cluster A	17.8 (1.05)	18.3 (1.59)	17.5 (1.28)	28.0 (1.49)	24.7 (2.02)	31.5 (2.04)
Paranoid	20.2 (1.32)	21.2 (2.14)	19.6 (1.48)	22.3 (1.46)	18.4 (1.88)	26.4 (1.95)[a]
Schizoid	20.0 (1.55)	19.3 (2.11)	20.7 (2.00)	15.6 (1.21)	14.2 (1.63)	17.1 (1.57)
Any Cluster B	22.1 (0.81)	20.3 (1.07)	24.4 (1.12)[a]	74.4 (1.44)	74.7 (2.21)	74.0 (1.94)
Antisocial	16.5 (1.33)	15.8 (1.58)	18.4 (2.29)	16.1 (1.33)	22.1 (2.05)	9.7 (1.23)[a]
Borderline	36.7 (1.37)	38.9 (2.04)	34.8 (1.60)	54.9 (1.72)	51.3 (2.40)	58.8 (2.42)
Histrionic	21.2 (2.13)	23.8 (3.35)	18.7 (2.47)	9.7 (0.95)	10.4 (1.46)	9.0 (1.25)
Narcissistic	27.5 (1.16)	25.8 (1.52)	30.0 (1.76)	43.2 (1.67)	46.7 (2.44)	39.5 (2.29)
Any Cluster C	14.2 (0.79)	14.2 (1.17)	14.3 (0.97)	34.2 (1.61)	30.7 (2.26)	37.9 (2.01)
Avoidant	23.6 (1.77)	25.1 (3.00)	22.6 (2.12)	13.9 (1.08)	11.3 (1.46)	16.8 (1.61)
Dependent	32.3 (5.10)	43.8 (12.42)	26.2 (4.70)	3.5 (0.65)	3.2 (1.00)	3.8 (0.81)
Obsessive-compulsive	13.5 (0.83)	13.6 (1.24)	13.3 (1.04)	27.7 (1.49)	26.2 (2.14)	29.3 (1.86)

[a]Prevalence for women significantly different from prevalence for men ($p < .01$).

results were generally consistent among men and women with the following notable exceptions: SPD remained significantly, but less strongly, associated with drug abuse, MDD, panic disorder with and without agoraphobia, and generalized anxiety disorder among women but not among men.

Similar to the results for 12-month associations, all ORs for associations of SPD with specific lifetime Axis I disorders except alcohol abuse were statistically significant ($p < .01$) for the total sample and among men and women when only sociodemographic characteristics were controlled for (Table 5). The same result was found for associations of SPD with all specific Axis II personality disorders.

Odds ratios were also reduced when additional comorbidity was controlled for. In the total sample, lifetime SPD remained associated with drug dependence, bipolar disorders, and all anxiety disorders, but with much smaller ORs. These results closely paralleled those of the 12-month analyses with the following exceptions: drug dependence, but not drug abuse, was significantly ($p < .01$) associated with SPD among women; bipolar II disorder was not significantly associated with SPD among men; panic disorder without agoraphobia was significantly ($p < .01$) associated with SPD among men but not women; and MDD was no longer related to SPD among either men or women.

In the total sample, SPD remained significantly ($p < .01$) related to paranoid, schizoid, antisocial, avoidant, and obsessive-compulsive personality disorders, with much lower ORs when additional comorbidity was controlled for. By contrast, associations of borderline and narcissistic personality disorders with SPD, though reduced, remained strong and significant ($p < .01$), a result that held for both men and women. Among the other personality disorders, SPD was associated with schizoid,

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Table 4. Odds Ratios of Lifetime DSM-IV Schizotypal Personality Disorder and 12-Month Axis I Psychiatric Disorders by Sex[a]

	Odds Ratios Controlling for Sociodemographic Characteristics			Odds Ratios Controlling for Sociodemographic Characteristics and Other Psychiatric Disorders		
Psychiatric Disorder	Total, OR (99% CI)	Men, OR (99% CI)	Women, OR (99% CI)	Total, OR (99% CI)	Men, OR (99% CI)	Women, OR (99% CI)
Any substance use disorder	**2.5** (2.09 to 3.04)	**2.3** (1.78 to 2.99)	**2.8** (2.12 to 3.72)	**1.3** (1.03 to 1.53)	1.3 (0.95 to 1.67)	1.3 (0.94 to 1.75)
Any substance abuse	**1.5** (1.09 to 2.12)	1.4 (0.95 to 2.11)	**1.8** (1.06 to 2.99)	1.1 (0.77 to 1.65)	1.1 (0.70 to 1.68)	1.3 (0.72 to 2.30)
Any substance dependence	**3.7** (2.86 to 4.71)	**3.4** (2.41 to 4.73)	**4.3** (2.78 to 6.54)	**1.5** (1.13 to 2.01)	1.4 (0.97 to 2.07)	**1.6** (1.04 to 2.58)
Any alcohol use disorder	**2.0** (1.57 to 2.50)	**1.9** (1.42 to 2.59)	**2.1** (1.38 to 3.20)	1.0 (0.75 to 1.36)	1.0 (0.70 to 1.52)	1.0 (0.60 to 1.57)
Alcohol abuse	0.8 (0.53 to 1.23)	0.9 (0.53 to 1.37)	0.7 (0.33 to 1.37)	0.7 (0.44 to 1.17)	0.8 (0.47 to 1.39)	0.6 (0.24 to 1.27)
Alcohol dependence	**3.2** (2.44 to 4.10)	**3.0** (2.12 to 4.19)	**3.6** (2.25 to 5.65)	1.2 (0.87 to 1.70)	1.2 (0.77 to 1.90)	1.2 (0.72 to 2.03)
Any drug use disorder	**4.7** (3.46 to 6.48)	**3.8** (2.54 to 5.73)	**6.9** (4.20 to 11.73)	**1.9** (1.22 to 2.88)	1.5 (0.85 to 2.53)	**2.8** (1.49 to 5.30)
Any drug abuse	**3.4** (2.30 to 5.10)	**2.8** (1.64 to 4.67)	**5.2** (2.70 to 9.80)	**1.8** (1.04 to 2.96)	1.4 (0.72 to 2.72)	**2.7** (1.29 to 5.55)
Any drug dependence	**6.9** (4.19 to 11.50)	**5.9** (3.12 to 11.10)	**8.9** (4.15 to 19.28)	1.7 (0.89 to 3.11)	1.5 (0.69 to 3.11)	2.1 (0.77 to 5.54)
Nicotine dependence	**2.4** (1.99 to 2.92)	**2.4** (1.83 to 3.04)	**2.5** (1.87 to 3.35)	1.1 (0.90 to 1.44)	1.3 (0.97 to 1.75)	1.0 (0.70 to 1.42)
Any mood disorder	**7.5** (6.07 to 9.15)	**8.4** (6.08 to 11.50)	**6.7** (5.24 to 8.61)	**2.4** (1.84 to 3.00)	**2.5** (1.69 to 3.72)	**2.2** (1.68 to 2.93)
Major depressive disorder	**3.0** (2.28 to 4.02)	**3.8** (2.39 to 6.03)	**2.6** (1.87 to 3.61)	**1.6** (1.12 to 2.18)	1.7 (0.94 to 2.93)	**1.5** (1.03 to 2.09)
Dysthymia	**5.5** (3.69 to 8.97)	**5.6** (2.69 to 11.78)	**5.8** (3.45 to 9.69)	1.2 (0.68 to 1.95)	1.1 (0.45 to 2.54)	1.2 (0.62 to 2.14)
Bipolar I disorder	**11.2** (8.72 to 14.45)	**13.1** (8.73 to 19.62)	**10.2** (7.40 to 14.03)	**3.3** (2.43 to 4.38)	**3.6** (2.22 to 5.96)	**3.0** (2.09 to 4.34)
Bipolar II disorder	**5.6** (3.40 to 9.32)	**6.1** (2.64 to 14.26)	**5.5** (3.14 to 9.52)	**2.7** (1.58 to 4.50)	**2.5** (1.06 to 5.85)	**2.9** (1.59 to 5.17)
Any anxiety disorder	**7.6** (6.31 to 9.05)	**7.8** (6.08 to 9.87)	**7.4** (5.83 to 9.38)	**2.8** (2.25 to 3.47)	**3.0** (2.19 to 4.00)	**2.6** (2.02 to 3.46)
Panic with agoraphobia	**10.9** (6.91 to 17.08)	**5.5** (2.42 to 12.67)	**14.5** (8.73 to 24.18)	**1.8** (1.08 to 3.05)	0.7 (0.26 to 1.69)	**2.8** (1.55 to 5.10)
Panic without agoraphobia	**5.0** (3.56 to 7.07)	**6.2** (3.25 to 11.80)	**4.4** (2.76 to 6.98)	**1.7** (1.13 to 2.46)	1.7 (0.82 to 3.64)	**1.7** (1.04 to 2.69)
Social phobia	**11.1** (8.61 to 14.38)	**12.7** (8.33 to 19.35)	**10.2** (7.40 to 14.05)	**2.6** (1.94 to 3.56)	**3.2** (1.90 to 5.40)	**2.3** (1.59 to 3.22)
Specific phobia	**4.6** (3.60 to 5.83)	**4.7** (3.27 to 6.68)	**4.6** (3.47 to 5.98)	**1.8** (1.34 to 2.32)	**1.8** (1.15 to 2.69)	**1.8** (1.31 to 2.46)
Generalized anxiety disorder	**7.4** (5.72 to 9.54)	**8.4** (5.49 to 12.77)	**6.9** (5.02 to 9.55)	**1.6** (1.21 to 2.21)	1.6 (0.93 to 2.75)	**1.7** (1.13 to 2.50)
Posttraumatic stress disorder	**6.7** (5.36 to 8.34)	**6.8** (4.84 to 9.62)	**6.8** (5.20 to 8.85)	**2.0** (1.55 to 2.61)	**2.0** (1.30 to 2.96)	**2.1** (1.52 to 2.86)

[a]Estimates in boldface are statistically significant ($p < .01$).

Table 5. Odds Ratios of Lifetime DSM-IV Schizotypal Personality Disorder and Lifetime Axis I and II Psychiatric Disorders by Sex[a]

	Odds Ratios Controlling for Sociodemographic Characteristics			Odds Ratios Controlling for Sociodemographic Characteristics and Other Psychiatric Disorders		
Psychiatric Disorder	Total, OR (99% CI)	Men, OR (99% CI)	Women, OR (99% CI)	Total, OR (99% CI)	Men, OR (99% CI)	Women, OR (99% CI)
Any substance use disorder	**2.4** (1.97 to 2.93)	**2.0** (1.46 to 2.71)	**2.9** (2.24 to 3.78)	1.2 (0.94 to 1.42)	1.0 (0.73 to 1.40)	**1.3** (1.02 to 1.77)
Any substance abuse	**1.6** (1.32 to 1.95)	**1.4** (1.07 to 1.84)	**2.0** (1.51 to 2.53)	1.1 (0.89 to 1.34)	1.0 (0.74 to 1.34)	1.3 (0.94 to 1.67)
Any substance dependence	**2.9** (2.31 to 3.56)	**2.4** (1.81 to 3.25)	**3.7** (2.70 to 4.94)	1.1 (0.88 to 1.41)	1.0 (0.68 to 1.31)	1.4 (0.99 to 1.92)
Any alcohol use disorder	**2.1** (1.72 to 2.44)	**1.8** (1.35 to 2.32)	**2.4** (1.90 to 3.15)	0.9 (0.76 to 1.16)	0.8 (0.61 to 1.15)	1.1 (0.79 to 1.50)
Alcohol abuse	0.9 (0.74 to 1.18)	0.8 (0.61 to 1.11)	1.1 (0.82 to 1.58)	0.9 (0.71 to 1.19)	0.9 (0.59 to 1.21)	1.0 (0.69 to 1.50)
Alcohol dependence	**2.6** (2.11 to 3.21)	**2.3** (1.69 to 3.02)	**3.2** (2.37 to 4.40)	0.9 (0.72 to 1.20)	0.8 (0.55 to 1.17)	1.1 (0.75 to 1.63)
Any drug use disorder	**3.1** (2.51 to 3.83)	**2.7** (2.05 to 3.67)	**3.7** (2.66 to 5.15)	1.3 (0.98 to 1.69)	1.2 (0.80 to 1.65)	**1.5** (1.03 to 2.26)
Any drug abuse	**2.4** (1.90 to 3.03)	**2.2** (1.58 to 3.00)	**2.8** (2.00 to 3.99)	1.2 (0.87 to 1.51)	1.1 (0.73 to 1.57)	1.3 (0.90 to 1.94)
Any drug dependence	**5.1** (3.84 to 6.75)	**4.5** (3.02 to 6.60)	**6.3** (4.08 to 9.72)	**1.5** (1.08 to 2.11)	1.4 (0.88 to 2.24)	**1.7** (1.05 to 2.84)
Nicotine dependence	**2.2** (1.83 to 2.63)	**2.2** (1.70 to 2.82)	**2.2** (1.72 to 2.86)	1.0 (0.84 to 1.29)	1.2 (0.89 to 1.61)	0.9 (0.66 to 1.20)
Any mood disorder	**6.3** (5.23 to 7.61)	**5.9** (4.45 to 7.84)	**6.8** (5.16 to 8.98)	**2.0** (1.59 to 2.51)	**1.9** (1.30 to 2.71)	**2.2** (1.58 to 2.95)
Major depressive disorder	**2.0** (1.61 to 2.49)	**2.1** (1.49 to 3.06)	**1.9** (1.48 to 2.44)	1.2 (0.95 to 1.56)	1.2 (0.78 to 1.84)	1.2 (0.92 to 1.60)
Dysthymia	**2.8** (2.00 to 3.95)	**2.8** (1.56 to 5.13)	**2.8** (1.98 to 4.14)	1.0 (0.70 to 1.54)	1.1 (0.57 to 1.98)	1.0 (0.64 to 1.58)
Bipolar I disorder	**7.8** (6.23 to 9.45)	**7.6** (5.54 to 10.45)	**7.9** (6.02 to 10.36)	**2.8** (2.21 to 3.64)	**2.6** (1.73 to 3.90)	**3.2** (2.18 to 4.66)
Bipolar II disorder	**3.1** (2.02 to 4.73)	**2.8** (1.47 to 5.33)	**3.4** (2.08 to 5.50)	**2.0** (1.22 to 3.15)	1.6 (0.80 to 3.27)	**2.4** (1.34 to 4.30)
Any anxiety disorder	**7.1** (5.62 to 8.87)	**7.1** (5.42 to 9.36)	**7.0** (5.22 to 9.33)	**2.6** (1.97 to 3.29)	**2.9** (2.10 to 3.99)	**2.2** (1.58 to 2.99)
Panic with agoraphobia	**8.8** (6.34 to 12.27)	**7.0** (3.93 to 12.31)	**10.1** (6.94 to 14.79)	**2.1** (1.43 to 2.98)	1.4 (0.74 to 2.66)	**2.5** (1.64 to 3.80)
Panic without agoraphobia	**3.8** (3.07 to 4.71)	**4.6** (3.26 to 6.43)	**3.4** (2.49 to 4.57)	**1.4** (1.09 to 1.80)	**1.6** (1.05 to 2.33)	1.3 (0.94 to 1.82)
Social phobia	**7.4** (6.09 to 9.04)	**7.3** (5.35 to 9.88)	**7.7** (5.98 to 10.02)	**2.2** (1.74 to 2.77)	**2.3** (1.58 to 3.24)	**2.2** (1.63 to 2.91)
Specific phobia	**3.8** (3.04 to 4.65)	**3.8** (2.82 to 5.13)	**3.7** (2.91 to 4.81)	**1.4** (1.11 to 1.76)	**1.5** (1.02 to 2.04)	**1.4** (1.02 to 1.78)
Generalized anxiety disorder	**6.1** (4.95 to 7.42)	**5.9** (4.33 to 8.11)	**6.3** (4.83 to 8.08)	**1.6** (1.26 to 2.00)	**1.5** (1.03 to 2.13)	**1.7** (1.21 to 2.24)
Posttraumatic stress disorder	**6.4** (5.19 to 7.84)	**6.7** (4.90 to 9.22)	**6.3** (4.85 to 8.21)	**2.3** (1.79 to 2.82)	**2.4** (1.65 to 3.41)	**2.2** (1.64 to 2.92)
Any other personality disorder	**19.0** (15.22 to 23.67)	**14.9** (10.81 to 20.51)	**25.0** (18.44 to 33.81)	**10.3** (8.11 to 13.00)	**8.1** (5.70 to 11.57)	**13.5** (9.59 to 18.89)
Any other Cluster A	**5.6** (4.49 to 6.95)	**5.0** (3.60 to 7.04)	**6.2** (4.74 to 8.13)	1.2 (0.95 to 1.62)	1.2 (0.82 to 1.85)	1.3 (0.87 to 1.83)
Paranoid	**6.0** (4.67 to 7.70)	**5.3** (3.63 to 7.86)	**6.6** (4.96 to 8.87)	**1.3** (1.02 to 1.73)	1.3 (0.85 to 1.95)	1.3 (0.98 to 1.83)
Schizoid	**5.8** (4.36 to 7.78)	**5.2** (3.39 to 7.95)	**6.6** (4.67 to 9.32)	**1.5** (1.06 to 1.99)	1.3 (0.82 to 2.11)	**1.6** (1.11 to 2.27)
Any Cluster B	**21.7** (17.58 to 26.72)	**17.0** (12.43 to 23.20)	**28.2** (21.19 to 37.54)	**11.0** (8.67 to 13.86)	**9.1** (6.39 to 12.98)	**13.4** (9.71 to 18.58)
Antisocial	**4.3** (3.30 to 5.58)	**4.2** (3.00 to 5.74)	**4.7** (3.07 to 7.11)	**1.5** (1.06 to 2.02)	**1.5** (1.01 to 2.29)	1.4 (0.89 to 2.23)
Borderline	**26.5** (21.48 to 32.74)	**23.7** (17.37 to 32.25)	**31.2** (23.48 to 41.50)	**9.0** (7.07 to 11.50)	**8.1** (5.64 to 11.50)	**10.5** (7.39 to 14.80)
Histrionic	**5.4** (3.73 to 7.69)	**5.6** (3.35 to 9.49)	**5.0** (3.16 to 7.96)	1.2 (0.81 to 1.82)	1.2 (0.69 to 2.23)	1.2 (0.71 to 1.87)
Narcissistic	**13.6** (11.16 to 16.54)	**12.0** (9.09 to 15.89)	**15.8** (12.00 to 20.76)	**5.6** (4.46 to 7.02)	**5.3** (3.82 to 7.44)	**6.1** (4.50 to 8.26)
Any Cluster C	**5.4** (4.40 to 6.54)	**4.7** (3.47 to 6.36)	**6.2** (4.85 to 7.86)	**1.6** (1.24 to 2.04)	1.4 (0.98 to 2.07)	**1.8** (1.27 to 2.43)
Avoidant	**7.3** (5.41 to 9.78)	**6.7** (4.21 to 10.64)	**8.0** (5.51 to 11.51)	**1.5** (1.12 to 2.09)	1.4 (0.87 to 2.38)	**1.6** (1.10 to 2.39)
Dependent	**9.4** (4.93 to 11.97)	**12.5** (3.17 to 48.89)	**7.8** (4.02 to 15.22)	1.7 (0.91 to 3.13)	2.2 (0.59 to 8.12)	1.4 (0.71 to 2.66)
Obsessive-compulsive	**4.8** (3.87 to 5.89)	**4.4** (3.14 to 6.05)	**5.3** (4.08 to 6.75)	**1.3** (1.06 to 1.69)	1.3 (0.87 to 1.83)	**1.4** (1.06 to 1.85)

[a]Estimates in boldface are statistically significant ($p < .01$).

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Table 6. Odds Ratios of Lifetime DSM-IV Schizotypal and Other Personality Disorders and the Occurrence of Schizophrenia or Psychotic Episode by Sex[a]

	Odds Ratios Controlling for Sociodemographic Characteristics			Odds Ratios Controlling for Sociodemographic Characteristics and Other Psychiatric Disorders		
Personality Disorder	Total, OR (99% CI)	Men, OR (99% CI)	Women, OR (99% CI)	Total, OR (99% CI)	Men, OR (99% CI)	Women, OR (99% CI)
Cluster A						
Schizotypal	**4.7** (3.51 to 6.34)	**5.5** (3.61 to 8.43)	**4.1** (2.76 to 6.14)	**2.1** (1.51 to 2.93)	**2.6** (1.57 to 4.18)	**1.7** (1.10 to 2.76)
Paranoid	**3.2** (2.33 to 4.45)	**3.8** (2.37 to 6.09)	**2.9** (1.92 to 4.36)	1.3 (0.91 to 1.86)	1.5 (0.89 to 2.53)	1.2 (0.74 to 1.84)
Schizoid	**3.0** (2.01 to 4.34)	**2.9** (1.64 to 5.09)	**3.1** (1.92 to 4.94)	1.3 (0.85 to 1.88)	1.2 (0.64 to 2.10)	1.4 (0.84 to 2.22)
Cluster B						
Antisocial	**2.9** (1.96 to 4.27)	**2.9** (1.80 to 4.77)	**2.8** (1.46 to 5.29)	1.4 (0.94 to 2.14)	1.5 (0.91 to 2.49)	1.3 (0.67 to 2.41)
Borderline	**5.3** (3.93 to 7.06)	**5.8** (3.68 to 9.03)	**4.9** (3.38 to 7.13)	**2.5** (1.76 to 3.42)	**2.6** (1.60 to 4.31)	**2.3** (1.46 to 3.68)
Histrionic	**3.7** (2.40 to 5.54)	**5.2** (2.91 to 9.35)	**2.6** (1.36 to 4.80)	1.5 (0.94 to 2.27)	2.1 (1.00 to 3.94)	1.0 (0.51 to 1.95)
Narcissistic	**2.4** (1.70 to 3.30)	**2.2** (1.41 to 3.56)	**2.6** (1.71 to 3.95)	1.2 (0.85 to 1.77)	1.2 (0.70 to 1.93)	1.3 (0.84 to 2.10)
Cluster C						
Avoidant	**6.4** (4.58 to 8.93)	**9.0** (5.07 to 15.86)	**4.9** (3.33 to 7.33)	**2.6** (1.84 to 3.76)	**3.7** (1.96 to 6.97)	**2.1** (1.31 to 3.29)
Dependent	**15.7** (9.06 to 27.27)	**31.7** (11.24 to 89.55)	**11.6** (6.24 to 21.43)	**5.7** (3.23 to 10.05)	**10.0** (3.39 to 29.71)	**4.6** (2.40 to 8.86)
Obsessive-compulsive	**2.1** (1.59 to 2.83)	**2.2** (1.40 to 3.52)	**2.1** (1.46 to 2.87)	1.0 (0.73 to 1.38)	1.0 (0.63 to 1.71)	1.0 (0.66 to 1.44)

[a]Estimates in boldface are statistically significant ($p < .01$).

avoidant, and obsessive-compulsive personality disorders only among women; conversely, SPD was associated with antisocial personality disorder among men but not women.

Associations of Lifetime SPD and Other Personality Disorders With Schizophrenia or Psychotic Episode by Sex

Table 6 shows the associations of lifetime SPD and the 9 other DSM-IV personality disorders with the occurrence of lifetime self-reported schizophrenia or psychotic episode. Schizotypal and all other personality disorders were significantly ($p < .01$) associated with schizophrenia or psychotic episodes when only sociodemographic characteristics were controlled for. With additional control for lifetime Axis I and II comorbidity, significant ($p < .01$) associations remained for SPD and borderline, avoidant, and dependent personality disorders with schizophrenia or psychotic episodes, but with lower ORs. These results held in the total sample and separately among men and women.

Disability

Schizotypal personality disorder was highly and significantly ($p < .001$) related to each SF-12v2 mental disability score among men and women when only sociodemographic characteristics were controlled for in the analyses. As can be seen in Table 7, respondents with lifetime SPD were shown to have significantly greater disability than those without SPD, even when sociodemographic characteristics and other Axis I and II psychiatric disorders were controlled for.

DISCUSSION

The prevalence of SPD was 3.9% in this general population sample, within the range of estimates (0.0% to 5.2%) found in previous epidemiologic surveys.[3,39–42] The discrepancies in rates of SPD between this study and others may be partly due to limitations of prior surveys with respect to sample size. Differences in diagnostic criteria, assessment instruments, and survey designs and methodologies may also have contributed to the discrepancies.

At variance with prior epidemiologic surveys[3,35,39,40,43] that found no sex differences in SPD, this general population survey found SPD to be significantly more prevalent among males. No epidemiologic survey and only 1 clinical study[85] have examined relationships between SPD and race-ethnicity. Consistent with that clinical study, the present investigation found significantly higher rates of SPD among blacks, specifically among black women. Another new finding of the present study identifies lower rates of SPD among Asian men, but not Asian women, compared with their white counterparts. These differences by race-ethnicity in rates and odds of SPD raise

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Table 7. Associations Between Lifetime Schizotypal Personality Disorder and Mental Disability[a]

	Total		Men		Women	
SF-12v2 Item	Mean (SE)	β (SE)	Mean (SE)	β (SE)	Mean (SE)	β (SE)
Social functioning score	43.3 (0.44)	–2.99 (0.44)***	44.9 (0.63)	–2.94 (0.65)***	41.6 (0.62)	–3.08 (0.61)***
Role emotional functioning score	42.2 (0.43)	–1.86 (0.44)***	44.1 (0.57)	–1.55 (0.60)*	40.2 (0.62)	–2.28 (0.59)**
Mental health score	43.2 (0.38)	–2.17 (0.41)***	45.0 (0.57)	–2.20 (0.66)***	41.3 (0.52)	–2.28 (0.53)***

[a]Multiple linear regression analyses controlled for all sociodemographic characteristics and other Axis I and II psychiatric disorders.
*p < .01, **p < .001, ***p < .0001.
Abbreviation: SF-12v2 = Short Form-12 Health Survey, version 2.

questions regarding the influence of culturally specific experiences on schizotypal personality psychopathology. That is, the differences may be genuine and explained by culturally specific environmental stressors or interactions between stressors and genotype. Alternatively, clinicians' lack of familiarity with culturally sanctioned behaviors among some black subethnic groups, such as premonitions and communications with ancestral spirits, or beliefs about persecution or paranoia that may be genuinely related to experiences of discrimination, may lead to misinterpretation of these characteristics as schizotypal symptomatology. Whether culturally specific experiences protect against or increase vulnerability to SPD, or whether DSM-IV personality disorder categories are culturally uninformed, are important questions for future clinical and epidemiologic research.

Consistent with findings from 1 epidemiologic survey,[39] but not others,[3,43] SPD bore a modest inverse relationship to age in the total sample and separately among men and women, with the greatest decline occurring after age 64 years. Consistent with longitudinal clinical studies initiated among child or adolescent cohorts,[86,87] but at variance with findings from most short-term longitudinal studies of adults,[88–90] this result suggests good temporal stability of SPD. However, the slight age gradient observed in this study may, in part, be artifactual and attributable to longer duration of illness, cohort effects, or recall or other biases. Future prospective work is needed to gain a better understanding of the processes that result in changes in SPD over time.

This study also identified sociodemographic characteristics associated with increased odds of SPD that were not generally reported in previous clinical and epidemiologic research due to limitations of sample size. Rates of SPD were consistently higher among individuals who were separated, divorced, or widowed, and among those with low incomes, results that did not vary by sex. Criteria for SPD, with an emphasis on detached social relationships, constricted affect, and odd behavior, thinking, and speech would be expected to result in interpersonal and occupational dysfunction. However, whether being separated, divorced, or widowed, or of lower socioeconomic status, represents true risk factors for SPD, or vice versa, are questions also best addressed within a longitudinal framework.

Rates of co-occurrence of Axis I and II disorders among individuals with SPD were substantially higher than the corresponding rates of SPD among individuals with other psychiatric disorders. Among individuals with SPD, co-occurrence rates were highest for personality disorders, with men more likely to have selected substance use disorders and women more likely to have most mood and anxiety disorders except bipolar II and panic disorder without agoraphobia. Taken together, these results suggest more vigilance in the assessment of Axis I and II disorders among individuals with SPD, with special attention to sex differences as observed in this study. Though the co-occurrence rates of SPD among individuals with Axis I and other Axis II disorders were much lower, they were not trivial (5.9% to 17.2%), further suggesting that assessment of SPD comorbidity among individuals presenting for other disorders is warranted, especially for MDD, bipolar I disorder, and anxiety disorders among men. Associations found in this study between SPD and mood disorders may indicate the presence of a schizoaffective disorder. However, distinguishing between true mood disorders and schizoaffective disorder is difficult in epidemiologic surveys, and further efforts toward the development of fully structured assessment instruments in this area are warranted.

One prior epidemiologic survey[39] and several clinical studies conducted among outpatients,[14] substance abusers,[11] and personality disorder patients[8–10,12–14] found SPD to be comorbid with MDD and dysthymia (but not bipolar disorders), as well as panic disorder, social phobia, and posttraumatic stress disorder. Despite the relationship observed between cannabis use and SPD symptoms and disorder,[91–94] results for substance use disorders remain mixed, with 1 community study[39] finding associations of SPD with alcohol and drug use disorders and nicotine dependence, and 1 clinical study[10] finding no relationships of SPD to alcohol, cannabis, or other drug use disorders. Further, epidemiologic and clinical research[7,13] has shown strong associations of SPD with other personality disorders, including paranoid, borderline, avoidant, antisocial, and schizoid personality disorders. However, none of these studies controlled for sociodemographic characteristics or other comorbidity.

This study controlled for additional Axis I and II comorbidity as well as sociodemographic characteristics

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when examining associations between SPD and other psychiatric disorders. These adjustments were important, as they allowed for the determination of the unique relationships of SPD to other disorders that themselves are highly comorbid. Associations with narcissistic and borderline personality disorders were reduced, but remained strong and significant among both men and women when both sociodemographic characteristics and other psychiatric disorders were controlled for. The drop in magnitude is analogous to results obtained from twin and genetic study designs and suggests that common causal factors underlie associations of SPD with borderline and narcissistic personality disorders. However, the strength of the remaining associations suggests that unique genetic or environmental factors underlie these disorder-specific associations. For example, the unique factors underlying associations between SPD and borderline personality disorder are not necessarily the same as those underlying associations between SPD and narcissistic personality disorder. Interestingly, the drops in the magnitude of these associations are similar to those in prior work on alcohol and drug use disorders that used similar adjustment methodology.[47,48]

After control for additional comorbidity, significant but weaker 12-month and lifetime associations remained between SPD and bipolar disorders, social phobia, specific phobia, generalized anxiety disorder, and posttraumatic stress disorder among men and women, and paranoid personality disorder in the total sample. A similar pattern was additionally observed for 12-month associations of SPD with drug abuse, MDD, and panic disorder with and without agoraphobia, as well as lifetime associations with drug dependence, panic disorder with agoraphobia, and schizoid, avoidant, and obsessive-compulsive personality disorders among women, and panic disorder without agoraphobia among men. Thus, while some unique disorder-specific associations were found, much of the comorbidity between SPD and these disorders appears to reflect factors common to these disorders. Taken together, the present findings suggest that unique and common factors may differentially contribute to disorder-specific comorbidity with SPD and that some of these associations appear to be sex specific. These results highlight the importance of research examining common and specific factors underlying the comorbidity of SPD with these disorders and a continued need to address sex differences in this comorbidity. Lifetime and 12-month associations of SPD with alcohol use disorders, nicotine dependence, dysthymia, and dependent personality disorder were no longer significant among men or women once comorbidity was controlled for. These results strongly suggest that associations of SPD with these disorders observed in prior studies were largely accounted for by other comorbid Axis I and II disorders.

With few exceptions,[95–97] there is strong evidence from numerous adoption,[25,98,99] family,[22,100–108] and, recently, linkage studies[109,110] to support SPD as a schizophrenia spectrum disorder. Though familial relationships have also been found with paranoid, schizoid, and avoidant personality disorders,[22,100–104] the evidence remains mixed regarding borderline personality disorder as a component of the spectrum.[100,107,108] Of the 2 family studies that examined all DSM-IV personality disorders as putative schizophrenia-related personality disorders, only SPD was found to be associated with schizophrenia.[107,108] To address this question from an epidemiologic perspective, we found that each DSM-IV personality disorder was strongly associated with the occurrence of self-reported schizophrenia or psychotic episode when only sociodemographics were controlled for. Additional control for all other Axis I and II psychiatric disorders reduced the magnitude of the associations between dependent personality disorder and schizophrenia or psychotic episode among men and women, but the ORs remained strong and statistically significant. This new finding suggests that common as well as unique causal factors that may be genetic or environmental underlie the associations between dependent personality disorder and schizophrenia or psychotic episode. Consistent with most, but not all, prior research, associations of schizotypal, avoidant, and borderline personality disorders and schizophrenia or psychotic episode remained significant among men and women but were weakened with control for additional comorbidity, suggesting that much of the relationship between SPD and these 2 personality disorders and schizophrenia or psychotic episode appears to be due to common factors underlying these disorders and that the associations do not appear to be sex specific. Associations of paranoid, schizoid, antisocial, histrionic, narcissistic, and obsessive-compulsive personality disorders with schizophrenia or psychotic episode were no longer significant among men or women when other disorders were controlled for, suggesting that relationships between these personality disorders and schizophrenia observed in prior studies were largely accounted for by other comorbid Axis I and II disorders.

Taken together, the findings of previous family, adoptive, twin, and linkage studies as well as this study suggest that the phenotypic boundaries for molecular genetic studies should be extended beyond core schizophrenia to incorporate measures of SPD as well as borderline, dependent, and avoidant personality disorders to increase sensitivity of identification of the affected phenotype. Incorporation of measures of these personality disorders into linkage studies and studies of gene-environment interactions may considerably enhance power.

Potential study limitations are noted. This study is based on data from the Wave 2 NESARC. We were unable to interview respondents to the Wave 1 interview who

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were deceased or unable or unwilling to participate. However, the Wave 2 response rate, much higher than in most national studies conducted to date, combined with successfully implemented statistical adjustments for nonresponse at both person and household levels on numerous sociodemographic characteristics and the presence of any lifetime Wave 1 Axis I or II disorder, considerably minimized the impact of nonresponse bias on study findings. The prevalence of lifetime schizophrenia or psychotic episode was also based on self-report of these disorders being diagnosed by a physician or other health professional. A future planned national survey in 2011 will also include extensive schizophrenia and psychotic disorder modules once adequate reliability and validity have been achieved in pretests. Although the NESARC sampling frame included group quarters, some special populations such as individuals under 18 years of age and those incarcerated or hospitalized during the interview periods were not included in the sample.

In summary, the prevalence of SPD in the general population is considerable, and the disorder is highly associated with disability among men and women. This study also identified population subgroups at risk for SPD, especially men and black women, that have rarely been described in previous epidemiologic or clinical studies. Importantly, the inverse relationship of SPD and age was modest, suggesting that the disorder may be more stable among adults than previously recognized. Future prospective studies are needed to determine the course of SPD over the life span and to elucidate the temporal relationships between SPD and other psychiatric disorders. This study has also highlighted the need for future epidemiologic, clinical, and genetically informed studies to identify unique and common factors underlying the disorder-specific comorbidity with SPD found in the NESARC sample. Important sex differences in associations between SPD and other specific Axis I and II disorders can inform more focused, hypothesis-driven investigations of factors that underlie the comorbid relationships. Finally, this study has shown that schizotypal as well as borderline, dependent, and avoidant personality disorders may be components of the schizophrenia spectrum. As such, inclusion of measures of these personality disorders could enhance the power of future genetic research.

Disclosure of off-label usage: The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside U.S. Food and Drug Administration–approved labeling has been presented in this article.

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After studying the article by Pulay et al., you should be able to:

- Identify patients who have risk factors for and/or features of schizotypal personality disorder.

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This pretest is designed to facilitate your study of the material.

1. **Schizotypal personality disorder is highly and independently related to mental disability, highlighting its clinical significance, among both men and women.**
   a. True
   b. False

For Pretest answer and Posttest, see pages 87–88.

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Pulay et al. pp. 53–67

1. **Although schizotypal personality disorder (SPD) was significantly more prevalent among men, _____ were also at increased risk for developing the disorder.**
   a. Asian women
   b. Women aged 65 years and older
   c. Black women
   d. Women with low education levels

2. **Other socioeconomic factors, like _____, were also related to SPD in men and women.**
   a. Low education level
   b. Low economic status and being separated, divorced, or widowed
   c. Region of residence
   d. Living in urban areas

3. **Screening for SPD is indicated among patients with potentially increased SPD frequency, like men with:**
   a. Alcohol abuse
   b. Nicotine dependence
   c. Obsessive-compulsive personality disorder
   d. Major depressive disorder, bipolar I disorder, and anxiety disorders

4. **Men and women with SPD had substantially different patterns of psychiatric comorbidity, with:**
   a. Men having higher rates of nicotine dependence and women being more prone to antisocial personality disorder
   b. Anxiety and mood disorders being more prevalent among men and substance use disorders being more prevalent among women
   c. Substance use disorders being more prevalent among men, while mood and anxiety disorders were more common among women
   d. Higher rates of bipolar I disorder among men and bipolar II disorder among women

5. **Among the 10 DSM-IV personality disorders, _____ was/were independently associated with psychotic episode/schizophrenia, emphasizing the importance of carefully monitoring these patients for psychosis.**
   a. Only SPD
   b. Schizotypal, borderline, avoidant, and dependent personality disorders
   c. Only Cluster A personality disorders
   d. All personality disorders

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2. This activity provided a balanced, scientifically rigorous presentation of therapeutic options related to the topic, without commercial bias.	❑	❑	❑	❑	❑
3. The educational content was relevant to the stated educational objectives.	❑	❑	❑	❑	❑
4. This activity helped me to:					
A. Identify patients who have risk factors for and/or features of schizotypal personality disorder.	❑	❑	❑	❑	❑
5. This activity confirmed the way I already manage my patients.	❑	❑	❑	❑	❑
6. This activity provided practical suggestions I can use in my practice.	❑	❑	❑	❑	❑
7. This activity provided information that will help me change my practice.	❑	❑	❑	❑	❑

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_____

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