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Prevalence, Persistence, and Sociodemographic Correlates of *DSM-IV* Disorders in the National Comorbidity Survey Replication Adolescent Supplement

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Context: Community epidemiological data on the prevalence and correlates of adolescent mental disorders are needed for policy planning purposes. Only limited data of this sort are available.

Objective: To present estimates of 12-month and 30-day prevalence, persistence (12-month prevalence among lifetime cases and 30-day prevalence among 12-month cases), and sociodemographic correlates of commonly occurring *DSM-IV* disorders among adolescents in the National Comorbidity Survey Replication Adolescent Supplement.

Design: The National Comorbidity Survey Replication Adolescent Supplement is a US national survey of *DSM-IV* anxiety, mood, behavior, and substance disorders among US adolescents based on face-to-face interviews in the homes of respondents with supplemental parent questionnaires.

Setting: Dual-frame household and school samples of US adolescents.

Participants: A total of 10 148 adolescents aged 13 to 17 years (interviews) and 1 parent of each adolescent (questionnaires).

Main Outcome Measures: The *DSM-IV* disorders assessed with the World Health Organization Composite International Diagnostic Interview and validated with blinded clinical interviews based on the Schedule for Affective Disorders and Schizophrenia for School-Age Children. Good concordance (area under the receiver operating characteristic curve ≥0.80) was found between Composite International Diagnostic Interview and Schedule for Affective Disorders and Schizophrenia for School-Age Children diagnoses.

Results: The prevalence estimates of any *DSM-IV* disorder are 40.3% at 12 months (79.5% of lifetime cases) and 23.4% at 30 days (57.9% of 12-month cases). Anxiety disorders are the most common class of disorders, followed by behavior, mood, and substance disorders. Although relative disorder prevalence is quite stable over time, 30-day to 12-month prevalence ratios are higher for anxiety and behavior disorders than mood or substance disorders, suggesting that the former are more chronic than the latter. The 30-day to 12-month prevalence ratios are generally lower than the 12-month to lifetime ratios, suggesting that disorder persistence is due more to episode recurrence than to chronicity. Sociodemographic correlates are largely consistent with previous studies.

Conclusions: Among US adolescents, *DSM-IV* disorders are highly prevalent and persistent. Persistence is higher for adolescents than among adults and appears to be due more to recurrence than chronicity of child-adolescent onset disorders.

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MOST ADULT MENTAL DISorders begin in childhood or adolescence,[1] highlighting the importance of understanding the onset and progression of mental disorders among youths. Although progress has been made in epidemiological understanding of these issues,[2] gaps continue to exist. One such gap is that US national data on the prevalence and correlates of child-adolescent disorders are unavailable. The US national prevalence estimates that exist have been derived from

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dimensional ratings and service indicators, but these are imprecise.[3] Epidemiological studies using structured diagnostic interviews have been carried out in

regional samples, but these have limited generalizability.[4-6] One recent study assessed mental disorders in a US national sample of youths, but this study included a restricted number of disorders.[7] More broad-based national data could help confirm findings from regional studies, set future research agendas, and inform federal resource allocation decisions for prevention and treatment.

The National Comorbidity Survey Replication Adolescent Supplement (NCS-A) was carried out to fill these gaps in epidemiological understanding as the first US national survey of adolescents to assess a wide range of *DSM-IV* disorders using fully structured research diagnostic interviews. Previous reports described the NCS-A sample design,[8,9] measurements,[10] validity of diagnostic assessments,[11] and reported lifetime prevalence and selected sociodemographic correlates.[12] This study presents new data on 12-month and 30-day prevalence and on persistence of disorders. Extensive appendix tables (http://www.hcp.med.harvard.edu/ncs/publications.php) provide detailed sociodemographic data on subsample disorder prevalence and persistence. In addition, a public use version of the full deidentified individual-level NCS-A data set has also been made available for secondary analysis. A companion article presents data on 12-month severity.[13]

METHODS

SAMPLE

Adolescents (aged 13-17 years) were interviewed between February 5, 2001, and January 31, 2004, in dual-frame household and school samples described elsewhere.[8,9] The NCS-A household sample included 904 adolescents (879 students in school, 25 dropouts) from households in the National Comorbidity Survey Replication.[14] The conditional adolescent response rate was 86.8%. The NCS-A school sample included 9244 adolescents from a representative sample of schools in the adult sample areas. The conditional adolescent response rate was 82.6%. The household sample, despite comparatively small size, is important because it includes school dropouts and adolescents residing in areas where schools refused to participate. The nonparticipating initially selected schools (72.0%) were replaced with matched replacement schools. Comparison of household sample respondents from nonparticipating schools with school sample respondents from replacement schools found no evidence of bias in estimates of either disorder prevalence or correlates.[8] One parent or surrogate (henceforth described as *parents*) of participating adolescents was asked to complete a self-administered questionnaire about the adolescent's developmental history and mental health. The conditional response rates were 82.5% for household samples and 83.7% for school samples.

This article focuses on the 10 123 adolescents in school at the time of survey, the subset of 6483 adolescent-parent pairs with both adolescent interviews and parent questionnaires, and the additional subset of 1987 pairs with adolescent interviews and short-form questionnaires administered to hard-to-recruit parents. Data for parent-adolescent pairs were weighted to adjust for differences in measured variables compared with incomplete pairs using methods discussed elsewhere.[8,9] Written parent informed consent and written adolescent assent were obtained before surveying either adolescents or parents. Each respondent was given $50 for participation. The recruitment and consent procedures were approved by the human subjects committees of both Harvard Medical School and the University of Michigan. Once the survey was completed, cases were weighted for within-household probability of selection (household sample) and deviation from census population sociodemographic distributions, making each sample nationally representative on the sociodemographic variables. The samples were then merged with sums of weights proportional to relative sample sizes adjusted for design effects in estimating disorder prevalence. These procedures are detailed elsewhere.[8,9] As documented in previous NCS-A reports,[8,9] the weighted composite sample sociodemographic and geographic distributions closely approximate census population distributions.

MEASURES

Diagnostic Assessment

Adolescents in the NCS-A were administered the fully structured Composite International Diagnostic Interview (CIDI) modified to simplify language and use examples relevant to adolescents.[10] The *DSM-IV* and CIDI disorders assessed include mood disorders (major depressive disorder or dysthymia, bipolar I or II disorder), anxiety disorders (panic disorder with or without agoraphobia, agoraphobia without panic disorder, social phobia, specific phobia, generalized anxiety disorder, posttraumatic stress disorder, separation anxiety disorder), behavior disorders (attention-deficit/hyperactivity disorder, oppositional-defiant disorder, conduct disorder), eating disorders (anorexia nervosa, bulimia nervosa, binge-eating behavior), and substance disorders (alcohol and drug abuse, alcohol and drug dependence with abuse). There were no other exclusionary diagnoses. These disorders include all those assessed in most previous adolescent epidemiological studies.

All diagnoses were made using *DSM-IV* distress or impairment criteria and organic exclusion rules. All but 2 were made using diagnostic hierarchy rules, the exceptions being oppositional-defiant disorder with or without conduct disorder and substance abuse with or without dependence. Adolescent interviews assessed all disorders, while briefer parent questionnaires assessed only disorders for which parent reports have previously been shown to play a large part in diagnosis: behavior disorders[15] and depression or dysthymia.[16] Parent and adolescent reports were combined at the symptom level using an "or" rule (except in the case of attention-deficit/hyperactivity disorder where only parent reports were used based on evidence of low validity of adolescent reports). Exploratory analyses showed that the use of this "or" rule optimized concordance with diagnoses in the NCS-A clinical reappraisal study.[11] Prevalence was assessed for 3 times: lifetime, past 12 months, and past 30 days. Lifetime disorders were defined as present whether they were or were not also present in the past 12 months or 30 days. Twelve-month disorders were defined as present whether they were or were not also present in the past 30 days. Disorders with longer than a 30-day duration requirement were defined as present in the past 30 days only if they had durations meeting the minimum *DSM-IV* requirement. Special probing procedures shown experimentally to increase recall of lifetime adult disorders[17] were used to address the problem of underestimation of lifetime prevalence in retrospective cross-sectional surveys of adults[17,18] and youths.[1]

An NCS-A clinical reappraisal study used licensed clinicians to interview adolescent-parent pairs by telephone with the Schedule for Affective Disorders and Schizophrenia for School-Age Children Lifetime Version.[19] Diagnoses were made from combined parent-adolescent reports and, as needed, reconciliation interviews. Concordance was good between lifetime survey and clinical diagnoses, with areas under the re-

Table 1. Sociodemographic Distributions of the Unweighted and Final Weighted Sample Data

Sociodemographic Variable	% (SE)	
	Unweighted	Weighted
Age, y		
13	16.3 (1.3)	15.2 (1.4)
14	21.9 (1.1)	21.0 (1.1)
15	18.6 (0.6)	20.5 (0.8)
16	19.9 (0.9)	21.0 (1.2)
17-18	23.3 (1.2)	22.3 (1.0)
Sex		
Male	48.9 (0.5)	51.3 (0.9)
Female	51.1 (0.5)	48.8 (0.9)
Race		
Hispanic	18.9 (1.0)	14.4 (1.2)
Non-Hispanic black	19.3 (1.1)	15.1 (1.0)
Other	6.1 (0.4)	5.0 (0.6)
Non-Hispanic white	55.7 (1.4)	65.6 (1.6)
Parents' education		
<High school	16.6 (0.7)	15.5 (1.0)
High school graduate	30.4 (0.7)	29.7 (1.3)
Some college	19.7 (0.6)	19.4 (0.7)
College graduate	33.2 (1.0)	35.3 (1.6)
Family income		
Low	17.0 (0.7)	14.7 (0.8)
Low average	20.0 (0.4)	19.1 (0.5)
High average	30.6 (0.6)	31.9 (0.8)
High	32.4 (0.9)	34.3 (1.2)
Census region		
Northeast	18.5 (1.0)	18.1 (2.4)
Midwest	27.4 (1.0)	23.3 (2.2)
South	33.9 (0.7)	36.0 (2.7)
West	20.2 (0.5)	22.6 (2.3)
Urbanicity		
Census major metropolitan area	44.5 (0.9)	47.5 (2.4)
Other urbanized county	32.6 (1.4)	37.6 (3.0)
Rural county	22.8 (1.4)	14.9 (2.0)
Biological parents living with adolescent, No.		
0	9.6 (0.4)	9.3 (0.7)
1	37.5 (0.7)	35.7 (1.1)
2	52.9 (1.0)	55.0 (1.3)
Birth order		
Oldest	30.3 (0.5)	33.6 (0.8)
Middle	37.4 (0.6)	33.0 (0.8)
Youngest	27.5 (0.5)	27.9 (0.9)
Only	4.8 (0.3)	5.5 (0.3)
Siblings, No.		
≥3	43.8 (0.8)	39.6 (0.9)
2	26.0 (0.5)	26.5 (0.7)
1	25.4 (0.6)	28.4 (0.8)
0	4.8 (0.3)	5.5 (0.3)

ceiver operating characteristic curves of 0.81 to 0.94 for fear disorders, 0.79 to 0.86 for distress disorders, 0.78 to 0.98 for behavior disorders, 0.92 to 0.98 for substance disorders, and 1.0 for bipolar disorder.[11] Survey vs clinical absolute (ie, as a proportion of the entire sample) prevalence differences of 1% or more were found for 5 diagnoses: 1% to 2% for agoraphobia, illicit drug dependence, and major depression or dysthymia, 4% for oppositional-defiant disorder, and 6.5% for specific phobia. Most of these differences represent large proportions of the clinical prevalence estimates. The CIDI overdiagnosed 4 of these 5 disorders and underdiagnosed major depression or dysthymia. That prevalence differences were smaller for the other diagnoses shows that diagnostic thresholds are generally comparable for survey and clinical diagnoses. Parent and adolescent reports both contributed to area under the curve when both were assessed, with respective values based on adolescent, parent, and combined reports of 0.75, 0.71, and 0.87 for depression or dysthymia; 0.57, 0.71, and 0.78 for attention-deficit/hyperactivity disorder; 0.71, 0.66, and 0.85 for oppositional-defiant disorder; and 0.59, 0.96, and 0.98 for conduct disorder.

Special caution is needed in interpreting 2 controversial diagnoses: bipolar disorder and agoraphobia without panic disorder. Consistent with concerns about diagnostic reliability[20] and clinical significance[21] of bipolar II disorder, clinical reappraisal data show that the CIDI has difficulty distinguishing bipolar II disorder from subthreshold bipolar disorder among both adolescents[11] and adults.[22] Second, controversy also exists about the validity[23] and ability of fully structured interviews to distinguish agoraphobia without panic disorder from specific phobia.[24]

Sociodemographic Variables

The sociodemographic variables considered here include 6 of the 7 used in the earlier NCS-A report on lifetime prevalence[12]—age, sex, race/ethnicity, parents' education, family income, and urbanicity—in addition to region of the country, number of siblings, and birth order. Rather than consider the seventh sociodemographic variable, marital status of parents, from the earlier NCS-A article on lifetime prevalence, we consider the closely related measure of number of biological parents living with the respondent because we found this to be a stronger predictor of disorder prevalence and persistence than marital status of parents (detailed results are available on request). Taken together, these 10 sociodemographic variables include all those examined in most previous epidemiological studies of child-adolescent mental disorders.

STATISTICAL ANALYSIS

Prevalence was estimated with cross-tabulations, and persistence was estimated with 2 prevalence ratios (12-month prevalence among lifetime cases; 30-day prevalence among 12-month cases). Sociodemographic correlates were examined with logistic regression either in the total sample (to predict prevalence) or in subsamples of respondents with lifetime disorders (to predict 12-month prevalence among lifetime cases) or 12-month disorders (to predict 30-day prevalence among 12-month cases). Logistic regression coefficients and their standard errors were exponentiated to create odds ratios (ORs) with 95% CIs. Standard errors were estimated using the Taylor series linearization method to account for sample weights and clustering. Significance of predictor sets was evaluated using Wald χ^2 tests based on the 44 NCS-A sample strata using Taylor series coefficient variance-covariance matrices. These procedures were implemented using the SUDAAN software system version 8.01 (Research Triangle Institute). Statistical significance was consistently evaluated using 2-sided tests at the α level of .05.

RESULTS

SAMPLE REPRESENTATIVENESS

As shown in more detail elsewhere,[8,9] the NCS-A sample is highly representative of the US population of adolescents aged 13 to 17 years on a wide range of sociodemographic and geographic variables. Weighting did not have a strong effect on these distributions (**Table 1**), indi-

Table 2. Estimates of 12-Month and 30-Day Prevalence Estimates and 12-Month to Lifetime and 30-Day to 12-Month Prevalence Ratios of *DSM-IV* and Composite International Diagnostic Interview Disorders in the Total Sample[a]

	% (SE)			
	Prevalence		Prevalence Ratio	
Disorder	12-mo	30-d	12-mo/Lifetime	30-d/12-mo
Mood disorder				
Major depressive disorder or dysthymia	8.2 (0.8)	2.6 (0.3)	70.2 (3.1)	31.8 (2.7)
Bipolar I or II disorder	2.1 (0.2)	0.7 (0.1)	72.3 (4.0)	32.0 (3.7)
Any mood disorder	10.0 (0.8)	3.1 (0.4)	69.8 (2.4)	31.5 (2.5)
Anxiety disorder				
Agoraphobia[b]	1.8 (0.2)	0.8 (0.1)	74.6 (4.6)	43.7 (6.7)
Generalized anxiety disorder	1.1 (0.2)	0.4 (0.1)	51.2 (5.4)	35.3 (7.8)
Social phobia	8.2 (0.4)	4.6 (0.3)	90.9 (1.7)	55.7 (3.3)
Specific phobia	15.8 (0.8)	9.5 (0.6)	81.9 (1.4)	60.2 (1.7)
Panic disorder[c]	1.9 (0.2)	0.8 (0.1)	81.7 (3.1)	40.0 (5.2)
Posttraumatic stress disorder	3.9 (0.4)	1.6 (0.2)	78.1 (2.7)	41.9 (3.1)
Separation anxiety disorder	1.6 (0.2)	0.6 (0.1)	20.9 (2.2)	36.0 (5.5)
Any anxiety disorder	24.9 (0.9)	14.9 (0.6)	77.9 (1.3)	60.1 (1.4)
Behavior disorder				
Attention-deficit/hyperactivity disorder	6.5 (0.5)	4.5 (0.3)	74.6 (2.5)	68.6 (3.6)
Oppositional-defiant disorder	8.3 (0.7)	2.9 (0.3)	66.0 (3.2)	34.2 (3.6)
Conduct disorder	5.4 (0.8)	1.5 (0.3)	78.4 (3.7)	27.5 (4.5)
Eating disorder	2.8 (0.2)	1.1 (0.1)	54.0 (3.1)	38.8 (4.1)
Any behavior disorder	16.3 (1.1)	7.6 (0.7)	72.1 (2.4)	46.8 (2.6)
Substance disorder				
Alcohol abuse with or without dependence	4.7 (0.3)	1.3 (0.1)	73.6 (2.2)	27.3 (2.8)
Drug abuse with or without dependence	5.7 (0.5)	1.6 (0.3)	64.1 (3.2)	27.8 (3.3)
Any substance disorder	8.3 (0.5)	2.6 (0.3)	73.3 (2.3)	31.2 (3.0)
Total disorders, No.				
Any	40.3 (1.2)	23.4 (1.0)	79.5 (1.2)	57.9 (1.7)
Exactly 1	21.9 (0.8)	16.4 (0.8)	66.1 (2.1)[d]	43.2 (2.0)[e]
Exactly 2	8.7 (0.6)	4.8 (0.5)	86.2 (1.9)[d]	67.9 (3.0)[e]
≥3	9.8 (0.7)	2.2 (0.3)	95.4 (1.2)[d]	82.5 (2.7)[e]

[a] All disorders other than oppositional-defiant disorder and substance disorders are classified using *DSM-IV* diagnostic hierarchy rules. Oppositional-defiant disorder is diagnosed with or without conduct disorder. Alcohol and drug abuse are diagnosed with or without dependence. While diagnoses of most disorders are based exclusively on adolescent reports, parent reports are used to make diagnoses of major depressive disorder or dysthymia, oppositional-defiant disorder, conduct disorder, and attention-deficit/hyperactivity disorder. The first 3 of these 4 disorders were assessed in the sample that completed the full parent self-administered questionnaire (n = 6483), whereas attention-deficit/hyperactivity disorder was assessed in both the full self-administered questionnaire sample and in the subsample of parents who completed the short-form self-administered questionnaire (n = 8470). As a result, prevalence estimates of any mood disorder, any behavior disorder, any disorder, and number of disorders are based on 6483 cases.

[b] Agoraphobia is diagnosed without a history of panic disorder.

[c] Panic disorder is assessed with or without agoraphobia.

[d] The percentage of respondents with the number of lifetime disorders indicated in the row who have 1 or more 12-month disorders. For example, 86.2% of the respondents with a lifetime history of exactly 2 disorders had 1 or more disorders in the 12 months before interview.

[e] The percentage of respondents with the number of 12-month disorders indicated in the row who have 1 or more 30-day disorders. For example, 67.9% of the respondents with a 12-month history of exactly 2 disorders had 1 or more disorders in the 30 days before interview.

cating that response rates were quite comparable in major sociodemographic and geographic segments of the population.

PREVALENCE AND PREVALENCE RATIOS

The previous NCS-A article on lifetime prevalence reported that more than half of respondents meet lifetime criteria for any *DSM-IV* disorder.[12] As shown in **Table 2**, estimates of overall 12-month and 30-day prevalence are 40.3% (79.5% of lifetime prevalence) and 23.4% (57.9% of 12-month prevalence). Rank-order correlations of prevalence estimates across time frames are 0.91 (lifetime with 12 months), 0.85 (lifetime with 30 days), and 0.96 (12 months with 30 days). Separation anxiety disorder has the most dramatic variation in ranking (seventh most common lifetime disorder and 14th most common 12-month and 30-day disorder), reflecting the fact that separation anxiety disorder is the only disorder considered here that often resolves before adolescence. Anxiety disorders are the most common class of disorders in all time frames, followed by behavior, mood, and substance disorders.

Variation in prevalence rankings across time frames means that disorders differ in persistence, a fact shown more directly in the disorder-specific 12-month to lifetime and 30-day to 12-month prevalence ratios, although it needs to be noted that even these ratios assess persistence only indirectly given that duration of persistence varies as a function of time since onset. In the extreme case of respondents with first onsets in the 12 months before interview, 100% are considered persistent in these ratios by definition. As a result, the ratios have to be interpreted as suggestive rather than defini-

tive. Nonetheless, the 12-month to lifetime ratios have a wide range across disorders (from 20.9% for separation anxiety disorder to 90.9% for social phobia) but a narrow interquartile range (66.0%-78.4%). That the lower bound of this range represents nearly two-thirds of cases suggests that most disorders are highly persistent during adolescence. High persistence could be due to either disorder chronicity or recurrence. To the extent that the former is more important, we would expect the 30-day to 12-month prevalence ratios to be higher than the 12-month to lifetime prevalence ratios. The opposite is the case, though, in the NCS-A data, with an interquartile range of 32.7% to 43.7% for the 30-day to 12-month prevalence ratios vs 66.0% to 78.4% for the 12-month to lifetime prevalence ratios. Considered as classes, anxiety and behavior disorders have much higher 30-day to 12-month ratios (60.1% and 46.8%, respectively) than mood (31.5%) or substance (31.2%) disorders.

SOCIODEMOGRAPHIC CORRELATES

The previous NCS-A report on lifetime prevalence examined 6 of the 10 sociodemographic variables considered here in predicting lifetime prevalence of classes of disorder and any disorder.[12] We focus here on associations of sociodemographic variables with individual disorders for each prevalence time frame and ratio. Nearly one-third (30.3%) of the resulting 640 associations (10 predictors of 15 disorders for each of 4 time frames or ratios) are significant at the $\alpha = .05$ (2-sided test) level in bivariate models, and about one-fourth (26.4%) are significant in multivariate models (**Table 3**). The highest proportions of significant (bivariate and multivariate) coefficients are for 12-month prevalence (43.7% and 36.37%, respectively) followed by 30-day prevalence (38.7% and 31.3%, respectively), with much lower proportions significant for 12-month to lifetime (19.4% and 18.0%, respectively) and 30-day to 12-month (19.4% and 20.0%, respectively) prevalence ratios. The proportions of significant bivariate and multivariate coefficients are similar for most sociodemographic variables, which means that multivariate controls do not have dramatic effects on the estimates. The exceptions are parents' education (40.0% and 23.7%, respectively), birth order (32.5% and 17.5%, respectively), and number of siblings (51.2% and 22.5%, respectively). We consequently focus on multivariate associations, but we compare bivariate and multivariate associations when they differ meaningfully. Only summary patterns are reviewed here. However, complete results for all bivariate and multivariate associations are available at http://www.hcp.med.harvard.edu/ncs/index.php.

Age

Age is associated with 37.5% of 12-month disorders and 43.7% of 30-day disorders. The disorders not significantly related to age mostly begin before adolescence (eg, phobias, attention-deficit/hyperactivity disorder) (R.C.K., S.A., E.J.C., J.G.G., K.A.M., N.A.S., A.M.Z., K.R.M., and Matthew D. Lakoma, MPH, unpublished data, February 5, 2001, and January 31, 2004).[25] The shape of significant age differences is complex as some disorders are inversely related to age, others are positively related, and others are highest at intermediate ages. Age is significantly related to 18.7% of the 12-month to lifetime prevalence ratios and 37.5% of the 30-day to 12-month prevalence ratios, mostly involving negative associations (ORs, 0.1-0.6) of age with later-onset disorders.

Sex

Girls have significantly higher 12-month and 30-day prevalence of all mood and anxiety disorders and eating disorders than boys, with most ORs in the range of 1.5 to 2.5. Boys have significantly higher prevalence of almost all behavior and substance disorders than girls, with most ORs in the range of 0.3 to 0.8. Prevalence ratios are significantly higher among girls than boys for most mood and anxiety disorders (44.4%), with most significant ORs in the range of 1.5 to 3.0. Sex differences in these ratios are generally nonsignificant for behavior and substance disorders.

Race/Ethnicity

Nearly one-third (31.2%) of multivariate associations between race/ethnicity and prevalence are significant, the most consistent involving lower prevalence of behavior and substance disorders among minority races/ethnicities than non-Hispanic white individuals, with significant ORs in the range of 0.2 to 0.8. Race/ethnicity is related to a much smaller proportion (15.6%) of prevalence ratios, with no consistent sign pattern, which means that race/ethnicity is generally not related to persistence of disorders.

Family Socioeconomic Status

Half of the bivariate associations but only one-fourth of the multivariate associations between parent education and prevalence are significant. The most consistent pattern here is for higher prevalence of diverse disorders among offspring of parents with less than college education vs college graduates (ORs, 1.6-2.6). One-fourth of the multivariate associations between parent education and prevalence ratios are also significant, but the sign pattern is inconsistent. Family income is significantly related to 28.1% of prevalence estimates in bivariate models and 25.0% in multivariate models with inconsistent signs. A similarly inconsistent sign pattern is found in associations between family income and prevalence ratios.

Family Composition

Number of biological parents living with the adolescent is the most consistently significant sociodemographic predictor of prevalence (65.1%). Prevalence is inversely related to number of biological parents in the household. Significant ORs are mostly in the range of 1.5 to 2.0 in predicting mood and anxiety disorders and 2.7 to 6.1 in predicting behavior and substance disorders. Associations with prevalence ratios are less consistently significant (18.7%), although they are consistently negative in sign. More than one-third (37.5%) of multivariate associations between birth order and prevalence are significant in bi-

Table 3. Proportions of Associations Between Individual Sociodemographic Variables and *DSM-IV* and Composite International Diagnostic Interview Disorders That Are Significant at the $\alpha = .05$ (2-Sided Test) Level in Bivariate and Multivariate Logistic Regression Equations in the Total Sample[a]

	%				
	Prevalence		Prevalence Ratio		
Sociodemographic Variable[b]	12-mo	30-d	12-mo/Lifetime	30-d/12-mo	Total
Age					
Bivariate	25.0	50.0	25.0	18.7	29.7
Multivariate	37.5	43.7	18.7	37.5	34.3
Sex					
Bivariate	75.0	50.0	37.5	12.5	43.7
Multivariate	68.7	50.0	37.5	6.2	40.6
Race/ethnicity					
Bivariate	31.2	37.5	6.2	12.5	21.8
Multivariate	31.2	31.2	12.5	18.7	23.4
Parents' education					
Bivariate	56.2	43.7	18.7	12.5	32.8
Multivariate	18.7	31.2	25.0	25.0	25.0
Family income					
Bivariate	31.2	25.0	18.7	12.5	21.8
Multivariate	31.2	18.7	25.0	18.7	23.4
No. of biological parents living with adolescent					
Bivariate	81.2	50.0	25.0	12.5	42.2
Multivariate	81.2	50.0	25.0	12.5	42.2
Birth order					
Bivariate	37.5	37.5	12.5	37.5	31.2
Multivariate	25.0	12.5	12.5	18.7	17.2
No. of siblings					
Bivariate	56.2	62.5	37.5	31.2	46.9
Multivariate	37.5	12.5	6.2	18.7	13.1
Urbanicity					
Bivariate	12.5	0.0	12.5	6.2	7.8
Multivariate	6.2	12.5	12.5	12.5	10.9
Region					
Bivariate	31.2	31.2	0.0	37.5	25.0
Multivariate	25.0	50.0	6.2	31.2	28.1
Total					
Bivariate	43.7	38.7	19.4	19.4	30.3
Multivariate	36.3	31.3	18.0	20.0	26.4

[a] Each bivariate equation includes a single sociodemographic variable to predict 1 of the 16 *DSM-IV* or Composite International Diagnostic Interview disorders in 1 of 2 time frames (12-month and 30-day prevalence) in the total sample or in 1 of 2 prevalence ratios in subsamples (12-month prevalence among lifetime cases, 30-day prevalence among 12-month cases). This results in a total of 64 bivariate equations (each of 16 disorders in each of 4 time frames) for each sociodemographic variable. Each multivariate equation includes all 10 sociodemographic variables to predict 1 of the 16 disorders in 1 of the same 4 time frames, again resulting in 64 associations involving each sociodemographic variable. Sex is the only dichotomous sociodemographic variable. The others have either 3 categories (eg, 0, 1, or 2 biological parents living with the adolescent) or 4 categories (eg, residence in 1 of the 4 census regions: Northeast, Midwest, South, or West), which were treated as a series of 2 or 3 dummy predictor variables in logistic regression equations. The statistical significance of each association was evaluated using Wald χ^2 tests with $c - 1$ *df*, where *c* represents the number of categories in the predictor variable. The entries in the table represent the proportion of times this χ^2 test was significant at the $\alpha = .05$ (2-sided test) level using design-based significance tests. While diagnoses of most disorders are based exclusively on adolescent reports, parent reports are used to make diagnoses of major depressive disorder or dysthymia, oppositional-defiant disorder, conduct disorder, and attention-deficit/hyperactivity disorder. The first 3 of these 4 were assessed in the full parent self-administered questionnaire (n = 6483), whereas attention-deficit/hyperactivity disorder was assessed in both the full self-administered questionnaire and the short-form self-administered questionnaire (n = 8470). As a result, prevalence estimates of any mood disorder, any behavior disorder, any disorder, and number of disorders are based on 6483 cases.

[b] See the text for a description of the response categories in each of the sociodemographic variables.

variate models, and 12.5% are significant in multivariate models. The most consistent pattern is lower prevalence of behavior disorders (conduct disorder, eating disorders) among only children (ORs, 0.1-0.5 in bivariate models and 0.3-0.8 in multivariate models). Birth order among adolescents with siblings, in comparison, is only rarely significant. Associations of birth order with prevalence ratios have no consistent sign pattern. Number of siblings among those with any is significantly related to prevalence in 59.3% of bivariate models and 18.7% of multivariate models. The significant associations (ORs, 0.1-0.5 in bivariate models and 0.3-0.8 in multivariate models) almost entirely involve lower prevalence of diverse disorders among adolescents with 1 vs 2 or more siblings. Associations with prevalence ratios have inconsistent signs.

Geography

Urbanicity is significantly related to 12.5% of bivariate and 6.2% of multivariate 12-month prevalence estimates, most involving lower prevalence among respondents in rural than urban areas (ORs, 0.3-0.7), and in-

consistently related to prevalence ratios. Region is the only sociodemographic variable associated with a much higher proportion of multivariate 30-day prevalence estimates (50.0%) than 12-month prevalence estimates (25.0%). These associations largely involve lower prevalence of disorders in the South than other parts of the country (ORs, 0.6-0.8). Region is inconsistently related to prevalence ratios.

COMMENT

Three noteworthy limitations of the NCS-A concern sampling: (1) the school-level response rate was very low; (2) the individual-level response rate was relatively low; and (3) the sample excluded school dropouts, homeless individuals, and non-English speakers. As we noted, methodological analysis of the first limitation found no evidence for bias due to school replacement.[8] However, the finding in previous methodological studies that nonrespondents have higher rates of mental illness than respondents implies that the second limitation led prevalence estimates to be conservative[26] and might also have influenced estimates of persistence and correlates. The exclusion of non-English speakers, who compose about 4% of the US adult population (http://factfinder2.census.gov/), could also be at least partially responsible for the failure to find strong associations of race/ethnicity with prevalence of persistence.

Two other limitations concern measurement: (1) diagnoses were based on fully structured interviews and parent questionnaires for a subset of diagnoses; and (2) lifetime diagnoses were based on retrospective recall. Concern about the first limitation is reduced by evidence of good concordance with diagnoses based on blinded clinical interviews,[11] although prevalence estimates of simple phobia and oppositional-defiant disorder are substantially higher than those in the blinded clinical reappraisal interviews. The second limitation presumably led to underestimation of prevalence, overreporting of persistence, and possible distortion in estimates of correlates, possibly in a differential way across disorders as a function of differences in age at onset and severity.[18]

Despite the largely conservative limitations of the biases with respect to estimating prevalence, NCS-A prevalence estimates are at the upper end of the range of estimates in previous epidemiological studies. This likely reflects the survey including more disorders than other studies and using special recall probes.[17] It is noteworthy that 2 disorders with among the highest prevalence, specific phobia and oppositional-defiant disorder, were overestimated in the CIDI.[11] Prevalence estimates are most similar to estimates in previous adolescent studies that did not require special criteria for severe functional impairment beyond *DSM-IV* distress or impairment requirements.[27] Of note, our companion article[13] reports that most 12-month disorders in the survey do not meet criteria for a diagnosis of serious emotional disturbance (ie, a *DSM-IV* disorder with a Children's Global Assessment Scale score ≤50).[28] Whether less severe disorders should be included in future *DSM* editions is the subject of controversy.[29] As noted in the previous National Comorbidity Survey Replication report on lifetime prevalence,[12] the fact that most disorder-specific lifetime prevalence estimates closely approximate those of adults is consistent with evidence that most adult mental disorders have first onsets in childhood or adolescence.[25]

The 12-month to lifetime prevalence ratios of individual disorders are considerably higher in adolescents than among adults,[25] presumably reflecting recent first onset. The finding that 30-day to 12-month prevalence ratios are generally lower than 12-month to lifetime ratios is consistent with the possibility that high disorder persistence may be due more to episode recurrence than to chronicity, although differential recall could also be involved. This pattern is also consistent with the longitudinal pattern in the National Comorbidity Survey 2 panel sample. The higher 30-day to 12-month ratios for anxiety and behavior disorders than mood and substance disorders suggest that the former disorders are more often chronic than the latter, although differential recall across disorders could also be involved. If we accept the ratios as accurate, the finding that 30-day to 12-month ratios exceed 50% for only 3 disorders (attention-deficit/hyperactivity disorder, specific phobia, and social phobia) means that most active adolescent disorders are asymptomatic for at least half the year. It is noteworthy that the only 2 disorders with high values on both 12-month to lifetime and 30-day to 12-month prevalence ratios (specific phobia and social phobia) are both early-onset chronic disorders (R.C.K., S.A., E.J.C., J.G.G., K.A.M., N.A.S., A.M.Z., K.R.M., and Matthew D. Lakoma, MPH, unpublished data, February 5, 2001, and January 31, 2004), although we have no way to tell the extent to which methodological factors account for this pattern.

The results regarding sociodemographic variables are largely consistent with previous research.[4,30] Several findings diverge from previous research, though, and point to potentially valuable areas for further inquiry. For one, we did not replicate the regional finding that Hispanic individuals have higher rates of depression than non-Hispanic white individuals,[31] raising the possibility of urban-rural, regional, or socioeconomic differences that need to be explored in more detailed analyses. In addition, the finding that girls have a more persistent course of mood and anxiety disorders than boys is consistent with some[32] but not other[33] previous studies, raising the possibility of informative specifications to explore in further analyses.

Another interesting deviation from previous findings involves family socioeconomic status. Our finding that parental socioeconomic status is inversely related to prevalence, although broadly consistent with previous studies,[34,35] differs in 2 important ways from earlier findings. First, previous studies largely focused on parental income, whereas we found the strongest association with education and no consistent income effect after controlling for education. Second, earlier studies documented especially high rates of disorder in the lowest socioeconomic strata (ie, living in poverty), whereas we found especially low rates at the highest socioeconomic strata (ie, parents graduated from college). Further analysis of joint education-income effects are needed to reconcile these differences.

The strongest sociodemographic correlate was number of biological parents living with the adolescent. This is consistent with previous research,[36] but the causal dynamics are unclear. Although a genetically informative design would be needed to investigate relative influences of genes and environment,[37] further analyses of our data might be useful in refining understanding of component associations involving the presence and timing of parental marital disruption, single parenthood, and family stressors.

In summary, the results reported here suggest that *DSM-IV* disorders are highly prevalent and persistent among US adolescents. The results also support retrospective findings in adult studies that most adult disorders begin in childhood or adolescence. A number of well-known adult sociodemographic correlates of disorders are found here to exist among adolescents. A companion article documents differentiation among adolescent disorders in patterns and predictors of severity (R.C.K., S.A., E.J.C., J.G.G., K.A.M., N.A.S., A.M.Z., K.R.M., and Matthew D. Lakoma, MPH, unpublished data, February 5, 2001, and January 31, 2004). Taken together, these findings provide a strong rationale for continuing to prioritize research to understand the development of major mental disorders during the first 2 decades of life.

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Additional Information: A complete list of NCS-A publications can be found at http://www.hcp.med.harvard.edu/ncs. A public-use version of the NCS-A data set is available for secondary analysis. Instructions for accessing the data set can be found at http://www.hcp.med.harvard.edu/ncs/index.php. A detailed set of subsample prevalence tables has been posted on the NCS Web site (http://www.hcp.med.harvard.edu/ncs/publications.php) in conjunction with the publication of this article. The NCS-A is carried out in conjunction with the World Health Organization World Mental Health Survey Initiative. A complete list of World Mental Health Survey Initiative publications can be found at http://www.hcp.med.harvard.edu/wmh/.
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