

Prevalence of Mental Disorder and Service Use by Immigrant Generation and Race/Ethnicity Among U.S. Adolescents

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Objective: To examine differences in lifetime prevalence of mental disorder and service use among U.S. adolescents by both immigrant generation and race/ethnicity.

Method: A total of 6,250 adolescents aged 13 to 18 years in the National Comorbidity Survey Replication Adolescent Supplement were assessed for lifetime prevalence of mood and/or anxiety disorders, behavior disorders, and mental health service use. Twelve groups defined by self-identified race/ethnicity (non-Hispanic white, Hispanic, non-Hispanic black, Asian) and immigrant generation (first, second, third, or more) were compared.

Results: Differences in prevalence of lifetime mental disorder were most apparent when immigrant generation and race/ethnicity were considered jointly. Compared to third+generation non-Hispanic white adolescents, the odds of mood/anxiety disorder were increased among second-generation Asian (adjusted odds ratio [AOR] = 2.51; 95% CI = 1.22–5.17) and third+generation Hispanic (AOR = 1.28; 95% CI = 1.00–1.63) but reduced among first-generation Asian (AOR = 0.27; 95% CI = 0.10–0.71) and second-generation non-Hispanic white adolescents (AOR = 0.50; 95% CI = 0.30–0.81). The odds of behavior disorder were lower among first-generation Asian (AOR = 0.26; 95% CI = 0.09–0.71) and all generations of non-Hispanic black adolescents (AOR range 0.43–0.55). Adjusting for lifetime disorder, first-generation Hispanic and non-Hispanic white adolescents and all generations of non-Hispanic black adolescents were less likely to receive mental health services (AOR range 0.24–0.55).

Conclusions: Variation in risk of disorder by immigrant generation and race/ethnicity underscores the importance of considering social, economic, and cultural influences in etiologic and treatment studies of adolescent psychopathology. Lower rates of service use, particularly among first-generation immigrant adolescents, highlight the need to identify and address barriers to recognition and treatment of mental disorders among adolescents from immigrant and racial/ethnic minority backgrounds.

Key words: immigration, mental disorder, mental health services, mental health disparities, ethnicity, race

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 hildren living in families with at least one foreign-born parent represent the fastest growing segment of the U.S. population and, by 2050, are projected to represent up to one-third of the child population.¹ These children are disproportionately exposed to risk factors known to contribute to mental health disparities, including poverty, lack of health care coverage, and low parental education.² Yet, no studies have examined variation in the prevalence of mental disorder and service use in a nationally representative sample of U.S. adolescents cross-classified according to both immigrant and racial/ethnic background. This information can inform service delivery and further our understanding of the etiology of mental disorders.

Nationally representative studies examining differences in the prevalence of mental disorder between immigrant and U.S.-born groups are based on adult samples.^{3–8} These studies generally document a lower prevalence of mental disorders among immigrants versus their U.S.-born counterparts.^{3–9} However, studies that have disaggregated age at immigration suggest that adult populations who immigrated to the United States in childhood (i.e., before age 13 years) have risks for mood, anxiety, and behavior disorders equal to those of their U.S.-born counterparts.^{4,5,9} In contrast, risk for substance use disorders is consistently lower

among immigrants, regardless of age at immigration.^{5,9} Studying adolescent populations may therefore provide valuable information about the etiology of these patterns. However, prior studies of immigrant background and mental health in U.S. adolescents have largely relied on dimensional measures of mental health problems^{10–13} or parental reports of past diagnoses.^{14,15} In general, findings are most robust for adolescent behavior problems and suggest lower levels among immigrant compared to nonimmigrant adolescents.^{10–17} Findings for emotional problems are less consistent, with some studies reporting elevated levels among immigrant adolescents^{18–20} and others reporting no difference^{14,16,21} or lower levels.^{10,11,13,22}

With few exceptions,⁸ studies of U.S. children and adolescents that have examined disparities in the prevalence of mental disorders and service use have focused exclusively on racial/ethnic differences without considering immigrant background,^{23–30} likely yielding imprecise estimates of the magnitude of disparities.^{7,31} For example, a national study of U.S. adults showed substantially lower rates of disorder among both foreign-born non-Hispanic white and Mexican American adults compared to their U.S.-born counterparts.⁷ Similarly, studies documenting low rates of mental health service use among Asian Americans

obscure important differences based on immigrant generation, with first- and second-generation Asian Americans reporting lower rates compared to their third-generation counterparts who had rates similar to those in the U.S. general population.³² These findings underscore the importance of disaggregating racial/ethnic disparities further by immigrant generation to allow for more precise identification of subgroups at greatest risk.

Here, we examined differences in lifetime prevalence of mood/anxiety and behavior disorders and mental health service use among adolescents grouped simultaneously by race/ethnicity and immigrant generation in the National Comorbidity Survey–Adolescent Supplement (NCS-A).

METHOD

Sample

The NCS-A is a nationally-representative survey of 10,123 adolescents 13 to 17 years of age in the continental United States that was conducted in 2001 to 2004. Study design, sampling, recruitment, and weighting are described elsewhere.^{33–35} Briefly, participants were recruited via a dual-frame sampling strategy that included a household ($n = 879$) and school-based ($n = 9,244$) sample, with an overall response rate of 82.9%.³⁴ One parent or parent surrogate provided written informed consent, and the adolescents provided written informed assent before conducting the survey. Procedures were approved by the Harvard Medical School and the University of Michigan human subjects committees.

Interviews were conducted face-to-face in adolescents' homes. Parents also completed a parent self-administered questionnaire (PSAQ) about the adolescent's developmental history, mental health, and family socioeconomic circumstances. The conditional response rates for the PSAQ were 82.5% for the household sample and 83.7% for the school sample.³⁴ PSAQ subsample weights controlled for differences on poststratification variables and lifetime and 12-month mental disorder prevalence.³⁴

Analyses focused on the 6,483 adolescents with completed PSAQs, of whom 6,250 identified as white/Caucasian, black/African American, Asian, or Hispanic/Latino. There were 14 individuals with unknown immigrant generation status, and 219 American Indian, Native Alaskan, Hawaiian, and Pacific Islanders were excluded due to the small sample size.

Measures

Mental Disorders and Service Use. Adolescents were administered a modified version of the World Health Organization Composite International Diagnostic Interview (CIDI 3.0), a fully structured diagnostic interview administered by trained lay interviewers.^{33,36} Lifetime *DSM-IV* disorders assessed in the CIDI included mood disorders and episodes (major depressive disorder or dysthymia, bipolar I or II), anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder, posttraumatic stress disorder, separation anxiety disorder), behavior disorders (attention-deficit/hyperactivity disorder, oppositional defiant disorder, conduct disorder), substance disorders (alcohol abuse/dependence, drug abuse/dependence), and eating disorders (anorexia nervosa, bulimia nervosa, and binge eating disorder).

For the present study, lifetime disorders were grouped into 3 composite diagnostic categories: (a) mood and/or anxiety disorder; (b) behavior disorder (any behavior or substance use disorder); and (c) any disorder (any mood, anxiety, behavior, or substance use disorder), presented in Tables S1 to S3, available online. Mood, anxiety, and substance use disorders were based on the adolescent interview, whereas behavior disorders and service use were based on combined parent reports from the PSAQ and adolescent reports using the "or" rule at the symptom level.^{37,38} All disorders included distress and impairment criteria and organic exclusion rules.

Lifetime history of service use for emotional or behavioral problems was assessed using questions from the Service Assessment for Children and Adolescents.^{29,39} Respondents were asked whether they or their child had ever received services for problems with "emotions or behavior" or "use of alcohol or drugs" across multiple settings.

Sociodemographic/economic Characteristics. Immigrant generation was based on adolescent reported country of birth and nativity of their parents (U.S.-born versus foreign-born). Adolescents were classified as: (1) first-generation, born outside of the United States; (2) second-generation, born in the United States with at least one parent born outside of the United States; or (3) third-generation, born in the United States, with 2 parents (2-parent family) or one parent (single-parent family) born in the United States. Race/ethnicity was based on adolescents' self-identification. Immigrant generation and race/ethnicity were cross-classified to yield 12 groups for comparative purposes.

Sociodemographic covariates included sex, age (in years), family structure (whether the adolescent lived his/her whole life with his/her mother and his/her father), urbanicity (major metropolitan area, other urbanized area and nonurban), and region of country (Northeast, Midwest, South, and West). Socioeconomic covariates included parental education and family income to poverty ratio (log transformed).

Statistical Analysis

Logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for associations between race/ethnicity or immigrant generation and mental disorders and service use. Basic adjustment included only age and sex, whereas full adjustment included all sociodemographic/economic covariates. Models predicting service use controlled for the presence of any lifetime disorder. Log income to poverty ratio was modeled as a cubic spline, as this improved model fit. Age was modeled as a linear continuous variable in all models except for service use, in which a second-degree polynomial was used. Analyses accounted for the complex sample design, and standard errors were estimated using Taylor series linearization using R statistical software version 3.3.0.⁴⁰ The false discovery rate (FDR) method⁴¹ was used to account for multiple comparisons within basic and adjusted models considering the combined impact of race/ethnicity and immigrant generation.

We used imputed versions of the parental level of education and household income variables that have been used in previous NCS-A papers. Multiple imputation was performed using the Amelia package in R to address missingness in family structure.⁴²

RESULTS

Table 1 presents the distribution of sociodemographic/economic characteristics, lifetime mental disorder, and service use by immigrant generation and race/ethnicity. Third+ generation, non-Hispanic white adolescents constituted the largest group ($n = 4,006$; 64.10%), followed by third+generation non-Hispanic black ($n = 999$; 15.98%) and third+generation Hispanic ($n = 476$; 7.62%) adolescents. Parental education, family structure, income to poverty ratio, urbanicity, and region differed across racial/ethnic and immigrant subgroups (Table 1).

Table 2 shows basic and fully adjusted associations between lifetime mental disorder and service use and race/ethnicity and immigrant generation, when considered separately. Under basic adjustment, Hispanic ($OR = 1.46$, 95% CI = 1.08–1.98) and non-Hispanic black adolescents ($OR = 1.29$, 95% CI = 1.00–1.66) had higher odds of mood/anxiety disorders compared to non-Hispanic white adolescents. These differences were attenuated and no longer statistically significant under full

TABLE 1 Sample Characteristics Among Groups Defined by Race/Ethnicity and Immigrant Generation, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Characteristic	Non-Hispanic White				Hispanic				Non-Hispanic Black				Asian			
	First (n = 56)	Second (n = 192)	Third+ (n = 4,006)	Total (n = 4,254)	First (n = 61)	Second (n = 218)	Third+ (n = 476)	Total (n = 755)	First (n = 33)	Second (n = 57)	Third+ (n = 999)	Total (n = 1,089)	First (n = 45)	Second (n = 87)	Third+ (n = 20)	Total (n = 152)
Female Sex	24.60 (7.10)	52.60 (3.95)	47.87 (1.38)	47.51 (1.27)	52.01 (9.13)	52.55 (4.44)	46.50 (5.62)	49.26 (4.54)	74.61 (12.78)	59.72 (14.61)	51.94 (2.58)	53.32 (2.27)	50.80 (14.30)	52.18 (13.59)	55.44 (21.80)	51.78 (6.32)
Age, mean (SE)	15.10 (0.26)	15.23 (0.16)	15.26 (0.08)	15.26 (0.07)	14.95 (0.28)	15.21 (0.19)	15.04 (0.14)	15.07 (0.13)	17.76 (0.36)	14.69 (0.22)	15.03 (0.12)	15.00 (0.11)	15.29 (0.26)	14.61 (0.35)	14.08 (0.35)	14.87 (0.24)
Parental Education																
< High school	15.24 (12.18)	9.74 (3.04)	7.83 (0.97)	8.12 (0.84)	46.67 (10.39)	22.70 (4.01)	14.91 (2.52)	22.86 (2.33)	15.54 (6.53)	29.02 (12.68)	17.07 (1.92)	17.52 (1.71)	7.35 (2.77)	34.13 (16.59)	13.27 (2.20)	20.95 (7.01)
High school	14.55 (6.47)	19.88 (5.20)	28.64 (1.72)	27.80 (1.74)	15.59 (8.29)	32.84 (6.59)	29.88 (3.49)	28.20 (2.51)	39.84 (29.35)	19.07 (10.40)	40.53 (2.99)	39.58 (2.95)	23.40 (19.40)	6.52 (4.55)	20.15 (8.97)	14.86 (6.37)
Some college	27.63 (12.64)	14.59 (2.81)	21.59 (1.24)	21.37 (1.23)	17.43 (6.77)	20.16 (4.65)	27.01 (5.06)	23.29 (2.80)	7.93 (8.38)	9.96 (5.05)	24.01 (1.85)	22.67 (1.80)	0.63 (0.84)	3.05 (1.54)	7.87 (6.83)	2.30 (0.87)
College graduate	42.57 (8.61)	55.79 (6.43)	41.94 (1.71)	42.71 (1.72)	20.30 (6.28)	24.30 (5.11)	28.21 (3.41)	25.65 (2.82)	36.70 (21.39)	41.94 (18.88)	18.38 (1.84)	20.24 (2.28)	68.62 (19.37)	56.30 (14.11)	58.72 (6.97)	61.89 (11.70)
Family Structure																
Lived with mother	88.56 (9.86)	88.56 (9.86)	90.58 (0.76)	89.89 (0.81)	84.09 (4.90)	91.79 (3.12)	83.17 (4.82)	85.86 (3.13)	76.18 (12.71)	65.79 (14.87)	85.37 (1.69)	84.11 (1.58)	73.61 (14.08)	94.17 (3.56)	93.18 (16.94)	85.01 (5.16)
Lived with father	70.54 (11.54)	72.89 (4.50)	65.01 (1.76)	65.58 (1.80)	58.98 (10.15)	64.70 (5.77)	41.60 (4.95)	51.47 (3.28)	43.51 (23.51)	39.81 (10.09)	26.96 (1.65)	28.28 (1.99)	62.91 (18.26)	87.42 (7.08)	75.57 (10.58)	75.82 (5.66)
Family Income to Poverty Ratio, mean (SE)	1.53 (0.19)	1.49 (0.17)	1.40 (0.04)	1.41 (0.05)	0.42 (0.48)	0.83 (0.13)	1.06 (0.15)	0.88 (0.15)	1.48 (0.85)	1.02 (0.84)	0.47 (0.13)	0.54 (0.11)	1.23 (0.41)	1.32 (0.27)	1.87 (0.41)	1.32 (0.20)
Urbanicity																
Urban	59.27 (7.14)	52.60 (5.50)	39.77 (2.79)	40.97 (2.75)	65.46 (14.39)	70.91 (5.03)	53.89 (8.03)	60.94 (4.27)	91.96 (9.32)	71.15 (13.19)	41.45 (3.98)	45.06 (4.02)	93.43 (4.15)	81.24 (10.04)	16.93 (8.70)	82.46 (5.43)
Suburban	34.54 (6.27)	32.61 (5.30)	42.40 (3.93)	41.66 (3.86)	33.01 (14.51)	28.75 (5.06)	40.61 (7.38)	35.78 (3.83)	7.40 (9.28)	25.50 (12.34)	40.79 (5.27)	38.59 (5.00)	5.96 (4.03)	18.02 (10.01)	43.07 (9.50)	14.31 (5.08)
Rural	6.19 (1.10)	14.79 (4.72)	17.83 (2.66)	17.37 (2.63)	1.54 (0.34)	0.34 (0.12)	5.50 (0.93)	3.28 (0.67)	0.64 (0.27)	3.35 (1.28)	17.76 (5.74)	16.35 (5.35)	0.61 (0.80)	0.74 (0.46)	40.00 (9.31)	3.23 (1.44)
Region																
Northeast	21.12 (9.58)	22.96 (5.63)	18.39 (1.89)	18.71 (1.98)	23.59 (10.97)	16.96 (4.06)	15.37 (5.76)	17.30 (4.29)	46.35 (19.51)	41.16 (18.57)	14.71 (2.66)	17.30 (2.96)	36.71 (16.43)	7.00 (2.30)	8.37 (7.84)	20.22 (7.43)
Midwest	27.19 (8.80)	20.65 (4.00)	30.70 (2.82)	30.06 (2.72)	3.53 (2.07)	3.12 (1.14)	8.56 (1.99)	6.07 (1.09)	8.96 (3.77)	5.17 (1.95)	13.28 (3.01)	12.73 (2.97)	5.99 (2.24)	11.93 (4.98)	32.04 (8.04)	10.61 (3.34)
South	29.21 (5.20)	24.63 (5.15)	31.64 (3.31)	31.20 (3.25)	41.44 (14.05)	37.36 (5.64)	38.26 (8.81)	38.56 (4.16)	43.91 (23.50)	45.07 (19.33)	60.65 (4.15)	59.21 (4.12)	29.51 (11.16)	9.96 (6.75)	45.39 (7.53)	20.90 (4.27)
West	22.48 (5.77)	31.76 (8.43)	19.28 (2.72)	20.04 (2.77)	31.45 (10.24)	42.56 (6.56)	37.81 (6.08)	38.07 (3.71)	0.77 (0.33)	8.60 (3.25)	11.37 (2.71)	10.76 (2.53)	27.79 (15.35)	71.11 (9.47)	14.20 (8.89)	48.27 (9.54)
Lifetime Disorder																
Mood/anxiety	25.57 (10.92)	19.34 (3.62)	31.29 (1.37)	30.49 (1.25)	39.40 (10.41)	37.15 (6.38)	39.80 (3.82)	38.95 (3.59)	30.71 (18.59)	37.16 (12.02)	36.76 (2.19)	36.49 (2.35)	12.41 (7.31)	53.07 (10.28)	14.98 (12.39)	32.62 (5.33)
Behavior	25.63 (13.47)	21.25 (3.43)	26.42 (1.45)	26.12 (1.44)	23.82 (11.03)	27.92 (7.50)	34.50 (5.04)	30.66 (3.64)	3.61 (1.52)	16.75 (6.48)	20.98 (3.09)	19.99 (2.74)	9.56 (4.21)	14.17 (4.78)	31.81 (11.29)	13.27 (2.70)
Lifetime Mental Health Service Use	30.60 (11.87)	42.79 (5.62)	47.79 (1.42)	47.07 (1.39)	25.66 (7.97)	46.91 (6.39)	54.11 (3.57)	46.92 (3.28)	13.80 (10.40)	36.69 (11.95)	42.22 (2.19)	40.67 (1.85)	23.40 (12.72)	55.07 (11.88)	49.45 (19.46)	40.70 (7.22)

Note: Numbers provided are weighted percentages followed by standard errors (SE) except where noted (age and family income to poverty ratio). Mood/anxiety disorder includes mood and anxiety disorders. Behavior disorder includes conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and substance use disorder.

TABLE 2 Odds Ratios of Lifetime Mental Disorder and Service Use Among Groups Defined by Race/Ethnicity or Immigrant Generation, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Outcome	Grouping Variable	Basic Adjustment			Full Adjustment		
	Race/Ethnicity ^a	OR	95% CI	p Value	AOR	95% CI	p Value
Mood/Anxiety Disorder	Hispanic	1.46	(1.08–1.98)	.015	1.30	(0.97–1.73)	.077
	Non-Hispanic black	1.29	(1.00–1.66)	.047	1.14	(0.87–1.49)	.340
	Asian	1.10	(0.69–1.75)	.688	1.07	(0.68–1.68)	.785
Behavior Disorder	Hispanic	1.33	(0.92–1.92)	.135	1.11	(0.77–1.60)	.572
	Non-Hispanic black	0.77	(0.54–1.08)	.125	0.54	(0.39–0.74)	<.001
	Asian	0.48	(0.28–0.80)	.005	0.50	(0.28–0.87)	.015
Mental Health Service Use	Hispanic	0.84	(0.67–1.07)	.152	0.70	(0.53–0.91)	.008
	Non-Hispanic black	0.73	(0.61–0.88)	.001	0.54	(0.44–0.67)	<.001
	Asian	0.87	(0.48–1.57)	.647	0.80	(0.40–1.61)	.539
Outcome	Immigrant Generation ^b						
Mood/Anxiety Disorder	First	0.85	(0.55–1.33)	.487	0.78	(0.48–1.25)	.303
	Second	0.98	(0.65–1.47)	.911	0.94	(0.61–1.46)	.793
Behavior Disorder	First	0.68	(0.34–1.38)	.290	0.64	(0.32–1.29)	.213
	Second	0.87	(0.61–1.22)	.417	0.90	(0.66–1.22)	.491
Mental Health Service Use	First	0.36	(0.22–0.58)	<.001	0.32	(0.21–0.49)	<.001
	Second	0.97	(0.70–1.34)	.848	0.96	(0.69–1.33)	.805

Note: Mood/anxiety disorder includes mood and anxiety disorders. Behavior disorder includes conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and substance use disorder. Basic adjustment includes age and sex. For service use, basic adjustment also includes presence of any disorder. Full adjustment additionally includes urbanicity, region, parental education, family poverty index, and family structure. Bold typeface denotes p values <.05. AOR = adjusted odds ratio.

^aReference is non-Hispanic white.

^bReference is third-generation or more.

adjustment. The odds of behavior disorder were lower among non-Hispanic black (AOR = 0.54, 95% CI = 0.39–0.74) and Asian (AOR = 0.50, 95% CI = 0.28–0.87) adolescents compared to non-Hispanic white adolescents, and the odds of service use were lower among Hispanic (AOR = 0.70, 95% CI = 0.53–0.91) and non-Hispanic black (AOR = 0.54, 95% CI = 0.44–0.67) adolescents. First-generation immigrant adolescents had lower odds of service use (AOR = 0.32, 95% CI = 0.21–0.49), compared to third+generation adolescents.

Table 3 presents basic and fully adjusted associations of lifetime mental disorders and service use with immigrant generation and race/ethnicity considered jointly and third+generation non-Hispanic white adolescents serving as the reference group. Estimates for first-generation non-Hispanic black and third+generation Asian adolescents are suppressed because of small cell sizes. Under basic and full adjustment, the odds of lifetime mood/anxiety disorders were lower among second-generation non-Hispanic white (AOR = 0.50, 95% CI = 0.30–0.81) and first-generation Asian (AOR = 0.27, 95% CI = 0.10–0.71) adolescents, compared to the reference group. In contrast, odds were higher for third+generation Hispanic (AOR = 1.28, 95% CI = 1.00–1.63) and second-generation Asian (AOR = 2.51, 95% CI = 1.22–5.17) adolescents, compared to third+generation non-Hispanic white adolescents. Basic and fully adjusted models showed lower odds of behavior disorders among first-generation Asian adolescents (AOR = 0.26, 95% CI = 0.09–0.71). In addition, full adjustment revealed lower odds of behavior disorder among both second-generation (AOR = 0.43, 95% CI = 0.20–0.91) and third+generation (AOR = 0.55, 95% CI = 0.39–0.78) non-Hispanic black adolescents. The odds of mental health service use were lower among first-generation non-Hispanic white (AOR = 0.39, 95% CI = 0.21–0.72) and Hispanic (OR = 0.24, 95%

CI = 0.11–0.51) adolescents, and second- and third+generation non-Hispanic black adolescents (AOR = 0.42, 95% CI = 0.18–1.00 and AOR = 0.55, 95% CI = 0.43–0.70), compared to third+generation non-Hispanic white adolescents.

Table 4 presents basic and fully adjusted associations of lifetime mental disorders and service use with immigrant generation and race/ethnicity, in which earlier immigrant generations are compared to subsequent generations within the same racial/ethnic group. Associations among non-Hispanic white adolescents mirror those in Table 3. Compared to second-generation Asian adolescents, first-generation Asian adolescents had lower odds of mood/anxiety disorder (AOR = 0.11, 95% CI = 0.03–0.45). Odds of service use were lower among first-generation Hispanic (AOR = 0.30, 95% CI = 0.14–0.63) and Asian (AOR = 0.27, 95% CI = 0.08–0.92) adolescents, compared to subsequent generations in the same racial/ethnic group.

DISCUSSION

This is the first study of a nationally representative sample to document differences in the lifetime prevalence of mental disorders and mental health service use among U.S. adolescents cross-classified by immigrant generation and race/ethnicity. **We found disparities in the prevalence of mood/anxiety and behavior disorders and service use when comparing third+generation non-Hispanic white adolescents to other groups defined by both immigrant generation and race/ethnicity.** Many of these differences were not apparent when immigrant generation and race/ethnicity were considered separately, thereby underscoring the importance of joint consideration of these factors in studies of disparities in adolescent mental disorders and service use.

TABLE 3 Odds Ratios of Lifetime Mental Disorder and Service Use Among Groups Defined by Race/Ethnicity and Immigrant Generation, Compared to Third-Generation or More Non-Hispanic Whites, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Outcome	Race/Ethnicity	Immigrant Generation	Basic Adjustment		Full Adjustment	
			OR	95% CI	AOR	95% CI
Mood/Anxiety Disorder	Non-Hispanic white	First	0.86	(0.32–2.31)	0.82	(0.29–2.33)
		Second	0.51	(0.31–0.83)^a	0.50	(0.30–0.81)^a
		Third+	1.00	(Reference)	1.00	(Reference)
	Hispanic	First	1.43	(0.63–3.26)	1.26	(0.54–2.91)
		Second	1.27	(0.76–2.14)	1.18	(0.69–2.02)
		Third+	1.49	(1.12–1.98)^a	1.28	(1.00–1.63)
	Non-Hispanic black	Second	1.26	(0.58–2.72)	1.09	(0.44–2.71)
		Third+	1.27	(1.00–1.61)	1.11	(0.86–1.42)
	Asian	First	0.30	(0.11–0.82)	0.27	(0.10–0.71)^a
		Second	2.55	(1.24–5.24)^a	2.51	(1.22–5.17)^a
Behavior Disorder	Non-Hispanic white	First	0.90	(0.35–2.29)	0.86	(0.37–2.01)
		Second	0.77	(0.50–1.18)	0.77	(0.50–1.20)
		Third+	1.00	(Reference)	1.00	(Reference)
	Hispanic	First	0.96	(0.34–2.68)	0.77	(0.25–2.34)
		Second	1.12	(0.59–2.13)	1.04	(0.57–1.92)
		Third+	1.55	(0.98–2.47)	1.22	(0.80–1.87)
	Non-Hispanic black	Second	0.68	(0.34–1.37)	0.43	(0.20–0.91)
		Third+	0.79	(0.54–1.15)	0.55	(0.39–0.78)^a
	Asian	First	0.29	(0.12–0.73)^a	0.26	(0.09–0.71)^a
		Second	0.54	(0.27–1.07)	0.63	(0.35–1.13)
Mental Health Service Use	Non-Hispanic white	First	0.44	(0.21–0.90)	0.39	(0.21–0.72)^a
		Second	0.95	(0.57–1.57)	0.87	(0.54–1.41)
		Third+	1.00	(Reference)	1.00	(Reference)
	Hispanic	First	0.29	(0.12–0.68)^a	0.24	(0.11–0.51)^a
		Second	0.89	(0.60–1.32)	0.82	(0.54–1.25)
		Third+	1.10	(0.84–1.43)	0.81	(0.62–1.06)
	Non-Hispanic black	Second	0.66	(0.34–1.28)	0.42	(0.18–1.00)
		Third+	0.76	(0.62–0.94)^a	0.55	(0.43–0.70)^a
	Asian	First	0.49	(0.18–1.34)	0.34	(0.11–1.05)
		Second	1.21	(0.55–2.68)	1.27	(0.56–2.84)

Note: Mood/anxiety disorder includes mood and anxiety disorders. Behavior disorder includes conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder and substance use disorder. Basic adjustment includes age and sex. For service use, basic adjustment also includes presence of any disorder. Full adjustment additionally includes urbanicity, region, parental education, family poverty index, and family structure. Bold typeface denotes nominal p values <.05. AOR = adjusted odds ratio.

^aAssociations robust to false discovery rate correction.

Odds of lifetime mood/anxiety disorders were greater among third+generation Hispanic adolescents compared to third+generation non-Hispanic white adolescents. Although previous epidemiological studies of adolescents have not differentiated between immigrant generations, our findings are consistent with past studies documenting a higher prevalence of mood and anxiety disorders among Mexican American and Hispanic adolescents, relative to non-Hispanic white adolescents.^{23,30} Consistent with previous epidemiological studies of the prevalence of substance use and disruptive behavior disorders among both adolescents and adults,^{24,30,43–45} non-Hispanic black adolescents had consistently lower odds of behavior disorders after full adjustment. Although the odds of lifetime mood/anxiety disorders were higher among non-Hispanic black compared to non-Hispanic white adolescents in basic adjusted models, these differences were attenuated and no longer statistically significant in fully adjusted models. These findings are consistent with previous epidemiological studies of adolescent samples documenting

higher rates of anxiety disorders among non-Hispanic black adolescents and no differences in rates of depressive disorders, compared to non-Hispanic white adolescents.^{23,24,30} In contrast, studies of adults consistently report a lower prevalence of depression among non-Hispanic black compared to non-Hispanic white adults.^{46–50}

Differences in the odds of mental disorder were observed for Asian adolescents, both when considering race/ethnicity and immigrant generation jointly and when comparing Asian adolescents by immigrant generation. Compared to third+generation non-Hispanic white adolescents, the odds of mood/anxiety disorders and behavior disorders were lower among first-generation Asian adolescents. In contrast, second-generation Asian adolescents had higher odds of mood/anxiety disorders, relative to third+generation non-Hispanic white adolescents, a result that was not evident when immigrant generations were pooled. The lower odds of mood/anxiety disorders among first-generation Asian adolescents was also observed in comparison to second-generation Asians, and is in line with

TABLE 4 Odds Ratios of Lifetime Mental Disorder and Service Use by Immigrant Generation, Compared to Peers in Same Racial/Ethnic Group, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Outcome	Race/Ethnicity	Immigrant Generation	Basic Adjustment		Full Adjustment	
			OR	95% CI	AOR	95% CI
Mood/Anxiety Disorder	Non-Hispanic white	First	0.86	(0.32–2.31)	0.82	(0.29–2.33)
		Second	0.51	(0.31–0.83)^a	0.50	(0.30–0.81)^a
		Third+	1.00	(Reference)	1.00	(Reference)
	Hispanic	First	0.96	(0.45–2.04)	0.98	(0.46–2.11)
		Second	0.86	(0.51–1.45)	0.93	(0.54–1.59)
		Third+	1.00	(Reference)	1.00	(Reference)
	Non-Hispanic black	Second	0.99	(0.47–2.08)	0.98	(0.40–2.04)
		Third+	1.00	(Reference)	1.00	(Reference)
	Asian	First	0.12	(0.03–0.52)^a	0.11	(0.03–0.45)^a
		Second	1.00	(Reference)	1.00	(Reference)
Behavior Disorder	Non-Hispanic white	First	0.90	(0.35–2.29)	0.86	(0.37–2.01)
		Second	0.77	(0.50–1.18)	0.77	(0.50–1.20)
		Third+	1.00	(Reference)	1.00	(Reference)
	Hispanic	First	0.62	(0.21–1.82)	0.63	(0.19–2.08)
		Second	0.72	(0.33–1.59)	0.85	(0.41–1.78)
		Third+	1.00	(Reference)	1.00	(Reference)
	Non-Hispanic black	Second	0.86	(0.36–2.04)	0.78	(0.31–1.39)
		Third+	1.00	(Reference)	1.00	(Reference)
	Asian	First	0.54	(0.16–1.82)	0.41	(0.12–1.39)
		Second	1.00	(Reference)	1.00	(Reference)
Mental Health Service Use	Non-Hispanic white	First	0.44	(0.21–0.90)	0.39	(0.21–0.72)^a
		Second	0.95	(0.57–1.57)	0.87	(0.54–1.41)
		Third+	1.00	(Reference)	1.00	(Reference)
	Hispanic	First	0.26	(0.10–0.66)^a	0.30	(0.14–0.63)^a
		Second	0.81	(0.50–1.30)	1.01	(0.61–1.69)
		Third+	1.00	(Reference)	1.00	(Reference)
	Non-Hispanic black	Second	0.87	(0.44–1.70)	0.77	(0.32–1.82)
		Third+	1.00	(Reference)	1.00	(Reference)
	Asian	First	0.41	(0.12–1.36)	0.27	(0.08–0.92)
		Second	1.00	(Reference)	1.00	(Reference)

Note: Mood/anxiety disorder includes mood and anxiety disorders. Behavior disorder includes conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder and substance use disorder. Basic adjustment includes age and sex. For service use, basic adjustment also includes presence of any disorder. Full adjustment additionally includes urbanicity, region, parental education, family poverty index, and family structure. Bold typeface denotes nominal p values $<.05$. AOR = adjusted odds ratio.

^aAssociations robust to false discovery rate correction.

previous studies suggesting a protective effect of foreign-nativity status, relative to those born in the United States.^{10,13} The higher odds of mood/anxiety disorders among second-generation Asian adolescents, relative to third+generation non-Hispanic white adolescents, are similar to past studies of adolescents and adults that have documented increased risk for depression among Asians born in the United States.^{9,13}

Comparisons by immigrant generation within racial/ethnic groupings revealed no differences in lifetime behavior disorders across all groups and no differences in lifetime mood/anxiety disorders for Hispanic adolescents. Although further stratifying first-generation immigrant adolescents by age at arrival would have resulted in subgroups too small to produce reliable estimates, it is important to acknowledge that the majority arrived in the United States during childhood, with a mean age of arrival of 6.3 years (SD = 4.8). Consequently, our findings lend indirect support to previous studies documenting similar rates of mood,

anxiety and behavior disorders among adults who immigrated to the United States in childhood and their U.S.-born counterparts.^{4,5,9} Alternatively, it is plausible that our failure to find statistically significant differences, particularly for behavior disorders, is partly attributable to small sample sizes for some subgroups, resulting in wide CIs.

Although racial/ethnic disparities in mental health service use for children and adolescents have been documented,^{25–28} we are unaware of any studies that have attempted to disaggregate these disparities further by immigrant generation in a nationally representative sample. We found lower odds of service use among first-generation immigrant adolescents as a group, a pattern that held true for first-generation non-Hispanic white, Hispanic, and Asian adolescents, when compared to subsequent generations of co-ethnic peers. In contrast, the lower odds of service use among non-Hispanic black adolescents was present in both the second- and third+generation, and did not differ between them. Disparities generally

remained or widened after adjusting for sociodemographic and economic characteristics. These residual differences point to other explanatory factors, beyond sociodemographic and economic circumstances, that may contribute to disparities in service use. Although we cannot determine the barriers to care in this study, structural barriers (i.e., lack of insurance, high cost, language, lack of knowledge of available service, inaccessibility, culturally unresponsive services) and cultural barriers (i.e., stigma, beliefs, or norms about mental disorder) are likely explanations.^{32,51} Our findings underscore the importance of increasing access to necessary services among adolescents from immigrant and racial/ethnic backgrounds, as well as identifying subgroups in need of the most intensive outreach to facilitate early identification and treatment.

This study has a number of limitations that may influence the interpretation of our results. The NCS-A was not explicitly designed to compare the prevalence of mental disorders across adolescents from immigrant and racial/ethnic backgrounds, so simultaneous consideration yielded small numbers. We therefore focused on composite diagnostic categories of mental disorders rather than specific disorders, on pan-ethnic groups rather than more homogeneous subgroups, and we adjusted basic models only for age and sex. Nonetheless, this approach may have resulted in heterogeneity within our racial/ethnic subgroups that may mask differences by immigrant generation.³ The small numbers of participants within some racial/ethnic or immigrant subgroups may have resulted in wide CIs and limited our ability to detect significant group differences. Null findings should therefore be interpreted with caution and should be confirmed in larger samples of adolescents from racial/ethnic minority and immigrant backgrounds. We also could not examine age at immigration and duration of U.S. residence.^{4,6,52} The administration of assessments in English may reduce generalization to non-English-speaking adolescents and those without an English-speaking parent, and the sensitivity and specificity of the CIDI may differ among racial/ethnic groups.⁵³ Finally, temporal changes in the context of immigration in the United States since the NCS-A was conducted may have an impact on the degree to which our findings generalize to adolescents living in the United States today.

Despite these limitations, our findings document the complex ways that immigrant background intersects with race/ethnicity and socio-demographic and economic circumstances to influence mental

disorder risk and service use in adolescents. We demonstrate the importance of systematically incorporating immigrant generation in investigations of racial/ethnic disparities in mental disorders. Studies explicitly designed to examine mental health disparities across immigrant or racial/ethnic subgroups of adolescents are warranted to confirm our findings. In addition, longitudinal studies spanning the transition from adolescence to adulthood may provide valuable insight into changes in the impact of immigrant minority status on mental health across the lifecourse. Such efforts may inform models of disorder etiology and service delivery while contributing to a reduction in social disparities in mental health.

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TABLE S1 Odds Ratios of Any Lifetime Mental Disorder Among Groups Defined by Race/Ethnicity or Immigrant Generation, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Grouping Variable	Basic Adjustment			Full Adjustment		
	OR	95% CI	p Value	AOR	95% CI	p Value
Race/Ethnicity						
Hispanic	1.55	(1.11–2.17)	.010	1.31	(0.95–1.80)	.104
Non-Hispanic black	1.10	(0.83–1.47)	.492	0.84	(0.64–1.11)	.224
Asian	0.78	(0.49–1.23)	.288	0.76	(0.46–1.26)	.287
Non-Hispanic white	1.00	(Reference)		1.00	(Reference)	
Immigrant Generation						
First	0.82	(0.53–1.26)	.368	0.73	(0.45–1.19)	.210
Second	0.96	(0.66–1.38)	.806	0.94	(0.65–1.37)	.746
Third or more	1.00	(Reference)		1.00	(Reference)	

Note: Mental disorder includes mood disorders, anxiety disorders, conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and substance abuse/dependence. Basic adjustment includes age and sex. Full adjustment additionally includes urbanicity, region, parental education, family poverty index, and family structure. Bold typeface denotes p values <.05. AOR = fully adjusted odds ratio; OR = odds ratio.

TABLE S2 Odds Ratios of Any Lifetime Mental Disorder Among Groups Defined by Race/Ethnicity and Immigrant Generation, Compared to Third+Generation Non-Hispanic Whites, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Race/Ethnicity	Immigrant Generation	Basic Adjustment		Full Adjustment	
		OR	95% CI	AOR	95% CI
Non-Hispanic White	First	0.93	(0.39–2.18)	0.88	(0.38–2.07)
	Second	0.67	(0.47–0.96)	0.66	(0.46–0.94)
	Third +	1.00	(Reference)	1.00	(Reference)
Hispanic	First	1.51	(0.66–3.49)	1.21	(0.47–3.11)
	Second	1.24	(0.69–2.23)	1.13	(0.63–2.00)
	Third +	1.70	(1.27–2.28)^a	1.38	(1.01–1.89)
Non-Hispanic Black	Second	0.91	(0.47–1.78)	0.67	(0.28–1.60)
	Third +	1.11	(0.84–1.48)	0.84	(0.65–1.10)
Asian	First	0.22	(0.09–0.56)^a	0.19	(0.08–0.47)^a
	Second	1.74	(0.93–3.29)	1.79	(0.92–3.45)

Note: Mental disorder includes mood disorders, anxiety disorders, conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and substance abuse/dependence. Basic adjustment includes age and sex. Full adjustment additionally includes urbanicity, region, parental education, family poverty index, and family structure. Bold typeface denotes nominal p values <.05. AOR = fully adjusted odds ratio.

^aAssociations robust to false discovery rate correction.

TABLE S3 Odds Ratios of Any Lifetime Mental Disorder by Immigrant Generation, Compared to Peers in Same Racial/Ethnic Group, National Comorbidity Survey–Adolescent Supplement (N = 6,250)

Race/Ethnicity	Immigrant Generation	Basic Adjustment		Full Adjustment	
		OR	95% CI	AOR	95% CI
Non-Hispanic White	First	0.93	(0.39–2.18)	0.88	(0.38–2.07)
	Second	0.67	(0.47–0.96)	0.66	(0.46–0.94)
	Third+	1.00	(Reference)	1.00	(Reference)
Hispanic	First	0.89	(0.38–2.06)	0.88	(0.32–2.43)
	Second	0.73	(0.37–1.42)	0.82	(0.40–1.65)
	Third+	1.00	(Reference)	1.00	(Reference)
Non-Hispanic Black	Second	0.82	(0.41–1.62)	0.79	(0.32–1.93)
	Third+	1.00	(Reference)	1.00	(Reference)
Asian	First	0.13	(0.04–0.46)^a	0.11	(0.03–0.37)^a
	Second	1.00	(Reference)	1.00	(Reference)

Note: Mental disorder includes mood disorders, anxiety disorders, conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and substance abuse/dependence. Basic adjustment includes age and sex. Full adjustment additionally includes urbanicity, region, parental education, family poverty index, and family structure. Bold typeface denotes nominal p values <.05. AOR = fully adjusted odds ratio.

^aAssociations robust to false discovery rate correction.