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Melissa J. DuPont-Reyes

Alice P. Villatoro
Santa Clara University, avillatoro@scu.edu

Jo C. Phelan

Kris Painter

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ESTIMATING SCHOOL RACE/ETHNIC ENROLLMENT EFFECTS ON STUDENT MENTAL HEALTH: DENSITY AND DIVERSITY AS A RISK OR PROTECTIVE FACTOR

Melissa J. DuPont-Reyes, PhD, MPH¹; Alice P. Villatoro, PhD²;
Jo C. Phelan, PhD³; Kris Painter, PhD⁴; Bruce G. Link, PhD⁵

Objective: To investigate effects of school race/ethnic enrollment on mental health in early adolescence by examining both race/ethnic density (percent non-Latinx [NL] White enrollment) and diversity (range/size of all race/ethnic groups enrolled). Variation by student race/ethnic identity is examined as minority stressors are uniquely experienced by race/ethnic minority students.

Design: Longitudinal cohort from a broader mental health study.

Setting: Fourteen schools in Texas (2011-2015).

Participants: Sixth-grade participants (mean age 11.5 years) linked to publicly available data about their school (N=389).

Methods: Generalized estimating equations tested main effects of density/diversity on depressive-anxious symptoms across student-reported race/ethnic identity, adjusting for student/school factors. Owing to statistically significant Latinx-group differences by acculturative stress, four unique identities were generated: NL-Black, low-stress Latinx, high-stress Latinx, and NL-White—referent. Points of convergence of student mental health profiles across density/diversity were explored.

Main Outcome Measures: Self-reported depressive-anxious symptoms over a two-year period.

Results: A significant interaction between density and student race/ethnicity was found ($P < .01$), with NL-Black and low-stress Latinx vs NL-White students experiencing higher symptoms over the two-year period, net of covariates. In contrast, greater diversity was associated with higher symptoms, net of controls ($P < .05$). A marginally significant interaction ($P = .06$) revealed

INTRODUCTION

Variation in the quality of educational experiences across and within schools in the United States significantly influences student health.¹ For instance, dissimilarity in school race/ethnic enrollment can introduce unique experiences and challenges that may affect student mental health. This conjecture is supported by a small body of evidence suggesting significant school race/ethnic enrollment effects on mental health, particularly for students identifying as members of race/ethnic minority groups.²⁻¹¹ Overall for race/ethnic minority students, schools

with larger proportions of same-race/ethnic peers are associated with fewer mental health symptoms; alternatively, mental health symptoms increase for race/ethnic minority students with increasing non-Latinx (NL) White enrollment.²⁻¹¹ For NL-White students, studies have demonstrated either increased or steady risk with greater race/ethnic minority enrollment.^{2,3,6,11}

Extant research has employed one of two measures of school race/ethnic enrollment to examine its relationship to mental health.²⁻¹¹ First, density of a race/ethnic group is used to compare a sociopolitical majority vs minority group in a lo-

fewer symptoms for high-stress Latinx vs NL-White students. At about 25%, NL-White density and diversity of .5-.6, all students experienced similar mental health profiles.

Conclusions: Greater NL-White density increases mental health risk for NL-Black and low-stress Latinx students, while school diversity lowers risk for high-stress Latinx students. These findings demonstrate how educational settings may produce or lessen minority stress. *Ethn Dis.* 2021;31(2):205-216; doi:10.18865/ed.31.2.205

Keywords: School Enrollment; Race/Ethnic Density; Race/Ethnic Diversity; Mental Health; Adolescent; School Health

¹ School of Public Health, Texas A&M University, College Station, TX

² Latino Research Institute, The University of Texas at Austin, Austin, TX

³ Mailman School of Public Health, Columbia University, New York, NY

⁴ National Institute of Independent Living, Disability and Rehabilitation Research, Washington, DC

⁵ School of Public Policy, University of California, Riverside

Address correspondence to Melissa J. DuPont-Reyes; Epidemiology & Biostatistics, School of Public Health, Texas A&M University, 212 Adriance Lab Road, Suite 217, College Station, Texas 77843-1266; melissadr@tamu.edu

cal population. The percent of NL-White student enrollment is commonly used to measure race/ethnic density; alternatively, the proportion of enrolled race/ethnic minority students can also be employed. Second, diversity indices are used to account for the range and size of all available race/ethnic groups in a school.^{3,4,7} A diversity index captures complete school race/ethnic composition in its

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calculation rather than one group. Diversity reflects educational policy goals of increasing representation of race/ethnic minority populations in educational institutions. Both school race/ethnic density and diversity are related in that they each can quantify school race/ethnic make-up thereby its propensity for stressors that can influence student mental health.

The theoretical foundation of this evidence lies in the minority stress model.^{12,13} The minority stress model sources the stress that is ex-

perienced among race/ethnic minority students as the relationship between race/ethnic minority and NL-White student values and any resultant conflict in the school context.^{12,13} The stressors in the school context can include stigma, prejudice, discrimination, harassment, and victimization.^{12,13} These stressors are assumed to be unique to race/ethnic minority students, chronically occurring throughout the span of formal education, and based within school processes, institutions, and structures.^{12,13} For race/ethnic minority students, individual- and community-level coping mechanisms and social supports may buffer negative mental health effects resulting from school-based stressors.^{12,13}

Stressors of discrimination and lack of equality and equity in the school setting can lead to feelings of marginalization and isolation that are associated with negative mental health.^{6,7} Experienced discrimination occurs more often in schools with greater NL-White enrollment, which drives opportunities for conflict to arise vs schools with greater race/ethnic minority enrollment.^{7,14} Conversely, race/ethnic minority students in predominantly race/ethnic minority schools may experience increased school attachment and supportive education as more race/ethnic-specific support and programming are integrated into the school curriculum and culture, thereby reducing stress.^{4,5,15,16} High race/ethnic minority student density has been associated with improved well-being and less peer victimization, externalizing problems, and alcohol use.^{17,18} School attachment is

also associated with resilient factors (eg, parent involvement, later initiation of sex, lower substance use).^{19,20} In more racially/ethnically diverse schools, a more balanced power dynamic and ameliorative culture may exist due to a broader range and size of race/ethnic groups that may decrease discrimination and increase social acceptance among students.^{4,14} Yet, increasing school diversity may present challenges to students of any race/ethnic identity as students try to form relationships with students with different values/experiences.

Extant research examining school race/ethnic enrollment effects on mental health has focused on testing a single measure of density or diversity and predominantly among older adolescent samples.⁶ These studies also conducted cross-sectional analysis, controlled for either student- or school-level socioeconomic status, and focused on NL-Black vs NL-White comparisons.⁶ Our current study examines school race/ethnic enrollment effects on mental health over a two-year period among developmentally important younger ages when mental health symptoms emerge. This study examines both race/ethnic density (percent NL-White enrollment) and diversity (range/size of all race/ethnic groups enrolled). Variation by student race/ethnic identity is examined as minority stressors are uniquely experienced by race/ethnic minority students.

As Latinx populations are heterogeneous with respect to race, nativity, language, and other distinctions, this study also examines Latinx students across acculturative stress to capture variation in minority stress

among Latinx students. We hypothesize that density and diversity may lead to divergent findings for race/ethnic student groups; thus, the current longitudinal analysis tests whether increasing school NL-White density or diversity presents mental health risk or protection across student race/ethnicity. The analysis also identifies points of convergence where no difference in mental health profiles exists between race/ethnic groups. Findings from this study can inform future research examining minority stress processes in educational settings and educational policy as schools are projected to become more ethnically diverse over the next century despite stagnant improvements in educational integration.²¹

METHODS

Data came from the Texas Stigma Study (2011-2015), a longitudinal evaluation of an anti-stigma intervention aimed at improving mental-illness knowledge, attitudes, and behaviors. The selection of participants, design, and procedures of the study are described in detail elsewhere.²² Briefly, 14 schools in an urban area in Texas agreed to participate in the study. Students and parents/guardians gave active assent/consent for either short-term or longitudinal participation after receiving information about the study. Students were not included in the study without signed forms. Students and parents/guardians received

a modest monetary incentive for returning signed forms and completing assessments. Pre-posttest assessments were self-completed on laptops during the participants' health education class. Assessments were offered in English or Spanish; all students chose the English version. At study enrollment, a sub-sample agreed to longitudinal follow-up assessments of up to two-years to be completed at their homes. The study was approved by the responsible institutional review boards. All procedures were in accordance with the ethical standards of the institutional review boards and the Helsinki Declaration of 1975, as revised in 2000. Publicly available data about the 14 participating schools from the

Table 1. Characteristics of adolescent sample by study participation and assessment periods; Texas Stigma Study, 2011-2015, N=751

	Short-term sample		Long-term sample		Analytic longitudinal sample							
					Pre-test		Post-test		18-month follow-up		24-month follow-up	
	n=267		n=484		n=389		n=379		n=309		n=285	
N and %, or mean ± standard deviation												
Adolescent characteristics												
Age ^a	11.60 ± .57		11.48 ± .56		11.49 ± .56		11.48 ± 0.57		11.48 ± .57		11.48 ± .56	
Female	137 52.29		267 55.39		220 56.70		212 55.94		172 55.84		163 57.39	
Race/ethnic group ^a												
Latinx	94 41.59		234 52.82		180 46.27		174 45.91		153 49.51		141 49.47	
NL-Black	68 30.09		100 22.57		100 25.71		97 25.59		70 22.65		63 22.11	
NL-White	64 28.32		109 24.60		109 28.02		108 28.50		86 27.83		81 28.42	
Household income <\$50,000	145 71.08		298 68.82		244 67.97		237 67.71		199 69.82		180 68.70	
Parent educ. ≤ high school diploma	92 44.88		186 42.08		148 40.44		143 40.06		123 42.27		114 42.38	
Intervention assignment												
Treatment group	192 71.91		370 76.45		295 75.84		287 75.73		228 73.79		216 75.79	
Control group	75 28.09		114 23.55		94 24.16		92 24.27		81 26.21		69 24.21	
Mental health symptoms	8.49 ± 5.54		8.99 ± 5.78		9.27 ± 5.85		9.34 ± 5.87		9.14 ± 5.96		8.94 ± 5.95	
School characteristics												
% NL-White students	.22 ± .22		.24 ± .24		.24 ± .24		.25 ± .24		.24 ± .24		.25 ± .25	
School diversity index ^a	.58 ± .13		.55 ± .14		.55 ± .14		.55 ± .14		.54 ± .14		.54 ± .14	
% free/reduced-price lunch eligible	.71 ± .26		.71 ± .26		.71 ± .27		.71 ± .27		.71 ± .27		.71 ± .27	

NL, non-Latinx.

a. P<.05 for statistically significant differences between pre-posttest only and longitudinal samples; no statistically significant differences in loss to follow-up in the analytic longitudinal sample was observed.

Texas Education Agency (TEA) was linked to the study's database to provide school contextual data for each participant.²³ The TEA publishes their data collection procedures.^{23,24}

Study Sample

Sixth graders (N=1260) from participating schools received a study packet and invitation to participate. Of those who responded, 751 (85%) agreed to participate and completed the pre-test survey. The study sample is representative of TEA enrollment data across age, sex, race/ethnicity, and socioeconomic status; there is little evidence of non-response bias at baseline. This current analysis uses the longitudinal sub-sample (n=484; 64.5% response rate). Participants with missing data on race/ethnicity (n=7; <2%) were excluded, including students of a race/ethnic group other than Latinx, NL-White, and NL-Black (n=34; 7%). The "other" category was too small and heterogeneous for adequate analysis and interpretation (eg, Asian American, Pacific Islander, Native American, mixed-race). Therefore, the total analytic sample size for this current study was 389 students. Short- and long-term samples did not significantly differ by sex, socioeconomic status, intervention assignment, or mental health status, though significant differences were observed by age, race/ethnicity, and school diversity (Table 1). Loss to follow-up did not significantly differ by any of these factors.

Among the 389 students in the analytic sample, the mean age at baseline was 11.5 years and more than half were girls (Table 1). The sample, like the broader population

it was drawn from, was ethnically diverse (46% Latinx, 28% NL-White, 26% NL-Black). Socioeconomically, 68% came from a household income of <\$50,000 (2011 median household income was \$50,502 nationally and \$49,392 in Texas)²⁵ and 40% had a parent/guardian with an educational attainment of a high school diploma or less.

Measures

Depressive-Anxious Symptoms

A 23-item mental health symptoms checklist provided a compact self-reported screen at pre-test, post-test, 18-, and 24-month assessment periods. Items came from the National Institute of Mental Health Diagnostic Interview Schedule for Children, Version IV.²⁶ Sixteen items examined depressive (eg, "felt really sad/depressed") and anxious (eg, "worried too much") symptoms. Exploratory factor analysis indicated that using these 16 items fit the data ($\alpha=.84$). All items were combined to create a count of depressive-anxious symptoms. No effects were found for the remaining seven items that predominantly assessed hyperactivity.

School Race/Ethnic Density

School race/ethnic density was measured as the proportion of enrolled NL-White students at each school, ranging from 3-68%. Schools collect student race/ethnic identity from the parent/guardian who enrolled the student in public school. In the rare event that a parent/guardian declines to provide this information, the US Department of

Education requires that the school district employ observer identification as a last resort to gather this information for federal reporting.²⁴ This procedure was used for all schools. The race/ethnicity codes were then reported to TEA by school districts. Other specifications of density were explored including quartiles of NL-White enrollment and race/ethnic minority enrollment. Analyses with these different specifications resulted in similar patterns.

School Race/Ethnic Diversity

Previously validated for use in demography, education, and social science research, a diversity index measured the range of different race/ethnic groups and general representation of each group within a school.²⁷⁻³⁰ The index, ranging from 0 to 1, equals the probability that two students taken at random from the sample represent the same race/ethnic group. The proportion of NL-White, NL-Black, Latinx, and other race/ethnic group enrolled in the school was used to calculate the diversity index using, $D=1-\sum(n^2)$, where 'n' represents the proportion of each race/ethnic group. A higher index represents greater diversity.

Student Race/Ethnic Identity

Race/ethnicity was self-reported at pre-test (Latinx, NL-Black, NL-White). To assess immigrant-related factors of the largest group in Texas schools,^{23,24} Latinx students (n=170; 51% of longitudinal sample) completed a modified version of the Social, Attitudinal, Familial, and Environmental Acculturative Stress in Children scale ($\alpha=.89$)³¹ in

the same academic year. Items measured stressfulness of experiences of discrimination, feeling like an outsider, and being faced with different expectations. The median score was used as a cut-off to create a dichotomous variable of low/high-stress. Within Latinx group analyses identified significant differences in results by acculturative stress ($P < .01$); thus, final analyses employ combined race/ethnicity and acculturative stress variables to

generate four unique identities: NL-Black, low-stress Latinx, high-stress Latinx, and NL-White—referent.

Covariates

Analyses controlled for parent-reported household income ($\geq \$50,000$ —referent) and education (some college or more—referent). School socioeconomic status was assessed by the proportion of students eligible for free/reduced-price lunch. Analyses also controlled for self-

reported sex (female—referent), intervention assignment (no intervention/control—referent), assessment period (pre-test—referent), family history of mental-illness (none—referent), and past formal mental health service use (eg, doctor, therapist) at pre-test (never used—referent).

Statistics

Generalized estimating equations (GEE) examined the longitudinal effects of school race/ethnic enroll-

Table 2. Estimates from generalized estimating equations models predicting depression-anxiety symptoms and regressing on school race/ethnic density; Texas Stigma Study, 2011-2015 (N=389)

	Model 1		Model 2		Model 3		Model 4	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
School race/ethnic density								
% NL-White enrolled	1.20	.81, 1.77	.79	.49, 1.26	.85	.54, 1.36	.65	.32, 1.34
Student race/ethnic identity								
NL-White		ref.		ref.		ref.		ref.
NL-Black	1.15	.92, 1.44	.83	.61, 1.12	.82	.61, 1.12	.83	.61, 1.13
High-stress Latinx	.97	.77, 1.22	.84	.61, 1.16	.90	.64, 1.26	.92	.65, 1.30
Low-stress Latinx	.80	.63, 1.01	.57 ^b	.42, .79	.64 ^a	.46, 0.90	.65 ^b	.46, .91
Student identity X density								
NL-White X NL-White density				ref.		ref.		ref.
NL-Black X NL-White density			2.80 ^a	1.28, 6.10	2.39 ^a	1.10, 5.21	2.27 ^a	1.02, 5.05
High-stress Latinx X NL-White density			.81	.19, 3.36	.84	.17, 4.04	.69	.13, 3.58
Low-stress Latinx X NL-White density			3.13 ^b	1.38, 7.13	2.24 ^a	1.04, 4.82	2.19 ^a	1.01, 4.75
Student covariates								
Sex								
Male						ref.		ref.
Female					1.23 ^b	1.08, 1.40	1.23 ^b	1.08, 1.40
Household income								
$\geq \$50,000$						ref.		ref.
$< \$50,000$					1.11	.94, 1.32	1.11	.93, 1.32
Parent education								
Some college or more						ref.		ref.
High school diploma or less					0.94	.79, 1.11	0.94	.80, 1.12
Family history of mental illness								
No						ref.		ref.
Yes					1.22 ^b	1.06, 1.41	1.22 ^a	1.05, 1.41
Mental health service use								
No						ref.		ref.
Yes					1.22 ^b	1.06, 1.40	1.23 ^a	1.06, 1.41
% free/reduced price lunch eligible							.75	.42, 1.34

Omnibus test for interaction term in model 2: $F(3,925119.1) = 3.89; P = .0086$.

NL, Non-Latinx.

All models control for study assessment period and intervention group; a. $P < .05$, b. $P < .01$.

Table 3. Estimates from generalized estimating equations models predicting depression-anxiety symptoms and regressing on school race/ethnic diversity; Texas Stigma Study, 2011-2015 (N=389)

	Model 1		Model 2		Model 3		Model 4	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
School race/ethnic diversity								
Diversity index	1.81 ^a	1.09, 3.00	2.85	.95, 8.53	2.46	.88, 6.86	3.04 ^a	1.07, 8.65
Student race/ethnic identity								
NL-White	ref.		ref.		ref.		ref.	
NL-Black	1.06	.89, 1.26	1.34	.58, 3.08	1.08	.49, 2.38	1.38	.60, 3.18
High-stress Latinx	.90	.75, 1.08	2.01	.89, 4.58	1.90	.83, 4.34	2.56 ^a	1.08, 6.06
Low-stress Latinx	.75 ^b	.61, .91	.64	.27, 1.52	.66	.29, 1.50	.84	.36, 1.94
Student identity X diversity								
NL-White X Diversity			ref.		ref.		ref.	
NL-Black X Diversity			.65	.16, 2.70	.87	.23, 3.33	.63	.16, 2.51
High-stress Latinx X Diversity			.23 ^a	.05, .96	.27	.07, 1.16	.19 ^a	.04, 0.81
Low-stress Latinx X Diversity			1.33	.29, 5.97	1.39	.34, 5.76	1.02	.24, 4.31
Student covariates								
Sex								
Male					ref.		ref.	
Female					1.23 ^b	1.08, 1.39	1.23 ^b	1.08, 1.40
Household income								
≥\$50,000					ref.		ref.	
<\$50,000					1.09	.92, 1.29	1.10	.93, 1.31
Parent education								
Some college or more					ref.		ref.	
High school diploma or less					.95	.81, 1.13	.96	.81, 1.13
Family history of mental illness								
No					ref.		ref.	
Yes					1.25 ^b	1.08, 1.44	1.24 ^b	1.08, 1.43
Mental health service use								
No					ref.		ref.	
Yes					1.25 ^b	1.09, 1.44	1.25 ^b	1.10, 1.44
School covariate								
% free/reduced price lunch eligible							.77	.57, 1.05

Omnibus test for interaction term in model 2: $F(3,700121.3) = 2.45$; $P = .0611$.

NL, Non-Latinx.

All models control for study assessment period and intervention group; a. $P < 0.05$, b. $P < 0.01$, c. $P < 0.001$.

ment on depressive-anxious symptoms, adjusting for controls. The Poisson family and a corresponding log link were selected to appropriately model the distribution of the outcome. An exchangeable correlation structure and robust standard errors were used to allow the estimates to be maximally valid in the event of model misspecification. The QIC statistic and consistency across coefficients and standard er-

rors suggested that the exchangeable correlation was the optimal correlation structure. Predicted counts of depressive-anxious symptoms across density and diversity were generated from the GEE results. P -values $< .05$ were considered statistically significant. Data analysis was performed using STATA/SE Version 14.2.

For multivariate GEE modeling, models first examined the association between density or diversity and de-

pressive-anxious symptoms adjusting for time, intervention assignment, and self-reported student race/ethnic identity (Model 1; $n=389$). Next, to investigate variation by student race/ethnicity, an interaction term was included between student race/ethnicity and density or diversity (Model 2). Model 3 examined whether effects in Model 2 were attenuated after adjusting for sex, household income, parent education, family history of mental

illness, and past mental health service use. Model 4 (n=384) added percent eligible for free/reduced-price lunch at school. Potential interactions with all covariates (n=52 tests) and the student race/ethnicity and density/diversity interaction term were tested and none were statistically significant.

Minimal missing data were found in the analytic sample with <2% missing mental health status due to nonresponse of the checklist across all observed assessments. Most missing data affected parent-reported income (8% missing) and education (6% missing) where missing values were imputed. Results were combined according to Rubin's rules,³² improving the overall analytic sample size from n=355 in the complete case to n=384 in the imputation analyses. The size and direction of the effect of the covariates were similar when using either sample; thus, multiple imputation analyses are presented.

RESULTS

Overall schools had an average of 24% NL-White student enrollment, a diversity index of .55, and 71% of students eligible for free/reduced-price lunch (Table 1). Consistent with national trends,²¹ these school-level indicators were significantly different across student race/ethnicity (results not shown). Nearly 70% of NL-White students vs <10% of NL-Black and Latinx students attended schools with 40% or more NL-White enrollment. About half of NL-Black and Latinx students attended schools with >90% race/ethnic minority student enrollment.

School Race/Ethnic Density

Table 2 presents the incidence rate ratios (IRR) from GEE models examining the effect of NL-White density on count of depressive-anxious symptoms. Adjusting for time and intervention assignment (Model 1), we found no main effect for NL-White density, though its interaction with student race/ethnicity was statistically significant (P<.01; Model 2). In particular, there were significant differences in the effect of density on symptoms among NL-Black and low-stress Latinx compared with NL-White students. After adjusting for sex, household income, parent education, family history of mental-illness, and past mental health service use (Model 3), and percent of students eligible for free/reduced-price lunch (Model 4), NL-Black and low-stress Latinx, compared with NL-White students, had about twice the rate of depressive-anxious symptoms during a two-year period for every one-unit increase in NL-White enrollment (P<.05).

School Race/Ethnic Diversity

Table 3 presents the results from GEE models examining the effect of school race/ethnic diversity on depressive-anxious symptoms. Higher diversity was associated with higher counts of depressive-anxious symptoms P<.01; Model 1. After adjusting for sex, household income, parent education, family history of mental illness, past mental health service use, and percent eligible for free/reduced price lunch (Model 4), the main effect of diversity remained statistically significant: NL-White students expe-

rienced about three times the rate of symptoms over a two-year period for every one-unit increase in diversity (P<.05). In Model 2, a marginally statistically significant interaction between diversity and student race/ethnicity was found (P=.06) demonstrating significant differences between high-stress Latinx vs NL-White students. Net of all controls, the interaction remained marginally significant: high-stress Latinx students experienced about a fifth of the rate of depressive-anxious symptoms over a two-year period for every one-unit increase in diversity (P<.05). Though not significant, the interaction effect for NL-Black vs White students indicated fewer depressive-anxious symptoms with greater diversity.

Points of Convergence

To better understand the direction and magnitude of the interactive effects between student race/ethnicity and density/diversity, as well as points of convergence in mental health risk for each student group, post-estimated predicted depressive-anxious symptoms were plotted using the values of density/diversity in the data. Figures 1 and 2 display the predicted symptom counts net of all controls by student race/ethnicity as density/diversity increases along the x-axis. The plots in Figure 1 show how symptom count increased for NL-Black and low-stress Latinx students with increasing density. In contrast, symptoms appear to decrease for NL-White and high-stress Latinx students with increasing density. As shown in Figure 2, NL-Black stu-

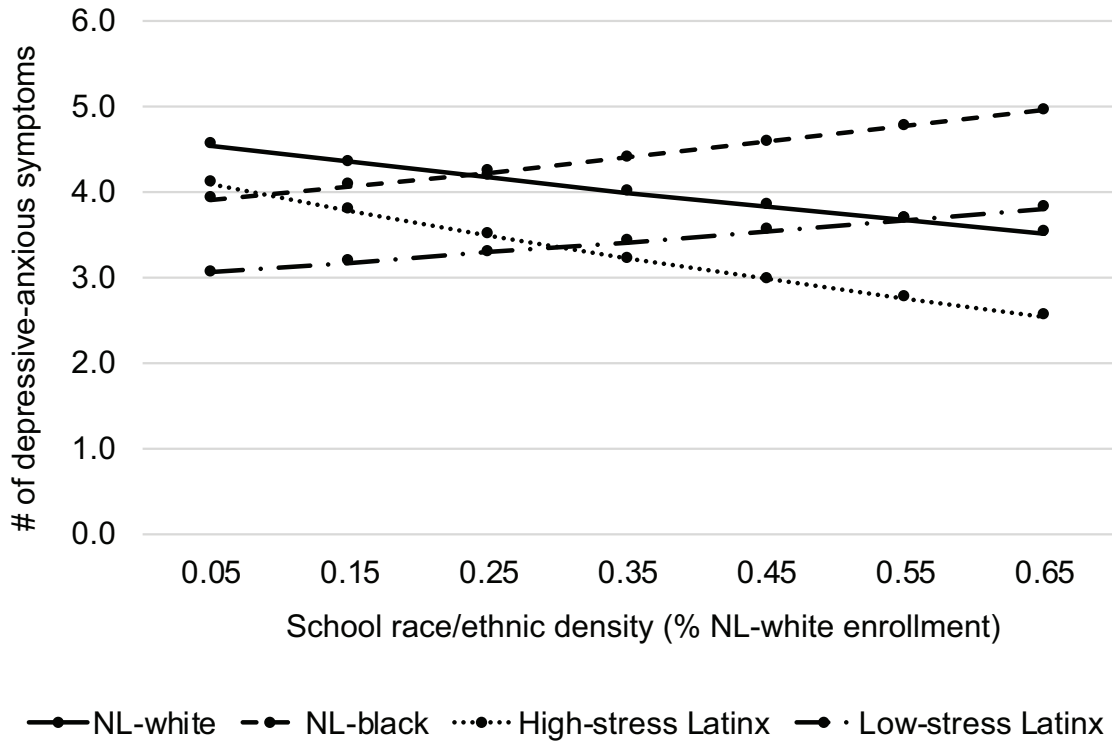


Figure 1. Predicted counts of depressive-anxious symptoms across school race/ethnic enrollment measured by density

dents had fewer depressive-anxious symptoms than NL-White students up to 25% of NL-White student enrollment; above that point, symptoms were higher for NL-Black students. A similar mental health convergence between low-stress and high-stress Latinx students was found at about 25% NL-White density. Net of covariates, predicted depressive-anxious symptoms across diversity are plotted in Figure 2. While diverse schools were associated with more symptoms overall, the plot shows how symptoms lower among high-stress Latinx students with increasing diversity. Thus, high-stress Latinx vs NL-White students had fewer symp-

ptoms with increasing diversity. All student groups had similar depressive-anxious symptoms when the diversity index was between .5-.6.

DISCUSSION

To measure the impact of school race/ethnic enrollment on mental health, the current study examined whether school race/ethnic density or diversity was associated with depressive-anxious symptoms and whether this relationship varied according to student race/ethnic identity. Net of covariates, we found an interactive effect between NL-Black and low-stress Latinx compared with

NL-White students with respect to NL-White student density. NL-Black and low-stress Latinx vs NL-White students had about twice the rate of depressive-anxious symptoms over a two-year period for every one-unit increase in NL-White student density. Predicted counts of symptoms were greater for NL-Black vs NL-White students when NL-White enrollment was greater than 25%.

Analyses examining the effects of school race/ethnic diversity on depressive-anxious symptoms supported these findings. While diversity significantly increased symptoms as a main effect for all students, high-stress Latinx compared with NL-White students had about a

fifth of the rate of symptoms over a two-year period for every one-unit increase in diversity. A possible explanation for these observed effects may be that race/ethnic enrollment captures whether the school environment holds minority-stressors (eg, discrimination, harassment), or alternatively, protective buffers that develop strong identities. These findings were also consistent across sex and socioeconomic status, and robust to complete case analyses. Together, these findings suggest that a school race/ethnic composition with a diversity index of .5-.6 or 25% NL-White density leads to similar mental health risk across all student race/ethnic groups. This study adds to an existing body of

knowledge about approaches to examining mental health equity in educational settings, examining school race/ethnic enrollment effects on mental health, specifically. Our findings are consistent with previous studies in this area and demonstrate that these patterns appear even earlier in adolescence.²⁻¹¹

Little evidence was found to suggest that NL-Black and low-stress Latinx students experience fewer symptoms in schools with greater NL-White density. Instead, NL-Black and low-stress Latinx vs NL-White students had increased symptoms in these contexts. Student/school socioeconomic status did not explain away this relationship. As NL-White density mea-

sures the sociopolitical dominant group and taps into differential power dynamics, this relationship may be pointing to potential sources of minority stress (eg, discrimination, harassment) for NL-Black and low-stress Latinx students occurring in these particular contexts. For NL-Black vs NL-White students in particular, rates of depressive-anxious symptoms increased when NL-White density exceeded ~25% of the total student body. While rates of symptoms also increased for NL-White students with increasing diversity, they declined for high-stress Latinx students demonstrating general mental health protection for these students. These findings are informative as they point to the

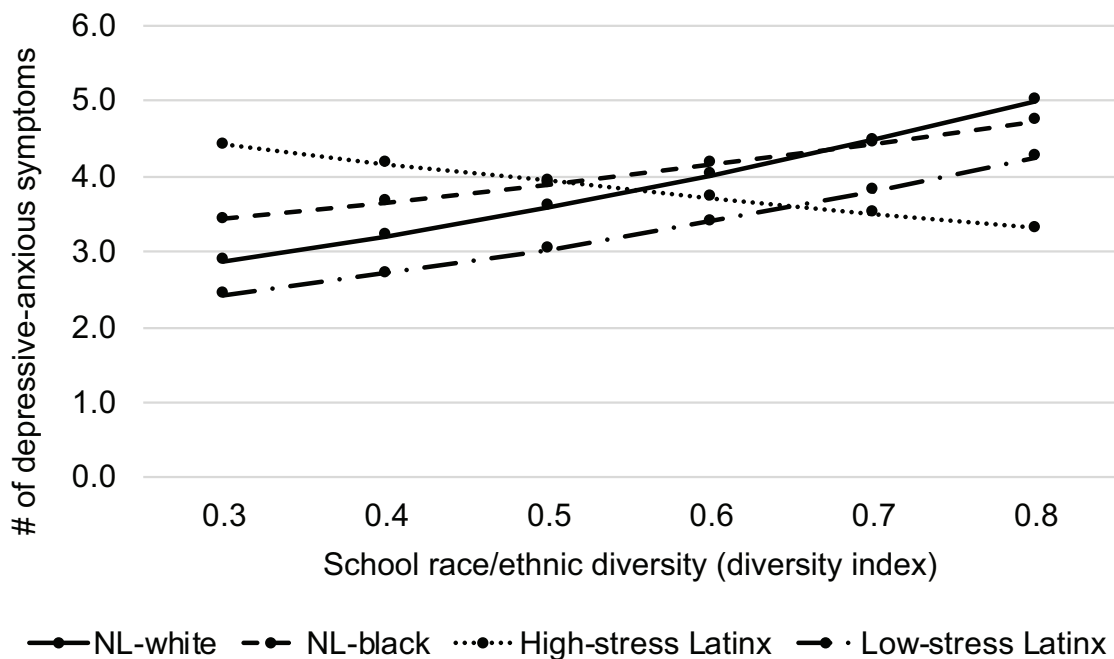


Figure 2. Predicted counts of depressive-anxious symptoms across school race/ethnic enrollment measured by diversity

kinds of school contexts where differences can emerge and be minimized with respect to race/ethnic composition and mental health.

Several limitations require discussion. First, this study assessed race/ethnic enrollment at one point in time in early sixth grade. To assess the impact of various educational experiences on mental health

Non-Latino(NL)-Black and low-stress Latinx vs NL-White students had about twice the rate of depressive-anxious symptoms over a two-year period for every one-unit increase in NL-White student density.

requires a dynamic measure collected over time. A dynamic measure can better capture changes in density/diversity at the individual-level (eg, when a student moves) and school-level (eg, gentrification) and sensitive periods for these effects. Natural experiments using school lotteries or vouchers, for example, may better infer causality. Second, indirect effects that can explain underlying mechanisms were not examined such as school attachment and discrimination. Future research

could explore other unmeasured factors related to school race/ethnic enrollment and student mental health such as presence of a school police officer, disciplinary practices and policies, ethnic-specific support and curricula, and race/ethnic make-up of teachers/staff. Finally, this study excluded students with other race/ethnic identities and did not measure acculturative stress among NL-students. Acculturative stress measures were administered to Latinx students only owing to the prominent group size in the local setting and limited validity of the measures to other groups. As acculturative stress does not only pertain to immigrant populations in the United States, and as these students represent growing and understudied groups, future research could examine acculturative stress among non-Latinx students and its relationship to mental health. Also, interpretations of the Latinx group are limited to students identifying as Mexican/Chicano, as they comprised 91% of the Latinx sample. Despite these limitations, these findings make an important contribution to the understanding of the impact of school race/ethnic make-up on mental health. The study included an ethnically and socioeconomically diverse sample of early adolescents when mental health symptoms begin to emerge and used reliable and validated measures of mental health symptoms over approximately two-years (sixth to eighth grade) with the exposure captured at baseline. Results may be particularly relevant to NL-Black and Latinx students in the United States.

CONCLUSIONS

This study focused on mental health effects only, though its findings should be weighed against other important outcomes such as academic, economic, and physical health trajectories. Future research is needed to examine underlying mechanisms that explain these patterns, including the assessment of sources of minority stress (ie, stigma, prejudice, discrimination, harassment, victimization). Future research should also examine potential ameliorating buffers of student minority stress such as anti-discrimination or anti-bullying policies, the race/ethnic composition of faculty/staff, school mental health care, more equitable access to educational resources, or ethnic-specific support and programming.^{33,34} National school-aged populations are ethnically diverse yet there is no immediate expected change to increased educational segregation in the United States, requiring more research in this area. Student mental health is important in that it is related to well-being, academic success, and school retention and the prevention of chronic stress and poor health in adulthood.³⁵ Mental health research in school contexts can help further understanding of how disparities in mental health can emerge, and strategies to reduce minority stress.

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CONFLICT OF INTEREST

No conflicts of interest to report.

AUTHOR CONTRIBUTIONS

Research concept and design: DuPont-Reyes, Villatoro, Phelan, Link; Acquisition of data: DuPont-Reyes, Painter, Link; Data analysis and interpretation: DuPont-Reyes, Villatoro, Phelan, Link; Manuscript draft: DuPont-Reyes, Villatoro, Phelan; Statistical expertise: DuPont-Reyes, Villatoro, Link; Acquisition of funding: Phelan, Painter, Link; Administrative: DuPont-Reyes, Villatoro, Painter; Supervision: DuPont-Reyes

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