

**Unequal Foundations:  
Racial Disparities in School Building Conditions in New York State**

Sodiq Ambali\*, Miyeun Jung\*, and Lucy C. Sorensen\*

University at Albany, SUNY

**Author Note**

Sodiq Ambali  <https://orcid.org/0009-0009-5789-2680>

Miyeun Jung  <https://orcid.org/0000-0003-0094-2287>

Lucy C. Sorensen  <https://orcid.org/0000-0003-4111-1236>

\*All authors contributed equally.

Lucy C. Sorensen is now at Learning Policy Institute.

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Correspondence concerning this article should be addressed to Lucy Sorensen, 1301 Connecticut Avenue NW, Suite 500, Washington, DC 20036. Email: lsorensen@learningpolicyinstitute.org.

## **Abstract**

School infrastructure is a critical yet often overlooked factor shaping student health, learning, and well-being. This study examines racial disparities in public school building conditions across New York State using building inspection data linked to demographic and fiscal data. Schools serving more students of color are significantly more likely to have poor overall conditions, inadequate ventilation, mold exposure, and reduced access to athletic fields, gymnasiums, and health offices. A Kitagawa-Oaxaca-Blinder decomposition shows that local property taxes are the largest contributor to racial gaps in building quality, while progressive state building aid helps reduce these disparities. These findings highlight persistent infrastructure inequities and the need for targeted investments to ensure all students have access to safe and healthy learning environments.

*Keywords:* school infrastructure, facilities, building conditions, racial inequality, school finance, decomposition, capital funding, environmental health

Recent research underscores the critical role that the physical school environment plays in shaping student health, well-being, and educational achievement. Increased capital investment in schools can improve student outcomes (Biasi et al., 2025; Lafortune & Schönholzer, 2022; O’Hagan, 2025), while poor environmental conditions in school buildings—such as inadequate air quality, exposure to toxins, and extreme temperatures—can impair learning and increase disruptive behavior (Chung et al., 2025; Gilraine, 2023; Park et al., 2020; Persico & Venator, 2021). Additional building features, including classroom space and access to facilities that support students’ physical and social development, may also influence educational quality and overall student well-being (Gunter & Shao, 2016; Michael et al., 2015). Despite the importance of these building conditions, access to high-quality school infrastructure appears uneven: schools serving more students of color and low-income students are more likely to report inadequate building conditions than more advantaged schools (Alexander & Lewis, 2014).

This study provides, to our knowledge, the first comprehensive analysis of racial disparities in school building conditions using large-scale building inspection data. By linking these data with information on student demographics and school finance, we examine not only the extent of disparities but also their underlying structural sources. In doing so, we extend prior research on capital spending by providing direct evidence on disparities in the realized conditions of school buildings rather than in funding or investments alone (Biasi et al., 2021; Brunner et al., 2023; Lee et al., 2022). Specifically, we address three questions: (1) What is the overall state of school building conditions in New York State? (2) How do these conditions vary across student racial and ethnic groups? And (3) What role do structural factors, such as school funding sources, play in explaining these gaps?

To answer these questions, we draw on the 2015 New York Building Condition Survey, covering over 2,400 public schools outside New York City, linked to state and federal data on student demographics, school characteristics, and district finances. We construct detailed measures across three domains: building aesthetics (e.g. appearance, lighting, cleanliness, noise, vermin), environmental conditions (e.g. HVAC systems, humidity, mold, water systems), and health and recreational facilities (e.g. playgrounds, athletic fields, gymnasiums, swimming pools, and health offices). We first present descriptive comparisons across student groups and school racial compositions, and then implement a Kitigawa-Oaxaca-Blinder (KOB) decomposition to examine the sources of observed disparities (Blinder, 1973; Kitagawa, 1955; Oaxaca, 1973).

Our analysis reveals substantial racial disparities in school building conditions across New York State. Schools serving predominantly Black and Hispanic students experience significantly worse facility conditions than those serving mostly White students. Concerning building aesthetics, predominantly non-White schools are 12 percentage points less likely to have good lighting quality and 15 percentage points less likely to receive a good cleanliness rating. Regarding environmental conditions, schools serving mostly students of color are 25 percentage points less likely to have satisfactory ventilation system conditions, 20 percentage points less likely to have satisfactory humidity conditions, and 7 percentage points more likely to have mold exposure. Finally, related to health and recreational facilities, predominantly non-White schools are 19 percentage points less likely to have athletic fields and 25 percentage points less likely to have a stadium, and these facilities are in worse condition on average. Additionally, mostly non-White schools are 12 percentage points less likely to have a health office. Across nearly all measures, mostly White schools exhibit better building conditions than mostly non-White schools.

Examining specific student groups reveals a similar pattern. Hispanic students attend schools with building conditions 0.32 standard deviations (SDs) below the statewide average, and Black students 0.19 SDs below average. In contrast, Asian, multiracial, American Indian or Alaska Native, and White students all attend schools with above-average conditions, ranging from 0.05 to 0.21 SDs above the mean.

Results from the KOB decomposition indicate that differences in local property taxes explain the largest share of the racial gap in overall school building conditions. This finding is consistent with the strong association between property wealth and community racial composition, shaped by the historical exclusion of families of color from property ownership in the U.S. (Derenoncourt et al., 2024). The decomposition also indicates that gaps would be even larger in the absence of state building aid. New York State's progressive aid formula provides additional resources to districts undertaking building improvements (NYC Independent Budget Office, 2024), and our results suggest that this aid meaningfully narrows infrastructure gaps between schools serving predominantly White students and those serving students of color. Taken together, these findings underscore the need for targeted investments to improve school infrastructure in historically marginalized communities.

## **Literature Review**

Several governmental reports have raised concerns about inadequate funding for school infrastructure (GAO, 1995; NCES, 2000). Building on these concerns, recent research has uncovered disparities in capital spending across districts. Because school infrastructure is primarily financed through local resources, differences in funding can translate into differences in facility conditions (Duncombe & Wang, 2009). Districts typically finance capital improvements

through long-term bonds, with states providing more limited support (Backer & Royal, 2025; Duncombe & Wang, 2009; Handel & Hanushek, 2023). As a result, districts with lower fiscal capacity may face greater challenges in maintaining and improving school facilities, contributing to disparities in school conditions (Sielke, 2001). These disparities also emerge by student race and ethnicity, with Native American, Black, and Hispanic students more likely to attend schools with lower levels of facility investment and maintenance spending (Filardo, 2021).

Capital spending serves multiple purposes—ranging from building repairs and maintenance to new construction projects—and studies have examined its effects on outcomes such as student achievement, attainment, crime, and house prices (Duncombe & Wang, 2009; Jackson & Mackevicius, 2024). Evidence on the effects of capital spending is mixed, with some quasi-experimental studies finding null effects on student achievement (Baron et al., 2022; Cellini et al., 2010; Enami et al., 2021; Goncalves, 2015; Martorell et al., 2016); some finding delayed or modest positive effects, reflecting implementation lags (Conlin & Thompson, 2017; Hong & Zimmer, 2016; O’Hagan, 2025; Rauscher, 2020); and others finding strong positive effects of capital or facility investments on student outcomes (Biasi et al., 2025; Lafortune & Schönholzer, 2022; Neilson & Zimmerman, 2014).

To provide a few recent examples, LaFortune & Schönholzer (2022) show that achievement gains from school facility investments in Los Angeles were driven by improved building quality and alleviated overcrowding. O’Hagan (2025) similarly uses a difference-in-differences design to study new school building construction due to overcrowding in New York City and finds that students experience approximately a 1 percentage point improvement in attendance after three years in a new school facility. In the most comprehensive study to date, Biasi et al. (2025) provide national evidence that not all types of capital spending are equally effective.

Using district-level data across 29 U.S. states, the study uses a stacked regression discontinuity approach to establish that increased spending on school infrastructure (e.g., HVAC, plumbing, roofs, and furnaces) improves test scores, while investments in athletic facilities do not provide the same educational returns.

Another strand of literature examines the direct impact of building condition improvements on student outcomes. These studies reveal that renovations that improve environmental conditions can have positive impacts on students' outcomes. For example, Gilraine (2023) demonstrates that installing air filters in Los Angeles schools raised math and reading scores using a spatial regression discontinuity design based on proximity to a gas leak. Using school-level data from New York State, Sorensen et al. (2024) also find that improved HVAC system conditions improve student math and reading scores and further reduce absenteeism and student suspension. Park et al. (2020) use national PSAT data to show that extreme heat is harmful to student learning and that school air conditioning can mitigate these impacts.

Taken together, the existing literature reveals a few gaps. First, the existence of disparities in school building conditions remains understudied. Some studies have documented that capital spending generates larger educational benefits for students from high-poverty and historically marginalized communities than for their counterparts in more advantaged communities (Baron et al., 2024; Biasi et al., 2025; Rauscher, 2020). Brunner et al (2023) also examines disparities in school facilities funding in California, finding that school districts with more disadvantaged students and students of color experience lower levels of school facility funding than districts with more advantaged students. Lee et al. (2022) study resource inequalities across a number of dimensions and demonstrate using district-level capital outlay funding data that Black, Hispanic, and low-income students receive lower capital expenditures than do White and non-low-income

students. However, much less is known about how these disparities in funding translate into disparities in school infrastructure conditions by student characteristics. A critical first step is therefore to examine the extent and nature of these inequalities.

Second, identifying the factors contributing to disparities in school building conditions is essential. Existing research largely emphasizes capital spending as the primary determinant, but because capital spending serves multiple purposes and is closely tied to broader community characteristics (Duncombe & Wang, 2009), it remains unclear which structural factors most directly drive inequalities in building conditions. Third, limited research has explored disparities in access to physical activity and recreational facilities, such as playgrounds and athletic fields, leaving limited evidence on how inequities extend beyond core instructional spaces. Yet infrastructure that supports physical education and activity can positively shape student outcomes (Michael et al., 2015).

Our study therefore examines in depth racial and ethnic disparities in school building conditions across three broad domains: building aesthetics, environmental conditions, and health and recreational facilities.<sup>1</sup> The building aesthetics domain captures visible and experiential features of the school environment that may shape students' comfort, well-being, and sense of belonging at school, including appearance, lighting quality, cleanliness, classroom noise level, and the presence of vermin (e.g., rodents, insects, or cockroaches). The environmental conditions domain captures physical features of the school building related to indoor air quality, water quality, and temperature – conditions that can affect students' health, comfort, and ability to learn. Finally, the health and recreational facilities domain captures the presence and condition of spaces that

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<sup>1</sup> Other aspects of school facilities, notably safety infrastructure and conditions (Hailey, 2025), also matter to students and families. However, aside from fire alarm presence, which varies little across schools, the BCS does not contain related questions.

support student health and physical activity, including recreational facilities such as playgrounds and athletic fields, as well as health offices. Together, these domains provide a comprehensive view of school building conditions that may affect students' daily experiences, health, and learning environments.

## **Data**

We analyze racial disparities in school building conditions using school- and district-level data from New York public schools outside New York City.<sup>2</sup> Our analysis relies on data from the 2015 New York State Building Condition Survey (BCS)—the most comprehensive set of building inspection reports available at the time of writing. Historically administered for all schools on a five-year cycle, the BCS transitioned to an annual inspection of only a smaller sample of schools following the 2015 inspection cycle.<sup>3</sup>

New York State laws mandate that all occupied public school buildings regularly undergo a building condition survey. School districts are responsible for completing the inspections, with detailed technical guidance and documentation from the New York State Education Department Office of Facilities Planning to support standardized data collection and reporting. The building condition review is conducted by a qualified team that includes at least one licensed architectural or engineering firm, the district superintendent, and other district officials. The 2015 BCS covers approximately 86 percent of public schools in New York State outside New York City, resulting in cleaned data for 2,473 of the 2,875 traditional public schools operating during the survey period.<sup>4</sup>

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<sup>2</sup> This study excludes New York City because it operates under distinct administrative, data, and funding systems that are not directly comparable to the rest of the state.

<sup>3</sup> The 2015 BCS includes 2,473 public schools, compared with roughly 500–560 schools annually in subsequent years (2020–2023).

<sup>4</sup> Of 2,926 schools outside NYC, 51 are charter schools typically excluded from the BCS. The analytic sample of 2,473 schools shows no evidence of systematic differences from the full universe.

The inspections include information on building aesthetics (e.g., building appearance rating, quality of lighting, cleanliness of the environment), environmental conditions (e.g., mold in a classroom or common areas, evidence of vermin in classrooms, lead water systems, HVAC system conditions), and health and recreational facilities (e.g., playground, athletic fields, health offices). Exact questions are provided in Appendix Table A1. We converted Likert-scale variables into binary indicators for ease of interpretation (e.g., satisfactory or unsatisfactory, good or fair).<sup>5</sup> From these individual building condition measures, each scaled from 0 to 1, we constructed four aggregate indices— (1) building aesthetics, (2) environmental conditions, and (3) recreational and health facilities, each calculated as the average of items included in that category—plus an (4) overall conditions index, equaling the average of the other three indices. We have tested alternative measurement schemes, including a confirmatory latent factor analysis, that produce nearly identical results, and so present findings from the averaged-item indices in the main text for simplicity of interpretation.

Additionally, we link the school-level data from the New York Building Condition Surveys to directory and enrollment data from the NCES’s CCD and the Urban Institute’s MEPS. We also supplement this with school district fiscal data from the NYS Comptroller, including information on capital expenditures, local property taxes, state building aid, federal building aid, school donations, and bond revenues, and socioeconomic and demographic indicators from the five-year American Community Survey Education Tabulation (2013-2017). Merging these data sources together results in a sample of 2,352 unique schools with full coverage of variables.<sup>6</sup> Of these, 1,409 are elementary schools; 369 are middle schools; 436 are high schools; and 138 have some

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<sup>5</sup> Most responses cluster at the extremes, so collapsing to binary measures leads to minimal information loss; see Appendix Table A2.

<sup>6</sup> We exclude BOCES institutions, as they are not traditional public schools.

other grade configuration. Appendix Figures A1, A2, and A3 show the number of schools in our sample by school level and student composition type.

## **Method**

### **Descriptive Comparisons**

We first summarize building condition measures for the full universe of public schools and across schools by student racial composition using the following categories and means comparison t-tests: Mostly White (>80 percent White); Mixed (50-80 percent White); and Mostly non-White (>50 percent non-White).<sup>7</sup> We also compare schools by student poverty concentration<sup>8</sup> and urban-centric locale.

To more closely examine differences in exposure to adequate building conditions across specific student racial and ethnic groups, we further compute averages of building condition measures across schools, weighted by the number of students in each racial or ethnic group, to derive group-specific average exposures. We assess differences relative to the most advantaged group using a nonparametric cluster bootstrap with resampling (200 replications).

### **Statistical Decomposition**

To understand the underlying factors contributing to racial gaps in school building conditions, we apply the KOB decomposition to the gap in school building conditions between predominantly White and predominantly non-White schools. The KOB method decomposes a difference in outcome means across two groups into three components: (1) differences in observable characteristics (endowments); (2) differences in how those observable characteristics affect the outcome (coefficients); and (3) the interaction between differences in characteristics and

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<sup>7</sup> These categories ensure sufficient sample sizes for decomposition; future work could examine more granular racial compositions.

<sup>8</sup> Poverty categories are based on MEPS: <10% (low), 10–20% (medium), and >20% (high). MEPS estimates are generally lower than FRPL-based measures (Gutierrez et al., 2022).

differences in the effects of those characteristics (interaction) (Blinder, 1973; Kitagawa, 1955; Oaxaca, 1973). Mathematically, we express the outcome gap  $\Delta Y$  as follows:

$$\begin{aligned}\Delta Y &= E + C + I, \text{ where:} \\ E &= \{E(X_W) - E(X_{NW})\}\beta_{NW} \\ C &= E(X_{NW})(\beta_W - \beta_{NW}) \\ I &= \{E(X_W) - E(X_{NW})\}(\beta_W - \beta_{NW})\end{aligned}$$

Here,  $X_W$  and  $X_{NW}$  represent the vectors of explanatory variables for predominantly White (W) and predominantly non-White (NW) schools, respectively.  $\beta_W$  and  $\beta_{NW}$  are the corresponding coefficients. The endowments component (E), therefore, equals the size of the gap if the coefficients on explanatory factors were equal across groups ( $\beta_{NW}$ ), but the expected values of the explanatory factors differed across groups. The coefficients component (C) equals the outcome gap if, instead, the explanatory factors were held constant ( $X_{NW}$ ), but the association between those factors and the outcome varied across groups. Finally, the interaction component (I) equals the outcome gap resulting from the interaction of both the endowment and coefficient differences across the two groups.<sup>9</sup>

We consider several structural and contextual factors (X) that may explain differences in school building conditions across student racial groups. First, differential access to financial resources could contribute to school building condition gaps. We explore multiple potential sources of revenue differences: property taxes, state aid for capital expenses, federal aid for capital expenses, bond revenues, and school donations. We also examine whether geographic locale shapes school building condition gaps by including urbanicity measures. Finally, we include basic school characteristics, including number of students enrolled and school level, to account for potential differences across school sizes and grade levels. We focus on this set of variables to

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<sup>9</sup> We implement the decomposition using Jann's (2008) `oaxaca` command in Stata.

preserve a clear interpretation of the role of school finance channels; later, we show that the results are substantively similar when broader community socioeconomic characteristics are added.

We should note that this decomposition remains descriptive and could contain bias due to omitted variables or reverse causality. The KOB approach helps us to understand which structural factors are correlated with school building conditions and therefore could explain some part of the racial gap. However, it does not establish causal relationships.

## **Results**

### **Overall School Building Conditions**

Before examining racial disparities in exposure to adequate school building conditions, we provide an overarching descriptive summary of school building conditions in New York. Figure 1 presents average school building conditions across the three identified categories, respectively: (a) building aesthetics, (b) environmental conditions, and (c) health and recreational facilities. Overall, there is clear variance in school building conditions across the state, and significant room for improvement in the health and safety qualities of these buildings. In panel (a), across our sample, 84 percent of schools have at least satisfactory overall building condition. 85 percent have good quality lighting and 75 percent have a good appearance rating, indicating that a fair number of schools remain inadequate in these items. However, 93 percent of schools possess a good cleanliness rating, 94 percent have no excessive classroom noise, and 95 percent have no identified vermin, including rodents, insects, or cockroaches, indicating generally positive conditions.

In panel (b), we found that a substantial share of schools is not equipped with systems that support adequate environmental conditions. Only 49 percent of schools have a central HVAC

system<sup>10</sup>, 67 percent a satisfactory ventilation system, and 62 percent satisfactory humidity conditions. Most schools meet satisfactory conditions in other items—88 percent have a satisfactory cooling system, 94 percent have a satisfactory heating system, and 92 percent with no reported mold exposure. Scarcely any schools have lead water systems, and 97 percent have satisfactory water system conditions.

Regarding health and recreational facilities in panel (c), 68 percent of all schools have a playground (62 percent in satisfactory condition); 88 percent have athletic fields (80 percent in satisfactory condition); 32 percent have an external stadium (29 percent in satisfactory condition); 95 percent have a gymnasium, and 13 percent have a swimming pool. In addition, 90 percent of schools have a health office located in the building. Overall, we observe that not all students in New York have equivalent access to health and recreational facilities in adequate condition.

### **School Building Conditions by Student Racial Composition**

Table 1 presents average school building conditions by the racial composition of the school. Appendix Tables A3 and A4 provide the same comparisons for elementary schools and middle and high schools separately. In each of these tables, the first column shows average values for mostly White schools (>80 percent students White); the second column for schools with mixed racial composition (50-80 percent students White); and the third column for schools with mostly non-White students (over 50 percent students Black, Hispanic, Asian, Native American, multiracial, or another race/ethnicity). The fourth column presents a simple means comparison test between mostly White and mostly non-White schools, with asterisks designating statistical significance level from the t-test.

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<sup>10</sup> Many upstate schools use window or portable AC systems rather than central HVAC; while functional, these systems are typically lower quality, which may matter as extreme heat increases.

Beginning with building aesthetics, we observe that schools with mostly students of color have lower rated conditions than predominantly White schools. Specifically, their buildings are 8.1 percentage points less likely to be rated as satisfactory or better condition overall ( $p < 0.01$ ). School buildings with predominantly non-White students are also 17.3 percentage points less likely to have a good building appearance rating ( $p < 0.01$ ), 12.2 percentage points less likely to have a good lighting quality rating ( $p < 0.01$ ), and 14.6 percentage points less likely to have a good cleanliness rating ( $p < 0.01$ ), than school buildings with predominantly White students. Mostly non-White schools are also 2.5 percentage points more likely to have vermin, although this difference is only marginally significant ( $p < 0.1$ ). There are no significant differences in classroom noise levels.

Regarding environmental conditions within schools, there are several sizable and significant differences across school types. As seen in Table 1, predominantly non-White schools are 25.9 percentage points less likely to have a ventilation system in satisfactory condition ( $p < 0.01$ ), 20.0 percentage points less likely to have satisfactory humidity conditions ( $p < 0.01$ ), and 7.1 percentage points more likely to have mold ( $p < 0.01$ ), than their predominantly White counterparts. Schools serving mostly students of color are also 2.3 percentage points less likely to have a satisfactory heating system, although that difference is only marginally significant ( $p < 0.1$ ). There is also one slightly counterintuitive result: predominantly non-White schools have slightly more satisfactory cooling systems (3.6 percentage points higher,  $p < 0.05$ ). This result may reflect differences across urban and rural schools in cooling systems (see Appendix Tables A5 and A6).

Finally, there are notable differences in the presence or absence of health and recreational facilities across schools based on the racial composition of students. Presented in the third panel of Table 1, mostly non-White schools are 19.4 percentage points less likely to have athletic fields

( $p < 0.01$ ), 24.7 percentage points less likely to have an external stadium ( $p < 0.01$ ), 2.5 percentage points less likely to have a gymnasium ( $p < 0.1$ ), and 3.3 percentage points less likely to have a swimming pool ( $p < 0.01$ ), than predominantly White schools. Athletic fields and external stadiums are also in significantly better condition in predominantly White schools than in predominantly non-White schools. Finally, mostly non-White schools are 11.5 percentage points less likely to have a health office than mostly White schools ( $p < 0.01$ ). Schools serving more non-White students are *more* likely to have satisfactory playground equipment ( $p < 0.05$ ), although this partly reflects differences in school grade configurations, since elementary schools hold the opposite pattern across school racial composition (Appendix Table A3). Taken together, these findings suggest greater access to recreation, activity, and healthcare in schools serving mostly White students than in schools serving mostly non-White students.

### **Exposure to School Building Conditions by Student Race/Ethnicity**

Of course, these classifications of schools by racial composition group together students of different racial and ethnic backgrounds who may have very different access, on average, to higher quality school building conditions. For this reason, we also calculate weighted averages of each building condition measure by student race/ethnicity, with full results presented in Appendix Table A7 and results for the four aggregated indices presented in Figure 2. The heatmap in Figure 2 displays average building conditions (x-axis) in standard deviation units by student race/ethnicity (y-axis), with lighter colors representing exposure to more positive school building conditions and darker colors representing exposure to more negative school building conditions.

On average, Hispanic students experience the worst school building conditions in the state, with an average overall conditions index of 0.32 standard deviations below the mean, a recreation and health index of 0.16 standard deviations below the mean, a building aesthetics index of 0.25

standard deviations below the mean, and an environmental conditions index of 0.24 standard deviations below the mean. Each of these values is significantly different from the most advantaged racial/ethnic group for that index at a 99 percent significance level. Black students fare second worst, with an average overall conditions index of -0.19 ( $p < 0.01$ ), recreation and health index of -0.19 ( $p < 0.01$ ), building aesthetics index of -0.16 ( $p < 0.01$ ), and environmental conditions index of -0.03 standard deviations ( $p < 0.01$ ). Asian and multiracial students face more typical facility conditions for New York public schools, with indices of 0.05 ( $p < 0.01$ ) and 0.10 ( $p < 0.01$ ) for overall conditions, 0.03 (n.s.) and 0.01 ( $p < 0.05$ ) for recreation and health, 0.06 ( $p < 0.01$ ) and 0.14 (n.s.) for building aesthetics, and 0.00 ( $p < 0.05$ ) and 0.05 (n.s.) for environmental conditions, respectively. American Indian and Alaska Native students attend schools with relatively high-quality building conditions, as evidenced by their average overall conditions index of 0.15, recreation and health index of 0.16, building aesthetics index of 0.03, and environmental conditions index of 0.12 standard deviations. None of these values is statistically different from the most advantaged group. Finally, White students have access to school facilities in the best physical condition by many metrics, with an average overall conditions index of 0.21, recreation and health index of 0.14, building aesthetics index of 0.18, and environmental conditions index of 0.10 standard deviations above the mean. Again, these values represent either the highest group index values or are statistically indistinguishable from those of the most advantaged group.

These patterns underscore that infrastructure inequality is not only a school-level phenomenon, but also a student-level disparity in the physical environments students enter each day.

### **The Roles of Poverty and Geography**

One possible reason students of color may experience worse building conditions is that they may be more likely to attend high-poverty schools serving communities with fewer financial resources. In Appendix Tables A8 (elementary schools) and A9 (secondary schools), we present comparisons of school building conditions, this time across low-, medium-, and high-poverty schools. Although there are some notable differences between low- and high-poverty schools, in general, the differences in school building conditions are more modest and less significant than between schools of different student racial compositions. This suggests that student or community poverty is not the only relevant factor. Indeed, for both the aggregate indices (Appendix Figure A4) and individual building condition measures (Appendix Table A10), gaps in school building conditions are much larger between mostly White and mostly non-White schools within the same poverty tier than between schools of different poverty tiers.

A second possibility is that students of color are more likely to attend urban schools, which could tend to be in worse physical condition, whereas White students are more likely to attend rural or suburban schools. We correspondingly compare school building conditions across rural, town, suburban, and urban settings in Appendix Tables A5 and A6 for elementary schools and secondary schools, respectively. There is some evidence of an urban-rural disparity in school building conditions, as there is an average gap (for instance) in overall school building conditions of around 7 or 8 percentage points between urban and rural schools. Some part of the racial gap in school building conditions could therefore be related to average building differences across geographic locales.

### **Decomposition of Racial Gap in School Building Conditions**

To more fully explore the structural or contextual factors contributing to student racial gaps in school building conditions, we proceed to a statistical decomposition of these gaps. We do not

decompose each of the 24 building condition measure gaps separately, but instead use aggregated indices (equaling the average of scores in that category): (1) a building aesthetics index; (2) an environmental conditions index; (3) a health and recreational facilities index; and (4) an overall building conditions index, calculated as the average of the first three indices.<sup>11</sup> Table 2 presents the findings from the three-fold KOB decomposition of the gap in each index between mostly White schools and mostly non-White schools.

The first panel in Table 2 provides an overall summary of the decomposition. The total racial gap in the overall index is 0.083, 0.089 for the building aesthetics index, 0.060 for the environmental conditions index, and 0.100 for the health and recreational facilities index. These all represent sizable gaps, given that the standard deviations of these indices range from 0.14 to 0.17. The remainder of the summary panel indicates how much of the gap is due to differences in endowments, or differences in potential contributing factors between White and non-White schools; how much is due to coefficients, or differential *effects* of those potential contributing factors on school building conditions by school racial composition; and how much is due to interactions, or the interaction between endowment differences and coefficient differences. For most indices, the coefficients component of the racial gap is most substantial, suggesting that contributing factors (e.g., school characteristics and school funding) have different associations with school building conditions in mostly White schools as compared to in mostly non-White schools, in ways that exacerbate inequality.

Looking at specific contributing factors, we calculate for each covariate included in the decomposition the percent of the total race gap in building conditions explained by that covariate.

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<sup>11</sup> As an alternative, we estimate three latent factors via SEM (aesthetics, environmental conditions, recreation/health), allowing covariance among related items and fixing factor variances to 1. Model fit is adequate (RMSEA = 0.054;  $\chi^2$  p = 0.000), and decomposition results closely match those from averaged indices (Appendix Tables A11-A12), so we present the simpler measures.

Figure 3 summarizes this information for the overall building conditions index. Appendix Figures A5, A6, and A7 correspondingly present this information for the building aesthetics index, environmental conditions index, and health and recreational facilities index.

Focusing on overall building conditions, a few important points emerge. The largest single contributor to the racial gap in overall school building conditions is per-pupil property taxes in thousands of dollars—explaining 30 percent of the total gap. This implies that differences in community property wealth, and therefore differences in local revenues, are a major reason why students of color attend schools with poorer building infrastructure than White students. The second largest contributor to the race gap is school donations in thousands per pupil (explaining 7 percent), again suggesting that White communities may use their access to wealth to donate to schools and create inequalities in building conditions. There is also one factor that explains a large, *negative*, portion of the race gap in overall building conditions (-17 percent): per-pupil state building aid (in thousands of dollars). This finding implies that the racial gap in school building conditions would be larger in the absence of state building aid. State building aid is distributed by the state to school districts needing to make capital improvements using a formula that provides more financial assistance to districts with lower levels of property wealth (New York State Education Department, 2004). Therefore, our result indicates that the progressive formula for state building aid is successfully helping to equalize gaps in school building quality between schools serving disadvantaged racial groups and schools serving more advantaged racial groups. Other contextual factors, such as school level and geographic locale, explain only a modest portion of the racial gap in school building conditions.

As a sensitivity exercise, we compare our preferred decomposition results (model 2) to two alternative specifications: a more parsimonious model that includes only the policy-malleable

school finance variables (model 1) and an expanded model that adds community socioeconomic and demographic covariates, including taxable property values, median household income, population age composition, population racial and ethnic composition, schoolwide Title 1 eligibility, and estimated student poverty (model 3). Across all three models, property tax revenue remains a large contributor to the racial gap in building conditions, while state aid consistently emerges as an important compensatory factor, offsetting part of the gap (see Appendix Figure A8 and Table A13). The contribution of property tax revenue is somewhat smaller in the fully expanded model, falling from roughly 30 percent to roughly 20 percent. This attenuation is consistent with the large contribution of taxable property values in model 3, which captures some of the same underlying variation in local fiscal capacity as property tax revenue.

## **Discussion**

This study documents substantial racial disparities in the physical environments of public schools in New York. Across multiple dimensions, including building aesthetics, environmental conditions, and access to health and recreational facilities, we find that White students are systematically more likely than students of color to attend schools with higher-quality building conditions. These disparities indicate that educational inequities extend beyond instructional resources and staffing to include the physical environments in which learning takes place. They also align with broader environmental justice research showing that communities of color are disproportionately exposed to environmental hazards and unhealthy built environments (e.g., Banzhaf et al., 2019).

A growing body of research suggests that school building and environmental conditions influence both students' academic outcomes and their engagement in schooling (Chung et al.,

2025; Duque & Gilraine, 2022; Gilraine, 2023; Heissel et al., 2022; Park et al., 2020; Persico & Venator, 2021; Simons, 2010). Improvements in school facilities and capital investments can similarly positively shape educational outcomes (Biasi et al., 2025; Lafortune & Schönholzer, 2022; Neilson & Zimmerman, 2014; O’Hagan, 2025). Our findings, therefore, suggest that racial disparities in school building conditions may represent a material dimension of the broader education debt, reflecting the cumulative effects of historically unequal public investments in the schooling environments available to students of different racial groups (Ladson-Billings, 2006). This framing also reflects the close connection between health and educational opportunity: conditions that shape students’ health and well-being also shape their ability to attend, engage with, and benefit from school (Gopalan & Edara, 2023).

Our decomposition analysis sheds light on the institutional mechanisms underlying these racial disparities. Even after controlling for school characteristics such as level, size, type, and geographic locale, differences in local property tax revenue (measured in thousands of dollars per pupil) explain nearly one-third of the observed racial gap in school building conditions, underscoring the central role of local wealth in shaping facility investments. Prior research shows that local revenues play a key role in shaping disparities in capital investment and bond financing (Biasi et al., 2021; Brunner et al., 2023). By focusing on realized building conditions, our analysis illustrates how differences in local fiscal capacity translate into disparities in the physical environments in which students learn, reflecting broader patterns of segregation and wealth inequality.

We also find that donations to public schools—an increasingly common form of supplemental funding in affluent communities (Nelson & Gazley, 2014) – contribute meaningfully to the observed racial gaps in school building conditions. These contributions may further amplify

inequalities by enabling wealthier communities to supplement public capital investments with privately raised funds.

At the same time, our results suggest that state policies can play an important mitigating role. State building aid partially offsets disparities arising from differences in local property revenues, indicating that progressive state formulas have the potential to narrow gaps in school infrastructure quality. However, prior research suggests that formulas targeting economic disadvantage do not always reduce racial disparities in school funding to the same extent (Rauscher & Fiel, 2025). This suggests that policymakers may need to consider multiple dimensions of equity when designing capital aid programs.

To address racial inequities in school infrastructure quality, policymakers may consider expanding progressive state aid for school construction and renovation, redesigning capital finance systems to reduce reliance on local wealth, and improving transparency in the reporting of school facility conditions (Blagg et al., 2023; Plummer, 2006). Systematic collection and public reporting of infrastructure data would allow policymakers, researchers, and communities to better track facility needs and monitor progress toward more equitable school environments.

This study contains several limitations that should be considered when interpreting the findings. First, our data are cross-sectional at the school level, which limits our ability to examine how students' exposure to school building conditions evolves over time or varies across multiple dimensions of student identity. Second, we selected a subset of measures from the building inspection reports, which contain hundreds of questions. While these measures capture several important dimensions of school facilities, they may be subjective and represent only a portion of the full range of building systems, conditions, and qualities documented in the inspection process. Finally, our analysis is descriptive in nature. We do not estimate the causal effects of policy

changes, such as reforms to state building aid formulas or limits on property tax rates, on racial disparities in school building conditions. Future research could build on this work by linking measures of school infrastructure to longitudinal student data and by examining how changes in capital finance policies shape inequalities in school facility conditions over time.

Investments in high-quality school building infrastructure can yield meaningful benefits for students' health, well-being, and learning (Bailey, 2009; Biasi et al., 2025; Conlin & Thompson, 2017; Lafortune & Schönholzer, 2022; Neilson & Zimmerman, 2014; O'Hagan, 2025). Our findings show that access to these investments remains unequally distributed across students, with students of color more likely to attend schools with lower-quality building conditions. These disparities suggest that school infrastructure represents an important, yet often overlooked, dimension of educational inequality.

## References

- Alexander, D., and Lewis, L. (2014). Condition of America's Public School Facilities: 2012–13 (NCES 2014-022). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved March 2026 from <https://ies.ed.gov/use-work/resource-library/report/first-look-ed-tab/condition-americas-public-school-facilities>
- Backer, D. I., & Royal, C. (2025). Toxic finance: Underinvestment in Philadelphia's School Buildings, 1993–2021. *Journal of Educational Administration and History*, 57(1), 74-91.
- Bailey, J. A. (2009). *A Synthesis of Studies Pertaining to Building Conditions, Student Achievement, Student Behavior, and Student Attitude*. Virginia Polytechnic Institute and State University. (Doctoral dissertation).
- Banzhaf, S., Ma, L., & Timmins, C. (2019). Environmental justice: The economics of race, place, and pollution. *Journal of Economic Perspectives*, 33(1), 185-208.
- Baron, E. J. (2022). School Spending and Student Outcomes: Evidence from Revenue Limit Elections in Wisconsin. *American Economic Journal: Economic Policy*, 14(1), 1-39.
- Baron, E. J., Hyman, J., & Vasquez, B. (2024). Public School Funding, School Quality, and Adult Crime. *Review of Economics and Statistics*, 1-46.
- Biasi, B., Lafortune, J., & Schönholzer, D. (2021). School capital expenditure rules and distribution. *AEA papers and proceedings III*, 450-454.
- Biasi, B., Lafortune, J., & Schönholzer, D. (2025). What works and for whom? Effectiveness and efficiency of school capital investments across the US. *The Quarterly Journal of Economics*, 140(3), 2329-2379.
- Blagg, K., Terrones, F., & Nelson, V. (2023). *Assessing the national landscape of capital expenditures for public school districts*. Washington, DC: Urban Institute.

- Blinder, A. S. (1973). Wage Discrimination: Reduced Form and Structural Estimates. *Journal of Human Resources*, 436-455.
- Brunner, E. J., Schwegman, D., & Vincent, J. M. (2023). How Much Does Public School Facility Funding Depend on Property Wealth?. *Education Finance and Policy*, 18(1), 25-51
- Cellini, S. R., Ferreira, F., & Rothstein, J. (2010). The Value of School Facility Investments: Evidence from a Dynamic Regression Discontinuity Design. *The Quarterly Journal of Economics*, 125(1), 215-261.
- Chung, S., Persico, C., & Liu, J. (2025). *The Effects of Daily Air Pollution on Students and Teachers* (No. w33549). National Bureau of Economic Research.
- Conlin, M., & Thompson, P. N. (2017). Impacts of New School Facility Construction: An Analysis of a State-Financed Capital Subsidy Program in Ohio. *Economics of Education Review*, 59, 13-28.
- Derenoncourt, E., Kim, C. H., Kuhn, M., & Schularick, M. (2024). Wealth of Two Nations: The US Racial Wealth Gap, 1860–2020. *The Quarterly Journal of Economics*, 139(2), 693-750.
- Duncombe, W., & Wang, W. (2009). School Facilities Funding and Capital-Outlay Distribution in the States. *Journal of Education Finance*, 34(3), 324-350.
- Duque, V., & Gilraine, M. (2022). Coal use, air pollution, and student performance. *Journal of Public Economics*, 213, 104712.
- Enami, A., Alm, J., & Aranda, R. (2021). Labor versus Capital in the Provision of Public Services: Estimating the Marginal Products of Inputs in the Production of Student Outcomes. *Economics of Education Review*, 83, 102131.

- Filardo, M. (2021). *State of Our Schools 2021: America's PK-12 Public School Facilities*. 21st Century School Fund, International WELL Building Institute, & National Council on School Facilities. Retrieved February 24, 2023, from <http://stateofourschools2021.org/>
- Gilraine, M. (2023). Air Filters, Pollution, and Student Achievement. *Journal of Human Resources*, 60(3).
- Goncalves, F. (2015). The Effects of School Construction on Student and District Outcomes: Evidence From a State-Funded Program in Ohio. *Available at SSRN 2686828*.
- Gopalan, M., & Edara, R. (2023). Health policies as education policies? A review of causal evidence and mechanisms. *AERA Open*, 9, 23328584231177616.
- Government Accountability Office. (1995). *School Facilities: Condition of America's Schools*. GAO.
- Gunter, T., & Shao, J. (2016). Synthesizing the Effect of Building Condition Quality on Academic Performance. *Education Finance and Policy*, 11(1), 97-123.
- Gutierrez, E., Blagg, K., & Chingos, M. M. (2022). User Guide to Model Estimates of Poverty in Schools. *Urban Institute*.
- Hailey, C. A. (2025). Choosing Schools, Choosing Safety: How Multiple Dimensions of School Safety Shape School Choices. *AERA Open*, 11, 23328584251329899.
- Handel, D. V., & Hanushek, E. A. (2023). US School Finance: Resources and Outcomes. In *Handbook of the Economics of Education* (Vol. 7, pp. 143-226). Elsevier.
- Heissel, J. A., Persico, C., & Simon, D. (2022). Does pollution drive achievement? The effect of traffic pollution on academic performance. *Journal of Human Resources*, 57(3), 747-776.
- Hong, K., & Zimmer, R. (2016). Does Investing in School Capital Infrastructure Improve Student Achievement?. *Economics of Education Review*, 53, 143-158.

- Jackson, C. K., & Mackevicius, C. L. (2024). What Impacts Can We Expect From School Spending Policy? Evidence from Evaluations in the United States. *American Economic Journal: Applied Economics*, 16(1), 412-446.
- Jann, B. (2008). The Blinder–Oaxaca Decomposition for Linear Regression Models. *The Stata Journal*, 8(4), 453-479.
- Kitagawa, E. M. (1955). Components of a Difference Between Two Rates. *Journal of the American Statistical Association*, 50(272), 1168-1194.
- Ladson-Billings, G. (2006). From the achievement gap to the education debt: Understanding achievement in US schools. *Educational Researcher*, 35(7), 3-12.
- Lafortune, J., & Schönholzer, D. (2022). The Impact of School Facility Investments on Students and Homeowners: Evidence from Los Angeles. *American Economic Journal: Applied Economics*, 14(3), 254-289.
- Lee, H., Shores, K., & Williams, E. (2022). The Distribution of School Resources in the United States: A Comparative Analysis Across Levels of Governance, Student Subgroups, and Educational Resources. *Peabody Journal of Education*, 97(4), 395-411.
- Martorell, P., Stange, K., & McFarlin Jr, I. (2016). Investing in Schools: Capital Spending, Facility Conditions, and Student Achievement. *Journal of Public Economics*, 140, 13-29.
- Michael, S. L., Merlo, C. L., Basch, C. E., Wentzel, K. R., & Wechsler, H. (2015). Critical Connections: Health and Academics. *Journal of School Health*, 85(11), 740-758
- National Center for Education Statistics. (2000). *Condition of America's Public School Facilities: 1999*. U.S. Department of Education.
- Neilson, C. A., & Zimmerman, S. D. (2014). The Effect of School Construction on Test Scores, School Enrollment, and Home Prices. *Journal of Public Economics*, 120, 18-31.

- Nelson, A. A., & Gazley, B. (2014). The Rise of School-Supporting Nonprofits. *Education Finance and Policy*, 9(4), 541-566.
- New York City Independent Budget Office. (2024). State Support for New York City's Education Infrastructure: Understanding school building aid. *Schools Brief*.
- New York State Education Department. (2004). State Building Aid for Public School Districts and BOCES. <https://www.nysed.gov/memo/facilities-planning/state-building-aid-public-school-districts-and-boces>
- O'Hagan, K. (2025). Inequities and Impacts of Investments in New School Facilities. (*EdWorkingPaper No.25 -1121*). Annenberg Institute at Brown University
- Oaxaca, R. (1973). Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review*, 693-709.
- Park, R. J., Goodman, J., Hurwitz, M., & Smith, J. (2020). Heat and Learning. *American Economic Journal: Economic Policy*, 12(2), 306-39.
- Persico, C. L., & Venator, J. (2021). The Effects of Local Industrial Pollution on Students and Schools. *Journal of Human Resources*, 56(2), 406-445.
- Plummer, E. (2006). The effects of state funding on property tax rates and school construction. *Economics of Education Review*, 25(5), 532-542.
- Rauscher, E. (2020). Delayed Benefits: Effects of California School District Bond Elections on Achievement by Socioeconomic Status. *Sociology of Education*, 93(2), 110-131.
- Rauscher, E., & Fiel, J. E. (2025). Slow Progress: School Finance Reforms and Racial Disparities in Funding. *Educational Evaluation and Policy Analysis*, 0(0)
- Sielke, C. C. (2001). Funding School Infrastructure Needs Across the States. *Journal of Education Finance*, 27(2), 653-662.

Simons, E., Hwang, S. A., Fitzgerald, E. F., Kielb, C., & Lin, S. (2010). The Impact of School Building Conditions on Student Absenteeism in Upstate New York. *American journal of public health, 100*(9), 1679-1686.

Sorensen, L. C., Hwang, M., & Radia, M. A. (2024). The Effects of School Building HVAC System Conditions on Student Academic and Behavioral Outcomes (*EdWorkingPaper No. 24-1093*). Annenberg Institute at Brown University.

## Tables and Figures

Table 1. School Building Conditions by Student Racial Composition

	Mostly White (1)	Mixed (2)	Mostly Non- White (3)	Difference (3-1)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.857	0.852	0.776	-0.081**
Appearance rating good	0.896	0.879	0.723	-0.173**
Lighting quality good	0.785	0.768	0.663	-0.122**
Cleanliness rating good	0.967	0.946	0.821	-0.146**
No excessive classroom noise	0.928	0.955	0.944	0.016
No vermin (rodents, insects, cockroaches)	0.948	0.974	0.923	-0.025+
<i>Building aesthetics average</i>	<i>0.897</i>	<i>0.896</i>	<i>0.808</i>	<i>-0.089**</i>
<b>Environmental conditions</b>				
Central HVAC system	0.529	0.444	0.499	-0.030
Cooling system	0.951	0.936	0.954	0.003
Cooling system satisfactory	0.869	0.887	0.906	0.036*
Heating system satisfactory	0.938	0.950	0.915	-0.023+
Ventilation system satisfactory	0.768	0.660	0.509	-0.259**
Humidity condition satisfactory	0.685	0.618	0.486	-0.200**
No lead water system	0.999	0.996	1.000	0.001
Water system condition satisfactory	0.968	0.977	0.963	-0.005
No mold	0.940	0.925	0.869	-0.071**
<i>Environmental conditions average</i>	<i>0.850</i>	<i>0.821</i>	<i>0.789</i>	<i>-0.061**</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.657	0.684	0.694	0.036
Playground condition satisfactory	0.580	0.640	0.645	0.066*
Athletic fields	0.922	0.925	0.728	-0.194**
Athletic fields condition satisfactory	0.820	0.850	0.665	-0.155**
External stadium	0.428	0.295	0.181	-0.247**
Stadium condition satisfactory	0.386	0.266	0.162	-0.224*
Gymnasium	0.957	0.947	0.933	-0.025+
Swimming pool	0.152	0.113	0.119	-0.033**
Health offices	0.930	0.921	0.815	-0.115**
<i>Health and recreational facilities average</i>	<i>0.648</i>	<i>0.627</i>	<i>0.549</i>	<i>-0.099**</i>
<i>Schools</i>	<i>481</i>	<i>568</i>	<i>360</i>	

+ $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ .

*Note.* Means or proportions of each variable by group presented in columns 1-3. Column 4 presents a comparison of group means t-test between mostly White and mostly non-White schools.

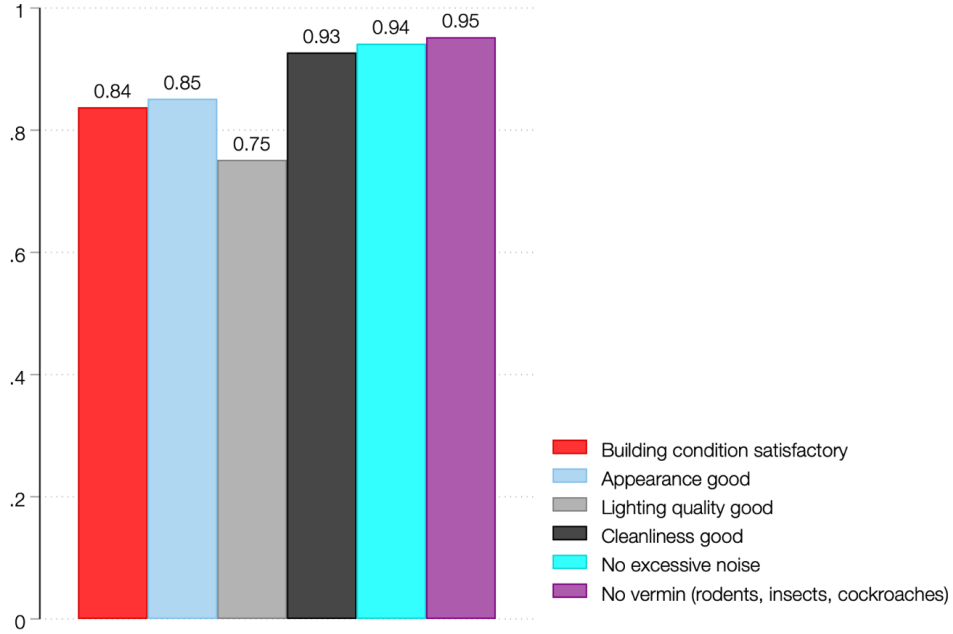
Table 2. Threefold Decomposition of Race Gap in School Building Conditions

	Overall conditions index	Building aesthetics index	Environmental conditions index	Health and recreational facilities index
<b>Summary</b>				
Mostly White	0.8005** (0.0031)	0.8977** (0.0047)	0.8507** (0.0044)	0.6532** (0.0051)
Mostly non-White	0.7175** (0.0057)	0.8092** (0.0096)	0.7904** (0.0068)	0.5529** (0.0079)
Difference	0.0830** (0.0065)	0.0885** (0.0107)	0.0602** (0.0081)	0.1002** (0.0094)
Endowments	0.0337** (0.0126)	0.0445+ (0.0263)	0.0246 (0.0152)	0.0319 (0.0225)
Coefficients	0.0603** (0.0162)	0.0880** (0.0277)	0.0480** (0.0166)	0.0450** (0.0156)
Interactions	-0.0110 (0.0194)	-0.0439 (0.0364)	-0.0124 (0.0210)	0.0233 (0.0262)
<b>Endowments</b>				
Middle school	-0.0003 (0.0005)	0.0002 (0.0005)	0.0003 (0.0005)	-0.0015 (0.0020)
High school	-0.0030+ (0.0018)	-0.0008 (0.0027)	-0.0006 (0.0017)	-0.0077* (0.0033)
Other grades	-0.0019 (0.0022)	0.0006 (0.0040)	0.0048 (0.0037)	-0.0110** (0.0041)
City	-0.0042 (0.0041)	-0.0112 (0.0072)	-0.0211** (0.0057)	0.0198** (0.0060)
Town	-0.0008 (0.0042)	0.0045 (0.0072)	-0.0111+ (0.0062)	0.0042 (0.0063)
Rural	0.0141 (0.0099)	-0.0011 (0.0224)	0.0393** (0.0119)	0.0040 (0.0195)
Enrollment	0.0008 (0.0025)	0.0145** (0.0048)	0.0014 (0.0026)	-0.0136** (0.0040)
Property taxes (pp)	0.0425** (0.0076)	0.0583** (0.0115)	0.0254** (0.0079)	0.0437** (0.0082)
State building aid (pp)	-0.0107* (0.0046)	-0.0257** (0.0079)	-0.0100+ (0.0054)	0.0036 (0.0058)
Federal building aid (pp)	-0.0029 (0.0032)	0.0069 (0.0052)	-0.0022 (0.0037)	-0.0132** (0.0046)
Bond revenues (pp)	-0.0018 (0.0015)	-0.0029 (0.0022)	-0.0018 (0.0019)	-0.0006 (0.0019)
Donations (pp)	0.0020 (0.0012)	0.0013 (0.0013)	0.0003 (0.0008)	0.0043+ (0.0024)
<b>Coefficients</b>				
Middle school	-0.0010 (0.0024)	-0.0015 (0.0042)	-0.0018 (0.0029)	0.0002 (0.0037)
High school	0.0047 (0.0032)	0.0025 (0.0052)	0.0038 (0.0035)	0.0077 (0.0052)
Other grades	0.0006 (0.0010)	-0.0008 (0.0018)	-0.0028 (0.0017)	0.0055** (0.0021)

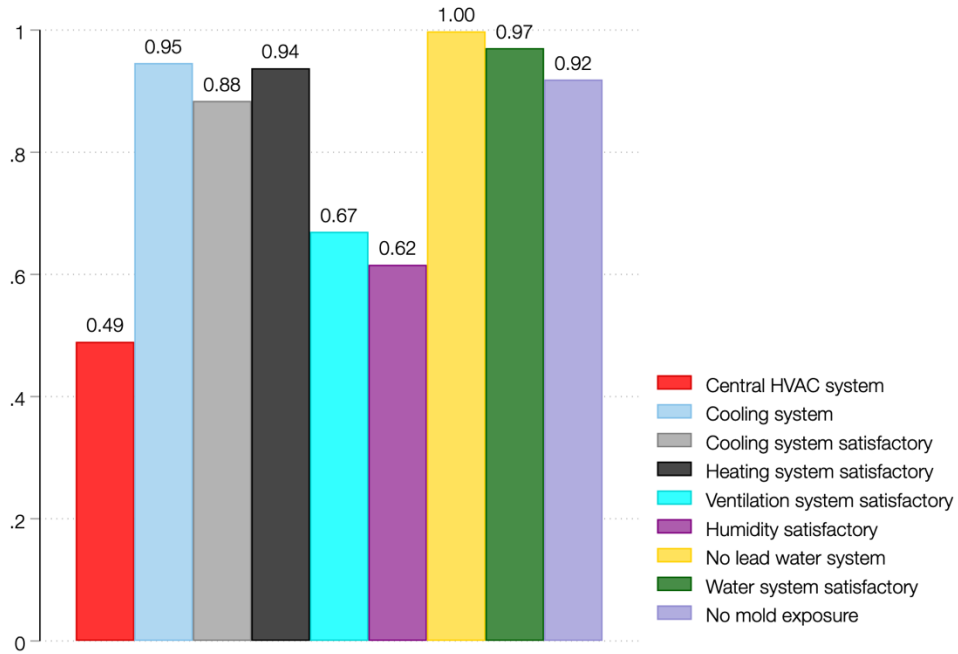
	Overall conditions index	Building aesthetics index	Environmental conditions index	Health and recreational facilities index
City	-0.0404* (0.0195)	-0.0455 (0.0343)	-0.0786** (0.0216)	0.0029 (0.0135)
Town	0.0000 (0.0011)	-0.0013 (0.0018)	0.0020 (0.0016)	-0.0007 (0.0016)
Rural	-0.0004 (0.0005)	-0.0001 (0.0010)	-0.0017* (0.0008)	0.0005 (0.0009)
Enrollment	0.0025 (0.0016)	0.0064* (0.0030)	0.0004 (0.0016)	0.0007 (0.0019)
Property taxes (pp)	0.0151** (0.0043)	0.0269** (0.0069)	0.0069 (0.0048)	0.0114* (0.0052)
State building aid (pp)	0.0118 (0.0108)	0.0114 (0.0181)	0.0313** (0.0119)	-0.0071 (0.0108)
Federal building aid (pp)	-0.0034 (0.0025)	0.0008 (0.0038)	-0.0008 (0.0026)	-0.0102* (0.0040)
Bond revenues (pp)	-0.0046* (0.0021)	-0.0066* (0.0033)	-0.0027 (0.0025)	-0.0045 (0.0029)
Donations (pp)	0.0056** (0.0020)	0.0031 (0.0031)	0.0012 (0.0024)	0.0126** (0.0028)
<b>Interactions</b>				
Middle school	-0.0001 (0.0003)	-0.0002 (0.0005)	-0.0002 (0.0004)	0.0000 (0.0004)
High school	0.0026 (0.0019)	0.0014 (0.0029)	0.0021 (0.0020)	0.0043 (0.0030)
Other grades	0.0015 (0.0024)	-0.0019 (0.0043)	-0.0066 (0.0040)	0.0131** (0.0045)
City	0.0391* (0.0189)	0.0441 (0.0332)	0.0761** (0.0210)	-0.0028 (0.0131)
Town	0.0001 (0.0044)	-0.0054 (0.0075)	0.0084 (0.0065)	-0.0028 (0.0067)
Rural	-0.0097 (0.0105)	-0.0018 (0.0231)	-0.0400** (0.0128)	0.0127 (0.0203)
Enrollment	-0.0050+ (0.0029)	-0.0128* (0.0050)	-0.0008 (0.0031)	-0.0013 (0.0038)
Property taxes (pp)	-0.0328** (0.0086)	-0.0585** (0.0135)	-0.0150 (0.0102)	-0.0248* (0.0110)
State building aid (pp)	-0.0153 (0.0139)	-0.0147 (0.0233)	-0.0404** (0.0148)	0.0092 (0.0139)
Federal building aid (pp)	0.0049 (0.0035)	-0.0012 (0.0055)	0.0011 (0.0038)	0.0147** (0.0052)
Bond revenues (pp)	0.0057* (0.0025)	0.0082* (0.0040)	0.0034 (0.0031)	0.0056 (0.0035)
Donations (pp)	-0.0020 (0.0013)	-0.0011 (0.0013)	-0.0004 (0.0009)	-0.0045+ (0.0026)
Observations	1440	1440	1440	1440

Figure 1. Average Building Conditions of New York State Public Schools

(a) Building aesthetics



(b) Environmental conditions



(c) Health and recreational facilities

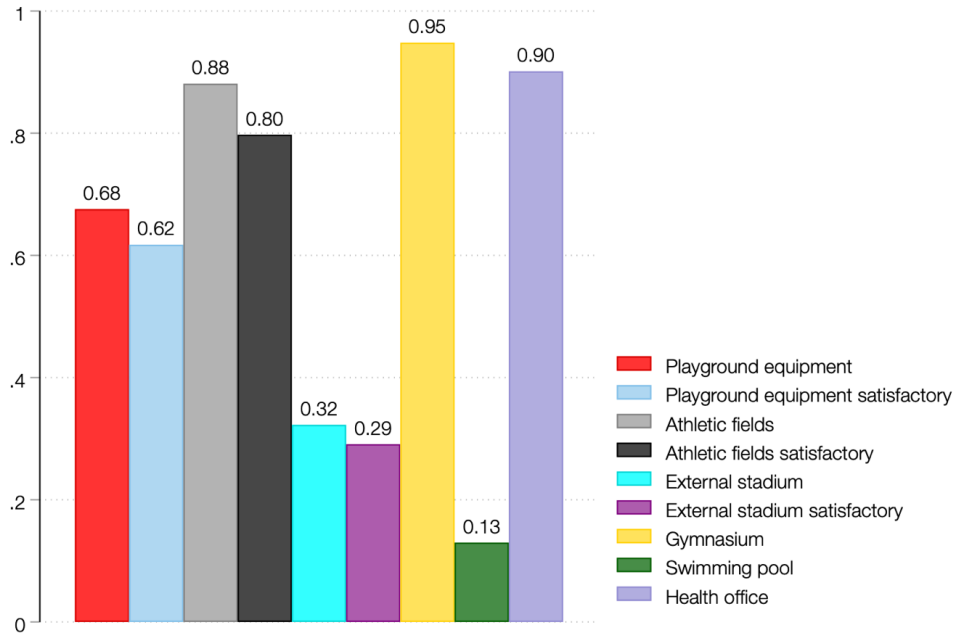
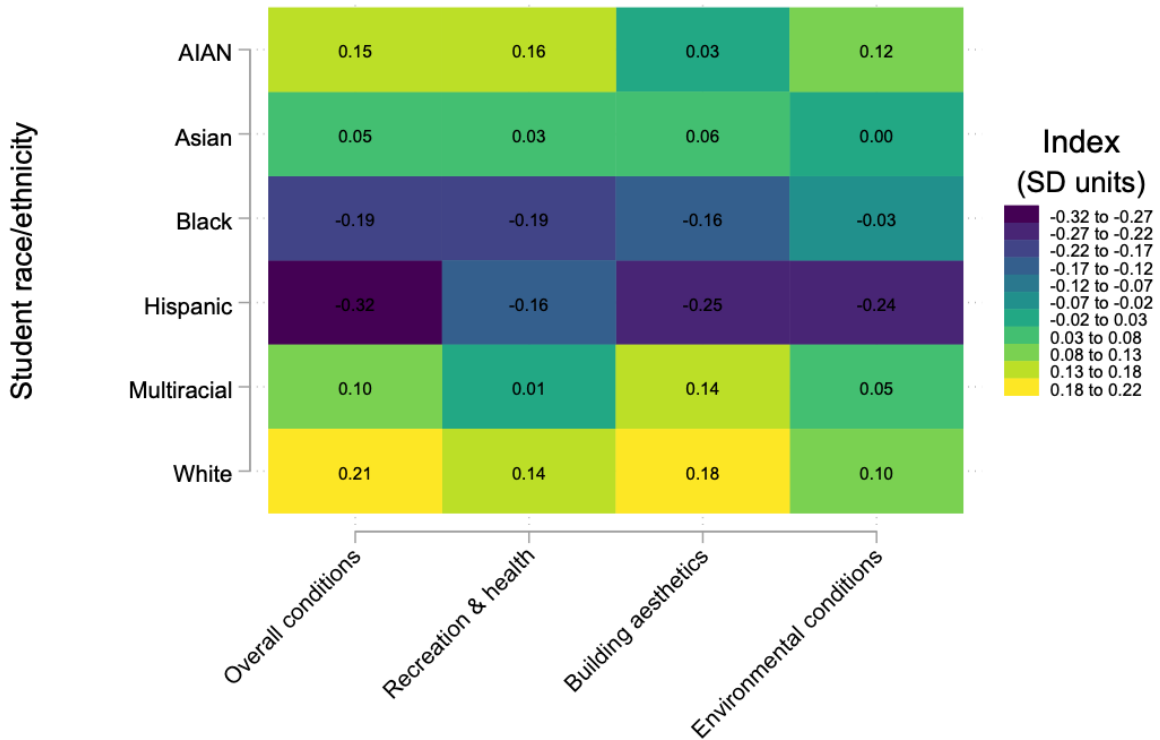
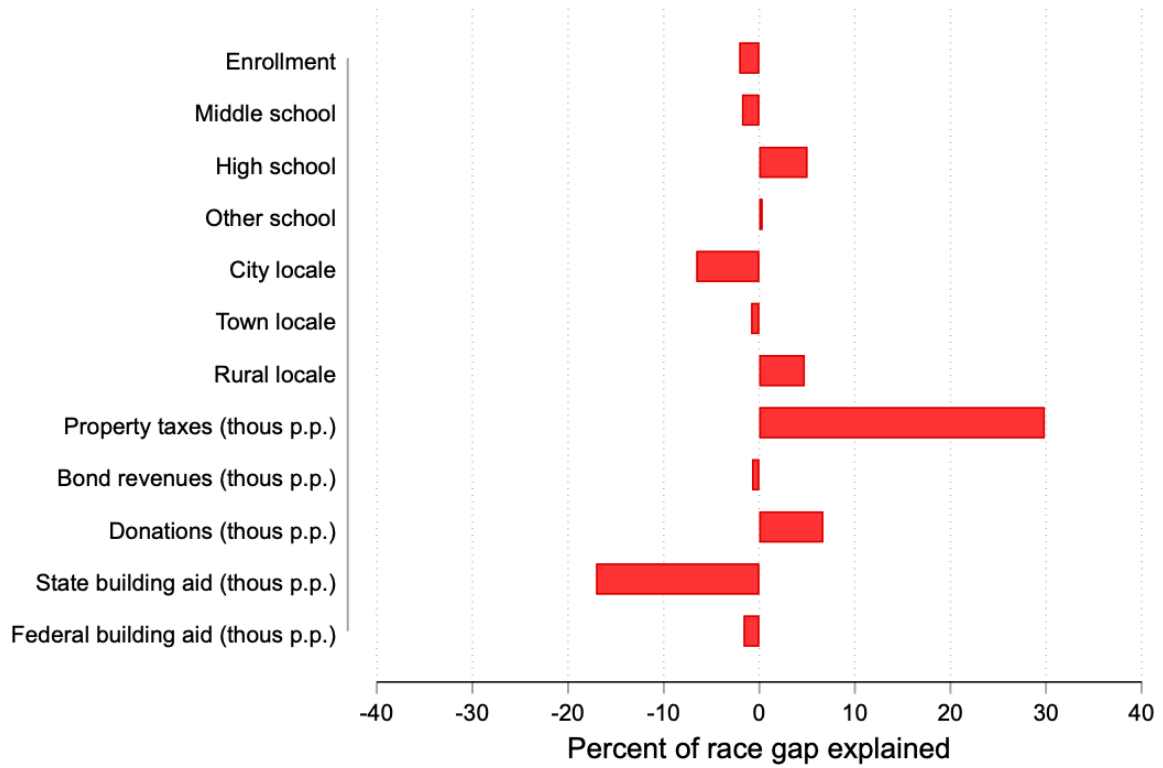


Figure 2. Average Exposure to Adequate School Building Conditions by Student Race/Ethnicity



*Note.* AIAN = American Indian or Alaska Native. For this graphic, we calculate student-weighted average building condition indices across the four building condition indices examined in this study for each student racial/ethnic group. Values are presented as deviations from the mean in standard deviation units, where the standard deviation comes from student-weighted variation in building conditions across schools. Higher values and lighter colors represent better building conditions and lower values and darker colors represent worse building conditions.

Figure 3. Percent of Racial Gap in Overall School Building Conditions Explained by Contributing Factors



*Note.* This figure is calculated based on the combined explanatory power of endowments, coefficients, and their interactions from the three-fold decomposition of the racial gap in overall school building conditions between predominantly White and predominantly non-White schools presented in Table 2.

## Appendix Tables and Figures

Table A1. Selected Questions from the School Building Condition Survey (2015)

Variables	Questions	Answer Options
<b><i>Building aesthetics</i></b>		
Overall building condition satisfactory	Q29. Overall building rating	Excellent, Satisfactory, Unsatisfactory, and Poor
Appearance rating good	Q104a. General Appearance – Overall Rating	Good, Fair, and Poor
Lighting quality good	Q108c. Lighting Quality- Overall Rating	Good, Fair, and Poor
Cleanliness rating good	Q105a. Cleanliness – Overall Rating	Good, Fair, and Poor
Noise in classrooms	Q107. Is there noise in classrooms from HVAC units, traffic, etc. that may impact education?	Yes/No
Vermin (rodents, insects, cockroaches)	Q109a. Is there evidence of active infestations of ... (check all that apply)?	Rodents, Wood-boring or wood-eating insects, Cockroaches, Other Vermin, Other
<b><i>Environmental conditions</i></b>		
Central HVAC system	Q88a. Does this building have a central HVAC system?	Yes/No
Cooling system	Q91. Cooling / Air-Conditioning Generating Systems?	Yes/No
Heating system satisfactory	Q89b. Overall condition of heat generating systems?	Excellent, Satisfactory, Unsatisfactory, Non-functioning, and Critical Failure
Cooling system satisfactory	Q91. Overall condition of piped heating and cooling distribution systems?	Excellent, Satisfactory, Unsatisfactory, Non-functioning, and Critical Failure
Ventilation system satisfactory	Q92a. Overall condition of air handling and ventilation systems?	Excellent, Satisfactory, Unsatisfactory, Non-functioning, and Critical Failure
Humidity condition satisfactory	Q111a. Overall rating of humidity/moisture condition in building:	Good, Fair, and Poor
Lead water system	Q84a. Water Distribution System – Types of Pipes?	Iron, Galvanized, Copper, Lead, PVC, Other
Water system condition satisfactory	Q84b. Overall condition of water distribution system?	Excellent, Satisfactory, Unsatisfactory, Non-functioning, and Critical Failure
Mold	Q110a. Is there visible mold or moldy odors?	Yes/No
<b><i>Health and recreational facilities</i></b>		
Playground equipment	Q55. Playgrounds and Playground Equipment	Yes/No
Playground condition satisfactory	Q55b. Playgrounds and Equipment Condition	Excellent, Satisfactory, Unsatisfactory, and Poor
Athletic fields	Q56. Athletic Fields and Play Fields	Yes/No

Athletic fields condition satisfactory	Q56b. Athletic Fields Condition	Excellent, Satisfactory, Unsatisfactory, and Poor
External stadium	Q57. Exterior Bleachers / Stadiums	Yes/No
Stadium condition satisfactory	Q57b. Exterior Bleachers/Stadiums Condition	Excellent, Satisfactory, Unsatisfactory, and Poor
Gymnasium	Q26. Spaces provided – Tick all that applies	Yes/No
Swimming pool	Q26. Spaces provided – Tick all that applies	Yes/No
Health offices	Q26. Spaces provided – Tick all that applies	Yes/No

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Table A2. Distribution of Likert Variables in Building Condition Survey

Original Variable	Proportion	Satisfactory or Unsatisfactory	Good or Fair
<u>Building rating</u>			
Excellent	0.030	0.969	N/A
Satisfactory	0.838		
Unsatisfactory	0.132		
Poor	0.001		
<u>Appearance rating</u>			
Good	0.852	N/A	0.997
Fair	0.146		
Poor	0.003		
<u>Lighting rating</u>			
Good	0.752	N/A	0.995
Fair	0.244		
Poor	0.005		
<u>Cleanliness rating</u>			
Good	0.927	N/A	0.999
Fair	0.072		
Poor	0.001		
<u>Water system condition</u>			
Excellent	0.019	0.981	N/A
Satisfactory	0.952		
Unsatisfactory	0.029		
Non-Functioning	0.000		
<u>Heating system condition</u>			
Excellent	0.088	0.911	N/A
Satisfactory	0.854		
Unsatisfactory	0.057		
Non-Functioning	0.001		
<u>Cooling system condition</u>			
Excellent	0.037	0.958	N/A
Satisfactory	0.897		
Unsatisfactory	0.060		
Critical Failure	0.000		
Non-Functioning	0.005		
<u>Ventilation condition</u>			
Good	0.670	N/A	0.992
Fair	0.322		
Poor	0.008		
<u>Humidity condition</u>			
Good	0.616	N/A	0.989

Original Variable	Proportion	Satisfactory or Unsatisfactory	Good or Fair
Fair	0.374		
Poor	0.011		
<u>Playground condition</u>			
Excellent	0.066	0.933	N/A
Satisfactory	0.848		
Unsatisfactory	0.085		
Critical Failure	0.001		
Non-Functioning	0.001		
<u>Athletic fields condition</u>			
Excellent	0.026	0.970	N/A
Satisfactory	0.879		
Unsatisfactory	0.091		
Critical Failure	0.001		
Non-Functioning	0.003		
<u>External stadiums condition</u>			
Excellent	0.069	0.925	N/A
Satisfactory	0.833		
Unsatisfactory	0.093		
Critical Failure	0.001		
Non-Functioning	0.004		

Table A3. Elementary School Building Conditions by Student Racial Composition

	Mostly White (1)	Mixed (2)	Mostly Non-White (3)	Difference (3-1)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.869	0.847	0.783	-0.086**
Appearance rating good	0.888	0.882	0.739	-0.149**
Lighting quality good	0.786	0.762	0.667	-0.119**
Cleanliness rating good	0.971	0.952	0.839	-0.132**
Noise in classrooms	0.067	0.048	0.053	-0.014
Vermin (rodents, insects, cockroaches)	0.050	0.026	0.075	0.025
<i>Building aesthetics average</i>	<i>0.605</i>	<i>0.586</i>	<i>0.526</i>	<i>-0.079</i>
<b>Environmental conditions</b>				
Central HVAC system	0.503	0.403	0.458	-0.045
Cooling system	0.936	0.926	0.944	0.009
Heating system satisfactory	0.946	0.952	0.925	-0.021
Cooling system satisfactory	0.854	0.880	0.900	0.046*
Ventilation system satisfactory	0.755	0.662	0.503	-0.252**
Humidity condition satisfactory	0.694	0.620	0.492	-0.203**
Lead water system	0.002	0.005	0.000	-0.002
Water system condition satisfactory	0.971	0.970	0.964	-0.007
Mold	0.037	0.072	0.122	0.085**
<i>Environmental conditions average</i>	<i>0.633</i>	<i>0.61</i>	<i>0.590</i>	<i>-0.043</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.975	0.977	0.936	-0.039**
Playground condition satisfactory	0.863	0.921	0.878	0.015
Athletic fields	0.909	0.908	0.697	-0.211**
Athletic fields condition satisfactory	0.817	0.854	0.650	-0.167**
External stadium	0.227	0.111	0.064	-0.163**
Stadium condition satisfactory	0.198	0.092	0.053	-0.145**
Gymnasium	0.944	0.947	0.933	-0.011
Swimming pool	0.056	0.023	0.053	-0.003
Health offices	0.919	0.905	0.797	-0.122**
<i>Health and recreational facilities average</i>	<i>0.656</i>	<i>0.638</i>	<i>0.562</i>	<i>-0.094</i>
<i>Schools</i>	<i>481</i>	<i>568</i>	<i>360</i>	

+ $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ .

Note. Means or proportions of each variable by group presented in columns 1-3. Column 4 presents a comparison of group means t-test between mostly White and mostly non-White schools.

Table A4. Middle and High School Building Conditions by Student Racial Composition

	Mostly White (1)	Mixed (2)	Mostly Non- White (3)	Difference (3-1)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.868	0.868	0.763	-0.105**
Appearance rating good	0.909	0.877	0.676	-0.233**
Lighting quality good	0.776	0.785	0.640	-0.136**
Cleanliness rating good	0.962	0.936	0.763	-0.199**
Noise in classrooms	0.079	0.043	0.072	-0.007
Vermin (rodents, insects, cockroaches)	0.056	0.028	0.079	0.023
<i>Building aesthetics average</i>	<i>0.608</i>	<i>0.590</i>	<i>0.499</i>	<i>-0.109</i>
<b>Environmental conditions</b>				
Central HVAC system	0.576	0.503	0.576	-0.001
Cooling system	0.968	0.951	0.978	0.011
Heating system satisfactory	0.941	0.948	0.899	-0.042
Cooling system satisfactory	0.885	0.896	0.928	0.043
Ventilation system satisfactory	0.812	0.666	0.489	-0.323**
Humidity condition satisfactory	0.676	0.620	0.439	-0.238**
Lead water system	0.000	0.003	0.000	0.000
Water system condition satisfactory	0.974	0.988	0.964	-0.010
Mold	0.091	0.083	0.165	0.074*
<i>Environmental conditions average</i>	<i>0.658</i>	<i>0.629</i>	<i>0.604</i>	<i>-0.054</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.191	0.199	0.101	-0.090*
Playground condition satisfactory	0.153	0.178	0.079	-0.074*
Athletic fields	0.944	0.960	0.842	-0.102**
Athletic fields condition satisfactory	0.847	0.847	0.741	-0.106**
External stadium	0.656	0.604	0.496	-0.159**
Stadium condition satisfactory	0.591	0.558	0.453	-0.138**
Gymnasium	0.968	0.948	0.950	-0.018
Swimming pool	0.297	0.261	0.273	-0.024
Health offices	0.956	0.945	0.871	-0.085**
<i>Health and recreational facilities average</i>	<i>0.623</i>	<i>0.611</i>	<i>0.534</i>	<i>-0.089</i>
<i>Schools</i>	<i>340</i>	<i>326</i>	<i>139</i>	

+ $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ .

Note. Means or proportions of each variable by group presented in columns 1-3. Column 4 presents a comparison of group means t-test between mostly White and mostly non-White schools.

Table A5. Elementary School Building Conditions by Geographic Locale

	City (1)	Town (2)	Rural (3)	Suburb (4)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.833	0.826	0.912	0.819
Appearance rating good	0.858	0.888	0.869	0.830
Lighting quality good	0.772	0.770	0.785	0.725
Cleanliness rating good	0.907	0.963	0.946	0.922
Noise in classrooms	0.049	0.062	0.073	0.050
Vermin (rodents, insects, cockroaches)	0.043	0.019	0.050	0.052
<i>Building aesthetics average</i>	<i>0.577</i>	<i>0.588</i>	<i>0.610</i>	<i>0.566</i>
<b>Environmental conditions</b>				
Central HVAC system	0.562	0.453	0.442	0.432
Cooling system	0.951	0.901	0.919	0.943
Heating system satisfactory	0.926	0.938	0.946	0.946
Cooling system satisfactory	0.914	0.839	0.854	0.884
Ventilation system satisfactory	0.698	0.696	0.765	0.599
Humidity condition satisfactory	0.716	0.652	0.673	0.567
Lead water system	0.000	0.000	0.004	0.004
Water system condition satisfactory	0.975	0.975	0.965	0.967
Mold	0.074	0.118	0.042	0.074
<i>Environmental conditions average</i>	<i>0.646</i>	<i>0.619</i>	<i>0.623</i>	<i>0.602</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.914	0.963	0.973	0.977
Playground condition satisfactory	0.864	0.826	0.858	0.920
Athletic fields	0.586	0.857	0.896	0.893
Athletic fields condition satisfactory	0.556	0.801	0.804	0.828
External stadium	0.080	0.199	0.262	0.099
Stadium condition satisfactory	0.074	0.186	0.227	0.078
Gymnasium	0.951	0.975	0.923	0.942
Swimming pool	0.105	0.031	0.092	0.015
Health offices	0.827	0.932	0.865	0.888
<i>Health and recreational facilities average</i>	<i>0.551</i>	<i>0.641</i>	<i>0.656</i>	<i>0.627</i>
<i>Schools</i>	<i>162</i>	<i>161</i>	<i>260</i>	<i>822</i>

*Note.* Means or proportions of each variable by group presented.

Table A6. Middle and High School Building Conditions by Geographic Locale

	City (1)	Town (2)	Rural (3)	Suburb (4)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.800	0.901	0.876	0.834
Appearance rating good	0.764	0.851	0.896	0.850
Lighting quality good	0.836	0.762	0.756	0.743
Cleanliness rating good	0.818	0.921	0.948	0.914
Noise in classrooms	0.109	0.089	0.078	0.046
Vermin (rodents, insects, cockroaches)	0.109	0.020	0.041	0.051
<i>Building aesthetics average</i>	<i>0.573</i>	<i>0.591</i>	<i>0.599</i>	<i>0.573</i>
<b>Environmental conditions</b>				
Central HVAC system	0.745	0.564	0.508	0.533
Cooling system	1.000	0.960	0.959	0.960
Heating system satisfactory	0.891	0.941	0.943	0.938
Cooling system satisfactory	0.909	0.911	0.891	0.896
Ventilation system satisfactory	0.691	0.723	0.788	0.650
Humidity condition satisfactory	0.600	0.644	0.637	0.595
Lead water system	0.000	0.000	0.000	0.002
Water system condition satisfactory	0.909	1.000	0.984	0.978
Mold	0.127	0.139	0.073	0.097
<i>Environmental conditions average</i>	<i>0.652</i>	<i>0.654</i>	<i>0.643</i>	<i>0.628</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.073	0.168	0.228	0.173
Playground condition satisfactory	0.073	0.149	0.192	0.142
Athletic fields	0.800	0.901	0.959	0.945
Athletic fields condition satisfactory	0.655	0.782	0.839	0.856
External stadium	0.527	0.614	0.689	0.580
Stadium condition satisfactory	0.509	0.554	0.627	0.527
Gymnasium	0.927	0.970	0.943	0.962
Swimming pool	0.600	0.347	0.244	0.237
Health offices	0.818	0.960	0.938	0.945
<i>Health and recreational facilities average</i>	<i>0.554</i>	<i>0.605</i>	<i>0.629</i>	<i>0.596</i>
<i>Schools</i>	<i>55</i>	<i>101</i>	<i>193</i>	<i>452</i>

Note. Means or proportions of each variable by group presented.

Table A7. Average Exposure to School Building Conditions by Student Race/Ethnicity

Variable	American Indian or Alaska Native	Asian	Black	Hispanic	Two or More Races	White
Enrollment	5,816	67,460	146,559	218,386	31,662	899,503
<b>Aggregate indices</b>						
Overall conditions index	0.780	0.770**	0.743**	0.730**	0.775**	0.786 <sup>R</sup>
Building aesthetics index	0.862	0.868**	0.829**	0.813**	0.882	0.890 <sup>R</sup>
Environmental conditions index	0.837 <sup>R</sup>	0.820*	0.816**	0.786**	0.827	0.834
Health and recreation index	0.640 <sup>R</sup>	0.620	0.585**	0.589**	0.616*	0.636
<b>Building aesthetics</b>						
Overall condition satisfactory	0.727**	0.821	0.778**	0.795**	0.835	0.847 <sup>R</sup>
Appearance rating good	0.843	0.851*	0.753**	0.743**	0.864*	0.883 <sup>R</sup>
Lighting quality good	0.777 <sup>R</sup>	0.727	0.727	0.678**	0.767	0.770
Cleanliness rating good	0.935	0.928**	0.848**	0.812**	0.923**	0.948 <sup>R</sup>
No excessive classroom noise	0.946 <sup>R</sup>	0.927	0.942	0.943	0.945	0.939
No vermin (rodents, insects, roaches)	0.947	0.956	0.925**	0.907**	0.959 <sup>R</sup>	0.952
<b>Environmental conditions</b>						
Central HVAC system	0.650 <sup>R</sup>	0.493**	0.579	0.513**	0.523**	0.513**
Cooling system	0.948	0.955*	0.972 <sup>R</sup>	0.953**	0.939**	0.952**
Heating system satisfactory	0.892	0.931	0.902**	0.923	0.944 <sup>R</sup>	0.935
Cooling system satisfactory	0.854	0.914	0.922 <sup>R</sup>	0.891**	0.886**	0.881**
Ventilation system satisfactory	0.665	0.640**	0.592**	0.503**	0.662*	0.706 <sup>R</sup>
Humidity condition satisfactory	0.685 <sup>R</sup>	0.594*	0.540**	0.444**	0.613	0.630
No lead water system	0.999 <sup>R</sup>	0.998	0.999	0.998	0.998*	0.997*
Water system satisfactory	0.946	0.971	0.947*	0.970	0.972 <sup>R</sup>	0.971
No mold	0.898	0.888	0.893*	0.884**	0.906	0.919 <sup>R</sup>
<b>Health and recreational facilities</b>						
Playground equipment	0.542**	0.533**	0.523**	0.556**	0.694 <sup>R</sup>	0.533**
Playground condition satisfactory	0.500**	0.492**	0.474**	0.518**	0.643 <sup>R</sup>	0.483**
Athletic fields	0.894	0.912	0.795**	0.865**	0.853**	0.929 <sup>R</sup>
Athletic fields condition satisfactory	0.761	0.832	0.695**	0.771**	0.763**	0.833 <sup>R</sup>
External stadium	0.444	0.394	0.363*	0.336**	0.292**	0.447 <sup>R</sup>
External stadium satisfactory	0.396	0.354	0.338*	0.300**	0.266**	0.405 <sup>R</sup>
Gymnasium	0.979 <sup>R</sup>	0.970	0.957**	0.942*	0.965*	0.964**
Swimming pool	0.307 <sup>R</sup>	0.171**	0.246	0.133**	0.157**	0.197*
Health offices	0.935 <sup>R</sup>	0.920	0.871**	0.880**	0.914**	0.934

R = reference group with highest value; \* p<0.05; \*\*p<0.01.

Note. These means are calculated as weighted exposure averages across schools, weighted by the number of students in the specified racial/ethnic category at each school. Differences relative to the most advantaged group were tested using a nonparametric cluster bootstrap that resamples schools (200 bootstrapped samples).

Table A8. Elementary School Building Conditions by Student Poverty Concentration

	Low (1)	Medium (2)	High (3)	Difference (3-1)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.867	0.853	0.792	-0.075**
Appearance rating good	0.888	0.814	0.834	-0.055*
Lighting quality good	0.734	0.757	0.748	0.015
Cleanliness rating good	0.965	0.914	0.906	-0.059**
Noise in classrooms	0.053	0.059	0.055	0.002
Vermin (rodents, insects, cockroaches)	0.031	0.052	0.059	0.028*
<i>Building aesthetics average</i>	<i>0.590</i>	<i>0.575</i>	<i>0.566</i>	<i>-0.024</i>
<b>Environmental conditions</b>				
Central HVAC system	0.391	0.449	0.521	0.129**
Cooling system	0.953	0.912	0.934	-0.019
Heating system satisfactory	0.957	0.948	0.923	-0.034*
Cooling system satisfactory	0.910	0.839	0.875	-0.035+
Ventilation system satisfactory	0.636	0.673	0.652	0.016
Humidity condition satisfactory	0.616	0.590	0.630	0.014
Lead water system	0.006	0.002	0.000	-0.006
Water system condition satisfactory	0.971	0.975	0.961	-0.010
Mold	0.063	0.057	0.101	0.038*
<i>Environmental conditions average</i>	<i>0.611</i>	<i>0.605</i>	<i>0.622</i>	<i>0.011</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.990	0.977	0.928	-0.062**
Playground condition satisfactory	0.928	0.896	0.842	-0.085**
Athletic fields	0.943	0.884	0.726	-0.217**
Athletic fields condition satisfactory	0.904	0.807	0.643	-0.261**
External stadium	0.092	0.168	0.162	0.070**
Stadium condition satisfactory	0.076	0.143	0.140	0.064**
Gymnasium	0.941	0.943	0.943	0.002
Swimming pool	0.014	0.027	0.088	0.074**
Health offices	0.892	0.896	0.858	-0.035
<i>Health and recreational facilities average</i>	<i>0.642</i>	<i>0.638</i>	<i>0.592</i>	<i>-0.05</i>
<i>Schools</i>	<i>511</i>	<i>441</i>	<i>457</i>	

+ $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ .

Note. Means or proportions of each variable by group presented in columns 1-3. Column 4 presents a comparison of group means t-test between high poverty and low poverty schools.

Table A9. Middle and High School Building Conditions by Student Poverty Concentration

	Low (1)	Medium (2)	High (3)	Difference (3-1)
<b>Building aesthetics</b>				
Overall building condition satisfactory	0.862	0.835	0.837	-0.025
Appearance rating good	0.911	0.818	0.771	-0.140**
Lighting quality good	0.766	0.736	0.759	-0.007
Cleanliness rating good	0.958	0.892	0.849	-0.109**
Noise in classrooms	0.062	0.061	0.072	0.011
Vermin (rodents, insects, cockroaches)	0.052	0.030	0.066	0.015
<i>Building aesthetics average</i>	<i>0.602</i>	<i>0.562</i>	<i>0.559</i>	<i>-0.043</i>
<b>Environmental conditions</b>				
Central HVAC system	0.505	0.571	0.620	0.116*
Cooling system	0.958	0.965	0.976	0.018
Heating system satisfactory	0.936	0.965	0.898	-0.038
Cooling system satisfactory	0.897	0.887	0.922	0.025
Ventilation system satisfactory	0.695	0.697	0.699	0.004
Humidity condition satisfactory	0.623	0.584	0.620	-0.003
Lead water system	0.002	0.000	0.000	-0.002
Water system condition satisfactory	0.980	0.978	0.970	-0.010
Mold	0.094	0.095	0.127	0.033
<i>Environmental conditions average</i>	<i>0.632</i>	<i>0.638</i>	<i>0.648</i>	<i>0.016</i>
<b>Health and recreational facilities</b>				
Playground equipment	0.158	0.216	0.181	0.023
Playground condition satisfactory	0.133	0.182	0.151	0.018
Athletic fields	0.966	0.931	0.855	-0.110**
Athletic fields condition satisfactory	0.887	0.814	0.705	-0.182**
External stadium	0.628	0.597	0.566	-0.062
Stadium condition satisfactory	0.569	0.550	0.518	-0.051
Gymnasium	0.963	0.952	0.946	-0.017
Swimming pool	0.249	0.251	0.392	0.143**
Health offices	0.946	0.957	0.886	-0.060*
<i>Health and recreational facilities average</i>	<i>0.611</i>	<i>0.606</i>	<i>0.578</i>	<i>-0.033</i>
<i>Schools</i>	<i>406</i>	<i>231</i>	<i>166</i>	

+ $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ .

Note. Means or proportions of each variable by group presented in columns 1-3. Column 4 presents a comparison of group means t-test between high poverty and low poverty schools.

Table A10. Average Exposure to Building Conditions by School Racial and Poverty Composition

	Low poverty			Medium poverty			High poverty		
	Mostly White	Mixed	Mostly non-White	Mostly White	Mixed	Mostly non-White	Mostly White	Mixed	Mostly non-White
<b>Aggregate indices</b>									
Overall conditions index	0.794	0.780	0.752	0.799	0.778	0.710	0.803	0.790	0.709
Building aesthetics index	0.903	0.899	0.846	0.892	0.884	0.800	0.895	0.899	0.802
Environmental conditions index	0.855	0.811	0.810	0.846	0.833	0.751	0.847	0.845	0.803
Health and recreational facilities index	0.623	0.631	0.601	0.658	0.616	0.577	0.667	0.627	0.521
<b>Building aesthetics</b>									
Overall building condition satisfactory	0.850	0.864	0.895	0.854	0.817	0.836	0.870	0.853	0.715
Appearance rating good	0.930	0.888	0.842	0.873	0.851	0.664	0.887	0.885	0.722
Lighting quality good	0.802	0.746	0.539	0.767	0.812	0.632	0.789	0.782	0.711
Cleanliness rating good	0.978	0.962	0.908	0.950	0.916	0.809	0.980	0.929	0.804
No excessive classroom noise	0.949	0.949	0.895	0.934	0.950	0.954	0.891	0.981	0.952
No vermin (rodents, insects, cockroaches)	0.911	0.982	1.000	0.973	0.960	0.908	0.955	0.962	0.911
<b>Environmental conditions</b>									
Central HVAC system	0.565	0.384	0.408	0.517	0.525	0.401	0.498	0.558	0.574
Cooling system	0.965	0.947	0.987	0.944	0.906	0.941	0.943	0.942	0.952
Cooling system satisfactory	0.891	0.904	0.974	0.849	0.851	0.888	0.870	0.885	0.897
Heating system satisfactory	0.927	0.951	0.961	0.952	0.950	0.934	0.931	0.942	0.893

	Low poverty			Medium poverty			High poverty		
	Mostly White	Mixed	Mostly non-White	Mostly White	Mixed	Mostly non-White	Mostly White	Mixed	Mostly non-White
Ventilation system satisfactory	0.754	0.620	0.579	0.780	0.723	0.382	0.765	0.718	0.557
Humidity condition satisfactory	0.709	0.587	0.513	0.663	0.639	0.336	0.684	0.699	0.557
No lead water system	0.997	0.995	1.000	1.000	0.995	1.000	1.000	1.000	1.000
Water system condition satisfactory	0.965	0.980	0.987	0.968	0.980	0.974	0.972	0.962	0.952
No mold	0.923	0.929	0.882	0.942	0.931	0.901	0.960	0.904	0.849
No radon above limits	0.968	0.986	0.987	0.936	0.985	1.000	0.927	0.994	0.993
<b>Health and recreational facilities</b>									
Playground equipment	0.524	0.665	0.645	0.690	0.733	0.684	0.777	0.699	0.711
Playground condition satisfactory	0.466	0.627	0.592	0.605	0.688	0.638	0.684	0.635	0.663
Athletic fields	0.946	0.957	0.895	0.926	0.891	0.862	0.895	0.859	0.615
Athletic fields condition satisfactory	0.872	0.906	0.842	0.814	0.797	0.816	0.769	0.718	0.540
External stadium	0.393	0.303	0.303	0.451	0.248	0.191	0.437	0.321	0.144
Stadium condition satisfactory	0.355	0.270	0.263	0.411	0.223	0.178	0.389	0.301	0.127
Gymnasium	0.952	0.946	0.947	0.968	0.931	0.921	0.951	0.974	0.935
Swimming pool	0.173	0.089	0.092	0.125	0.109	0.046	0.166	0.205	0.165
Health offices	0.930	0.917	0.829	0.931	0.921	0.862	0.931	0.936	0.787

*Note.* Each value in this table represents the proportion of schools in that category with the specified characteristic.

Table A11. Factor Loadings from Structural Equation Model

Indicator	Loading	SE
<b>Building aesthetics factor</b>		
Overall building condition satisfactory	0.049***	(0.008)
Appearance rating good	0.298***	(0.008)
Lighting quality good	0.173***	(0.010)
Cleanliness rating good	0.183***	(0.005)
No excessive classroom noise	0.022***	(0.005)
No vermin (rodents, insects, cockroaches)	0.022***	(0.005)
<b>Environmental conditions factor</b>		
Central HVAC system	0.038***	(0.013)
Cooling system	0.011*	(0.006)
Heating system satisfactory	0.045***	(0.006)
Cooling system satisfactory	0.040***	(0.008)
Ventilation system satisfactory	0.254***	(0.012)
Humidity condition satisfactory	0.342***	(0.013)
No lead water system	0.000	(0.001)
Water system satisfactory	0.024***	(0.004)
No mold	0.038***	(0.007)
<b>Health and recreational facilities factor</b>		
Playground equipment	0.255***	(0.012)
Playground condition satisfactory	0.244***	(0.013)
Athletic fields	-0.083***	(0.008)
Athletic fields condition satisfactory	-0.044***	(0.011)
External stadium	-0.344***	(0.014)
External stadium satisfactory	-0.309***	(0.014)
Gymnasium	-0.038***	(0.006)
Swimming pool	-0.148***	(0.009)
Health offices	-0.065***	(0.008)

Note. Chi-squared (245) = 1926.5, p=0.000; RMSEA = 0.054; N = 2,371.

Table A12. Threefold Decomposition of Race Gap in School Building Condition Latent Factors

	Building aesthetics factor	Environmental conditions factor	Health and recreational facilities factor
<b>Summary</b>			
Mostly White	0.1745** (0.0258)	0.2148** (0.0290)	-0.2229** (0.0336)
Mostly non-White	-0.4443** (0.0601)	-0.4281** (0.0524)	0.3151** (0.0407)
Difference	0.6188** (0.0654)	0.6429** (0.0599)	-0.5380** (0.0528)
Endowments	0.3340* (0.1502)	0.2792* (0.1406)	-0.3117* (0.1418)
Coefficients	0.4160* (0.2061)	0.5610** (0.1819)	-0.0020 (0.0845)
Interactions	-0.1312 (0.2442)	-0.1973 (0.2205)	-0.2243 (0.1584)
<b>Endowments</b>			
Middle school	0.0009 (0.0029)	0.0006 (0.0024)	-0.0124 (0.0161)
High school	-0.0131 (0.0184)	0.0033 (0.0140)	-0.1040** (0.0297)
Other grades	0.0092 (0.0228)	0.0329 (0.0235)	-0.0422** (0.0156)
City	-0.1446** (0.0460)	-0.1956** (0.0426)	0.0510* (0.0215)
Town	0.0065 (0.0510)	-0.0131 (0.0427)	-0.0849** (0.0304)
Rural	0.2455* (0.1249)	0.3107* (0.1226)	-0.1807 (0.1300)
Enrollment	0.0549* (0.0254)	0.0406* (0.0201)	0.0794** (0.0184)
Property taxes (pp)	0.2578** (0.0659)	0.1795** (0.0592)	-0.0116 (0.0235)
State building aid (pp)	-0.1159** (0.0412)	-0.0940* (0.0390)	-0.0078 (0.0179)
Federal building aid (pp)	0.0276 (0.0268)	0.0058 (0.0263)	0.0103 (0.0134)
Bond revenues (pp)	-0.0113 (0.0136)	0.0008 (0.0144)	0.0013 (0.0046)
Donations (pp)	0.0165 (0.0104)	0.0076 (0.0074)	-0.0100 (0.0066)
<b>Coefficients</b>			
Middle school	-0.0051 (0.0260)	-0.0009 (0.0233)	0.0242 (0.0179)
High school	0.0277 (0.0343)	0.0108 (0.0276)	0.0035 (0.0218)
Other grades	-0.0040 (0.0101)	-0.0173 (0.0110)	-0.0081 (0.0070)

	Building aesthetics factor	Environmental conditions factor	Health and recreational facilities factor
City	-0.4684* (0.1950)	-0.5115** (0.1665)	0.0799 (0.1096)
Town	-0.0025 (0.0128)	0.0004 (0.0109)	0.0176* (0.0085)
Rural	-0.0109+ (0.0064)	-0.0132+ (0.0068)	0.0048 (0.0057)
Enrollment	0.0316* (0.0160)	0.0177 (0.0123)	-0.0075 (0.0083)
Property taxes (pp)	0.1118** (0.0389)	0.0591 (0.0366)	0.0638** (0.0190)
State building aid (pp)	0.0272 (0.1284)	0.1429 (0.1141)	0.1471* (0.0587)
Federal building aid (pp)	-0.0094 (0.0202)	0.0026 (0.0188)	0.0094 (0.0113)
Bond revenues (pp)	-0.0246 (0.0184)	-0.0165 (0.0197)	0.0030 (0.0098)
Donations (pp)	0.0496** (0.0179)	0.0200 (0.0185)	-0.0296* (0.0120)
Interactions			
Middle school	-0.0006 (0.0030)	-0.0001 (0.0026)	0.0027 (0.0041)
High school	0.0153 (0.0193)	0.0059 (0.0153)	0.0019 (0.0121)
Other grades	-0.0096 (0.0240)	-0.0411 (0.0253)	-0.0193 (0.0164)
City	0.4537* (0.1890)	0.4954** (0.1615)	-0.0774 (0.1062)
Town	-0.0104 (0.0525)	0.0017 (0.0449)	0.0723* (0.0319)
Rural	-0.2645* (0.1288)	-0.3202* (0.1273)	0.1156 (0.1328)
Enrollment	-0.0634* (0.0278)	-0.0355 (0.0231)	0.0150 (0.0162)
Property taxes (pp)	-0.2428** (0.0799)	-0.1284 (0.0781)	-0.1386** (0.0383)
State building aid (pp)	-0.0352 (0.1658)	-0.1846 (0.1462)	-0.1900** (0.0735)
Federal building aid (pp)	0.0136 (0.0291)	-0.0038 (0.0272)	-0.0135 (0.0161)
Bond revenues (pp)	0.0306 (0.0225)	0.0206 (0.0244)	-0.0037 (0.0122)
Donations (pp)	-0.0178 (0.0113)	-0.0072 (0.0076)	0.0106 (0.0070)
Observations	1,440	1,440	1,440

Table A13. Threefold Decomposition of Race Gap in Overall Building Conditions Index with Different Covariates Included

	Model 1	Model 2	Model 3
<b>Summary</b>			
Mostly White	0.8005** (0.0031)	0.8005** (0.0031)	0.8020** (0.0032)
Mostly non-White	0.7175** (0.0056)	0.7175** (0.0057)	0.7160** (0.0059)
Difference	0.0830** (0.0064)	0.0830** (0.0065)	0.0861** (0.0067)
Endowments	0.0260** (0.0068)	0.0337** (0.0126)	0.0894** (0.0224)
Coefficients	0.0714** (0.0134)	0.0630** (0.0169)	0.1569** (0.0437)
Interactions	-0.0144 (0.0136)	-0.0137 (0.0200)	-0.1602** (0.0491)
<b>Endowments</b>			
Property taxes (pp)	0.0403** (0.0066)	0.0425** (0.0076)	0.0256** (0.0070)
State building aid (pp)	-0.0116** (0.0043)	-0.0107* (0.0046)	-0.0114** (0.0042)
Federal building aid (pp)	-0.0031 (0.0031)	-0.0029 (0.0032)	-0.0050+ (0.0028)
Bond revenues (pp)	-0.0018 (0.0013)	-0.0018 (0.0015)	-0.0006 (0.0013)
Donations (pp)	0.0021+ (0.0013)	0.0020 (0.0012)	-0.0001 (0.0008)
Middle school		-0.0003 (0.0005)	-0.0006 (0.0007)
High school		-0.0030+ (0.0018)	-0.0049* (0.0022)
Other grades		-0.0019 (0.0022)	-0.0015 (0.0020)
City		-0.0042 (0.0041)	-0.0173* (0.0068)
Town		-0.0008 (0.0042)	0.0019 (0.0048)
Rural		0.0141 (0.0099)	-0.0002 (0.0161)
Enrollment		0.0008 (0.0025)	-0.0035 (0.0029)
Property values (pp)			0.0349** (0.0065)
% population school age			-0.0123 (0.0086)
% population over 65			0.0245** (0.0087)
% population Black			0.0055 (0.0142)

	Model 1	Model 2	Model 3
% population Hispanic			0.0192 (0.0124)
Median income			0.0148* (0.0058)
% students in poverty			0.0136 (0.0097)
Title 1 eligibility			0.0069 (0.0065)
<b>Coefficients</b>			
Property taxes (pp)	0.0128** (0.0038)	0.0152** (0.0043)	0.0084 (0.0052)
State building aid (pp)	-0.0037 (0.0093)	0.0100 (0.0113)	0.0501** (0.0161)
Federal building aid (pp)	-0.0037 (0.0025)	-0.0034 (0.0025)	-0.0046* (0.0022)
Bond revenues (pp)	-0.0044* (0.0020)	-0.0045* (0.0021)	-0.0040* (0.0020)
Donations (pp)	0.0061** (0.0019)	0.0056** (0.0020)	0.0003 (0.0023)
Middle school		-0.0010 (0.0024)	0.0006 (0.0025)
High school		0.0046 (0.0032)	0.0071* (0.0033)
Other grades		0.0006 (0.0010)	0.0008 (0.0008)
City		-0.0349+ (0.0210)	-0.0105 (0.0127)
Town		0.0001 (0.0011)	-0.0008 (0.0013)
Rural		-0.0004 (0.0005)	0.0001 (0.0007)
Enrollment		0.0025 (0.0016)	0.0001 (0.0017)
Property values (pp)			0.0156+ (0.0089)
% population school age			-0.0093 (0.0074)
% population over 65			0.0179** (0.0056)
% population Black			0.0354 (0.0267)
% population Hispanic			-0.0188 (0.0182)
Median income			0.0173+ (0.0089)
% students in poverty			0.0237* (0.0112)
Title 1 eligibility			0.0036 (0.0178)

	Model 1	Model 2	Model 3
<b>Interactions</b>			
Property taxes (pp)	-0.0277** (0.0076)	-0.0330** (0.0087)	-0.0179+ (0.0108)
State building aid (pp)	0.0048 (0.0120)	-0.0129 (0.0146)	-0.0647** (0.0198)
Federal building aid (pp)	0.0053 (0.0034)	0.0049 (0.0035)	0.0065* (0.0030)
Bond revenues (pp)	0.0055* (0.0024)	0.0056* (0.0025)	0.0048* (0.0023)
Donations (pp)	-0.0022+ (0.0013)	-0.0020 (0.0013)	-0.0001 (0.0008)
Middle school		-0.0001 (0.0003)	0.0001 (0.0003)
High school		0.0026 (0.0019)	0.0047* (0.0023)
Other grades		0.0014 (0.0024)	0.0023 (0.0022)
City		0.0339+ (0.0204)	0.0103 (0.0125)
Town		0.0002 (0.0044)	-0.0031 (0.0050)
Rural		-0.0092 (0.0105)	0.0037 (0.0166)
Enrollment		-0.0050+ (0.0029)	-0.0002 (0.0031)
Property values (pp)			-0.0241+ (0.0137)
% population school age			0.0116 (0.0092)
% population over 65			-0.0335** (0.0102)
% population Black			-0.0504 (0.0380)
% population Hispanic			0.0285 (0.0277)
Median income			-0.0111+ (0.0059)
% students in poverty			-0.0262* (0.0124)
Title 1 eligibility			-0.0014 (0.0072)
Observations	1,440	1,440	1,366

Figure A1. Number of Schools by School Racial Composition and Level

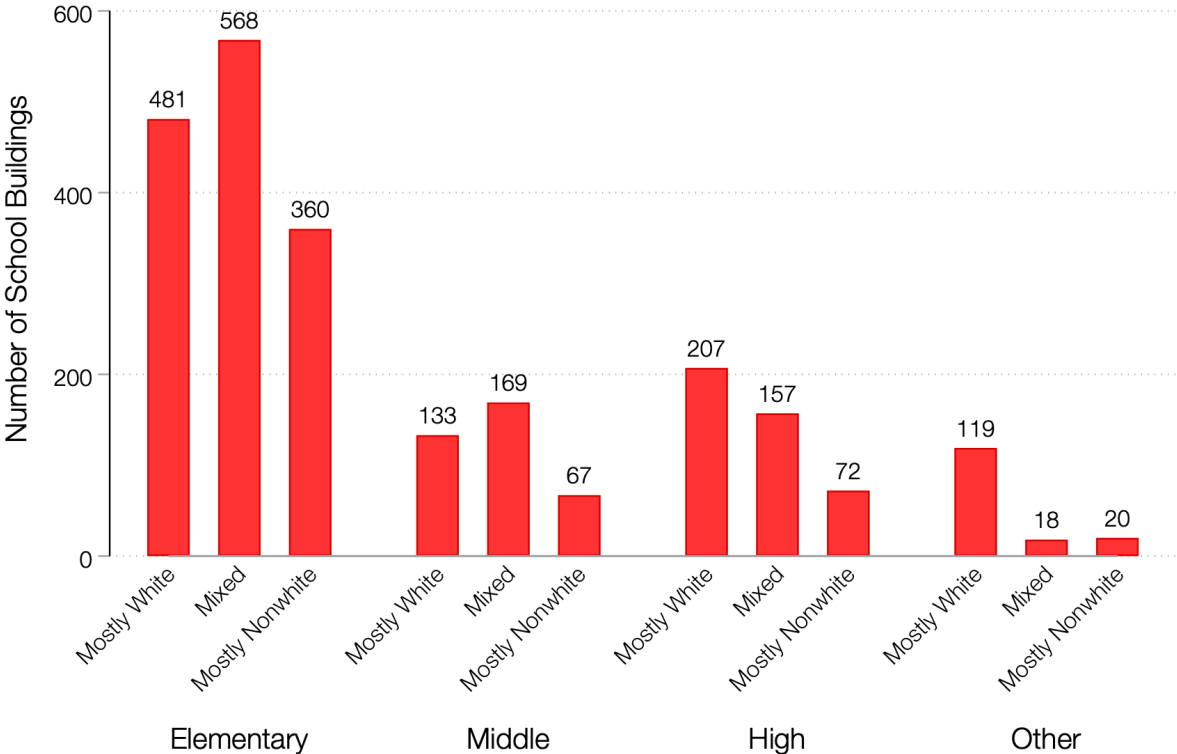


Figure A2. Number of Schools by Student Poverty Concentration and Level

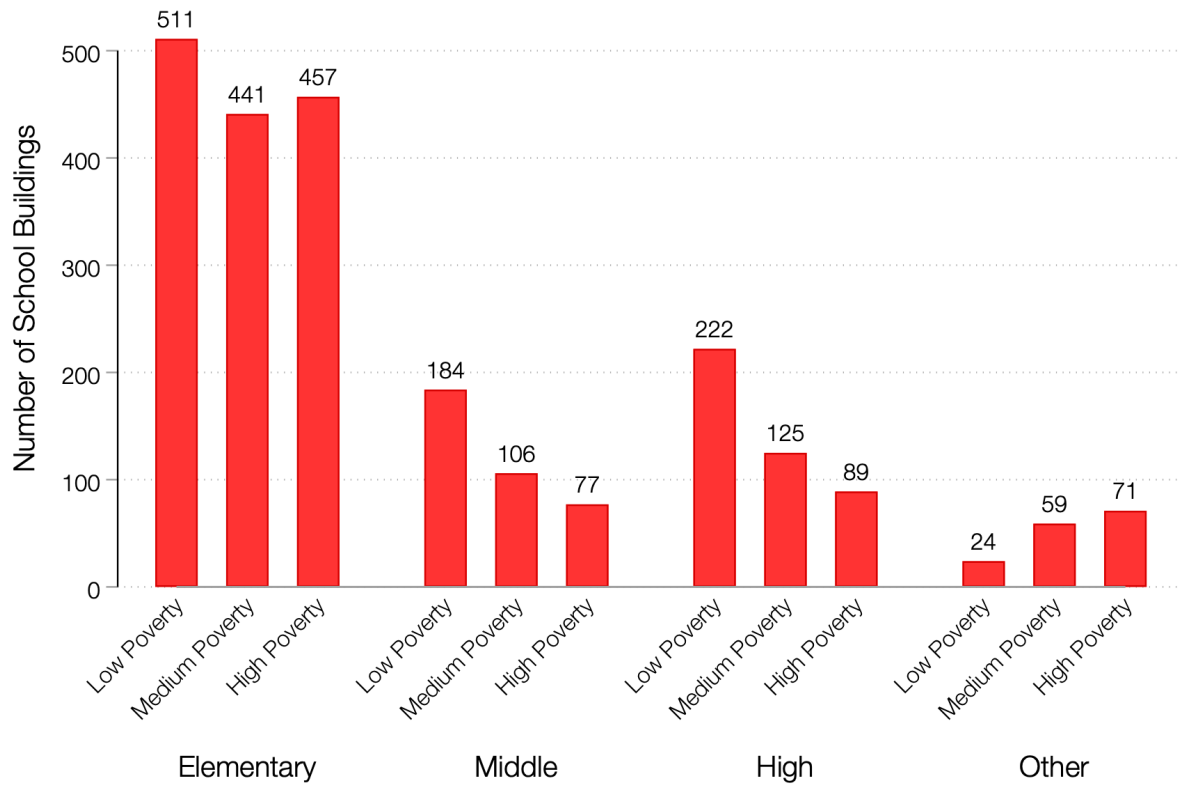


Figure A3. Number of Schools by Geographic Locale and School Level

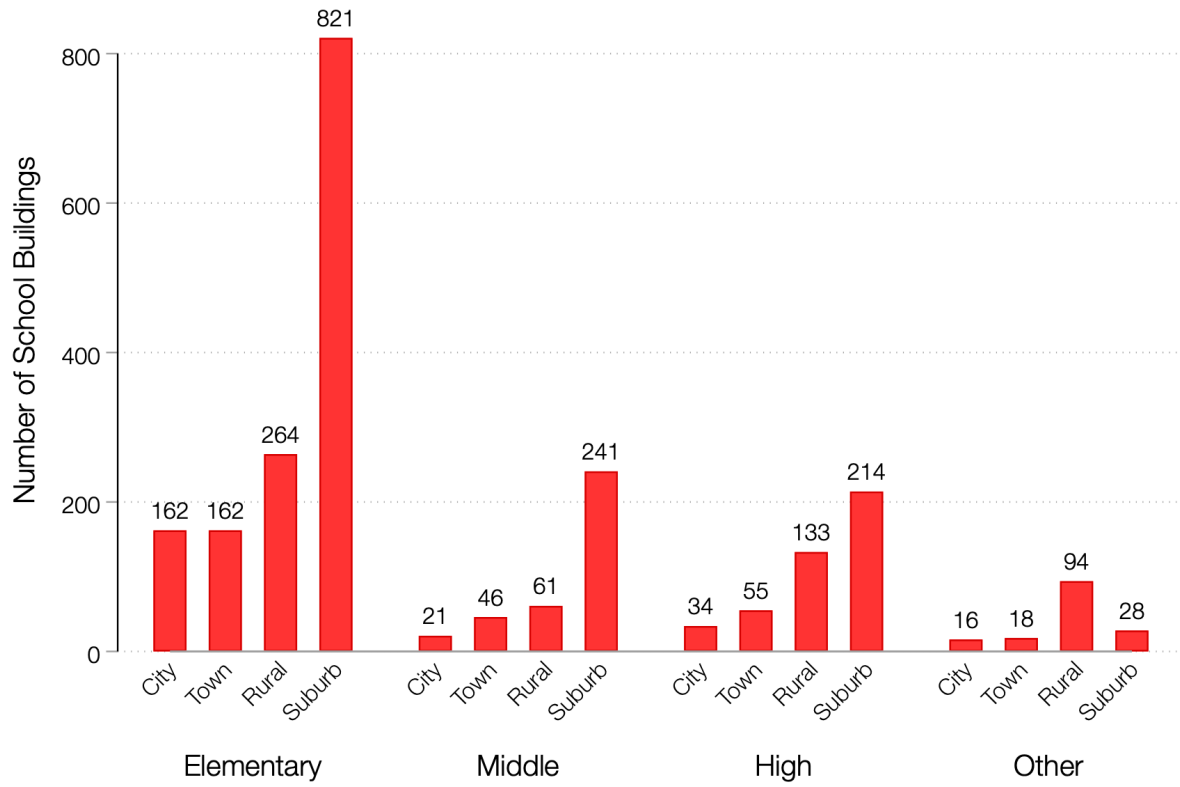
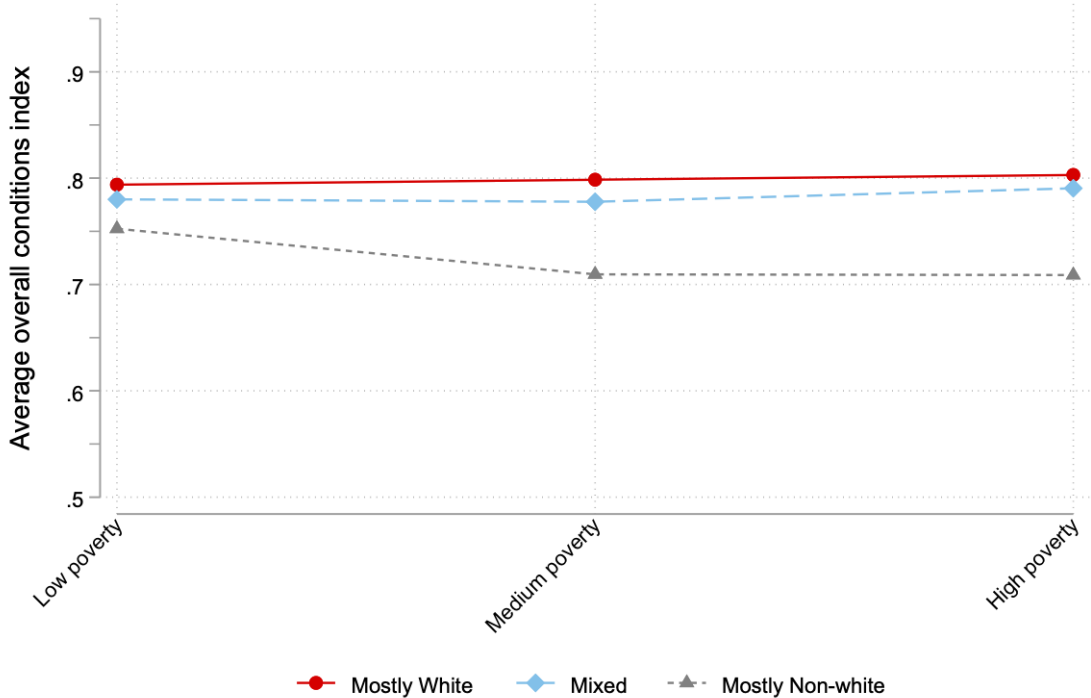
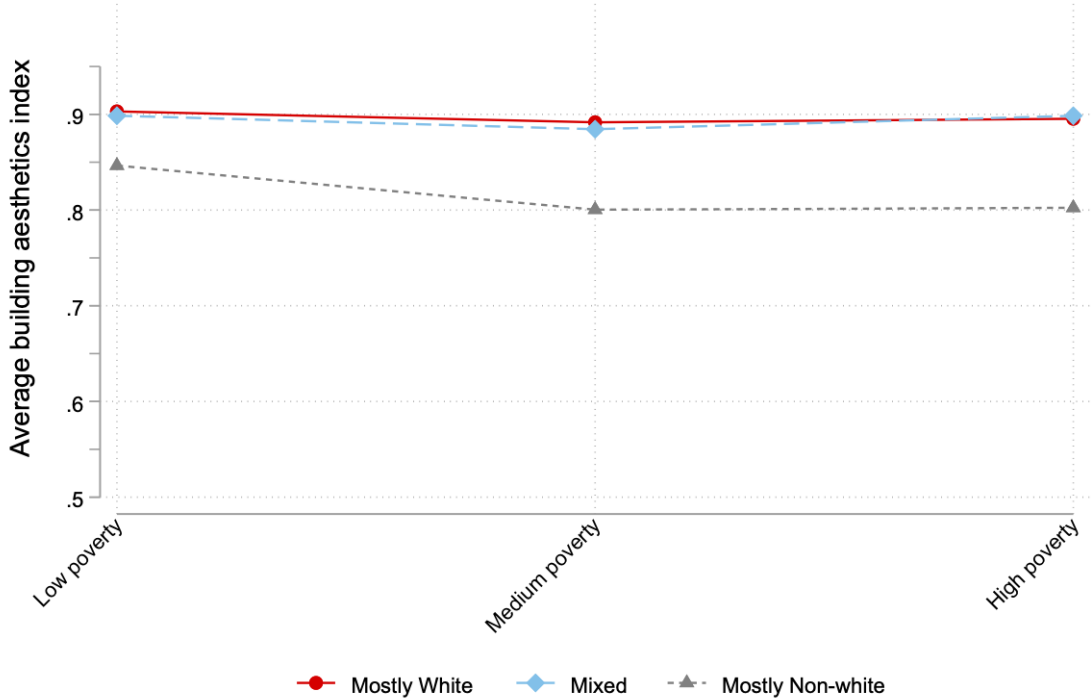


Figure A4. Average Exposure to Building Conditions by School Racial and Poverty Composition

(a) Overall conditions index

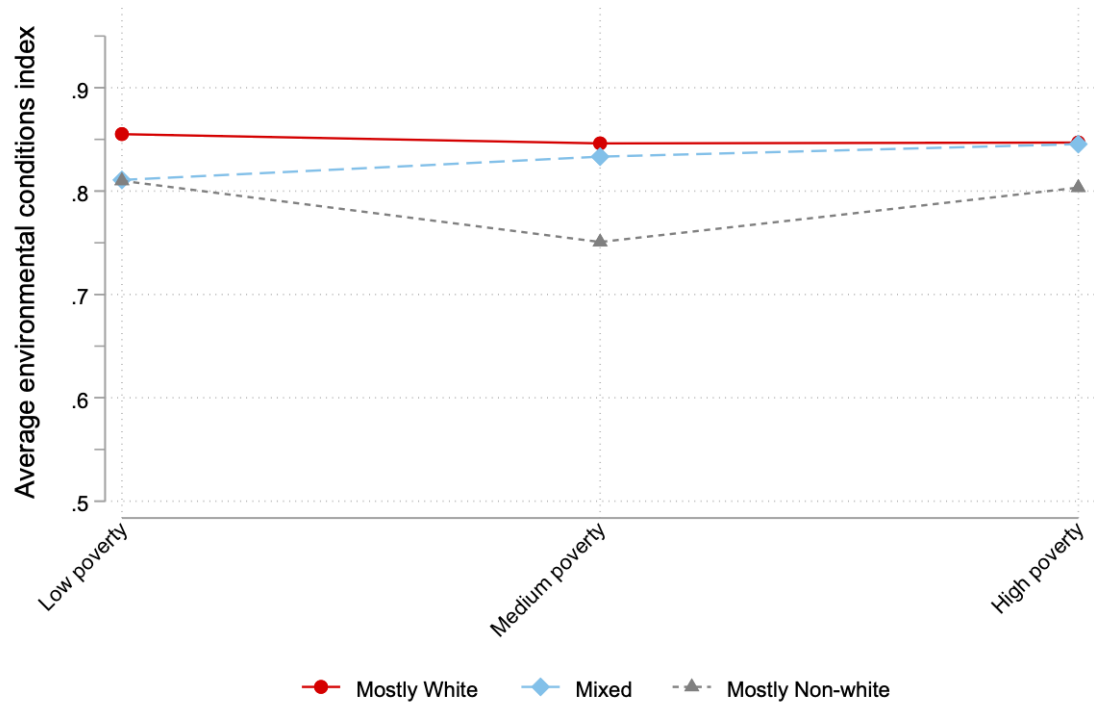


(b) Building aesthetics inde



x

(c) Environmental conditions index



(d) Health and recreational facilities index

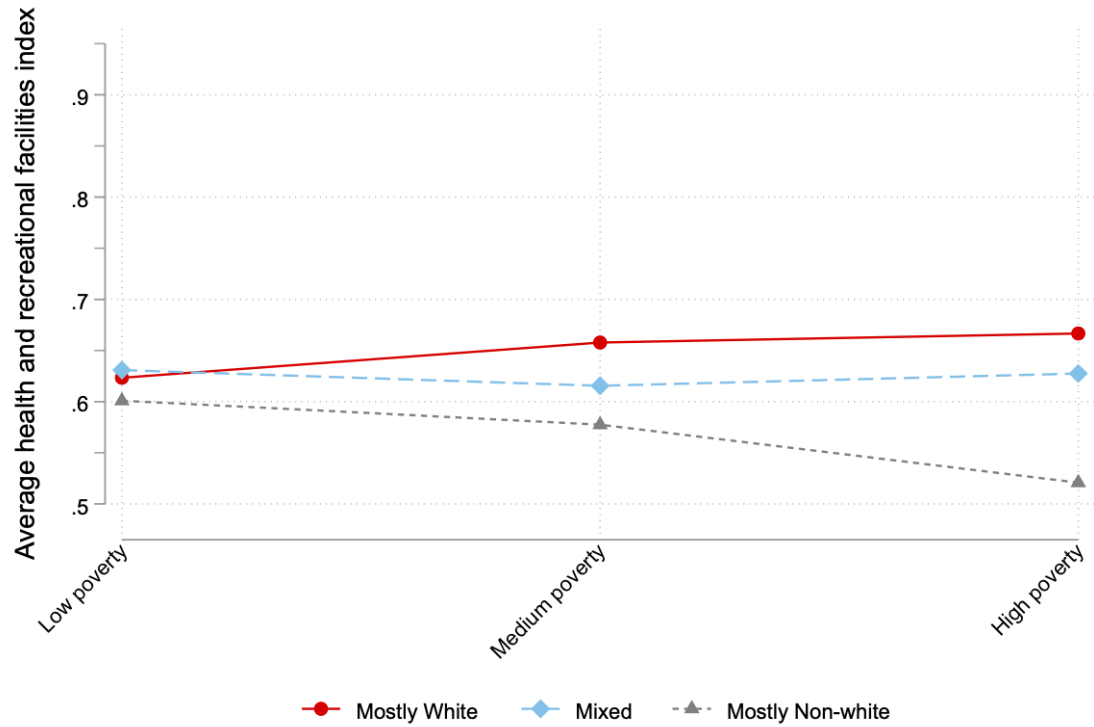


Figure A5. Percent of Racial Gap in Building Aesthetics Index Explained by Contributing Factors

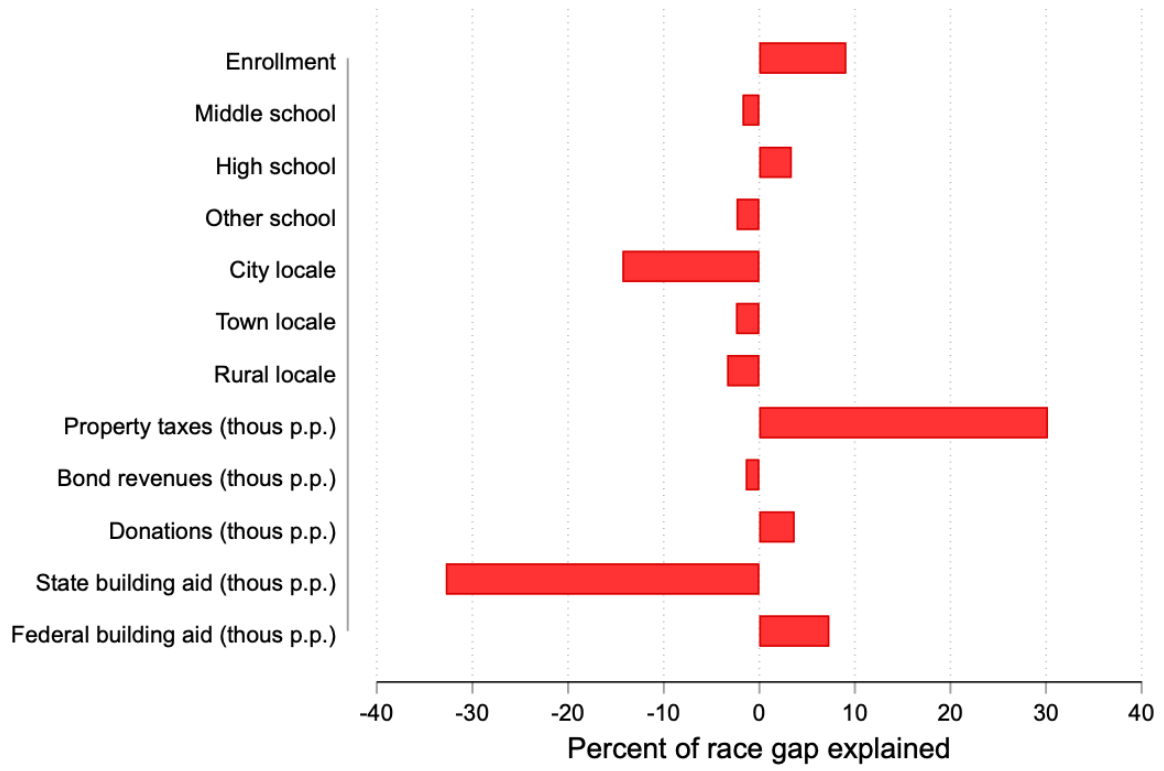


Figure A6. Percent of Racial Gap in Environmental Conditions Index Explained by Contributing Factors

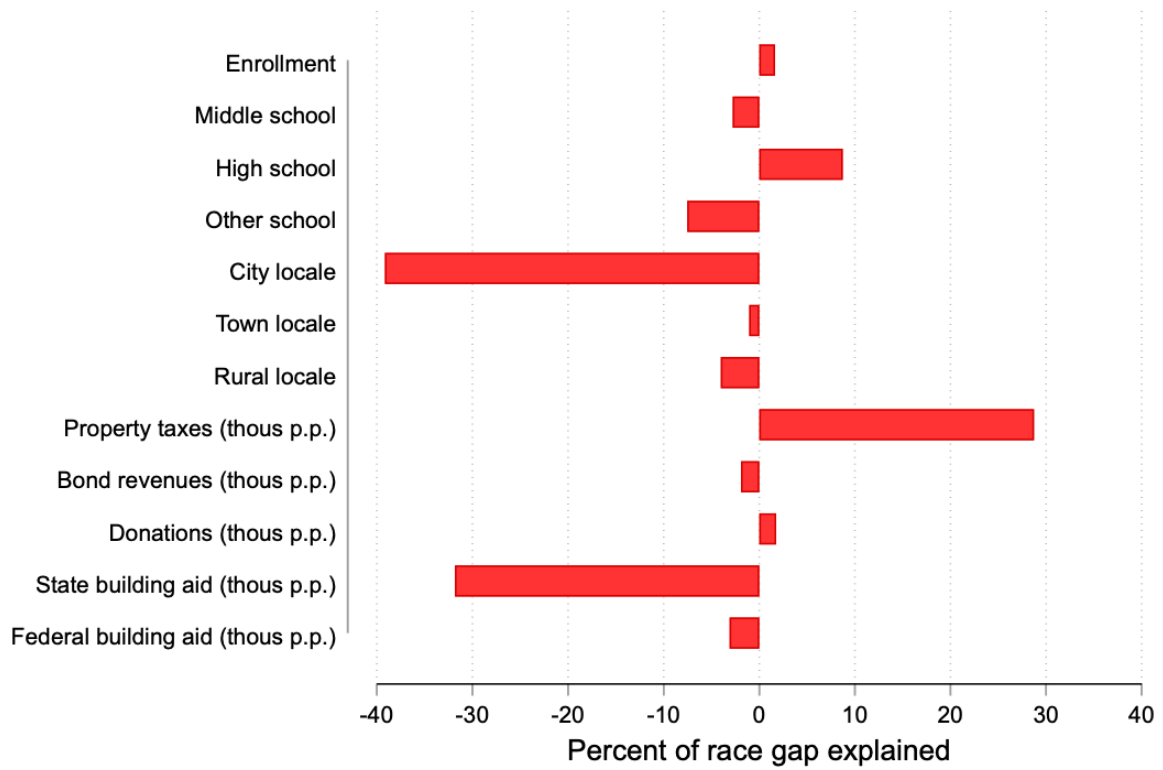


Figure A7. Percent of Racial Gap in Health and Recreational Facilities Index Explained by Contributing Factors

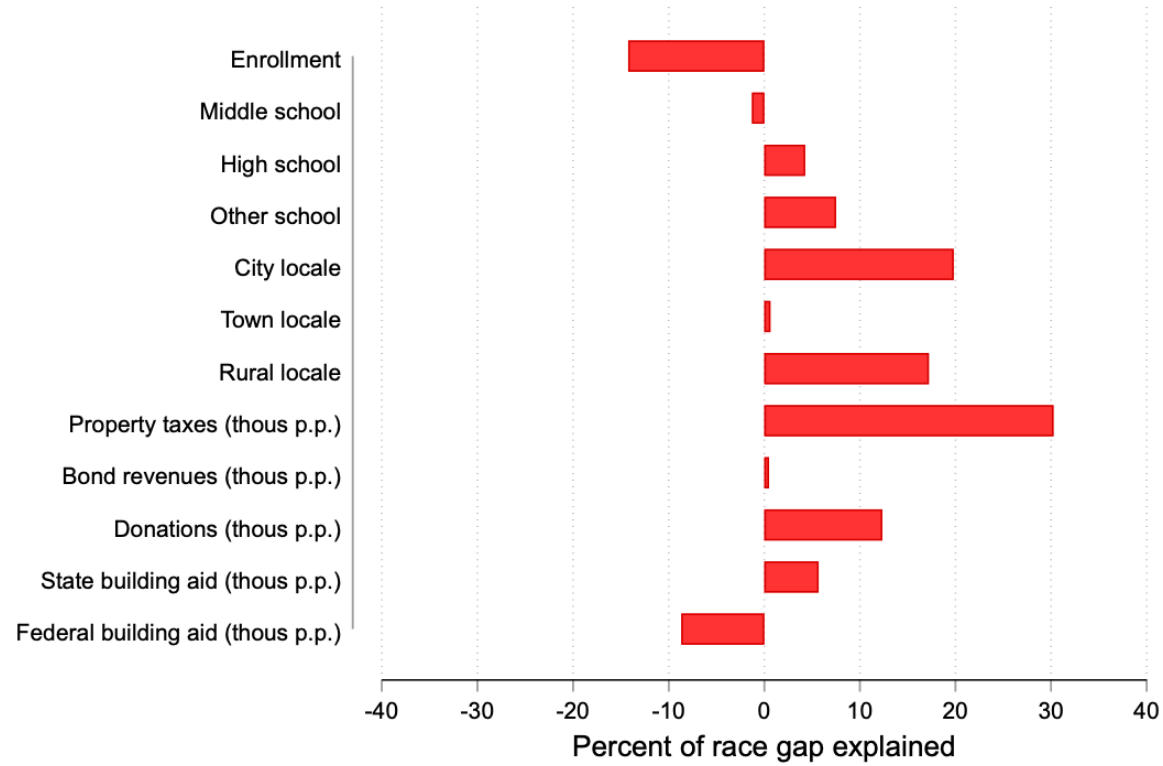
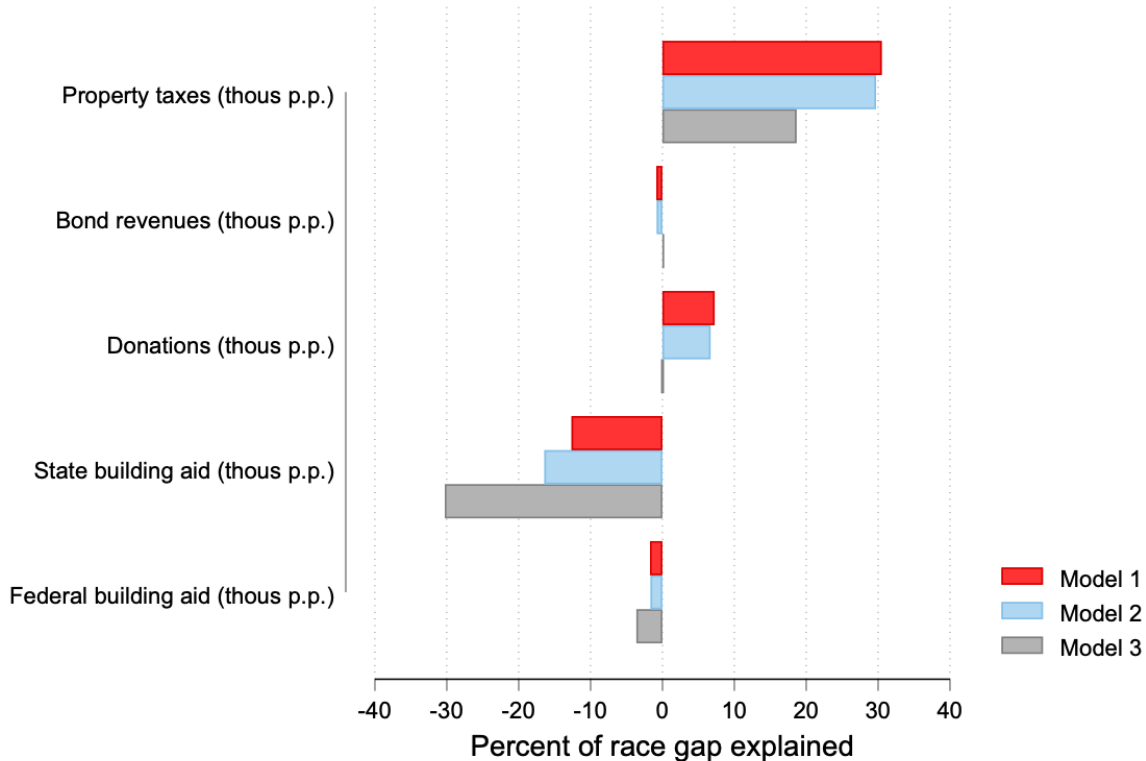


Figure A8. Percent of Racial Gap in Building Conditions Index Explained by School Finance Factors by Model Specification



*Note.* Model 1 only includes the listed school finance variables. Model 2 includes our preferred list of covariates: enrollment, school level indicators (middle, high, other), and urban-centric locale indicators (city, town, rural). Model 3 includes the preferred controls and additional covariates that may be confounders of or determinants of property taxes: estimated percent of students in poverty, schoolwide Title 1 eligibility status, percent of district population school age, percent of district population 65+, percent of district population Black, percent of district population Hispanic, median household income, and taxable property values (in thousands of dollars per pupil).