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New Directions in Measuring Racial Isolation in School

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Dylan Conger

*Trachtenberg School
George Washington University*

Research Fellow

Institute for Education and Social Policy

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Abstract

This article offers new directions in measuring racial isolation in schools. The most widely-used measurement approach is to examine the mean on the distribution of school percentage nonwhite across nonwhite students (the isolation rate) or the percentage of nonwhite students in schools with large shares of nonwhites (e.g. 90 percent or more) at a single point in time. Using data on New York City public school students, I discuss the complexity that is revealed when school officials and researchers consider the following three dimensions of racial isolation: that between classrooms, over time, and among nonwhite students.

Introduction

In July of 2007, the U.S. Supreme Court ruled unconstitutional the practice of assigning students to K-12 schools based on their race. While some school officials have eliminated their race conscious assignment policies, others are devising alternative strategies for promoting racial diversity, and most continue to monitor levels of racial isolation in their schools. Meanwhile, with the increasing availability of pupil-level data, social scientists are producing an unprecedented number of studies on the influence of racial isolation in school on children's academic, economic, psychological, and social outcomes. With the needs of these school officials and social scientists in mind, this paper offers new directions in measuring racial isolation that capture a greater degree of complexity than the measures they currently use. The conventional measurement approach is to examine the isolation index, defined as the percentage of nonwhite students in the average nonwhite student's school (Boozer et al., 1992; C.F.R., 1993; Orfield et al., 1997). Other common approaches identify extremely racially-isolated schools, for instance, those with at least 90 percent nonwhite, or that deviate by some percentage from the district share of nonwhite students (Clotfelter, 2004; Logan, 2004; Orfield & Lee, 2004; Orfield & Yun 1999). The cutoffs for identifying a racially-isolated school or school system vary by district and individual researcher yet, with little exception, most users start with the percentage white or nonwhite in the school at a single point in time as the base of the measure.

Though straightforward, these approaches may fail to capture the complexity of racial isolation in school. First, they focus only on the racial composition of students' schools and not the classrooms that they attend. Second, they examine students' school compositions in a single year, neglecting their experiences in previous years. Third, they examine the isolation of nonwhites from whites with little attention paid to other types of racial isolation, such as between black and Asian students. Using data on New York City public school students, I examine how evaluations of racial isolation in the district change when these three dimensions are considered.

Specifically, I examine differences in the racial isolation of a cross section of fifth grade students in their classrooms versus their schools. I then use data on a cohort of first graders to compare their rates of classroom isolation in the first and fifth grades (single-year rates) as well as their risk of isolation at least once during the five years of school (cumulative rate) and in at least four of the five years of school (chronic rate). Finally, I examine the single-year, cumulative, and chronic rates of classroom isolation for each of the three major nonwhite racial groups (Asian, black, and Hispanic) both from whites and from one another.

Motivation and Literature

Importance and Use of Racial Isolation Measures

Though most school districts have achieved unitary status, which means they are no longer required by the *Brown v. Board of Education* decision to track racial isolation, many continue to monitor the isolation that is now driven by parents' preferences in where to live and, correspondingly, where to send their children to school. Each school district uses a different technique for measuring racial isolation. Some measure the level of racial imbalance across schools and concern themselves only with those schools that deviate in their racial composition by some percentage from the district composition. In Seattle, one of the defending districts in the Supreme Court case regarding race conscious K-12 assignment policies, school officials identify schools as racially imbalanced if the percentage nonwhite deviates by 15 percentage points from the percentage nonwhite in the district student population, which is approximately 60 percent. Another example is Connecticut school districts, which are required by state law to minimize racial, ethnic, and economic isolation; schools with a percentage minority that is between 15 and 25 percentage points different from the district minority share are considered racially-imbalanced.

Other districts measure the percentage of students in schools that are extremely racially-isolated by choosing a cutoff on the nonwhite share. The Commissioner of Education in New

York State, for instance, once ordered New York City to desegregate the schools and defined a segregated school as one that was 90 percent or more black/Puerto Rican or 90 percent or more white (see, Bolner, 1968, for reprint of original text). Despite differences in the measures they choose, almost all the districts use the distribution in the school percentage nonwhite at a single point in time to construct their measures. Research on what their chosen measures overlook is of clear importance.

This research is also important to social scientists that use such measures to explore the consequences of racial isolation on children's interracial attitudes and their psychological, academic, and economic prospects. In the past, this research has played a large role in shaping lawmakers' decisions regarding the importance of integration and the legality of race-conscious education policies. The *Brown* decision that outlawed state-sponsored segregation was, at least partially, decided on the basis of research demonstrating that such laws had a negative impact on the psychology of black students. In the K-12 cases recently reviewed by the Supreme Court, several friends of the court briefs were filed by social scientists, one of which included the signatures of 553 scholars across the nation detailing the extensive research on the harms of both de jure and de facto segregation on an array of student outcomes.

In this area, researchers have studied the potential effect of racial isolation on inter-group relations, friendships, and, more recently, on students' abilities to work comfortably with members of other racial groups. The theory underlying this work, formally referred to as the contact theory, posits that interracial contact is a necessary condition for dismantling stereotypes, eliminating prejudices, and improving interracial relations (Allport, 1954). This research conventionally examines the attitudes, prejudices, interracial friendships, and ability to function in multiracial settings later in life between students who attended racially-mixed versus racially-isolated K-12 schools (e.g. Kurlaender & Yun, 2007; Hallinan & Smith, 1985; Schofield, 1991; Schofield & Sagar, 1977; Wells & Crain, 1994).

This line of research has been most influential in the Supreme Court’s decisions on affirmative action policies in higher education. In the 1978 *University of California v. Bakke* and 2002 *Grutter v. Bollinger* decisions, the Court accepted the argument that universities and the state have a “compelling interest” in maintaining racial diversity in institutions of higher education. One of the rationales offered for ensuring a diverse student body is that in order for U.S. students to compete successfully in a multiethnic global marketplace, they must be comfortable with and accepting of other racial/ethnic group members. To achieve this level of comfort, they should attend schools that are racially and ethnically diverse, as proscribed by the contact theory.

Other researchers seek to quantify the consequences of racial isolation on children’s academic and labor market outcomes. With the availability of pupil-level longitudinal data in recent years, a few studies have attempted to overcome the selection biases inherent in earlier studies with regressions of student level outcomes (usually standardized test scores) on variables capturing the racial composition of children’s schools and controlling for outcomes in prior years (Burke & Sass, 2006; Hanushek et al., 2002; Hoxby, 2000; Rivkin, 2000).¹ The results from this new, more rigorous, wave of peer effects research show mixed results of school peers on school performance measures. On balance, most of the studies suggest relatively small influences of the demographic composition of school peers (e.g. percentage black) on individual student test score performance once the bias driven by selection of students into schools is reasonably minimized. Newer studies are certainly on the horizon as pupil-level data become widely available in many states and districts. Moving forward, this research will need to carefully consider how cross-racial exposure and isolation in school is measured and how the chosen measure influences the magnitude of the relationships examined.

¹ Unlike most studies, Cooley (2006) uses classroom level data as opposed to school level data.

Three Measurement Directions

This paper focuses on three measurement choices in particular. First, by neglecting the separation of students across classrooms, users of racial isolation measures may underestimate isolation for some groups and overestimate it for others. Though schools represent the broader environment that students experience during the course of a school day, classrooms may provide a more accurate measure of the quality of the education they receive and the peers whom they see most frequently. While there is substantial debate about the effect of measurable school-wide resources on student achievement and racial disparities therein, few dispute the importance of classroom teachers (Hanushek et al., 1998; Wright et al., 1997).² Recent studies have found that teacher quality and experience can also vary widely within schools, and that black students are disproportionately assigned to classrooms with less experienced teachers (Clotfelter et al., 2005). Thus, racial isolation at the classroom level may correlate with lower quality instruction, even for students in the same school.

If black students are also disproportionately assigned to classrooms with other black students, then their exposure to other racial groups, outside of the relatively brief period of time allotted for lunchtime and recess, is substantially limited. As Allport (1954) put it, the “contact must reach below the surface in order to be effective in altering prejudice. Only the type of contact that leads people to *do* things together is likely to result in changed attitudes.” (276) If classroom isolation drives students’ school performance or attitudes towards other racial group members, then estimates of the effect of racial isolation on these outcomes might be different when school-level indicators are used.

The importance of the aggregation unit—school or classroom—should not be of concern only to researchers. By using the school as the aggregation unit, school officials who seek to

² Though large racial disparities in measurable school-wide resources are not widely documented (Boozer et al., 1992), some argue that traditional measures of school quality (expenditures, class size) fail to capture quality differentials on other characteristics, such as parental involvement and Parent Teacher Association funding (Fryer & Levitt, 2004).

evaluate the severity of isolation in their district and how it changes over time, might overlook an additional layer of racial isolation in classrooms that could reveal very different patterns and trends. A school that is identified as highly integrated could have entirely segregated classrooms. Likewise, a school system could appear to become more racially integrated over time at the school level, yet experience increasing isolation at the classroom level.

Second, by relying on single-year estimates of racial isolation, users ignore the distribution in isolation experienced by students during all of their years of school. Some students spend just one year in an isolated classroom or school while others spend almost all of their schooling years in racially isolated educational settings. Racial isolation that occurs for many years may have more severe or long-lasting effects than temporary isolation in the same way that longer spells of poverty in childhood have more severe consequences later in life (Duncan et al., 1994; Korenman & Miller, 1997). Students who spend most of their school years segregated from other racial groups, for instance, might be less likely than those who spend only a few segregated years to harbor prejudiced views of other racial groups. Without considering the dynamics of isolation—the likelihood of ever attending a racially isolated setting and the number of years in such settings—researchers may be unable to precisely quantify the total effects of isolation on student outcomes.

Failure to consider the dynamics of racial isolation may also lead to shallow assessments of racial isolation in school districts. Two school districts (A and B) could have the same level of racial isolation in each year, for instance, 20 percent of the students in both districts attend highly isolated schools. But in District A, the same students are racially isolated each year and in District B, different students are isolated in different years. In District A, the isolation is more chronic, implying that students are trapped in, or prefer to attend, isolated settings. In District B, isolation is relatively short-lived for most students and, in some respects, less severe.

Finally, most of the existing research on, and tracking of, racial isolation focuses on the isolation of nonwhite students from white students. This is an understandable concern given the

resources, access to job networks, and other privileges commonly associated with white families. Yet isolation between nonwhites may also influence the individual performance and interracial attitudes of Asian, black, and Hispanic students towards one another. Conflict and prejudices are sometimes equally severe among nonwhites, for instance, between African- and Asian-Americans (Bobo & Zubrinsky, 1996; Weitzer, 1997; Yoon, 1997). School districts that fail to monitor trends in isolation between these groups may be unable to address racial conflicts, and possibly decreases in academic achievement, that occur as a result of increasing racial isolation. Substantial immigration from Latin America and Asia over the past 30 years and the large out-migration of whites from many urban districts has transformed the largest districts into minority white districts with Hispanic pluralities. In New York City, Los Angeles, Chicago, and Dade County, the largest districts on the mainland, white shares are 15, 10, 10, and 12 percent respectively and Hispanic shares are 38, 70, 34, and 54 percent respectively (U.S. NCES, 2003). These dramatic changes in the demographics of the nation's public schools render studies of interracial contact and isolation among Hispanics, blacks, and Asians of increasing importance.

Existing Research

Though some of the concerns raised in this paper are not necessarily new to those who study the intricacies of segregation and isolation measures (see, for instance, Bell, 1954; Duncan & Duncan 1955; Reardon & Firebaugh, 2002; White, 1986), they have not been sufficiently considered by those who use these measures to track racial isolation in school and quantify its consequences. Indeed, there are many studies that focus on the limitations of the various indexes available for measuring unevenness in the distribution of students across schools irrespective of the racial composition of the district. This research has demonstrated that measures such as the Dissimilarity Index, a measure that ranges from zero (perfect integration) to one (perfect segregation), are sensitive to the share of minorities and the size of the sub-units (e.g. school enrollment) under study (e.g. Carrington & Troske, 1997; Cortese et al., 1976; Winship, 1977).

School officials who monitor racial imbalance in their schools and researchers who examine the effects of segregation using pupil-level data tend to use racial isolation measures, such as the percentage of black students in the average black student's school, rather than unevenness measures that do not reflect the racial composition of the district. The large literature on the sensitivities of unevenness measures is, therefore, of relatively limited value to these users.

The studies that document trends in racial isolation over time and that compare districts to one another typically rely on school-level, point-in-time, measures (Orfield & Yun, 1999). A few studies have investigated segregation across classrooms within schools but these studies tend to use unevenness indexes (Clotfelter et al., 2003; Conger, 2005; Morgan & McPartland, 1981). In addition, due largely to the shortage of pupil-level data that can be linked to classrooms and tracked over time, none of the prior segregation studies have explored the dynamics of racial isolation in schools or classrooms, including the cumulative or chronic risk of isolation during the schooling years. Relatively more attention has been devoted to describing the dynamics of other social problems and policies, such as illness or hospital stays, unemployment, welfare use, poverty and exposure to high poverty neighborhoods (e.g. Bane & Ellwood, 1986; Gramlich et al., 1992; South & Crowder, 1997).

Data and Measures

This study relies on a unique database of public elementary school students supplied by the New York City Department of Education. The data include all students enrolled in each of the years 1996-97 through 2000-01 with identifiers linking students over time. In addition to the racial/ethnic group membership of each student (Asian, black, Hispanic, or white), the database includes school and classroom identifiers that permit calculation of the racial composition of students' school and classmates in each year. The analysis focuses first on the cross section of fifth graders in the 2000-2001 school-year, consisting of approximately 78 thousand students in

675 schools and 3,315 classrooms. This cross section is used to compare classroom and school racial isolation rates in a single year.

To examine the dynamics of racial isolation over time, the analysis then uses the subset of fifth graders in 2000-2001 who entered the New York City school system as first graders in 1996-97 and who were continuously enrolled in school for all five years (a sample of 66 thousand students who are referred to here forward as the first grade 1996-97 cohort). Roughly 85 percent of the fifth graders in 2000-01 are included in the cohort and the racial composition of the two groups is nearly identical, suggesting that the students who entered and exited the school system over the five years differed little in their racial composition from those who were continuously enrolled.³

Using these two samples, I employ simple measures of racial isolation taken from the distributions in the school and classroom racial shares across students. For all nonwhite students, for instance, the average school percentage nonwhite provides a measure known as the isolation rate, which is often interpreted as the percentage nonwhite in the typical nonwhite student's school (see Lieberman, 1981 for a thorough description of this measure). The isolation rate can also be thought of as the probability of contact of the average student from a given group to same-race members in school. I also compute measures of exposure of each race to one another; for instance, the classroom exposure rate of Asian to black students provides the percentage black in the average Asian student's classroom.⁴

³ The racial composition of the 5th grade cross section is 38.2% Hispanic, 34.3% black, 15.3% white, and 11.8% Asian. The racial composition of the 1st grade cohort is 39.9% Hispanic, 34.8% black, 15.1% white, and 10.1% Asian.

⁴ The exposure of Asian to black students is the mean on the distribution in the black school percentage for all Asian students and is defined as:
$${}_A E_B = \frac{\sum_j N_{Aj} P_{Bj}}{\sum_j N_{Aj}}$$
 where the subscript j identifies schools and N_{Aj} and P_{Bj} are the number of Asian students and percentage of black students in school j respectively.

Following cutoffs used in prior studies and, at one time, by New York City policymakers to identify an extremely racially-isolated setting, I also examine the percentage of students who attend schools and classrooms that are at least 90 percent same-race or less than 10 percent of a specific racial group (Bolner, 1968; Orfield & Lee, 2004). The 90 percent threshold at the school level translates to a wide range in the number of same-race students because schools vary a great deal in size. In 2000-01, the average New York City elementary school student attended a school with roughly 800 other students, translating to fewer than 80 students who differed from the rest of the school population in a racially-isolated school. Schools ranged, however, from an enrollment of 72 to an enrollment of 1,849. Black and white students attend slightly smaller schools than do Asian and Hispanic students, indicating that they are exposed to even fewer students from other racial groups when they attend racially isolated schools.⁵ The numerical equivalent of 90 percent plus at the classroom level is far less variable because most elementary school classrooms in the city include between 21 and 25 students. A classroom of at least 90 percent same-race translates to fewer than two or three students that differ from the rest of the classroom.

A brief justification for the 90 percent or more same-race measure is warranted. Though many school districts identify schools as racially-isolated based upon their deviation from the school district share, such measures have little practical meaning for New York City and other large urban districts where nonwhites comprise substantial majorities. If New York City were to follow Seattle's definition of a racially-imbalanced school, one that deviates by more than 15 percentage-points from the district nonwhite share, schools between 70 and 100 percent nonwhite would be considered racially balanced. Schools systems like New York City must establish cutoffs for identifying racially isolated settings in addition to making comparisons to the larger district shares. The 90 percent same-race cutoff translates to an indisputably racially isolated

⁵ The average school size of the students from each racial group are as follows: Hispanic (897), black (773), white (693), and Asian (843).

environment that, at the very least, fails to establish a “critical mass” required for meaningful integration. The critical mass argument, which was successfully used to defend the University of Michigan law school admissions policy in *Grutter*, stipulates that meaningful integration occurs only when there is more than a token number of each racial group in an educational setting. The need for non-token numbers of students from each group is justified on two grounds. One purpose is to prevent the minority group members in the classroom from feeling isolated or singled out. The second purpose is to expose the majority group members in the classroom to enough members of a given racial group to prevent stereotyping based on one or two individuals, for instance, to both high and low-achieving Asian students (Gurin, 1999). Though no scholar has, or likely can, offer a precise number or percentage required to achieve critical mass, classrooms of 20 to 25 students with fewer than two of a given racial group (less than 10 percent) are unlikely to be offering the kind of critical mass that meets these two goals. Ultimately, since the purpose of this paper is to demonstrate what is learned about racial isolation when users consider alternative aggregation units, time dimensions, and racial comparisons, the cutoff chosen for identifying an extremely racially-isolated setting is of relatively little significance. Cutoffs of 85 and 80 percent were also explored and the findings were qualitatively the same as those reported in the text. All analyses were also conducted on other cross sections of students in different grades and different years as well as an alternate cohort of first graders in 1995-96. The results were similar and can be obtained from the author.

Results

Classroom versus School Isolation

This section asks how assessments of racial isolation change when the classroom is used as the aggregation unit rather than the school. Table 1 considers two measures of isolation at the school and the classroom level (the mean percentage same-race and the percentage of students

attending 90 percent plus same-race settings) for each racial group. Looking first at the average same-race percentage at the school (the school isolation rate), the table shows that each group of students is far more exposed to their own race than they would be if schools were perfectly integrated. The average white student, for instance, attends a school where 49.7 percent of the students are also white and yet whites comprise only 15.3 percent of the student population in New York City. This difference between the isolation of whites and the white representation in the district is an indication of how segregated white students are across schools (perfect white integration with nonwhites would occur if the isolation rate were also 15.3 percent).

The classroom rates indicate further segregation across classrooms within schools, yet they are not much higher than the school rates. For the average white student, classroom isolation is only 3.6 percentage points higher than school isolation. The largest difference between the average classroom and school same-race percentage is among Asians and this difference is only 4.1 points. These small differences suggest that, for the average student, the school isolation rate typically underestimates the classroom isolation rate, but by a very small amount.

The difference becomes larger for rates of extreme isolation, measured as the percentage of students in 90 percent plus classrooms and schools. The bottom rows of the table reveal that while only 4.5 percent of whites attend schools that are predominantly white, nine percent attend classrooms that are predominantly white. Among nonwhites, the differences are relatively small, yet grouping all nonwhites together hides variation in own-race isolation. Within the nonwhite category, the classroom-school gap is largest for Hispanics; almost three times as many Hispanics attend isolated classrooms than attend isolated schools (a difference of 13 percentage-points). Indeed, Hispanics are almost as isolated in their classrooms as black student students are in their schools, 21 percent and 24 percent respectively.⁶ Given that the findings are substantially more

⁶ Determining the causes of classroom isolation is beyond the scope of this paper; however, a reasonable explanation for the high rate of classroom isolation among Hispanics is their sorting into separate classrooms for English language instruction.

illuminating when Hispanic, black, and Asian students are examined individually, the remainder of the paper will separate them out.

These large differences indicate that by using school-level measures to characterize the severity of racial isolation, school officials may overlook an additional layer of isolation within schools. Such oversights are revealed when New York City is divided into its five boroughs and extreme isolation rates in each borough are compared using school and classroom measures (see Table 2). The boroughs vary substantially in their racial compositions and, correspondingly, in their levels of racial isolation. For instance, Staten Island is the only sub-district that is majority white and that has any schools that are at least 90 percent white. In addition, isolation is higher in classrooms than in schools for each racial group in all the boroughs. Were school officials to use the classroom rate instead of the school rate to evaluate the relative severity of isolation in the boroughs, the story would change very little for white, black, and Asian students. That is, white isolation is highest in Staten Island, black isolation is highest in Brooklyn and Queens, and Asian isolation is highest in Manhattan irrespective of the aggregation level (note that although Brooklyn has a higher percentage of black students in isolated classrooms than does Queens, a reversal of the relative severity at the school level, the differences between Brooklyn and Queens in black isolation are not statistically different from zero).

Yet, when classroom rates are used instead of school rates to compare the boroughs on Hispanic isolation, the relative position of the boroughs changes. While the Bronx shows low levels of Hispanic isolation at the school level (0.9 percent), its relative ranking increases dramatically at the classroom level. Hispanics in the Bronx are almost equally isolated in their classrooms as Hispanics in Brooklyn, 20.2 percent versus 21.9 percent, respectively. Were school officials to compare the boroughs strictly based upon the rates of school isolation, they would miss the high rates of Hispanic classroom isolation occurring in Brooklyn.

Those who monitor racial isolation might also overlook the variation in classroom isolation experienced by individual students within the same school. Consider one school in Brooklyn

where 45.6 percent of the students are black and the average fifth grader attends a classroom that is 52.6 percent black, a classroom isolation rate that is only slightly higher than the school percentage black. Though the average classroom and school isolation rates are not dramatically different, the experience of individual black students ranges quite a bit. In this school, eight of the black fifth graders attend a classroom that is 24 percent black and 19 attend a classroom that is 66 percent black.

Figure 1 provides the distribution in the percentage point difference between school and classroom same-race percentages (the school minus the classroom percentage) across all white fifth graders (the black, Hispanic, and Asian graphs were not included for simplicity but their distributions are discussed in the text). While the distribution centers on a zero percentage point difference (indicating no difference between the school and classroom same-race shares), there is substantial dispersion from zero. Recall from that Table 2 that the average student from each racial group attends a school with a lower same-race share than his classroom, which would result in a negative percentage point difference. Yet this is true of only 63.9% of white, 57.8% of Hispanic, 70% of black, and 65.7% of Asian students, slim majorities in most cases. The average percentage point differences are also fairly large; for students who attend less integrated classrooms than schools (classrooms with a higher co-race share than the school) the mean percentage point difference is 9.1 for white, 12.1 for Hispanic, 8.5 for black, and 9.3 for Asian students. The mean differences are similar at the positive end of the distribution, for students whose classrooms are more integrated than their schools. This substantial variation in the school-classroom gap across students suggests that using the school percentage co-race fails to capture the experience of most students in their classrooms. This difference is not necessarily an aggregation bias; rather, the effect of classroom isolation on students may differ from the effect of school isolation. Without measuring isolation at both levels of aggregation, social scientists will fail to fully capture the various ways in which the racial composition of peers influences students.

Cross Sectional versus Cumulative Racial Isolation

This section asks by how much the estimates of students' isolation in their fifth year of school differ from their cumulative experience over the five years of school. The analyses presented in this section use data on the cohort of 65,849 students who entered the first grade in 1996-97 and who remained enrolled through the 2000-01 school-year.

I begin with a look at school level measures of isolation, which could fluctuate for students if they switch schools or if the composition of their schools changes during the five years they are enrolled in school. Though advocates in the city have documented large barriers to student mobility, particularly for low-income students (Hemphill, 2002), over one-third of the students in the 1996-97 first grade cohort transferred schools at least once during their elementary school years. Hispanic students were most likely to transfer (40 percent), followed by black (38 percent), Asian (23 percent), and white (20 percent). Yet despite these transfers, the racial composition of individual schools changed very little over the five-year period.⁷

Because most students do not transfer out of their elementary schools and because the racial composition of schools changes very little over time, the rates of school isolation for students in their first year of school is very similar to the rates in the following four years. For instance, the percent of students in the cohort who attended a 90 percent plus same-race school in the first grade was 14 percent. By the fifth grade, the percent of students in such extremely isolated schools increased only to 18 percent, indicating only a small number of students entered isolated schools between the second and fifth grades. Thus, while a snapshot of isolation at the school level is a misrepresentation of the isolation experienced in previous years, it is not a gross misrepresentation.

⁷ Of the ten cross-year correlations in school racial compositions in elementary schools (for instance, the percentage white in 1996-97 correlated with percentage white in 1997-98 for all schools), all are above 0.98. These high correlations reveal that school racial compositions change very little over short periods of time. See, Ellen et al. (forthcoming) for more detail on the demographics of school change in New York City.

Though the school racial compositions remain stable as students progress through elementary school, the composition of their classrooms change much more (see Table 3). The classroom isolation rate (mean same-race percentage) and levels of extreme isolation (percentage of students in 90 percent plus classrooms) are lower in the fifth grade than in the first grade for students in all racial groups, indicating that students are exposed to higher shares of other racial groups as they progress through school. Again, the isolation rates (the experience of the average student) do not capture changes at the far reaches of the distribution (the extremely isolated settings). In some cases, the drops in extreme isolation are quite large; while 31.3 percent of Hispanic students in the cohort attended an extremely racially-isolated classroom in the first grade, only 18.7 percent attended such a classroom by the fifth grade (the declines are monotonic across grades). Simply using the fifth grade rates, therefore, could substantially underestimate the rate of isolation experienced by these students in prior years.

The table also provides the cumulative percent of students who were racially isolated in their classrooms and reveals a large difference between the cross-sectional and cumulative pictures. While 18.7 percent of Hispanics attended an isolated classroom in 2000, almost 41 percent attended an isolated classroom at least once by their fifth year in school. For each racial group, the cumulative risk is at least 1.7 times higher than the cross-sectional risk, and for Hispanics and Asians it is over two times higher. If even one year of racial isolation influences students' prejudices or their academic performance, then researchers that use the fifth year experience to estimate these effects will generate confounded estimates.

The very last row in the table considers one measure of the chronicity of racial isolation in classrooms, the percentage of students who are isolated in at least four of the five years of school. Relatively small percentages of whites and Asians are isolated in at least four of their five years but a larger percentage of black (21 percent) and Hispanic (17 percent) students are so isolated. Over 40 percent of the black and Hispanic students who experience racial isolation at least once, experience it chronically ($20.7/46.5=44.5$ percent of black and $17.2/40.7=42.3$ percent

of Hispanic). Again, if the duration of exposure to isolated settings matters to student outcomes, then we miss an important difference between the students who are chronically and temporarily isolated by only using temporary measures.

These comparisons reveal that single-year estimates of classroom racial isolation, particularly if they are measured in the fifth grade, may underestimate the prevalence and duration of isolation experienced by New York City students in previous years. Again, I use the five sub-districts of New York City to demonstrate how a dynamic perspective on isolation alters evaluations of the relative severity of isolation in different jurisdictions. Table 4 provides the cross sectional rates of classroom isolation in the first and fifth grades, the cumulative rate (percentage isolated at least once), and the chronic rate (percentage isolated in at least four years) for each borough. For the most part, the ranking of the boroughs in terms of their levels of isolation is the same whether the cross section, cumulative, or chronic rates are examined. That is, white isolation is highest in Staten Island, Hispanic and black isolation are highest in Brooklyn, and Asian isolation is highest in Manhattan, on all three indicators. Yet in between the most and least isolated boroughs, some boroughs switch their positions when different indicators are used to measure racial isolation. Among whites, for instance, the cross sectional rates of isolation are slightly higher in Queens than in Brooklyn (5 percent of Queens white first graders were isolated compared to 3.9 percent of Brooklyn white first graders, a difference that is statistically different from zero). Yet the cumulative rate of isolation is higher in Brooklyn than in Queens (9.7 versus 7.9, again, a statistically significant difference). What is more, the chronic rates of isolation are higher in Queens, indicating that though fewer students experience isolation in Queens, those who do are more likely to experience it for four to five years.

The dynamics of racial isolation also differ in each borough. For instance, the Bronx has a relatively low rate of isolation among black first graders (only 1.5 percent). But the cumulative rate jumps to 8.9 percent (almost 6 times the first grade rate), indicating that many students enter isolated classrooms after the first grade. In addition, since the fifth grade rate is only 1.7 percent

and the chronic rate is only 0.9 percent, this means that most students who are ever isolated are only isolated for a short period of time. A very different dynamic emerges in Queens, where the rate of black isolation is much higher in the first grade (41.3 percent of students), and the cumulative rate is only 1.4 times higher at 56.6 percent, indicating that relatively fewer students enter isolated settings after the first grade. In addition, a much higher share of black students are chronically isolated in Queens than in the Bronx even when the cumulative rate of isolation is considered; approximately 10 percent of black students who attend an isolated classroom at least once in the Bronx are chronically isolated (0.9/8.9) compared to almost 54 percent of students in Queens (30.5/56.6). Thus, in addition to having a higher share of isolated students, Queens has a more chronic type of isolation, indicating relatively little mobility out of isolated classrooms than the Bronx.

These differences highlight the complexity that can be revealed when dynamic measures of racial isolation are considered. Evaluating a district as more or less isolated than another may depend upon the dimension considered: cross-sectional, cumulative, or chronic. The three measures also uncover variation in the relative prevalence and severity of the isolation: white isolation is less common in Queens than in Brooklyn, for instance, but it is more persistent.

Considering the longitudinal aspects of isolation may also be important for understanding the individual student's experience during school. As an example, Figure 2 provides the distribution in the point difference between the classroom same-race percentage in the first and fifth grades (first minus fifth) across white students in the cohort (again, the Hispanic, black, and Asian figures are suppressed for simplicity). Perhaps most striking is that even though the numbers in Table 3 indicated that, on average, students attend more integrated classrooms as they age, the students are evenly split between attending more or less integrated classrooms in the first versus the fifth grades. Approximately half of all Hispanic, black, and Asian students (55.9, 55.7, and 47.1 percent respectively) and 60.2 percent of white students attended a classroom with a lower same-race share in the fifth grade than in the first grade (a point difference below zero).

The difference in the same-race share for these students ranges from an average of 11.5 to 12.5 percentage points. The largest difference in the first-fifth grade gap in same-race shares is found among Hispanic students who attended more integrated first grade than fifth grade classrooms (those at the positive end of the distribution): for these students, the average difference is almost 20 percentage points. Again, this analysis reveals that efforts to quantify the consequences of isolation on students could be very different if single-year measures were replaced with more dynamic measures.

Exposure and Isolation between Each Racial Group

This last section examines measures of isolation between specific racial group members beginning with Table 5, which considers the degree to which each racial group is isolated from the other across classrooms in the fifth grade 2000-01 cross section. Specifically, the table provides the average classroom same-race exposure and the percentage of each group that attends classrooms with less than 10 percent of each of the other groups (school level measures are omitted to simplify the analysis). The table first provides the exposure rates of each racial group to all others, precisely the inverse of the figures presented in Table 1; the average white student, for instance, attends a classroom that is 53.3 percent white and 46.7 percent nonwhite.

A closer look at exposure to each racial group reveals large differences. Though the typical white student experiences 47 percent nonwhite collectively, her probability of contact with a black student in class is only 10 percent even though black students are the second largest group in the city. The probability that an Asian student will come into contact with a black student in her classroom is also quite low, only 11.9. Asian and white students have relatively high exposure to most racial groups except blacks. Hispanic and black students, on the other hand, are very unlikely to see Asian or white students in their classrooms, in part, because they are population minorities. The average black student shares a classroom with only 4 percent Asian and 4 percent white, translating to only one member of these racial groups in their

classrooms. In general, classroom exposure is highest between whites and Asians and between blacks and Hispanics, a finding that comports with other research on cross-racial exposure at the neighborhood and school level (e.g. Farley & Allen, 1987; Ellen & O'Regan, 2007).

The bottom panel in the table focuses on extreme isolation, measured as the percentage of students in classrooms where less than 10 percent are members of the other races. Though only 21.4 percent of Hispanics attend classrooms where less than 10 percent are nonHispanic, 74 percent attend a classroom with fewer than 10 percent Asian and 77 percent attend a classroom with fewer than 10 percent white. For black students, extreme isolation from Asians and whites is even higher with the large majority (88 percent) attending classrooms with less than 10 percent Asian and white. Likewise, whites and Asians appear to be fairly integrated with other racial groups at first blush; only 6 percent of Asians attend a classroom with fewer than 10 percent nonAsian. Yet a closer look at the specific composition of the nonAsians reveals a high degree of isolation for some groups; 64 percent of Asians attend a classroom with fewer than 10 percent blacks. Even rates of extreme isolation between Hispanic and black students are high; 44 percent of Hispanic students attend a classroom with fewer than 10 percent black, for instance.

Turning to the longitudinal experience of the first grade cohort, Table 6 provides the cumulative and chronic rates of classroom isolation between each racial group. Nearly all black students (roughly 95 percent) attend a classroom with less than 10 percent Asian students or 10 percent white students in at least one of the five years of school. Cumulative rates of isolation from Asians and whites are only slightly lower for Hispanics, 88 percent of whom attend a classroom with fewer than 10 percent Asian or white in at least one year. Hispanic isolation from black and vice versa is, again, much lower than the isolation from Asians and whites, but the majority of students still experience isolation. Sixty-four percent of Hispanics, for instance, attend a classroom with fewer than 10 percent black students at least once.

The next panel in the table reveals that not only do the majority of black students attend classrooms with few to 0 Asians or whites, they do so for nearly their entire elementary school

careers. Approximately 87 percent of black students and 71 percent of Hispanic students spend at least four years in a classroom with few to 0 Asians. A relatively large percentage of black students (38 percent) also spend most of their elementary school years isolated from Hispanic students. Assuming exposure is necessary for positive attitudes towards other racial groups, these high rates of isolation, both cumulative and chronic, between Asian, black, and Hispanic students do not bode well for the future of interracial relations in New York City public schools.

Discussion and Conclusion

Though this article answers questions of measurement, a field typically reserved for researchers, it is also intended for school officials who use conventional measures to track the severity of racial isolation in the nation's public schools. Specifically, the most conventional measure, which relies on school-level shares of nonwhite students at a single point in time, ignores additional layers of isolation within classrooms, over time, and among Asian, black, and Hispanic students.

Using data on New York City public school students, I first explore how assessments of racial isolation change when the classroom is used as the aggregation unit rather than the school. The difference between the school and classroom same-race percentages are relatively small on average. But the difference between the school and classroom measures is much larger at the extremes (when cutoffs of 90 percent are used), and across individual students. When racial isolation in each of the five boroughs of New York City is measured using classroom instead of school isolation measures a different picture emerges as to the relative severity of isolation for Hispanic students. A much higher percentage of Hispanic students in Brooklyn than in the Bronx attend a school that is 90 percent or more Hispanic. Yet the percentage of Hispanic students that attend 90 percent or more Hispanic classrooms is roughly the same in the Bronx and in Brooklyn, indicating that Brooklyn has more integrated schools but far more isolated classrooms. To the

extent that classroom racial composition measures the peers whom students most frequently interact with and the resources that matter most to their learning, were school officials to rely only on measures of school isolation they may overlook perhaps the most important type of isolation.

In addition, the racial composition of students' classrooms and schools varies a great deal across individual students, with only slim majorities of students attending classrooms that are less integrated (have higher same-race shares) than their schools. And the mean point difference in the school and classroom same-race shares reaches up to 12.1 percentage points for Hispanic students who attend less integrated classrooms than schools. Measures of school isolation may over or underestimate exposure to same-race peers depending upon the student and the particular school they attend. Such differences could generate different estimates of the effect of racial isolation on students' academic, economic, social, and psychological well-being.

The complexity of racial isolation is also revealed when the cumulative and chronic risk of classroom racial isolation is examined for a cohort of New York City first graders. For instance, though few black first graders in the Bronx attend racially isolated classrooms, by the fifth grade, almost six times as many students had attended a racially isolated classroom at least once. The classroom isolation rate of black first graders is, therefore, not an entirely informative statistic in the Bronx. In contrast, most of the black elementary school students in Queens who ever attend a racially isolated classroom do so in their very first year of school. In other words, the risk of isolation in the first grade is not substantially different from the cumulative risk by the end of school. Black students in the Bronx also spend relatively few years in racial isolation while black students in Queens spend most of their elementary school years in isolation. These differences in the cumulative and chronic rates of classroom isolation between the sub-districts of New York City suggest that dynamic measures of isolation should be used to compare the rates of isolation among U.S. school districts and to evaluate changes in districts over time.

There is also substantial variation across individual students in the difference between the isolation they experience in their first year of school and the isolation experienced in their fifth year of school. In fact, students are almost evenly split between attending a more or less integrated classroom in the first grade than in the fifth grade. And the percentage-point differences between the first and fifth grade classroom shares averages around 12, which in classrooms of 20 to 25 students translates to a difference of two to three students. Studies that rely on classroom racial compositions in a single year to determine the consequences of isolation on students may under or overestimate students' experiences during all their years in school depending upon the individual student.

Finally, rates of isolation among black, Asian, and Hispanic students point to some revealing trends. Among the more disturbing statistics is that the overwhelming majority of black and Hispanic students (roughly 87 percent of black students and 71 percent of Hispanic students) attend classrooms with few to no Asian students throughout their elementary school years. An even higher percentage of black and Hispanic students are unlikely to ever see a white student in their classrooms. In addition, though Hispanic and black students make up the largest shares in the district, they too are isolated from one another at high rates. Almost 38 percent of Hispanic students in the first grade cohort attended a classroom with fewer than 10 percent black students in four of their five years of elementary school. These extreme isolation rates for black and Hispanic students from their Asian and white peers, and from one another, may hamper their relations with members of those groups as well as opportunities within and outside of classrooms that are provided through association with these students. Monitoring trends in the isolation of these groups from one another in schools and classrooms may help to identify the causes of and solutions to academic failure and racial conflict among nonwhite students.

The analysis here provides three alternative dimensions of racial isolation for New York City students and reveals that the conventional measurement approach may not reveal the complexity of racial isolation in large urban districts. The most obvious policy implication from

this work is that state and district level school officials as well as policy researchers would be better informed by more sophisticated measures. Many districts already record data at the classroom level and are able to track individual students over time, thus measures such as the percent of students in racially isolated classrooms or the number of years spent in isolated classrooms are not extremely difficult to generate. For the research community, having access to these types of data, along with outcome measures such as test scores and the ability to merge classroom demographics with results from surveys of inter-ethnic attitudes, would significantly improve the precision of our estimates of segregation effects.

Indeed, despite 50 years of research, much more work remains to be done on the effects of racial isolation. There is limited research on whether the consequences of classroom isolation differ from those of school isolation and how these two types of isolation interact. With respect to interracial attitudes, for instance, does sharing a school with members of other racial groups promote interethnic harmony despite no interaction within classrooms? Similarly, in order to sufficiently interpret the implications of temporal questions about segregation, the research and policy community requires further investigation into whether short-term isolation is less or equally harmful than long-term isolation to student achievement, interracial relations, and other outcomes. A longer time frame, for instance following students through middle and high school, would also reveal whether and how racial isolation changes as students age.

Research on the sources of racial isolation across and within schools, and how they differ, would also add significantly to our understanding of racial isolation in educational settings. Research in this area is limited, though more substantial at the secondary level, and suggests that classroom assignments are largely driven by pedagogical decisions, such as special education, bilingual education, and ability grouping programs (Monk, 1987; Burns & Mason, 1998). Much more work remains to be done on the drivers of classroom racial isolation and whether public policies can prevent it.

Finally, the purpose of this paper is to use the New York City case study to reveal insights from considering alternative ways to measure racial isolation. Were these analyses repeated in smaller jurisdictions that have less racial diversity, or less racial segregation, the comparisons could be substantially more or less dramatic. Such research will substantially enhance our knowledge of racial isolation in schools and how it varies across districts and over time.

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Table 1: Racial Isolation across Schools and Classrooms, 5th Grade, 2000-01

	White	Nonwhite	Hispanic	Black	Asian
% of all 5th graders	15.3	84.7	38.2	34.3	11.8
Mean % same-race:					
School	49.7	91.1	58.2	63.2	35.5
Classroom	53.3	91.6	61.8	67.0	39.6
Same-race % is 90-100:					
School	4.5	77.0	8.0	23.6	3.5
Classroom	9.0	77.5	21.4	28.6	6.0

Table reads: The average white New York City 5th grader attended a school that was 49.7% white and a classroom that was 53.3% white in 2000-01.

Notes: Analysis uses data on 78,351 5th graders, 3,315 classrooms, and 675 schools in the 2000-01 school-year.

Table 2: Extreme Racial Isolation (90% or more same-race) by Borough, 5th Grade, 2000-2001

	Manhattan	Bronx	Brooklyn	Queens	Staten Island
White					
% of all students	10.6	4.5	15.6	16.7	62.8
90% same-race in school	0.0	0.0	0.0	1.3	18.4
90% same-race in classroom	1.2	0.3	2.6	3.9	30.7
Hispanic					
% of all students	50.7	58.3	26.6	34.0	15.9
90% same-race in school	34.6	0.9	5.1	0.0	0.0
90% same-race in classroom	41.1	20.2	21.9	8.4	0.2
Black					
% of all students	28.0	33.7	48.3	24.5	14.2
90% same-race in school	4.5	0.0	34.7	38.2	0.0
90% same-race in classroom	13.9	2.5	41.9	38.6	0.7
Asian					
% of all students	10.2	3.0	9.2	24.5	6.8
90% same-race in school	28.6	0.0	0.0	0.0	0.0
90% same-race in classroom	37.7	0.2	3.7	0.7	0.3

Table reads: In Manhattan, 10.6% of the fifth graders are white, 0.0% of the white students attend 90% or more same-race schools, and 1.2% attend 90% or more same-race classrooms. Notes: Analysis uses data on 78,351 5th graders, 3,315 classrooms, and 675 schools in the 2000-01 school-year.

Table 3: Classroom Racial Isolation, 1996-97 First Grade Cohort

	White	Hispanic	Black	Asian
Mean % same-race in classroom:				
1 st Grade	57.5	65.5	69.0	40.1
5 th Grade	54.5	61.0	66.6	39.3
% in 90%-100% same-race classroom:				
1 st Grade	11.0	31.3	30.4	7.8
5 th Grade	9.7	18.7	27.1	5.1
In at least one year (cumulative)	19.2	40.7	46.5	12.1
4-5 years (chronic)	5.9	17.2	20.7	4.2

Table reads: The average white student in the cohort attended a classroom that was 57.5% white in the 1st grade and a classroom that was 54.5% white in the 5th grade.

Notes: Analysis uses data on students who were in the 1st grade in the fall of 1996 and who remained in the NYC school system for each of the following four years.

Table 4: Cross Sectional and Cumulative risk of Extreme Classroom Racial Isolation (90% or more same-race) by Borough, 1996-97 First Grade Cohort

	Manhattan	Bronx	Brooklyn	Queens	Staten Island
White					
1 st	0.8	3.1	3.9	5.0	34.4
5 th	0.4	0.2	2.7	4.2	30.7
Cumulative	5.0	3.3	9.7	7.9	56.2
Chronic	0.0	0.0	1.2	2.1	21.2
Hispanic					
1 st	48.5	31.5	30.0	20.3	0.0
5 th	38.3	16.4	19.5	6.0	0.7
Cumulative	59.3	39.5	41.5	29.3	1.7
Chronic	36.4	16.9	15.6	4.6	0.0
Black					
1 st	12.5	1.5	44.3	41.3	2.3
5 th	13.0	1.7	39.4	37.1	0.0
Cumulative	31.1	8.9	64.4	56.6	10.3
Chronic	4.5	0.9	30.3	30.5	0.2
Asian					
1 st	36.4	0.0	10.9	0.7	0.0
5 th	34.7	0.0	1.9	0.0	0.0
Cumulative	60.2	0.0	12.5	1.7	0.0
Chronic	27.0	0.0	2.5	0.0	0.0

Table reads: In Manhattan, 0.8% of the cohort attended a classroom that was 90% or more same-race in the first grade and 0.4% attended such a classroom in the fifth grade. Five percent of the students attended such a classroom at least once during the five years and 0% attended such a classroom in four to five of the years.

Notes: Analysis uses data on students who were in the 1st grade in the fall of 1996 and who remained in the NYC school system for each of the following four years.

Table 5: Cross-Racial Classroom Isolation, 5th Grade, 2000-01

		Mean Classroom Exposure to:				
		Other Race	Hispanic	Black	Asian	White
Race of Student						
	Hispanic	38.2	61.8	22.7	8.0	7.8
	Black	33.0	24.6	67.0	3.9	4.4
	Asian	60.4	26.6	11.9	39.6	21.9
	White	46.7	19.5	10.0	15.7	53.3
		Less than 10% of classmates are:				
		Other Race	Hispanic	Black	Asian	White
Race of Student						
	Hispanic	21.4	2.4	44.4	74.1	77.1
	Black	28.6	36.7	2.8	88.4	88.0
	Asian	6.0	22.3	64.0	10.5	43.9
	White	9.0	34.2	67.3	47.3	5.7

Table reads: The average Hispanic fifth grader attends a classroom that is 61.8% Hispanic, 22.7% black, 8.0% Asian, and 7.8% white.

Notes: Analysis uses data on 78,351 5th graders, 3,315 classrooms, and 675 schools in the 2000-01 school-year.

Table 6: Cumulative and Chronic Risk of Cross-Racial Classroom Isolation, 1996-97 First Grade Cohort

		In at least one year (cumulative), less than 10% of classmates are:				
		Other Race	Hispanic	Black	Asian	White
Race of Student	Hispanic	40.7	5.9	64.2	88.6	88.2
	Black	99.3	55.9	5.9	96.1	94.9
	Asian	12.1	43.9	80.2	20.4	59.3
	White	19.2	60.6	84.4	67.9	10.4
		In all years (chronic), less than 10% of classmates are:				
		Other Race	Hispanic	Black	Asian	White
Race of Student	Hispanic	17.2	0.8	37.6	71.2	74.3
	Black	89.1	26.9	1.1	87.1	86.2
	Asian	4.2	14.0	56.6	6.0	38.0
	White	5.9	26.7	61.6	41.6	3.1

Table reads: 40.7% of Hispanic students in the cohort attended a classroom where less than 10% of the students were members of another racial group at least once during their five years in school.

Notes: Analysis uses data on students who were in the 1st grade in the fall of 1996 and who remained in the NYC school system for each of the following four years.

Figure 1: Distribution in %-Point Difference Between School and Classroom Same-race Share, White Students, 5th Grade, 2000-01

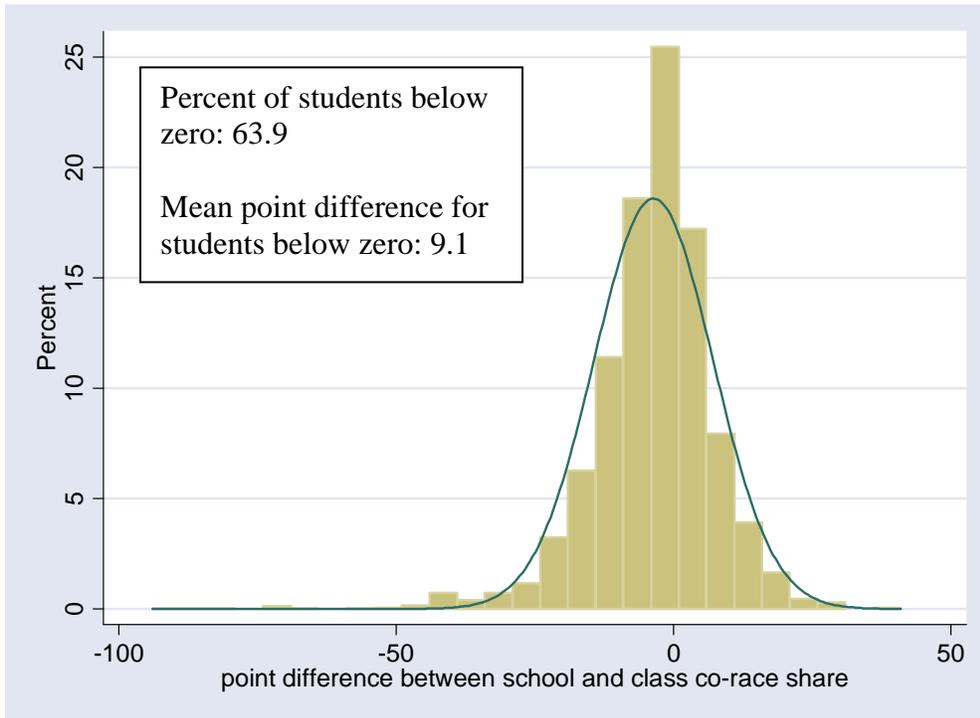
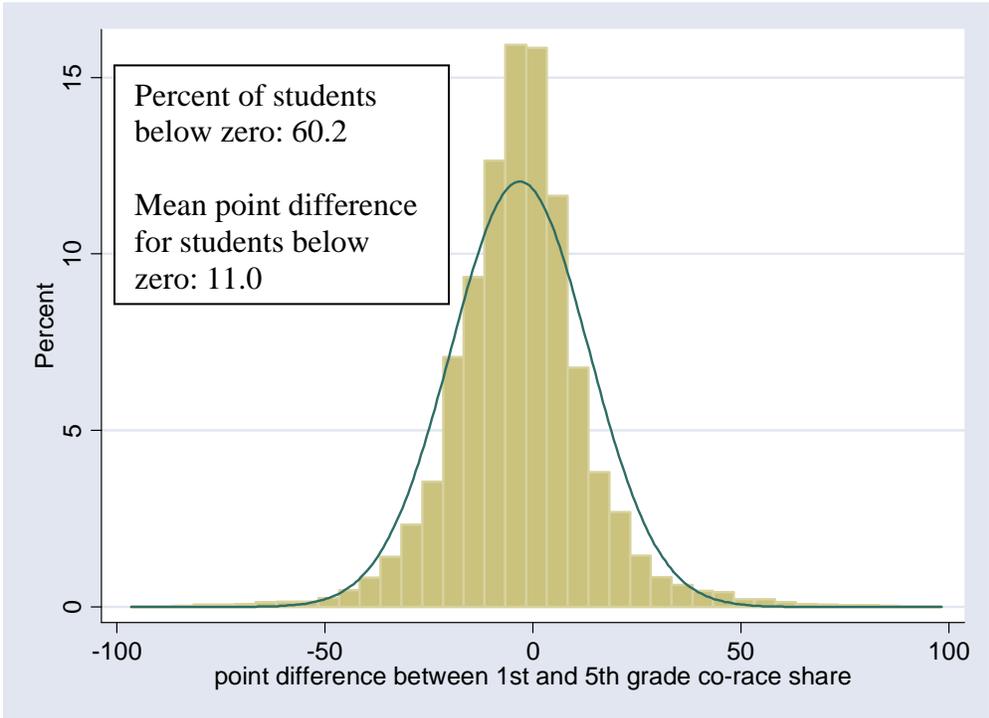


Figure 2: Distribution in %-Point Difference Between 1st and 5th grade Same-race Share, White Students, 1st Grade 1996-97 Cohort





I N S T I T U T E F O R
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