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**Public School Choice And Integration:
Evidence from Durham, North Carolina**

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Abstract

Using evidence from Durham, North Carolina, we examine the impact of school choice programs on racial and class-based segregation across schools. Theoretical considerations suggest that how choice programs affect segregation will depend not only on the family preferences emphasized in the sociology literature but also on the linkages between student composition, school quality and student achievement emphasized in the economics literature. Reasonable assumptions about the distribution of preferences over race, class, and school characteristics suggest that the segregating choices of students from advantaged backgrounds are likely to outweigh any integrating choices by disadvantaged students. The results of our empirical analysis are consistent with these theoretical considerations. Using information on the actual schools students attend and on the schools in their assigned attendance zones, we find that schools in Durham are more segregated by race and class as a result of school choice programs than they would be if all students attended their geographically assigned schools. In addition, we find that the effects of choice on segregation by class are larger than the effects on segregation by race.

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Two U.S. Supreme Court cases more than 50 years apart highlight the struggle over school integration in the U.S. At one end is *Brown v. Board of Education* (1954), which ended the *de jure* racial segregation of schools, and ultimately forced districts to integrate their schools. At the other is the 2007 Supreme Court ruling that limits the ways in which districts can use race in determining the assignment of students to schools.¹ During the period between the two rulings, attitudes about the potential for parental choice of schools to play a positive role in integrating schools have changed quite significantly. Although choice programs served as a means for many white families to avoid racially integrated schools during the 1950s and the 1960s and, hence, represented a significant obstacle to racial integration, the 1970s to the 1990s witnessed the development of new choice programs, primarily in the form of magnet schools or controlled choice programs, intended to promote racial integration. At the same time that such programs gave families more choice over their children's schools, policy makers typically retained control over school assignments by placing limits on the extent to which individual schools could be racially unbalanced.

Now that the Supreme Court has limited the use of race-based considerations in school assignments, the question arises of what role parental choice of schools will play in the future with respect to racial or other forms of school segregation. On the one hand are those who fear that unfettered choice systems will increase school segregation. On the other are those who believe that choice programs can continue to play a positive role in integrating schools and, indeed, may be the only option available in light of the recent Supreme Court decision.

This paper develops a conceptual framework, tested against data from Durham, North Carolina, to help understand how the expansion of parental choice within the current legal

¹ *Parents Involved in Community Schools v. Seattle School District No. 1*, No. 05-908. Argued December 4, 2006—Decided June 28, 2007.

environment is likely to affect race- and class-based segregation of schools. The sociology and economics literatures have produced a number of hypotheses concerning how race- and class-based preferences influence levels of school segregation. Underemphasized in this literature is the high correlation between various aspects of school quality valued by parents and the racial and class composition of a school's student body. Though this correlation complicates the situation, plausible assumptions about how preferences with regard to race, class, and aspects of school quality are distributed among families of different types allow us to formulate some testable predictions about how choice programs are likely to affect school segregation. In particular, because preferences about school quality are likely to reinforce any race- and class-based preferences for students from advantaged backgrounds, such students are unambiguously predicted to opt out of schools with concentrations of disadvantaged students in favor of schools with high percentages of advantaged peers. Students from disadvantaged backgrounds, in contrast, face a tradeoff between attending a school with students like themselves and schools with high levels of achievement. As a result, the segregating effects of choices made by students from advantaged backgrounds are likely to outweigh the integrating effects of choices made by students from disadvantaged backgrounds.

We test our hypotheses against data from Durham, North Carolina, a countywide school district that contains significant student diversity by race and class, and that offers a variety of different choice programs. The empirical analyses are divided into three parts. The first part examines students' decisions to opt out of their assigned schools, and examines how those decisions are affected by the peer compositions of the students' assigned attendance zones. The second set of analyses examine whether the students who opt out are choosing schools that are more or less segregated than their assigned school. The third set compares various indicators of

racial and class segregation that emerge from Durham's school choice programs to what those same indicators would look like if all students attended their assigned neighborhood schools. These analyses provide evidence consistent with our theoretical expectations.

Theoretical Considerations

School choice programs are understood here as programs that separate a family's choice of school from its choice of residence. In addition to providing more schooling options for families compared to a mandatory school assignment program, such programs shift control over the composition of each school's students away from district policy makers in favor of parents. Our main research question is how such school choice programs are likely to affect student segregation. While racial integration remains a salient concern, many people are also concerned with the extent to which students who are challenging to educate, regardless of race, are concentrated in specific schools (Kahlenberg, 2000). Hence, we broaden the question to consider the effects of choice programs on segregation defined by class as well as by race.

Preferences based on race and class

Several theories emphasize the role of race- and class-based preferences in determining the level of school segregation when parents are given choices. One theory posits that school choice programs will increase segregation by making it easier for white or otherwise advantaged parents to avoid schools with concentrations of minority or other disadvantaged students whom they wish to avoid. Following Saporito (2003), we refer to this theory as the outgroup avoidance theory and note that it is one of the explanations given for "white flight" in the context of school desegregation efforts. A second theory, which also implies that school choice will increase segregation, posits that parents of all races seek out educational environments in which their children can be with students of similar backgrounds. We refer to this theory as neutral

ethnocentrism. Finally, the high level of residential segregation in U.S. metropolitan areas suggests that choice might reduce racial segregation in schools by providing families access to schools that are more integrated than the neighborhoods available to them. School choice in this context liberates families from the residential constraints they face, and following Archbald (2003) we call this the liberation theory.

Outgroup avoidance theories argue that white, wealthier and more educated families will take steps to maintain their social status by distancing themselves from groups of lower standing (Bobo, 1999; Bonilla-Silva, 1996; Tauber & James, 1982; Wells & Crain, 1992). Evidence for the outgroup avoidance hypotheses comes from studies of neighborhood preferences, which find that whites are not willing to live in neighborhoods with substantial percentages of minority, and particularly, black residents (Bobo and Zubrinsky, 1996; Clark, 1992; Farley et al., 1994; Timberlake, 2000). The outgroup avoidance hypothesis is also consistent with studies that find evidence of white parents avoiding schools with substantial minority populations (Henig, 1996; Lankford, Lee, & Wyckoff, 1995; Lankford & Wyckoff, 1999; Saporito, 2003), as well as studies that find lower housing prices near schools with a large fraction of minority students (Clapp, Nanda, & Ross, 2007; Downes & Zabel, 2002; Kain, Staiger & Riegg, 2005).

Several studies have shown that past efforts to desegregate schools generated “white flight” from U.S. central cities (Clotfelter, 1979; Coleman, Kelly & Moore, 1975; Rossell & Armor, 1996; Welch & Light, 1987). In the South, however, where school districts tend to be coterminous with counties, urban school districts may contain a substantial fraction of the housing stock available within a metropolitan area, thereby limiting the ability of white parents to avoid integrated schools by moving to a different district (Clotfelter, 2004). Thus, in countywide districts that construct school zones to promote racial integration, school choice

programs might provide an alternative mechanism for white students to avoid reduce their contact with minority students.

An alternative theory suggests that choices of social settings are motivated by a “neutral ethnocentrism” or desire to interact with those similar to oneself. “Neutral ethnocentrism” implies that black families (or outgroups more generally) are as likely to choose segregated over integrated environments as are white (or high status groups more generally). Limited evidence for black self-segregation in housing markets is provided by King and Mieskowski (1973) and more recently by Ihlanfeldt and Scafidi (2002).² Evidence from charter school programs in several places also show that significant numbers of black students have transferred from relatively integrated public schools into predominantly black charter schools (Bifulco & Ladd, 2007; Booker, Zimmer, & Buddin, 2005).³

In contrast to the outgroup avoidance and neutral ethnocentrism theories, the liberation theory posits that programs to expand school choice could potentially decrease school segregation relative to the segregation that would occur with neighborhood-based school assignment zones. Although there has been some progress in reducing residential segregation over the last two decades, it remains pronounced in many metropolitan areas (Farley & Frey, 1994; Iceland, 2004; Massey, 2001). To the extent that school districts assign students to schools by neighborhood, residential segregation translates into segregated schools. School choice programs that break the link between residential location and school attendance would reduce school segregation if families prefer schools that are more integrated than the neighborhoods in which they live.

² For evidence against the black self-segregation hypothesis see Cutler, Glaeser & Vigdor (1999); Galster (1982); Krysan & Farley (2002); and Yinger (1978).

³ Evidence from both Bifulco and Ladd (2007) and from Renzulli (2006), however, suggests dissatisfaction with public schools maybe driving such choices as much as a preferences to attend schools with more black students.

This outcome is most likely to occur when residential opportunities are restricted. Existing studies suggest several ways that residential opportunities may be restricted. Racially integrated neighborhoods have proven difficult to maintain, even where substantial numbers of individuals are open to interracial settings (Yinger, 1995). Further, ample evidence indicates that the residential location choices of black families continue to be constrained by ongoing discriminatory practices as well as the legacy of historical discrimination (Ross, 2008; Ross & Turner, 2005). Thus, many black families may find themselves and their children in more segregated settings than they might choose in less constrained housing markets (Bayer, McMillan and Rueben, 2005). In addition, Ellen (2000) and Krysan (2002) argue that racial stereotypes play an important role in the perception of neighborhood quality. Although, racial stereotypes can also influence school choices, modern school accountability programs often make information on school quality – at least as crudely measured by test scores – readily available. If parents have more information about school quality than they have about neighborhood quality, they might rely less on racial stereotypes in selecting schools than in selecting neighborhoods, and as a result, school choice programs could reduce school segregation relative to neighborhood assignment policies.

Preference for school quality and segregation

The literature on school segregation has emphasized the importance of preferences regarding race and class, and has often overlooked other aspects of schools, such as student achievement, quality of instruction, school discipline, and programmatic offerings, that also may affect parental choices and the resulting patterns of segregation. How school choice affects segregation will depend on the importance parents place on these factors relative to the racial or

socioeconomic composition of a school's students, and on the extent to which preferences regarding these other factors differ systematically across racial and socioeconomic groups.

Although the evidence on school preferences and whether these differ across groups is mixed, surveys of parents typically find the both white and minority parents place a high value on student achievement as typically measured by test scores and on instructional quality (Armor & Peiser, 1998; Klietz, Weiher, Tedin, and Matland, 2000; Schneider, Teske, and Marschall, 2000).⁴ The situation is complicated, however, by the fact that a school's student composition is a determinant of various measures of school quality. A massive array of studies dating back to the Coleman report document the strong relationship between race and class and student performance based on standard benchmarks, such as standardized test scores, grades and graduation rates (Campbell, Hombo, & Matteo, 1998; Coleman, 1966; Duncan & Brooks-Gunn, 1997; Jencks & Phillips, 1998). As a result, regardless of instructional quality, schools with high proportions of white and college educated parents often exhibit high levels of academic achievement, which makes those schools attractive to many parents.

In addition, several studies demonstrate that instructional quality depends on the mix of students in the school. The presence of a large proportion of educationally advantaged students in a school may have positive effects on school quality through a variety of mechanisms. In addition to the possibility of positive spillover effects on motivation and learning from one student to another, it may affect discipline in the classroom and, through discipline, the time and resources available to support learning (Lazear, 2001). Also students from advantaged backgrounds may bring with them social capital in the form of parental input, and may make it

⁴ The most consistent finding from these surveys is that few parents in any group report that racial composition is an important consideration. However, Schneider and Buckley (2002), who observe internet search behavior of parents in Washington, D.C., provide evidence that lack of emphasis on socioeconomic characteristics and race in surveys of school preferences is due to socially desirable response bias.

easier for the school to attract high quality teachers. The latter occurs because high quality teachers often prefer to teach in schools with more motivated and high-achieving students (Clotfelter, Ladd, & Vigdor, 2006; Lankford, Loeb & Wyckoff, 2002).

For students from educationally advantaged groups, e.g. white families with college educated parents, preference for high quality schools or schools with high levels of achievement will reinforce any preferences about peer composition associated with outgroup avoidance or neutral ethnocentrism and will tend to increase the pressure for segregated schools. Students from educationally disadvantaged groups, including minorities and those with less educated parents, in contrast, may face a tradeoff between the desire for high performing schools and the desire for settings with students who share a similar background.

The endogeneity of preferences

Finally, it is worth noting that much of the literature reviewed here has taken preferences as given and has emphasized how race- and class-based preferences influence patterns of segregation. Preferences, however, may be influenced by patterns of segregation as well (Renzulli & Evans, 2005; Renzulli, 2006). Contact theory (Allport, 1954) suggests that increased exposure among groups under the right conditions increases understanding and reduces prejudice. In addition, the strength of the correlation between family background characteristics and achievement might itself depend on levels of segregation. For example, if minorities gain access to more integrated schools and benefit from higher teacher quality in those schools, the link between race and student performance might weaken. A weaker link between race and achievement might make white parents more willing to choose integrated schools. Alternatively, if high levels of segregation negatively affect performance of minority students, incentives for

white flight will be greater. Such feedback can make the long-run effects of school choice programs on integration greater than any immediate effects.

Empirical Implications and Hypotheses

These theoretical considerations have at least two important implications for empirical studies of how parental choice influences segregation. First, it is difficult to draw conclusions about the distribution of race- and class-based preferences from observed parental choices. Because of the correlation between the race and class composition of a school and hard to observe aspects of school quality, it is difficult to interpret the tendency of white or socially advantaged parents to avoid schools with concentrations of disadvantaged students as reflecting race- or class-based motives. In the analyses that follow, we do not attempt to draw conclusions about parents' underlying preferences.

Second, if preferences are dependent upon context, then it might be difficult to make general statements about the relationship between parental choice and school segregation. Suppose that school choice programs did tend to increase segregation by race and class in many different places. That fact would not imply a necessary relationship between parental choice and segregation. In particular, if public policies or other developments were able to promote positive intergroup contact or to weaken the correlation between race, class and school quality, the segregating effects of parental choice might disappear.

Despite these important caveats, if we make plausible assumptions about how parent preferences are distributed, we can formulate some predictions about how school choice programs are likely to affect segregation. Let us assume: that, consistent with the outgroup avoidance hypothesis, some parents from socially advantaged groups seek to avoid interactions with disadvantaged groups; that, consistent with neutral ethnocentrism, some people from both

advantaged and disadvantaged groups prefer, all else equal, social environments that have more people with backgrounds similar to their own; and finally, that parents from all groups tend to place some positive value on schools with higher levels of achievement and higher quality teachers. These assumptions generate the following hypotheses.

Hypothesis 1: Substantial numbers of white parents and parents from socially advantaged groups will use school choice programs to avoid schools with concentrations of black and disadvantaged students and to move into schools with more homogenously white and advantaged student populations. These parents will be motivated by some combination of concern about race and class composition per se and by a desire for either higher quality schools or schools with higher levels of achievement.

Hypothesis 2: Black students and socially disadvantaged students will be more likely than white and socially advantaged students to use choice to make integrative moves--that is to move from schools that have a higher percentage of students from their own group to schools with lower percentages of students from their own group. This expectation follows from the fact that while race- and class-based preferences among whites and advantaged groups will be reinforced by preferences about school quality, black and socially disadvantaged parents often face a tradeoff between sending their children to schools with more students that share a similar background and sending their children to schools with high levels of achievement. Thus, while parents from socially advantaged groups have little incentive to make integrating moves, parents from socially disadvantaged groups may be motivated by school quality considerations to make integrating moves.

Hypothesis 3: The net effect of parental choices that result from school choice programs will be to increase segregation by race and class relative to geographic assignment policies. This

expectation is particularly strong where geographic assignment zones are drawn to promote integration. Some number of parents from all groups will make integrative moves. We expect, however, that a relatively high proportion of parents from advantaged groups will opt out of schools with concentrations of disadvantaged students for more homogenous schools and, consistent with hypothesis 2, that parents from disadvantaged groups will choose schools with advantaged peers and high levels of achievement less frequently than parents from advantaged groups. As a result, the integrating effects of choices by disadvantaged students seeking higher achieving schools will be outweighed by the segregating effects of choices made by parents from advantaged groups.

Each of these hypotheses is formulated in terms of both race- and class-based segregation. Whether the expected patterns are more marked by class or by race will depend on the strength of the correlation between race and school quality relative to the correlation between class and school quality, and on the relative strength of preferences regarding race, class, and school quality. We have no a priori expectations about whether the effects of choice programs on racial segregation will be stronger or weaker than the effects on segregation by class.

Data

Our empirical analysis uses data on elementary and middle school students in Durham, North Carolina during the 2002-03 school year. The Durham Public School district is a countywide school system that serves approximately 32,000 students in 46 schools. Unlike many other large, urban districts in North Carolina and elsewhere, the Durham Public Schools have never been subject to a federal desegregation court order. Nonetheless, for a number of years the district used race conscious student assignment policies to promote racial balance. Since 1999, however, all student assignment decisions have been race blind.

The district relies primarily on contiguous, geographic attendance zones to determine student school assignments. There are 21 elementary school and six middle school attendance zones. As is the case in many urban districts across the country, however, layered on top of the district's geographic assignment plan are several programs that provide parents the opportunity to opt out of their assigned school to attend another public school. These programs include: a long-standing policy that allows transfers between zoned schools for any reason and requires approval of any requested transfer provided space is available at the requested school and the student has an acceptable record of attendance and behavior; a magnet school program that during 2002-03 included six elementary and two middle magnet schools that offer educational programs and enrichment opportunities designed around a specific theme; three elementary and two middle schools that operate on a year-round calendar, which divides the year into 9-week quarters with a three week break between each quarter;⁵ and charter schools that are authorized and governed independently of the Durham Public Schools, including seven charter schools located in Durham that served students in grades 3 through 8 during 2002-03. Each of these programs is by application only and if there are more applications than seats available, admissions are determined by lottery.⁶

The data for our analyses are drawn from two administrative sources: the North Carolina Department of Public Instruction's End of Grade (EOG) test files and the Durham Public School's student transportation files. The EOG files contain a record for every public school student in grades 3 through 8, including charter school students and students without test scores.

⁵ The three elementary year round schools each have a regular attendance zone similar to those for other elementary schools. However, students in those zones who do not want a year-round calendar are guaranteed admission at a neighboring school. The remaining seats in the year-round schools are available by application. One of the two year-round middle schools does not have a regular attendance zone and all admissions are by application.

⁶ Transfers under the transfer policy are granted on a first come first served basis, and for admission to four of the elementary magnet schools, priority is given to students who reside in a small walk zone surrounding the schools. In all four of these magnets most of the seats go to students outside these small walk-zones.

In addition to information on test scores, the EOG files indicate what school the student attended, the student's race/ethnicity and the highest level of education obtained by the student's parents. The transportation files include an address for every student for which the district is responsible for providing transportation. These files were linked together and made available to us by the North Carolina Education Research Data Center. In addition, we obtained school attendance zone boundary files from the County of Durham that allow us to place individual addresses into school attendance zones established by the Durham Public Schools.

Two issues in assembling these data are worth noting. First, because the Durham Public School district does not provide transportation for charter school students, we do not have addresses for the majority of charter schools students residing in Durham during the years they attended charter schools. We do have current year addresses for students who transferred into a charter school during the school year. In addition, because we have transportation files for multiple years between 1997-98 and 2005-06, we have addresses for charter school students who are observed at some point in other Durham public schools. All but two of the charter schools in Durham end by grade eight, and the two that serve older students end in tenth grade and begin after third grade. Thus, most of the charter school students between grades six and eight during the 2002-03 school year had transferred to a regular Durham public high school by 2005-06, and many of those that did not are observed in a Durham elementary school in earlier grades not served by their charter school. Thus, we were able to obtain addresses for 70 percent of charter school students in grades six through eight. Because younger students are less likely to have aged out of their charter school by 2005-06, we have address data for only 45 percent of charter school students in grades three through five. The possibility that some charter school students might have moved between the year we observe their addresses and the year they enrolled in a

charter school introduces some measurement error into our analysis, but the error is likely to be small.⁷

Second, one of the year-round schools, representing about one-third of the middle school students who have chosen the year-round option, is housed in the same building as a traditional, zoned middle school. The student test score files do not distinguish students who attend the year-round school housed in this building from the students in the traditional program. To distinguish these two groups, we assume that any student in that school, who does not live in the attendance zone for the traditional, zoned school is in the year-round program, and that all other students in the building are in the traditional program. This process results in an assignment of approximately the correct total number of students to each school. Undoubtedly, however, some students are misclassified. For purposes of computing a student's average peer characteristics, we treat the two schools as one.

Table 1 presents summary information on the students in our study. The first and third columns provide information on all students in grades 3-5 and grades 6-8 in the EOG files. Not including students in alternative schools, who are excluded from all of the analysis that follow,⁸ approximately 60 percent of both elementary and middle school students attend their assigned school. Forty percent of elementary school students opt out of their assigned school—12.4 percent choose a magnet school, 15.8 percent transfer to another zoned school, 6.2 percent opt for a year-round school, and 5.8 percent choose a charter school. Among middle school students, 14.2 percent choose one of the two magnet schools, 10.4 percent transfer to another zoned school, 10.4 percent choose one of the two year-round schools, and 5.2 percent attend a charter

⁷ Mobility rates are fairly low among owner-occupants, and while renters move at higher rates their moves are often within the same neighborhood.

⁸ Alternative schools include a school at the Duke medical center for students experiencing long-term hospital stays, and a school for students with behavioral or other issues. Assignment of these students is based neither on geographic assignment zones nor on parental decisions.

school. The lower portions of the table show that approximately 60 percent of students are black, 25 to 28 percent are white, and 7 to 9 percent are Hispanic. Just over 38 percent of elementary school students and 48 percent of middle school students have a parent with a two- or four-year college degree.

The second and last columns describe the sample of students for whom we have address data. Overall, we have addresses for 96.6 percent of the students in grades 3 through 8 in 2002-03, although this percentage is lower for charter schools, particularly at the elementary school level. All the analyses that follow are conducted using the set of students for whom we have address data, and exclude students attending alternative schools. This sample includes 7715 students in grades 3-5, and 7204 students in grades 6-8.

Analytic Strategy

We conduct three sets of empirical analyses to test the three hypotheses formulated above. The first hypothesis is that many white parents and parents from socially advantaged groups will use school choice programs to avoid schools with concentrations of black and disadvantaged students and to move into schools with more homogenously white and advantaged student populations. To test this hypothesis we estimate models to predict the likelihood that white parents and that college educated parents will opt out of their geographically assigned school as a function of the composition of their assigned attendance zone and their proximity to schools with more advantaged student populations. Here and throughout we use parental education level as a proxy for class or social advantage. Our second hypothesis is that black and socially disadvantaged students will be more likely than white and socially disadvantaged students to use choice to make integrative moves. To test this expectation we consider the choices of students who have opted out of their assigned school, and compare the peer

composition in the schools they choose to the peer composition in the assigned school they forego. Finally, we expect that the net effect of parental choices that result from school choice programs will be to increase segregation by race and class relative to geographic assignment policies. To test this expectation we compare actual measures of segregation by race, parent education level, and achievement to what those segregation measures would be if all students attended their assigned school. Each of these analyses are described in this section and the results of each analysis are presented in the next section.

Analysis of the decision to opt out

To examine whether advantaged families use school choice programs to avoid schools with concentrations of disadvantaged students, we model the decision of white students and students with college educated parents to opt out of their assigned schools. In particular, we model the likelihood that student i will opt out of his or her assigned school, z , as a function of student and family characteristics, S , the distance of the family's residence from its assigned school, D , the composition of the student population in the assigned attendance zone, C , access to schools with more advantaged populations, A , and an random error term, e .

$$Y_{iz} = f(S_{iz}, D_{iz}, C_z, A_{iz}, e)$$

We estimated this equation as a linear probability model using OLS and as a probit model using maximum likelihood. The two approaches provide very similar results and only the results of the linear probability models are presented below. In all cases, robust standard errors clustered by attendance zone were used. Separate models were estimated for white students and for students with college educated parents.

Student and family characteristics, including the students achievement level, race/ethnicity, and parents level of education, and miles to the assigned school are used as

control variables. The variables of interest in this model are the composition of the student's assigned attendance zone and access to schools with more advantaged student populations. For white students, we expect that they will be more likely to opt out of their assigned schools when the percent black in their assigned attendance zone is higher and when they have easier access to schools with a substantially higher percentage of white students than in their assigned zone. We expect students with college educated parents will be more likely to opt out when the percent of students with college educated parents in their assigned zone is lower and when they have easier access to schools with a higher percentage of students with college educated parents.

The percent black and percent college educated in the assigned zone are the percentages of students in the zone in the same grade as the individual student i . To capture variation across students in access to schools with different peer compositions than in their assigned attendance zone, we use measures of the distance between the student's residence and various types of schools. Recent studies show that a school's distance from home influences the likelihood that a student will use school choice programs to enroll in that school (Bifulco & Ladd, 2007; Cullen, Jacob & Levitt, 2005; Hastings, Kane, & Staiger, 2006). The distance measures of interest are miles to the nearest school that has a percent black (or white) 15 points higher than in the student's assigned attendance zone and miles to the nearest school where the percent of students with college educated parents is 10 points higher than in the assigned attendance zone.⁹ The shorter these distances, the more access one has to schools with significantly different peer compositions than the assigned school.

⁹ Differences of 15 points for percent black and 10 points for percent of college educated parents were selected after examining the distributions of these percentages across schools. The cutpoint percent black is higher than for percent college educated because the range of values for the former is greater than for the latter. Only schools serving the grade that the student is in are used in determining the distance to the nearest school.

Analysis of choices of those who opt out

To test the hypothesis that families from disadvantaged groups will be more likely to make integrative moves, we first focus on students who have opted out of their assigned school—i.e. choosers. We examine black choosers, white choosers, choosers with college educated parents and choosers whose parents do not have a college education. We begin by comparing the average student composition in the school these students have chosen to the average student composition in the assigned schools they have left behind. We also examine the percentage of students in each group who make integrating choices and segregating choices. For white students, a racially integrating (segregating) choice is defined as a choice of a school that has at least 10 percent more (fewer) black students than the student's assigned school, and for black students, racially integrating (segregating) choices are defined as the choice of a school that is at least 10 percent fewer (more) black students than the student's assigned school. Similarly, we consider a choice to be integrating (segregating) by class if a student with college educated parents chooses a school that has 10 percent more (fewer) parents who are not college educated or if a student whose parents do not have a college degree chooses a school that has 10 percent more (fewer) parents with a college education.

Counterfactual Comparisons

To examine the net effect of individual parent choices on school segregation we compare several measures of segregation given the actual distribution of students in 2002-03 to the measures of segregation that would have emerged if all students had attended the school to which they were geographically assigned. This counterfactual, in which all students attend their assigned schools, is probably not what we would see in the absence of school choice programs. About a quarter of elementary school students and nearly 30 percent of middle school students in

Durham choose a school that does not have an assigned attendance zone. If magnet, year-round, and charter schools were not available, more zoned schools would be required, and as a result attendance zones would be drawn differently. In addition, student assignment policies can influence residential location decisions and decisions to opt out of the public schools in favor of private schools. Thus, we might expect to see a different pattern of residential segregation and private school enrollment if Durham choice programs were removed. Nonetheless, the counterfactual comparisons presented in this section provide a good indication of the potential of choice to increase or decrease segregation relative to strict geographic assignment policies.

We proceed by calculating a series of exposure indices given the observed distribution of students and comparing these to the same indices under the counterfactual. An exposure index measures the extent to which one group has contact with another, and can be defined for any pair of groups. Given counts of students in a given group (A), of students a different group (B), and of all students (T) in each school, the exposure index (E) for a district composed of i schools can be computed as:

$$E_{AB} = \frac{\sum_i A_i \left(\frac{B_i}{T_i} \right)}{\sum_i A_i}$$

Mathematically, the exposure rate is a weighted average of the percent of group B in each school, where shares of Group A are used as the weights. Exposure rates can be interpreted as the percentage of students in Group B in the school of the typical member of group A. So the exposure rate of blacks to whites is the percentage white in the typical black student's school. Higher values indicate more exposure to the other group. In the analysis here we focus on the exposure of blacks to whites, of whites to blacks, and of students from families with various

educational backgrounds to students with college education parents and students with parents who are high school dropouts.

Exposure of Group A to members of its own group can be interpreted as a measure of group isolation. In this case higher values represent greater isolation. We also compare measures of isolation for black students, white students, students with college educated parents, and students of high school dropouts.

All three sets of analyses are conducted separately for students in grades 3 through 5 and grades 6 through 8. The contexts in which elementary and middle school students in Durham choose schools differ in two ways. First, because the district is divided into 21 elementary school attendance zones, but only 6 middle school zones, elementary schools draw from smaller geographic areas than middle schools. As a result, segregation across elementary school attendance zones is greater than across middle school zones. The percent black ranges from 18.4 to 91.0 across elementary attendance zones, but only from 45.8 to 71.3 across middle school attendance zones. Similarly the percent of students with college educated parents ranges from 16.1 to 69.5 at the elementary school level, but only from 41.5 to 54.5 at the middle school level. Second, the magnet schools programs offered at the elementary and middle school grades differ. The elementary magnet schools offer various themes, but none are primarily targeted for high achieving students. In contrast, both magnets at the middle school level provide programs attractive to high achieving and socially advantaged students. One of the middle magnets offers an International Baccalaureate Middle Years Program which is a rigorous college prep curriculum, and the other offers extensive visual and performing arts programs. Comparing the pattern of choices in the elementary and in middle schools provides an opportunity to examine how these differences in context mediate the effect of school choice on segregation.

Results

In this section we present the results of our three sets of analyses and assess the support these results provide for our three hypotheses.

The Decision to Opt Out

Summary statistics for the variables used in our linear probability models are presented in Table 2 and the results of the model estimations are presented in Table 3. The first column of Table 3 presents the model estimates for white, elementary school students and the second column presents results for elementary grade students with college educated parents. The third and fourth column presents corresponding estimates for students in the middle school grades.

Considering the control variables first, student and family background characteristics do not have strong effects on the decision to opt out at the elementary school level. The one exception is that among white students those with college educated parents are about 11 percent more likely to opt out of the assigned school than others. At the middle school level, high achieving students are more likely to opt out than low achieving students, and among students with a college educated parents, black students are also slightly more likely to opt out than otherwise similar white and Hispanic students. In keeping with expectations, the further a student lives from his or her assigned school, the more likely the student is to opt out, confirming that distance is an important consideration for parents in choosing a school.

At both the elementary and middle school levels, the results for our variables of interest are very much in keeping with our expectations. Among white students in the elementary school grades, both the percent black in the assigned attendance zone and the distance to a school with a substantially higher percentage of white students are strong predictors of the likelihood of opting out. The coefficient estimates in the first column of Table 3 indicate that a 10 point increase in

the percent black in the assigned attendance zone increases the average white students likelihood of opting out by 5.7 percent, and living a mile closer to a school with a substantially higher percent white than the assigned school increases the likelihood of opting out by an additional 4.3 percent. The estimates for white, middle school students (third column) indicate that a 10 point increase in the percent black in the assigned attendance zone increases the likelihood of opting out by 11.2 percent, an even larger effect than among elementary school students. The point estimate for white, middle school students indicates that being closer to a school with a higher percentage white than the assigned school does increase the likelihood of opting out, but this estimate is not precise enough to reject the null hypothesis.

Among students with college educated parents, living in an attendance zone with a high percentage of students with college educated parents significantly reduces the likelihood of opting out of the assigned school. Among elementary school students with a college educated parent, an increase of 10 points in the percent of students with college educated parents in the zone is associated with a 9.3 percent reduction in the likelihood of opting out. Among middle school students a 10 point increase in the percent college educated is associated with a 23.4 percent decrease in the likelihood of opting out. Among both elementary and middle school students with college educated parents, being closer to a school with substantially more college educated parents does increase the likelihood of opting out, but these effects are not statistically significant.

The models presented in Table 3 do not include controls for other characteristics of the students in the assigned attendance zone nor any characteristics of the assigned school itself. Consequently, we cannot determine the specific reasons why white parents tend to opt out of schools that serve higher percentages of black students or why college educated parents tend to

opt out of schools serving lower percentages of college educated parents. For the purposes of predicting the impact of choice programs on segregation, however, it matters only that white parents do in fact tend to avoid schools with concentrations of black students and college education parents tend to avoid schools with concentrations of less educated parents.¹⁰

Schools Chosen by Those Who Opt Out

The effects of school choice programs on patterns of segregation depend not only on who is more likely to opt out of their assigned school, but also on how the student compositions in the schools these students choose compare to those in the assigned schools that they are avoiding. Figures 1 and 2, which focus on students who have opted out of their assigned school, show how the student compositions of assigned and chosen schools compare. The comparisons are presented separately for black students, white students, students whose parents do not have a college degree, and children of college educated parents.

The results depicted in Figure 1 suggest that black students are less likely to make racially segregating choices than white students at the elementary school level, but not necessarily at the middle school level. Among students in the elementary school grades, black choosers, on average, select schools with higher percentages of black students than in their assigned schools, and white students select schools with lower percentages of black students in their assigned school. The average difference in percent black between the assigned school and the chosen school among white choosers is 11.4, about two-and-a-half times larger than the average difference among black choosers. This pattern suggests that the tendency to make segregating moves at the elementary level is greater for white students than for black students. At the middle school level, black choosers, on average, choose schools with a percent black 3.3 points higher than in their assigned school, and whites choosers, on average choose schools with

¹⁰ For a similar argument see Brunner, Imazeki, and Ross (2006).

a percent black about 3.4 point lower than in their assigned school, suggesting roughly equal tendencies to make segregating choices among the two groups.

The results in Figure 2 suggest that students whose parents do not have a college degree are considerably less likely to make choices that increase segregation by class than students with college educated parents. On average, at both the middle school and elementary school level, students whose parents do not have a college degree choose schools with a higher percent of college educated parents, although the difference is not statistically significant for elementary school choosers. This result suggests that the tendency to make moves that decrease class-based segregation is at least as strong among choosers in this group as is the tendency to make choices that increase class-based segregation. Among students with college educated parents, however, the tendency to make choices that increase class-based segregation is strong. At the elementary school level, the percent college educated in schools chosen by students who themselves have college educated parents is 14.8 points higher than in the assigned school, and at the middle school level, the percent college educated in schools chosen by students with college educated parents is 22.7 points higher than in the assigned school. Clearly, students who have college educated parents are much more likely than other students to make moves that increase class-based segregation.

The average changes depicted in Figures 1 and 2 hide some interesting variation within each group. Table 4 more directly tests the hypotheses that students from disadvantaged groups are more likely to use school choice programs to make integrating moves. This table reports the share of students who make integrating choices and segregating choices measured as a percent of all students, both those who opt out of and those who remain in their assigned school. For black and white students, integrating moves and segregating moves mean racially integrating and

racially segregating moves, as defined above. For students with and without a college educated parent, integrating moves and segregating moves mean moves that decrease or increase class-based segregation.

Among students in grades 3 through 5, black students are almost twice as likely as white students to make integrating moves—10.9 percent of black students and only 5.9 percent of white students. Contrary to our expectations, however, black students are also slightly more likely than white students to make racially segregating moves. Comparing across columns in the first two rows of Table 4, both white students and black students are more likely to make racially segregating moves than racially integrating moves. In the middle school grades, the percentages of blacks that make both integrating moves and segregating moves is similar to the percentage of whites who make those types of moves. Again at the middle school level, both black students and white students are more likely to make racially segregating moves than racially integrating moves.

Table 4 also indicates that students whose parents do not have a college degree are more than twice as likely to make integrating moves and considerably less likely to make segregating moves than students with college educated parents. Among students whose parents do not have a college degree, the percent who make moves that decrease class-based segregation is slightly larger than the percent who make moves that increase class-based segregation. Among students with college educated parents, however, the percent that makes segregating moves is several times higher than the percent that make integrating moves. These patterns hold at both the elementary school and middle school levels.

Table 4, then, provides strong support for our second hypothesis. Black students are more likely than white students to make racially integrating moves, and students whose parents

are not college educated are more likely to make moves that increase integration by class than students with college educated parents. Also, students with college educated parents are far more likely to make moves that increase segregation by class than students whose parents are not college educated.

Net Effects on Segregation

Figures 3 and 4 examine measures of racial segregation given the actual distribution of students in 2002-03 to the measures of segregation that would have emerged if all students had attended the school to which they were geographically assigned. At the elementary level, the isolation of both black and white students is higher as the result of choice programs than they would be if all students attended their assigned school, and at the middle school level the isolation of white students is higher than under the counterfactual. At both grade levels, the actual exposure of both black students to white students and white students to black students is lower than under the counterfactual. Even at the elementary school level, where the differences are larger, the differences between the actual measures of racial segregation and the counterfactual measures are small. Nonetheless the bottom line is still clear: the availability of choice options in Durham has not reduced segregation either at the middle school level where magnet schools are specifically designed to appeal to white students or at the elementary level where existing levels of segregation under neighborhood assignment are relatively high.

Though the average effects on racial segregation are relatively small, effects may still be meaningful for the educational experiences of students, and particularly black students. With the choice programs, the percentage of black elementary school students who attend schools that are 75 percent or more black is 28.2 percent, which is 50 percent higher than the 18.4 percent we would see if all students were in their assigned school. Among third to fifth graders, the percent

of black students in schools that are more than 90 percent black increases from 3.9 percent under the counterfactual to 7.2 percent as the result of school choice. School choice in Durham has, then, increased the number of black students in highly segregated environments.

As shown in Table 5, the overall effects of choice on segregation by parent's level of education are larger than for race.¹¹ At the elementary school level there would be some segregation by parent's education level if all students attended their assigned school. Under the counterfactual, the percent of school peers with college educated parents is, on average, nearly 11 percent higher for students whose parents have a four-year college degree than for students whose parents have a high school degree and no college. Segregation by parent's education level, however, is even greater as a result of school choice. Given the actual distribution of students across schools, the percent of school peers with college educated parents is nearly 20 percent higher for students whose parents have a four year degree than for students whose parents have a high school diploma and no college. Also, in the right hand panel of Table 5, we see that students whose parents are high school dropouts are more concentrated than they would be under the counterfactual.

At the middle school level, there would be virtually no segregation by parent education if students attended their assigned school. Under the counterfactual, students would attend schools with nearly equal percentages of college educated parents, regardless of their own parent's education level. In actuality, there is significant segregation by parent education. The percent of school peers with a college educated parent is, on average, more than 10 points higher in the schools attended by students whose own parents are college educated than in the schools

¹¹ The information on segregation by parent education is presented as a table due to the large number of student classifications.

attended by students whose parents do not have a college degree. Children of high school dropouts are also more concentrated at the middle school level as a result of parental choice.

Conclusions

Our conceptual considerations led us to formulate three empirical expectations. We hypothesized that: (1) substantial numbers of parents from socially advantaged groups would use school choice programs to avoid schools with concentrations of disadvantaged students and to move into schools with more homogeneously advantaged student populations; (2) students from disadvantaged groups would be more likely than advantaged students to use choice to make integrative moves; and (3) the net effect of this pattern of choices would be to increase segregation relative to what we would see if all students attended their geographically assigned school.

Our empirical analyses strongly confirm each of these expectations. White parents are much more likely to opt out of their assigned school if they live in an attendance zone with a higher percentage of black students and college educated parents are much more likely to opt out of their assigned school if the percent of college educated parents in that zone is lower. Also, white parents who opt out of their assigned school tend to select schools with a lower percentage of black students than the assigned school, and college educated parents who opt out of their assigned school tend to select schools with higher percentages of other college educated parents. Our analysis also shows that black students and students whose parents lack a college education are more likely than white students and students with college educated parents to make integrative moves. The net effects of this pattern of choices are that levels of segregation are higher in Durham as a result of school choice programs than they would be if everyone attended their geographically assigned school.

Whether the results for Durham can be generalized to other areas and districts is an open question. A couple of considerations, however, suggest that school choice programs are likely to have similar effects elsewhere. Despite important differences in the context of elementary and middle schools in Durham, school choice results in slightly more segregation by race and significantly more segregation by class at both levels. More importantly, the results for Durham are consistent with what we would expect given reasonable assumptions about how preferences for school characteristics are distributed. Given the correlation between family background characteristics and school achievement, and the links between student composition and school quality, any preference students from advantaged backgrounds might have to attend schools with peers from a similar background will be reinforced by preferences for high quality schools or schools with high average levels of achievement. Indeed, many parents might not even distinguish between schools with advantaged students, schools with high levels of achievement, and schools with high quality instruction. As a result, we can expect a high proportion of students from advantaged backgrounds to opt out of schools with concentrations of disadvantaged students and into schools with high percentages of advantaged peers and high achievement levels. Such choices increase segregation by race, class, and achievement. Students from disadvantaged backgrounds in contrast often face a tradeoff between attending a school with more peers who share a similar background and schools with high levels of achievement. As a result, they can be expected to opt for schools with more advantaged peers and higher levels of achievement less frequently than students from advantaged backgrounds. Thus, the integrating effects of choice by disadvantaged students seeking higher achieving schools are outweighed by the segregating effects of choices made by students from advantaged backgrounds.

Two important caveats should be noted. In the absence of school choice programs, parents might be more likely to use residential location choice or private school options to ensure their students are in schools that are more desirable to them. Thus, our conclusion that schools are more segregated than they would be if everyone attended their currently assigned public school need not imply that schools are more segregated in Durham than they would be in the absence of school choice programs. Also, the pattern of choices we observe are the result of the current distribution of preferences relative to race, class, and school quality, and the strength of the current correlations between those variables. As society makes progress towards changing intergroup attitudes and reducing intergroup disparities, school choice programs might have more salutary effects on school segregation.

These caveats notwithstanding, our results suggest that, in the absence of direct controls over the student composition of particular schools, school choice programs of the type used in Durham are unlikely to decrease student segregation by race and class relative to neighborhood assignment policies. School choice programs might serve other legitimate purposes, but advocates of integrated schools are unlikely to find the solutions they seek in these programs.

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Table 1. Summary Information on Durham Students, 2002-03

	Grade 3-5		Grades 6-8	
	All students	Students with Address Data	All students	Students with Address Data
<i>Enrollment</i>				
Total Number	8049	7715	7421	7204
In Assigned School	4813	4747	4298	4236
In a Magnet School	997	991	1024	1019
Transferred to Regular School ^a	1274	1274	747	747
Transferred to Year-Round School	495	492	751	742
In a Charter School	465	211	377	261
In an Alternative School	5	0	224	199
<i>Race/Ethnicity</i>				
% Black	60.5	60.1	60.9	60.7
% White	25.2	25.4	27.8	28.1
% Hispanic	8.9	9.1	6.8	6.7
% Multiracial	2.7	2.8	2.5	2.5
% Asian	2.3	2.4	1.8	1.8
% Native American	0.3	0.3	0.2	0.2
<i>Parents' Education</i>				
% Less than High School	8.3	8.3	6.5	6.2
% High School	53.4	53.5	45.6	45.8
% Two-Year College	12.1	11.9	14.5	14.3
% Four-Year College	26.2	26.3	33.5	33.7

a. Students who attend a zoned school other than the one to which they are assigned. Only students with address data could be identified as transfer requests.

Table 2: Summary of Variables Used in Linear Probability Models, Means (& Standard Deviations)

	Grades 3-5		Grades 6-8	
	White	College Educated Parent	White	College Educated Parent
Number of Observations	1961	2946	2023	3458
Student opted out of assigned school	0.304 (0.460)	0.388 (0.487)	0.360 (0.480)	0.436 (0.496)
Student Achievement	0.544 (0.860)	0.261 (0.902)	0.449 (0.887)	0.161 (0.916)
Black		0.502 (0.500)		0.491 (0.500)
White		0.408 (0.491)		0.424 (0.494)
Hispanic		0.018 (0.135)		0.027 (0.162)
Other		0.072 (0.258)		0.058 (0.234)
College educated parent	0.612 (0.487)		0.724 (0.447)	
Miles to assigned school	1.62 (1.57)	1.43 (1.45)	3.26 (1.93)	3.28 (1.82)
% black in assigned zone	49.3 (18.5)	55.9 (19.2)	58.2 (9.0)	59.9 (9.0)
% college ed. parents in assigned zone	44.3 (14.5)	43.9 (14.7)	49.3 (4.7)	48.5 (4.7)
Miles to nearest school with 15% more white students	2.83 (1.98)	2.57 (1.75)	5.52 (3.24)	4.59 (3.17)
Miles to nearest school with 10% more college educated parents	3.78 (4.55)	2.90 (3.54)	3.28 (1.54)	2.79 (1.59)

a. Calculated by converting 2002-03 scores on statewide End of Grade reading and math test to standard scores with a mean of 0 and standard deviation of 1, and then averaging math and reading.

Table 3: The relationship between student characteristics, attendance zone characteristics, and the decision to opt out

	Grades 3-5		Grades 6-8	
	White	College Educated Parent	White	College Educated Parent
Student achievement	-0.010 (0.021)	-0.011 (0.023)	0.067 (0.033)	0.064 (0.018)
Black		0.034 (0.047)		0.055** (0.022)
Hispanic		-0.096 (0.057)		-0.063 (0.123)
Other		0.035 (0.046)		0.014 (0.075)
College Educated Parent	0.109** (0.052)		0.113 (0.064)	
Miles to assigned school	0.044** (0.022)	0.041 (0.010)	0.016* (0.008)	-0.008 (0.009)
% black in assigned zone	0.567** (0.233)		1.122** (0.362)	
% college ed. parents in assigned zone		-0.932** (0.234)		-2.344** (0.509)
Miles to nearest school with 15% more white students	-0.043** (0.015)		-0.029 (0.036)	
Miles to nearest school with 10% more college educated parents		-0.008 (0.011)		-0.029 (0.023)

Figures reported are coefficients from OLS estimation of linear probability model. Dependent variable==1 if student attend school other than the geographically assigned school and 0 otherwise. Figures in parentheses are robust standard errors adjusted for clustering within attendance zones. * statistically significant at 0.10 level and ** statistically significant at .05 level

Figure 1: Differences in Percent Black between Assigned School and Chosen School

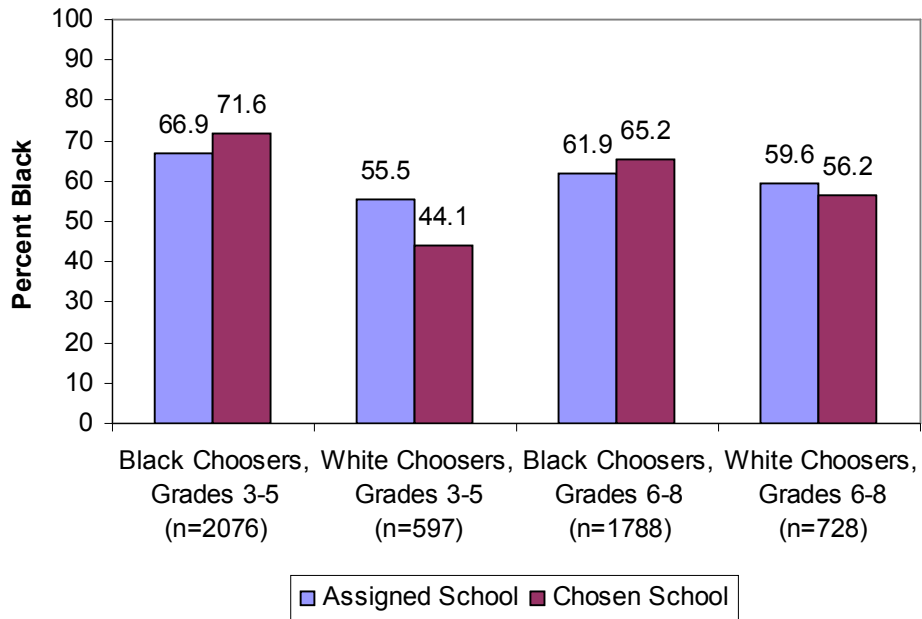


Figure 2: Differences in Percent of Students with College Education Parents between Assigned School and Chosen School

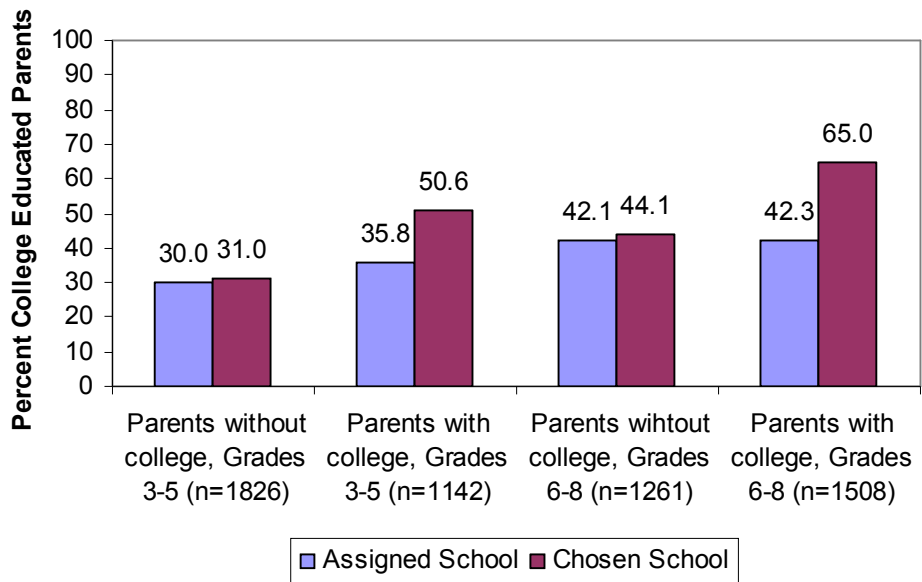


Table 4: Integrating and Segregating Choices

	Percent Making Integrating Moves ^a	Percent Making Segregating Moves ^b
Grades 3-5		
White Students	5.9	16.4
Black Students	10.9	18.4
Students with College Educated Parents	6.5	22.9
Students without College Educated Parents	14.3	12.9
Grades 6-8		
White Students	8.4	12.0
Black Students	9.5	14.2
Students with College Educated Parents	4.1	32.5
Students without College Educated Parents	11.3	10.4

a. For white and black students, an integrating move is a choice of a school where percent of the other race is at least 10 points higher than in the assigned school. For students with college educated parents and students without college educated parents, an integrating move is a choice of a school where the percent of the other group is at least 10 points higher than in the assigned school.

b. For white and black students, a segregating move is a choice of a school with percent of the other race is at least 10 points lower than in the assigned school. For students with college educated parents and students without college educated parents, a segregating move is a choice of school where the percent of the other group is at least 10 points lower than in the assigned school.

Figure 3: Racial Segregation, Actual Compared to Counterfactual, Grade 3-5

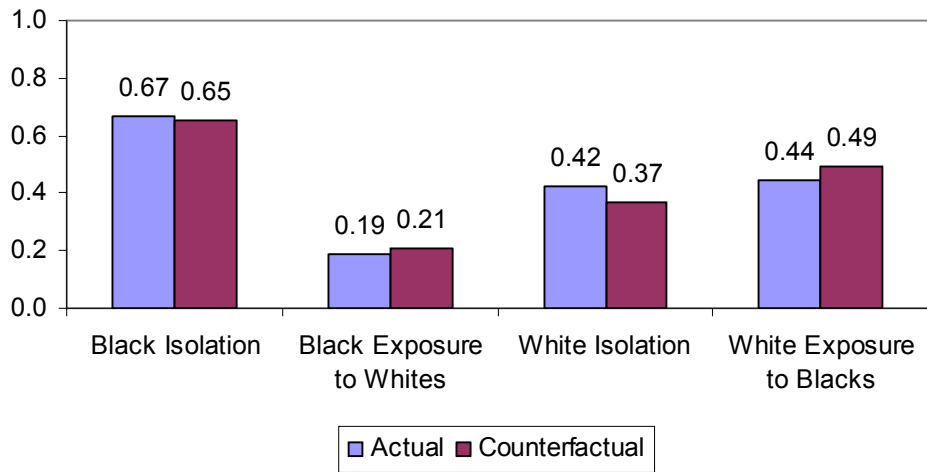


Figure 4: Racial Segregation, Actual Compared to Counterfactual, Grades 6-8

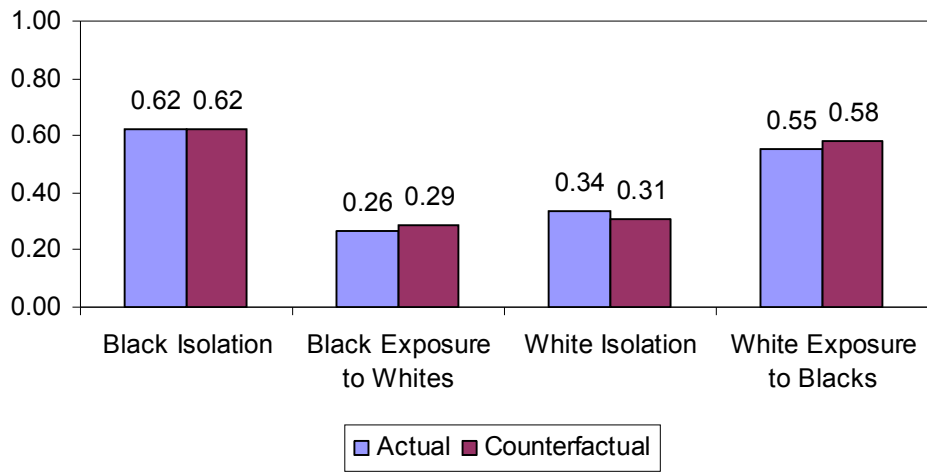


Table 5: Exposure to Students Whose Parents are College Graduates and High School Dropouts, Actual Compared to Counterfactual

Grades 3-5				
	Exposure to College Graduates		Exposure to H.S. Dropouts	
	Actual	Counterfactual	Actual	Counterfactual
<i>Education of Student's Own Parent</i>				
Less than High School	0.291	0.329*	0.174	0.128*
High School	0.318	0.349*	0.083	0.084
Two-Year College Degree	0.440	0.397*	0.072	0.076
Four-Year College Degree	0.515	0.458*	0.059	0.069*
Grades 6-8				
	Exposure to College Graduates		Exposure to H.S. Dropouts	
	Actual	Counterfactual	Actual	Counterfactual
<i>Education of Student's Own Parent</i>				
Less than High School	0.423	0.479*	0.104	0.071*
High School	0.437	0.476*	0.064	0.061
Two-Year College Degree	0.538	0.475*	0.055	0.062*
Four-Year College Degree	0.544	0.489*	0.054	0.062*

Counterfactual is index computed with all students in their assigned neighborhood school.

* indicates that difference between actual and counterfactual is statistically significant at 0.01 level.