Choosing Alone? Peer Continuity Disparities in Choice-Based Enrollment Systems

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Abstract: We provide novel evidence on the broader impacts of school choice systems by quantifying disparities in peer continuity from middle to high school in New York City. We find that Black and Hispanic students, and those in high poverty neighborhoods, attend high school with a much smaller fraction of their middle school or neighborhood peers than their White, Asian, and low poverty neighborhood counterparts. Disparities also emerge in peer isolation: 27 and 20 percent of Black and Hispanic students transitioned with no other student from their middle school, while only 7-8 percent of White and Asian students did. Group differences in choice similarity, which in part reflects systematic variation in the number of local school options, drive this result.

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School choice policies have transformed the way in which many students are assigned to schools in the United States. Their impact, however, varies between and within districts. Urban districts, which educate 43% of Black and Hispanic compared with 18% of White children, have disproportionately gained charter, magnet, and small schools of choice, and are more likely to use centralized enrollment systems in which families submit applications ranking their most preferred schools (Benner & Boser, 2018; Bloom & Unterman, 2014; USDOE, 2022; Wang, Rathbun, & Musu, 2019). In contrast, traditional residentially-based enrollment patterns persist more strongly outside of cities. That families of different racial and socioeconomic backgrounds are increasingly experiencing different school assignment policies makes understanding their full impact important for educational researchers studying inequality. Such policies potentially have a range of cascading implications for individuals and communities, affecting not only academic opportunities but also the duration and continuity of children's peer relationships.

The potential for choice-based school assignment to impact peer continuity, and to do so differentially by social background, is of interest for several reasons. First, shared contexts and propinquity are key predictors of friendship stability; as a result, most adolescent friends share the same school and grade (Moody, 1999). Friendships are more likely to dissolve when children transition from middle to high school with a smaller fraction of their peers (Felmlee et al., 2018; Temkin et al., 2018), and researchers have linked friendship instability across the transition with lower socioemotional wellbeing (Benner 2011; Benner et al. 2017). Second, continuity in childhood peer groups may promote stronger relationships between parents, a key determinant of social capital. Children who share schools for a longer period are more likely to experience intergenerational closure—parents knowing the parents of their children's friends (Coleman & Hoffer, 1987, Day & Dotterer, 2020). Third, peer continuity can affect academic outcomes. Prior

research found high-achieving middle school students performed better when they entered high school with a majority of their classmates while low-performing middle school students struggled more academically (Langenkamp, 2009; Schiller, 1999). Together, these studies confirm that peer continuity is not only a quantity of interest in its own right, but is associated with social, emotional, and academic outcomes in high school.

In this paper, we examine peer continuity in the transition from middle to high school in New York City, a context in which all 8th graders are required to rank their top choices and are centrally assigned (Abdulkadiroğlu, Pathak, & Roth, 2005). We address the following questions: 1) To what extent do students experience peer continuity in the transition from middle to high school, and how do levels of peer continuity vary by race/ethnicity and neighborhood poverty?; 2) What role does high school choice similarity between peers in the same middle school and neighborhood play in the levels of and disparities in peer continuity?, and 3) To what extent do differences in proximate school supply account for this pattern?

We find that the median high school applicant in NYC enrolled in a high school with only 3% of their middle school cohort; nearly 1 in 5 applicants were the *only* student in their 9th grade class who attended their middle school. Black and Hispanic students and students living in high-poverty neighborhoods were the most isolated from their middle school peers, with 28% of Black students, 20% of Hispanic students, and 29% of students from high-poverty neighborhoods the only student in their 9th grade class from their middle school cohort (versus 7% of White students and 7% from low-poverty neighborhoods). The prevailing reason middle school cohorts do *not* remain peers is their own choice dissimilarity, not other factors such as program selectivity or oversubscription (although these may influence initial choices). Features of the choice landscape— such as the number and size of nearby school options—are strongly related to choice similarity

and, in turn, peer continuity.

      While one might expect adolescents to prioritize friends and known peers when choosing schools, our results do not provide strong evidence of coordination, especially for traditionally disadvantaged students. If surprising, this finding is consistent with our own survey of NYC students attending high-poverty schools and recent survey evidence finding friends' influence ranks low among applicant priorities in Chicago (Sartain & Barrow, 2022).

Background

School Choice and Peer Continuity

      A small body of work focused primarily on neighborhoods has addressed peer continuity in the context of choice-based assignment systems. Burdick-Will (2017) examined differences in high school enrollment patterns across Chicago and found that students living in low-income and more violent neighborhoods attended a larger and more heterogeneous set of high schools than students living in higher-income and less violent neighborhoods. The latter tended to travel less far to school, and clustered in a small number of destination high schools (see also Sirer et al., 2015). Lenhoff et al. (2020) defined "peer choice sets" in Detroit using the set of all schools attended by families in a neighborhood and identified neighborhoods in which the majority of students attended school close to home and others in which students attended a much more diffuse set of schools. Using idiosyncratic annual changes in application patterns, Ruijs and Oosterbeek (2019) found that students in Amsterdam were more likely to apply to a secondary school when more of their primary school classmates did. While none of these papers were specifically focused on peer continuity, their results suggest important differences in peer continuity by family background and neighborhood context.

The Role of Choices, School Supply, and Preferences on Peer Continuity

In a choice-based school assignment system, the likelihood students remain peers in a school transition depends on the specific school(s) they list on their applications. All else equal, students who make similar choices are more likely to remain peers than students who don't. Other factors also matter, including students' likelihood of admission to the schools they apply to. Two students with the same top choice school, for example, are more likely to remain peers when they have higher likelihoods of assignment to that school.

This logic extends to the group level. Two student populations may differ in peer continuity because they differ in their propensity to have specific choices in common with their same-school or same-neighborhood peers. Alternatively, two groups with comparable choice similarity may differ in peer continuity if they differ in their likelihood of matching to and enrolling in their preferred choices. Understanding group differences in peer continuity therefore requires a consideration of factors that lead students in the same school or neighborhood to make the same choices, as well as factors that lead to variation in match rates.

Choices are affected by factors on both the supply and demand side. On the supply side, the spatial availability of schools and their admissions policies impact families' willingness and ability to consider them. In many large districts, the quantity and quality of choices are unevenly distributed. Neighborhoods with higher fractions of Black residents have experienced more school closures and openings (Pearman & Greene, 2022), and fewer high-performing schools tend to be available in these neighborhoods (Edwards, 2018; Laverde, 2022; Sartain & Barrow, 2022).

In NYC, there are stark differences in the number and size of school options across neighborhoods and demographic groups (see Appendix Figures 1-2). Most large comprehensive

4

high schools in the boroughs of Manhattan and the Bronx have been closed and replaced with smaller themed high schools, giving residents more choices (Jennings, 2010; Kemple, 2015). Queens and Brooklyn, in contrast, offer a mix of school sizes, while Staten Island offers mostly large comprehensive high schools. Students may apply to any school in the city, and its extensive public transit system—which is subsidized for students—provides access to a large number of schools (Corcoran, 2018). However, prior studies have found that families have a strong preference for proximity when choosing schools (Glazerman & Dotter, 2017; Harris & Larsen, 2015; Hastings, Kane, & Staiger, 2006). Thus, we might expect residentially proximate families to make more similar choices, all else equal.

Admissions policies further shape the "effective" supply of schools (Corcoran & Baker-Smith, 2018; Rucinski & Goodman, 2022; Sartain & Barrow, 2022). In NYC during our study period, more than a third of all high schools screened applicants using academic or other criteria such as an audition. Some gave admissions priority to students who lived in their borough, attended a "feeder" school, or attended an open house. The implication is that students who share academic eligibility or admissions priorities are more likely to share choices and remain peers than those who do not.

On the demand side, prior research has found variation in school preferences by family background, with high-SES parents and parents of higher-achieving students more likely to prioritize schools with high test scores than low-SES parents and parents of lower-achieving students (Abdulkadiroğlu et al., 2020; Glazerman & Dotter, 2017; Harris & Larsen, 2015; Hastings, Kane, & Staiger, 2006). Families also differ in preferences for the racial composition of schools (Bell, 2009; Billingham & Hunt, 2016; Goyette 2008; Schneider & Buckley, 2002; Hailey, 2022a) and school safety (Hailey, 2022b). Other constraints may prevent families from acting on

their preferences, such as access to information (Corcoran & Jennings, 2019, Sattin-Bajaj 2014), proximity to higher-quality schools (Denice & Gross, 2016), and transportation. All else equal, we might expect shared preferences, constraints, and information within a school or neighborhood to lead to similar school choices.

Finally, in adolescence, peers may directly provide information or shape preferences. Prior work finds students have greater agency in high school choice than in earlier stages (Condliffe et al., 2015; Sattin-Bajaj, 2014; Teske et al., 2007) and international evidence suggests information sharing between peers and siblings plays a role in K-12 school choice (Rosenqvist, 2017; Dustan, 2018; Ruijs and Oosterbeek, 2019), but this has not been studied in the US context. By looking at application similarity within schools, our analysis provides new—albeit indirect—evidence on the extent to which same-school peers in NYC make the same high school choices.

Data and Measures

Applications Data and Analytic Sample

Our analytic dataset consists of individual high school applications from 2014-15 matched to student demographic, residential location, achievement, and other information. Applications are from the main round of admissions when initial preferences were submitted and 92% of applicants were matched.[1] The matching algorithm is designed to be strategy-proof, meaning students are incentivized to reveal their true preferences (Abdulkadiroğlu, Pathak, & Roth, 2005). Students can list up to 12 choices. We used 2014-15 as large-scale informational interventions we conducted during the 2016-2018 cycles may have affected peer continuity and application similarity in participating schools (Corcoran et al, 2018; Cohodes et al., 2022).

Non-applications data include student race/ethnicity; gender; language spoken at home; disability status; residential census tract, elementary school zone and borough; 7th grade English Language Arts (ELA) and mathematics test scores; and 9th grade enrolled school. 7th grade scores are the ones used by academically selective high schools and are the most recent at the time of application. We used an average of ELA and math scores—each standardized to mean zero and standard deviation one—as a composite measure of achievement. If either test score was missing, we used the non-missing score.

Given known limitations of subsidized lunch eligibility as a measure of family income—especially in NYC, where many schools provide universal free meals—we assigned students an index based on the level of concentrated disadvantage in their census tract as a proxy for family income. Following Sampson, Raudenbush, and Earls (1997), we conducted a factor analysis combining six tract-level measures from the 2011-2015 American Community Survey 5-year estimates; this yielded a continuous index that we grouped into citywide quintiles.[2]

We excluded applicants from private, alternative, or special education schools, leaving 70,030 from 577 traditional and charter schools. 11.1% (7,775) attended a school that offered 9th grade, meaning they had the option to continue in their current school. (They were still required to apply and rank the school first). We retained these students as not all chose to remain in their school. As this group is more likely to attend 9th grade together and have similar applications, we calculated our outcomes with and without them. Descriptive statistics for the analytic sample are reported in Appendix Table 1.

Measuring Peer Continuity

We measure middle to high school peer continuity in two ways. The first is the share of student i's 8th grade application cohort that enrolled in their high school in 9th grade. The second is a binary variable equal to one when i is the *only* student from their middle school in their 9th grade class. These measures capture two dimensions of peer continuity, with the latter representing complete isolation from 8th grade peers. We experimented with several alternatives, including the share and count of students in i's 9th grade class that attended i's middle school in 8th grade. The findings were qualitatively very similar.

As an alternative conceptualization of peer continuity, we calculated the share of students in i's neighborhood that enrolled in the same high school as i and a binary variable equal to one when i is the only student from their neighborhood in their 9th grade class. Neighborhoods are defined using elementary school zones, based on current address.[3] This measure is of interest to the extent students in the same neighborhood know one another and are more likely to travel together to school; it is also aligned with prior work focused on neighborhoods (e.g., Burdick-Will, 2017; Lenhoff et al., 2020). The number of elementary zones in the sample (686) is larger than the number of middle schools (577), and contains fewer students, on average (101 vs. 121).

Measuring Choice Similarity

We measure choice similarity as the proportion of students in a reference group j who ranked student i's first choice school among their top three. We refer to this measure as *Top3*:

$$Top3_j = \frac{1}{n_j} \sum_{i=1}^{n_j} \left(\frac{1}{n_j - 1} \sum_{k \neq i} D_{ik} \right)$$

where n_j is the number of students in group j and D_{ik} equals one if the first-choice school on i's application is the first, second, or third choice on student k's application (and zero otherwise). In

our case, group *j* refers to a middle school cohort or neighborhood, but it can refer to any reference group.[4] While we considered more complex measures that incorporate more information about each application, *Top3* has desirable properties, is computationally simple, and is easy to interpret. It is also strongly related to peer continuity, as we show later. In 2014-15, roughly half of all applicants matched to their first choice, and 75% were matched to one of their top three.

In addition to *Top3*, we calculated for each student the proportion of students in reference group *j* who had *identical* top three choices, in the same rank order. This special case could arise, for instance, when students have identical preferences, when friends coordinate applications, or when students follow the same set of recommendations from a teacher or guidance counselor.

Importantly, NYC 8th graders apply to *programs* rather than *schools*; in our sample, students applied to 727 programs in 427 high schools citywide. Some schools offer more than one program, although most (about 70%) offer just one. We focus on similarity in *school* choices rather than *programs* since these align with our notion of middle to high school peer continuity. However, we also calculated similarity using programs, since these are what students list on their application. Because programs are a subset of schools, program choice similarity is always less than or equal that for schools.

Methods

We report means for our peer continuity and application similarity measures for the full sample and for student subgroups of interest, including race/ethnicity, levels of neighborhood disadvantage, and prior achievement. These describe the extent to which groups differ, on average, in peer continuity in their transition to high school and in their propensity to share specific school choices with others in their middle school or neighborhood.

While levels and group differences in these measures are of primary interest, we also examine the extent to which differences in peer continuity are "explained" by differences in application similarity (versus differences in matches or enrollment behavior). We do this in three ways. First, we look descriptively at competing reasons for low peer continuity: a lack in overlap in choices versus other factors. Second, we re-calculate our peer continuity measures assuming every student enrolled in their first-choice school. This removes any influence of match rates and focuses on top choices. Third, we use regression to show how predicted group differences in peer continuity change adjusting for differences in application similarity.

After demonstrating the importance of choice similarity for peer continuity, we use the following regression to identify student and other contextual factors that are systematically associated with peer continuity:

$$Continuity_{is} = \alpha + \beta' f(Top3_i) + \gamma' \boldsymbol{X}_i + \theta' \boldsymbol{S}_i + \delta_s + u_i$$

where $\boldsymbol{X_i}$ is a vector of student-level predictors described below, $\boldsymbol{S_i}$ is a vector of measures capturing the local supply of school options, and δ_s represents fixed effects for the 32 Community School Districts (CSDs) in NYC.

We report estimated coefficients from the full model, but also show how successively adjusting for explanatory variables affects predicted gaps by race or neighborhood disadvantage. The first model includes only a quadratic function of prior achievement; the second adds the school supply measures $\boldsymbol{S_i}$ (described later), the third adds student covariates $\boldsymbol{X_i}$ and CSD fixed effects; and the fourth adds the *Top3* similarity measure. (We exclude *Top3* from the first three regressions since it has high explanatory power and reflects the influence of other covariates, such as prior achievement and school supply). $\boldsymbol{X_i}$ includes gender, language spoken at home, foreign born status, disability status, 8th grade cohort size (quadratic), average demand at *i*'s top three choices

(quadratic in applications per seat), the proportion of i's cohort who live in their elementary zone, an indicator for students who were the only student in their middle school from their elementary zone (capturing existing isolation), and separate indicators for charter school students, students with the option to continue in their school, and students who enroll in a specialized high school or the LaGuardia Performing Arts HS.[5] The average demand variable is included assuming that—all else equal—students are less likely to be matched with high demand schools. All regressions were estimated using ordinary least squares, with standard errors adjusted for clustering at the middle school level.

Results

Peer Continuity

Table 1 reports student-level means for peer continuity from the same middle school (first two columns) and from the same neighborhood (second two columns). Focusing first on continuity from middle schools, we find the mean applicant enrolled in a 9th grade class with roughly 1 in 8 (12.3%) of their middle school cohort. This overstates peer continuity for the typical student, however, as the median applicant enrolled in a 9th grade class with only 3.3% of their middle school cohort, and nearly 1 in 5 applicants (18.2%) were the *only* student in their 9th grade class who attended their middle school. When excluding students with the opportunity to remain in their school, overall peer continuity is lower, as expected (see Appendix Table 2).

There are notable differences in peer continuity and isolation by race, neighborhood disadvantage, language spoken at home, and prior achievement. Students who identified as White, lived in the lowest poverty Census tracts, spoke English at home, and scored higher on 7th grade tests enrolled in high schools with a larger share of their middle school cohort. Students who

identified as Black or Hispanic, lived in the highest poverty tracts, spoke another language at home, and scored lower on tests experienced much less peer continuity. For example, the mean Black and Hispanic applicant enrolled in high schools with 9.9 and 11.2% of their middle school cohorts, respectively; the share for White applicants was nearly twice as high (20.2%). The share was only marginally higher for Asian applicants (12.4%), though Asian applicants were also among the least isolated based on the singleton measure.

Remarkably, 27% of Black and 20% of Hispanic applicants were the *only* student in their 9th grade class who attended their middle school, as compared to 7% of White and 8% of Asian applicants. Similar gaps were observed by prior achievement and neighborhood poverty: 23% of applicants who scored in the bottom quintile on state tests were isolated from their middle school class in 9th grade, as compared to 11% of applicants in the top quintile. 29% of applicants living in the highest-poverty Census tracts were isolated from their middle school class, as compared to 7% in the lowest-poverty tracts.[6]

The second two columns of Table 1 measure peer continuity from neighborhoods, using elementary zones as a proxy. Group differences in neighborhood peer continuity mirror those for middle schools, although peer continuity overall tends to be lower by this measure. In part, this reflects prior sorting into middle schools: students are more likely to transition to high school with peers from their middle school than peers from their neighborhood. Black students were by far the most likely to be the only student from their neighborhood in their 9th grade class (35.0%) as compared with Hispanic (28.4%), White (15.3%), and Asian (15.1%) students.

We also calculated the percent of applicants who were *both* the only student from their middle school *and* the only student from their neighborhood in their 9th grade class (not shown).

Roughly 1 in 9 (10.9%) were so isolated, including 15.8% of Black students 12.0% of Hispanic students, 5.0% of Asian students, and 4.9% of White students.

Choice Similarity

Table 2 reports student-level means for choice similarity, using students from the same middle school as a reference group in the first two columns, and same neighborhood in the second two columns. The average student's first choice high school could be found among the top three of 21.5% of other students in their cohort. The median is again much lower (10.8%). Identical applications are rare in NYC, with the average student sharing top three school choices with only 4.5% of their same-school peers. The median share is zero; indeed, for 69% of students, *no* other student in their middle school shared their top three ranked choices.

Group differences in application similarity closely mirror patterns of peer continuity. Students who identified as White or Asian, lived in the lowest poverty Census tracts, or scored higher on state tests were much more likely to share top choices with others in their middle school than were students who identified as Black or Hispanic, lived in the highest poverty tracts, or had lower test scores. The mean *Top3* measures for White and Asian applicants were highest at 0.378 and 0.287, while Black and Hispanic applicants had the lowest similarity (0.146 and 0.176). Students living in the highest poverty neighborhoods were least likely to share top choices with others in their school (0.139) while those in the lowest poverty neighborhoods made the most similar choices (0.376). Students who scored in the top quintile were more than twice as likely to share top school choices (0.308) than those who scored in the bottom quintile (0.151). *Identical* top three choices were rare for any subgroup, but applicants who identified as White, lived in the lowest two quintiles of neighborhood poverty, scored in the top two quintiles or lived in Manhattan

or Staten Island were the most likely to share exact top choices. As with peer continuity, choice similarity is lower when excluding students with the option to continue (Appendix Table 3).

Appendix Table 4 reports the same statistics using *programs* rather than schools. These are worth noting, as students formally apply to programs, not schools. Because programs are a subset of schools, similarity is generally lower. Identical top three programs are extremely rare, suggesting students rarely coordinate their applications by listing the same ranked choices. Gaps in program similarity by race, prior achievement, and neighborhood disadvantage are roughly proportional to those in Table 2.

The last two columns of Table 2 measure application similarity within neighborhoods, again using elementary zones as a proxy. As with peer continuity, gaps in choice similarity are generally wider at the neighborhood level than at the school level.

The Link Between Choice Similarity and Peer Continuity

Results thus far reveal sizable group differences in peer continuity in the transition from middle to high school. Moreover, groups with high peer continuity are more likely to share top choices with others in their middle school or neighborhood. This observation reflects the natural link between student choices and the propensity to remain peers in a choice-based assignment system. Figure 1 displays the full bivariate relationship between peer continuity and *Top3* application similarity in our sample. Not surprisingly, this relationship is strong, especially for the isolation measure.

These findings prompt two questions. First, to what extent are group differences in peer continuity explained by differences in choice similarity, as opposed to differences in placements

and enrollment conditional on choices? Second, what student and other contextual factors predict peer choice similarity and, by extension, peer continuity?

Table 3 addresses the first question in two ways. First, we divide members of i's cohort who did *not* enroll in their high school into those who listed that high school anywhere on their application but did not match/enroll there (column B) and those who did not list that school anywhere on their application (column C). As the top row shows, the prevailing reason students do *not* remain peers in high school is a lack of overlap in choices. For the average student, 83% of their cohort who did *not* enroll in their high school did not list that school anywhere on their application. This share is higher for subgroups with low peer continuity (e.g., Black and Hispanic students and those living in high-poverty neighborhoods). Low peer continuity thus appears to be driven by dissimilar choices rather than lower match rates given similar choices.

Second, we re-calculated mean peer continuity and isolation assuming all students enrolled in their first-choice school (rightmost columns of Table 3). Peer continuity would be higher overall if students enrolled in their first choice, but the difference is small, especially for the share measure (0.130 vs. 0.123 for the full sample). About 1 in 6 students (16.5%) would be the only student in their 9th grade class from their middle school, compared to 18.2% in practice. Gaps in peer continuity by race, neighborhood disadvantage, and achievement are generally *higher*, not lower, under this scenario. Interestingly, White and Asian students end up enrolling in schools where they experience less peer continuity than "desired" (as evidenced by their first choices) while Black and Hispanic students enroll in schools where they experience more. A similar pattern holds by quintiles of neighborhood disadvantage and achievement.

Finally, we used regression to examine the extent to which gaps in peer continuity and isolation are "explained" by application similarity. (Similarity enters the regression as a quadratic,

15

as suggested by Figure 1). The first two panels in Figures 2-3 show how raw gaps by race/ethnicity and neighborhood poverty, respectively, are reduced when adjusting for differences in similarity. Gaps in the continuous measure of peer continuity largely disappear when adjusting for differences in application similarity. For example, assuming all students have mean *Top3* similarity, Black-White and Hispanic-White gaps in peer continuity become small and statistically insignificant. Gaps in isolation are cut in half but remain sizable at 10.4 and 4.7 percentage points (ppts).

Other Predictors of Peer Continuity

Adjusting for choice similarity has intuitively large effects on gaps in peer continuity since students who apply to the same schools are—all else equal—more likely to attend together. This implies that individual and contextual factors that lead students to make more or less similar choices have a strong effect on peer continuity. For the next three panels in Figures 2-3, we remove *Top3* from the regression and consider other predictors of peer continuity. All coefficients and standard errors are reported in Appendix Tables 5-6.

In the third panel, we adjust only for 7th grade test scores, which influence both where students apply and their likelihood of admission to those schools. Perhaps surprisingly, this has little effect on predicted gaps by race and neighborhood poverty, and the marginal effect of a one standard deviation increase in achievement on peer continuity is small. Raw gaps in peer continuity observed in Table 1 do not appear to be strongly related to prior achievement.

In the fourth panel, we further adjust for differences in local school supply, measured using the number of schools, mean 9th grade cohort size, and mean demand (applications per seat) for schools within 3.5 miles of student i's census tract.[7] (Each enters the regression as a quadratic). In this case, assuming students have equal school supply by these measures has a large effect on

16

predicted gaps in peer continuity, cutting gaps by half or more. For example, a one standard deviation increase in the number of high schools within 3.5 miles (about 38 schools) is associated with a 4.8 percentage point increase in the likelihood of being isolated in 9th grade. This suggests the local supply of school options has an important effect on students' propensity to make similar choices and experience peer continuity.

In the fifth panel, we adjust for the full set of student and other covariates described earlier, and report predicted margins at the sample means of these covariates. (For the margins by race we hold the distribution across quintiles of neighborhood disadvantage constant, and vice versa). Doing so further reduces gaps in peer continuity by race and neighborhood poverty, though not to the same extent as adjusting for measures of school supply.

Regression coefficients in Appendix Tables 5-6 point to other factors associated with peer continuity. For example, students with the option to remain in their school experienced substantially greater peer continuity, attending 9th grade with a 41 ppt higher share of their cohort ($p=0.026$), and had a 12 ppt lower likelihood of isolation ($p=0.011$). Students who enrolled in a specialized high school attended 9th grade with 8-10 ppt fewer middle school peers, on average ($p<0.05$). Students who attended a middle school with fewer own-neighborhood peers experienced less peer continuity, and students who were isolated in middle school were, on average, 5.5 ppt ($p=0.006$) more likely to be isolated in 9th grade. Students from larger cohorts were less likely to be isolated in 9th grade, and those who listed high-demand schools in their top three were more so.

The rightmost panel of Figures 2-3 brings the *Top3* measure back to the regression and shows that adjusting for similarity—together with the other covariates—renders most gaps in peer continuity insignificant, suggesting these residual differences are captured by "unexplained"

choice dissimilarity. A deeper understanding of contextual factors that lead to dissimilarity in school choices would be a productive area for future research.

Discussion

This paper documents middle to high school peer continuity in the context of a large urban school district with school choice and examines its variability across student populations. We find peer continuity from middle to high school to be quite low in NYC, with large disparities by race, neighborhood disadvantage, and prior achievement. Often, NYC students transition from middle to high school with *none* of their 8th grade peers.

We also explored potential explanations for disparities in peer continuity. In NYC, group differences appear to be driven largely by *choices*, not differences in the probability of admission or enrollment behavior; peer continuity would vary by social background even if all students received their top choice.

It is less clear why peer choice similarity varies by social background, but the answer appears related to features of the local choice landscape. In NYC, traditionally disadvantaged groups have more (and smaller) school options within a short commuting distance from home (Corcoran, 2018), creating more opportunities for separation. NYC also has a middle school choice process which clusters students with similar interests and academic performance. This process may have its own effects on sorting, leading to later differences in high school choice similarity. Our results suggest that proximate school supply is important in statistically explaining gaps in peer continuity.

Demand-side factors may also play a role. Access to and use of information vary across contexts and by socioeconomic background (Corcoran & Jennings, 2019), as do school counseling

practices related to school choice (Sattin-Bajaj et al., 2018). These may produce systematic differences in choice coherence and coordination within middle schools. Preferences for peer continuity may also vary, and in some cases, families may purposefully seek out a different peer group than the one in their current school or neighborhood. Indeed, some research has found disadvantaged students are more likely to benefit from the "fresh start" that changes in peer contexts provide (Weiss & Bearman, 2007). In our data, Black and Hispanic students would have experienced even less peer continuity had they received their first choice, while White and Asian students would have experienced more. (Of course, first choice schools differ in other respects, such as academic performance and selectivity).

Our findings provide little support for coordination between same-school peers in high school applications, particularly among traditionally disadvantaged populations. While perhaps surprising, it is consistent with results of a student survey we conducted in 29 high-poverty NYC middle schools in 2015.[8] In that survey, friends' intentions to attend a school ranked 16th out of 18 school characteristics in terms of importance. Friends ranked lowest among interpersonal influences on school choices, behind parents, counselors, teachers, and siblings. Notably, Sartain and Barrow (2022) found very consistent results in their survey of Chicago high school applicants.

Because school districts control the enrollment policy, the number and variety of options available, and the conditions under which students make school choices, it is worthwhile to understand whether and how choice policies contribute to divergent childhood social contexts. Future research can help fill this gap, in several respects. First, we need to know more about the consequences of variation in peer continuity like those documented here. Recent evidence shows that the disruption of friendships and peer networks during school transitions can lead to social isolation and academic difficulties (Benner, 2011; Benner et al., 2017; Stein, Burdick-Will, &

Gregg, 2021; Felmlee et al., 2018). The extent to which these effects are unevenly distributed across groups is crucial for understanding the full impacts of school choice systems for students and their communities.

Second, better evidence is needed on factors explaining variability in choice similarity within and between districts. This could include research with quasi-experimental designs that takes advantage of variation across locations and/or over time to identify the effects of school choice systems that affect choice similarity. New data collections from students and families on the influence and importance of peers in school choices would also be valuable.

The expansion of school choice has been concentrated in historically disadvantaged communities, and we find that even within those communities, disadvantaged families experience far lower peer continuity than more advantaged families. The effects of choice systems on peer continuity, and any cascading effects on students and their communities, are thus likely to be highly unequal. More research is necessary to understand how peer continuity is produced, and how it matters for social and academic outcomes.

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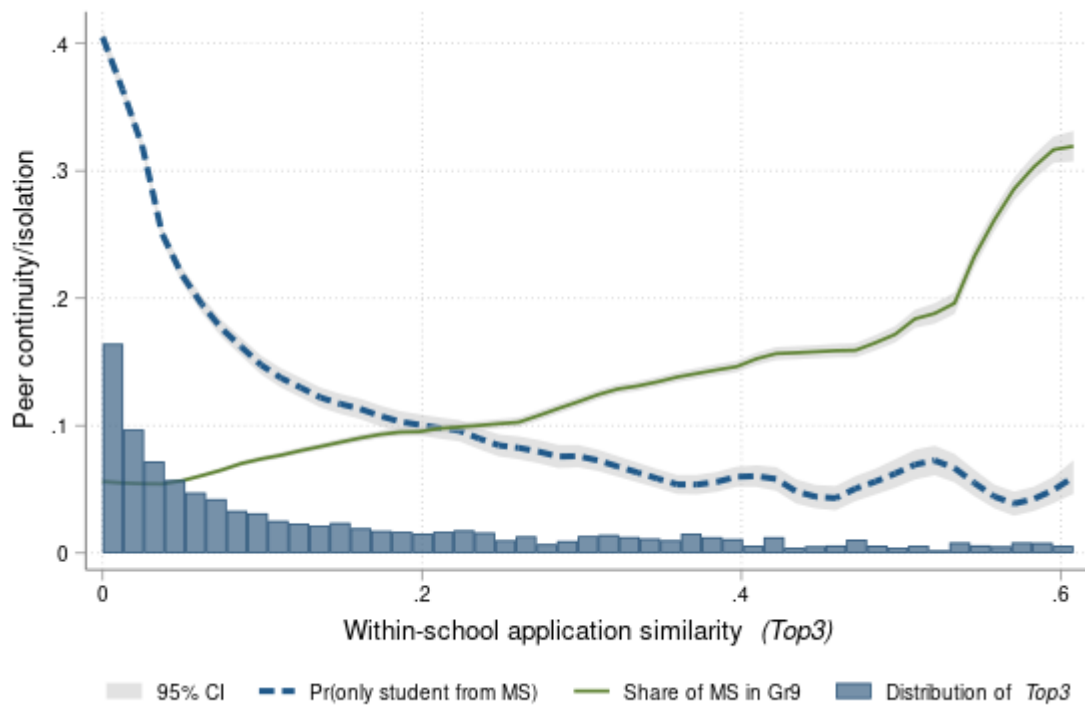
Figure 1: Bivariate Association Between Peer Continuity/Isolation and Choice Similarity

Note: Authors' calculations using applications data provided by the Research Alliance for New York City Schools. See text for variable definitions. Includes the full sample of applicants, including those with the option to remain in their school. Local polynomial plots and histogram only shown for values of *Top3* < 0.608 (the 90th percentile).
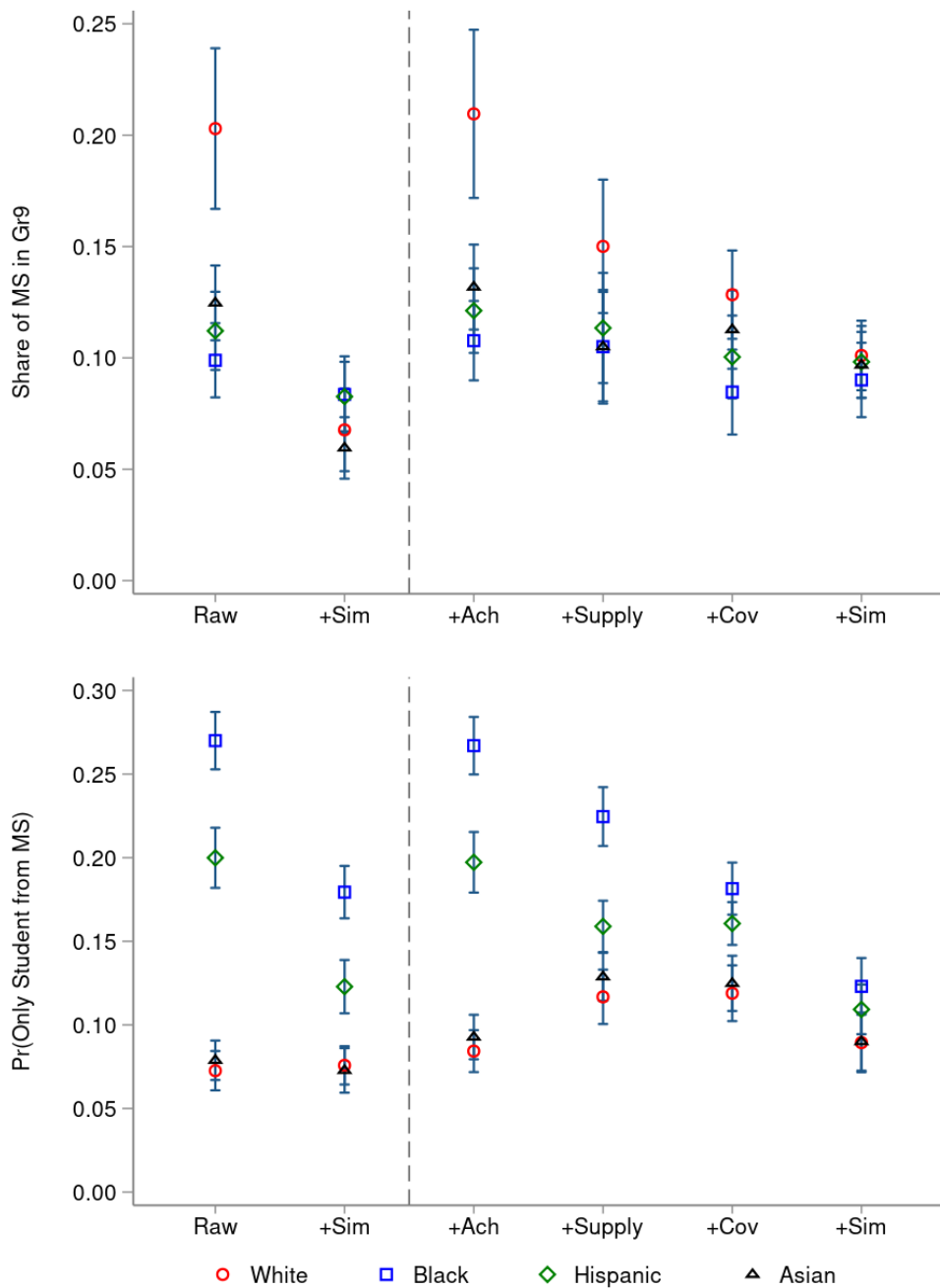
Figure 2: Regression-Adjusted Predictions of Peer Continuity/Isolation by Race/Ethnicity

Note: Authors' calculations using applications data provided by the Research Alliance for New York City Schools. "Raw" are the unadjusted mean values of peer continuity/isolation by subgroup (from Table 1). "+Sim" (second column) are predicted margins adjusting only for the *Top3* similarity measure; "+Ach" reflects the addition of a quadratic in prior student achievement to the regression (*Top3* is omitted); "+Supply" reflects the addition of proximate school supply variables; "+Cov" reflects the addition of other covariates, including CSD fixed effects; "+Sim" (last column) reintroduces *Top3* to the regression. 95% prediction intervals are shown, where standard errors are adjusted for clustering by middle school. See Appendix Table 5 for estimated regression coefficients.
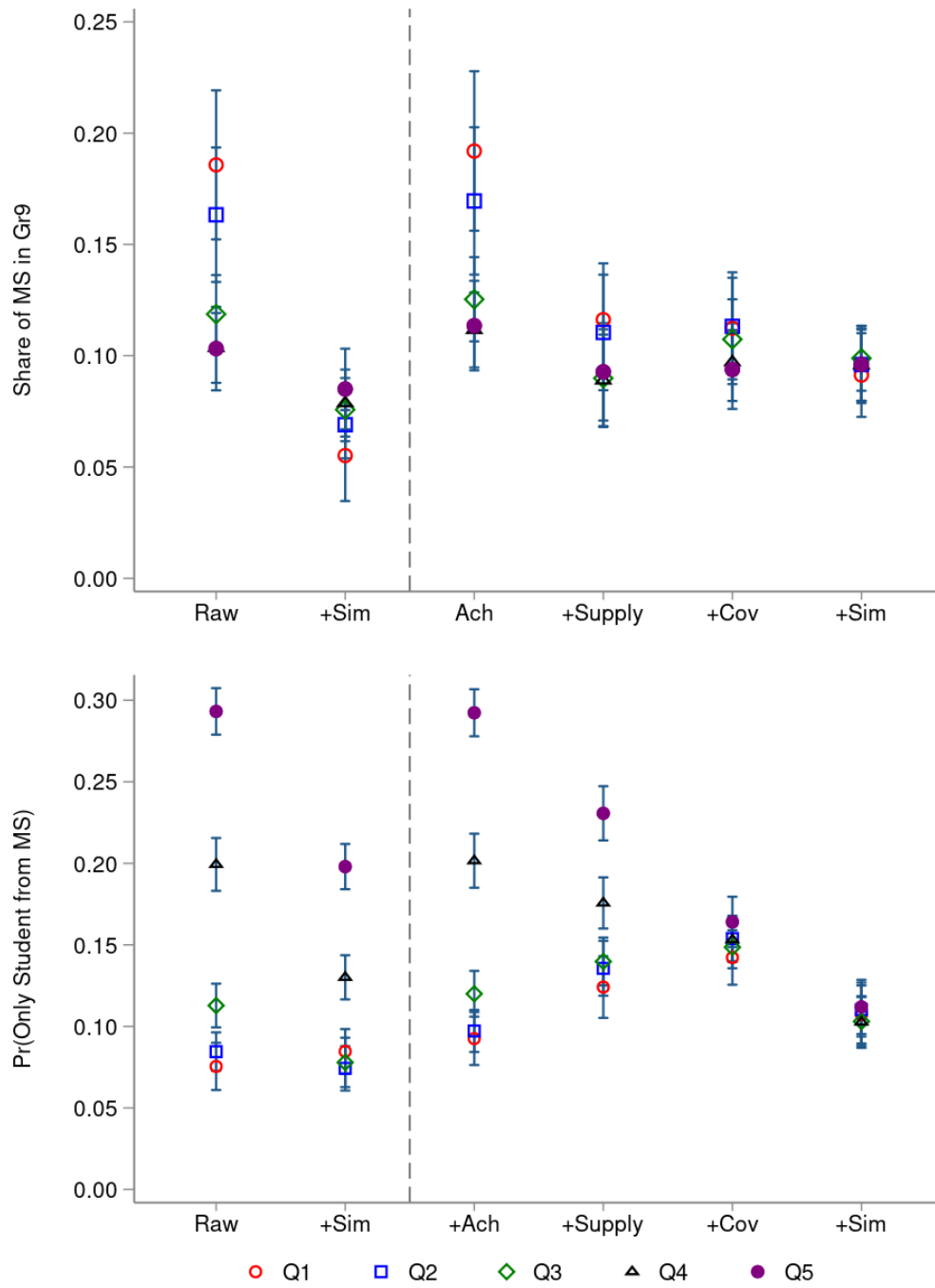
Figure 3: Regression-Adjusted Predictions of Peer Continuity/Isolation: By Tract Disadvantage

Note: See notes to Figure 2. See Appendix Table 6 for estimated regression coefficients.

Table 1: Middle to High School Peer Continuity

	Middle School Peers		Neighborhood Peers	
	Mean share of MS in 9th	Only student from MS	Mean share of ES zone in 9th	Only student from ES zone
All students	0.123	0.182	0.073	0.262
White	0.202	0.074	0.166	0.153
Black	0.099	0.271	0.033	0.350
Hispanic	0.112	0.200	0.055	0.284
Asian	0.124	0.079	0.101	0.151
English at home	0.128	0.210	0.069	0.294
Spanish at home	0.109	0.182	0.053	0.265
Chinese at home	0.125	0.057	0.115	0.124
Neighborhood disadv:				
Lowest	0.185	0.074	0.157	0.173
Second	0.163	0.083	0.139	0.158
Third	0.118	0.112	0.084	0.198
Fourth	0.103	0.198	0.047	0.290
Highest	0.103	0.292	0.025	0.360
Achievement:				
Lowest	0.093	0.230	0.053	0.292
Second	0.108	0.217	0.063	0.282
Third	0.130	0.187	0.076	0.269
Fourth	0.154	0.161	0.091	0.245
Highest	0.135	0.109	0.082	0.210
Borough:				
Manhattan	0.126	0.244	0.025	0.384
Brooklyn	0.111	0.195	0.068	0.274
Queens	0.115	0.095	0.085	0.173
Staten Island	0.328	0.027	0.306	0.052
Bronx	0.094	0.288	0.027	0.350

Note: Authors' calculations using applications data provided by the Research Alliance for New York City Schools. The total number of students in an 8th grade cohort and elementary zone are based on all applicants, including those who had the opportunity to remain in their middle school.

Table 2: Within-School and Neighborhood Application Similarity

	Within-School Similarity		Within-ES Zone Similarity	
	Top3: schools	Identical top 3 schools	*Top3*: schools	Identical top 3 schools
All students	0.215	0.045	0.162	0.024
White	0.378	0.109	0.334	0.089
Black	0.146	0.023	0.089	0.005
Hispanic	0.176	0.040	0.114	0.012
Asian	0.287	0.038	0.252	0.026
English at home	0.210	0.050	0.153	0.028
Spanish at home	0.177	0.039	0.114	0.010
Chinese at home	0.327	0.032	0.296	0.030
Neighborhood disadv:				
Lowest	0.376	0.097	0.340	0.081
Second	0.315	0.075	0.282	0.060
Third	0.230	0.033	0.194	0.017
Fourth	0.173	0.032	0.116	0.007
Highest	0.139	0.031	0.063	0.004
Achievement:				
Lowest	0.151	0.030	0.106	0.013
Second	0.175	0.034	0.127	0.016
Third	0.205	0.046	0.153	0.024
Fourth	0.246	0.055	0.188	0.031
Highest	0.308	0.059	0.246	0.036
Borough:				
Manhattan	0.219	0.058	0.105	0.004
Brooklyn	0.211	0.026	0.169	0.013
Queens	0.222	0.031	0.188	0.017
Staten Island	0.518	0.227	0.496	0.215
Bronx	0.126	0.032	0.058	0.007

Note: Authors' calculations using applications data provided by the Research Alliance for New York City Schools. Sample includes all 8th grade students attending a NYC public middle school, including charter schools, who applied in the main round of admissions in 2014-15. Reported values in the first and third columns are averages of the *Top3* score for students listed in the leftmost column. Values in the second and fourth columns are the mean share with identical top three choices for students listed in the leftmost column.

Table 3: Choices as an Explanation for Differences in Peer Continuity

	(A) Mean share of MS in 9th	(B) Mean share of MS chose but not enrolled	(C) Mean share of MS did not choose	(C)/ [(B)+(C)]	Assuming all get 1st choice Mean share of MS in 9th	Only student from MS
All students	0.123	0.151	0.725	0.828	0.130	0.165
White	0.202	0.225	0.573	0.718	0.243	0.061
Black	0.099	0.113	0.788	0.875	0.085	0.252
Hispanic	0.112	0.134	0.754	0.849	0.108	0.182
Asian	0.124	0.194	0.682	0.778	0.163	0.064
Neighborhood disadv:						
Lowest	0.185	0.220	0.595	0.730	0.238	0.064
Second	0.163	0.210	0.628	0.750	0.193	0.068
Third	0.118	0.177	0.705	0.799	0.127	0.098
Fourth	0.103	0.135	0.762	0.850	0.100	0.177
Highest	0.103	0.098	0.799	0.891	0.090	0.272
Achievement						
Lowest	0.093	0.125	0.782	0.862	0.087	0.217
Second	0.108	0.134	0.758	0.850	0.102	0.198
Third	0.130	0.148	0.722	0.830	0.123	0.173
Fourth	0.154	0.176	0.670	0.792	0.150	0.144
Highest	0.135	0.178	0.686	0.794	0.194	0.082

Notes: columns (A)-(C) sum to 100. Column (A) is carried over from Table 1. Column (B) is the mean share of student *i*'s middle school who listed *i*'s enrolled school on their application but did not enroll there (i.e., they were matched to a higher or lower choice). Column (C) is the mean share of student *i*'s middle school who did not list *i*'s enrolled school on their application (or who did and were matched there but did not enroll—a small share of students). The last two columns repeat the calculations from Table 1 but assume every student enrolled in their first-choice school.

Appendix Figure 1: Number of high schools within 3.5 or 5 miles from residential census tract, by student race/ethnicity and neighborhood disadvantage
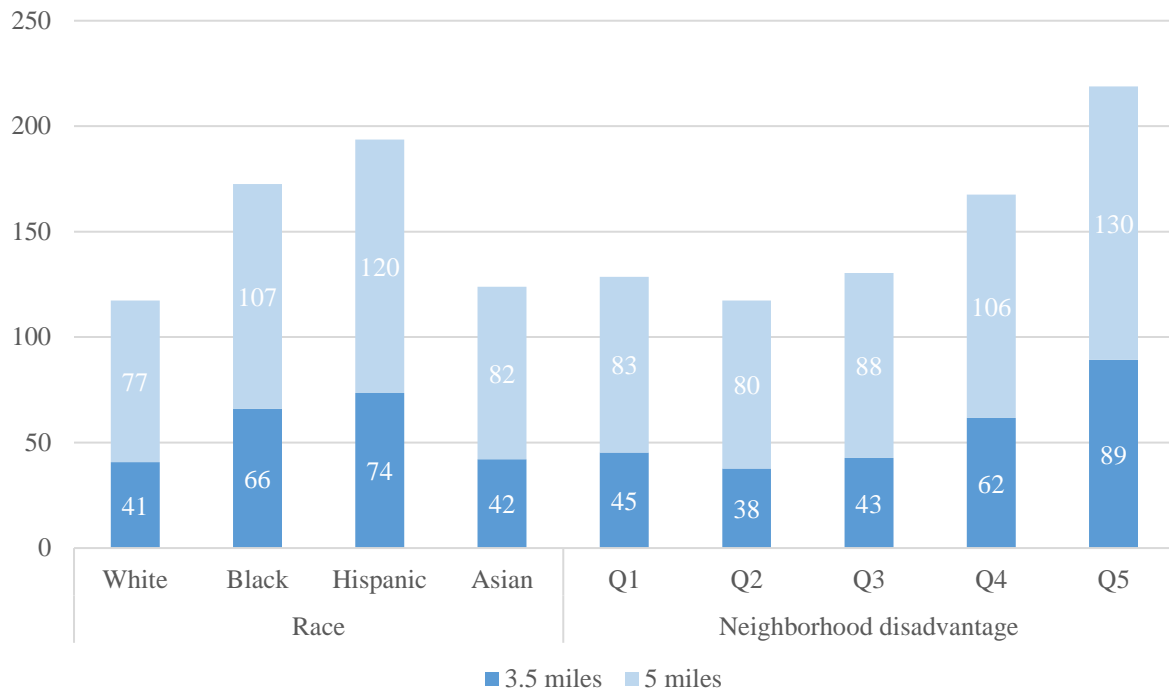
Appendix Figure 2: Mean size of high schools within 3.5 or 5 miles from residential census tract, by student race/ethnicity and neighborhood disadvantage
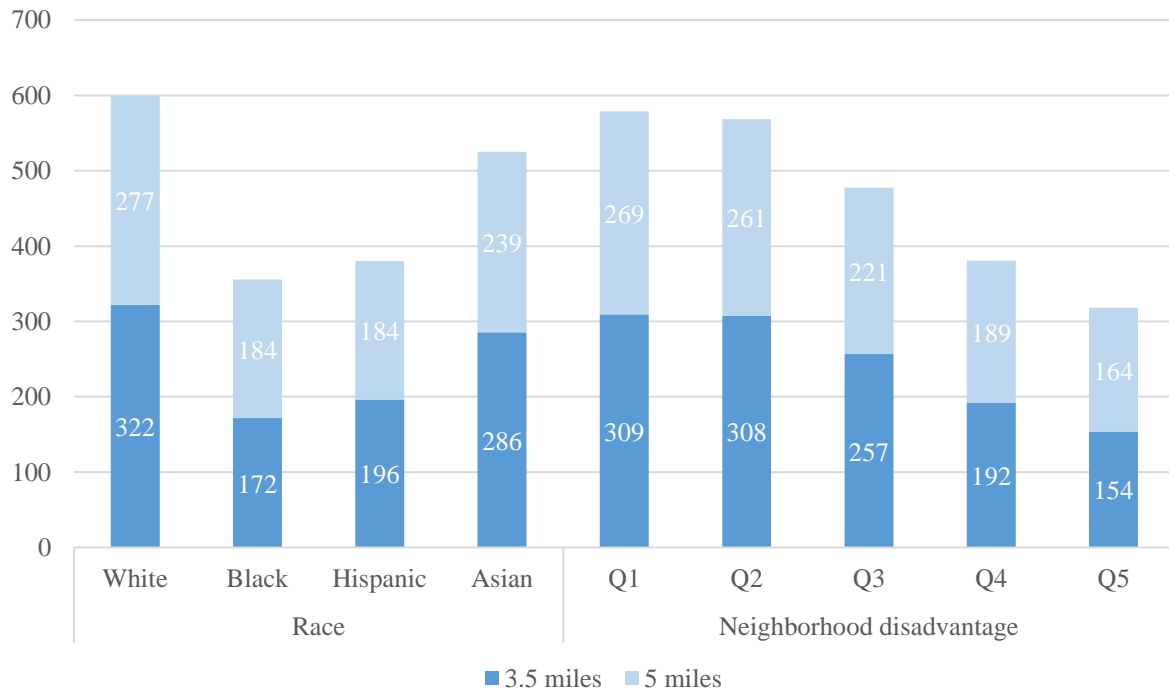
Appendix Table 1: Means of Student Variables

	Analytic sample	Excluding option to remain
White	0.146	0.148
Black	0.276	0.267
Hispanic	0.403	0.404
Asian	0.159	0.166
Female	0.495	0.491
English at home	0.561	0.548
Spanish at home	0.251	0.254
Chinese at home	0.061	0.066
SWD	0.183	0.185
Charter	0.040	0.029
Foreign born	0.186	0.194
Neighborhood disadv:		
Lowest	0.098	0.099
Second	0.159	0.163
Third	0.193	0.201
Fourth	0.230	0.230
Highest	0.320	0.306
Achievement:		
Lowest	0.197	0.203
Second	0.201	0.203
Third	0.200	0.199
Fourth	0.201	0.196
Highest	0.201	0.198
Borough:		
Manhattan	0.129	0.118
Brooklyn	0.303	0.312
Queens	0.289	0.294
Staten Island	0.061	0.066
Bronx	0.218	0.211
Specialized HS	0.051	0.052
LaGuardia HS	0.009	0.009
Option to remain	0.111	0.000
Only student in MS from ES zone	0.132	0.116
Prop. students in MS from ES zone	0.164	0.171
9th grade class size	335.9	354.0
Avg demand, top 3 choices	14.8	14.9

Notes: Analytic sample includes all 8th grade students attending a NYC public middle school, including charter schools but excluding alternative and special education schools, who applied in the main round of admissions in 2014-15. N=70,030 for the analytic sample and N=62,255 excluding students with the option to remain.

Appendix Table 2: Middle to High School Peer Continuity (excluding option to remain)

	Middle School Peers		Neighborhood Peers	
	Mean share of MS in 9th	Only student from MS	Mean share of ES zone in 9th	Only student from ES zone
All students	0.081	0.183	0.074	0.260
White	0.170	0.073	0.168	0.151
Black	0.046	0.275	0.034	0.346
Hispanic	0.062	0.204	0.054	0.288
Asian	0.102	0.079	0.102	0.147
English at home	0.080	0.212	0.071	0.290
Spanish at home	0.061	0.186	0.052	0.271
Chinese at home	0.117	0.056	0.115	0.123
Neighborhood disadv:				
Lowest	0.156	0.072	0.164	0.172
Second	0.136	0.083	0.137	0.155
Third	0.088	0.109	0.083	0.194
Fourth	0.058	0.199	0.048	0.288
Highest	0.040	0.305	0.024	0.366
Achievement:				
Lowest	0.061	0.229	0.053	0.292
Second	0.069	0.218	0.064	0.280
Third	0.083	0.188	0.078	0.266
Fourth	0.097	0.163	0.094	0.243
Highest	0.099	0.104	0.084	0.203
Borough:				
Manhattan	0.043	0.255	0.023	0.391
Brooklyn	0.081	0.192	0.071	0.267
Queens	0.081	0.094	0.083	0.172
Staten Island	0.318	0.026	0.314	0.049
Bronx	0.028	0.301	0.017	0.364

Note: See notes to Table 1. Means calculated for this table exclude students with option to remain in their same school for 9th grade.

Appendix Table 3: Within-School and Neighborhood Application Similarity (excluding option to remain)

	Within-School Similarity		Within-ES Zone Similarity	
	Top3: schools	Identical top 3 schools	*Top3*: schools	Identical top 3 schools
All students	0.191	0.024	0.167	0.023
White	0.363	0.090	0.346	0.092
Black	0.118	0.005	0.092	0.004
Hispanic	0.142	0.012	0.116	0.010
Asian	0.275	0.024	0.257	0.026
English at home	0.183	0.028	0.160	0.028
Spanish at home	0.143	0.011	0.115	0.008
Chinese at home	0.326	0.028	0.298	0.029
Neighborhood disadv:				
Lowest	0.364	0.079	0.354	0.085
Second	0.300	0.059	0.287	0.058
Third	0.212	0.015	0.196	0.015
Fourth	0.147	0.008	0.120	0.006
Highest	0.097	0.004	0.063	0.003
Achievement:				
Lowest	0.130	0.014	0.108	0.015
Second	0.151	0.016	0.130	0.023
Third	0.180	0.024	0.159	0.032
Fourth	0.218	0.030	0.198	0.032
Highest	0.290	0.038	0.258	0.038
Borough:				
Manhattan	0.171	0.005	0.110	0.002
Brooklyn	0.200	0.014	0.177	0.013
Queens	0.201	0.013	0.189	0.014
Staten Island	0.514	0.226	0.507	0.222
Bronx	0.075	0.002	0.049	0.001

Note: See notes to Table 2. Means calculated for this table exclude students with option to remain in their same school for 9th grade.

Appendix Table 4: Within-School and Neighborhood Application Similarity (using *program codes*)

	Within-School Similarity		Within-ES Zone Similarity	
	Top3: programs	Identical top 3 programs	*Top3:* programs	Identical top 3 programs
All students	0.156	0.029	0.106	0.009
White	0.266	0.051	0.223	0.032
Black	0.105	0.019	0.053	0.002
Hispanic	0.136	0.032	0.078	0.006
Asian	0.197	0.020	0.163	0.008
English at home	0.152	0.031	0.099	0.010
Spanish at home	0.136	0.032	0.078	0.005
Chinese at home	0.223	0.012	0.193	0.009
Neighborhood disadv:				
Lowest	0.265	0.045	0.229	0.027
Second	0.208	0.036	0.178	0.022
Third	0.159	0.022	0.124	0.007
Fourth	0.129	0.025	0.076	0.003
Highest	0.116	0.027	0.046	0.002
Achievement:				
Lowest	0.105	0.021	0.066	0.005
Second	0.122	0.024	0.079	0.006
Third	0.144	0.031	0.096	0.010
Fourth	0.176	0.036	0.121	0.012
Highest	0.241	0.033	0.178	0.011
Borough:				
Manhattan	0.213	0.055	0.102	0.004
Brooklyn	0.155	0.018	0.116	0.005
Queens	0.143	0.020	0.114	0.006
Staten Island	0.245	0.064	0.226	0.058
Bronx	0.118	0.031	0.052	0.007

Note: See notes to Table 2. This table calculates application similarity using program codes rather than schools.

Appendix Table 5: Regressions for Peer Continuity/Isolation and Effects on Gaps by Race

	(1) Share	(2) Share	(3) Share	(4) Share	(5) Share	(6) Share	(7) Only	(8) Only	(9) Only	(10) Only	(11) Only	(12) Only
Black	-0.104***	0.016	-0.102***	-0.045***	-0.044***	-0.011*	0.197***	0.104***	0.183***	0.108***	0.063***	0.034***
	(0.019)	(0.011)	(0.019)	(0.010)	(0.006)	(0.004)	(0.010)	(0.009)	(0.010)	(0.009)	(0.007)	(0.007)
Hispanic	-0.091***	0.015	-0.088***	-0.037***	-0.028***	-0.003	0.127***	0.047***	0.113***	0.042***	0.042***	0.020**
	(0.017)	(0.010)	(0.017)	(0.008)	(0.005)	(0.004)	(0.010)	(0.008)	(0.009)	(0.007)	(0.007)	(0.006)
Asian	-0.078***	-0.008	-0.078***	-0.045***	-0.016**	-0.004	0.006	-0.003	0.008	0.012	0.006	0.001
	(0.017)	(0.008)	(0.017)	(0.009)	(0.006)	(0.004)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)
Top3		-0.049				0.065		-1.092***				-0.985***
		(0.069)				(0.041)		(0.042)				(0.043)
Top3 (sq)		0.770***				0.428***		0.940***				0.863***
		(0.114)				(0.069)		(0.052)				(0.052)
Math + ELA			0.007	0.007	0.008***	-0.001			-0.018***	-0.011***	-0.013***	-0.008**
			(0.004)	(0.004)	(0.002)	(0.002)			(0.003)	(0.003)	(0.003)	(0.002)
Math + ELA (sq)			-0.010***	-0.009***	-0.002*	-0.004***			-0.002	-0.004**	-0.004**	-0.003*
			(0.002)	(0.002)	(0.001)	(0.001)			(0.002)	(0.002)	(0.001)	(0.001)
schools within 3.5				-0.001	-0.001*	-0.001				0.001*	0.001	0.001*
				(0.001)	(0.001)	(0.000)				(0.001)	(0.000)	(0.000)
schools within 3.5 (sq)				0.000	0.000	0.000				0.000	-0.000	-0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
mean size 3.5				-0.001**	-0.000	0.000				-0.001***	-0.000**	0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
mean size 3.5 (sq)				0.000***	0.000*	-0.000				0.000***	0.000**	-0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
mean demand 3.5				0.000	-0.001	0.007				-0.017*	-0.004	-0.009
				(0.010)	(0.008)	(0.007)				(0.008)	(0.007)	(0.006)
mean demand 3.5 (sq)				0.000	0.000	-0.000				0.001*	0.000	0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)

District 2	0.057	0.014	-0.006	-0.057**	-0.002	-0.004
	(0.071)	(0.035)	(0.018)	(0.017)	(0.027)	(0.025)
Female		-0.003	0.002		0.008*	0.002
		(0.002)	(0.001)		(0.003)	(0.003)
Spanish at home		0.007*	0.002		-0.025***	-0.017**
		(0.003)	(0.002)		(0.005)	(0.005)
Chinese at home		0.001	0.002		0.003	0.015*
		(0.008)	(0.005)		(0.007)	(0.007)
Foreign born		-0.004	-0.003		-0.014***	-0.014***
		(0.002)	(0.002)		(0.004)	(0.004)
SWD		-0.002	-0.002		0.004	0.005
		(0.002)	(0.002)		(0.005)	(0.004)
Disadvantage Q2		0.001	0.005		0.012*	0.003
		(0.007)	(0.004)		(0.005)	(0.005)
Disadvantage Q3		-0.005	0.008		0.006	-0.004
		(0.008)	(0.006)		(0.006)	(0.006)
Disadvantage Q4		-0.015	0.004		0.011	-0.005
		(0.008)	(0.007)		(0.007)	(0.007)
Disadvantage Q5		-0.019*	0.005		0.022**	0.005
		(0.009)	(0.007)		(0.008)	(0.008)
Charter		-0.031	0.022		0.020	0.001
		(0.025)	(0.020)		(0.020)	(0.018)
Option to continue		0.409***	0.284***		-0.117***	-0.067***
		(0.026)	(0.018)		(0.011)	(0.011)
SPHS		-0.080***	-0.074***		0.011	0.006
		(0.018)	(0.015)		(0.010)	(0.009)
LGA		-0.094***	-0.079***		-0.001	-0.009
		(0.021)	(0.018)		(0.018)	(0.016)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grade 8 enrl					-0.001 (0.009)	-0.002 (0.006)					-0.099*** (0.007)	-0.097*** (0.007)
Grade 8 enrl (sq)					-0.000 (0.001)	-0.000 (0.001)					0.010*** (0.001)	0.009*** (0.001)
%MS from ELZ					0.040** (0.014)	0.035** (0.011)					-0.015 (0.014)	-0.004 (0.013)
Only from ELZ					-0.004 (0.004)	0.001 (0.003)					0.055*** (0.006)	0.046*** (0.006)
Nonstandard ELZ					0.001 (0.005)	0.003 (0.004)					0.009 (0.006)	0.006 (0.005)
Demand - top 3					-0.006*** (0.001)	-0.004*** (0.001)					0.004*** (0.001)	0.005*** (0.001)
Demand (sq)					0.000*** (0.000)	0.000*** (0.000)					-0.000*** (0.000)	-0.000*** (0.000)
Constant	0.203*** (0.018)	0.042*** (0.010)	0.210*** (0.019)	0.281*** (0.056)	0.233*** (0.032)	0.050 (0.028)	0.073*** (0.006)	0.268*** (0.010)	0.084*** (0.006)	0.277*** (0.031)	0.265*** (0.028)	0.384*** (0.026)
Observations	69463	69463	69463	69463	69462	69462	69463	69463	69463	69463	69462	69462

Note: selected coefficients from separate regression models in which the dependent variable is the fraction of student i's 8th grade class enrolled in their high school (columns 1-6) or a binary variable equal to one if the student i was the only student from their 8th grade class enrolled in their high school (columns 7-12). Coefficients omitted for brevity include "other" race, other language groups, and indicator variables for missing z-scores and missing tract disadvantage (imputed at the mean and Q3, respectively). Standard errors in parentheses adjusted for clustering at the middle school level. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Appendix Table 6: Regressions for Peer Continuity/Isolation and Effects on Gaps by Neighborhood Disadvantage

	(1) Share	(2) Share	(3) Share	(4) Share	(5) Share	(6) Share	(7) Only	(8) Only	(9) Only	(10) Only	(11) Only	(12) Only
Disadvantage Q2	-0.022	0.014	-0.022	-0.006	0.001	0.005	0.009	-0.010	0.005	0.012	0.012*	0.003
	(0.012)	(0.009)	(0.012)	(0.009)	(0.007)	(0.004)	(0.007)	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)
Disadvantage Q3	-0.067***	0.021*	-0.067***	-0.026**	-0.005	0.008	0.037***	-0.007	0.027**	0.016*	0.006	-0.004
	(0.016)	(0.010)	(0.017)	(0.010)	(0.008)	(0.006)	(0.009)	(0.009)	(0.009)	(0.008)	(0.006)	(0.006)
Disadvantage Q4	-0.082***	0.024*	-0.080***	-0.027*	-0.015	0.004	0.124***	0.045***	0.109***	0.052***	0.011	-0.005
	(0.017)	(0.011)	(0.018)	(0.012)	(0.008)	(0.007)	(0.011)	(0.009)	(0.011)	(0.009)	(0.007)	(0.007)
Disadvantage Q5	-0.083***	0.030*	-0.078***	-0.023	-0.019*	0.005	0.218***	0.113***	0.200***	0.107***	0.022**	0.005
	(0.019)	(0.012)	(0.019)	(0.013)	(0.009)	(0.007)	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
Top 3		-0.055				0.065		-1.035***				-0.985***
		(0.069)				(0.041)		(0.042)				(0.043)
Top 3 (sq)		0.778***				0.428***		0.877***				0.863***
		(0.113)				(0.069)		(0.049)				(0.052)
Math + ELA			0.007	0.006	0.008***	-0.001			-0.017***	-0.012***	-0.013***	-0.008**
			(0.004)	(0.004)	(0.002)	(0.002)			(0.003)	(0.003)	(0.003)	(0.002)
Math + ELA (sq)			-0.010***	-0.009***	-0.002*	-0.004***			-0.006***	-0.006***	-0.004**	-0.003*
			(0.002)	(0.002)	(0.001)	(0.001)			(0.002)	(0.002)	(0.001)	(0.001)
schools within 3.5				-0.002*	-0.001*	-0.001				0.001*	0.001	0.001*
				(0.001)	(0.001)	(0.000)				(0.001)	(0.000)	(0.000)
schools within 3.5 (sq)				0.000*	0.000	0.000				-0.000	-0.000	-0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
mean size 3.5				-0.000	-0.000	0.000				-0.001***	-0.000**	0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
mean size 3.5 (sq)				0.000*	0.000*	-0.000				0.000***	0.000**	-0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
mean demand 3.5				-0.024*	-0.001	0.007				-0.017*	-0.004	-0.009
				(0.012)	(0.008)	(0.007)				(0.008)	(0.007)	(0.006)

mean demand 3.5 (sq)	0.002*	0.000	-0.000	0.001*	0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
District 2	-0.002	0.014	-0.006	-0.040*	-0.002	-0.004
	(0.040)	(0.035)	(0.018)	(0.017)	(0.027)	(0.025)
Female		-0.003	0.002		0.008*	0.002
		(0.002)	(0.001)		(0.003)	(0.003)
Spanish at home		0.007*	0.002		-0.025***	-0.017**
		(0.003)	(0.002)		(0.005)	(0.005)
Chinese at home		0.001	0.002		0.003	0.015*
		(0.008)	(0.005)		(0.007)	(0.007)
Foreign born		-0.004	-0.003		-0.014***	-0.014***
		(0.002)	(0.002)		(0.004)	(0.004)
SWD		-0.002	-0.002		0.004	0.005
		(0.002)	(0.002)		(0.005)	(0.004)
Black		-0.044***	-0.011*		0.063***	0.034***
		(0.006)	(0.004)		(0.007)	(0.007)
Hispanic		-0.028***	-0.003		0.042***	0.020**
		(0.005)	(0.004)		(0.007)	(0.006)
Asian		-0.016**	-0.004		0.006	0.001
		(0.006)	(0.004)		(0.006)	(0.006)
Charter		-0.031	0.022		0.020	0.001
		(0.025)	(0.020)		(0.020)	(0.018)
Option to continue		0.409***	0.284***		-0.117***	-0.067***
		(0.026)	(0.018)		(0.011)	(0.011)
SPHS		-0.080***	-0.074***		0.011	0.006
		(0.018)	(0.015)		(0.010)	(0.009)
LGA		-0.094***	-0.079***		-0.001	-0.009
		(0.021)	(0.018)		(0.018)	(0.016)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grade 8 enrl					-0.001	-0.002					-0.099***	-0.097***
					(0.009)	(0.006)					(0.007)	(0.007)
Grade 8 enrl (sq)					-0.000	-0.000					0.010***	0.009***
					(0.001)	(0.001)					(0.001)	(0.001)
%MS from ELZ					0.040**	0.035**					-0.015	-0.004
					(0.014)	(0.011)					(0.014)	(0.013)
Only student from					-0.004	0.001					0.055***	0.046***
					(0.004)	(0.003)					(0.006)	(0.006)
Nonstandard ELZ					0.001	0.003					0.009	0.006
					(0.005)	(0.004)					(0.006)	(0.005)
Demand - top 3					-0.006***	-0.004***					0.004***	0.005***
					(0.001)	(0.001)					(0.001)	(0.001)
Demand (sq)					0.000***	0.000***					-0.000***	-0.000***
					(0.000)	(0.000)					(0.000)	(0.000)
Constant	0.185***	0.031**	0.192***	0.259***	0.233***	0.050	0.074***	0.266***	0.091***	0.307***	0.265***	0.384***
	(0.017)	(0.011)	(0.018)	(0.055)	(0.032)	(0.028)	(0.007)	(0.011)	(0.008)	(0.031)	(0.028)	(0.026)
Observations	69463	69463	69463	69463	69462	69462	69463	69463	69463	69463	69462	69462

Note: selected coefficients from separate regression models in which the dependent variable is the fraction of student i's 8th grade class enrolled in their high school (columns 1-6) or a binary variable equal to one if the student i was the only student from their 8th grade class enrolled in their high school (columns 7-12). Coefficients omitted for brevity include "other" race, other language groups, and indicator variables for missing z-scores and missing tract disadvantage (imputed at the mean and Q3, respectively). Standard errors in parentheses adjusted for clustering at the middle school level. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

[1] In the year of our study, NYC conducted a "supplemental round" of high school admissions in which unmatched students could submit another application. Students dissatisfied with their main round match could also participate.

[2] The six variables include the percent below poverty, the percent on public assistance, the percent of female-headed households, the percent unemployed, the percent under 18 years old, and the percent Black or African American.

[3] In an earlier version of this paper, we used zip codes as an approximation of neighborhoods. Elementary zones are preferable to zip codes because they are smaller (686 citywide versus 184 zip codes) and, by definition, related to prior school assignment. 14.8% of students had a zone that did not map to a single school but rather two or more elementaries. These zones, however, are still small, geographically contiguous areas. NYC also has middle school zones, but they are larger, and far more students live in unzoned areas.

[4] In an earlier version of this paper, we calculated application similarity with respect to others in the same school sharing a specific background characteristic (e.g., race, language spoken at home, prior achievement). Given similarity in preferences and the potential for peer effects on applications, these similarity measures tend to be higher, especially for certain subgroups.

[5] The specialized high schools and LaGuardia are highly selective schools that admit students citywide.

[6] Our measure of peer continuity using students' enrolled school may be affected by factors outside the centralized choice and enrollment process. For example, mobile students may transfer to a school other than the one to which they matched; others are retained and do not advance to 9th grade with the rest of their cohort. As the propensity to enroll in a different school likely varies by student background, we re-calculated our peer continuity measures using the matched school from the high school applications process. The results were very similar and are available upon request.

[7] Distance was measured from the population-weighted centroid of the student's census tract. We also included an indicator variable for students residing or attending a middle school in Manhattan's District 2, which was unique in offering an in-district admissions priority at many of its high schools.

[8] This survey was part of a pilot study conducted for the randomized control trial described in Corcoran et al. (2018). More than 2,500 eighth graders in 29 low-income middle schools participated, although results are reported for the 995 students who obtained parental consent. The survey was carried out shortly after applications were submitted, in February/March 2015.