

About This Report

This report, the third in an ongoing series on Denver's SchoolChoice system, was commissioned by A+ Denver and the SchoolChoice Transparency Committee, with support from Denver Public Schools. The SchoolChoice Transparency Committee, housed at A+ Denver, was created to analyze the SchoolChoice process, and has overseen the evaluation in A+ Denver's SchoolChoice Reports. The committee is made up of school leaders (with representation from charter, magnet, and traditional schools), district leaders, and third-party community stakeholders.

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About the Center on Reinventing Public Education

Through research and policy analysis, CRPE seeks ways to make public education more effective, especially for America's disadvantaged students. We help redesign governance, oversight, and dynamic education delivery systems to make it possible for great educators to do their best work with students and to create a wide range of high-quality public school options for families.

Our work emphasizes evidence over posture and confronts hard truths. We search outside the traditional boundaries of public education to find pragmatic, equitable, and promising approaches to address the complex challenges facing public education. Our goal is to create new possibilities for the parents, educators, and public officials who strive to improve America's schools.

CRPE is a nonpartisan, self-sustaining organization affiliated with the University of Washington Bothell. Our work is funded through private philanthropic dollars, federal grants, and contracts.

About A+ Denver

A+ Denver is an independent, nonprofit organization working to bring the power of Denver's citizens to bear on school reform. Our mission is to harness the power of civic leadership to build public will and advocate for the changes necessary to dramatically increase student achievement in public education in Denver. A+ focuses on the intersection of policy, practice, and politics—building support for changes that put the interests of students over those of adults.

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Introduction

Denver Public Schools' (DPS) universal enrollment system provides families with access to all of the city's public schools—both district-run and charter—through a single online or paper application. While students and their parents do not have to participate in the new process, many families in Denver—over a quarter—are using SchoolChoice to pick their children's schools. But what are the implications of this broad participation? What do the SchoolChoice applications tell us about what families prioritize and how well Denver Public Schools is meeting their demands?

In this report, we extend the analyses in Mary Klute's 2012 evaluation of the SchoolChoice process by examining three years of data on who is participating, what participating families want from their children's schools, and which school matches they receive through the system.¹ We found that across all segments of the city, families are demanding higher-rated schools, but such schools are unevenly distributed (even though the system's overall performance is improving). In short, much work remains to adequately service Denver families' demand for quality.

SchoolChoice Enjoys Broad Participation

Families have responded to DPS's new universal enrollment system with broad participation. Though students can still be assigned to a school without an application, Figure 1 shows that between 55 and 80 percent of students enrolling in key transition years (kindergarten, 6th grade, and 9th grade) participated in the SchoolChoice process. Additionally, nontrivial proportions of students entering non-transition grades used the application process.² Across all grade levels and years for which we have data, over one quarter—roughly 27 percent—of Denver's students participated in SchoolChoice. This translates to about 24,000 students in each of the three years (2012, 2013, and 2014), the majority of whom were entering transitional grades.

Though high participation rates are generally common across student subgroups, there are important differences between groups. Figure 2 shows the participation rates of different communities of students in transition grades across the three years (Table A2 in the appendix provides the full data). About 63 to 67 percent of students eligible for free or reduced-price lunch (FRL) participated in SchoolChoice, whereas 69 to 70 percent of non-FRL students did. Between 66 and 71 percent of English language learners (ELL) participated, compared to 63 to 69 percent of native English speakers. Interestingly, the gap between students who do and do not receive special education (SPED) decreased from 2012 to 2013. In 2012, about 53 percent of students in special education participated and about 68 percent of students not in special education did, for a difference of about 15 percentage points. In 2013, about 62 percent of students in special education and 69 percent of students in general education participated, for a gap of only 7 percentage points. And

¹Mary Klute, *Evaluation of Denver's SchoolChoice Process for the 2011-12 School Year* (Denver, CO: A+ Denver, June 2012), available [here](#).

²Most of the analyses in this report focus on students entering kindergarten, 6th grade, and 9th grade. As Figure 1 shows, these grades have the highest participation rates, and so drive the results for a sample that includes all students. Also, these grades represent key decision points for students and their families. We could also include early childhood education students, as Klute does in her analyses of the 2012 SchoolChoice data; however, large proportions of these students were not enrolled in a DPS school or program when their families filled out SchoolChoice applications, and so their inclusion in such measures as free and reduced-price lunch status, special education, and English language learners is difficult to verify. Table A1 in the appendix lists participation rates by all grades.

Box 1. Data Used in This Report

For these analyses, we draw on several data sources provided by Denver Public Schools. First, the SchoolChoice application data include the choices that families made from three rounds of the universal enrollment system. Participating families could rank up to five schools in March of 2012, 2013, and 2014 for enrollment in the 2012-13, 2013-14, and 2014-15 school years, respectively. The schools at which students were accepted, wait-listed, and denied are also noted in this data. Second, we had full enrollment information—including demographic traits like race and program participation, as well as the schools students attended—for the 2011-12, 2012-13, and 2013-14 school years. Third, we linked students’ enrollment and SchoolChoice records to their standardized test scores from the 2011-12 and 2012-13 school years. Finally, students’ current and requested schools were linked to school-level information, including School Performance Framework (SPF) ratings, region of the city, and projected enrollments. The school-level data are publicly available and were obtained from the DPS website, and we thank A+ Denver and DPS for their assistance in accessing the student-level SchoolChoice, enrollment, and testing data.

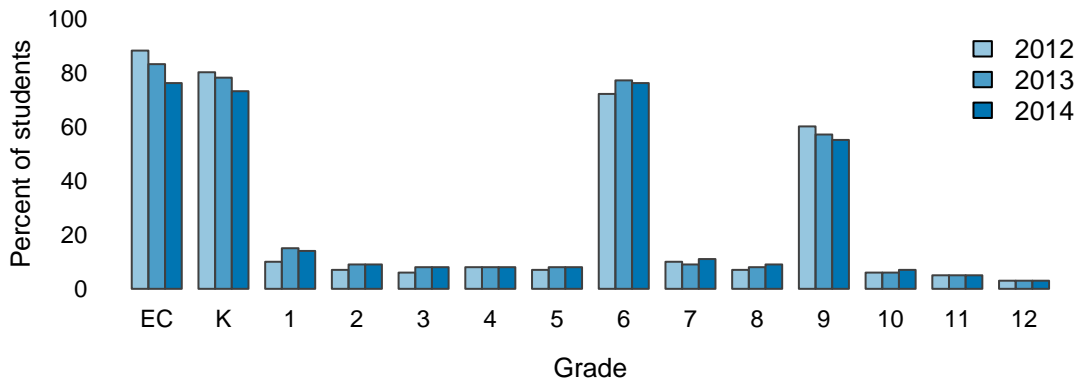
the gap actually reversed itself in 2014, when 66 percent of students in special education participated compared to 63 percent of students in general education.

The lower participation rates in 2012 and 2013 and the roughly equal rates in 2014 among SPED compared to non-SPED students are due to a change in the way parents accessed center-based special education programs. Prior to 2014, students with special needs were simply assigned to these programs. Starting in 2014, however, parents wishing to enroll their students in center-based programs for special education began filling out the SchoolChoice form.

Among racial groups, white students have the highest participation rates (84.7 percent participated in 2014), followed by those categorized as being of two or more racial groups (75.0 percent), Hispanic students (71.1 percent), black students (63.3 percent), and finally those in the “other” category (63.0 percent). These patterns are consistent across the three years of SchoolChoice.

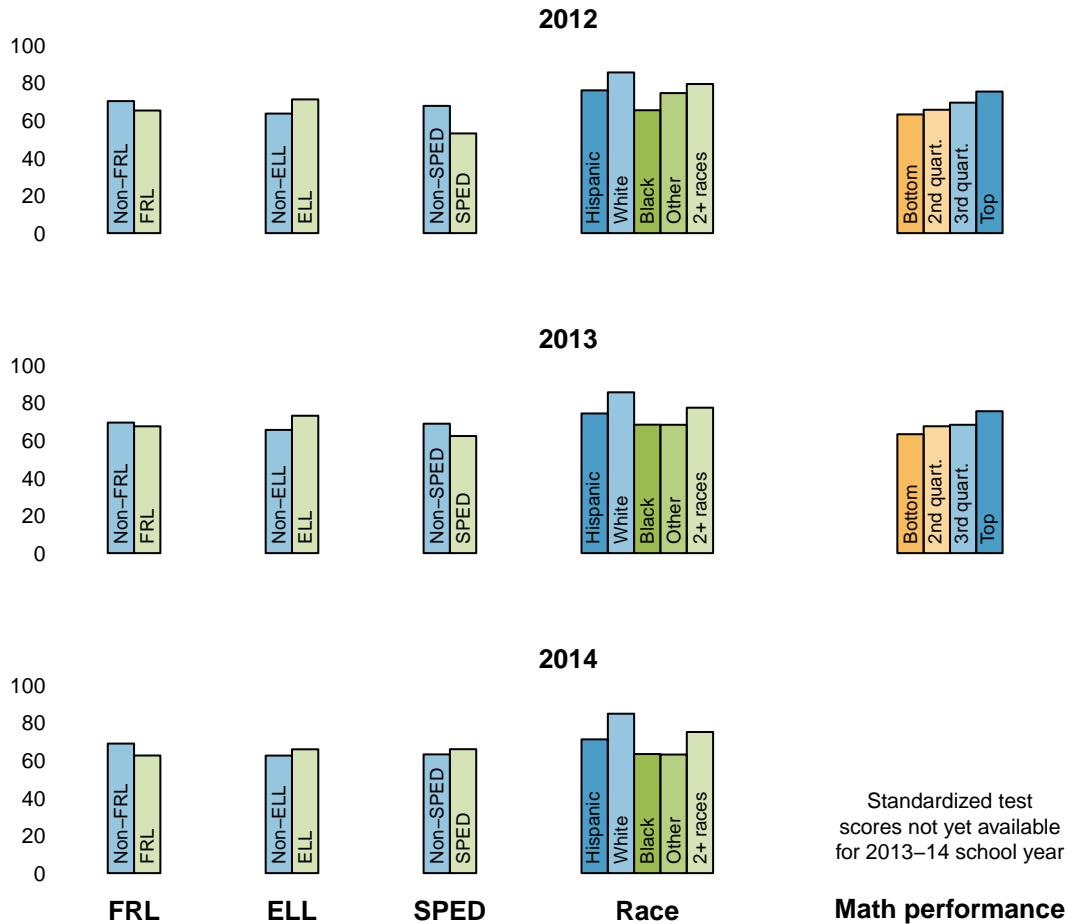
Finally, we see a positive relationship between students’ standardized test scores and

Figure 1: SchoolChoice Participation Is Highest in Transition Grades



Notes: The bars indicate the percentage of students in each grade and year who participated in SchoolChoice. The average participation rate across all three years and all grade levels is about 27%.

Figure 2: Participation in SchoolChoice by Student Subgroup



Notes: The bars indicate the percentage of students in each subgroup and year who participated in SchoolChoice. This chart considers only those students entering the three transitional grades (kindergarten, 6th grade, and 9th grade). Note that in 2014 parents wishing to enroll their students in center-based programs for special education began filling out the SchoolChoice form, rather than simply having their students assigned to those schools, accounting for the lower participation rates among this subgroup in 2012 and 2013 and an on-par rate in 2014.

their participation rate. While 63.2 percent of students in the bottom quartile of math performance participated in SchoolChoice in 2013, 75.4 percent of those in the top quartile did.³ This pattern for individual student achievement also matches the overall positive relationship between attending a higher-rated school and SchoolChoice participation (see Table A2). As a school’s SPF rating increases, that school’s students are generally more likely to fill out a SchoolChoice application. In short, students who are either higher performing themselves or attend higher-rated schools tend to participate in SchoolChoice at higher rates as compared to their lower-performing counterparts and their counterparts attending lower-rated schools.

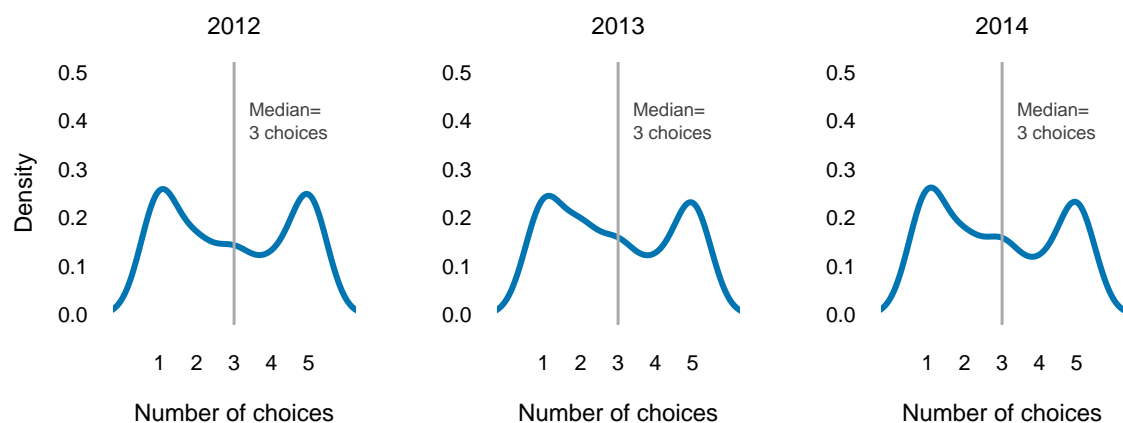
³Quartiles are calculated within year and grade level. We also looked at reading test scores, and the same pattern held. For instance, in 2013, the participation rate among students in the lowest reading quartile was 63.0 percent, in the second quartile it was 68.7 percent, in the third quartile it was 70.1 percent, and in the top quartile it was 72.3 percent.

Not only do high proportions of students in transitional grades participate in SchoolChoice, participating families are considering multiple options for their children. Figure 3 plots the number of choices made by families with students entering one of the three transition grades (see Table A3 in the appendix for the number of choices made by grade). In each of the three years in which SchoolChoice has been implemented, most parents (about 70 percent) list more than one school. The distributions are also bimodal. In any given year, roughly 30 percent of participating families made just one choice. Of the families selecting just one school, about 30 percent listed the school they currently attend, and about 47 percent listed their neighborhood-assigned school.⁴ An almost equal proportion (about 28 percent) of parents listed the full five choices.

We also looked to see whether families make a different number of choices depending on the region in which they live (see Table A3). Parents who live in the city’s Far Northeast region tend to list significantly more choices than elsewhere in the city, likely reflecting the fact that middle and high school students in this region do not have an assigned neighborhood school, as is the case in other neighborhoods. Across all three years, more parents in the Far Northeast listed the full five options than any other number of choices, while parents in the other regions were more likely to list just one option.

Because where families live in the city is associated with their racial and ethnic background, we predicted the number of choices a family made based on students’ race, region of residence, and additional demographic traits (full results of these analyses can be found in Table A4 of the appendix). We found significant variation among racial groups and among regions. When both race and region are jointly considered, both factors have a statistically

Figure 3: Families Typically List Just One or All Five Choices



Notes: This figure plots the density curve for each of the three years in which SchoolChoice has been implemented. The areas under the curve represent the proportion of families making the given number of choices. This chart considers only those students entering the three transitional grades (kindergarten, 6th grade, and 9th grade), though the results look similar if we include all grade levels.

⁴We note whether a school is a student’s neighborhood-assigned school if, according to the priority code a student is given for a school, the student lives in that school’s boundary (but not in a boundary that includes multiple schools). Because we rely on listed priority codes (which report only the single highest priority a student has at a given school), this definition is an approximation, and likely underestimates the number listing their neighborhood-assigned school. Though parents seeking a seat in their assigned school are not required to complete an application, DPS’s SchoolChoice materials recommend that families seeking to attend their assigned school simply list that school on the form and submit the application.

significant relationship with the number of choices made by a family (controlling for other student demographics). In this way, it appears that the race and region “effects” on how many choices families make are distinct. Specifically, families of black students and students identifying with “other” racial groups list more choices than families of white students, while families of Hispanic students list either fewer or about the same number of choices as white students’ families, when we take into account where families live in the city.

In terms of where in the city students live, again we see that families in the Far Northeast list, on average and controlling for student race and other traits, the greatest number of choices, while students in the other four regions list roughly one less choice.

Families of students receiving either English language learning or special education services, however, make fewer choices—potentially as a result of there being fewer programs available for students with these needs. The results also indicate that families of students entering the 6th or 9th grade list more choices than families of students heading into kindergarten. Finally, in each successive year, parents appear to be listing slightly fewer choices.

Available Seats Are Distributed Across the City, But Seats in Quality Schools Aren’t

The participation and choosing behavior described in the prior section depends, at least in part, on the schools that families reasonably believe are available to them. A simple analysis of Denver’s school supply suggests that capacity in the city’s district and charter schools is well distributed across the city. Figure 4 shows the ratio of the number of SchoolChoice participants heading into one of the three transition grades (kindergarten, 6th grade, and 9th grade) who request a seat in a given geographic region of the city to that region’s projected number of available seats in these grades. A ratio of less than one indicates that there is more capacity than the number of SchoolChoice participants seeking a spot in that region.

Box 2. Measuring Supply Across the City

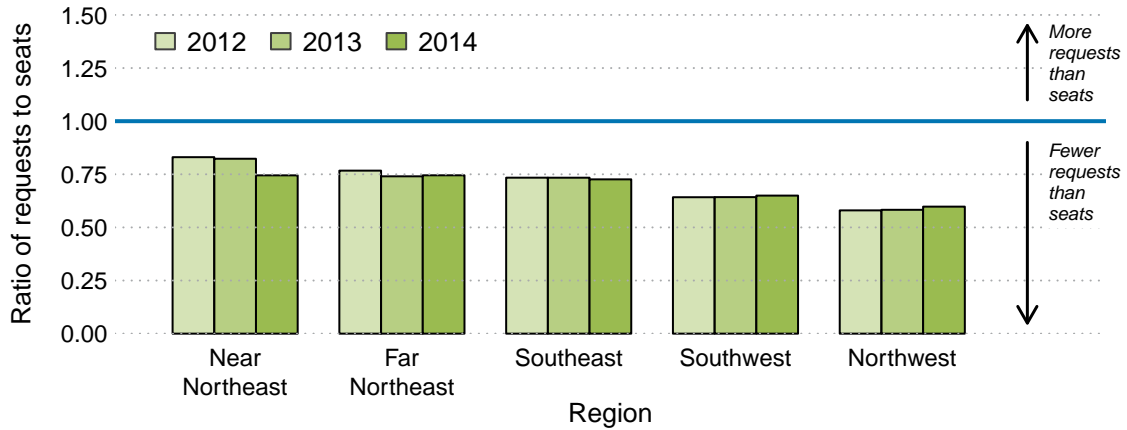
To measure the supply of seats in schools across the city, we calculate a ratio of the number of SchoolChoice participants who are heading into a transition grade and who list as their first choice a school in a given region to the projected number of available seats in that region and in those grades. To put it more simply:

$$Supply = \frac{SchoolChoiceParticipants}{ProjectedSeats}$$

As Figure 4 shows, every region has the capacity to accommodate all SchoolChoice participants going into kindergarten, 6th grade, and 9th grade who would like a seat in a school in the region.⁵ At the same time, three regions—the Far Northeast, the Near Northeast, and the Southeast in particular—received more first-choice requests for seats than the other regions. In 2014, for every 100 available seats, the Near Northeast region received about 75 first-choice requests, the Far Northeast received about 74 first-choice requests, and the Southeast received about 73 first-choice requests. The Southwest and

⁵Note that this is an approximation of the supply of and demand for seats in each region because we are using data from the SchoolChoice applications (which include students’ home addresses and therefore their region of residence) instead of students’ enrollment records (which do not include their addresses). However, because we are focused on the grades in which students are making transitions (i.e., students who are going into kindergarten and the 6th and 9th grades), and because the SchoolChoice participation rates are high for these grades, this analysis provides a good estimate of the alignment between supply and demand. We also ran this analysis including all grades, and the core result is the same.

Figure 4: Some Regions Are in Higher Demand by SchoolChoice Participants

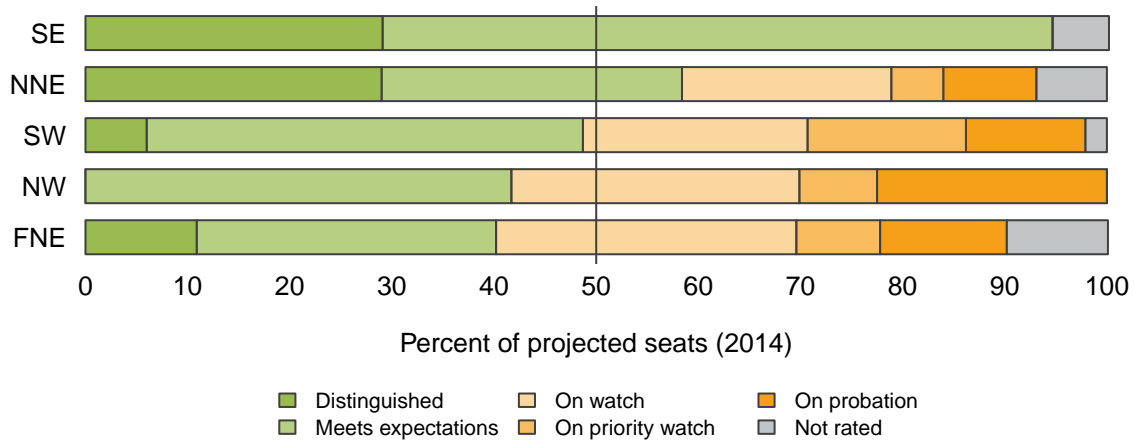


Notes: This figure plots the supply-demand ratio defined in Box 2 for each region. The blue line at a ratio of 1.0 represents an exact match between supply of available seats in a region to the number of SchoolChoice participants seeking a spot in that region. This chart considers only those students entering the three transitional grades (kindergarten, 6th grade, and 9th grade) and the projected enrollments for those grades in the next year.

Northwest regions received substantially fewer, at 65 and 60 first-choice requests for every 100 available seats, respectively.

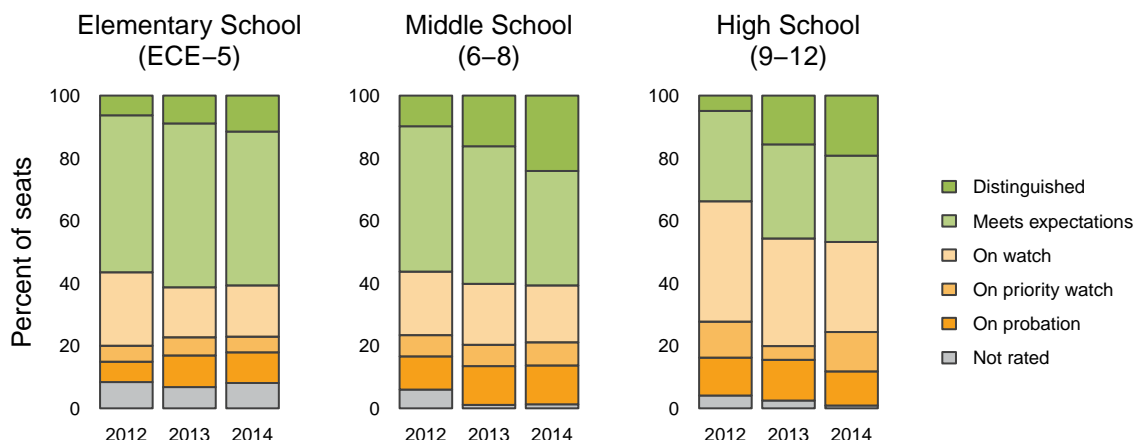
As Figure 5 shows, two of the regions receiving the greatest demand (the Near Northeast and the Southeast) also had the most higher-quality seats, where relatively high quality is defined as schools meeting expectations or distinguished on the School Performance Framework (SPF). In these regions, well over half of the projected openings were in schools rated as “meeting expectations” or “distinguished.” Conversely, less than half of the seats in two of the regions receiving lower demand (the Southwest and the Northwest) were rated in the

Figure 5: Highly Rated Seats Are Unevenly Distributed Across the City



Notes: This figure shows the distribution of quality by region across all grades in 2014. For each region, the percentage of the projected enrollment by the schools’ SPF rating is shown. Full results by grade level, region, and SPF rating can be found in Tables A5, A6, and A7.

Figure 6: The Number of Available Seats in Highly Rated Schools Has Increased



Notes: This figure shows the percentage of seats in schools at the elementary, middle, and high school levels by their SPF rating. Full data can be found in Tables A5, A6, and A7.

top two SPF categories.

Encouragingly, however, the number of openings at schools rated as “distinguished” or “meeting expectations” increased since 2012 at the elementary school level by 15.3 percent, at the middle school level by 17.3 percent and at the high school level by 41.8 percent, as can be seen in Figure 6.⁶ Across all grades, the number of projected seats in these top two SPF categories has increased by 20.9 percent from 2012 to 2014. Roughly 70 percent of this increase is due to existing schools receiving higher rating and 30 percent is due to increased capacity in consistently highly-rated schools. (Tables A5, A6, and A7 in the appendix provide the available seats by grade level, SPF rating, and region.) As the SchoolChoice process continues, it will be interesting to see how such increases in quality alter the dynamics discussed above—namely, the uneven distribution of both quality and demand across the city.

As we go on to discuss parents’ demand for schools, the unevenness in quality across the city has cascading consequences for how well parents’ demand is met. In short, while the supply of available seats is more or less evenly spread across the city, parental demand appears to follow *quality*, which is not as evenly distributed.

The Demand for Quality Sends Some Families Looking for Schools Beyond Their Neighborhood

Not all schools receive the same number of requests, even relative to their size. Figure 7 plots the ratio of demand to supply for each school in 2014. We calculated the ratio representing the demand for a school to its relative supply by dividing the number of times a school was requested as a student’s *first* choice by the school’s projected enrollment

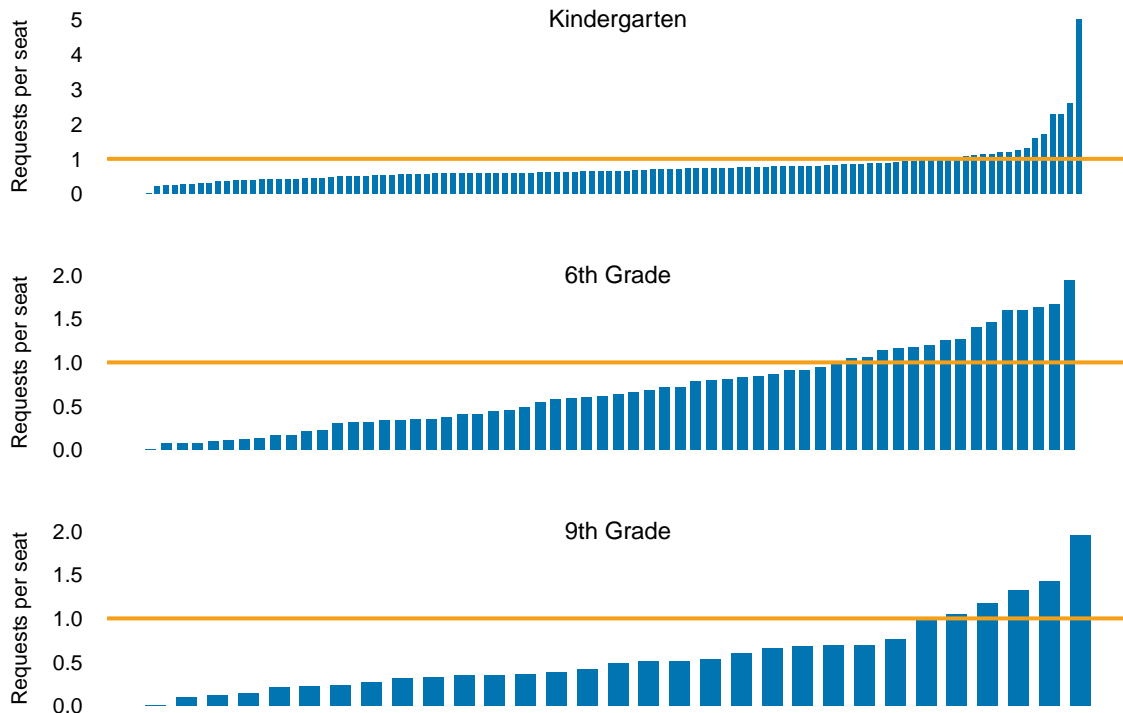
⁶As a reviewer helpfully pointed out, a portion of this change is reportedly due to a change in how the SPF was calculated for high schools. Beginning in 2013, college remediation data were eliminated from high schools’ SPF calculation. As a result, East High School—with its many students—moved into a higher SPF category. For more information regarding this change, see Alexander Ooms, *Beyond Averages: School Quality in Denver Public Schools* (Denver, CO: The Donnell-Kay Foundation, 2014), Appendix A, available [here](#).

among each of the transitional grades. This metric takes into account the variability in school sizes, which ensures that a school isn't considered a more in-demand school simply because it is large. Additionally, we retain our focus on students entering transition grades since higher proportions of the projected seats in kindergarten and grades six and nine will be true openings (i.e., available seats not already filled by existing students) as opposed to non-transition grades. Schools with ratios above the orange line are in high demand; they received more first-choice requests than there were available seats. Schools with ratios below the line received fewer requests than seats.

There is remarkable consistency in the schools that families request most often. Table 1 shows the schools receiving the most first-choice requests among students heading into kindergarten, 6th grade, and 9th grade in 2014. Five of the ten schools among kindergartners receiving the most first-choice requests in 2014 had the same distinction in both the 2012 and 2013 SchoolChoice processes. Among 6th and 9th graders, seven of the ten schools receiving the most first choices earned the same distinction all three years. In other words, if we were to redraw Figure 7 for 2012 and 2013, many of the same schools would appear at the far right of the figure no matter the year. The same would be the case for the far left of the figure (the lowest-demand schools).

Not only is a consistent set of schools represented among the top ten most-requested schools across the three years of SchoolChoice implementation, but Table 1 also shows

Figure 7: There Is Wide Variation in How Many Applications Schools Receive



Notes: Each bar in this figure represents the demand relative to the supply of available seats for each school by grade in 2014. The ratio plotted is calculated by dividing the number of first-choice requests received for the specified grade in a school by the number of projected seats in that school and grade. Bars that extend above the orange line are oversubscribed (i.e., they receive more first-choice requests than their projected enrollment); bars below the orange line receive fewer first-choice requests than projected enrollment.

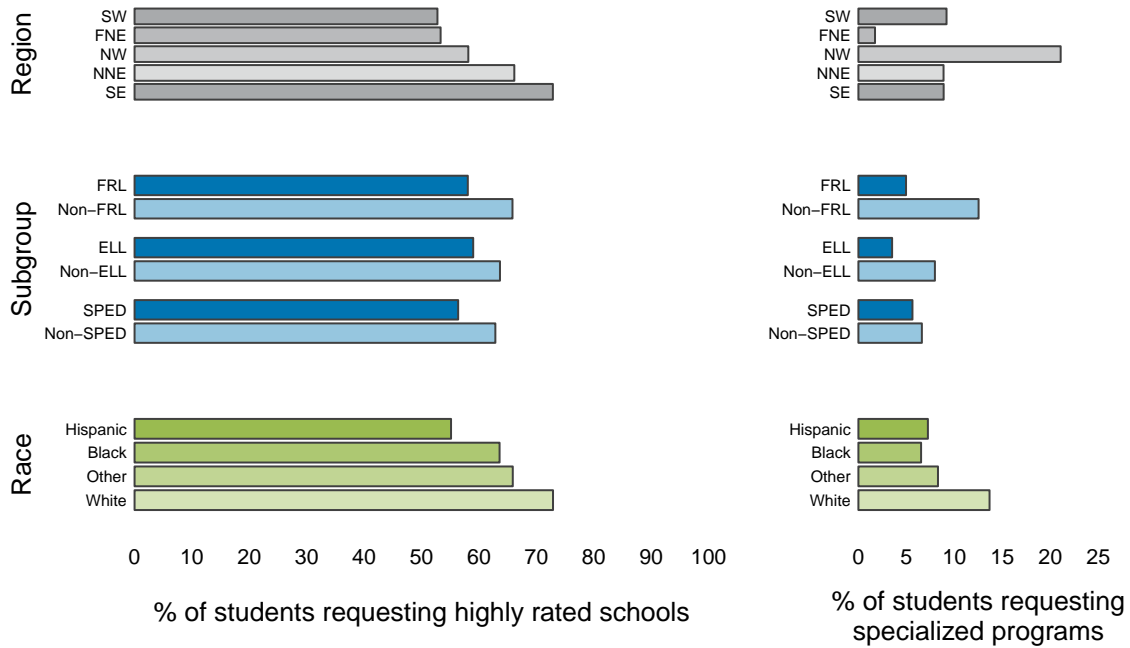
Table 1: Many Schools Are Consistently Among the Most Requested

Rank	School	Ratio	SPF	Region	Also Top 10 in:	
					2012	2013
<i>Kindergarten</i>						
1	Polaris at Ebert	5.00	Distinguished	NNE	✓	✓
2	Odyssey Charter School	2.58	Meets expect.	NNE	✓	✓
3	Swigert Intl. School	2.28	Distinguished	NNE		✓
4	Denver Language School	2.28	Meets expect.	SE		
5	Highline Academy	1.70	Distinguished	SE	✓	✓
6	Carson	1.58	Distinguished	SE		✓
7	Slavens	1.31	Distinguished	SE	✓	✓
8	Lincoln	1.25	Distinguished	SE	✓	✓
9	Escalante-Biggs Academy	1.19	Not rated	FNE		
10	Creativity Challenge Comm.	1.19	Not rated	SE		✓
<i>6th grade</i>						
1	DSST: GVR	1.93	Distinguished	FNE	✓	✓
2	DSST: Stapleton	1.67	Distinguished	NNE	✓	✓
3	Denver School of the Arts	1.63	Distinguished	NNE	✓	✓
4	Denver Public Montessori	1.60	On probation	NNE		✓
5	STRIVE: Westwood	1.59	Distinguished	SW	✓	✓
6	McAuliffe Intl. School	1.46	Distinguished	NNE	✓	✓
7	Slavens	1.41	Distinguished	SE	✓	✓
8	DCIS MS	1.26	Meets expect.	SW	✓	
9	Marie L. Greenwood	1.25	On watch	FNE	✓	✓
10	Florida-Pitt Waller	1.20	On watch	FNE		
<i>9th grade</i>						
1	CEC Middle College	1.95	Meets expect.	NW	✓	✓
2	STRIVE: SMART	1.42	On watch	SW	✓	✓
3	DSST: GVR	1.32	Distinguished	FNE	✓	✓
4	East High School	1.17	Distinguished	NNE	✓	✓
5	MLK Jr. Early College	1.05	Meets expect.	FNE	✓	✓
6	Kunsmiller Creative Arts	0.98	On watch	SW		
7	KIPP Denver Collegiate	0.76	Meets expect.	SW		✓
8	DSST: Stapleton	0.69	Distinguished	NNE	✓	
9	Bruce Randolph	0.69	Prior. watch	NNE	✓	✓
10	Denver School of the Arts	0.68	Meets expect.	NNE	✓	✓

Notes: Ratios are calculated by dividing the total number of first-choice requests for a school made by students in the specified grade by that school’s projected enrollment in the given grade in 2014. If we were to instead rank schools by, for example, the raw number of first choice requests they got, the top ten would be slightly different, although many of the schools in this list would appear in that other list (see DPS’s analysis of the SchoolChoice process in 2014, available [here](#)).

that families demand relatively highly-rated schools. Seven out of the ten most-requested schools for both 6th and 9th graders, and eight out of the ten most-requested schools for kindergartners, were rated as either “distinguished” or “meets expectations.” This desire to send their children to the city’s highest-rated schools cuts across all neighborhoods and student groups. Well over half of the families living in any region and with children belonging to any subgroup or race/ethnicity request schools in the top two SPF categories as their first choice.

Figure 8: Families Across the City and Student Subgroups Demand Quality



Notes: Figure shows the percentage of first choices that were made for highly rated schools or for specialized programs, by region, student subgroup, and race/ethnicity. By “highly rated schools,” we are referring to schools rated as either “meeting expectations” or “distinguished.” A list of “specialized programs” is provided in Box 3. This figure combines all three years of data, and is limited to students entering kindergarten, 6th grade, or 9th grade.

At the same time, Figure 8 does show variation among student groups. Across the three years of SchoolChoice, 73 percent of families in Denver’s Southeast region list a highly rated school as their first choice, while only 53 percent of families in the Southwest do. This finding aligns well with the pattern in Figure 5, which shows that the Southeast has the highest proportion of highly rated available seats and the Southwest has the lowest. Students eligible for FRL, ELL, and special education all chose a highly rated school as their first choice at lower rates than their non-eligible counterparts. Whereas 58 percent of FRL students preferenced a highly rated school, 66 percent of non-FRL students did. Similarly, 59 percent of ELL students chose a highly rated school as their first choice compared to 64 percent of non-ELL students, and 56 percent of students in special education chose a highly-rated school compared to 63 percent of students in general education. Finally, in terms of race/ethnicity, only 55 percent of Hispanic students listed a highly rated school as their first choice, as compared to 73 percent of white students. About 64 percent of black students and 66 percent of students belonging to other racial groups listed highly rated schools as their first choice.

We also find more variation among parents in whether or not they list a specialized program as their first choice, as shown in the right-hand side of Figure 8 (a list of schools with specialized programs can be found in Box 3). Roughly 18 percent of students residing in the Northwest selected a specialized program as their first choice, while only 1.3 percent of students in the Far Northeast did so. Students not eligible for free or reduced price lunch are about two and a half times as likely as FRL students to list a specialized program as their

first choice, while native English speakers are nearly twice as likely as English language learners to do so. Students who do and do not receive special education list specialized programs as their first choice at more comparable rates. Finally, white students are about twice as likely to choose a specialized program than students of other racial groups.

Families' demand for highly rated schools, however, is in tension with a desire for proximity. Citywide, parents prefer to find a school close to home, but the demand for highly rated schools drives many families to choose schools out of their region. In fact, one in five students select a school outside of their home region as their first choice. As we saw earlier in Figure 5, seats in highly rated schools are not evenly distributed across the city, and so for some parents the preference for proximity must come at the expense of quality. To further explore the tension between proximity and school quality, we predicted the likelihood that a family selected a school outside of their neighborhood as their first choice. Table A8 in the appendix presents the full results.

It is clear from this analysis that families make trade-offs between proximity and quality. Figure 9 illustrates this by showing the predicted probability that a student listed a school outside of their home region as their first choice across the full range of the average SPF rating within each region. The blue line shows the probability that a student selects a school outside their neighborhood by the region's average SPF rating (in points), holding all other variables in model 5 of Table A8 at their means. Families' preference for a school outside of their home region is motivated at least in part by the stock of school quality in their home region.⁷

As the blue line in Figure 9 indicates, there is generally a negative association between the likelihood that families select a school outside their region and the quality of schools within their home region. A little over one-fifth (about 22 percent) of SchoolChoice participants living in regions that have a relatively low stock of highly rated schools choose a school outside their region as their first choice, whereas substantially fewer students (about 15 percent) living in regions with a relatively high stock of highly rated schools do so (this difference is statistically significant, and controls for student background).

We just saw that the quality of schools around families corresponds with decisions to

Box 3. Specialized Programs in Denver

Dual Language:

- Academia A.M. Sandoval (also Montessori)
- Bryant Webster
- CMS Community School/Schenck
- Denver Language School
- Valdez
- Valverde Elementary

Expeditionary Learning:

- Centennial (beginning in 2013-14)
- Denver Green School
- Downtown Denver Expeditionary
- Odyssey Charter
- Rocky Mountain

Fundamental:

- Hallett Fundamental

Montessori:

- Denison Montessori
- Gilpin Elementary
- Lincoln Elementary
- Monarch Montessori

Single Gender:

- Girls Athletic Leadership School (female)
- Sims Fayola Academy (male)

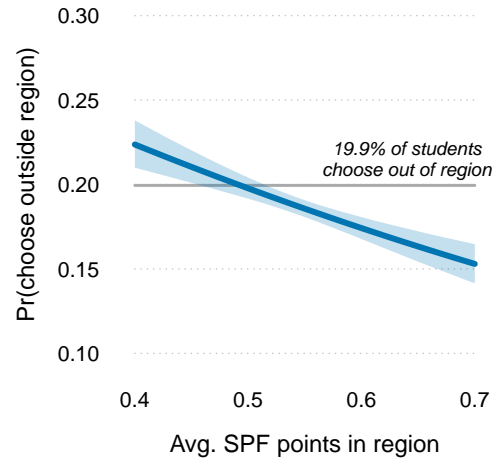
⁷Like other analyses in this report, we focus only on students entering transition grades (kindergarten, 6th grade, and 9th grade. We also ran this analysis for all SchoolChoice participants, and the core results were substantively similar.

choose a school outside the home region. A related question is whether the level of quality demanded by families is associated with the available quality. To help answer this question, we tested whether the SPF rating of a student’s top two choices related to the quality of the schools in their neighborhood (see Table A9 in the appendix for these results).

Families living in regions with schools that have higher average SPF ratings tend to request more highly rated schools in both their first and second choices. Indeed, controlling for student background and whether the selected school is outside of a student’s home region, each point increase in the average SPF rating in the region a student lives in is associated with a 19 point increase in the SPF rating of a student’s first choice and a 9 point increase in the SPF rating of their second choice. In short, whether a family prefers a “good” school reflects at least in part whether there are “good” schools around them.

We also found that, controlling for regional quality, minority students tend to choose schools with lower ratings as both their first and second choices than white students. Similarly, students eligible for FRL or in special education choose schools with lower ratings than students not receiving FRL or special education. English language learners, however, tend to include higher rated schools in their top two choices than native English speakers. Furthermore, the demand for quality has grown over time, particularly when we compare 2014 with 2012. The schools families listed as their first and second choices in 2014 had SPF ratings that were about one point higher than the ratings of schools selected in 2012.⁸

Figure 9: Students Living in Neighborhoods With Lower-Performing Schools Are More Likely to Select a School Outside Their Home Region as Their First Choice



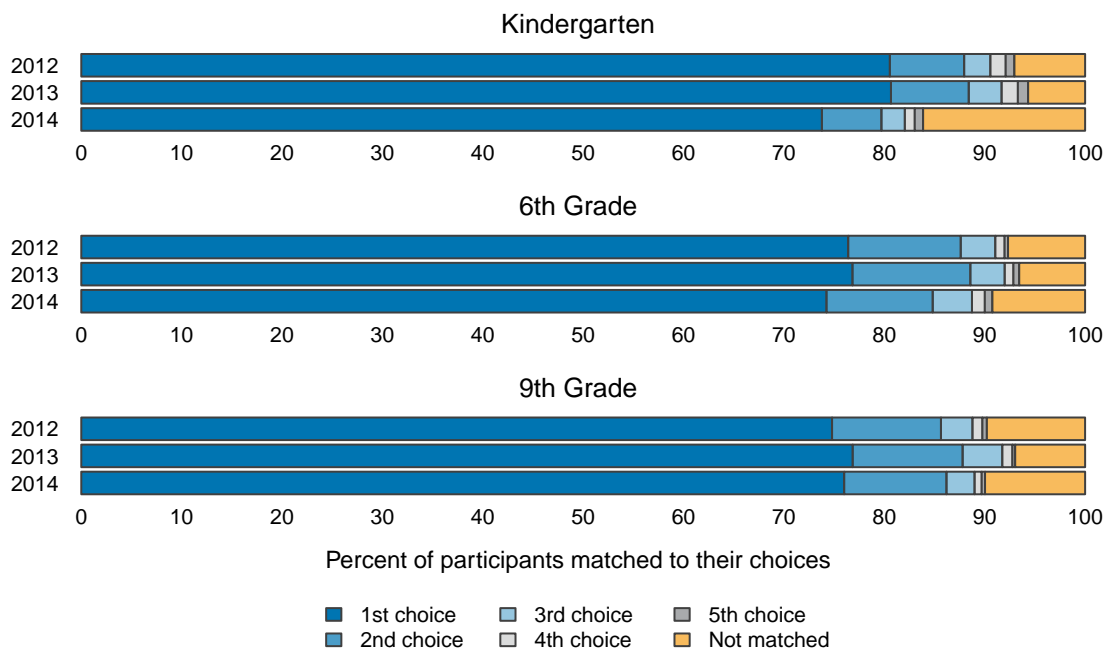
Notes: The blue line represents the predicted probabilities derived from model 5 in Table A8 that a student listed a school outside their home region as their first choice at each value of the average neighborhood SPF rating (holding all other variables at their means). The light blue shading represents the 95% confidence interval about the predicted probabilities. The darker gray line indicates the average percentage of students in the sample (19.9%) who select a school outside their region as their first choice. The sample is limited to students in transition grades (kindergarten, 6th grade, and 9th grade).

Match Rates Are High, But Some Families Miss Out Depending on Who They Are, Where They Live, and What They Prioritize

In light of the desires among families for both proximity and quality, and the constraints imposed by the unevenness in the supply of quality across the city, who is getting what they want? In general, the vast majority of students receive one of their choices. Among all grade levels, 84.7 percent of students were matched to one of their five choices in 2012, 88.6 percent were matched in 2013, and 76.1 percent were matched in 2014. Furthermore, most students

⁸This is likely due to both the increased availability of seats in highly rated schools (in turn the result of schools moving into higher SPF categories and increased capacity at highly rated schools, as discussed on page 7) and parents’ consciousness of better schools (given what we have heard from parents in interviews and focus groups about their use of SchoolChoice materials containing information on school performance).

Figure 10: A Majority of Students Are Matched to Their First Choice



Notes: Figure shows the percentage of students entering kindergarten, the 6th grade, and the 9th grade who are matched to one of their 5 choices or to none of their choices, by year. Rates are based on all students that fill out a SchoolChoice application. See Table A10 for all grade levels, and for match rates based on Denver residents only.

are matched to their first choice. As Figure 10 illustrates, between 74 and 81 percent of students entering kindergarten, between 74 and 77 percent of students entering the 6th grade, and between 75 and 77 percent of students entering the 9th grade were matched to their first choice over the three years that SchoolChoice has been implemented.⁹

Although high match rates can be found across student groups, including among various races and ethnicities and among students living across the city, there are important differences in match rates among Denver’s student population. Students in transition grades are much more likely to be matched to one of their choices, perhaps as a result of the greater degree of student mobility inherent in the transitions into school, into middle school, and into high school. Looking just at students in transition grades, while between 79 and 81 percent of Hispanic students were matched to their first choice, roughly 68 to 75 percent of white students and 74 to 78 percent of black students were assigned to their first choices. Also, students residing in the Northwest and Southwest regions of the city had particularly high first-choice match rates (recall, from Figure 4, that these two regions have among the lowest relative demand).

To dig further into the variation in which students were successfully matched either to their first choice or to none of their choices, we estimated two logistic regression models. For the first, we predicted the likelihood that a student was matched to their *first* choice. For the second, we predicted the likelihood that a student was matched to *none* of their

⁹See Tables A10 and A11 for additional details on student matches across grades, racial/ethnic groups, and regions of residence. Also included in Tables A10 and A11 are match rates based on Denver residents only.

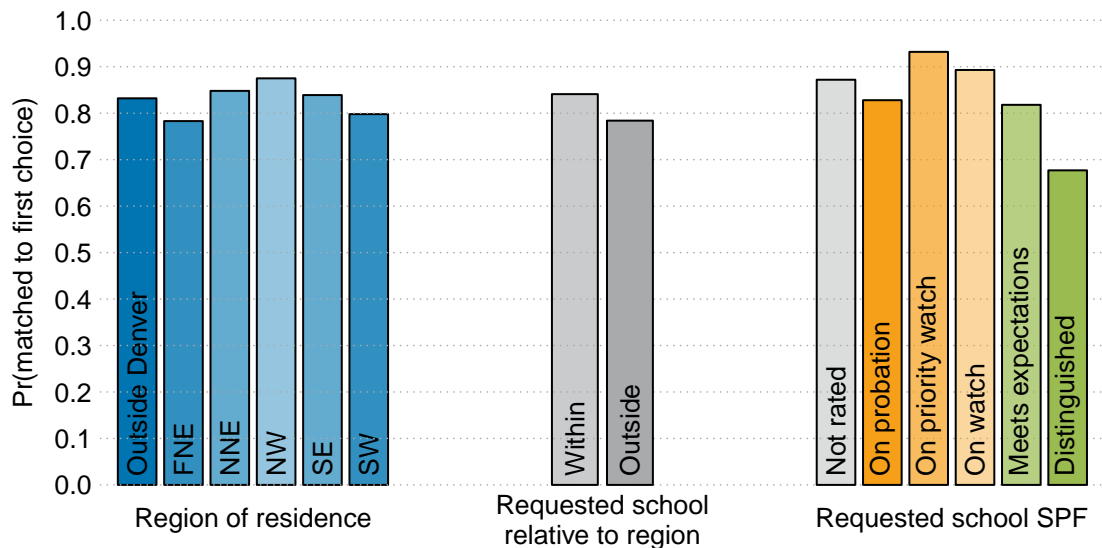
choices (see Table A12 for the full details and results). Overall, we found that whether students were successfully matched is related to their demographic traits, where in the city they live, and what families appear to prioritize when they make their selections.

Looking first at how student traits and family priorities are related to whether students are matched to their *first* choice (column 1 in Table A12), we find that black students, Hispanic students, and those in “other” racial groups are no more or less likely than white students to be matched to their first-choice school. Students who qualify for free or reduced price lunch have roughly 19 percent higher odds of getting their first choice than non-FRL students, and students receiving special education have about 11 percent lower odds than general education students. There is no difference in the likelihood that students who are and are not English language learners are assigned to their first-choice school.

Figure 11 illustrates other key differences among students in the predicted probability that they are matched to their first-choice school. Students living in the Far Northeast are markedly less likely to be assigned to their first choice than students living elsewhere. Controlling for students’ background and other characteristics, students in the Far Northeast have a 78.3 percent chance of being matched to their first choice, compared to the 87.5 percent chance for students in the Northwest. Selecting a school outside of one’s region of residence lowers the probability that a student is assigned to their first choice by nearly 6 percentage points (a statistically significant difference).

The requested school’s quality also impacts how likely a student is to be assigned to that school, as the right panel of Figure 11 shows. A student’s probability of matching to their first choice increases as the choice school moves from an “on probation” designation

Figure 11: Differences in First Choice Match Rates by Region and Requested School SPF Rating



Notes: The bars represent the predicted probabilities of being matched to one’s first-choice school among students entering transition grades (K, 6, 9), conditional on the scenario indicated and holding all other variables at their means. These are predicted by the logistic regression model in column 1 of Table A12. Note also that the predicted probabilities by region are reasonably close to the match rates from Tables A10 and A11; differences that exist are relatively minor and due to controlling for student background and other characteristics.

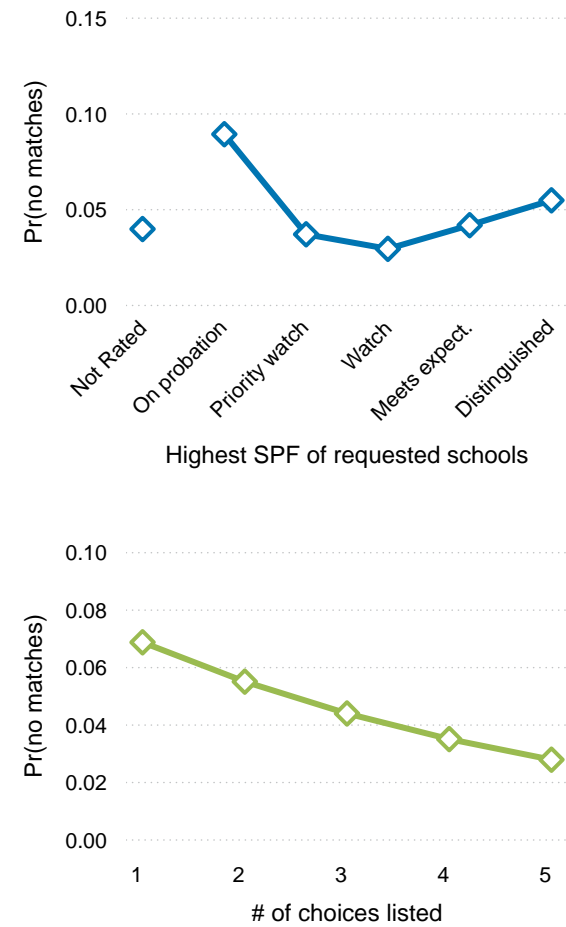
to either an “on priority watch” or “on watch” designation, but then falls if the school is designated in the top two SPF categories. Interestingly, a student’s likelihood of matching to his first choice if that school is “distinguished” is significantly lower than the likelihood of getting assigned to his first choice if that school is “on probation.”

Though the match rates in Denver are quite high across the board—as Table A10 shows, between 88 and 95 percent of SchoolChoice participants entering transition grades across the three years were successfully matched with one of their preferences—we do see that whether students fail to receive a match (column 2 in Table A12) is associated with their background and how they list their choices. For instance, students who are eligible for free or reduced price lunch are less likely to be rejected from all of their choice schools than non-FRL students, while students in special education and English language learners are more likely to receive none of their preferences than non-SPED and non-ELL students.

Figure 12 illustrates two particularly interesting patterns. First, the blue line plots the predicted probability of not receiving any matches by the highest SPF rating of a student’s set of requested schools, controlling for student background and other characteristics (see column 2 of Table A12 for full details and results). The U-shaped pattern (excluding the “not rated” SPF category) suggests that students whose highest-rated school is of middling quality (rated either “on priority watch” or “on watch”) have the lowest chance of not being matched, while those whose highest-rated school is either “on probation” or “distinguished” have a comparably more difficult time of getting a match.¹⁰

Second, as the bottom of Figure 12 shows, the number of schools a family lists on their SchoolChoice application is strongly related to the likelihood that their student will or will not be matched successfully. Roughly 7 percent of students with only one preference were not matched, whereas only 3 percent of students who list the maximum five schools failed to receive a match.

Figure 12: Differences in Non-Match Rates by Requested School SPF Rating and Number of Choices Listed



Notes: The lines in these two plots represent the predicted probabilities of not being matched to any of a student’s choices among students entering transition grades (K, 6, 9), conditional on the scenario indicated and holding all other variables at their means. These are predicted by the logistic regression model in column 2 of Table A12.

¹⁰We also looked at the lowest SPF rating of a student’s set of requested schools, and the pattern is substantively similar.

This latter finding is particularly important given what we are hearing from parents during interviews and focus groups that we are currently conducting in Denver—namely, that they believe that by putting down fewer choices, they are *more* likely to get their top preferences. In other words, many parents worry that they will be matched to less than ideal schools if they list too many choices on the SchoolChoice application. Additionally, many parents expressed feeling like they do not actually have five schools that they think would be adequate for their children. However, it is clear from this analysis that putting down too few schools has a strong negative impact on getting assigned to one of their choices at all.

Taken together, and considering the pattern in the right side of Figure 11, these findings suggest that parents demand quality but that the supply of quality schools is currently insufficient to meet the demand.

Summary

Building on Mary Klute’s analysis of the initial round of the SchoolChoice process in 2012, we found that the patterns Klute identified have remained largely stable two years later. DPS has seen consistently high rates of participation among students entering transitional grades, and the vast majority of these students are matched to one of their choices. Even when we consider all grades, we find that over a quarter of the district’s students (well over 20,000 students) in each of the three years have participated in SchoolChoice, and between 76 and 89 percent of all participants were matched to one of their choices. In the transition grades, roughly 90 percent are matched to one of their choices. More encouraging still, most students are matched to their first choice.

At the same time, there are some lingering gaps in terms of both participation and match rates. Lower proportions of students eligible for free or reduced price lunch participated than their non-eligible counterparts. White students participate at far higher rates than minority students. And students who either are high performing themselves or are currently enrolled in relatively higher-rated schools were more likely to participate in SchoolChoice. Notably, English language learners participated at higher rates than native English speakers. Participation rates between students in special and general education also compare favorably in 2014, when parents wishing to enroll their students in center-based programs were encouraged to complete SchoolChoice applications.

Additionally, as Klute found in 2012, each region has sufficient capacity to accommodate the SchoolChoice participants seeking a seat in the region. And the proportion of seats in highly rated schools (i.e., those rated as either “meeting expectations” or “distinguished”) has grown over time. This growth has been particularly dramatic at the high school level. However, quality seats are neither evenly distributed across the city’s regions nor in sufficient supply to meet parents’ demand.

The most-requested schools in the city are often the highest rated. Indeed, the demand for quality has grown over time, particularly when comparing 2014 to 2012. While not all families placed the same emphasis on quality when selecting their choices—for instance, black, Hispanic, and other racial groups compared to whites, FRL students compared to non-FRL students, and students in special education compared to students in general education all tend to list lower rated schools as their first and second choices—many parents are willing to look outside of their home regions for quality. One-fifth of SchoolChoice participants indicated as their first-choice a school outside their region of residence. This is particularly true for parents in the Northwest and Southwest, which had lower stocks of quality schools than other regions. The stock of available quality also has implications for

successful matching. Families that list higher-rated schools are less likely to be matched to either their first choice or to any of their choices than families listing schools of more middling quality. In short, families demand quality, but this demand is tempered by both a preference for proximity and an insufficient supply of quality close to some families.

Next Steps

As Klute noted in 2012, the data available on SchoolChoice is very rich, and we look forward to continued analyses. Specifically, we are interested in digging further into the trade-off between proximity and quality when parents are ranking schools. In this report, we measure proximity by noting which region a student lives in and whether their requested schools are also in that region or not. This is a helpful but not a particularly precise measurement, as it cannot take into account the actual distance parents are willing or will have to travel to get to a certain school. As an example, consider a student who lives one block west of the boundary line between the Far Northeast and the Near Northeast. This student thus lives in the Near Northeast, and would be considered as applying out of region if their choice school is located only a couple blocks east (in the Far Northeast). In order to more closely investigate the trade-offs between quality and proximity, we are in the process of mapping the schools listed by families on their SchoolChoice applications to their addresses to calculate driving distances. This will provide a more precise and useful measure of proximity than the one we currently use in this report, and will help us more accurately calculate the average level of quality around where a student lives. Furthermore, we are interested in what students who participate in multiple successive years of SchoolChoice could tell us about how successful the matching process is and the extent to which families' priorities are being met.

Appendix: Additional Data and Tables

This appendix contains additional data and tables related to the report.

Table A1: Participation in SchoolChoice by Year and Grade

	2012 (for 2012-13 year)	2013 (for 2013-14 year)	2014 (for 2014-15 year)
Projected enrollment	83,230	86,597	89,445
Number of SC participants	22,737 (27.3%)	24,121 (27.9%)	24,117 (27.0%)
<i>By grade</i>			
ECE	4,523 (88%)	4,761 (83%)	4,421 (76%)
Kindergarten	5,819 (80%)	5,909 (78%)	5,669 (73%)
Grade 1	742 (10%)	1,105 (15%)	1,124 (14%)
Grade 2	496 (7%)	632 (9%)	669 (9%)
Grade 3	434 (6%)	535 (8%)	596 (8%)
Grade 4	523 (8%)	505 (8%)	559 (8%)
Grade 5	408 (7%)	516 (8%)	548 (8%)
Grade 6	4,388 (72%)	4,702 (77%)	4,913 (76%)
Grade 7	545 (10%)	554 (9%)	664 (11%)
Grade 8	403 (7%)	441 (8%)	534 (9%)
Grade 9	3,854 (60%)	3,745 (57%)	3,641 (55%)
Grade 10	296 (6%)	314 (6%)	406 (7%)
Grade 11	193 (5%)	229 (5%)	245 (5%)
Grade 12	113 (3%)	128 (3%)	128 (3%)

Notes: Percentages of students are in parentheses, which are calculated by dividing the number of SchoolChoice participants by next year's projected enrollment (available [here](#)).

Table A2: Percent of Students Participating in SchoolChoice by Year and Student Traits

	2012 (for 2012-13 year)	2013 (for 2013-14 year)	2014 (for 2014-15 year)
<i>By FRL status</i>			
Non-eligible	70.1	69.3	68.8
Eligible	65.2	67.4	62.5
<i>By ELL status</i>			
Non-eligible	63.5	65.5	62.4
Eligible	71.1	73.0	65.8
<i>By special education status</i>			
Non-eligible	67.6	68.8	63.1
Eligible	53.0	62.2	65.9
<i>By race/ethnicity</i>			
Hispanic	74.9	74.2	71.1
White	85.4	85.5	84.7
Black	65.3	68.2	63.3
Other group	74.4	68.2	63.0
Two or more groups	79.2	77.3	75.0
<i>Significance</i>	$F(24130)=130.65,$ $p<0.001$	$F(24761)=119.64,$ $p<0.001$	$F(24676)=173.41,$ $p<0.001$
<i>By math performance quartile</i>			
Bottom quartile	63.1	63.2	
2nd quartile	65.5	67.4	
3rd quartile	69.3	68.2	
Top quartile	75.2	75.4	
<i>Significance</i>	$F(10831)=35.56,$ $p<0.001$	$F(11131)=33.43,$ $p<0.001$	
<i>By SPF rating of current school</i>			
Distinguished	75.7	73.0	69.8
Meets expectations	70.3	71.3	70.2
On watch	72.5	71.1	63.5
On priority watch	51.5	70.1	66.5
On probation	62.1	56.7	57.3
Not rated or not enrolled	90.2	89.0	86.4
<i>Significance</i>	$F(24132)=350.19,$ $p<0.001$	$F(25001)=310.82,$ $p<0.001$	$F(24938)=262.22,$ $p<0.001$

Notes: This table looks only at students entering one of three transition grades (kindergarten, 6th grade, and 9th grade). Percentages are calculated by dividing the number of participants in each particular category by the group's total enrollment. As in Klute's analysis of the 2012 data, only students who were currently enrolled in a DPS school were included in analyses including the free or reduced lunch variable as well as the analyses including ELL and special education students. The analysis by testing quartile is based only on students heading into the 6th and 9th grades, as students going into kindergarten have not yet been tested. Testing data for the 2013-14 school year are not yet available. Statistically significant differences at $p<0.05$ between FRL, ELL, and SPED subgroups are indicated by the higher value in boldtype. Statistical significance of differences among racial, performance, and SPF groups determined by ANOVA.

Table A3: Number of Choices by Grade and Region

	2012		2013		2014	
	Mean (SD)	Mode	Mean (SD)	Mode	Mean (SD)	Mode
Overall	2.8 (1.6)	1	2.8 (1.6)	1	2.8 (1.6)	1
<i>By grade</i>						
ECE	2.9 (1.6)	5	2.8 (1.6)	1	2.8 (1.6)	1
Kindergarten	2.7 (1.6)	1	3.0 (1.6)	5	2.8 (1.7)	1
Grades 1-5	2.3 (1.5)	1	2.6 (1.6)	1	2.6 (1.6)	1
Grade 6	3.1 (1.6)	5	3.0 (1.5)	5	3.1 (1.6)	5
Grades 7-8	2.1 (1.3)	1	2.5 (1.4)	1	2.6 (1.5)	1
Grade 9	3.1 (1.6)	5	2.9 (1.6)	5	2.8 (1.6)	1
Grades 10-12	2.0 (1.4)	1	2.3 (1.5)	1	2.3 (1.5)	1
<i>By region</i>						
Far Northeast	3.4 (1.5)	5	3.5 (1.5)	5	3.5 (1.5)	5
Near Northeast	2.8 (1.6)	1	2.9 (1.6)	1	2.9 (1.6)	1
Northwest	2.7 (1.6)	1	2.6 (1.6)	1	2.5 (1.5)	1
Southeast	2.8 (1.6)	1	2.6 (1.6)	1	2.5 (1.6)	1
Southwest	2.6 (1.6)	1	2.7 (1.5)	1	2.6 (1.6)	1

Table A4: Regression Results: Effect of Race/Ethnicity and Region of Residence on Number of Choices Made

	Model 1	Model 2	Model 3	Model 4
<i>Race/ethnicity (referent=white)</i>				
Black	0.66*** (0.03)		0.27*** (0.03)	0.31*** (0.03)
Hispanic	0.19*** (0.02)		-0.05* (0.02)	0.05 (0.03)
Other	0.23*** (0.04)		0.05 (0.04)	0.10* (0.04)
<i>Region (referent=Far Northeast)</i>				
Near Northeast		-0.87*** (0.02)	-0.86*** (0.03)	-0.87*** (0.03)
Northwest		-1.09*** (0.03)	-1.04*** (0.03)	-1.04*** (0.03)
Southeast		-1.07*** (0.03)	-1.06*** (0.03)	-1.06*** (0.03)
Southwest		-0.87*** (0.03)	-0.80*** (0.03)	-0.79*** (0.03)
<i>Controls</i>				
FRL				-0.03 (0.02)
ELL				-0.18*** (0.02)
SPED				-0.24*** (0.03)
<i>Grade (referent=kindergarten)</i>				
6th grade	0.37*** (0.02)	0.33*** (0.02)	0.33*** (0.02)	0.36*** (0.02)
9th grade	0.29*** (0.02)	0.25*** (0.02)	0.24*** (0.02)	0.25*** (0.02)
<i>Time trend (referent=2012)</i>				
2013	-0.04* (0.02)	-0.05** (0.02)	-0.06** (0.02)	-0.05* (0.02)
2014	-0.10*** (0.02)	-0.11*** (0.02)	-0.11*** (0.02)	-0.11*** (0.02)
Constant	2.57*** (0.03)	3.56*** (0.03)	3.52*** (0.03)	3.55*** (0.03)
<i>N</i>	32,261	32,261	32,261	32,261

Notes: The dependent variable—the number of choices made—is treated as a continuous variable in these Ordinary Least Squares (OLS) models (range=1:5). Standard errors are in parentheses. Similar models were estimated using Poisson regression with robust standard errors and the core results were substantively similar; while Poisson regression is useful for modeling count data, we present our OLS regression results here as their coefficients are easier to interpret (the coefficient can be read as increasing the number of choices a family makes given the condition specified by a given variable). The analytical sample includes only those entering transition grades (kindergarten, 6th grade, and 9th grade), and excludes those with missing information for the variables included in model 4. Statistical significance is indicated by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A5: Percent of Seats Offered by Region and School SPF Rating, Elementary Grades (ECE-5th)

Region	Not rated	On probation	On priority watch	On watch	Meets expectations	Distinguished
<i>2012</i>						
FNE	23.4	2.3	6.7	23.6	44.0	0.0
NNE	6.4	15.3	4.7	18.4	51.7	3.4
NW	4.5	10.9	9.2	36.5	38.8	0.0
SE	10.6	0.0	0.0	4.9	59.8	24.6
SW	0.0	4.2	5.9	36.0	53.0	0.9
<i>Total</i>	8.4	6.5	5.1	23.5	50.2	6.3
<i>2013</i>						
FNE	9.1	19.2	13.9	6.5	42.6	8.7
NNE	10.4	10.1	0.0	21.5	54.9	3.1
NW	4.1	27.3	0.0	21.0	48.6	0.0
SE	8.2	0.0	0.0	0.0	63.0	31.2
SW	2.4	0.0	15.0	30.2	52.8	0.9
<i>Total</i>	6.8	10.1	5.8	16.0	52.4	8.9
<i>2014</i>						
FNE	18.1	12.0	7.1	18.8	43.2	0.9
NNE	9.2	7.5	4.8	25.4	44.4	8.8
NW	0.0	20.9	8.5	21.3	49.3	0.0
SE	9.4	0.0	0.0	0.0	47.2	43.5
SW	3.9	11.5	5.8	17.1	60.7	0.9
<i>Total</i>	8.1	9.8	5.0	16.4	49.2	11.5

Notes: The percent of seats offered comes from projected enrollments from the next year. SPF ratings refer to the year in which SchoolChoice applications were filled out (so, for 2012, the SPF rating comes from 2011-12).

Table A6: Percent of Seats Offered by Region and School SPF Rating, Middle Grades (6th-8th)

Region	Not rated	On probation	On priority watch	On watch	Meets expectations	Distinguished
<i>2012</i>						
FNE	9.8	8.2	0.0	40.0	42.1	0.0
NNE	4.0	8.2	22.6	0.0	57.4	7.8
NW	15.1	6.4	11.7	18.6	24.7	23.5
SE	0.0	0.0	0.0	11.8	83.4	4.7
SW	3.6	26.1	0.0	31.5	24.5	14.4
<i>Total</i>	6.0	10.6	6.8	20.3	46.5	9.8
<i>2013</i>						
FNE	0.0	0.0	0.0	33.7	52.8	13.5
NNE	1.3	10.8	11.8	21.1	22.3	32.7
NW	0.0	33.9	0.0	6.2	59.9	0.0
SE	4.2	0.0	0.0	23.8	66.5	5.5
SW	0.0	21.0	18.7	10.9	26.3	23.1
<i>Total</i>	1.1	12.4	6.8	19.5	44.0	16.2
<i>2014</i>						
FNE	0.0	12.4	0.0	34.6	23.2	29.8
NNE	5.9	7.9	13.2	18.4	16.2	38.3
NW	0.0	27.0	4.3	29.3	39.4	0.0
SE	0.0	0.0	0.0	0.0	81.8	18.2
SW	0.0	16.6	17.9	11.6	26.3	27.6
<i>Total</i>	1.3	12.4	7.4	18.3	36.6	24.1

Notes: The percent of seats offered comes from projected enrollments from the next year. SPF ratings refer to the year in which SchoolChoice applications were filled out (so, for 2012, the SPF rating comes from 2011-12).

Table A7: Percent of Seats Offered by Region and School SPF Rating, High School (9th-12th)

Region	Not rated	On probation	On priority watch	On watch	Meets expectations	Distinguished
<i>2012</i>						
FNE	4.9	27.5	0.0	25.7	23.0	18.9
NNE	0.6	5.0	8.5	7.0	69.7	9.2
NW	8.6	41.0	12.1	25.0	13.4	0.0
SE	0.0	0.0	0.0	100.0	0.0	0.0
SW	8.0	5.3	30.3	40.6	15.9	0.0
<i>Total</i>	4.1	12.1	11.5	38.5	28.9	4.9
<i>2013</i>						
FNE	0.0	16.2	0.0	38.5	31.9	13.4
NNE	2.9	12.0	8.1	15.2	11.3	50.6
NW	4.8	36.7	4.1	35.1	19.3	0.0
SE	0.0	0.0	0.0	27.8	72.2	0.0
SW	4.5	8.5	6.3	59.0	21.6	0.0
<i>Total</i>	2.5	13.0	4.3	34.4	30.1	15.6
<i>2014</i>						
FNE	0.0	13.1	20.2	51.1	0.0	15.6
NNE	3.2	13.2	0.0	12.4	9.6	61.6
NW	0.0	22.7	8.7	44.7	23.8	0.0
SE	0.0	0.0	0.0	0.0	100.0	0.0
SW	0.0	8.1	34.9	40.9	16.0	0.0
<i>Total</i>	0.9	10.9	12.7	28.8	27.6	19.2

Notes: The percent of seats offered comes from projected enrollments from the next year. SPF ratings refer to the year in which SchoolChoice applications were filled out (so, for 2012, the SPF rating comes from 2011-12).

Table A8: Logistic Regression Results: Likelihood of Selecting a School Outside the Region of Residence as First Choice

	Model 1	Model 2	Model 3	Model 4	Model 5
Female	1.12*** (0.04)	1.13*** (0.04)	1.13*** (0.04)	1.13*** (0.04)	1.12*** (0.04)
<i>Race/ethnicity (referent=white)</i>					
Black	1.25*** (0.07)	1.44*** (0.09)	1.45*** (0.09)	1.16* (0.07)	1.16** (0.07)
Hispanic	0.87** (0.04)	0.73*** (0.04)	0.74*** (0.04)	0.79*** (0.03)	0.78*** (0.04)
Other	1.16* (0.08)	1.15* (0.08)	1.16* (0.08)	1.10 (0.07)	1.10 (0.07)
<i>Program participation</i>					
FRL	0.84*** (0.04)	0.76*** (0.03)	0.76*** (0.03)	0.81*** (0.04)	0.81*** (0.04)
SPED	0.96 (0.05)	0.95 (0.05)	0.95 (0.05)	0.96 (0.05)	0.96 (0.05)
ELL	0.74*** (0.03)	0.72*** (0.03)	0.72*** (0.03)	0.74*** (0.03)	0.74*** (0.03)
<i>Region of residence (referent=FNE)</i>					
NNE		1.15** (0.06)	1.15** (0.06)		
NW		2.08*** (0.12)	2.12*** (0.12)		
SE		1.01 (0.06)	1.02 (0.06)		
SW		2.10*** (0.11)	2.13*** (0.11)		
Requested school SPF (points)			1.22* (0.11)		0.92 (0.08)
Average SPF in region (points)				0.16*** (0.04)	0.15*** (0.04)
<i>Time trend (referent=2012)</i>					
2013					0.82*** (0.03)
2014					0.94*** (0.04)
<i>Grade (referent=kindergarten)</i>					
6th grade	1.93*** (0.08)	2.07*** (0.09)	2.04*** (0.09)	1.92*** (0.08)	1.94*** (0.08)
9th grade	2.97*** (0.13)	3.16*** (0.14)	3.14*** (0.14)	3.00*** (0.13)	3.01*** (0.13)
Constant	0.16*** (0.01)	0.13*** (0.01)	0.11*** (0.01)	0.48*** (0.08)	0.56*** (0.10)
<i>N</i>	26,067	26,067	26,067	26,067	26,067

Notes: Coefficients are presented as odds ratios, and can thus be interpreted as: For a one-unit increase in the independent variable, the odds of selecting a school outside the region of residence as the first choice increase (or decrease) by a factor of the odds ratio. Odds increase if coefficient is >1.0; odds decrease if coefficient is <1.0. Standard errors of the odds ratios are in parentheses. The analytical sample includes only those entering transition grades (kindergarten, 6th grade, and 9th grade), and excludes those with missing information for the variables included in model 5 and those who currently live outside of Denver (since any school they select will be, by virtue of it being located within Denver, outside of their residential “region”). When the average school SPF rating in a region is included in the model, region of residence is removed, given the perfect collinearity between these two measures. Statistical significance is indicated by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A9: Regression Results: Does Available Quality Drive the Demand for Quality?

	For first choice	For second choice
Average SPF in region (points)	0.18*** (0.02)	0.08*** (0.02)
Requested school is outside home region	0.02*** (0.00)	0.01*** (0.00)
Female	0.00 (0.00)	-0.01* (0.00)
<i>Race/ethnicity (referent=white)</i>		
Black	-0.02*** (0.00)	-0.01** (0.00)
Hispanic	-0.05*** (0.00)	-0.05*** (0.00)
Other	-0.03*** (0.00)	-0.02*** (0.01)
<i>Program participation</i>		
FRL	-0.05*** (0.00)	-0.04*** (0.00)
SPED	-0.02*** (0.00)	-0.02*** (0.00)
ELL	0.02*** (0.00)	0.01*** (0.00)
<i>Time trend (referent=2012)</i>		
2013	-0.00 (0.00)	0.01* (0.00)
2014	0.01*** (0.00)	0.01*** (0.00)
Constant	0.58*** (0.01)	0.62*** (0.01)
<i>N</i>	37,025	25,828

Notes: Coefficients are obtained from Ordinary Least Squares (OLS) models where the dependent variable is the SPF rating (in points) of the students' first and second choice, respectively. The number of observations is lower for the second model because some families only make one choice. For first choice, mean of dependent variable is 0.61 (s.d.=0.18, min=0.09, max=0.98). For second choice, mean of dependent variable is 0.62 (s.d.=0.18, min=0.09, max=0.98). Standard errors are in parentheses. The analyses combine all three years of data. Statistical significance is indicated by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A10: Percentage of SchoolChoice Participants Matched With Their Choices, Overall and By Grade

		All students					Excluding non-Denver residents				
		1st choice	1st-2nd	1st-3rd	1st-4th	1st-5th	1st choice	1st-2nd	1st-3rd	1st-4th	1st-5th
Overall: EC-12th	2012	69.9	79.1	82.6	84.0	84.7	71.2	80.5	83.9	85.3	86.0
	2013	72.4	82.8	86.4	87.8	88.6	74.0	84.5	88.0	89.4	90.2
	2014	63.5	71.4	74.4	75.5	76.1	64.8	72.7	75.7	76.7	77.4
Overall: K-12th	2012	72.2	81.5	84.7	86.0	86.6	73.7	83.1	86.3	87.6	88.2
	2013	73.8	85.0	88.9	90.2	91.0	75.7	87.1	90.8	92.2	92.9
	2014	65.2	73.5	76.5	77.6	78.3	66.8	75.1	78.1	79.1	79.8
Overall: K, 6th, and 9th	2012	77.7	87.2	90.2	91.4	92.0	78.8	88.3	91.4	92.5	93.1
	2013	78.4	88.3	91.8	93.0	93.7	80.0	89.9	93.3	94.5	95.1
	2014	74.5	83.1	86.1	87.2	87.8	75.8	84.5	87.4	88.4	89.1
<i>By grade</i>											
ECE											
Kindergarten	2012	61.0	69.7	74.0	75.8	77.1	61.4	70.2	74.5	76.3	77.6
	2013	67.1	73.6	76.5	78.1	79.1	67.5	74.1	76.9	78.5	79.6
	2014	55.7	62.0	64.9	66.0	66.7	56.2	62.5	65.3	66.4	67.2
Grades 1-5	2012	80.6	88.0	90.6	92.1	92.9	81.1	88.6	91.2	92.8	93.6
	2013	80.7	88.4	91.7	93.3	94.3	81.5	89.3	92.5	94.1	95.2
	2014	73.8	79.7	82.0	83.0	83.9	74.4	80.4	82.7	83.7	84.5
	2012	56.1	64.6	68.2	70.3	71.0	57.1	65.6	69.2	71.3	71.8
Grade 6	2013	60.7	76.4	81.0	83.0	84.2	62.4	78.5	83.1	85.0	86.2
	2014	40.7	47.7	50.5	51.5	52.3	41.7	48.8	51.6	52.6	53.3
	2012	76.4	87.6	91.0	92.0	92.3	77.3	88.4	91.9	92.8	93.1
	2013	76.8	88.6	92.0	92.9	93.4	78.2	90.1	93.6	94.5	95.1
Grades 7-8	2014	74.2	84.8	88.7	90.0	90.8	75.6	86.1	90.0	91.2	92.0
	2012	41.0	50.0	55.4	57.4	58.3	42.8	52.6	58.7	61.0	61.9
	2013	51.7	67.9	74.5	76.7	77.4	55.5	73.6	79.8	82.4	83.1
	2014	38.0	45.5	49.8	51.8	52.3	40.2	47.8	52.4	54.2	54.7
Grade 9	2012	74.8	85.6	88.8	89.8	90.2	76.8	87.8	90.9	91.8	92.2
	2013	76.9	87.8	91.8	92.8	93.0	79.8	90.7	94.1	95.1	95.2
	2014	76.0	86.2	89.0	89.7	90.0	78.4	88.8	91.5	92.1	92.4
	2012	62.3	69.4	72.0	72.2	72.2	66.6	74.8	77.2	77.4	77.4
Grades 10-12	2013	71.7	83.8	86.4	86.9	87.0	75.6	88.1	90.4	90.9	90.9
	2014	47.8	55.8	58.6	59.9	60.1	47.9	56.2	58.9	60.1	60.4

Notes: Table displays the percentage of SchoolChoice participants who were assigned to their choices, up to five. In the first set of numbers, we include all SchoolChoice applicants. In the second set of numbers, we exclude students who live outside of Denver. The relatively minor differences between our numbers and those published by DPS (available [here](#)) are likely due to (a) when the application and match data were pulled from the system for analysis (we received our data in late May 2014), and (b) different sample exclusions and definitions about "non-Denver" students.

Table A11: Percentage of SchoolChoice Participants Matched With Their Choices, by Race/Ethnicity and Region

<i>By race/ethnicity</i>		All students					Excluding non-Denver residents				
		1st choice	1st-2nd	1st-3rd	1st-4th	1st-5th	1st choice	1st-2nd	1st-3rd	1st-4th	1st-5th
Hispanic	2012	81.3	89.9	92.3	93.3	93.6	82.0	90.5	92.9	93.8	94.2
	2013	80.4	90.0	93.1	94.1	94.6	81.7	91.3	94.2	95.1	95.5
	2014	78.7	87.4	90.2	91.0	91.5	79.7	88.3	91.1	91.9	92.3
White	2012	72.3	82.4	85.8	87.4	88.3	73.7	84.2	87.7	89.3	90.2
	2013	75.1	85.0	88.9	90.6	91.7	77.1	87.2	91.3	93.1	94.2
	2014	67.6	75.7	78.7	79.9	81.0	68.9	77.3	80.4	81.6	82.6
Black	2012	73.6	85.8	90.2	92.0	92.5	75.4	87.9	92.1	93.6	94.0
	2013	77.8	88.1	92.6	93.9	94.5	79.7	90.1	94.0	95.3	95.7
	2014	75.7	85.1	89.1	90.3	90.8	77.1	86.4	90.2	91.3	91.9
Other	2012	77.0	87.0	90.7	91.6	92.6	77.9	87.7	91.5	92.4	93.3
	2013	77.0	88.2	91.4	92.5	93.5	78.2	89.3	92.6	93.8	94.8
	2014	69.2	78.1	80.5	81.8	82.7	71.9	80.6	83.0	84.1	85.1
<i>By region of residence</i>	Outside Denver	71.1	78.5	80.1	81.3	82.0					
	2012										
	2013	68.0	75.2	78.8	79.9	80.8					
2014	65.5	72.2	74.9	76.6	77.4						
FNE	2012	74.5	88.7	93.3	94.3	94.8					
	2013	76.9	91.7	95.9	97.2	97.7					
	2014	76.4	88.4	92.8	93.6	93.8					
NNE	2012	78.4	87.5	90.4	91.8	92.4					
	2013	79.0	89.3	93.0	94.7	95.4					
	2014	69.9	77.1	79.5	80.1	80.7					
NW	2012	82.8	89.4	92.0	93.2	93.7					
	2013	87.1	93.4	95.1	95.7	95.9					
	2014	82.8	89.2	92.0	92.8	93.5					
SE	2012	74.7	85.2	88.6	90.0	91.0					
	2013	80.6	88.7	91.9	92.8	93.8					
	2014	74.2	83.2	85.9	87.4	88.6					
SW	2012	82.9	90.0	92.0	92.8	93.0					
	2013	77.0	86.4	90.2	91.5	92.2					
	2014	77.9	86.8	89.6	90.7	91.3					

Notes: Table displays the percentage of SchoolChoice participants who were assigned to their choices, up to five. In the first set of numbers, we include all SchoolChoice applicants. In the second set of numbers, we exclude students who live outside of Denver. Note that this second set of numbers cannot be calculated by region of residence, since all students assigned to a region by definition live within Denver. Calculations are based only on students entering transition grades (kindergarten, 6th grade, and 9th grade). While match rates are higher for transition versus non-transition grades, as Table A10 shows, the patterns of differences between racial/ethnic groups and regions are consistent regardless of whether we include in our calculations transition students or all students.

Table A12: Logistic Regression Results: What Influences Whether Students Are Successfully Matched?

	Matched to first choice	Matched to no choices
Female	0.99 (0.03)	0.96 (0.05)
<i>Race/ethnicity (referent=white)</i>		
Black	0.95 (0.05)	1.10 (0.11)
Hispanic	1.00 (0.05)	0.95 (0.08)
Other	1.03 (0.07)	0.97 (0.11)
<i>Program participation</i>		
FRL	1.19*** (0.05)	0.79*** (0.05)
SPED	0.89* (0.04)	1.18* (0.09)
ELL	0.99 (0.04)	1.16*** (0.07)
<i>Region of residence (referent=FNE)</i>		
Outside Denver	1.39*** (0.10)	1.60*** (0.19)
NNE	1.57*** (0.07)	1.11 (0.09)
NW	2.05*** (0.12)	0.94 (0.09)
SE	1.40*** (0.07)	0.76** (0.08)
SW	1.14** (0.05)	1.36*** (0.12)
Requested school is outside home region ^a	0.70*** (0.03)	1.15 (0.09)
<i>SPF rating of requested school (referent=On probation)^b</i>		
Not rated	1.17 (0.11)	0.48** (0.12)
On priority watch	2.30*** (0.27)	0.30*** (0.06)
On watch	2.05*** (0.17)	0.34*** (0.05)
Meets expectations	1.01 (0.08)	0.38*** (0.05)
Distinguished	0.59*** (0.05)	0.85*** (0.12)
Requested school is special program ^a	0.92 (0.06)	1.01 (0.13)
SPF points of current school	1.44*** (0.14)	1.97*** (0.33)

Total number of choices made		0.79*** (0.01)
<i>Grade (referent=kindergarten)</i>		
6th grade	0.58*** (0.02)	0.99 (0.06)
9th grade	0.61*** (0.03)	1.04 (0.08)
<i>Time trend (referent=2012)</i>		
2013	1.22** (0.05)	0.41*** (0.03)
2014	0.93 (0.03)	1.32*** (0.08)
Constant	3.51*** (0.37)	0.16*** (0.03)
<i>N</i>	32,139	32,139

Notes: Coefficients are presented as odds ratios, and can thus be interpreted as: For a one-unit increase in the independent variable, being matched to one's first choice (column 1) or to none of their choices (column 2) increase (or decrease) by a factor of the odds ratio. Odds increase if coefficient is >1.0; odds decrease if coefficient is <1.0. Standard errors are in parentheses. The analytical sample includes all SchoolChoice participants who are entering transition grades (kindergarten, 6th grade, and 9th grade), and excludes those with missing information for the variables included in each model. ^aIn the model predicting the likelihood of being rejected from all choices, the variables measuring whether requested school was out of region and whether requested school was a special program are averaged across all of a student's choices (instead of dichotomous or categorical variables, as in the model predicted being accepted to one's first choice). ^bIn the model predicting the likelihood of being rejected from all choices, the set of variables measuring the SPF of the requested schools refers to the *highest*-rated school in a student's choice set; models using the SPF of the *lowest*-rated school yielded similar results. Statistical significance is indicated by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.