



AUGENBLICK,  
PALAICH AND  
ASSOCIATES

# MEMORANDUM

To: Denver Preschool Program  
From: APA Consulting  
Re: DPP 2010-11 Cohort Sample of 200 Analysis and Third Grade PARCC Results Analysis

## Introduction

In 2006, Denver voters approved a dedicated sales tax to fund the Denver Preschool Program (DPP). DPP began in 2007 and had its first full year of operations during the 2008-09 school year. DPP offers tuition support for all Denver families with four-year-old children, regardless of family income or neighborhood. Tuition support is scaled to family income, the quality of the school selected, and participation level. Through the 2014-15 school year, DPP has distributed over \$67 million in tuition support to help more than 36,000 Denver four-year-olds attend a quality-rated preschool. The program serves about 4,600-5,000 students per school year. DPP partners with more than 250 quality-rated preschool sites, and has invested more than \$9.7 million in these sites since 2007. Sites include community-based centers, family child care homes, and Denver Public Schools (DPS) preschool classrooms. The first full cohort of DPP students entered preschool in the 2008-09 school year. There are now three years of third grade assessment data on students who were approved to participate in DPP in earlier years (2008-09, 2009-10, and 2010-11). The 2010-11 DPP cohort entered third grade in DPS in fall 2014. Much of this cohort, along with other DPS students, participated in Partnership for the Assessment of Readiness for College and Careers (PARCC) third grade assessments in English Language Arts (ELA) and math in spring 2015.

Since 2007, APA Consulting (APA), in partnership with the Institute at Clayton Early Learning (Clayton), has led the evaluation of DPP.<sup>1</sup> The evaluation includes a child outcomes analysis, which measures DPP students' preschool development and kindergarten readiness; and a K-12 longitudinal analysis, which measures DPP students' academic achievement compared to non-DPP peers. This memo describes the current evidence about whether students who participate in DPP in the year before kindergarten are more likely to meet or exceed expectations on third grade statewide standardized assessments, compared to students who did not participate in DPP. Specifically, this memo discusses (1) a sample of

---

<sup>1</sup> APA staff members on the evaluation team include Bob Palaich, Ph.D.; Kathryn Rooney, MPA; Simon Workman, MPA; Abby McClelland, MPP, JD; Sarah Wool, and Jack Hill. Clayton staff members on the evaluation team include Sheridan Green, Ph.D.; and Caroline Ponce. During the first four years of the evaluation, Mary Klute, Ph.D., now with Marzano Research (Marzano), led the evaluation effort at Clayton.

200<sup>2</sup> analysis of the 2010-11 DPP cohort as that cohort moved from preschool through third grade and (2) an analysis of all children in DPS who took third grade PARCC exams in spring 2015 (comparing DPP and non-DPP children), including an analysis of elementary school quality. Before moving into these discussions, this memo presents overviews of DPP and of the measures used in each analysis.

### ***Denver Preschool Program***

DPP is a taxpayer-funded initiative that operates under the beliefs that (1) preschool plays an important role in the academic and social-emotional development of children, and that (2) participating in a high-quality preschool, even for only one year, can have a positive impact on a child. Denver voters approved the Preschool Matters initiative in November 2006. Under this ballot initiative, the City collected a 0.12-cent sales tax, earmarked for DPP. In November 2014, Denver voters approved DPP for an additional 10 years and increased the sales tax from 0.12 percent to 0.15 percent. DPP provides tuition credits to families and provides funding so that preschools serving children who live in Denver can obtain state-approved quality ratings. DPP-participating programs also receive access to professional development opportunities (e.g. training and coaching) and quality improvement grants to assist them in their efforts to improve program quality.

DPP is a four-person 501(c)3 nonprofit organization. Staff consists of a President and CEO, a Director of Operations, a Director of Quality Initiatives, and a Director of Outreach. The organization is overseen by a Board of Directors. With the exception of one City Council member, all Directors are appointed by the Mayor. DPP is required to provide status reports to the Denver Office of Children's Affairs, a Denver city agency, as well as the City Council annually.

DPP-designated preschools must be licensed and quality-rated by the state of Colorado, participate in DPP's quality improvement program, and serve children who live in Denver. The provider may be located outside the borders of the City and County of Denver. All DPP preschools are or soon will be rated for quality via the State of Colorado's Colorado Shines Level 3 through 5 Assessment. In the 2010-11 school year however, DPP preschools were quality-rated using the Qualistar Rating™ system. DPP provides financial supports to preschools to offset the cost of program and classroom rating. Additionally, DPP works with the providers to help improve their quality ratings through a quality improvement credit system. DPP provides preschools with an annual credit allowance based on need. Credits can be exchanged for professional development, coaching, or classroom materials. Providers are re-rated on a regular basis.

To obtain tuition credits (funded through the previously mentioned sales tax), a Denver family chooses a participating DPP preschool and submits an application to verify their residency and their child's age, per DPP requirements. Once a child is approved, DPP determines that child's family income level and preschool participation level (part-, full-, or extended-day) to calculate the full value of the tuition credit.

---

<sup>2</sup> In this memo, "sample of 200" refers to a randomly selected group of children from the 2010-11 DPP cohort. "Cohort," in contrast, refers to *all* children who participated in DPP in 2010-11. When comparing DPP and non-DPP students in terms of PARCC scores, the evaluation team looked at *all* 2010-11 DPP children who took the spring 2015 third grade PARCC tests in DPS.

## ***Measures in This Memo***

This memo discusses results from the evaluation team’s analysis of a sample of 200 from the 2010-11 DPP cohort and the team’s analysis of third grade PARCC results from the same cohort, including a discussion of student performance as it relates to school quality. Within the overall DPP evaluation, different analyses use different measures (i.e. test and assessment batteries) to assess children’s progress and achievement. This section explains the measures and analysis techniques used in the different parts of this memo.

## **Measures Used in the Sample of 200 Analysis**

The evaluation team’s sample of 200 analysis for the 2010-11 DPP cohort looks at students in terms of

- kindergarten readiness, which measures spring preschool scores and status relative to norms;
- first grade reading achievement, assessed in spring of the first grade year;
- second grade reading achievement, assessed in spring of the second grade year; and
- third grade English Language Arts achievement, assessed in spring of the third grade year.<sup>3</sup>

To do this, the team used several different assessment tools. To measure kindergarten readiness (i.e. spring preschool scores relative to norms), the team used the Peabody Picture Vocabulary Test-4 (PPVT: Dunn & Dunn, 2007) and the Test de Vocabulario en Imagenes Peabody (TVIP: Dunn, Lugo, Padilla & Dunn, 1986). The PPVT and TVIP are widely used measures of receptive vocabulary in English and Spanish, respectively. The team also used the Woodcock-Johnson III Achievement Battery (WJ; Woodcock, McGrew, & Mather, 2001) and the Bateria III Woodcock-Muñoz (WM; Muñoz-Sandoval, Woodcock, McGrew & Mather, 2005). The team used two WJ tests: Letter-Word Identification (LWI, an assessment of pre-literacy and literacy skills) and Applied Problems (a math assessment). The WJ has a parallel Spanish version, WM, and these two tests have strong reliability for preschool-aged children. Finally, the team conducted parent and teacher surveys using the Devereaux Early Childhood Assessment (DECA: LeBuffe & Naglieri, 1999) to measure children’s social-emotional development.

To gather information on the 2010-11 DPP cohort’s kindergarten reading achievement, the team used data from the kindergarten DRA Developmental Reading Assessment Version 2 (DRA2) and Evaluacion Del Desarrollo De La Lectura 2 (EDL2), each administered in spring of the kindergarten year.<sup>4</sup> The same tests were used to assess the cohort’s reading achievement in first and second grades, and were also administered in the springtime. When the cohort reached third grade, the evaluation team switched to using the PARCC third grade spring 2015 ELA test as a measure of reading achievement and proficiency.

---

<sup>3</sup> The evaluation team also looked at preschool progress – growth made between assessments conducted in the fall of the preschool year and assessments conducted in the spring of the preschool year – for the sample of 200. (Preschool progress differs from kindergarten readiness in that the former measures growth while the latter measures relative achievement and preparedness.) A report that looks more specifically at preschool progress for the sample of 200 is forthcoming.

<sup>4</sup> Tasks measured by the DRA test are divided into several skill sets. Rhyming, alliteration, segmentation, and phonemic awareness are tested in the phonemic awareness section. Letter naming, word-list reading, spelling, decoding, analogies, structural analysis, and syllabication are tested in the alphabetic principle/phonics portions. Oral reading fluency or words per minute for contextual reading are tested under fluency. Vocabulary, comprehension, and reading engagement skills are also measured in the test.

## Measures and Analysis Techniques Used in the PARCC Results Analysis

The evaluation team used spring 2015 third grade PARCC test results in the ELA and math test to analyze the 2010-11 DPP cohort's academic achievements relative to those of their peers. PARCC replaced Transitional Colorado Assessment Program (TCAP), Colorado's previous tool for measuring the knowledge and skills of students in third through ninth grades. Although this memo focuses on PARCC tests, it is important to understand some of the differences between TCAP and PARCC as a means of giving context to the analysis of PARCC results. The "Transition from TCAP to PARCC" subsection, below, covers some of the major difference between the two assessments.

Also included in the analysis of PARCC results is the analysis of elementary school quality. To examine elementary school quality, the evaluation team used the Denver School Performance Framework (SPF) ratings to assess whether elementary schools where DPP students enrolled met expectations. The SPF "is a comprehensive system to help schools focus on strengths and areas for targeted improvement. A wide range of measures are used to calculate ratings of how well each school supports student growth and achievement, and how well it serves students and families."<sup>5</sup> Schools are rated based on a point system. There are five possible ratings: Distinguished (earning 80-100 percent of points), Meets Expectations (51-79 percent), Accredited on Watch (40-50 percent), Accredited on Priority Watch (34-39 percent), and Accredited on Probation (up to 33 percent).

### ***Transition from TCAP to PARCC***

There are a number of noteworthy differences between TCAP and PARCC exams. Before the switch to PARCC in 2014-15, TCAP was administered to students in 2012-13 and 2013-14. TCAP tests were administered as paper and pencil assessments, without computers. TCAP included individual assessments for reading and writing, along with a math assessment. TCAP was not vertically aligned between grades, so the performance of one cohort on the third grade assessment was not comparable to the performance of the same cohort taking the fourth grade assessment. In contrast to TCAP tests, PARCC tests are typically administered as computerized assessments.<sup>6</sup> PARCC combines reading and writing into one ELA assessment, and also includes a math assessment. PARCC is vertically aligned between grades and will enable comparisons across grade levels.

With the switch from TCAP's paper and pencil assessment system to PARCC's computerized assessments, overall test scores have tended to decrease. PARCC's chief of assessment, Jeffrey Nellhaus, says the pattern "may be explained [in part] by students' [level of] familiarity with the computer-delivery system," where students may be less familiar with computerized tests than paper and pencil assessments.<sup>7</sup> Compared to TCAP scores, PARCC scores have also shown a larger gap between white students and students from different races.<sup>8</sup>

---

<sup>5</sup> <http://spf.dpsk12.org/>

<sup>6</sup> Different formats of the PARCC exams are still available, and some students may have taken the PARCC exams on paper. However, the majority of PARCC exams are administered online.

<sup>7</sup> Herold, B. (2016, Feb.). PARCC Exams Lower for Students Who Took Exams on Computers. *Education Week*. Published online 2/3/16. Retrieved 2/5/16 via [edweek.org](http://edweek.org).

<sup>8</sup> Tables and analyses in the body of this report illustrate how PARCC tests have highlighted a gap (often referred to as the achievement gap or the opportunity gap) between white students and their minority peers.

Table 1, below, provides an overview of the differences between the two tests. It is important to note, however, that PARCC results are not directly comparable to TCAP results. Comparisons across the two tests would require transforming students' raw scores into percentiles. Even with such a transformation, it is likely that the two tests measure different underlying skills, so comparisons across tests are likely less meaningful than comparisons within tests. This memo focuses solely on PARCC tests administered during the 2014-15 school year.

**TABLE 1: COMPARISON OF TCAP AND PARCC EXAMS**

	TCAP	PARCC
<b>Time Period</b>	2012-13 – 2013-14 school years	2014-15 school year –
<b>Who Developed</b>	Colorado	National PARCC Consortium
<b>How Administered</b>	Paper and Pencil	Online
<b>Scoring Scale</b>	150 – 900	650 – 850
<b>Proficiency Categories</b>	Four Categories: <ul style="list-style-type: none"> <li>• Unsatisfactory;</li> <li>• Partially Proficient;</li> <li>• Proficient; and</li> <li>• Advanced</li> </ul>	Five Categories: <ul style="list-style-type: none"> <li>• Does Not Meet Expectations;</li> <li>• Partially Meets Expectations;</li> <li>• Approaches Expectations;</li> <li>• Meets Expectations; and</li> <li>• Exceeds Expectations.</li> </ul>
<b>Standards Alignment</b>	Colorado standards for Language Arts, math, and science	Common Core State Standards
<b>Opt-out Policies</b>	Law did not allow parental opt-out.	Policies vary by district. Opt-out rates for 2014-15 school year were higher in grades seven and above, with up to 31 percent of students opting out statewide.
<b>Typical Language Arts Question</b>	Here is a word. Pick a synonym from a list of five choices.	Select definitions for words as those words are used in the context of reading passages.
<b>Typical Math Question</b>	Select the correct answer.	Select the correct answer and explain the mathematical reasoning.

## DPP 2010-11 Cohort Sample of 200 Analysis

### Sample of 200 Representativeness

The 200 children selected for inclusion in the evaluation study were compared with children approved by DPP but not included in the sample. This was a means of checking the sample's representativeness. For the 2010-11 cohort, the evaluation team performed statistical tests checking for differences in child gender, race/ethnicity, family income, Qualistar Rating™ of the child's preschool, home language, and child's primary language. In the 2010-11 cohort, no significant differences were found between study volunteers and non-volunteers on these variables. Thus, no stratification was necessary for ensuring representativeness of the sample. For the DPS sample, families in income Tier 5 and in the northeast region of Denver were overrepresented in the sample, and families from the southwest quadrant were underrepresented. Thus, the sample was adjusted in the stratification process to result in a sample representative of DPP as a whole at that time (2010-11).

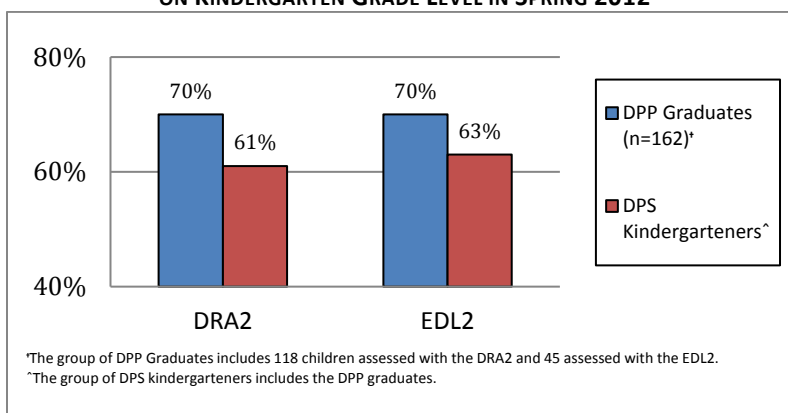
### Sample of 200 Kindergarten Readiness

After the evaluation team ensured the sample of 200's representativeness, the team examined the results of all administered assessments. Analysis results of the 2010-11 DPP sample suggested that, by spring, the vast majority of children were ready for kindergarten, both academically and social-emotionally. When considering both languages of assessment, the evaluation team concluded that few children had scores in the risk range (below standard score of 85) on assessments of their vocabulary, literacy, and math skills. These nationally standardized assessments are scaled such that students who have a standard score above 85 are approaching or have reached readiness for kindergarten. Average scores for literacy, math, and vocabulary in this sample exceeded that threshold. In addition, when teachers rated children's behaviors, their ratings of protective factors were high for most children. Protective factors (i.e. initiative, self-control and attachment) were rated as areas of concern for less than 10 percent of children.

### Sample of 200 Kindergarten Reading Achievement

The evaluation team obtained spring reading assessment data one year after the DPP experience for over 80 percent of the 200 children in the sample. These data included results from the kindergarten DRA2 and EDL2. Chart 1, below, displays the proportion of the 2010-11 sample of DPP graduates whose reading level was at or above grade level as assessed by the DRA2 and EDL2. This is presented alongside the reading levels for kindergarteners in DPS as a whole in spring 2012, which includes the DPP sample as well as non-DPP students also in DPS kindergarten.

**CHART 1: PERCENTAGE OF 2010-11 DPP SAMPLE OF 200 CHILDREN READING ON KINDERGARTEN GRADE LEVEL IN SPRING 2012**



As Chart 1 shows, 70 percent of the DPP cohort sample (assessed in English with the DRA2) were reading at or above grade level by the end of kindergarten. In contrast, in DPS as a whole, 61 percent of children were reading at or above grade level. Similarly, 70 percent of the DPP cohort sample assessed in Spanish using the EDL2 was reading at or above grade level by the end of kindergarten. In contrast, 63 percent of children in DPS as a whole were reading at or above grade level as assessed by the EDL2. Within DPS, a DRA2 score of 4 is considered the benchmark for being "on grade level" for reading. For all four bars in Chart 1, percentages of students reading on grade level are based on that cutoff of 4. (Each bar represents the percentage of kindergarten students reaching or exceeding a score of 4 on the spring

assessment.) The percentage who reach a 4 or higher are considered at grade level by DPS and by test standards for that grade.

### Sample of 200 First Grade Reading Achievement

**CHART 2: PERCENTAGE OF 2010-11 DPP SAMPLE OF 200 CHILDREN READING ON FIRST GRADE LEVEL IN SPRING 2013\***

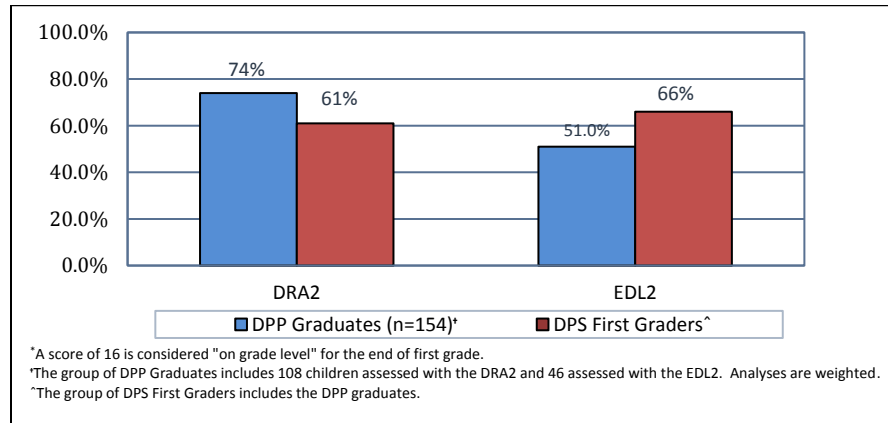


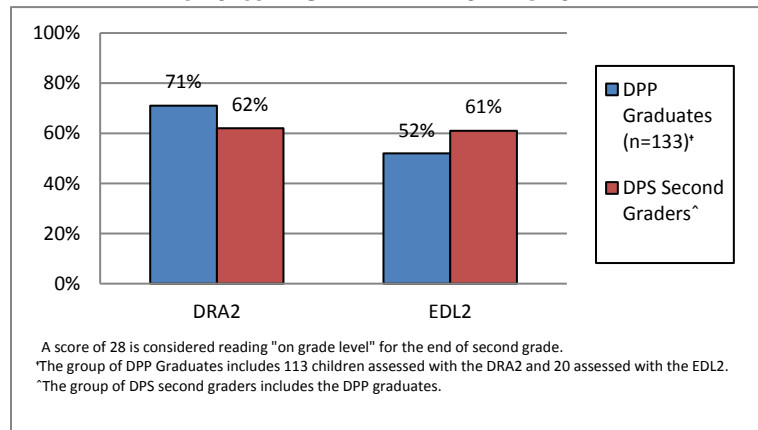
Chart 2 displays the percentage of 2010-11 DPP graduates whose reading level was at or above first grade level as assessed by the DRA2 and EDL2. This is presented alongside the reading levels for first graders in the district as a whole in spring 2013. Nearly three-quarters of DPP graduates assessed in English with the DRA2 were reading at or above grade level by the end of first grade. This is greater than the proportion reading at or above grade level in the district as a whole (61 percent). About half of DPP graduates assessed in Spanish using the EDL2 were reading at or above grade level by the end of first grade. In contrast, two-thirds of children in the district as a whole were reading at or above grade level as assessed by the EDL2.

### Sample of 200 Second Grade Reading Achievement

The spring 2014 second grade reading assessment data for the 2010-11 cohort sample were similar DPS district-wide data in terms of the racial and gender composition of students, with only slightly fewer Hispanic children in the DPP sample than in the district as a whole. A smaller percentage of children in the DPP sample qualified for free or reduced-price lunch (FRPL) than for the district as whole, suggesting that the samples might be composed of slightly wealthier families than the district as a whole.

Chart 3, below, displays the percentage of the 2010-11 DPP cohort sample whose reading levels were at or above grade level as assessed by the DRA2 and EDL2 in the spring of second grade. This is presented alongside the reading levels for second graders in DPS as a whole, which includes the DPP sample.

**CHART 3: PERCENTAGE OF 2010-11 DPP SAMPLE OF 200 CHILDREN READING ON SECOND GRADE LEVEL IN SPRING 2014**

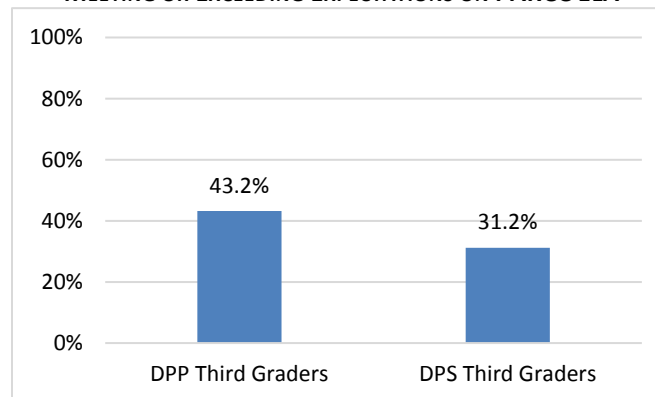


As can be seen in Chart 3, 71 percent of DPP graduates assessed in English with the DRA2 were reading at or above grade level by the end of second grade, compared with 62 percent of second graders in the district as a whole. Only 20 DPP graduates were assessed using the EDL2. Of this very small sample, 52 percent were reading on grade level compared to 61 percent of the second graders assessed with EDL2 in the district as a whole.

### Sample of 200 Third Grade Reading Achievement

Chart 4, below, displays the percentage of the remaining 2010-11 DPP sample of 200 ( $n=102$ ) who received scores of “Meets Expectations” or “Exceeds Expectations” as assessed by the PARCC ELA test in the spring of third grade. This is presented alongside the comparison percentages for third graders in the district as a whole in spring 2015 (which includes the DPP sample). More than 43 percent of DPP graduates assessed with the PARCC ELA were meeting or exceeding grade level expectations by the end of third grade, compared with 31.2 percent of third graders in the district as a whole. By third grade, the original sample of 200 included 102 students for whom data were available (51 percent of the original sample). Results for the PARCC math test are quite similar to results for the ELA test. On the math test, 41.2 percent of DPP students (i.e. 49 of 119 with available data) met or exceeded expectations at third grade compared with 29.5 percent of third grade students in DPS as a whole (including the DPP sample).

**CHART 4: PERCENTAGE OF 2010-11 DPP SAMPLE OF 200 CHILDREN MEETING OR EXCEEDING EXPECTATIONS ON PARCC ELA**





## Summary of Sample of 200 Analysis

Cumulatively, these results demonstrate that the representative sample of DPP graduates in the third full cohort of DPP (2010-11) were generally more likely to be reading on grade level by the end of their kindergarten year, by the end of first grade, by the end of second grade, and more likely to meet or exceed expectations in ELA by the end of the third grade, compared to the district as a whole. For the 2010-11 cohort, the gap between DPP graduates and all DPS students on the DRA2 was nine percentage points in spring 2012 (kindergarten), 13 percentage points in spring 2013 (first grade), nine percentage points in spring 2014 (second grade), and 12 percentage points on PARCC ELA in spring 2015 (third grade). The DPP 2010-11 cohort students followed from prekindergarten through third grade were more likely than the district as a whole to meet or exceed grade level expectations. These results indicate that this sample of DPP graduates outperformed their peers upon entering school, and continued to do so three years later.

## Spring 2015 Third Grade PARCC Results

This section looks at third grade PARCC English/Language Arts (ELA) and math scores for 2010-11 DPP cohort students compared to their non-DPP peers. While the bulk of this section focuses on comparisons of students within Denver Public Schools (DPS), the evaluation team also used data from the Colorado Department of Education (CDE)<sup>9</sup> to look at third grade PARCC results across Colorado. Throughout this section, references to “passing” tests mean receiving a score of “Meets Expectations” or “Exceeds Expectations.”

### *Third Grade PARCC Results in Colorado*

Across the state, there were 62,675 valid scores on the spring 2015 third grade PARCC ELA test (a 95.0 percent participation rate), and 38.2 of students received passing scores. On the PARCC math test, there were 63,766 valid scores (95.2 percent participation), and 36.7 percent of students passed.

### *Third Grade PARCC Results in DPS*

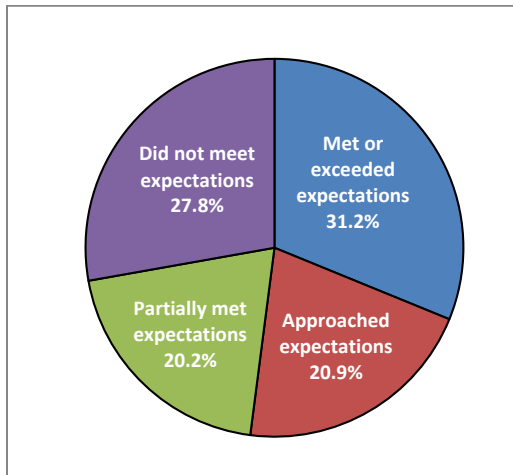
Using data from DPS, the team looked at results for DPS students who took one or more (ELA, math, or both) of the 2015 third grade PARCC tests. This section looks at those test results, for all test-takers and for DPP versus non-DPP test-takers. This section begins with an analysis of results by demographics (including race, FRPL eligibility, and English Language Learner (ELL) status, and gender), then presents an analysis of results by DPP status, and finally presents an analysis of results by both demographics and DPP status. School quality analysis is integrated throughout this section.

Most of the DPS third graders who took 2015 PARCC tests did not pass the PARCC ELA and math tests. Only 31.2 percent of DPS PARCC test-takers passed the ELA test, and only 29.5 did so on the math test. Overall ELA and math results are shown in Charts 5 and 6, respectively.

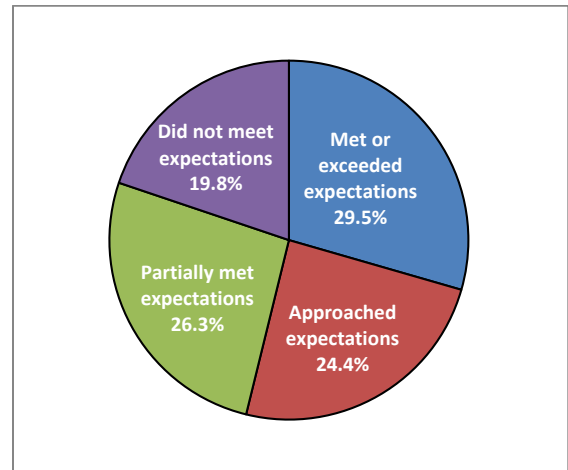
---

<sup>9</sup> <https://www.cde.state.co.us/assessment/cmas-elamath2015-achievement>

**CHART 5: DISTRIBUTION OF STUDENTS BY THIRD GRADE PARCC ELA PROFICIENCY**



**CHART 6: DISTRIBUTION OF STUDENTS BY THIRD GRADE PARCC MATH PROFICIENCY**



### DPS Third Grade PARCC Results, by Demographics

Demographics are an important variable to consider in any analysis of student achievement. Looking at how well students perform by demographic groups can help schools, districts, and states spot student achievement gaps and find areas for targeted instructional improvement. Discussing a recent report<sup>10</sup> on achievement gaps, *Chalkbeat* reported that

Despite DPS’s extensive efforts at school reform that have gained national attention, the district’s achievement gap between white and minority students has persisted for the last decade. Black and Latino students are making gains, but the gap is widening because white students are improving at a faster rate.<sup>11</sup>

With factors like the achievement gap in mind, the evaluation team looked at PARCC results across demographic groups. Table 2, below, offers an overview of the percentages of DPS students passing the spring 2015 third grade PARCC, by test and by student demographics.

**TABLE 2: PERCENTAGE OF DPS STUDENTS PASSING THIRD GRADE PARCC, BY SUBTEST AND DEMOGRAPHICS**

		ELA	Math
Race	Black	16.8%	15.7%
	Hispanic	17.9%	17.8%
	White	59.9%	60.0%
	Other race	36.9%	39.5%
FRPL Status	FRPL	16.6%	17.2%

<sup>10</sup> DeArmond, M., Denice, P., Gross, B., Hernandez, J. Jochim, A., and Lake, R. (2015, Oct.) *Measuring Up: Educational Improvement and Opportunity in 50 Cities*. University of Washington, Center for Reinventing Public Education (CRPE). Retrieved 2/19/16 from <http://www.crpe.org/publications/measuring-educational-improvement-and-opportunity-50-cities>.

<sup>11</sup> Gorski, E. (2015, Oct.) Report: Denver ranks last among cities scrutinized for income-based achievement gaps. Retrieved 2/19/16 from <http://co.chalkbeat.org/2015/10/07/report-denver-ranks-last-among-50-cities-on-income-based-achievement-gaps/#.VsYv5fkrIU4>. Para. 9.

		ELA	Math
	<b>Non-FRPL</b>	59.9%	58.7%
<b>ELL Status</b>	<b>ELL</b>	16.2%	18.3%
	<b>Non-ELL</b>	37.2%	36.1%

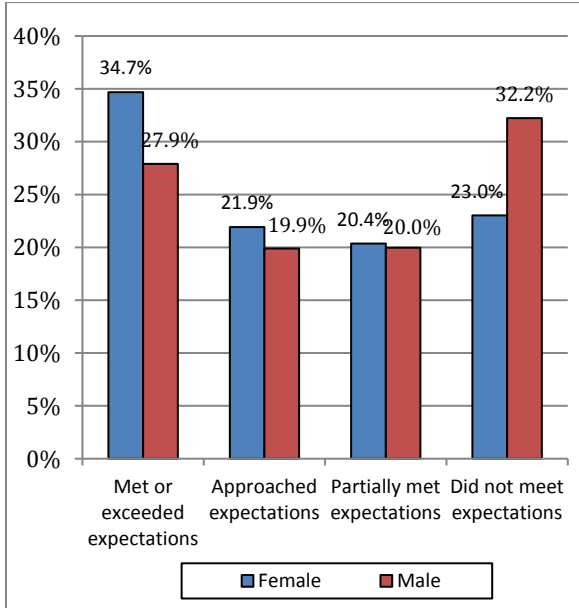
As can be seen in the table, white students passed PARCC ELA and math tests at the highest rates (59.9 percent and 60 percent, respectively), followed by other race students, Hispanic students, then black students. Students who did not qualify for FRPL passed ELA and math tests at much higher rates than FRPL-eligible peers. For ELA, the difference between non-FRPL and FRPL students was 43.3 percentage points. For math, the difference was 41.5 percentage points. Non-ELL students passed ELA and math at higher rates than ELL students, though the gap between these students was not as large as the gap between FRPL and non-FRPL students. The differences between scores for different demographic groups may point to larger achievement gaps across races as well as socioeconomic groups.

Charts 7 and 8, below, show student PARCC ELA and math scores broken down by gender. Female students were far more likely than males to pass PARCC ELA. Female students were slightly more likely than male students to pass PARCC math. According to recent research from the American Psychological Association, girls tend to perform better in every school subject than boys, when performance is measured through grades. Boys, however, often outperform girls on math and science achievement tests.<sup>12</sup> The results of the PARCC third grade test scores are interesting to consider in this context, as they show girls outperforming boys on both ELA and math tests. Future research could examine how gender performance gaps narrow or expand as this cohort of students enters middle and high school.

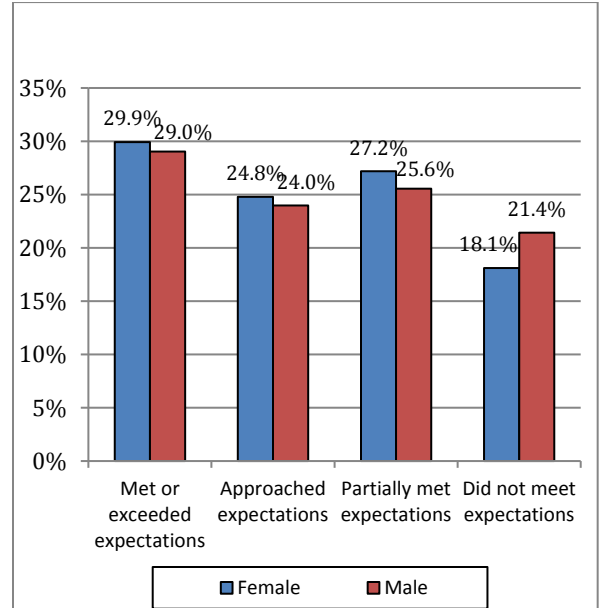
---

<sup>12</sup> American Psychological Association. (2014, April). Girls Make Higher Grades than Boys in All School Subjects, Analysis Finds. Retrieved 2/19/16 from [www.apa.org/news/press/releases/2014/04/girls-grades.aspx](http://www.apa.org/news/press/releases/2014/04/girls-grades.aspx).

**CHART 7: DISTRIBUTION OF DPS STUDENTS BY GENDER AND PARCC ELA PROFICIENCY**

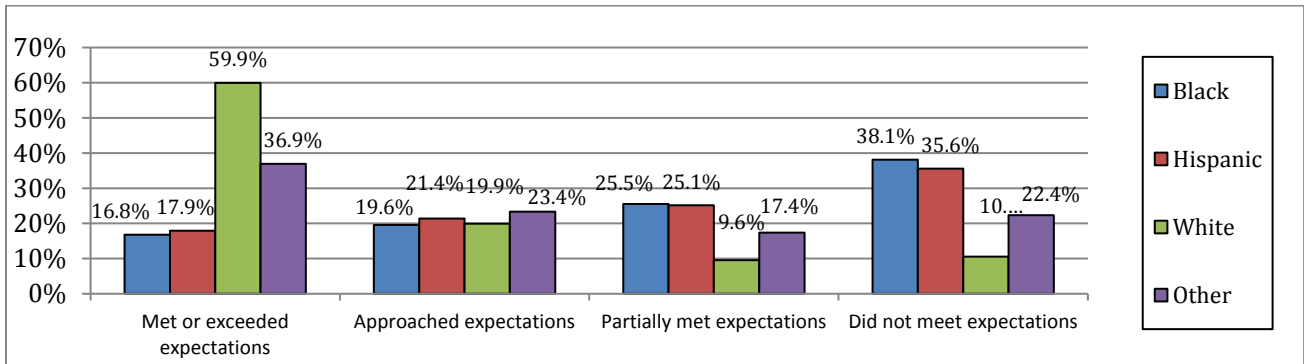


**CHART 8: DISTRIBUTION OF DPS STUDENTS BY GENDER AND THIRD GRADE PARCC MATH PROFICIENCY**

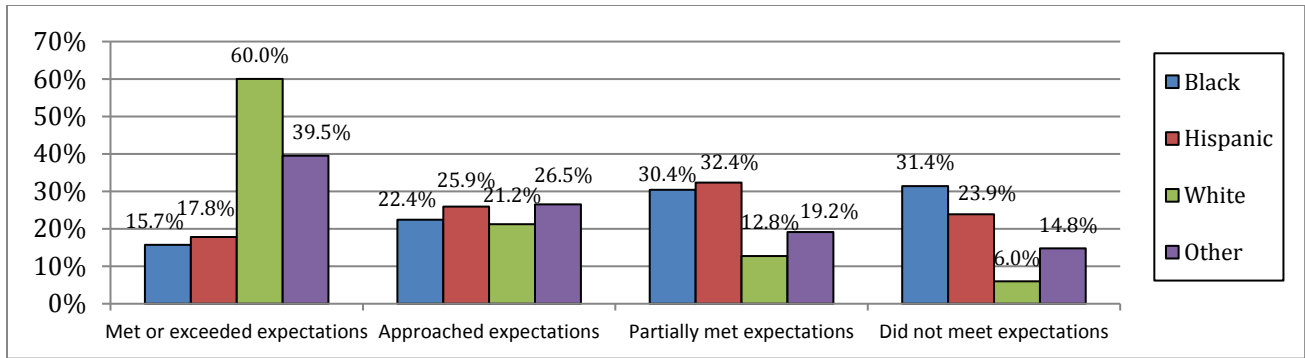


Charts 9 and 10, below, offer more detail on performances on the PARCC tests across races. Chart 9 provides an overview of how well students of different races performed on the PARCC ELA test. White students were far more likely than other students to pass PARCC ELA. Chart 10 illustrates results on the math test, and shows that white students were far more likely than students of other races to pass PARCC math. These results align with larger trends across Colorado, where Asian and white students had higher levels of proficiency on ELA and math than students of other racial backgrounds.

**CHART 9: DISTRIBUTION OF DPS STUDENTS BY RACE AND THIRD GRADE PARCC ELA PROFICIENCY**

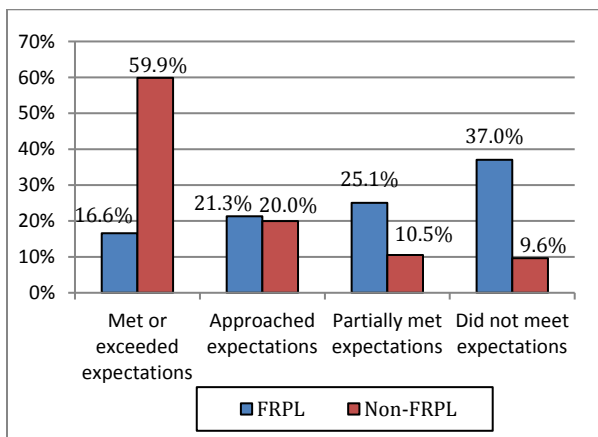


**CHART 10: DISTRIBUTION OF DPS STUDENTS BY RACE AND THIRD GRADE PARCC MATH PROFICIENCY**

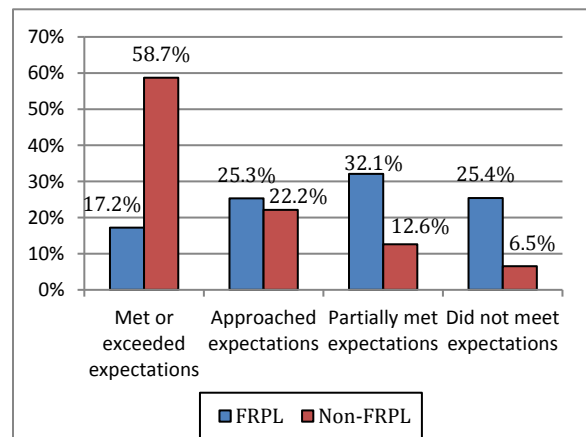


Charts 11 and 12, below, offer more detail on the PARCC tests across socioeconomic groups, comparing FRPL-eligible and non-FRPL-eligible test-takers. Chart 11 shows that non-FRPL students were far more likely than FRPL-eligible students to pass PARCC ELA. The same was true for the math test, as seen in Chart 12.

**CHART 11: DISTRIBUTION OF STUDENTS BY FRPL STATUS AND THIRD GRADE PARCC ELA PROFICIENCY**

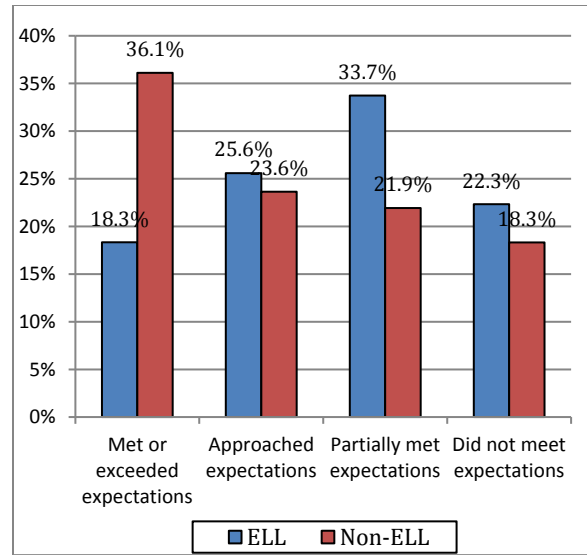
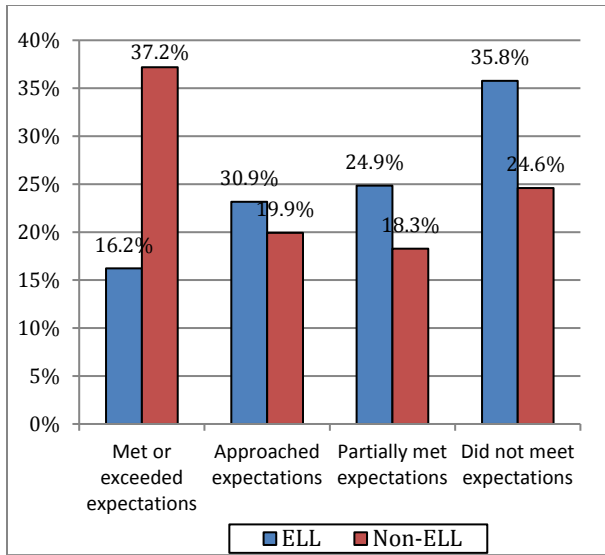


**CHART 12: DISTRIBUTION OF STUDENTS BY FRPL STATUS AND THIRD GRADE PARCC MATH PROFICIENCY**



Charts 13 and 14, below, compare performances on ELA and math by tests by student language. Chart 13 compares ELL students to non-ELL students in terms of ELA proficiency. Non-ELL students were far more likely than other students to meet or exceed expectations on the PARCC third grade ELA test. Chart 14, below, shows that non-ELL students were far more likely than ELL students to meet or exceed expectations on PARCC math. Since DPS is a district with a high percentage of ELL students, comparing results between ELL and non-ELL students could help schools and districts measure how well they are serving non-native English speakers through general instruction and/or specialized instruction.

**CHART 13: DISTRIBUTION OF STUDENTS BY ELL STATUS AND PARCC ELA PROFICIENCY**



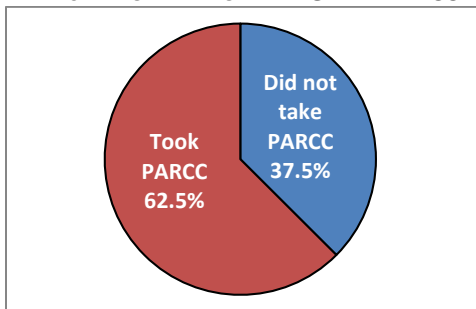
**CHART 14: DISTRIBUTION OF STUDENTS BY ELL STATUS AND THIRD GRADE PARCC MATH PROFICIENCY**

### DPS Third Grade PARCC Results, by DPP Status

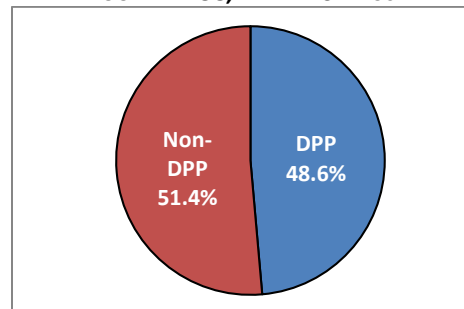
The next part of this memo looks at DPS third grade spring 2015 PARCC results not across demographics, but across DPP and non-DPP students. (A section further in this memo looks at results by demographics as well as by DPP status.) Comparing the achievement of DPP students to the achievement of non-DPP students can help researchers and other parties understand how well DPP students are performing generally, and also how well certain effects of preschool are persisting. For example, if preschool-attending students are more likely than non-preschool-attending students to enter kindergarten academically prepared for the year ahead, then will those preschool-attending students still have higher levels of academic achievement by third grade? These are the sorts of questions that the evaluation team considers when analyzing spring 2015 PARCC test results for DPP versus non-DPP third graders.

Charts 15 and 16, below, offer overviews of percentages of DPP students taking third grade PARCC tests. As shown in Chart 15, among students from the 2010-11 DPP cohort, a majority (62.5 percent) took third grade PARCC tests. However, among all 6,909 DPS students who took third grade PARCC tests, non-DPP students represented a slightly larger percentage of test-takers than DPP students – 51.4 percent compared to 48.6 percent. Chart 16 shows this nearly even split.

**CHART 15: DISTRIBUTION OF DPP STUDENTS BY PERCENTAGE TAKING THIRD GRADE PARCC**

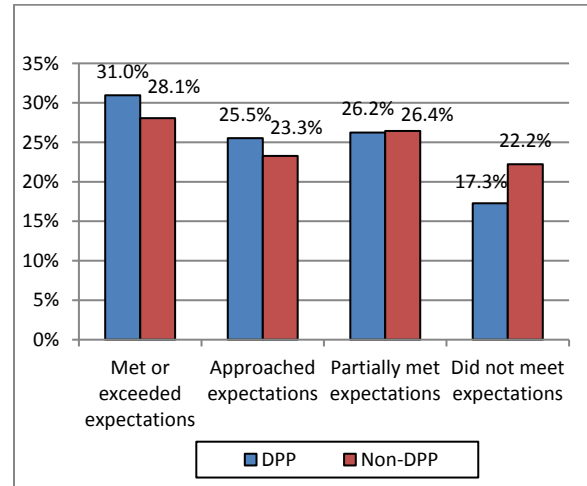
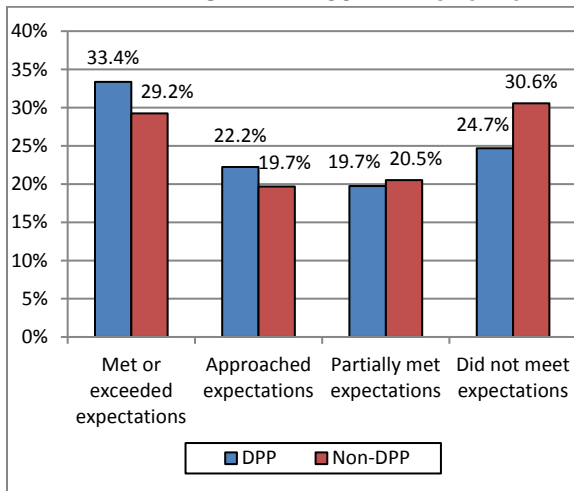


**CHART 16: DISTRIBUTION OF DPS THIRD GRADERS WHO TOOK PARCC, BY DPP STATUS**



Charts 17 and 18, below, look at student performance on PARCC tests for DPP and non-DPP students. Chart 17 shows the distribution of third grade PARCC ELA test proficiency, by DPP status. DPP third graders were 4.2 percent more likely to pass PARCC ELA than non-DPP third graders. DPP third graders were 5.9 percent less likely to receive scores of “Does Not Meet Expectations.” Chart 18 shows the distribution of third grade PARCC math test proficiency, by DPP status. DPP third graders were 2.9 percent more likely to pass PARCC math than non-DPP third graders. DPP third graders were 4.9 percent less likely to receive scores of “Does Not Meet Expectations” than non-DPP third graders.

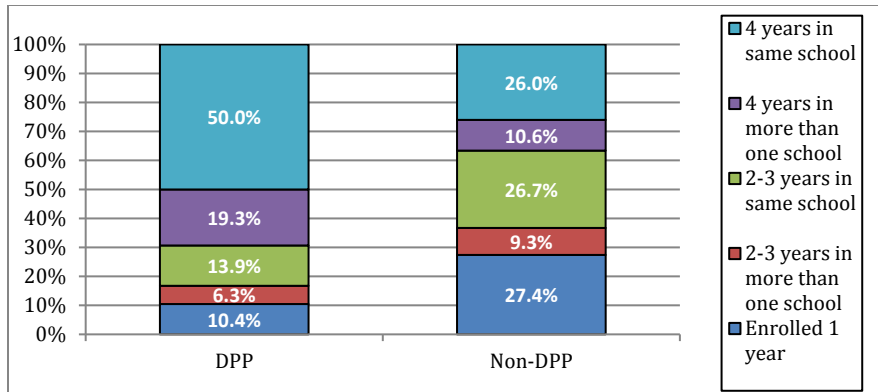
**CHART 17: DISTRIBUTION OF STUDENTS BY DPP STATUS AND BY THIRD GRADE PARCC ELA PROFICIENCY**



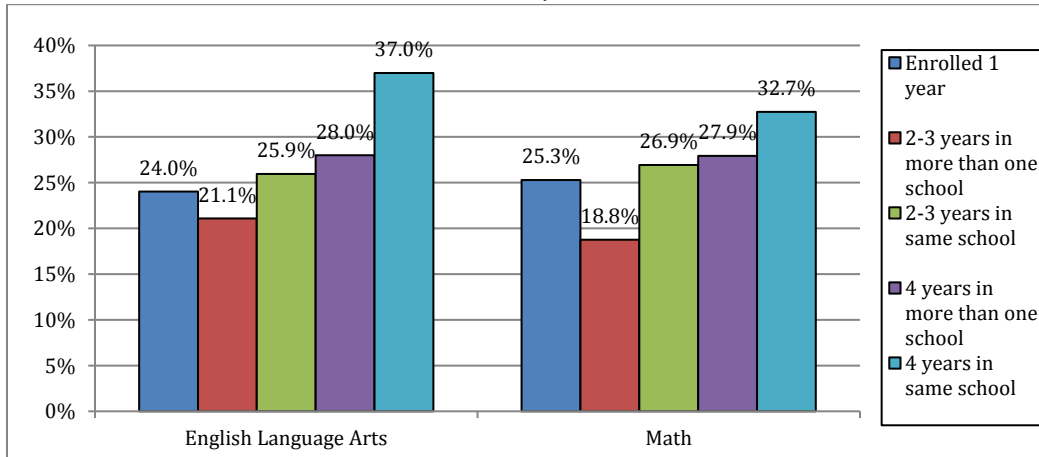
**CHART 18: DISTRIBUTION OF STUDENTS BY DPP STATUS AND BY THIRD GRADE PARCC MATH PROFICIENCY**

Evidence from PARCC results suggests students may benefit from the stability of staying in one elementary school for four years (kindergarten, first, second, and third grades), rather than switching schools. Charts 19 and 20, below, look at school stability and PARCC test scores. Chart 19 shows the distribution of K-3 students in DPS by DPP status and by patterns of enrollment in DPS. Compared to non-DPP students, DPP students are much more likely to be enrolled in the same DPS school for four years, and are much less likely to have been enrolled in DPS for just one year. Chart 20 illustrates the percentage of DPS third graders passing the third grade PARCC, by test (ELA or math) and by number of years enrolled in DPS schools in K-3. Children enrolled in the same DPS school for four years were the most likely to receive passing scores. (Note that Chart 20 does not look specifically at DPP status.)

**CHART 19: DISTRIBUTION OF STUDENTS BY DPP STATUS AND PATTERN OF DPS K-3 ENROLLMENT**



**CHART 20: PERCENTAGE OF STUDENTS PASSING PARCC, BY TEST AND BY PATTERN OF DPS K-3 ENROLLMENT**

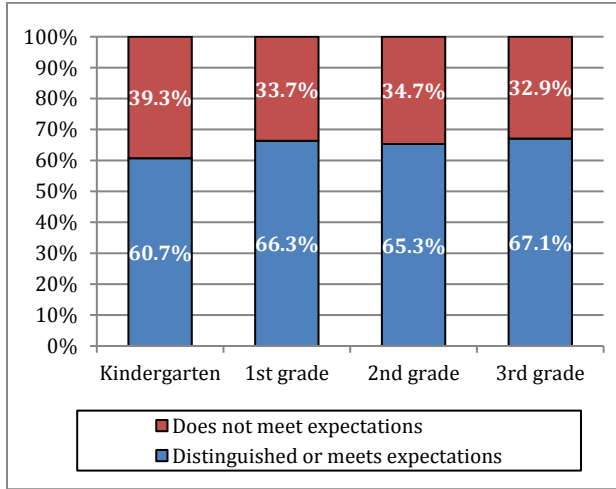


Just as students may benefit from the stability of staying in one school for multiple years, they may also benefit from attending higher-quality schools. To quantify elementary school quality, the evaluation team used the Denver School Performance Framework (SPF) ratings to assess whether elementary schools where students enrolled met expectations or did not meet expectations. For the purpose of this memorandum, schools that received ratings of “Distinguished” or “Meets Expectations” are referred to as “high-performing schools.”

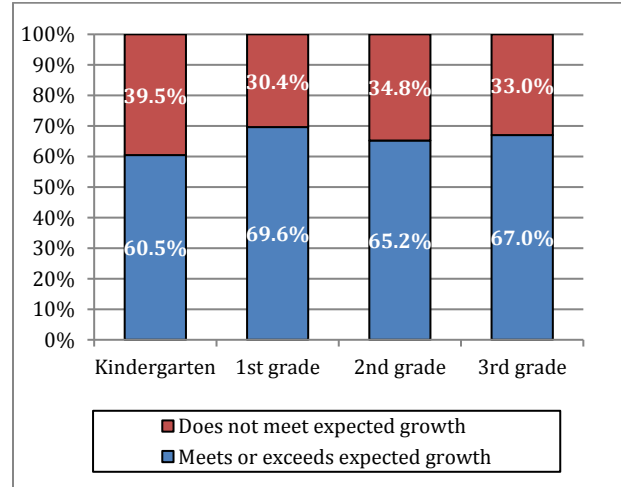
The following five charts (Charts 21-25) provide an overview of DPS students and school quality. These charts do not break students down by DPP status, but instead provide a wider picture of the district. Charts 21 and 22 show distributions of students by school SPF rating and by school SPF growth rating, respectively. Chart 21 shows that DPS students generally were less likely to attend high-performing schools in kindergarten than in other grades. However, students in each grade were more likely than not to attend high-performing schools. DPS students were less likely to attend high-growth schools in kindergarten than in other grades, as seen in Chart 22.



**CHART 21: DISTRIBUTION OF DPS STUDENTS BY SPF RATINGS OF SCHOOLS THEY ATTENDED IN EACH GRADE, 2010-11 COHORT**



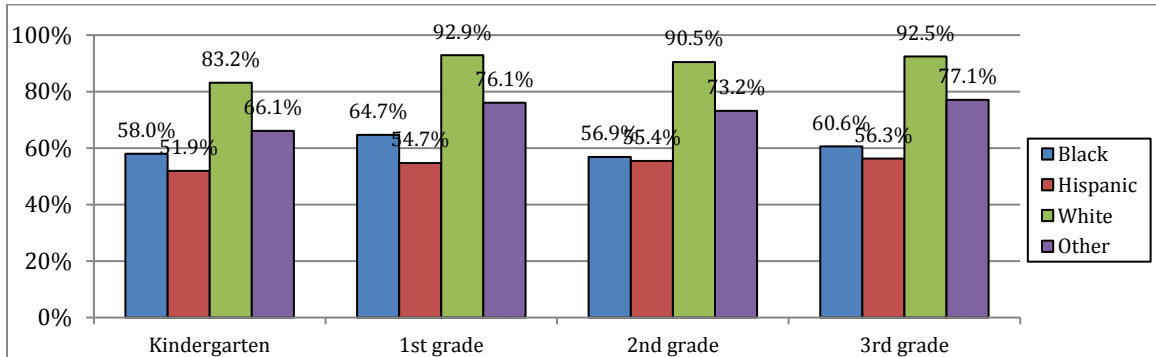
**THEY ATTENDED IN EACH GRADE, 2010-11 COHORT**



**CHART 22: DISTRIBUTION OF DPS STUDENTS BY SPF GROWTH RATINGS OF SCHOOLS**

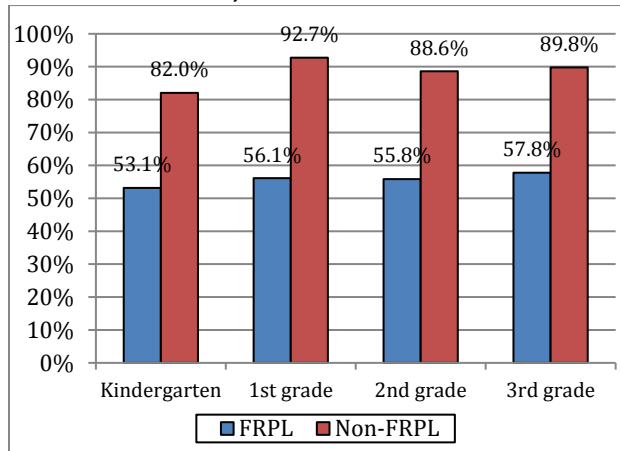
White students were the most likely to attend high-performing schools in every grade, followed by other race students. Hispanic students were the least likely to attend high-performing schools. Chart 23, below, illustrates these trends.

**CHART 23: PERCENTAGE OF STUDENTS ATTENDING HIGH-PERFORMING DPS SCHOOLS, BY RACE AND BY GRADE, 2010-11 COHORT**

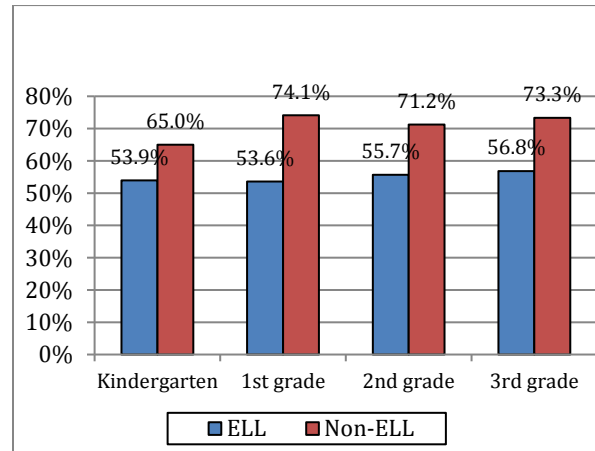


Charts 24 and 25, below, show the distribution of students attending high-performing schools in each grade by student FRPL status and by student ELL status, respectively. As seen in Chart 24, non-FRPL students were much more likely than FRPL students to attend a high-performing school, in every grade. Chart 25 illustrates that non-ELL students were more likely than ELL students to attend a high-performing school, in every grade.

**CHART 24: PERCENTAGE OF STUDENTS ATTENDING HIGH-PERFORMING DPS SCHOOLS, BY FRPL STATUS AND GRADE, 2010-11 COHORT**

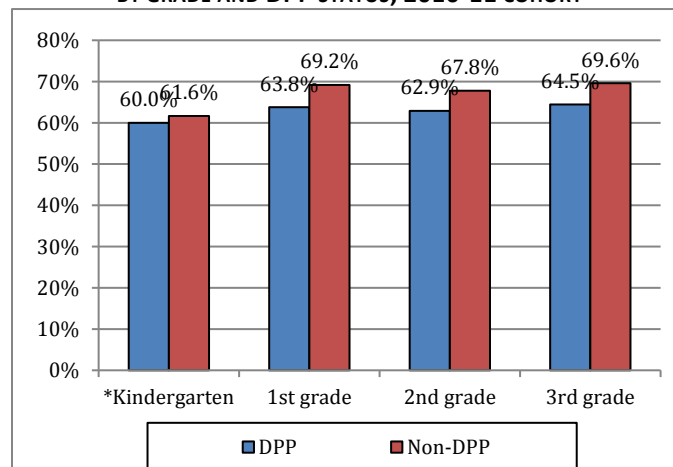


**CHART 25: PERCENTAGE OF STUDENTS ATTENDING HIGH-PERFORMING DPS SCHOOLS, BY ELL STATUS AND GRADE, 2010-11 COHORT**



Now that the memo has presented an overview of DPS students by quality of school attended and demographic factors (Charts 21-25), consider the following charts, which examine school quality and DPP status. Chart 26, below, illustrates, that DPP students are less likely than non-DPP students in first through third grades to attend high-performing schools. On average, there were 3,466 DPP students and 3,193 non-DPP students enrolled each year

**CHART 26: PERCENTAGE OF STUDENTS ATTENDING HIGH-PERFORMING DPS SCHOOLS, BY GRADE AND DPP STATUS, 2010-11 COHORT**

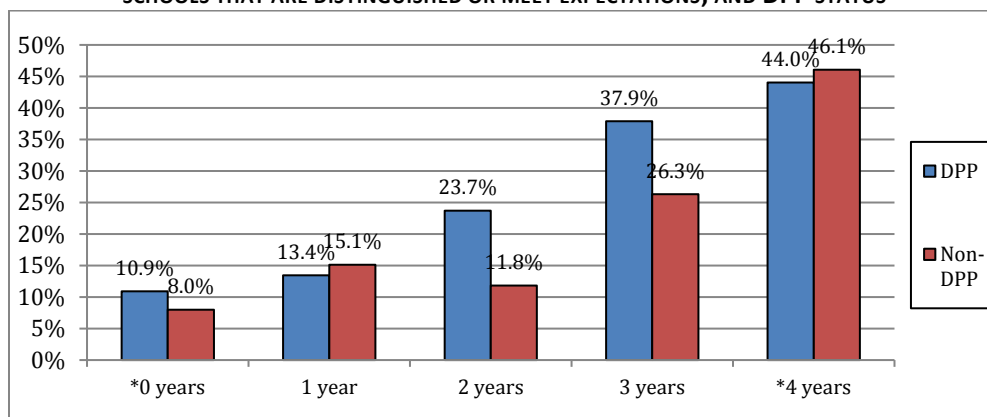


\*Indicates differences that are not statistically significant.

Charts 27 and 28, below, compare the percentages of students passing PARCC tests by the number of years in high-performing DPS schools, and by DPP status. Chart 27 shows ELA pass rates across these variables. DPP students who attended high-performing DPS schools for two or three years were more likely to pass PARCC ELA test than non-DPP students who attended high-performing DPS schools for two or three years. (The differences in DPP versus non-DPP student performances among children who attended high-performing DPS schools for zero or four years were not significant.) Chart 28 shows math

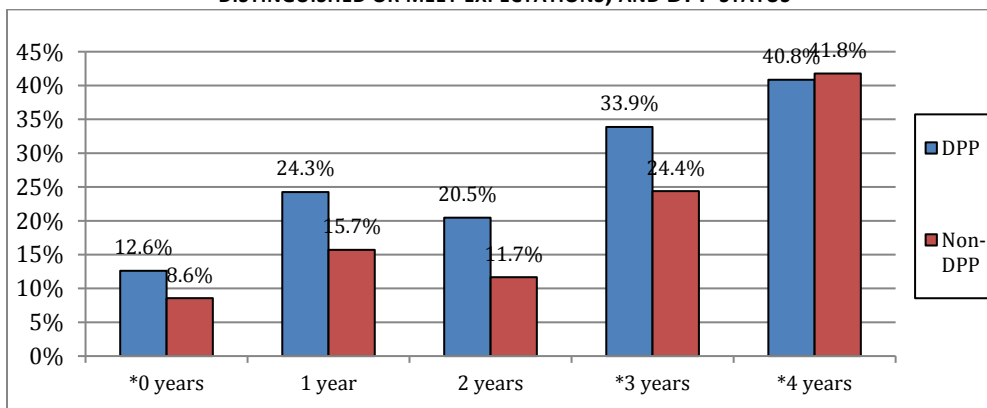
pass rates by number of years in high-performing DPS schools and by DPP status. DPP students who attended high-performing DPS schools for one or two years were significantly more likely to pass PARCC math than non-DPP students who attended high-performing DPS schools for one or two years. (The differences in DPP versus non-DPP student performances among children who attended high-performing DPS schools for zero, three, or four years were not significant.)

**CHART 27: PERCENTAGE OF STUDENTS PASSING 3RD GRADE PARCC ENGLISH LANGUAGE ARTS BY NUMBER OF YEARS IN DPS SCHOOLS THAT ARE DISTINGUISHED OR MEET EXPECTATIONS, AND DPP STATUS**



\*Indicates differences that are not statistically significant.

**CHART 28: PERCENTAGE OF STUDENTS PASSING 3RD GRADE PARCC MATH BY NUMBER OF YEARS IN DPS SCHOOLS THAT ARE DISTINGUISHED OR MEET EXPECTATIONS, AND DPP STATUS**



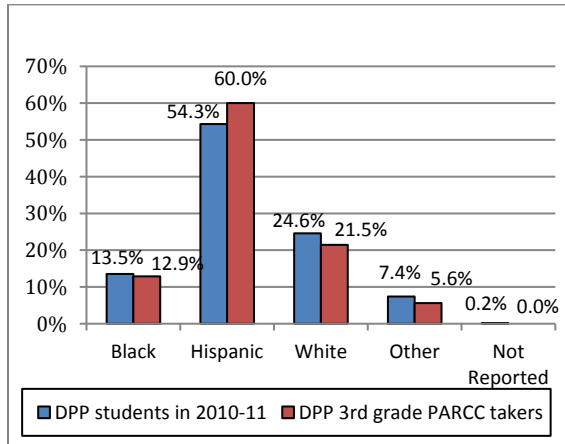
\*Indicates differences that are not statistically significant.

### DPS Third Grade PARCC Results, by Both Demographics and DPP Status

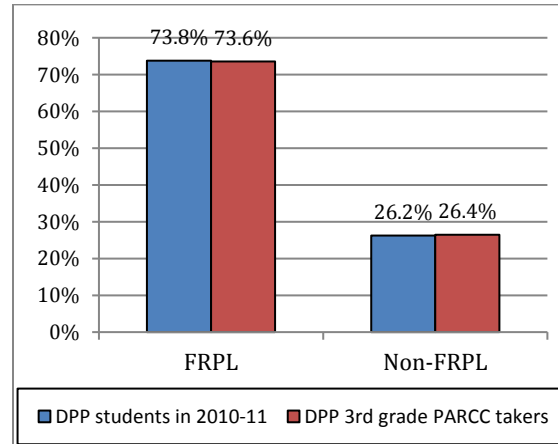
This part of the memo presents analyses of demographic variables with the variable of DPP participation or non-participation. Looking at demographic variables and DPP status simultaneously allowed the research team to consider how well DPP students of certain demographic groups performed on PARCC, compared to non-DPP students of the same demographic groups. It also allowed the research team to consider whether DPP participation can help students overcome certain demographic risk factors (e.g. FRPL status) to achieve at the same level as peers without those risk factors.

Charts 29-30, below, examine the demographic makeup of the cohort of 2010-11 DPP students when those students were in preschool (the “whole cohort”) compared to when they took the third grade PARCC. As seen in Chart 29, within the sample of DPP third graders who took PARCC tests in 2015, there was greater representation of Hispanic students than in the 2010-11 DPP cohort as a whole – 60 percent compared to 54.3 percent. The number of FRPL-eligible students was similar between the sample of DPP third graders who took PARCC tests in 2015 and the 2010-11 DPP cohort as a whole, as seen in Chart 30.

**CHART 29: COMPARISON OF CHILD’S RACE BETWEEN DPP STUDENTS IN 2010-11 AND DPP STUDENTS WHO TOOK THE THIRD GRADE PARCC IN 2015**



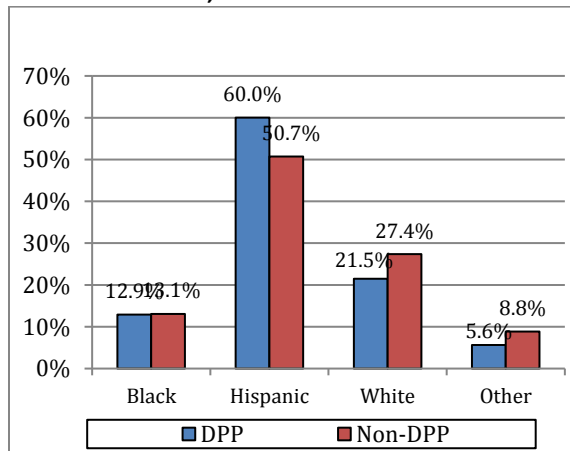
**CHART 30: COMPARISON OF FRPL STATUS BETWEEN DPP STUDENTS IN 2010-11 AND DPP STUDENTS WHO TOOK THE THIRD GRADE PARCC IN 2015**



Note: Counts include DPP third graders who were FRPL-eligible in any or all grades K-3.

The following four charts show the distributions of all third grade PARCC test-takers by DPP status and by demographic factors – race (Chart 31), FRPL status (Chart 32), ELL status (Chart 33), and gender (Chart 34). As seen in Chart 31, DPP students who took third grade PARCC tests were more likely than their non-DPP counterparts to be Hispanic, and less likely to be white. Chart 32 shows that DPP students were more likely than non-DPP students to be FRPL eligible and less likely to be non-FRPL.

**CHART 31: DISTRIBUTION OF THIRD GRADE PARCC STUDENTS, BY DPP STATUS AND RACE**



**CHART 32: DISTRIBUTION OF THIRD GRADE PARCC STUDENTS, BY DPP STATUS AND FRPL STATUS**

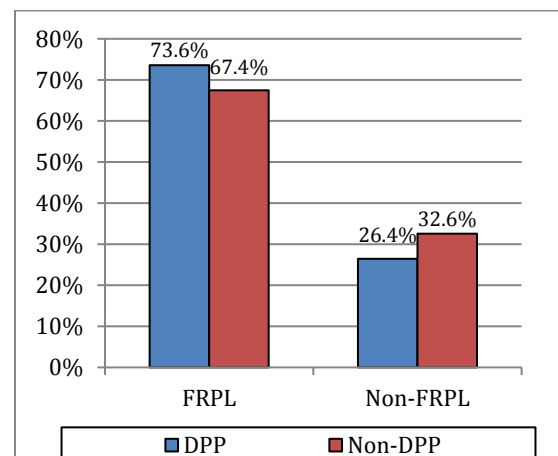
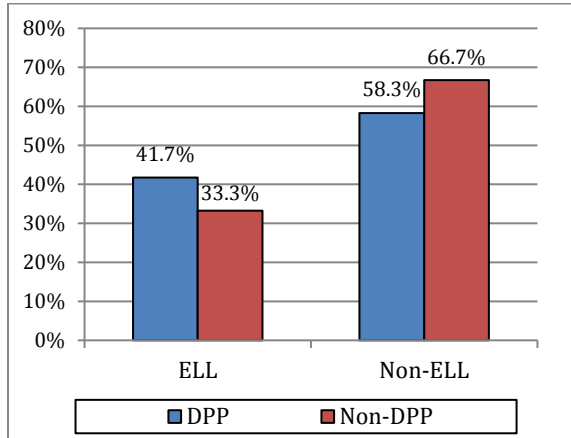
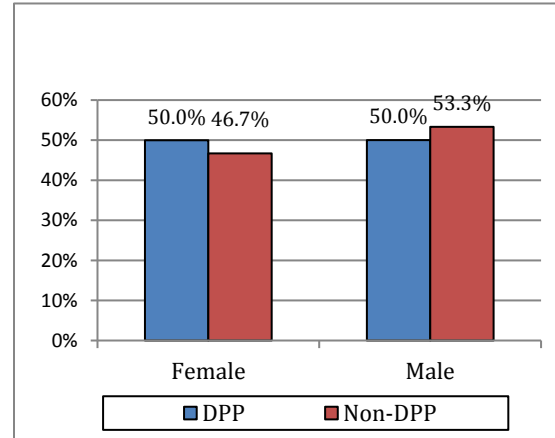


Chart 33, below, shows the distribution of third grade PARCC-takers by DPP status and ELL status. DPP students who took PARCC were more likely than non-DPP students to be ELLs and less likely to be non-ELLs. DPP students who took PARCC were more likely to be female than non-DPP PARCC test-takers. Chart 34, below, shows the distribution of third grade PARCC takers by DPP status and gender.

**CHART 33: DISTRIBUTION OF THIRD GRADE PARCC STUDENTS, BY DPP STATUS AND ELL STATUS**

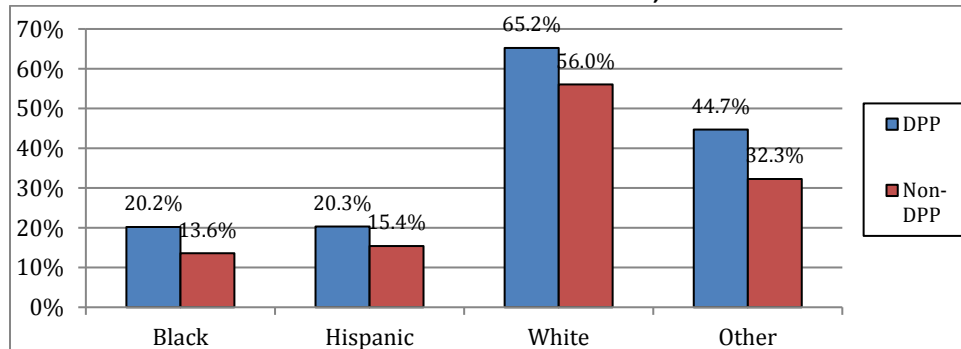


**CHART 34: DISTRIBUTION OF THIRD GRADE PARCC STUDENTS, BY DPP STATUS AND GENDER**

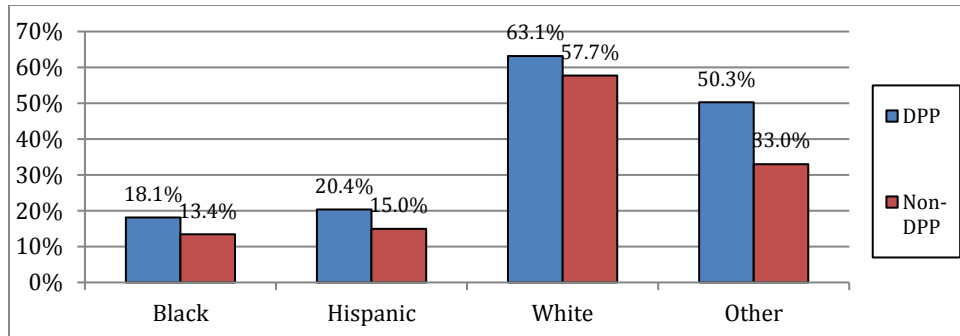


Charts 35 and 36, below, provide a more specific look at students who passed PARCC tests, by DPP status, test, and student race. Chart 35 breaks down the percentages of students passing ELA, by DPP status and race. DPP students were more likely than non-DPP students to pass PARCC ELA, regardless of race (i.e. across all races). Chart 36 breaks down the percentages of students passing the PARCC math test, by DPP status and by race. As was true for the PARCC ELA test, DPP students across all races were more likely than non-DPP students to pass PARCC math.

**CHART 35: PERCENTAGE OF STUDENTS PASSING PARCC ELA, BY DPP STATUS AND RACE**

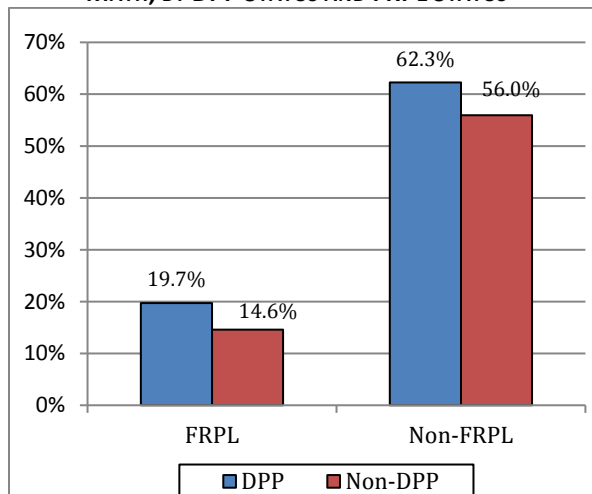


**CHART 36: PERCENTAGE OF STUDENTS PASSING PARCC MATH, BY DPP STATUS AND BY RACE**

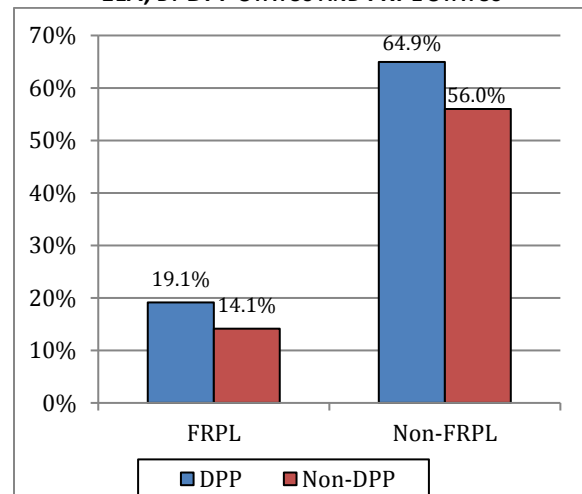


Charts 37 and 38, below, provide a specific look at students who passed PARCC tests, by test, DPP status, and student FRPL status. Chart 37 shows percentages of students passing the third grade PARCC ELA test, by DPP status and by FRPL status. DPP students were more likely than non-DPP students to pass PARCC ELA across both FRPL statuses. Chart 38 shows percentages of students passing PARCC math, by DPP status and FRPL status. As was true for PARCC ELA tests, DPP third graders were more likely than non-DPP third graders to pass PARCC math regardless of FRPL eligibility status.

**CHART 37: PERCENTAGE OF STUDENTS PASSING PARCC MATH, BY DPP STATUS AND FRPL STATUS**

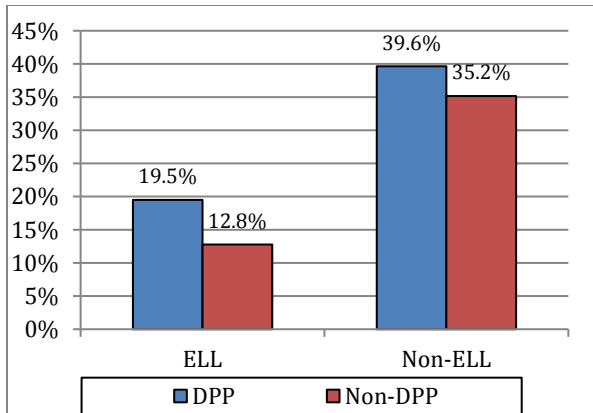


**CHART 38: PERCENTAGE OF STUDENTS PASSING PARCC ELA, BY DPP STATUS AND FRPL STATUS**

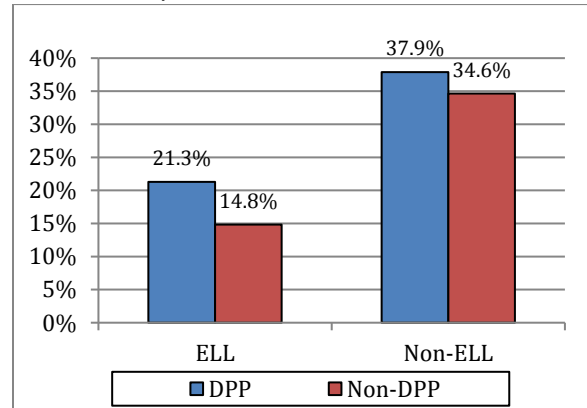


Charts 39-40, below, look at performance by test, DPP status, and ELL status. Chart 39 shows that DPP students were more likely than non-DPP students to pass PARCC ELA across ELL statuses. The same was true for PARCC math, as seen in Chart 40.

**CHART 39: PERCENTAGE OF STUDENTS PASSING PARCC ELA, BY DPP STATUS AND ELL STATUS**

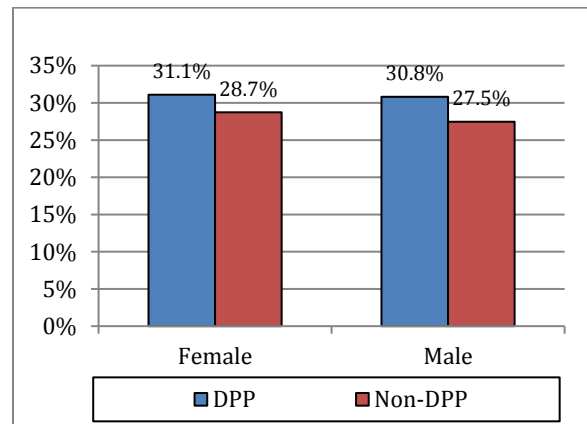
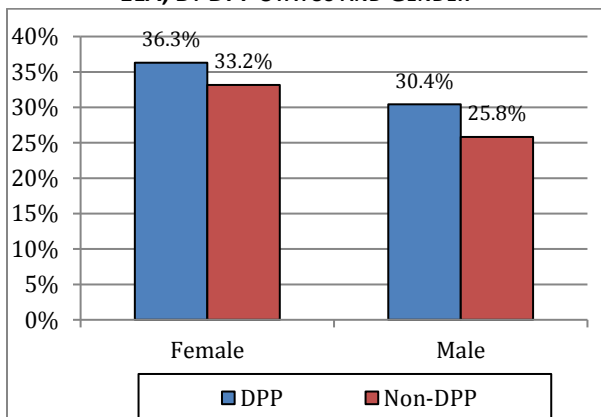


**CHART 40: PERCENTAGE OF STUDENTS PASSING PARCC MATH, BY DPP STATUS AND ELL STATUS**



Charts 41-42, below, show performances by test, DPP status, and gender. As seen in Chart 41, DPP students were more likely than non-DPP students to pass PARCC ELA for both genders. Chart 42 shows that DPP students were more likely than non-DPP students to pass PARCC math for both genders.

**CHART 41: PERCENTAGE OF STUDENTS PASSING PARCC ELA, BY DPP STATUS AND GENDER**



**CHART 42: PERCENTAGE OF STUDENTS PASSING PARCC MATH, BY DPP STATUS AND GENDER**

## Discussion

Examining DPP students through the sample of 200 analysis yields several conclusions:

- Results of the analysis for the 2010-11 DPP cohort sample suggest that, by spring of the preschool year, the vast majority of children were ready for school, both academically and social-emotionally.
- The 2010-11 DPP cohort sample exhibited kindergarten readiness in comparison to national norms.
- The sample continued to achieve at higher levels in reading/English Language Arts than DPS as a whole in kindergarten through third grade. They were generally more likely to be reading on grade level by the end of their kindergarten, first, and second grade and more likely to pass

PARCC ELA and math by the end of the third grade, compared to their peers who did not enroll in DPP.

Examining PARCC results along certain variables allows the evaluation team to analyze whether DPP participation is associated with higher student achievement on third grade standardized tests. This type of analysis is an important tool to inform the future of DPP, as well as the future of preschool education in general. Looking at demographic variables is also an important way to keep track of achievement gaps within the district, and to examine whether DPP participation could perhaps help reduce some of those gaps. Examining the PARCC results yields several conclusions:

- Compared to non-DPP students, DPP students are more likely to receive passing scores of “Meets Expectations” or “Exceeds Expectations” on both PARCC ELA and math, and across all races, FRPL statuses, ELL statuses, and genders.
- DPP students outperformed non-DPP students despite the fact that DPP students are *less* likely to attend high-performing schools in grades one through three than non-DPP students.
- DPP students outperformed non-DPP despite the fact that DPP served a greater proportion of students with risk factors (such as FRPL status) than the non-DPP pool of third grade PARCC-takers.

These conclusions indicate good news for DPP in terms of preparing students for kindergarten and future years of education through third grade.