MEMORANDUM February 10, 2016

TO: Board Members

FROM: Terry B. Grier, Ed.D.
Superintendent of Schools

SUBJECT: **Head Start Program Longitudinal Effects Study: Third Grade Follow-Up, 2014–2015 Third Grade STAAR Reading and Mathematics Performance**

CONTACT: Carla Stevens, (713) 556-6700

The purpose of this report was to evaluate the third grade academic performance of a cohort of students who attended one of the four Head Start programs in 2010–2011. The 2014–2015 third grade STAAR (regular English version) reading and mathematics tests were used as the outcome measures to assess the lasting impact of Head Start programs on students' academic performance.

Key findings include:

- Economically-disadvantaged students who attended Head Start programs obtained higher mean scale scores, and had higher percentages of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on both third grade reading and mathematics tests than their peers in the district.
- Comparisons by four Head agencies showed that Neighborhood Centers, Inc. (NCI) had the highest percentage of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on the third grade reading and mathematics tests, and obtained the highest mean scale scores on the 2015 STAAR reading and mathematics tests.

Should you have any questions or require any further information, please contact Carla Stevens in the Department of Research and Accountability, at 713-556-6700.

Terry B. Grier
TBG

TBG/CS:lp

cc: Superintendent's Direct Reports
Chief School Officers
School Support Officers
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EVALUATION REPORT
BUREAU OF PROGRAM EVALUATION
Volume 9, Issue 2, February 2016

Head Start Program Longitudinal Effects Study: Third Grade Follow-Up, 2014–2015 Third Grade STAAR Reading and Mathematics Performance

By Lai Kwan Pei, Ph.D.

The goal of Head Start is to develop the cognitive and social-emotional skills of children from low-income families to prepare them to succeed in kindergarten and beyond. Presently, Houston Independent School District (HISD) collaborates with four federally-funded Head Start agencies: AVANCE, Gulf Coast Community Services Association (GCCSA), Harris County Department of Education (HCDE), and Neighborhood Centers, Inc. (NCI). Each Head Start agency provides, not only high-quality educational programs to 3- or 4-year-old low income children, but also offers access to health, dental, and other support services in order to meet families' needs. The purpose of this report was to explore the lasting impact of Head Start on students' performance on the third grade STAAR reading and mathematics tests. The findings suggested that economically-disadvantaged students who attended Head Start programs obtained higher mean scale scores, and had higher percentages of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on both third grade reading and mathematics tests than their peers in the district. Among the four Head Start agencies, NCI had the highest percentage of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on the third grade reading and mathematics tests, and obtained the highest mean scale scores on the 2015 STAAR reading and mathematics tests.

Background

Head Start programs are publicly-funded and managed at the local level but must adhere to federal quality guidelines. These guidelines suggest that Head Start agencies provide a learning environment that promotes cognitive and social-emotional development to enhance school-readiness of low-income students. In addition, Head Start agencies are expected to provide a wide array of social services to assist families. The Head Start programs are expected to: 1) allow students to experience a more integrated school day with in-depth study of pre-k curriculum, 2) promote school readiness, and 3) contribute to the narrowing of achievement gaps related to school readiness at the start of kindergarten and subsequent grade levels (Gormley, Gayer, & Phillips, 2005).

Presently, the Houston Independent School District (HISD) collaborates with four federally-funded Head Start agencies: AVANCE, Gulf Coast Community Services Association (GCCSA), Harris County Department of Education (HCDE), and Neighborhood Centers, Inc. (NCI).

Review of the Literature

Past evaluations of Head Start programs suggest that a Head Start intervention can have both short-term and long-term benefits for children. For example, short-term benefits include improvements in cognitive and achievement outcomes (Shager et al., 2013). Longer-term benefits of Head Start include a reduction in the likelihood of special education placement and a reduction in the incidence of early grade retention. In addition, some studies have found that a quality Head Start intervention increases the likelihood of high school graduation and achievement test score gains (Currie, 2001; Currie & Neidell, 2007).

The short-term benefits of four Head Start agencies (AVANCE, GCCSA, HCDE, and NCI) have been evaluated in other reports that found that Head Start programs had positive impact on economically-disadvantaged students. The goal of this study was to

measure the lasting effect of the four Head Start programs on students' 2014–2015 STAAR reading and mathematics performance at third grade. Specifically, this study compared the third grade STAAR reading and mathematics performance of a cohort of students who attended one of four Head Start programs in 2010–2011.

Variations in findings regarding the benefits of Head Start sometimes have to do with methodological differences and the selection of comparison groups (Zhai, Brooks-Gunn, & Waldfogel, 2011; Shager et al., 2013). Previous studies have compared students who received a formal preschool education to all other students who did not receive a formal preschool education without controlling for demographic characteristics, such as economic status, that influence student performance (Gormley et al., 2005). Given the negative effects of low socio-economic status on academic outcomes (e.g., Aikens & Barbarin, 2008; Brooks-Gunn, 2003, 2005; Chatterji, 2006), this report has taken into consideration students' demographic characteristics when comparing Head Start students' performance on the 2014–2015 STAAR reading and mathematics tests.

Measures

Student performance data were collected through the STAAR (regular English version) reading and mathematics tests. STAAR is the state of Texas criterion-referenced assessment, and it replaced the Texas Assessment of Knowledge and Skills (TAKS) program in spring 2012. The Texas Education Agency (TEA), in collaboration with the Texas Higher Education Coordinating Board (THECB) and Texas educators, developed this new assessment system in response to requirements set forth by the 80th, 81st and 83rd Texas legislatures. This new system focuses on increasing postsecondary readiness of graduating high school students, and helps to ensure that Texas students are competitive with other students both nationally and internationally.

The key outcome measures for this report were the 2014–2015 STAAR reading and mathematics scale scores of third grade students. The 2014–2015 STAAR Level II: Satisfactory (Phase-in I) performance standard was also used to measure the proportion of students who met the standard in reading and mathematics.

Methods

In order to examine the effects of the four Head Start agencies on student's third grade performance, a cohort of students who attended one of the four Head Start programs in 2010–2011 was tracked up to the end of third grade. The descriptive statistics (mean scale scores and percentages of students who met STAAR Level II: Satisfactory (Phase-in I) standard on the 2014–2015 STAAR reading and mathematics tests were used to describe the lasting impact of four Head Start agencies on students enrolled in the programs in 2010–2011 and student subgroups (ethnicity, gender, economically-disadvantaged, special education placement, limited English proficiency (LEP), and at-risk status).

Aikens and Barbarin (2008) suggested that economic status has a strong effect on students' performance, and other factors, such as LEP and at-risk status are also associated with student performance. Thus, student groups were disaggregated by ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status to control for the effect of student demographic characteristics on the students' academic performance on third grade STAAR.

Sample

The study sample was students who attended one of the four Head Start programs in 2010–2011, and took the third grade STAAR test in 2014–2015. Only students who had 2015 STAAR reading and mathematics scores were included in this study. Consequently, the sample size of this study was 1,429. The demographic characteristics of students are shown in **Appendix - Table 1**. For AVANCE, 153 students were identified as 2014–2015 HISD third graders; for GCCSA, 583 students; for HCDE, 82 students; and for NCI, 611 students. Notably, in the four Head Start agencies, the majority of students (over 90%) were economically-disadvantaged, and 75.9% of the students were Hispanic based on student information at the time that the student enrolled in HISD third grade in 2014–2015.

How did Head Start students enrolled in the four Head Start agencies in 2010–2011 perform on the 2014–2015 third grade STAAR reading test?

The impact of the Head Start program on HISD third grade students' performance was measured using the STAAR reading and mathematics results. The 2015 third grade STAAR mean scale scores in reading for students who attended one of the four Head Start agencies in 2010–2011 are displayed in **Figure 1**. **Appendix -Table 2** presents the number of students who took the third grade STAAR reading test in 2014–2015, and the means and standard deviations of the scale scores by the four Head Start agencies and by other student groups

(ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status).
Figure 1 shows that in the overall sample, Head Start students who were enrolled in one of the four Head Start programs in 2010–2011 (M = 1398.5) scored lower than the district mean scale score (M = 1412.0) on the 2014–2015 STAAR reading test by 13.5 points.

Among the four Head Start agencies, students from NCI (M = 1408.1) obtained the highest mean scale score. The mean scale score of HCDE (M = 1363.1) was lower than students from the other three Head Start agencies on the 2014–2015 STAAR reading test (Figure 1).

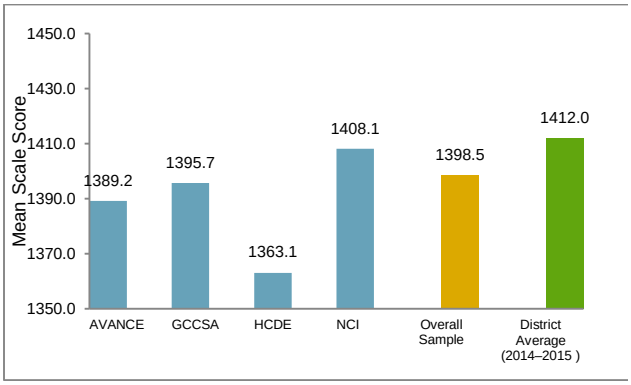

Figure 1. Mean scale scores on the 2014–2015 third grade STAAR reading test for Head Start students who were enrolled in 2010–2011.

The percentages of Head Start students who were enrolled in 2010–2011 Head Start programs and met the 2015 STAAR Level II: Satisfactory (Phase-In 1) reading standard are displayed in **Figure 2**. **Appendix -Table 3** presents the number of students who took the third grade STAAR reading test in 2014–2015, and the percentage of Head Start students who met the STAAR Level II: Satisfactory (Phase-In 1) reading standard by the four Head Start agencies and by other student groups (ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status).

Figure 2 shows that in the overall sample, 70.2% of Head Start students met the 2015 STAAR Level II: Satisfactory (Phase-In 1) reading standard compared to 69.0% for the district.

Among the four Head Start agencies, NCI (73.7%) had the highest percentage of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on the reading test, which was higher than the district percentage (Figure2).

GCCSA (69.8%) had comparable percentages of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on the reading test as the district percentage (Figure 2).

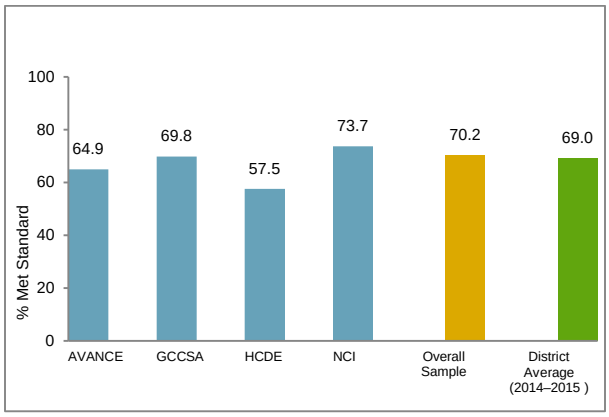

Figure 2. Percentage of Head Start students who were enrolled in 2010–2011 Head Start programs and met the 2015 third grade STAAR Level II: Satisfactory (Phase-In 1) reading standard.

How did Head Start students enrolled in the four Head Start agencies in 2010–2011 perform on the 2014–2015 third grade STAAR mathematics test?

The 2014–2015 third grade STAAR mean scale scores in mathematics for students who attended one of the four Head Start agencies' programs in 2010–2011 are displayed in **Figure 3**. **Appendix -Table 4** presents the number of students who took the third grade STAAR mathematics test in 2014–2015, and the means and standard deviations of the scale scores by the four Head Start agencies and by other student groups (ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status).

Figure 3 shows that in the overall sample, Head Start students who were enrolled in one of the four Head Start programs in 2010–2011 (M = 1429.3) scored lower than the district mean scale score (M = 1438.0) on the 2014–2015 STAAR mathematics test by 8.7 points.

Among the four Head Start agencies, students from NCI (M = 1443.8) obtained the highest mean scale score, which was higher than the district mean scale score. Students from AVANCE (M = 1425.9) and GCCSA (M = 1420.2) obtained comparable mean scale scores, which were lower than the district mean scale score. The mean scale score of HCDE (M = 1394.7) was lower than students from the other three Head Start agencies on the 2014–2015 STAAR mathematics test (Figure 3).

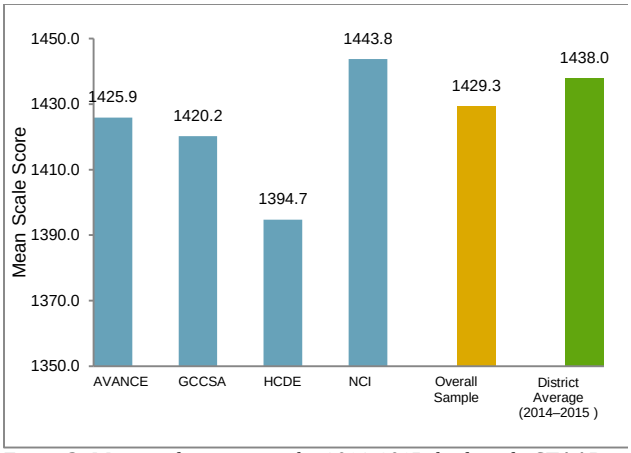

Figure 3. Mean scale scores on the 2014–2015 third grade STAAR mathematics test for Head Start students who were enrolled in 2010–2011.

The percentages of Head Start students who were enrolled in 2010–2011 Head Start programs and met the 2015 STAAR Level II: Satisfactory (Phase-In 1) mathematics standard are displayed in **Figure 4**. **Appendix -Table 5** presents the number of students who took the third grade STAAR mathematics test in 2014–2015, and the percentage of Head Start students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) mathematics standard by the four Head Start agencies and by other student groups (ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status).

Figure 4 shows that in the overall sample, 72.1% of Head Start students met the 2015 STAAR Level II: Satisfactory (Phase-In 1) mathematics standard compared to 71.0% for the district.

Among the four Head Start agencies, NCI (77.5%) had the highest percentage of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on the mathematics test, which was higher than the district percentage (Figure2).

GCCSA (68.4%) and AVANCE (67.9%) had fairly comparable percentages of students who met the 2015 STAAR Level II: Satisfactory (Phase-In 1) standard on the mathematics test (Figure 4).

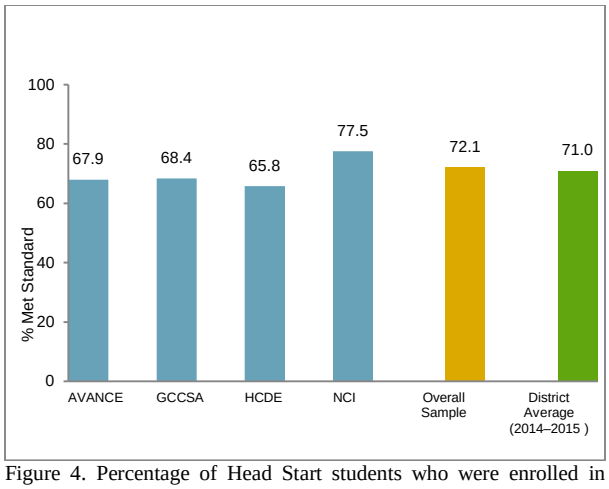

Figure 4. Percentage of Head Start students who were enrolled in 2010–2011 Head Start programs and met the 2015 third grade STAAR Level II: Satisfactory (Phase-In 1) mathematics standard.

How did economically-disadvantaged Head Start students enrolled in the four Head Start agencies in 2010–2011 perform on the 2014–2015 third grade STAAR reading and mathematics tests?

Figure 5 shows the economically-disadvantaged Head Start students (M = 1396.0) had a higher mean scale score than the district (M = 1383.0) on the 2014–2015 STAAR reading test.

Economically-disadvantaged Head Start students (M = 1430.3) had a higher mean scale score than the district (M = 1410.0) on the 2014–2015 STAAR mathematics test (Figure 5).

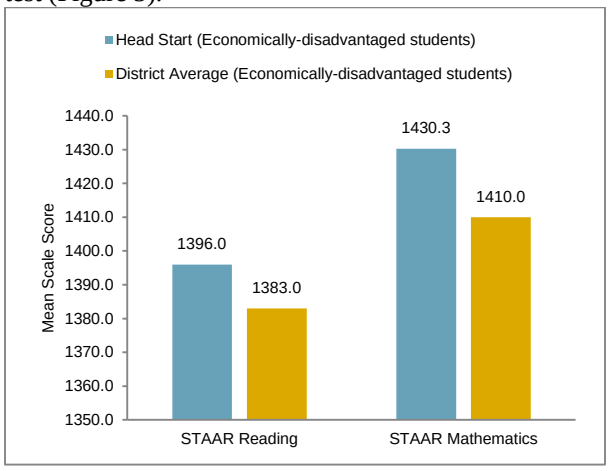

Figure 5. Mean scale scores on the 2014–2015 STAAR reading and mathematics tests for economically-disadvantaged Head Start students who were enrolled in 2010–2011.

Figure 6 shows that on the 2014–2015 STAAR reading test, the percentage of economically-disadvantaged Head Start students (69.9%) who met the STAAR Level II: Satisfactory (Phase-In 1) reading standard was higher than the district percentage (64.0%).

On the 2014–2015 STAAR mathematics test, the percentage of economically-disadvantaged Head Start students (71.6%) who met the STAAR Level II: Satisfactory (Phase-In 1) mathematics standard was higher than the district percentage (66.0%) (Figure 6).

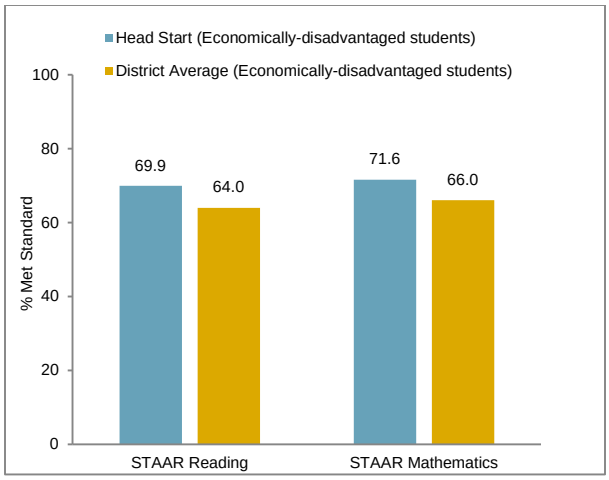

Figure 6. Mean scale scores on the 2014–2015 STAAR reading and mathematics tests for economically-disadvantaged Head Start students who were enrolled in 2010–2011.

Discussion

The goal of Head Start programs is to provide learning opportunities to economically-disadvantaged students to help them develop and maintain foundational skills necessary to be successful in school. This report explored the lasting impact of Head Start programs on HISD third graders by analyzing student academic performance on the 2014–2015 STAAR reading and mathematics tests.

The findings suggested that the impact of Head Start programs on student third grade academic performance was evident for both STAAR reading and mathematics scores, especially for the economically-disadvantaged students. When student performance was compared by Head Start agency, the findings revealed that students who attended NCI obtained higher mean scale scores than the other agencies on both STAAR reading and mathematics tests. NCI also had the higher STAAR passing rates than the district in both reading and mathematics tests before accounting for economically disadvantaged status.

Economically-disadvantaged students who attended Head Start programs outperformed their economically-disadvantaged peers in the district. Consequently, the economically-disadvantaged students may have acquired significant academic benefits from the Head Start program and maintained that academic edge to third grade. This finding was contrary to many previous studies (Barnett & Hustedt, 2005). The literature suggested that the effect of preschool usually diminishes over time. However, the findings in this report show that the beneficial effect of Head Start persists at least into third grade for economically-disadvantaged students.

In this report, the third grade STAAR test scores were used to evaluate the impact of Head Start on students' academic performance because the end of third grade has been found to detect an effect in cumulative measures of school success. Future studies on the lasting impact of Head Start programs should examine other aspects of school success, such as special education placement, and disciplinary incidents.

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For additional information contact the HISD Department of Research and Accountability at 713-556-6700 or e-mail Research@Houstonisd.org.

Appendix

Table 1. Demographic Characteristics of HISD 3rd Grade Students Who were 2010–2011 Head Start Cohort

Student Group		n	Percent
Agency	AVANCE	153	10.7
	GCCSA	583	40.8
	HCDE	82	5.7
	NCI	611	42.8
Gender	Female	676	47.3
	Male	753	52.7
Ethnicity	Asian	9	0.6
	African-American	321	22.5
	Hispanic	1,085	75.9
	White	9	0.6
	Other	5	0.4
Economically disadvantaged	No	133	9.3
	Yes	1,296	90.7
Special Education	No	1337	93.6
	Yes	92	6.4
Limited English Proficient (LEP)	No	583	40.8
	Yes	846	59.2
At-Risk	No	223	15.6
	Yes	1,206	84.4

Note. The demographic information used in this table was based on student information at the time that the student enrolled in HISD 3rd grade in 2014–2015.

Table 2. Mean Scale Scores on the 2014–2015 STAAR Reading Test

Student Group		Mean	SD	n
Overall Sample		1398.5	140.8	1,277
Agency	AVANCE	1389.2	127.4	131
	GCCSA	1395.7	143.2	526
	HCDE	1363.1	126.6	73
	NCI	1408.1	142.6	547
Gender	Female	1411.2	142.1	619
	Male	1386.6	138.6	658
Ethnicity	Asian	1426.3	158.0	8
	African-American	1383.6	135.9	274
	Hispanic	1402.7	141.9	983
	White	1322.3	78.5	8
	Other	*	*	*
Economically disadvantaged	No	1422.8	138.6	121
	Yes	1396.0	140.8	1,156
Special Education	No	1402.0	140.1	1,229
	Yes	1308.5	128.1	48
Limited English Proficient	No	1398.7	135.4	494
	Yes	1398.4	144.2	783
At-Risk	No	1495.6	111.9	206
	Yes	1379.8	138.1	1,071

Note. 1. * denotes fewer than 5 students, and were not reported. 2. The demographic information used in this table was based on student information at the time that the student enrolled in HISD 3rd grade in 2014–2015.

Table 3. Percentage of Students Who Met the 2015 STAAR Level II: Satisfactory (Phase-In 1) Reading Standard

Student Group		%	n
Overall Sample		70.2%	897
Agency	AVANCE	64.9%	85
	GCCSA	69.8%	367
	HCDE	57.5%	42
	NCI	73.7%	403
Gender	Female	73.8%	457
	Male	66.9%	440
Ethnicity	Asian	75.0%	6
	African-American	63.5%	174
	Hispanic	72.3%	711
	White	*	*
	Other	*	*
Economically disadvantaged	No	73.6%	89
	Yes	69.9%	808
Special Education	No	71.4%	878
	Yes	39.6%	19
Limited English Proficient (LEP)	No	68.6%	339
	Yes	71.3%	558
At-Risk	No	94.2%	194
	Yes	65.6%	703

Note. 1. * denotes fewer than 5 students, and were not reported. 2. The demographic information used in this table was based on student information at the time that the student enrolled in HISD 3rd grade in 2014–2015.

Table 4. Mean Scale Scores on the 2014–2015 STAAR Mathematics Test

Student Group		Mean	SD	n
Overall Sample		1429.3	138.1	1,267
Agency	AVANCE	1425.9	142.9	131
	GCCSA	1420.2	136.9	525
	HCDE	1394.7	144.6	73
	NCI	1443.8	135.9	538
Gender	Female	1429.1	135.6	616
	Male	1429.6	140.5	651
Ethnicity	Asian	1524.6	99.5	5
	African-American	1378.7	137.1	274
	Hispanic	1443.1	135.5	977
	White	1416.3	66.5	7
	Other	*	*	*
Economically disadvantaged	No	1420.6	138.7	120
	Yes	1430.3	138.1	1,147
Special Education	No	1432.6	137.9	1,221
	Yes	1343.1	116.4	46
Limited English Proficient (LEP)	No	1406.1	141.3	495
	Yes	1444.2	134.0	772
At-Risk	No	1493.3	131.9	206
	Yes	1416.9	135.9	1,061

Note. 1. * denotes fewer than 5 students, and were not reported. 2. The demographic information used in this table was based on student information at the time that the student enrolled in HISD 3rd grade in 2014–2015.

Table 5. Percentage of Students Who Met the 2015 STAAR Level II: Satisfactory (Phase-In 1) Mathematics Standard

Student Group		%	n
Overall Sample		72.1%	913
Agency	AVANCE	67.9%	89
	GCCSA	68.4%	359
	HCDE	65.8%	48
	NCI	77.5%	417
Gender	Female	71.9%	443
	Male	72.2%	470
Ethnicity	Asian	100.0%	5
	African-American	59.1%	162
	Hispanic	75.4%	737
	White	100.0%	7
	Other	*	*
Economically disadvantaged	No	76.7%	92
	Yes	71.6%	821
Special Education	No	73.1%	893
	Yes	43.5%	20
Limited English Proficient (LEP)	No	66.3%	328
	Yes	75.8%	585
At-Risk	No	86.9%	179
	Yes	69.2%	734

Note. 1. * denotes fewer than 5 students, and were not reported. 2. The demographic information used in this table was based on student information at the time that the student enrolled in HISD 3rd grade in 2014–2015.