BILINGUAL ACADEMIES ANALYSIS

Prepared for San Felipe Del Rio Consolidated Independent School District

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In the following report, Hanover Research analyzes the Texas English Language Proficiency Assessment System (TELPAS) and the State of Texas Assessments of Academic Readiness (STAAR) assessment data provided by San Felipe Del Rio Consolidated Independent School District to evaluate the efficacy of the newly implemented bilingual academies within the district.

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INTRODUCTION

In this report, Hanover Research (Hanover) evaluates the impact of the Bilingual Academies program implemented within San Felipe Del Rio Consolidated Independent School District (SFDR-CISD) in 2015-16. The program pairs six elementary schools, with one school in each pair hosting a bilingual academy.[1] Students who test at the beginning or intermediate level on the Texas English Language Proficiency Assessment System (TELPAS) attend the paired academy school.

The aim of the program is to provide more dedicated resources and services for English learners (ELs)[2] in elementary school. It allows the district to ensure that the English Learners in greatest need of support have access to improved services such as certified bilingual teachers, smaller class sizes, and full-time classroom aides, which was often not possible previously, when individual schools typically did not have enough of these students to fill an entire classroom in each grade. The district's goal is for students to exit the academies within two years of entering them, which is equivalent to a gain of one proficiency level per year for students who enter at the beginning TELPAS level.

In this report, Hanover conducts a set of analyses to compare academy participants and similar non-participants from Grade 1 through Grade 5. Specifically, we describe student outcomes segmented by the program group, distinguishing between academy participants (i.e., ELs who received the new academy services in 2015-16) and the non-participants (i.e., ELs in previous years, before the implementation of the academies). We present a descriptive analysis in which we compare the yearly proficiency gains on TELPAS of the two groups (academy participants and non-participants) as well as the results of a regression analysis of the program effect on post-academy TELPAS outcomes, controlling for pre-academy TELPAS scores and demographic characteristics.[3] We also use a similar methodology to examine students' performance in reading and mathematics, as measured by the State of Texas Assessments of Academic Readiness (STAAR).

The report is organized into the following sections:

- **Section I: Data Overview Methodology** describes the data provided by the district and Hanover's data processing and methodologies used in the analyses throughout the remainder of the report.

- **Section II: Program Effect on TELPAS** presents the yearly proficiency gains on TELPAS for academy participants and non-participants by grade level. This section also

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[1] In total, there are four schools that host a bilingual academy: Ruben Chavira Elementary, Buena Vista Elementary, Dr. Lonnie Green Elementary, and Garfield Elementary.

[2] Please note that throughout this report, ELs refer to students who tested at beginning or intermediate level on TELPAS in the previous year, since these are the students who were eligible for the academies in 2015-16.

[3] Please note that the demographic information is unavailable for some grade levels (i.e., Grade 1 and 2), thus we cannot control for that information. Please refer to the methodology section for further details.

presents the results of a regression analysis for each grade level, where we compare the TELPAS outcomes between these two student groups while controlling for previous TELPAS performance and demographic characteristics.[4]

- **Section III: Program Effect on STAAR** presents the yearly proficiency gains on STAAR for academy participants and non-participants by grade level. This section also presents the results of a regression analysis for each grade level, where we compare the STAAR outcomes between these two student groups while controlling for previous STAAR performance and demographic characteristics.

KEY FINDINGS

- **Based on the results of the regression analyses, we can conclude that the Bilingual Academies program likely has a positive influence on English proficiency (TELPAS) and academic progress (STAAR)**, though the impact appears to vary by grade level. We note that TELPAS performance is positively impacted in Grade 1, Grade 4, and Grade 5 (though mostly unchanged in Grade 2 and Grade 3), while STAAR achievement is positively impacted in Grade 4.
  - **In Grade 4, on average, the Bilingual Academies students have significantly higher scores than non-participants (similar students in 2013-14 and 2014-15) in all assessments of interest**, while students' previous academic performance and demographic characteristics are controlled for. To be more specific, Grade 4 academy participants significantly outperformed the non-participants by 0.23 points on the TELPAS composite, 14.71 points on the TELPAS reading assessment, 46.68 points on the STAAR mathematics assessment, and 33.42 points on the STAAR reading assessment (Figure E.1). The effects are all statistically significant, which shows that academy participants exhibited more growth on these measures than non-participants (similar students in same grade prior to program implementation).
  - **Similar conclusions can be drawn based on the significant results on the Grade 1 and 5 TELPAS composite scores**. In Grade 1 and Grade 5, the Academy participants, on average, had a higher TELPAS composite score by 0.34 and 0.18 point than non-participants, respectively.

Figure E.1: Summary of Program Effects for each Outcome Variable (Regression Coefficients of Academy Participants Compared to Non-Participants)

OUTCOME VARIABLES	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
TELPAS Composite Score	0.3421***	-0.0271	0.0331	0.2286**	0.1804**
TELPAS Reading Scale Score	--	-3.1968	10.6011	14.7068**	6.4357

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[4] Please note that the "previous TELPAS performance" refers to the proficiency level for each student in the previous year. For example, if a student was tested at beginning or intermediate level on TELPAS in 2013-14 (i.e., initial proficiency level), he/she is identified as an EL in 2014-15 (i.e., pre-academy non-participant). In the regression model, for this student, the outcome of interest is his/her TELPAS performance in 2014-15, while controlling for his/her TELPAS performance in 2013-14, as well as other relevant demographic characteristics.

Outcome Variables	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
STAAR Mathematics Scale Score	--	--	-0.6512	46.6828*	24.3289
STAAR Reading Scale Score	--	--	-3.4998	33.4160**	-16.3817

- **In general, a higher proportion of academy participants progressed in TELPAS than non-participants, which indicates that academy participants exhibited more gains in English proficiency than non-participants**. For example, 9% of Grade 5 non-participants progressed two or more levels in the TELPAS composite assessment, whereas 16% of Grade 5 participants progressed more than one level.

- Across all grade levels, the number of students unchanged/regressed on TELPAS fell by 2.67%, while the number of students progressing one level fell by 2.44% and the number progressing two or more levels increased by 5.10%.

Figure E.2: Summary of TELPAS Reading Proficiency Gain Progress

Grade Level	Non-Participants (2013-14 and 2014-15)				Academy Participants (2015-16)			
	Unchanged/ Regressed	Progressed 1 Level	Progressed 2+ Levels	Tot N.	Unchanged/ Regressed	Progressed 1 Level	Progressed 2+ Levels	Tot N.
1	33.47%	35.12%	31.40%	242	22.73%	35.45%	41.82%	110
2	41.35%	47.37%	11.28%	133	51.35%	37.84%	10.81%	74
3	46.46%	50.51%	3.03%	99	50.00%	42.31%	7.69%	52
4	60.23%	32.95%	6.82%	88	47.83%	41.30%	10.87%	46
5	30.77%	60.58%	8.65%	104	25.00%	59.09%	15.91%	44
Total	40.09%	43.54%	16.37%	666	37.42%	41.10%	21.47%	326

SECTION I: DATA AND METHODOLOGY

In this section, Hanover Research describes the data provided by SFDR-CISD for this analysis, the data processing performed by Hanover, and the analytical methodologies employed in this research. We also discuss potential methodological caveats that are notable when interpreting the report's findings.

DATA OVERVIEW

There are two outcome measures of interest for this study. The first and primary outcome is student performance on the Texas English Language Proficiency Assessment System (TELPAS), which is used in the state to measure the progress of English Learners (ELs) towards proficiency in English. The second measure is student performance on the State of Texas Assessments of Academic Readiness (STAAR) in Mathematics and Reading, a proxy for academic success. In the analysis, we compare students in the 2015-16 Bilingual Academies program with similar students in 2013-14 and 2014-15, before the Bilingual Academies program was implemented.

The data provided by SFDR-CISD include two components:

- **TELPAS Outcomes** – Include composite and reading outcomes (e.g., composite score, comprehensive rating, reading scale score, reading proficiency level), as well as the enrollment information for the assessed students (e.g., grade level, school membership). For this analysis, we focus on students who tested at the "beginning" or "intermediate" level on TELPAS at the beginning of the past three academic years (from 2013-14 through 2015-16)[5] and use this measure to identify whether a student participated in the program or not. If a student was tested at the beginning or intermediate level on TELPAS and attended a paired academy school in 2015-16, he/she is identified as an academy participant. On the other hand, if a student was tested at the beginning or intermediate level in 2013-14 and 2014-15, he/she is identified as a non-participant.

- **STAAR Outcomes** – Include mathematics and reading outcomes, enrollment information, and demographic information for assessed students. Relevant demographic data include each student's gender, race/ethnicity, special education program status, and bilingual program status.[6]

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[5] We use the beginning-of-year TELPAS performance to identify the EL status. For example, a student is identified as an EL in 2013-14 if he/she was tested at the beginning or intermediate level on TELPAS in 2012-13. Additionally, the non-ELs are not included in this analysis.

[6] We note, however, that there are no Kindergarten to Grade 2 student records in the data file, and thus we do not have demographic information for K-2 students. If SFDR-CISD is able to provide this information, the analyses can be updated. In addition, for the three students that have duplicate records at a student-test date level, each pair are associated with two different names or grade levels. We remove these six records since we assume that the records are for different students.

Figure 1.1 summarizes the data availability by grade level, data type (i.e., TELPAS, STAAR, demographic information), and subjects (e.g., STAAR mathematics, TELPAS reading). The availability of data limits our ability to control for certain types of variables (e.g., for Grade 1 and 2 students, we do not control for demographic characteristics) or build up the regression models for some grade levels (e.g., due to a lack of STAAR mathematics scores, we cannot complete a regression model for STAAR mathematics in Grade 1).

Figure 1.1: Data Availability by Grade Level, Data Type, and Subject

GRADE LEVEL	TELPAS		STAAR		DEMOGRAPHIC INFORMATION
	COMPOSITE	READING	MATHEMATICS	READING	
Kindergarten	Yes	No*	No	No	No
Grade 1	Yes	No*	No	No	No
Grade 2	Yes	Yes	No	No	No
Grade 3	Yes	Yes	Yes	Yes	Yes
Grade 4	Yes	Yes	Yes	Yes	Yes
Grade 5	Yes	Yes	Yes	Yes	Yes

Note: *For the TELPAS reading test records for Kindergarten and Grade 1 students, the data only contain proficiency level information, but do not have any valid scale score records (all values are marked as "0").
All the data are available from 2012-13 through 2015-16.

Hanover compiled these data into a single analytic file which includes a single observation for each student-grade combination. Ultimately, there are 710 students in our final analytic file, who were either academy participants (2015-16 only) or Beginner/Intermediate ELs in 2013-14 and 2014-15 (i.e., non-participants). Figure 1.2 describes the number of students in each of the student groups. The number of non-participants is around twice as many as the academy participants because we combined the ELs in 2013-14 and 2014-15 as the control group (i.e., non-participants).

Figure 1.2: Number of Students within Each Student Group by Grade Level

(Academy Participants versus Non-Participants)
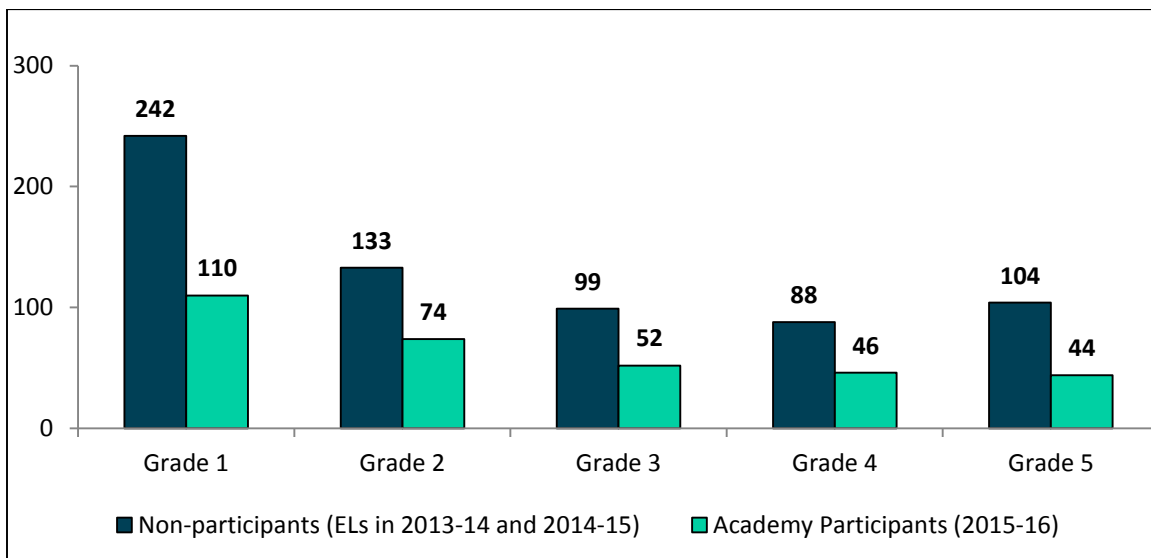
Note: The non-participants outnumbered academy participants since we pooled the ELs in 2013-14 and 2014-15, while the academy participants are all from 2015-16. All the non-participants and participants included above refer to only the ELs who tested at the beginning or intermediate level on TELPAS in the previous year.

Since the typical gains in English proficiency are likely to vary in each grade level and the scale score may not be comparable across different grade levels, we examine separate models for each grade level. In our final analytic model, the data is unique at the student-grade level.[7] Figure 1.3 below presents the variables of interest involved in the program evaluation. The table is divided into four sections – enrollment information, demographic information, TELPAS outcomes, and STAAR outcomes.

Figure 1.3: Description and Data Assumption on the Variables of Interest

VARIABLE	DESCRIPTION	DATA ASSUMPTION
Enrollment Information		
Student ID Number	The unique key identifier of each student in the data files.	--
School Year	The indication of the school year, from 2012-13 through 2015-16.	--
Grade Level	The grade that a student was in a given school year as Grades 1 to 5.	We exclude Kindergarten students from the analysis due to a lack of the assessment outcomes for the previous year.
School Membership	The school that a student was in the given spring semester when the TELPAS/STAAR assessment was administered.	We use the Campus Name to determine the school membership, focusing only on the observations with a campus name that is one of the seven elementary schools in the district.[8]
Demographic Information		
Gender	Gender indication as female and male.	--
Race/Ethnicity	Racial/ethnic indication as Asian, black, Hispanic, American Indian/Alaska Native, Two or More Races, white, and missing.	Hanover excludes this variable from the analysis due to a lack of variation in the final analytic dataset. For example, there are only four white students and all others are Hispanic.
At Risk Indicator	Whether the student is designated at risk of dropping out of school under state-mandated academic criteria only.	Hanover excludes this variable from the analysis due to a lack of variation in the final analytic dataset. For example, there is only one student who is not at risk.
Economic-Disadvantaged Status	The indication of economically disadvantaged status.	If the student is coded as 1, 2, or 9, he/she is identified as economically disadvantaged. If the student is coded as 0, he/she is identified as not economically disadvantaged.

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[7] If a student stays in the same grade for more than one year, we keep the earliest record. For example, if a student was enrolled in Grade 3 in both 2014-15 and 2015-16, we keep the record in 2014-15 and exclude the record in 2015-16.

[8] In a few cases, there are some minor inconsistencies in the campus names (e.g., "Lamar EL" and "Lamar Elementary"). We assume that they are for the same school.

Variable	Description	Data Assumption
Gifted and Talented Status	The indication of gifted and talented status.	Hanover excludes this variable from the analysis due to a lack of variation in the final analytic dataset. For example, there is only one student that is identified as gifted and talented.
Limited English Proficiency Status	The indication of LEP status. If the student is coded as "C", he/she is identified as LEP student. If the student is coded as "F", "S", or "0", he/she is identified as a non-LEP student.	Hanover excludes this variable from the analysis due to a lack of variation in the final analytic dataset. All the students in the final analytic dataset are identified as LEP students.
Migrant Status	The indication of migrant status.	--
Special Education Status	The indication of special education program status.	--
Bilingual Program Status	The indication of whether a student participates only in a bilingual program.	If the student is coded as 2, 3, 4, or 5, he/she participates in a bilingual program. If the student is coded as 0, he/she does not participate in a bilingual program.
English as Second Language Program Status	The indication of whether a student participates only in an English as second language program.	This variable is excluded from the analysis since it is highly correlated with the variable of Bilingual Program Status.
TELPAS		
Composite Score	The TELPAS composite score of each student in each year.	Hanover removes 22 records with zero composite score since we assume that these students do not have a valid score.
Composite Rating	The composite rating of each student in each year. There are four levels: beginning, intermediate, advanced, and advanced high.	We calculated the yearly composite progress based on this variable.
Reading Scale Score	The TELPAS reading scale score of each student in each year.	Kindergarten and Grade 1 students have zero reading scores. For Grades K-1, we do not include TELPAS reading scale scores in our analysis.
Reading Proficiency Level	The reading rating of each student in each year. There are four levels: beginning, intermediate, advanced, and advanced high.	We calculated the yearly reading progress based on this variable.
Yearly Progress	The yearly proficiency gains on TELPAS composite and reading.	Please refer to the Methodology subsection for detailed information.
STAAR		
Subject	The indication of the subject as reading and mathematics.	--

Variable	Description	Data Assumption
Scale Score	The scale scores of each student in each subject in each year.	Grade 5 students are offered three testing opportunities to pass the grade level state assessment (in March, May, and June). For the purpose of this analysis, we keep the highest score of the three administrations for each subject.[9]
Level II Satisfactory at Recommended Standard	The level II satisfactory academic performance at the recommended standard in each subject.	If the student is coded as 1, then he/she is identified as met the performance standard. If a student is coded as 0, then he/she is identified as not meet the performance standard.
Yearly Progress	The yearly proficiency gains on STAAR reading and mathematics.	Please refer to the Methodology subsection for detailed information.
Score Code	The indication of score code for each subject.	We remove the score of the subject if the student has a score code other than "S" and "P".[10]
Test Version	The indication of test version for each subject.	We remove the score of the subject if the student has a test version other than "S".[11]
Test Language	The indication of test language as English and Spanish.	We remove the score of the subject if the test language is Spanish.

METHODOLOGY

In order to provide the clearest possible evidence on whether the Bilingual Academies framework has improved outcomes for elementary English Learners within the district, Hanover focuses on comparing the performance of students currently receiving the new academy services with the performance of students with similar English proficiency levels in the same grade levels in previous years, before the implementation of the academies. In line with the district's request, we examine both students' progress in developing English proficiency (as measured by the TELPAS) and their performance on assessments testing academic content proficiency (as measured by the STAAR). For both the descriptive analysis and the regression analysis, we include four outcome variables of interest:

- TELPAS
  - Composite
  - Reading

- STAAR
  - Mathematics
  - Reading

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[9] For the same student-year combination, different records may be associated with different campus information or demographic information. To be consistent, we keep the campus and demographic information associated with the highest reading scale score for each student-year combination.

[10] We remove the score of the subject if the student has a score code as either "A" (Absent), "D" (No information available for this subject), "*" (No information available for this subject), or "O" (Other, e.g., illness during testing, testing irregularity. For example, if a student has a math score code of "O", we replace the student's math test outcomes (e.g., raw score, scale score) as missing.

[11] We remove the records with "A" (STAAR A), "L" (STAAR L), "M" (Modification), and "T". For example, if a student has a math test version of "A", we replace the student's math test outcomes as missing.

Hanover focuses on student performance over the last three years (2013-14 through 2015-16 school years), which provides a substantial baseline of pre-academy student performance to analyze while minimizing the impact of any longer-term changes in the district, other than the introduction of the Bilingual Academies, that might confound the analysis. Throughout the report, we only focus on students who tested at the beginning or intermediate level on the previous year's TELPAS, since these are the students who were eligible for the academies in 2015-16, or who would have been in previous years if the structure had been implemented.

DESCRIPTIVE ANALYSIS

First, Hanover conducts a descriptive analysis of the proficiency gains of students in 2015-16 and in previous years. We measure the percentage of students overall, as well as in each grade level, who progressed at least one level on the TELPAS rating (i.e., composite, reading) and STAAR rating (i.e., mathematics, reading). It provides a high-level view of whether students are making better progress on these standard assessments after the introduction of the academies. For students overall and in each grade level, we break students into several categories based upon their proficiency gains on TELPAS or STAAR. Figure 1.4 and Figure 1.5 summarize the definition associated with each category of TELPAS and STAAR, respectively. For example, if a student progresses by two or three levels on TELPAS, he/she is categorized as "Progressed 2+ Levels".

Figure 1.4: Definition of the Yearly TELPAS Progress – Composite & Reading

PROFICIENCY GAIN	DEFINITION	EXAMPLE
Unchanged/Regressed	The proficiency level remains the same or becomes lower in the current year than the previous year.	The student achieved "Intermediate" and "Beginning" in 2014-15 and 2015-16, respectively.
Progressed 1 Level	The student is progressed by one level. Or if a student achieved "Advanced High" in both the current and the previous years.	The student achieved "Beginning" and "Intermediate" in 2013-14 and 2014-15, respectively.
Progressed 2+ Levels	The student is progressed by two or three levels.	The student achieved "Beginning" and "Advanced High" in 2014-15 and 2015-16, respectively.

Figure 1.5: Definition of the Yearly STAAR Progress – Mathematics & Reading

PROFICIENCY GAIN	PROFICIENCY LEVEL IN THE PREVIOUS YEAR	PROFICIENCY LEVEL IN THE CURRENT YEAR
Unchanged	Met the standard	Met the standard
Unchanged	Did not meet the standard	Did not meet the standard
Regressed	Met the standard	Did not meet the standard
Progressed	Did not meet the standard	Met the standard

REGRESSION ANALYSIS

We build on the descriptive analysis by using regression models with TELPAS (composite and reading scores) and STAAR (mathematics and reading scores) as outcomes. The regression analysis provides estimates of the difference in performance between post-academy English Learners (2015-16) and pre-academy English Learners (2013-14 and 2014-15) in the same

grade level with the same initial proficiency level and demographic characteristics. The regression models allow us to control for other student characteristics, including relevant demographic characteristics, such as economic disadvantage, as well as relevant previous assessment performance. Additionally, we examine separate models for each grade level, since students' typical gains in English proficiency or assessments testing academic content proficiency are likely to vary in each grade level.

Figure 1.6 describes the types of variables (i.e., TELPAS performance in the previous year, STAAR performance in the previous year, demographic characteristics) that we controlled for in each model. As discussed in the Data Overview subsection, the availability of data limits our ability to control for certain types of data or build up the regression model for some grade levels (Figure 1.1). For example, due to a lack of TELPAS reading scale score for Grade 1 students, we cannot control for previous-year TELPAS reading score while analyzing Grade 2 TELPAS reading scale scores. Instead, we include previous-year TELPAS composite score as a control. Similarly, while analyzing Grade 3 STAAR mathematics and reading scores, we cannot include the previous STAAR performance. We control for previous TELPAS composite score and previous TELPAS reading scale score instead.

Figure 1.6: Types of Variables Controlled for Each Outcome Variable

(Each Regression Model)

REGRESSION MODEL BY GRADE LEVEL	TELPAS SCALE SCORE IN PREVIOUS YEAR		STAAR SCALE SCORE IN PREVIOUS YEAR		DEMOGRAPHIC INFORMATION
	COMPOSITE	READING	MATHEMATICS	READING	
Outcome Variable: TELPAS Composite Score					
Grade 1	Yes	No	No	No	No
Grade 2	Yes	No	No	No	No
Grade 3	Yes	No	No	No	Yes
Grade 4	Yes	No	No	No	Yes
Grade 5	Yes	No	No	No	Yes
Outcome Variable: TELPAS Reading Scale Score					
Grade 2	Yes	No	No	No	No
Grade 3	No	Yes	No	No	Yes
Grade 4	No	Yes	No	No	Yes
Grade 5	No	Yes	No	No	Yes
Outcome Variable: STAAR Mathematics Scale Score					
Grade 3	Yes	No	No	No	Yes
Grade 4	No	No	Yes	No	Yes
Grade 5	No	No	Yes	No	Yes
Outcome Variable: STAAR Reading Scale Score					
Grade 3	No	Yes	No	No	Yes
Grade 4	No	No	No	Yes	Yes
Grade 5	No	No	No	Yes	Yes

Figure 1.7 presents the summary statistics for each assessment outcome variable by grade level. For each outcome variable, the mean score varies across grades, which is aligned with our decision to examine separate models for each grade level.

Figure 1.7: Summary Statistics for the Assessment Outcome Variables by Grade Level

GRADE LEVEL	COUNT	MEAN	STD. DEV.	MIN.	MAX.
TELPAS Composite Score					
Grade 1	352	2.61	0.92	1	4
Grade 2	207	2.30	0.67	1	4
Grade 3	151	2.18	0.57	1	3.5
Grade 4	134	2.14	0.64	1	4
Grade 5	148	2.43	0.61	1	4
Total	**992**	**2.39**	**0.77**	**1**	**4**
TELPAS Reading Scale Score					
Grade 2	207	604.45	50.46	497	783
Grade 3	151	629.10	43.96	534	750
Grade 4	134	655.9	40.15	573	768
Grade 5	148	674.53	40.92	580	768
Total	**640**	**637.24**	**52.48**	**497**	**783**
STAAR Mathematics Scale Score					
Grade 3	90	1,303.47	102.82	1,058	1,660
Grade 4	92	1,399.43	101.10	1,244	1,716
Grade 5	102	1,476.02	99.78	887	1,764
Total	**284**	**1,396.53**	**123.29**	**887**	**1,764**
STAAR Reading Scale Score					
Grade 3	134	1,254.35	64.74	1,130	1,439
Grade 4	102	1,336.53	77.69	1,133	1,531
Grade 5	118	1,391.91	64.10	1,229	1,622
Total	**354**	**1,323.88**	**89.98**	**1,130**	**1,622**

POTENTIAL LIMITATIONS

Below we highlight important caveats to consider when interpreting the analysis in this report. The limitations include small sample size, data availability, and unobserved differences between groups.

SAMPLE SIZE

Since we examine separate models for each grade level, we have a smaller sample size in each model, which limits the power and interpretability of the results. As new results come in for 2016-17, the analysis may be updated to reflect additional data, hopefully making the findings more robust.

DATA AVAILABILITY

As discussed in the Methodology subsection, we cannot control for the demographics or most relevant previous assessment performance for certain grade levels. To be specific, for Grade 1 and Grade 2 students, who do not have demographic information available, we are unable to introduce control variables which may account for the observed pre-academy differences between the groups. Another example is for Grade 3 STAAR mathematics scale scores, where we control for previous TELPAS composite scores instead of previous STAAR mathematics

scores (the STAAR assessment begins in Grade 3). We are not able to control for students' prior mathematics proficiency in a more accurate way.

UNOBSERVED DIFFERENCES BETWEEN GROUPS

In our regression analyses, we compare students who participated the academy in 2015-16 and those who were ELs in previous years, since there is not a suitable comparison group in the from the same period. The implicit assumption underlying such a comparison is that the sole difference between the student groups is that one group received the intervention and the other did not. However, in addition to the *observed* differences between the groups (e.g., demographics, previous academic assessment performance), there might be some *unobserved* differences. For example, non-participants may be affected by some year-variable factors, such as teacher quality; any exhibited growth may be a result of a mixture of the academy and the unobserved year-variable factors.

SECTION II: PROGRAM EFFECT ON TELPAS

In this section, Hanover presents and compares the yearly proficiency gains on TELPAS for academy participants and non-participants by grade level. We also present the results of the regression analyses for each grade level, where we compare the TELPAS outcomes between these two student groups while controlling for students' previous TELPAS performance and demographic characteristics.

DESCRIPTIVE ANALYSIS

In this subsection, Hanover presents the descriptive analysis of the English proficiency gains of students in 2015-16 and in the previous two years. Figure 2.1 and Figure 2.2 on the following page present the percentage of students in each grade level who were unchanged or regressed, progressed one level, or progressed more than one level on the TELPAS composite rating for non-participants and academy participants, respectively. Similarly, Figure 2.4 and Figure 2.5 present the percentage of students in each grade level who were in each progression category on the TELPAS reading rating for non-participants and academy participants, respectively.
Figure 2.3 and Figure 2.6 summarize the percentages for all students (i.e., non-participants and academy participants) for TELPAS composite and reading, respectively.

In general, a higher proportion of academy participants progressed in TELPAS than did non-participants, which indicates that academy participants outperformed the non-participants on English proficiency gains. For most grade levels, the percentages of academy participants who were unchanged or regressed are smaller than the percentages of non-participants of the same progression category. For example, in Grade 4, 60 percent of non-participants (2013-14 and 2014-15) were unchanged or regressed, whereas only 48 percent of the participants (Bilingual Academy students in 2015-16) did not progress. On the other hand, the percentage of students who progressed (for one or more than one levels) increased for most grade levels. For example, nine percent of Grade 5 non-participants progressed two or more levels on the TELPAS composite assessment, while 16 percent of academy participants in Grade 5 progressed two or more levels.

Additionally, for lower and higher grade levels (i.e., Grade 1, Grade 5), there are a higher proportion of students who progressed, regardless of the academy participation status. As for the grade levels in-between (i.e., Grade 2 through Grade 4), more students stayed unchanged or even regressed.

TELPAS COMPOSITE

Figure 2.1: Number of Students by Grade Level and Proficiency Gain Category

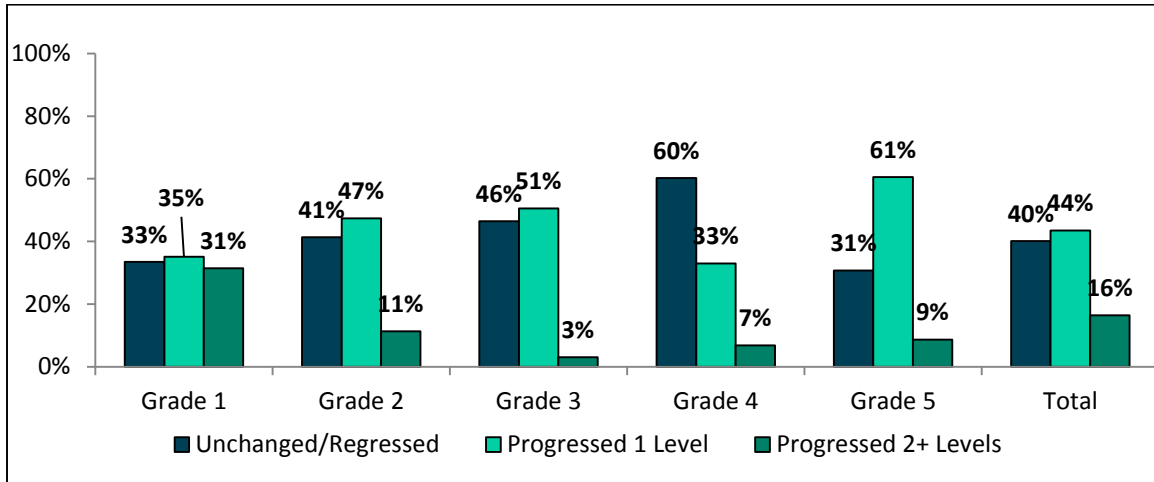*Non-Participants on TELPAS Composite Score*

Figure 2.2: Number of Students by Grade Level and Proficiency Gain Category

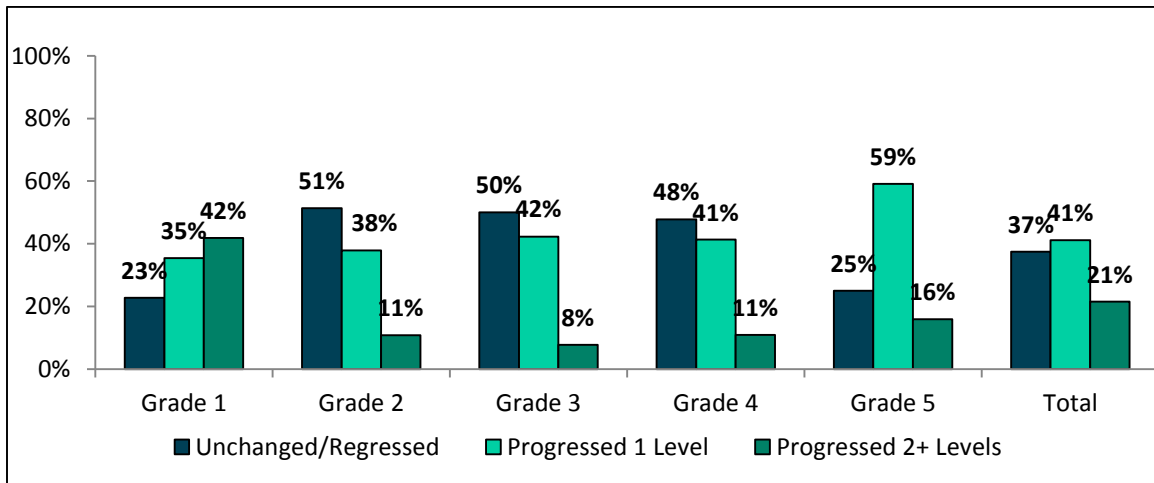*Academy Participants on TELPAS Composite Score*

Figure 2.3: Summary of TELPAS Composite Proficiency Gain Progress

GRADE LEVEL	NON-PARTICIPANTS				ACADEMY PARTICIPANTS			
	UNCHANGED/ REGRESSED	PROGRESSED 1 LEVEL	PROGRESSED 2+ LEVELS	TOT N.	UNCHANGED/ REGRESSED	PROGRESSED 1 LEVEL	PROGRESSED 2+ LEVELS	TOT N.
1	33.47%	35.12%	31.40%	242	22.73%	35.45%	41.82%	110
2	41.35%	47.37%	11.28%	133	51.35%	37.84%	10.81%	74
3	46.46%	50.51%	3.03%	99	50.00%	42.31%	7.69%	52
4	60.23%	32.95%	6.82%	88	47.83%	41.30%	10.87%	46
5	30.77%	60.58%	8.65%	104	25.00%	59.09%	15.91%	44
Total	40.09%	43.54%	16.37%	666	37.42%	41.10%	21.47%	326

Note: Tot N. presents the total number of students in the corresponding student group (either non-participants or Academy participants) and grade level (or across all grade levels shown in the last row).

TELPAS READING

Figure 2.4: Number of Students by Grade Level and Proficiency Gain Category

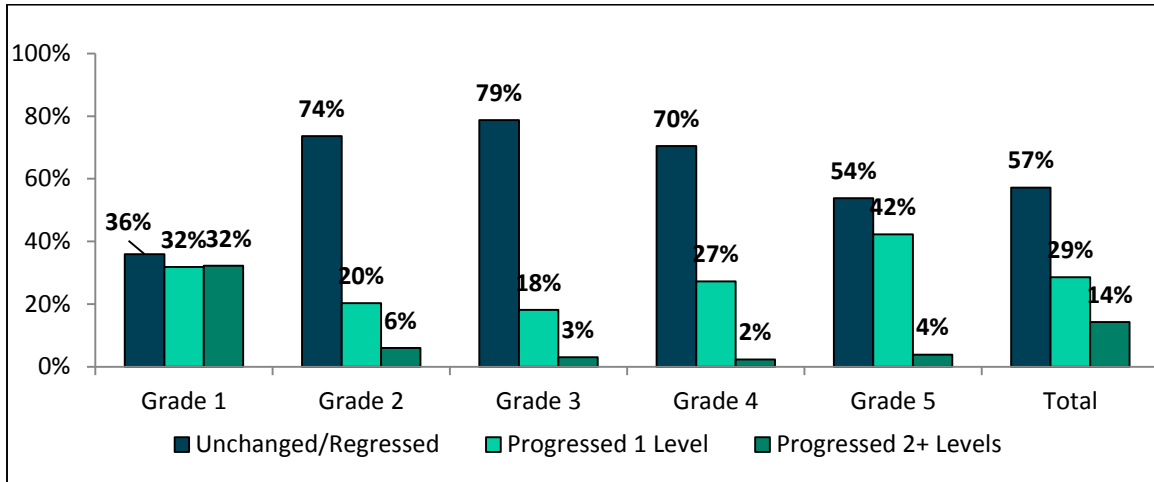*Non-Participants on TELPAS Reading Score*

Figure 2.5: Number of Students by Grade Level and Proficiency Gain Category

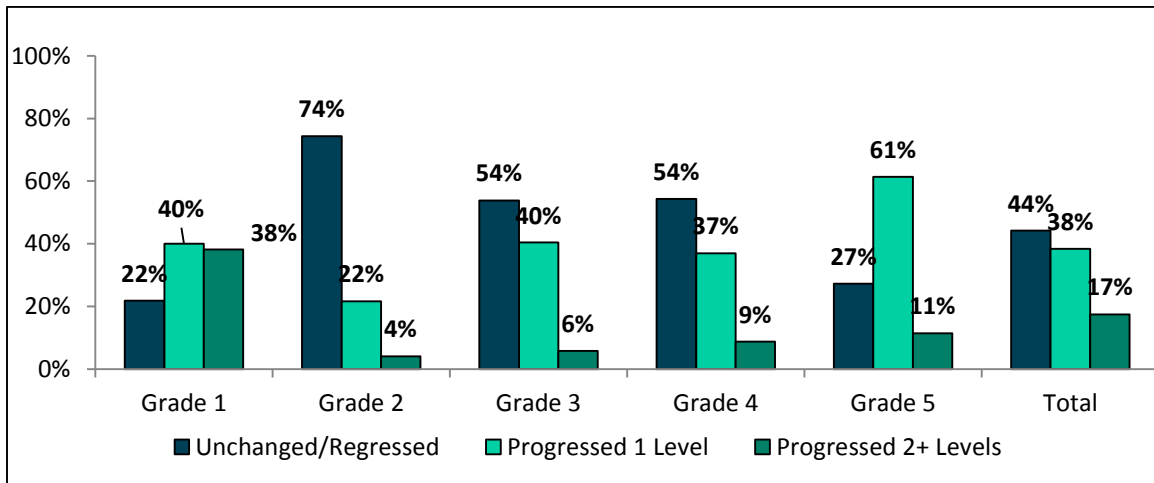*Academy Participants on TELPAS Reading Score*

Figure 2.6: Summary of TELPAS Reading Proficiency Gain Progress

GRADE LEVEL	NON-PARTICIPANTS				ACADEMY PARTICIPANTS			
	UNCHANGED/ REGRESSED	PROGRESSED 1 LEVEL	PROGRESSED 2+ LEVELS	TOT N.	UNCHANGED/ REGRESSED	PROGRESSED 1 LEVEL	PROGRESSED 2+ LEVELS	TOT N.
1	35.95%	31.82%	32.23%	242	21.82%	40.00%	38.18%	110
2	73.68%	20.30%	6.02%	133	74.32%	21.62%	4.05%	74
3	78.79%	18.18%	3.03%	99	53.85%	40.38%	5.77%	52
4	70.45%	27.27%	2.27%	88	54.35%	36.96%	8.70%	46
5	53.85%	42.31%	3.85%	104	27.27%	61.36%	11.36%	44
Total	57.21%	28.53%	14.26%	666	44.17%	38.34%	17.48%	326

Note: Tot N. presents the total number of students in the corresponding student group (either non-participants or Academy participants) and grade level (or across all grade levels shown in the last row).

REGRESSION ANALYSIS

Figures 2.7 and 2.8 present the regression results on TELPAS composite score and TELPAS reading scale score, respectively. The regression coefficients of interest are highlighted in blue and represent the difference in each outcome between the academy participants and non-participants (i.e., academy effect), after controlling for relevant baseline performance and student demographics.

Results indicate that the academy participants performed better than the non-participants on both TELPAS composite scores and reading scale scores in certain grade levels. For Grade 1, 4, and 5, the program effects on the TELPAS composite score are statistically significant (highlighted in pink), and the coefficients are positive (Figure 2.7). For example, the academy participants, on average, scored 0.34 points higher than the non-participants on Grade 1 TELPAS composite while controlling for their composite score in the previous year. In addition, the program effect on the Grade 4 TELPAS reading scale score is statistically significant and positive (Figure 2.8). It indicates that the academy participants scored 14.71 points higher than non-participants on Grade 4 TELPAS reading after controlling for baseline assessment scores and demographic characteristics, on average.

Figure 2.7: TELPAS Composite Score Regression Results

Academy Participants and Non-Participants

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
Academy Participation (Reference Group: Non-Participants)					
Academy Participants	0.3421***	-0.0271	0.0331	0.2286**	0.1804**
Baseline Assessment Scores					
TELPAS Composite Score - Previous Year	0.8192***	0.7516***	0.6881***	0.5996***	0.7308***
Gender (Reference Group: Female)					
Male	--	--	0.0847	-0.3502***	-0.1961**
Bilingual Program Status (Reference Group: Yes)					
No	--	--	0.0541	0.1085	-0.0578
Economic-Disadvantaged Status (Reference Group: Economically Disadvantaged)					
Not Economically Disadvantaged	--	--	0.3288	0.0211	-0.0460
Migrant Status (Reference Group: No)					
Yes	--	--	-0.0194	-0.4231**	-0.0216
Special Education Status (Reference Group: No)					
Yes	--	--	-0.2661*	-0.4005**	-0.2254
Overall Model Statistics					
Constant	1.2157***	0.9569***	0.8848***	1.2446***	1.2435***
Observations	352	207	134	107	119
R-squared	0.1930	0.2318	0.3118	0.3513	0.4568

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The statistically significant result(s) is/are highlighted in pink.

Figure 2.8: TELPAS Reading Scale Score Regression Results

Academy Participants and Non-Participants

	GRADE 2	GRADE 3	GRADE 4	GRADE 5
Academy Participation (Reference Group: Non-Participants)				
Academy Participants	-3.1968	10.6011	14.7068**	6.4357
Baseline Assessment Scores				
TELPAS Composite Score - Previous Year	45.3345***	--	--	--
TELPAS Reading Scale Score - Previous Year	--	0.5919***	0.6110***	0.7681***
Gender (Reference Group: Female)				
Male	--	9.8516	-17.6581***	-8.4044
Bilingual Program Status (Reference Group: Yes)				
No	--	2.0842	19.3016**	-6.4090
Economic-Disadvantaged Status (Reference Group: Economically Disadvantaged)				
Not Economically Disadvantaged	--	39.5711*	4.7020	-3.0408
Migrant Status (Reference Group: No)				
Yes	--	-9.5349	-19.5597	-17.1378*
Special Education Status (Reference Group: No)				
Yes	--	-27.9958***	-19.9345**	-15.2075
Overall Model Statistics				
Constant	523.7930***	283.2727***	291.4008***	199.1555***
Observations	207	134	107	119
R-squared	0.1507	0.3173	0.4755	0.4135

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The statistically significant result(s) is/are highlighted in pink.

SECTION III: PROGRAM EFFECT ON STAAR

In this section, Hanover presents and compares the yearly proficiency gains on STAAR mathematics and reading for academy participants and non-participants by grade level. We also present the results of the regression analyses for each grade level, comparing STAAR outcomes between these two student groups while controlling for students' previous STAAR performance and demographic characteristics.

DESCRIPTIVE ANALYSIS

In this subsection, Hanover presents the descriptive analysis of the core academic content area proficiency gains of students in 2015-16 and the previous years. Figure 3.1 and Figure 3.2 summarize the percentages of all students (i.e., non-participants and academy participants) in each grade level who regressed, remained unchanged, or progressed on STAAR mathematics and reading respectively.

In general, in each grade level and subtest (mathematics and reading), there are more academy participants progressed in STAAR than the non-participants, which indicates that academy participants outperformed the non-participants on English proficiency gains. For example, none of the Grade 5 non-participants progressed in STAAR mathematics, but there are 5 percent of participating students who progressed. However, please interpret the results with caution due to the lack of variation across different STAAR progression categories. We note that almost all the students remained unchanged, regardless of grade level, subtest, or academy participation status.

Figure 3.1: Summary of STAAR Mathematics Proficiency Gain Progress

GRADE LEVEL	NON-PARTICIPANTS				ACADEMY PARTICIPANTS			
	REGRESSED	UNCHANGED	PROGRESSED	TOT N.	REGRESSED	UNCHANGED	PROGRESSED	TOT N.
4	--	100.00%	--	37	7.69%	84.62%	7.69%	13
5	--	100.00%	--	65	--	95.00%	5.00%	20
Total	**--**	**100.00%**	**--**	**102**	**3.03%**	**90.91%**	**6.06%**	**33**

Note: Tot N. presents the total number of students in the corresponding student group (either non-participants or Academy participants) and grade level (or across all grade levels shown in the last row).

Figure 3.2: Summary of STAAR Reading Proficiency Gain Progress

GRADE LEVEL	NON-PARTICIPANTS				ACADEMY PARTICIPANTS			
	REGRESSED	UNCHANGED	PROGRESSED	TOT N.	REGRESSED	UNCHANGED	PROGRESSED	TOT N.
4	--	100.00%	--	64	--	100.00%	--	29
5	--	98.73%	1.27%	79	--	96.55%	3.45%	29
Total	**--**	**99.30%**	**0.70%**	**143**	**--**	**98.28%**	**1.72%**	**58**

Note: Tot N. presents the total number of students in the corresponding student group (either non-participants or Academy participants) and grade level (or across all grade levels shown in the last row).

REGRESSION ANALYSIS

Figure 3.3 and Figure 3.4 present the regression results on STAAR mathematics and reading scale scores, respectively. The regression coefficients of interest are highlighted in blue and represent the difference in each outcome between the academy participants and non-participants (i.e., academy effect), after controlling for relevant baseline performance and student demographics (if available).

We find that in Grade 4, the academy participants have significantly higher scores in both tests than non-participants. The program effect on the Grade 4 STAAR mathematics and reading are statistically significant and the coefficients are positive (Figures 3.3 and 3.4, respectively). To be more specific, the academy participants scored 46.68 points and 33.42 points higher than non-participants in the math test and the reading test, respectively, after controlling for baseline assessment scores and demographic characteristics.

Figure 3.3: STAAR Mathematics Scale Score Regression Results

Academy Participants and Non-Participants

	GRADE 3	GRADE 4	GRADE 5
Academy Participation (Reference Group: Non-Participants)			
Academy Participants	-0.6512	46.6828*	24.3289
Baseline Assessment Scores			
TELPAS Composite Score - Previous Year	59.9397**	--	--
STAAR Mathematics Scale Score - Previous Year	--	0.2192*	0.4621***
Gender (Reference Group: Female)			
Male	24.2799	-9.1236	-16.3701
Bilingual Program Status (Reference Group: Yes)			
No	42.3329*	19.5747	-4.1670
Economic-Disadvantaged Status (Reference Group: Economically Disadvantaged)			
Not Economically Disadvantaged	75.5606*	0.4126	-56.3381**
Migrant Status (Reference Group: No)			
Yes	-73.5349***	33.5030	-21.0185
Special Education Status (Reference Group: No)			
Yes	-87.0890*	-9.8194	42.9903***
Overall Model Statistics			
Constant	1,168.0641***	1,075.2776***	847.9749***
Observations	90	50	85
R-squared	0.2156	0.1541	0.3490

Note: *** p<0.01, ** p<0.05, * p<0.1. The statistically significant result(s) is/are highlighted in pink.

Figure 3.4: STAAR Reading Scale Score Regression Results

Academy Participants and Non-Participants

	GRADE 3	GRADE 4	GRADE 5
Academy Participation (Reference Group: Non-Participants)			
Academy Participants	-3.4998	33.4160**	-16.3817
Baseline Assessment Scores			
TELPAS Reading Scale Score - Previous Year	0.4173***	--	--
STAAR Reading Scale Score - Previous Year	--	0.3214***	0.0412
Gender (Reference Group: Female)			
Male	17.4229	-21.1630	-49.8311***
Bilingual Program Status (Reference Group: Yes)			
No	17.4153	10.4607	1.9113
Economic-Disadvantaged Status (Reference Group: Economically Disadvantaged)			
Not Economically Disadvantaged	70.2726***	-7.5231	-15.2727
Migrant Status (Reference Group: No)			
Yes	3.5458	-48.2173***	-18.1014
Special Education Status (Reference Group: No)			
Yes	6.3293	-28.4445*	-44.0062**
Overall Model Statistics			
Constant	995.2990***	936.1059***	1,379.8410***
Observations	134	93	108
R-squared	0.1243	0.2132	0.1751

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The statistically significant result(s) is/are highlighted in pink.

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