

RENAISSANCE

TECHNICAL PAPER | 2020–2021 School Year

Relating Star Reading Spanish and Star Math Spanish to the State of Texas Assessments of Academic Readiness Spanish (STAAR Spanish)



Contents

3	Introduction
3	Main Findings
4	Study
5	Results
7	Appendix A: About Star Reading Spanish and Star Math Spanish
7	Appendix B: Star Spanish Percentile Ranks (PRs) for cut-score equivalents
7	Appendix C: STAAR Spanish achievement levels
8	References

Figures

4	Figure 1. Star Reading Spanish and Star Math Spanish scores highly correlate with STAAR Spanish scores
---	--

Tables

5	Table 1. Star Reading Spanish and Star Math Spanish Unified Scale Score equivalents for each STAAR Spanish achievement level range
6	Table 2. Proficiency forecasting using Star Reading Spanish and Star Math Spanish scores yields accurate results
7	Table B1. Star Spanish Percentile Ranks (PRs) for cut-score equivalents
7	Table C1. STAAR Spanish achievement level score ranges

Initial publication August 21, 2020

Introduction

At Renaissance we know that as an educator, chief among your responsibilities is making decisions about how to allocate limited resources to best serve diverse student needs. A good assessment system supports your efforts, by providing timely, relevant information to help address key questions about which students are on track to meet important standards and who may need additional assistance.

Assessments that identify early any students at risk of missing academic standards are especially useful, as they inform instructional decisions to improve student performance and reduce gaps in achievement. Assessments that do this while taking little time away from instruction are particularly valuable. *Interim assessments*, one of three broad categories of educational assessment,¹ indicate which students are on track to meet later expectations (Perie et al., 2007).

This linking study applied results from two interim assessments, Renaissance Star Reading Spanish® and Renaissance Star Math Spanish®, to help you predict whether individual students are on track or need more assistance to succeed on the year-end summative State of Texas Assessments of Academic Readiness Spanish (STAAR Spanish) tests in reading and mathematics in grade 3 and 4.²

Assessments that identify early any students at risk of missing academic standards are especially useful.

Main Findings

Results from the linking analysis revealed that Star Reading Spanish and Star Math Spanish are accurate predictors of the State of Texas Assessments of Academic Readiness Spanish (STAAR Spanish), meaning as a Texas educator you can use Star Spanish scores to:

1. Identify early in the year students likely to miss reading and math yearly progress goals in time to make meaningful adjustments to instruction well before the year-end test.
2. Forecast the percent of students at each STAAR Spanish performance level to serve as an early warning system for building and district administrators and allow redirection of resources as needed.

¹ **Formative assessments** are short and frequent processes, embedded in instruction, that support learning and provide specific feedback on what students know and can do versus where gaps in knowledge exist. **Summative assessments** evaluate whether students have met a set of standards and serve most commonly as year-end state-mandated tests. **Interim assessments** represent the middle ground, in terms of duration and frequency and can serve purposes including informing instruction, evaluating curriculum and student responsiveness to intervention, and forecasting performance on high-stakes summative year-end tests.

² Sample sizes were inadequate for grade 5; possible linking for this grade will be re-visited in the future as more data becomes available.

Study

To determine if Star Reading Spanish and Star Math Spanish can predict student achievement on the end-of-year STAAR Spanish tests in reading and mathematics, we began by linking the score scales for each assessment.

Data collection

Using a secure data-matching procedure compliant with the federal Family Educational Rights and Privacy Act (FERPA) and Texas Department of Education policies, staff from three Texas districts provided Renaissance with state summative test scores for students who had taken Star Reading Spanish and/or Star Math Spanish during the 2018–2019 school year. Each record included a student’s STAAR Spanish scores and was matched with all Star Spanish scores for that year.

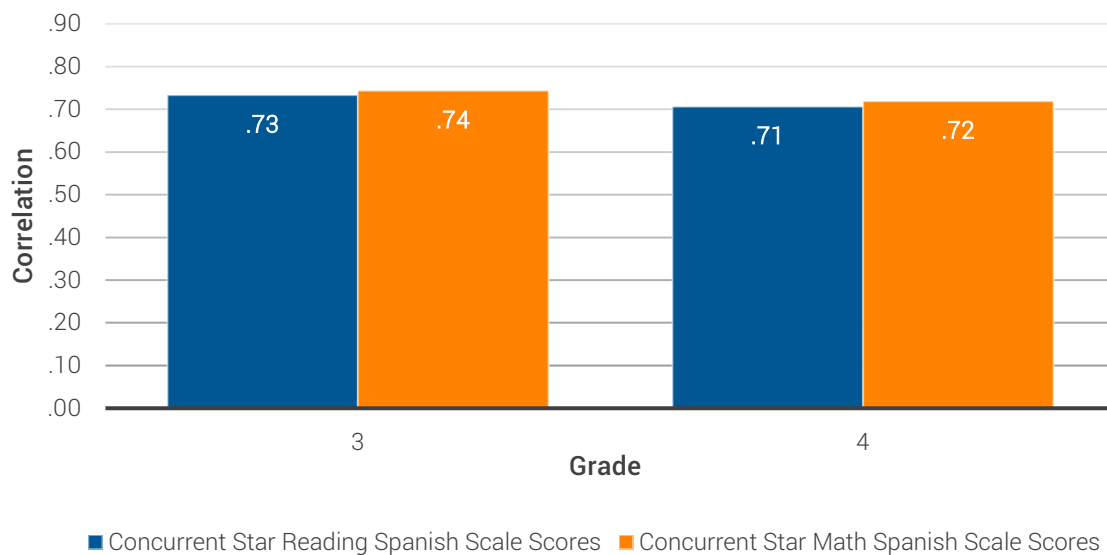
Sample characteristics

The sample selected included students’ scores for all Star Spanish tests taken within 30 days before or after the STAAR Spanish administration. This sample numbered 8,299 records in grades 3–4 with matched STAAR Spanish reading and Star Reading Spanish scores and 6,522 records in grades 3–4 with matched STAAR Spanish mathematics and Star Math Spanish scores. In each grade, we then set aside scores from a subset of these students—10%—as a holdout sample to use to evaluate the scale linkage.

Correlations

Before linking Star Spanish tests with STAAR Spanish, we ensured there was a strong relationship between the test scales. As seen in figure 1, the correlations were strong, averaging .72 and .73 between STAAR Spanish and Star Reading Spanish and Star Math Spanish, respectively.

Figure 1. Star Reading Spanish and Star Math Spanish scores highly correlate with STAAR Spanish scores



Scale linkage

Renaissance linked the Star Spanish test scale to the STAAR Spanish scale by applying equipercentile linking analysis (Kolen & Brennan, 2004). The concurrent sample (sans the holdout sample) was used in the linking, and the result was a table of STAAR Spanish scores for each possible Star Spanish score.

STAAR Spanish cut scores and corresponding Star Spanish score equivalents

STAAR Spanish results are reported in scaled scores that describe each student's location on an achievement continuum ranging from approximately 668 to 2056 and using four achievement levels: *Did Not Meet Grade Level*, *Approaches Grade Level*, *Meets Grade Level*, and *Masters Grade Level*. A main purpose in linking Star Reading Spanish and Star Math Spanish to the STAAR Spanish scale was to identify Star Spanish scores at the time of the state test that are approximately equivalent to the cut-off scores that separate the STAAR Spanish achievement levels. Table 1 displays these equivalent Star scores for grades 3–4 for Star Reading Spanish and Star Math Spanish.³ Appendix B includes the percentile ranks (PRs) for Star Reading Spanish and Star Math Spanish cut-score equivalents. The corresponding STAAR Spanish cut scores can be found in Appendix C.

Table 1. Star Reading Spanish and Star Math Spanish Unified Scale Score equivalents for each STAAR Spanish achievement level range

Star Reading Spanish cut-score equivalents				
Grade	Did Not Meet Grade Level	Approaches Grade Level	Meets Grade Level	Masters Grade Level
3	< 902	902 – 954	955 – 986	≥ 987
4	< 948	948 – 995	996 – 1032	≥ 1033
Star Math Spanish cut-score equivalents				
Grade	Did Not Meet Grade Level	Approaches Grade Level	Meets Grade Level	Masters Grade Level
3	< 936	936 – 994	995 – 1020	≥ 1021
4	< 989	989 – 1033	1034 – 1056	≥ 1057

Results

Accuracy of scale linkage confirmed

In evaluating the accuracy of the scale linkage, we applied the linking results (i.e., our table of STAAR Spanish scores for each possible Star Spanish score) to the holdout sample. For each student, we compared actual STAAR Spanish proficiency status to estimated proficiency status. Table 2 displays classification diagnostics about whether students were correctly or incorrectly classified as proficient or not on the STAAR using Star scores. On average, students were correctly classified (i.e., overall classification accuracy) 82% of the time for reading and 84% of the time for math.

For Area Under the ROC Curve (AUC), a summary measure of diagnostic accuracy, Star Reading Spanish averaged .88 and Star Math Spanish averaged .91 (also displayed in table 2). AUC values closer to 1 indicate an assessment perfectly distinguishes between students who are proficient versus those who are not, whereas values of .50

³ The Star Reading Spanish and Star Math Spanish cut-score equivalents presented in Table 1 apply only to the time of the state test.

indicate prediction no better than chance. In general, an AUC of .70 to .80 is considered acceptable, .80 to .90 is excellent, and greater than .90 is outstanding (Hosmer et al., 2013).

Table 2. Proficiency estimating using Star Reading Spanish and Star Math Spanish scores yields accurate results

Star Reading Spanish		
Measure	Grade	
	3	4
Overall classification accuracy (percentage of correct classifications)	81%	84%
Area Under the ROC Curve	0.87	0.90
Star Math Spanish		
Measure	Grade	
	3	4
Overall classification accuracy (percentage of correct classifications)	83%	84%
Area Under the ROC Curve	0.90	0.91

Other diagnostic accuracy measures studied:

- ✓ **Sensitivity** represents the percentage of proficient students that were correctly forecasted, which for Star Reading Spanish averaged 74% and for Star Math Spanish averaged 75%.
- ✓ **Specificity** represents the percentage of not-proficient students that were correctly forecasted, which averaged 86% for Star Reading Spanish and 89% for Star Math Spanish.
- ✓ **Positive predictive values** indicate that when Star scores forecasted students to be proficient, they actually were proficient 69% of the time for Star Reading Spanish and 80% of the time for Star Math Spanish.
- ✓ **Negative predictive values** indicate that when Star scores forecasted students to miss proficiency, they actually weren't proficient 88% of the time for Star Reading Spanish and 85% of the time for Star Math Spanish.
- ✓ **Proficiency status projection error**, the difference between actual and projected proficiency rates, indicates how well scores accurately predict proficiency within each grade. Star Reading Spanish averaged 2% and Star Math Spanish averaged -3% (negative scores indicate under-prediction while positive scores show over-prediction).

Appendix A: About Star Reading Spanish and Star Math Spanish

The computer-adaptive Star Reading Spanish and Star Math Spanish assessments allow educators to determine which students are on track to meet goals, and how students are progressing toward mastery and compare to grade-level peers. These highly reliable, valid, and efficient standards-based measures of student performance in reading and math provide valuable information regarding the acquisition of skills along a continuum of learning expectations. The assessments can be completed in about 20 minutes, and we recommend administering them two to five times a year for most purposes and more frequently when used for progress monitoring.



Appendix B: Star Spanish Percentile Ranks (PRs) for cut-score equivalents

Table B1. Star Spanish PRs for cut-score equivalents

Star Reading Spanish® PRs for cut-score equivalents			
Grade	Approaches Grade Level	Meets Grade Level	Masters Grade Level
3	47	75	87
4	56	80	92
Star Math Spanish® PRs for cut-score equivalents			
Grade	Approaches Grade Level	Meets Grade Level	Masters Grade Level
3	42	78	92
4	52	78	89

Appendix C: State of Texas Assessments of Academic Readiness Spanish (STAAR Spanish) achievement levels

Table C1. STAAR Spanish achievement level score ranges

STAAR Spanish achievement level score ranges: Reading				
Grade	Did Not Meet Grade Level	Approaches Grade Level	Meets Grade Level	Masters Grade Level
3	< 1318	1318 – 1443	1444 – 1531	≥ 1532
4	< 1413	1413 – 1538	1539 – 1635	≥ 1636
STAAR Spanish achievement level score ranges: Mathematics				
Grade	Did Not Meet Grade Level	Approaches Grade Level	Meets Grade Level	Masters Grade Level
3	< 1360	1360 – 1485	1486 – 1595	≥ 1596
4	< 1467	1467 – 1588	1589 – 1669	≥ 1670

References

- Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). Assessing the fit of the model. In *Applied logistic regression* (3rd ed., pp. 153–225). John Wiley & Sons.
- Kolen, M. J., & Brennan, R. R. (2004). *Test equating scaling and linking: Methods and practices*. Springer Science+Business Media.
- Perie, M., Marion, S., Gong, B., & Wurtzel, J. (2007). *The role of interim assessments in a comprehensive assessment system*. Aspen Institute.
- Renaissance Learning. (2018). *Star Reading Spanish technical manual*. Available by request to research@renaissance.com
- Renaissance Learning. (2019). *Star Math Spanish technical manual*. Available by request to research@renaissance.com