



Exact Path Diagnostic and State of Texas Assessment of Academic Readiness Correlation Study

Summary

This research study investigated the correlation between scores on the Exact Path Diagnostic Assessment and scores on the State of Texas Assessment of Academic Readiness (STAAR). The findings in this study show strong correlations between the Exact Path diagnostic and STAAR scores across content areas and grades, providing evidence that the assessments tend to measure the same skills and knowledge.



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Background

The Exact Path Diagnostic Assessment is a computer-adaptive test that can be administered up to four times a year in language arts, reading, and/or mathematics and which results in a scale score that ranges from 500 to 1500 regardless of grade level. Two districts in Texas who administered the Exact Path diagnostic provided student scores on the STAAR, the Texas accountability assessment for students in grades three through eight, totaling 241 students in reading, 328 students in math, and 152 students in language arts in grades three, four, and five. This study investigates the strength of the relationship between scores on the Exact Path diagnostic and the STAAR by investigating correlations between student scores on both tests. Correlations between two tests offer a source of validity evidence, with strong correlations providing evidence that the assessments tend to measure the same skills and knowledge.

Sample Description

Two Texas school districts participated in this study by providing Edmentum with student demographic and performance data from the spring 2019 STAAR. These data were then joined with Exact Path diagnostic data using a unique student identification number. The districts in the sample ranged in size and location and included an urban charter school and a moderately size district in a town.

The primary users of Exact Path within both districts were students in grades 3-5. Table 1 shows the demographic composition of students in the sample compared to the overall state population of students. No student demographic data was missing from the study sample. In general, the students in the study sample are more likely to be White, less likely to be English language learners, and they are somewhat more likely to qualify for free or reduced price lunch than the overall state population.

Table 1. Student Characteristics

Student Characteristic	Sample Percent (%)	State Percent (%)	Difference (%)
American Indian / Alaskan Native	0.30	0.38	0.07
Asian	1.22	4.47	3.25
Black	7.32	12.62	5.31
Hispanic (any race)	44.21	52.55	8.34
Multi-Racial	3.96	2.39	-1.57
White	42.99	27.44	-15.55
Female	49.09	48.74	-0.35
Male	50.91	51.26	0.35
English Language Learner	10.98	19.43	8.45
Free/Reduced Lunch	66.77	60.56	-6.21
Special Education	7.32	9.80	2.48

State data source: Texas Education Agency, 2019b

Table 2 compares the mean mathematics and reading STAAR scale scores from the districts participating in the study to the overall state population for grades 3-5. Results show that, on average, the study participants scored lower than the state population in both mathematics and reading.

Table 2. Mean STAAR Scores for Study Sample and State

Grade	Reading		Mathematics	
	Sample	State	Sample	State
3	1402.6	1449	1453.0	1478
4	1441.8	1521	1497.7	1577
5	1521.1	1579	1601.0	1651

State data source: Texas Education Agency, 2019c, 2019d, 2019e

Data and Methods

In this study, student academic performance within a subject is measured through two assessments: the Exact Path diagnostic and the STAAR. The Exact Path diagnostic assessments in mathematics, language arts, and reading result in scores on a vertical scale so that performance within a subject can be compared across grades. However, the vertical scale for each subject is distinct, so scores cannot be compared between subjects. The STAAR assesses academic performance in mathematics and reading. While Exact Path assesses reading and language arts separately resulting in two separate scores, the STAAR reading assessment is focused on reading content and doesn't directly assess language arts skills.

To perform correlational studies, students must typically take both tests (e.g., the Exact Path diagnostic and the STAAR) within the same time frame. Ideally, both tests would be administered within two weeks of each other and then student scores from both tests would be correlated. Practically, however, administering multiple tests within a short time span can be unreasonable. Students in this study completed the Exact Path diagnostic in reading and mathematics between March 20, 2019 and May 30, 2019. STAAR for both reading and mathematics was completed between April 1, 2019 and May 19, 2019.

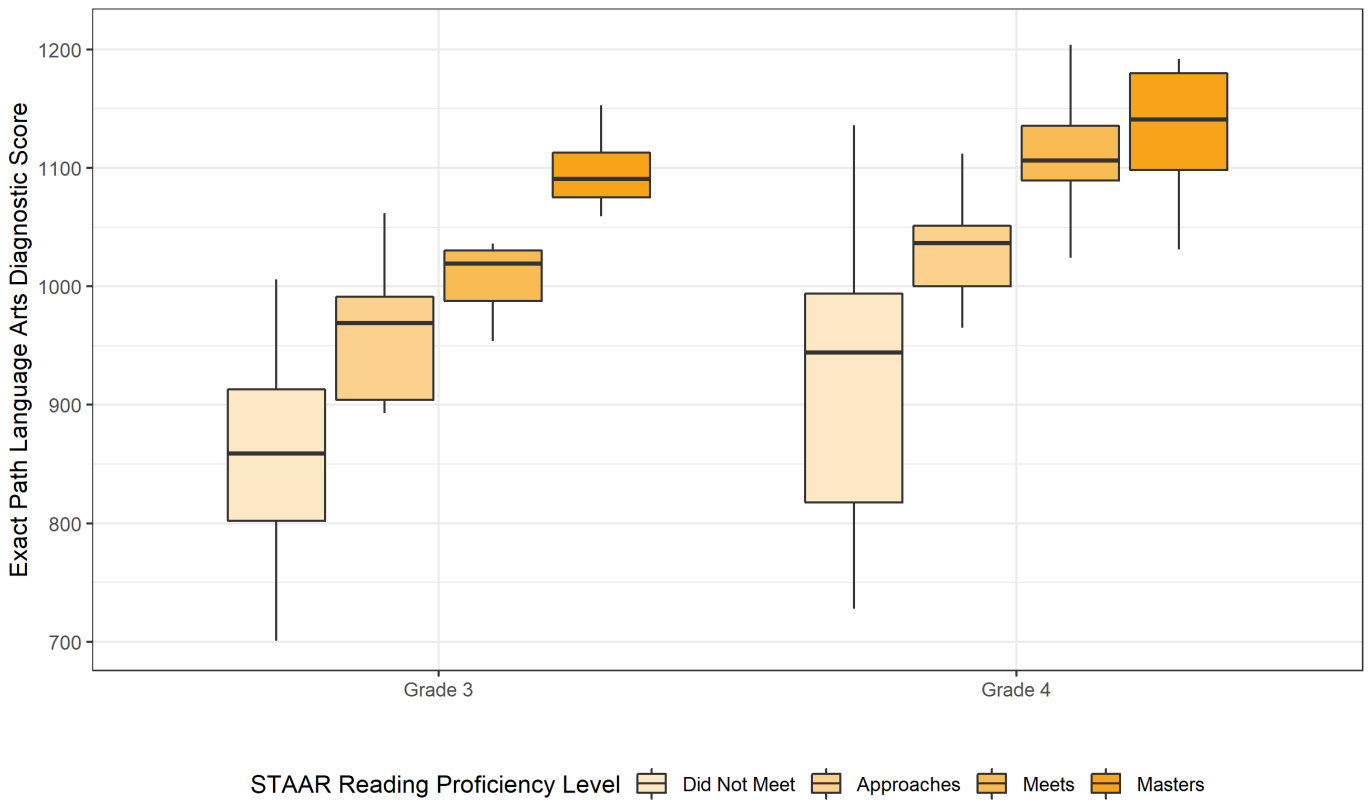
Both school districts in Texas provided Edmentum with student data from the spring 2019 STAAR, which Edmentum then merged with Exact Path diagnostic data from spring 2019. STAAR mathematics scores were merged with Exact Path diagnostic scores in mathematics, and STAAR reading scores were merged two ways: with Exact Path diagnostic scores in reading and again with Exact Path diagnostic score in language arts. Although the STAAR reading assessment is limited to reading content, it is the Texas assessment most closely related to the Exact Path language arts diagnostic and the constructs assessed are similar. It is expected that student performance on STAAR reading assessment and the Exact Path language arts diagnostic will show a high degree of correlation. Table 3 shows the number of students in the merged sample by grade and content area. A dash is included in the table for 5th grade students within language arts because there were not enough students in that subgroup to allow for analysis.

Table 3. Sample Size (Number of Students)

	Language Arts	Reading	Mathematics
Grade 3	76	93	118
Grade 4	76	67	79
Grade 5	-	81	131
Total	152	241	328

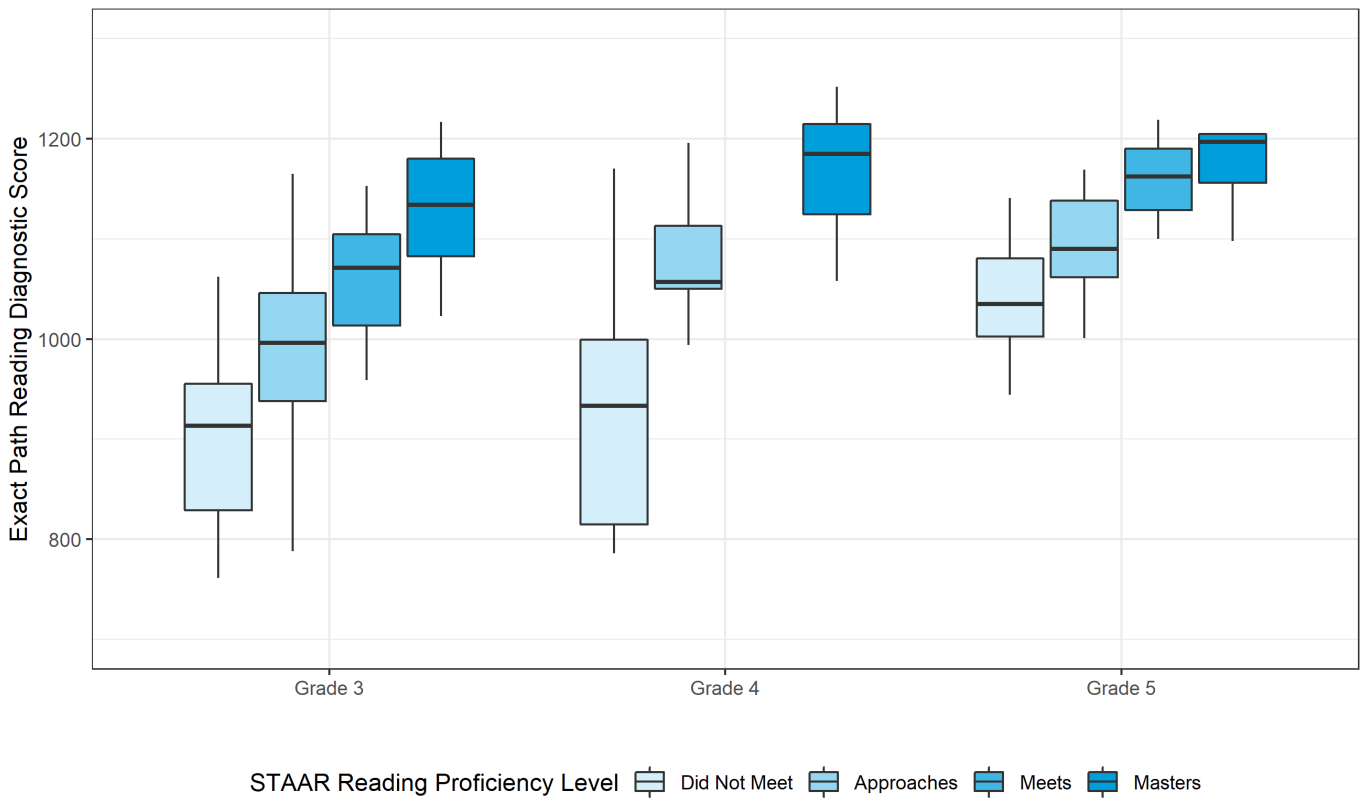
Results

The analysis begins by considering the relationship between Exact Path diagnostic scores and STAAR proficiency levels, with the expectation that median Exact Path scores will increase with each proficiency level. The distribution of Exact Path diagnostic scores by STAAR proficiency category (Texas Education Agency, 2019a) and by subject area are displayed in the box plots in Figures 1-3. The boxes represent the distribution of Exact Path scores from the first quartile to the third quartile, with a horizontal line intersecting the box at the median. Based on the vertical progression of the box plots across performance levels, these figures show that within each subject, there is a clear relationship between the STAAR proficiency levels and Exact Path diagnostic scores. Within each grade and subject area, median Exact Path diagnostic scores are consistently greater with increasingly higher proficiency levels. This suggests a strong relationship between STAAR performance levels and Exact Path diagnostic scores. Median and mean scale scores by STAAR performance level should not be interpreted as proficiency level predications or cut scores but rather provide evidence that students that scored higher on the Exact Path diagnostic also received STAAR scores corresponding to higher performance levels and vice versa. Tables with descriptive statistics reporting these data are included in Tables A1-A3 in the appendix.



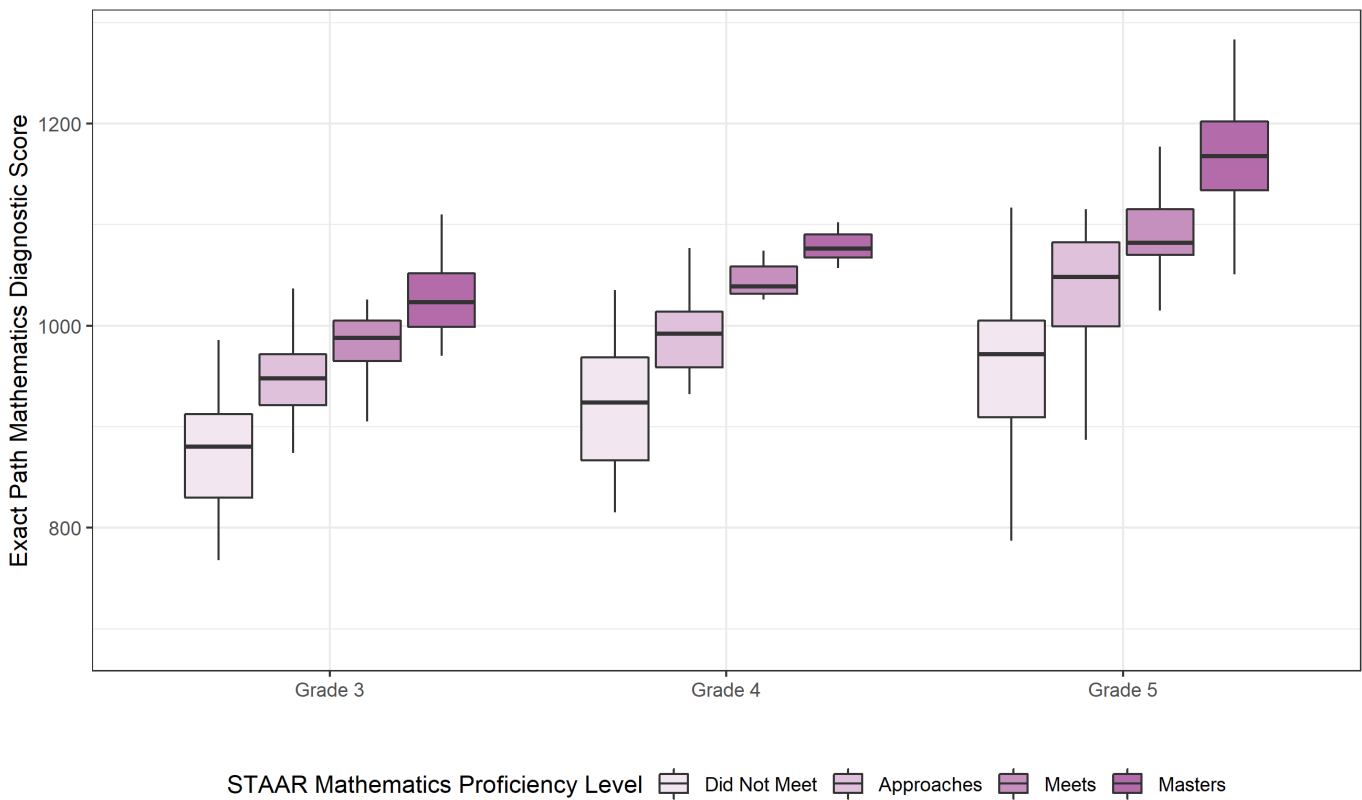
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Figure 1. Exact Path Language Arts Diagnostic Score Distribution by STAAR Reading Proficiency Level



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Figure 2. Exact Path Reading Diagnostic Score Distribution by STAAR Reading Proficiency Level



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Figure 3. Exact Path Mathematics Diagnostic Score Distribution by STAAR Mathematics Proficiency Level

Table 4 shows correlation coefficients between spring 2019 STAAR scale scores and spring 2019 Exact Path diagnostic scores, by grade level and content area. The correlation coefficient measures the linear correlation between two variables, and ranges from 0 to +/-1, where the larger the absolute value of the correlation coefficient, the stronger the association between the two measures.

All correlations show a strong positive relationship between the Exact Path diagnostic and the STAAR. To understand the magnitude of the association Cohen, Cohen, West, & Aiken (2003) provided a standard or rule of thumb for interpreting the strength of the relationship. Correlation coefficients between 0.10 and 0.29 represent a small association, coefficients between 0.30 and 0.49 represent a medium association, and coefficients of 0.50 and above represent a large association or relationship. All of the correlation coefficients reported in Table 4 fall within the band for a large association.

Scatter plot by grade in Figures A1-A6 in the appendix also show the relationship between student performance on each test, again by grade and content area. These figures and correlations demonstrate that students who score high on the Exact Path diagnostic tend to score higher on the STAAR and vice versa.

Table 4. Correlation Between 2019 STAAR Scores and Exact Path Scores

	Language Arts	Reading	Mathematics
Grade 3	0.722	0.802	0.800
Grade 4	0.758	0.806	0.807
Grade 5	-	0.727	0.735

Conclusion

Results indicated that performance on the Exact Path diagnostic is highly correlated with performance on the STAAR. In other words, students that score high on the STAAR also score high on the Exact Path diagnostic and vice versa. These results suggest that both the STAAR and the Exact Path diagnostic measure similar constructs and provide predictive validity evidence for the Exact Path diagnostic.

References

- Cohen, J., Cohen, P., West, S., & Aiken, L. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Texas Education Agency. (2019a). *2018-18 STAAR Raw Score Conversion Tables*. Austin, TX. Retrieved from <https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/2018-2019-staar-raw-score-conversion-tables>
- Texas Education Agency. (2019b). *Enrollment in Texas Public Schools, 2018-19 (Document No. GE19 601 13)*. Austin, TX. Retrieved from https://tea.texas.gov/sites/default/files/enroll_2018-19.pdf
- Texas Education Agency. (2019c). *State of Texas Assessments of Academic Readiness Summary Report Grade 3*. Austin, TX. Retrieved from https://tea.texas.gov/sites/default/files/Grade 3 Statewide_FinalTX_STAAR38_Spr19_Summary_Reports_062220190253_tagged.pdf
- Texas Education Agency. (2019d). *State of Texas Assessments of Academic Readiness Summary Report Grade 4*. Austin, TX. Retrieved from https://tea.texas.gov/sites/default/files/Grade 4 Statewide_FinalTX_STAAR38_Spr19_Summary_Reports_062220190253_tagged.pdf
- Texas Education Agency. (2019e). *State of Texas Assessments of Academic Readiness Summary Report Grade 5*. Austin, TX. Retrieved from https://tea.texas.gov/sites/default/files/5Statewide_FinalTX_STAAR58_Apr19_Summary_Reports_051120190231_tagged_Part1.pdf

Appendix

Table A1. Mean and Standard Deviation of Exact Path Language Arts Score by STAAR Reading Proficiency Level

STAAR Level	Grade 5		Grade 6	
	Mean (SD)	N	Mean (SD)	N
Did Not Meet	856.5 (81.7)	33	913.1 (106.5)	39
Approaches	940.0 (90.3)	21	1004.3 (94.9)	12
Meets	997.2 (54.9)	10	1115.7 (55.3)	11
Masters	1093.2 (43)	12	1129.1 (56.2)	14

Table A2. Mean and Standard Deviation of Exact Path Reading Score by STAAR Reading Proficiency Level

STAAR Level	Grade 3		Grade 4		Grade 5	
	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N
Did Not Meet	902.8 (82.8)	36	918.2 (103.8)	35	1034.2 (58.1)	31
Approaches	992.0 (84.0)	23	1073.5 (76)	13	1077.4 (68.9)	19
Meets	1061.9 (62.3)	15	-	9	1152.5 (55.4)	18
Masters	1127.3 (57.7)	19	1169.6 (64.6)	10	1201.7 (66.2)	13

Note: Data suppressed in cells with less than 10 students

Table A3. Mean and Standard Deviation of Exact Path Mathematics Score by STAAR Mathematics Proficiency Level

	Grade 3		Grade 4		Grade 5	
STAAR Level	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N
Did Not Meet	869.1 (69.4)	34	912.3 (78.7)	36	951.8 (94.6)	36
Approaches	948.3 (39.3)	35	989.3 (42.4)	15	1022.6 (83.6)	40
Meets	981.5 (34)	20	1045.3 (16.8)	12	1090.0 (50.3)	23
Masters	1034.2 (55.2)	29	1076.4 (26.2)	16	1164.3 (51.9)	32

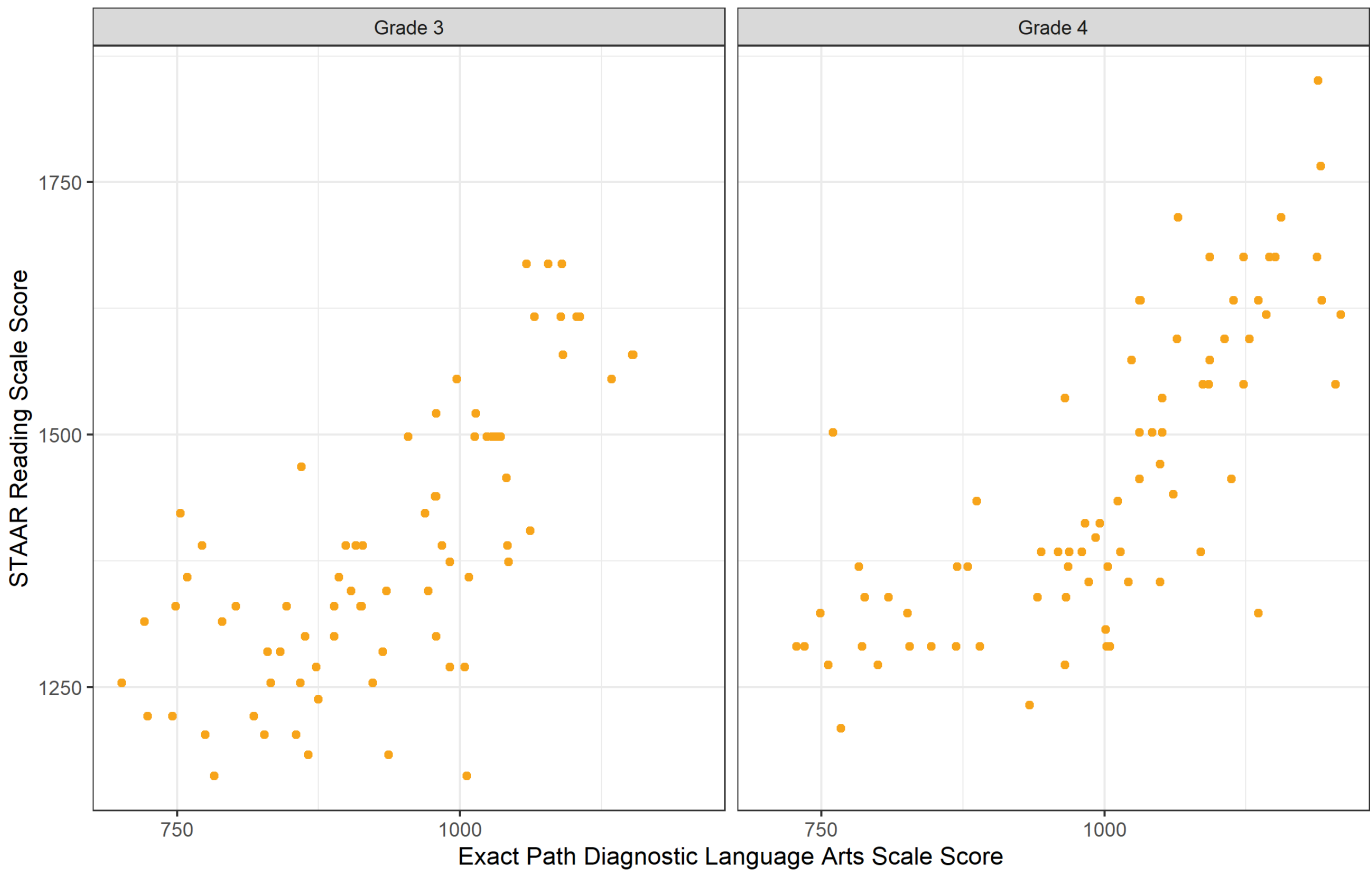


Figure A1. Scatterplot of Exact Path Language Arts Score and STAAR Reading Score



Figure A2. Scatterplot of Exact Path Reading Score and STAAR Reading Score

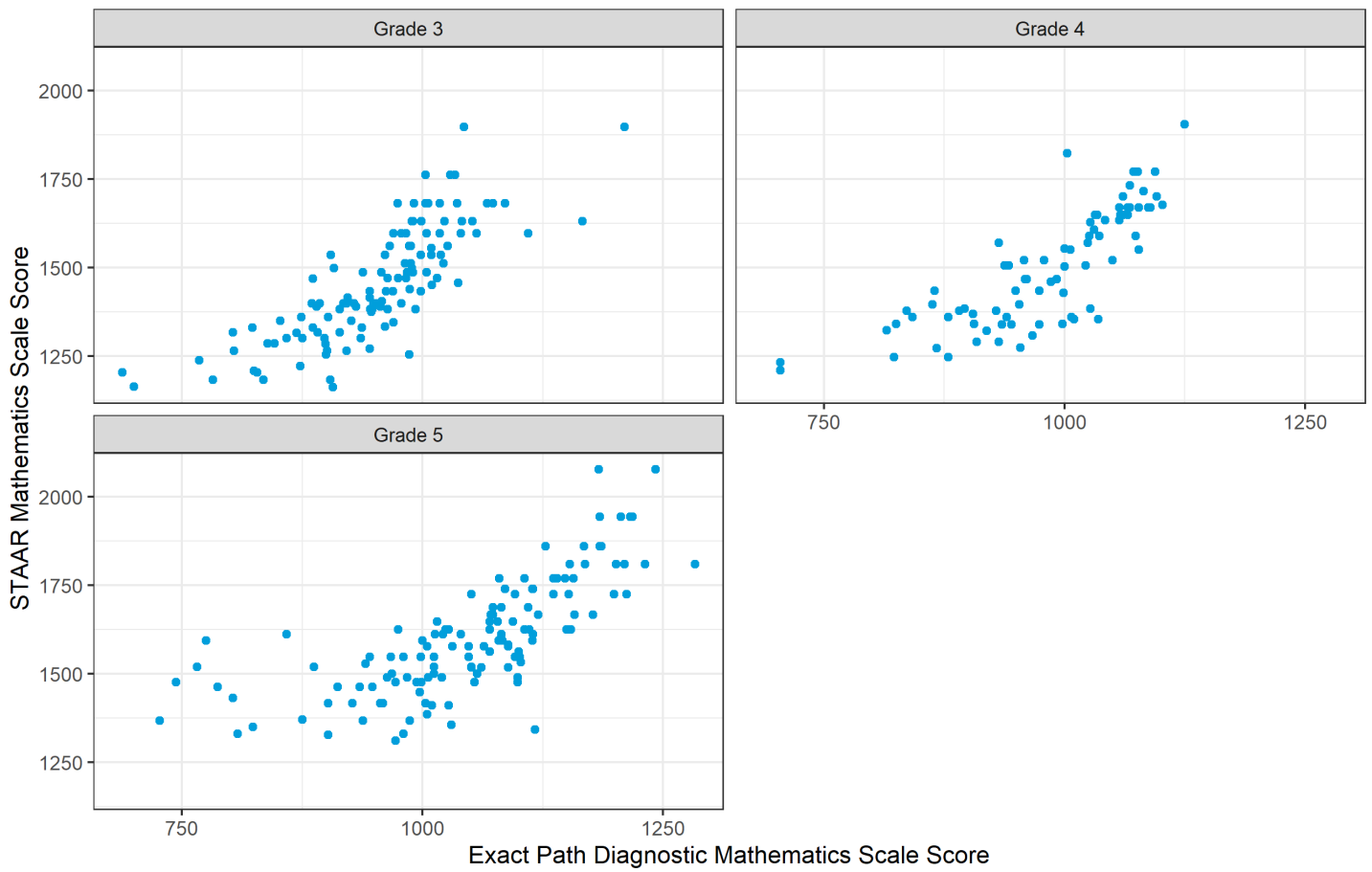


Figure A3. Scatterplot of Exact Path Mathematics Score and STAAR Mathematics Score