

A Multimethod Statistical Examination of Lexile Levels and STAAR Reading Performance in Third Grade

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Abstract

Early literacy proficiency is a critical predictor of later academic success, yet many students in rural communities continue to experience persistent reading challenges that place them at risk for long-term academic difficulties. Educators and policymakers increasingly rely on standardized literacy measures to identify students in need of early intervention, though questions remain regarding the strength and utility of these indicators in predicting academic achievement. This quantitative, nonexperimental study examined the relationship between third-grade literacy levels, measured by Lexile scores, and academic achievement, measured by STAAR

performance, among students in rural South Texas. Using archival data from the 2023–2024 academic year, the study analyzed Lexile and STAAR results for roughly 200–300 students. Guided by four research questions, analyses employed Spearman’s correlation, t-tests, logistic regression, and ANOVA to explore relationships, group differences, and predictive value. Grounded in the Psycholinguistic Perspective, which emphasizes how vocabulary, decoding, and phonological awareness shape reading proficiency, the study aimed to identify literacy indicators that support early intervention. Results showed a strong, positive correlation between Lexile scores and STAAR performance, with significant differences across all performance categories. Lexile scores also significantly predicted pass/fail outcomes, underscoring their value as early indicators of academic risk and useful tools for guiding targeted literacy supports in elementary settings.

Keywords: Foundational Skills, Lexile Reading Level, Proficient Reading, Reading Achievement, STAAR Standards, Standardized Assessment

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1. Introduction

Third grade is a pivotal stage in a child’s educational trajectory, marking the shift from learning to read to reading to learn (Logan et al., 2023). This transition underscores the importance of foundational literacy skills such as decoding, fluency, vocabulary, and comprehension which are essential for academic success across all subjects (Warren & Hicks, 2022). Yet many students encounter significant challenges during this period, limiting their ability to grasp increasingly complex concepts in math, science, and social studies. Addressing early literacy gaps is therefore critical, as timely intervention can mitigate long-term academic difficulties and better prepare students for the demands of later grades (National Early Literacy Panel, 2008).

Research on the science of reading has consistently highlighted persistent challenges in literacy development. In a qualitative study, Seidenberg (2013) identified key barriers contributing to poor reading outcomes, including the complexity of English’s deep alphabetic orthography, variation in instructional methods, and linguistic factors associated with the Black–White achievement gap. While the study noted opportunities to strengthen literacy instruction by integrating research-based practices, institutional limitations and evidence gaps continue to impede progress, reinforcing the need for practical strategies that address systemic issues.

Over time, schools have implemented a range of programs, interventions, and resources aimed at closing reading achievement gaps. These efforts emphasize early identification of reading difficulties and targeted support, reflecting longstanding evidence that early intervention improves foundational literacy development and long-term academic performance.

Within this context, educators frequently use Lexile levels to assess both the complexity of reading materials and the reading ability of individual students. Lexile scores provide insight into a student’s comprehension skills and help guide the selection of appropriate texts and targeted instruction. As students advance through school, Lexile levels serve as an indicator of readiness for grade-level standards, high-stakes assessments, and future academic demands. Despite decades of research on literacy development, many third-grade students continued to struggle with reading comprehension, fluency, and overall proficiency, which significantly impacted their academic performance across all subjects. These literacy challenges often resulted in long-term academic disparities, particularly for students from underserved populations. Addressing this issue required a deeper understanding of how assessments and instructional strategies could be better aligned to support foundational reading skills in the early grades.

2. Research Questions

RQ1: What is the relationship between Lexile scores and STAAR performance among third-grade students in South Texas?

RQ2: Is there statistically significant difference third grade students’ STAAR performance based on Lexile scores above and below the expected grade-level benchmark?

RQ3: To what extent do Lexile scores predict STAAR performance among third-grade students?

RQ4: Is there a statistically significant relationship between Lexile scores of third-grade students who participated in reading intervention and STAAR performance standards intervention?

3. Literature Review

Early reading proficiency is a critical foundation for later academic success. Research shows that literacy development depends on the integration of foundational skills, effective instruction, and timely assessment. This review examines key components of early literacy that support reading comprehension and long-term achievement.

3.1. Foundations of Early Literacy

Early literacy research underscores that **vocabulary knowledge, word recognition, and background knowledge** are foundational to later reading comprehension. Early exposure to rich vocabulary and diverse texts enhances children's ability to understand words in context, make inferences, and build coherent mental models of text (Lervåg et al., 2018; Perfetti, 2018; Wasik et al., 2017). Deficits in vocabulary or word recognition impede comprehension and motivation, making early, targeted interventions essential for preventing long-term reading difficulties (Chien et al., 2019; Hilaikal et al., 2023).

3.2. Comprehensive and Integrated Literacy Instruction

Effective early literacy instruction integrates **native-language development, systematic phonics, and access to diverse texts**. Instruction in a familiar language supports comprehension, while phonics builds decoding automaticity, both prerequisites for fluent reading (De La Paz & Graham, 2002; Ehri, 2020). Exposure to varied texts further develops vocabulary, background knowledge, and familiarity with multiple text structures (Dearing et al., 2020). A comprehensive instructional model emphasizes **vocabulary instruction, comprehension strategies, oral language, and writing**, which interact to support literacy development (Shanahan & Lonigan, 2017; Snow, 2018). Vocabulary and background knowledge exhibit a strong reciprocal relationship with reading comprehension, with integrated instruction yielding stronger outcomes than isolated skill-building (Dong et al., 2020; McKeown et al., 2009). Classroom practices such as interactive read-alouds, thematic units, and discussion-based instruction are effective in building these competencies (Fisher & Frey, 2014).

3.3. The Role of Oral Language and Writing in Literacy Achievement

Oral language development is a key predictor of reading and writing proficiency. Growth in vocabulary and grammar during early childhood strongly predicts later literacy and overall academic success, though grammar growth may plateau without targeted support (Jiang et al., 2018). Rich, cognitively engaging teacher-child conversations strengthen oral language and support comprehension, writing, and critical thinking (Whorral & Cabell, 2016; Snowling & Hulme, 2021). Similarly, **writing** predicts long-term academic achievement, especially for students from historically marginalized backgrounds (Manfra et al., 2017). Evidence-based writing instruction emphasizes planning, scaffolding, and self-regulated learning strategies, which enhance writing quality and reinforce reading comprehension (Chung et al., 2021; Graham & Perin, 2017; Panadero et al., 2016).

3.4. Targeted and Supplemental Interventions for Diverse Learners

Across diverse learners, **supplemental and targeted interventions** are critical for addressing early literacy gaps. Supplemental reading instruction alongside core classroom teaching improves reading fluency, comprehension, and word recognition, with sustained gains across student populations including English learners and students from low-income backgrounds (Foorman et al., 2019; Gersten et al., 2017; Gunn et al., 2024). Tailored interventions address language barriers, foundational skill gaps, and behavioral challenges that otherwise impede literacy development (Al Otaiba et al., 2020; Jiménez et al., 2021).

3.5. Third-Grade Reading Proficiency and Long-Term Outcomes

By **third grade**, reading proficiency becomes a critical academic milestone. Early decoding and comprehension skills underpin students' ability to engage in content-area literacy and predict later academic outcomes, including high school graduation (Torgesen, 2021). While third-grade retention policies aim to support struggling readers, evidence is mixed, with potential short-term gains but long-term social and emotional risks (Schwartz, 2022). The "science of reading" emphasizes evidence-based alternatives (explicit phonics, vocabulary, comprehension strategy instruction, and sustained interventions) over retention as the primary mechanism for improving literacy outcomes (National Reading Panel, 2000).

3.6. Reading Fluency as a Bridge to Comprehension

Reading fluency, the ability to read accurately, quickly, and with expression, is essential for comprehension because it frees cognitive resources for meaning-making. Students with weak fluency often experience frustration, disengagement, and difficulty accessing grade-level content across subjects (Kuhn et al., 2020; Miller, 2019). Evidence-based practices such as repeated reading, partner reading, guided oral reading, and systematic progress monitoring significantly improve fluency and comprehension (Ehri, 2021; O'Connor et al., 2019; Vaughn et al., 2021).

3.7. Assessment Practices and Data-Informed Instruction

Assessment practices play a crucial role in identifying literacy challenges and guiding instruction. Formative tools (e.g., reading conferences, DIBELS, GORT), Lexile measures, and adaptive digital assessments provide continuous data on decoding, fluency, and comprehension, while summative assessments such as STAAR measure grade-level mastery (Fisher & Frey, 2018; Schilling et al., 2020). Lexile scores and STAAR performance are closely linked, with lower Lexile scores predicting reading difficulties on high-stakes assessments (Wang et al., 2020). Together, these assessment practices highlight the importance of early, data-informed interventions targeting vocabulary, decoding, fluency, and comprehension to support equitable literacy development.

4. Methodology

This study employed a quantitative, non-experimental design to examine the relationship between third-grade literacy levels, as measured by Lexile scores, and academic achievement, as measured by STAAR performance. The study tested four research questions, each using the same dataset analyzed in multiple ways including correlation analysis, t-test, logistic regression, and ANOVA to provide a comprehensive understanding of the relationship between Lexile reading scores and STAAR assessment outcomes. Data for the study were collected from approximately 200–300 third-grade students who attended three elementary schools in South Texas. Lexile scores were obtained from standardized, computer-adaptive reading assessments, which adjusted the difficulty of questions based on students' responses. STAAR performance data were gathered from district-provided records, with a focus on reading and math scores.

5. Results

A total of 250 third-grade students were included in the dataset. Lexile scores, derived from computer-adaptive reading assessments, ranged from 140 to 1200 ($M = 659.28$, $SD = 230.51$). These scores provided a continuous measure of each student's reading proficiency and were used as the primary independent variable in the analysis. STAAR performance was categorized into four levels based on official Texas Education Agency scoring bands: *Did Not Meet*, *Approaches*, *Meets*, and *Masters*. Shown in Table 1, the largest group of students fell into the *Did Not Meet* category ($n = 76$), while the smallest group achieved *Masters* level performance ($n = 43$). Mean Lexile score increased consistently across STAAR performance levels, supporting the hypothesis that reading proficiency is positively associated with academic outcomes.

5.1. Results for Research Question 1

A **Spearman's rho** correlation was conducted to assess the strength and direction of the relationship. The results of this analysis are presented in Table 2. The analysis revealed a strong, positive correlation between Lexile scores and STAAR performance, $r_s = .965$, $p < .001$. Therefore, the null hypothesis was rejected, indicating a statistically significant association between reading proficiency and academic performance on the STAAR assessment.

5.2. Results for Research Question 2

A Mann-Whitney U test was conducted due to the ordinal nature of the STAAR variable and the non-normal distribution of Lexile data. The test compared two independent groups: students below the expected Lexile benchmark and those at or above the benchmark. Results are presented in Table 3. The results of the Mann-Whitney U test indicated a statistically significant difference in STAAR performance between students based on Lexile benchmark classification, $U = 784.000$, $Z = -15.008$, $p < .001$. Students who scored at or above the benchmark had significantly higher STAAR performance rankings compared to students below the benchmark. Therefore, the null hypothesis (H_{02}) was rejected.

5.3. Results for Research Question 3

A binary logistic regression was conducted using Lexile score as the predictor and STAAR performance status (pass/fail) as the dependent variable. The initial omnibus model test was statistically significant. However, the model failed to converge, and therefore, regression coefficients and odds ratios could not be interpreted. Results from the omnibus model test are presented in Table 4.

5.4. Results for Research Question 4

A one-way ANOVA was used to compare mean Lexile scores across the four STAAR categories. Levene's test for homogeneity of variances was significant ($p < .001$), so a Games-Howell post hoc test was used in place of Tukey's HSD. Results are shown in Table 5. The one-way ANOVA revealed a statistically significant difference in Lexile scores among STAAR performance groups, $F(3, 250) = 883.40, p < .001$. The effect size, calculated using eta squared, was .893, indicating a **very large** effect. These findings suggest that a substantial portion of variance in Lexile scores can be explained by differences in STAAR performance categories. Post hoc (Table 6) analysis using the Games-Howell test revealed that **all pairwise comparisons** between STAAR performance levels were statistically significant ($p < .001$). Students in higher STAAR categories consistently had higher Lexile scores than those in lower categories. Therefore, the **null hypothesis (H_{04}) was rejected**.

6. Discussion and Conclusion

This study examined the relationship between third-grade students' Lexile reading scores and their performance on the State of Texas Assessments of Academic Readiness (STAAR) Reading assessment in a rural South Texas context. The findings revealed a strong and statistically significant association between Lexile levels and STAAR outcomes, indicating that reading proficiency, as measured by Lexile scores, is closely linked to success on high-stakes standardized assessments. Students who met or exceeded grade-level Lexile benchmarks were substantially more likely to meet or exceed STAAR expectations, while students below benchmark demonstrated increased academic risk.

6.1. Predictive Validity of Lexile Measures

Consistent with prior literacy research, Lexile scores emerged as a powerful predictor of STAAR performance across correlational, group comparison, and predictive analyses. These results reinforce the validity of Lexile measures as indicators of reading comprehension and academic readiness. The findings align with theoretical frameworks that position language proficiency and reading comprehension as foundational to navigating increasingly complex, standards-based assessments. Importantly, this study extends existing research by confirming the predictive utility of Lexile data within a rural educational setting, where early identification tools may be particularly critical.

6.2. Reading Interventions and Persistent Literacy Gaps

The analysis indicated that students receiving reading interventions demonstrated lower Lexile scores and STAAR performance compared to their peers. Rather than suggesting limited effectiveness of intervention efforts, these findings highlight the persistent nature of early literacy gaps and underscore the need for earlier identification and sustained, targeted instruction. Lexile data may serve as a valuable mechanism for identifying students who require intensified support before reading difficulties become entrenched.

6.3. Implications for Instruction, Assessment, and Policy

From an instructional perspective, the results support the use of Lexile scores to guide differentiated instruction, align reading materials to student ability levels, and monitor progress over time. At the organizational level, systematic use of Lexile data can inform intervention placement, curriculum alignment, and resource allocation. At the policy level, integrating formative literacy measures such as Lexile scores with summative assessment data aligns with state and national initiatives emphasizing early intervention, accountability, and equitable literacy outcomes. Professional development focused on effective interpretation and application of Lexile data may further strengthen data-informed instructional practices.

6.4. Limitations and Directions for Future Research

Several limitations warrant consideration. Future research should employ longitudinal designs to examine Lexile growth and its relationship to reading performance across multiple grade levels. Replication in urban and suburban contexts would enhance generalizability, and disaggregated analyses could provide deeper insight into how Lexile scores function across diverse student populations. Examining pre- and post-intervention Lexile growth may clarify which instructional practices most effectively support students below benchmark, while qualitative studies could illuminate how Lexile data are used in classrooms and how this shapes instructional

decisions. Future research could also explore integrating Lexile assessments with other literacy measures, the role of teacher training and data literacy in interpreting Lexile scores, and student experiences with targeted literacy interventions to optimize instructional supports.

7. Conclusion

This study provides strong empirical evidence that Lexile reading scores are closely associated with and predictive of third-grade STAAR Reading performance. The findings reinforce the importance of early reading proficiency not only for classroom learning but also for success on high-stakes assessments. By incorporating Lexile data into a comprehensive assessment framework, educators and school leaders can identify academic risk earlier, target instruction more effectively, and support more equitable literacy outcomes. Strengthening early reading skills remains a critical pathway to long-term academic success, particularly for students in rural and historically underserved communities.

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Table 1

Descriptive Statistics for Lexile Scores by STAAR Performance Category

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Did Not Meet	76	381.55	93.292	9.472	362.74	400.35	140	510
Approaches	63	618.89	54.089	6.010	606.93	630.85	520	695
Meets	68	797.41	55.247	5.923	785.64	809.19	700	885
Masters	43	984.20	93.851	12.541	959.06	1009.33	895	1200
Total	250	659.28	230.508	12.866	633.97	684.60	140	1200

Table 2

Spearman's Rho Correlation Between Lexile Scores and STAAR Performance

	Lexile Measure	Numeric STAAR Performance	Lexile Measure	Numeric Performance	STAAR
Spearman's rho	Lexile Measure	Correlation Coefficient	1.000	.965**	
		Sig. (2-tailed)	.	<.001	
		N	250	250	
	Numeric STAAR Performance	Correlation Coefficient	.965**	1.000	
		Sig. (2-tailed)	<.001	.	
		N	250	250	

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3

Independent Samples t-Test: STAAR Performance by Lexile Group

	Lexile Benchmark Group	N	Mean Rank	Sum of Ranks
Numeric STAAR Performance	Below Benchmark	114	78.87	11515.00
	At or Above Benchmark	136	229.52	40166.00
	Total	250		

Table 4

Binary Logistic Regression Model: Predicting STAAR Pass/Fail Outcomes

		Chi-square	Df	Sig.
Step 1	Step	393.354	1	<.001
	Block	393.354	1	<.001
	Model	393.354	1	<.001

Table 5

One-Way ANOVA of Lexile Scores by STAAR Performance Category

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15186335.219	3	5062111.740	883.396	<.001
Within Groups	1816499.984	247	5730.284		
Total	17002835.202	250			

Table 6

Games-Howell Post Hoc Comparisons of Lexile Scores by STAAR Category

Dependent Variable: Lexile Measure

	(I) Numeric STAAR Performance	(J) Numeric STAAR Performance	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Did Not Meet	Approaches	-237.342*	11.394	<.001	-266.77	-207.92
		Meets	-415.867*	11.178	<.001	-444.74	-387.00
		Masters	-602.650*	12.704	<.001	-635.46	-569.84
	Approaches	Did Not Meet	237.342*	11.394	<.001	207.92	266.77
		Meets	-178.525*	11.688	<.001	-208.71	-148.34
		Masters	-365.308*	13.156	<.001	-399.28	-331.33
	Meets	Did Not Meet	415.867*	11.178	<.001	387.00	444.74
		Approaches	178.525*	11.688	<.001	148.34	208.71
		Masters	-186.783*	12.969	<.001	-220.28	-153.29
	Masters	Did Not Meet	602.650*	12.704	<.001	569.84	635.46
		Approaches	365.308*	13.156	<.001	331.33	399.28
		Meets	186.783*	12.969	<.001	153.29	220.28
Games-Howell	Did Not Meet	Approaches	-237.342*	11.218	<.001	-266.47	-208.21
		Meets	-415.867*	11.172	<.001	-444.87	-386.86
		Masters	-602.650*	15.717	<.001	-643.63	-561.67
	Approaches	Did Not Meet	237.342*	11.218	<.001	208.21	266.47
		Meets	-178.525*	8.438	<.001	-200.42	-156.63
		Masters	-365.308*	13.907	<.001	-401.80	-328.82
	Meets	Did Not Meet	415.867*	11.172	<.001	386.86	444.87
		Approaches	178.525*	8.438	<.001	156.63	200.42
		Masters	-186.783*	13.870	<.001	-223.18	-150.39
	Masters	Did Not Meet	602.650*	15.717	<.001	561.67	643.63
		Approaches	365.308*	13.907	<.001	328.82	401.80
		Meets	186.783*	13.870	<.001	150.39	223.18

*. The mean difference is significant at the 0.05 level.