

A LILLIPUTIAN ANALYSIS OF READING GROWTH USING PERCENTILES

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Introduction

Reading is foundational to student learning. The ability to read and comprehend text shapes a student's access to all other academic content. For schools, ensuring that students develop strong reading skills remains a central priority. However, students enter the classroom with varying levels of readiness, requiring instruction that meets them where they are and supports their growth toward academic expectations. To address these differences, many schools implement structured systems of support, including Multi-Tiered Systems of Support (MTSS) and Response to Intervention (RTI). This emphasis on targeted, data-driven instruction is supported by broad educational research. Hattie (2023) reports that structured instructional interventions produce strong effects on student learning, often exceeding typical growth expectations.

The effectiveness of interventions within MTSS and RTI has been well documented, particularly when instruction is targeted and intensive. Kim et al. (2025) found that “students who received individualized interventions had a higher likelihood of being transitioned to profiles of higher reading achievement.” As part of Tier 2 interventions within an MTSS framework, incorporating retrieval practice through strategies such as a “goodbye list” may strengthen learning for struggling readers, as retrieval-based approaches have been shown to improve word learning outcomes (Haebig et al., 2019).

Although MTSS frameworks are widely supported in theory, research indicates that implementation in practice is often inconsistent and does not fully reflect evidence-based recommendations (Al Otaiba et al., 2025). A key factor in effective MTSS implementation is early identification of struggling readers. Acadience Reading serves as a strong universal screener, with research showing that it can moderately to strongly predict reading performance

by the end of third grade. Landry et al. (2022) found that “Acadience Reading data collected at the end of kindergarten offered the best long-term predictive validity for third-grade reading performance” (p. 455). Early screening lets schools respond quickly to student needs and avoid delays in support, as Al Otaiba et al. (2014) caution against letting RTI become a “wait to fail” model and emphasize timely, data-based intervention decisions.

At the same time, effective MTSS systems must ensure that intervention is both targeted and temporary. Research suggests that early reading systems can over-identify students, as some students identified as at risk may make adequate progress with strong Tier 1 instruction alone (Wanzek et al., 2013). Additionally, interventions should adjust based on student responsiveness, reducing or removing support when students demonstrate sufficient progress (Hinton, 2025).

At Zion Classical Academy, these systems were not formally in place prior to 2024. Beginning in the 2024–2025 school year, the school introduced structured MTSS processes, including reading interventions, systematic data tracking, progress monitoring through Acadience Reading, and targeted teacher training. As a result, the current study examines the early stages of MTSS implementation and changes in student reading outcomes following the school's introduction of structured MTSS processes. The school’s intervention manual outlines clear decision-making rules: intervention teams review data within days of screening and formally evaluate student progress after 8–10 weeks to determine whether to continue, intensify, or discontinue support.

Research Question

To what extent did student reading outcomes change following the implementation of a structured MTSS framework at Zion Classical Academy?

Method

The purpose of this study is to examine changes in students' reading outcomes following the implementation of a structured MTSS framework. To what extent did student reading outcomes change following the implementation of a structured MTSS framework at Zion Classical Academy? The null hypothesis states that there is no significant difference in Reading Composite Score percentiles between the 2024 beginning-of-year and 2025 middle-of-year assessments. The alternative hypothesis states that the two time points differ significantly.

In the fall of 2024, 42 students in kindergarten through sixth grade at Zion Classical Academy completed the Acadience Reading screener. Trained staff administered the assessment during the first full week of school in August and participated in ongoing coaching and reliability checks to ensure consistent administration and scoring. Inter-rater reliability procedures were used to maintain accuracy across assessors. Students were assessed individually in a quiet setting outside of the classroom and were randomly assigned to trained staff for benchmarking.

In December 2025, students were assessed again for benchmarking purposes, approximately 16 months after the initial screening. This extended timeline was intentional, as the purpose of the study was to examine student outcomes over time following the implementation of MTSS rather than within a single academic year. The same staff administered the assessment using consistent procedures, including similar testing environments, continued inter-rater reliability practices, and random assignment of students to assessors. These measures were taken to ensure consistency in data collection across testing periods. Between the two assessment periods, 30 students were included in the study because they had complete data for both fall 2024 and December 2025.

According to the Zion Classical Academy Intervention Manual, students performing below benchmark were placed in reading interventions. Students engaged with the MTSS framework dynamically throughout the study period. While some students remained in Tier 1 instruction, others received Tier 2 or Tier 3 interventions at various points based on their reading performance. Movement between tiers was guided by clearly defined decision-making rules and ongoing progress monitoring, allowing students to access support at increasing or decreasing levels as needed. This structure reflects the intended design of MTSS as a responsive, data-driven system rather than a fixed-grouping model. Interventions were delivered in structured sessions of approximately 30 minutes. Interventionists tracked student progress, including lesson pacing, instruction duration and frequency, and recorded anecdotal notes to inform bi-weekly data meetings. Student progress was monitored weekly using Acadience measures aligned to each student's area of need, as outlined in the intervention guidelines. Scores were interpreted using the Acadience Reading national norms, which provided percentile rankings and benchmark classifications to evaluate student performance relative to national expectations.

Interventionists and the administrator met bi-weekly to review Acadience data and determine whether students required intensified support or were ready to exit intervention. Students who were dismissed from special education or exited an MTSS reading intervention group continued to be progress-monitored on a bi-weekly basis for 3 additional data points to ensure that reading progress was maintained and that re-entry into intervention was not necessary.

The study analyzed two data points: 2024 beginning-of-year and 2025 middle-of-year Reading Composite Score percentiles using a quasi-experimental, single-group pretest–posttest design. A paired-samples t-test was conducted to examine differences in Reading Composite Score

percentiles between the 2024 beginning-of-year and 2025 middle-of-year assessments, with the same group of students measured at both time points.

Several threats to validity should be considered when interpreting the results of this study. One potential threat is researcher influence, as the primary investigator also held an administrative role within the school, which may have introduced unintended pressure on staff to implement interventions with increased fidelity or on students to perform during assessments. Additionally, the absence of a control group limits the ability to attribute observed changes in reading outcomes solely to the implementation of the MTSS framework. The extended 16-month period between assessments introduces the possibility of maturation effects, as students may have demonstrated natural developmental growth in reading independent of the intervention. Attrition also presents a concern, as the sample size decreased from 42 to 30 students, and those excluded from the final analysis may differ meaningfully from those who remained. Furthermore, the relatively small sample size limits the generalizability of the findings to broader populations. Finally, repeated exposure to the Acadience assessment may have resulted in testing effects, where increased familiarity with the assessment improved performance.

Results

Descriptive statistics were calculated to examine student performance at the beginning and later stages of the study. Reading Composite Score percentiles at the 2024 beginning-of-year assessment had a mean of $M = 51.20$ ($SD = 31.26$), while the 2025 middle-of-year assessment had a higher mean of $M = 64.30$ ($SD = 27.43$), indicating an overall increase in reading performance. The average growth in percentile scores was 13.10 points ($SD = 26.04$; see Table 1).

The distribution of scores for both assessments demonstrated acceptable levels of normality. Skewness values for beginning-of-year (*skewness* = 0.04) and middle-of-year (*skewness* = -0.82) percentiles were within acceptable ranges, indicating no substantial asymmetry. Similarly, kurtosis values at both time points were below 3 in absolute value, suggesting no extreme deviation from normality. The distribution of percentile growth scores demonstrated a skewness of 0.02 and kurtosis of 1.05, providing no clear indication of substantial departures from normality in the paired differences.

Table 1

Summary Statistics Table for Interval and Ratio Variables

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis	<i>Mdn</i>	Mode
BOY Percentile	51.20	31.26	30	5.71	2.00	99.00	0.04	-1.42	55.00	98.00
MOY Percentile	64.30	27.43	30	5.01	2.00	99.00	-0.82	-0.18	70.00	71.00
Percentile Growth	13.10	26.04	30	4.75	-55.00	81.00	0.02	1.05	9.50	9.00

Note. BOY represents beginning of the year, MOY represents middle of the year

A paired-samples t-test was conducted to examine differences in Reading Composite Score percentiles between the 2024 beginning-of-year and 2025 middle-of-year assessments. Results indicated that students demonstrated a statistically significant increase in reading performance over time, $t(29) = 2.76, p = .010$. The mean difference between the two time points was 13.10 percentile points, with middle-of-year scores significantly higher than beginning-of-year scores.

The effect size, calculated using Cohen's *d*, was 0.50, indicating a moderate standardized difference in reading percentile scores between the two assessment periods.

Discussion

The results of this study indicate that implementing a structured MTSS framework at Zion Classical Academy was associated with a statistically significant and educationally meaningful increase in students' reading performance. On average, students demonstrated notable growth in reading percentile scores over approximately 1.5 years. This extended timeframe allowed the study to examine changes in student reading performance across more than one academic year, rather than within a single school year. Although these improvements followed implementation of the MTSS framework, the study design does not allow the observed growth to be attributed solely to MTSS.

These findings align with existing research on effective intervention systems. Kim et al. (2025) found that students receiving individualized interventions were more likely to show higher reading achievement, consistent with the targeted support provided within this study's MTSS framework. Similarly, Al Otaiba et al. (2014) emphasized the importance of early identification and timely intervention to avoid a “wait to fail” model. Universal screening through Acadience and ongoing progress monitoring were important components of the MTSS framework implemented during the study period. Additionally, Wanzek et al. (2013) highlighted concerns about overidentification in early reading systems, and the present study's data-driven exit criteria reflect a system designed to avoid unnecessary intervention. This responsive approach is further supported by Hinton (2025), who emphasizes the importance of flexible, data-based decision-making within effective MTSS implementation.

An important aspect of the study was the structure of the MTSS system implemented at Zion Classical Academy. At Zion Classical Academy, the framework was implemented as a dynamic and responsive system rather than a static grouping model. Students moved between

Tier 1, Tier 2, and Tier 3 supports based on ongoing progress-monitoring data and clearly defined decision-making rules. This allowed students to receive targeted intervention when needed and return to core instruction when appropriate. Weekly progress monitoring, biweekly data meetings, and structured intervention timelines ensured instructional decisions were timely and consistent. These elements were central to the school's MTSS implementation, although the present study cannot determine their individual contributions to the observed improvements.

This study's findings have important implications for educational practice. Schools seeking to improve reading outcomes may benefit from implementing structured MTSS systems that include early screening, consistent progress monitoring, and clearly defined decision-making processes. Additionally, interventions should be targeted and temporary, so students receive support when needed without remaining in the intervention unnecessarily. While this study's results are promising, future research should examine MTSS implementation across larger, more diverse populations and explore subgroup differences, such as socioeconomic status and gender. Longitudinal studies across multiple schools would further strengthen the understanding of how MTSS impacts reading outcomes over time.

While the MTSS framework provided additional support for students requiring intervention, it also raises important considerations for students who remained in Tier 1 instruction. Descriptive comparisons suggest that students who received Tier 2 or Tier 3 intervention supports showed greater average percentile growth than those who remained in Tier 1 instruction. However, students receiving intervention began at lower initial percentile levels, which may have contributed to greater growth by leaving more room for improvement. While these differences were not formally analyzed, they suggest important considerations for future implementation. In particular, students who remain in Tier 1 instruction may benefit from

additional enrichment or extension opportunities, such as High Ability Learner (HAL) supports, to promote continued academic growth. This shares the importance of ensuring that MTSS frameworks address the needs of both struggling and advanced learners.

Reflection

Determining a question before tackling the paper was more difficult than I assumed. I had checked many different subsets of data in the groups for comparison, but they answered different questions than what I had originally started with. It was a fun rabbit hole, and it started to answer questions about implementation and weaknesses in our own systems, though I chose not to write about them in depth and stuck to the assignment's tight parameters. The question is what guides the writing, and the need to complete the assignment blunted creativity a bit. Alas, this is the point, I suppose.

Thankfully, much of this work aligned with my Educational Specialist work creating an MTSS manual for decision-making rules in reading, as well as my new role as principal at Zion Classical Academy. I wasn't sure whether I should have stated that the cultural changes I brought, along with other systems, may have contributed to students' educational growth. Nothing happens in a vacuum, which is a strong reason to read all studies as critically as possible; it has worked somewhere, but there is no guarantee it will work everywhere with everyone. I am, however, thankful that there is a tangible number showing that our teachers have worked hard and done well for our students.

The research was a particular boon to my learning in this process. Best practices, however, handed down to me by leaders and peers, were generally part of the vernacular vocabulary among us. Often, I cannot hang my hat on specific research, but on generalized, ten-thousand-foot publishers such as Hattie, Danielson, and Marzano. Finding real designs,

experiments, and quasi-experiments will help narrow my view to something more manageable.

This process has shifted how I approach both research and leadership, as I now value studies that reflect specific contexts and measurable outcomes over broad generalizations. Moving forward, I will use targeted research more intentionally to refine MTSS systems and instructional decision-making, ensuring practice is continually informed by evidence rather than assumption. Being able to run my own analyses and determine the effectiveness of instructional systems will be a powerful tool.

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