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## **The Benefits of Using Phoneme Segmentation & Oral Reading Fluency CBM on 1st Grade**

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**The Benefits of Using Phoneme Segmentation &  
Oral Reading Fluency CBM on 1st Grade Learning**

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Capstone Project: An Action Research Project

Northwestern College, Orange City, Iowa

### Abstract

This action research was driven by the researcher's interest in using curriculum-based measurement as an assessment tool and the effects they can have on student growth throughout the school year. The researcher utilized the STAR CBM phoneme segmentation tool quarterly, beginning in the first quarter, as well as the STAR CBM oral reading fluency passages quarterly, beginning in the second quarter. The research was conducted to analyze the effectiveness of using CBM, specifically phoneme segmentation and oral reading fluency, as a progress monitoring tool with 1st Grade students. The researcher is a first grade teacher in her eighth year of teaching first grade, and her seventeenth year of teaching overall. The findings revealed students were able to show student growth and progress through the scores, though the progress made is not enough to justify its significance. Findings also indicated a slight correlation between having a high phoneme segmentation score and having a high oral reading fluency score. This research was conducted to impact future classroom practices as well as school-wide decisions in placing students in reading intervention/Title I services.

*Keywords: Curriculum-based measurement, progress monitoring, phoneme segmentation, fluency, 1st Grade, reading*

BENEFITS OF USING CBM ON LEARNING	3
<b>Table of Contents</b>	
Abstract	2
Introduction	4
Literature Review	8
Methodology	
Research Questions	21
Participants & Research Site	21
Variables, Intervention, & Timeline	22
Anticipated Statistical Analysis	23
IRB	23
Data Collection	23
Findings	
Data Analysis	25
Discussion	
Summary of Findings	29
Limitations	30
Further Study	31
Conclusion	32
References	33

## **The Benefits of Using Phoneme Segmentation & Oral Reading Fluency CBM on 1st Grade Learning**

One of the most important milestones during a young child's formative years is learning how to speak, followed closely by learning how to read. To do this successfully, children begin speaking one-syllable words, such as “dad” or “ball,” and gradually progress to short sentences (“I want food,” or “Car go beep,”). These sentences grow in length and complexity around the same time students begin studying their letters and sounds in Preschool and Kindergarten (Clemens et al., 2018). By the middle or end of Kindergarten, sight word recognition is introduced, with familiar words which may or may not have the ability to be sounded out (Snyder & Ayres, 2020).

In 1st Grade, students learn even more about phonics (the relationship between sounds and letters) and phonemic awareness (the sounds of a word). As students learn more about phonics patterns, such as long or short vowels, blends, and digraphs, they begin reading short passages to check for fluency, also known as the ability to read with speed, accuracy, and expression, which can be a predictor of reading success (Grima-Farrell, 2014).

The problem with learning a plethora of reading skills, especially so quickly, is how to best track student progress. Teachers typically track this progress through varying means, including data binders, quarterly skill checks, formative and summative assessments, and curriculum-based measurement, or CBM. These CBMs can be given paper/pencil, but typically are given electronically, with easier access to the data, as well as various reports available to be viewed and analyzed (Clemens, et al., 2018; Ford, et al., 2017; Gesel & Lemons, 2020; January, et al., 2019; Jenkins, et al., 2009; Missall, et al., 2019; Snyder & Ayres, 2020; Thornblad & Christ, 2014). Looking at these reports can give teachers an idea of what is working in their

classrooms, what could be revisited with a mini-lesson, or even retaught to the whole class in a new way. This is especially true for students who are struggling with reading and its various facets (i.e.-phonics, sight words, phonemic awareness, fluency, etc.).

The idea of diving deeper into assessments and data is observed by Fisher & Frey, who state that “struggling readers are extremely complex, and in order to meet their needs, teachers must take a closer and more sophisticated look at their literacy strengths, needs, and preferences. This means, in addition to quality initial assessments, ongoing assessments are necessary to determine if students understand the varied purposes for reading and writing, which skills they have already mastered, and where they could use further assistance” (Fisher & Frey, 2010, pg. 86). Often, educators are not only expected to meet certain district, state, and federal benchmarks, but also provide evidence if they are unable to meet those goals. Using CBM to track student progress would provide continual check-ins, allowing teachers to make changes to their instruction. CBM progress monitoring, as Hosp, et al., point out “can be used to decide, within a fairly short period of time, when instruction is (or is not) working” (Hosp, et al., 2016, pg. 8). A similar point is made by Vaughn, et al., who share that “Another critical purpose of progress monitoring is to use the data from students’ performance to adjust instruction and influence the intensity of students’ intervention” (Vaughn, et al., 2017, pg. 52). While there is much research done on using CBM as a progress monitoring tool, there have not been many studies done on using the phoneme segmentation CBM, which involves students segmenting each word given into three parts.

Therefore, the purpose of this action research project is to examine the effectiveness of using CBM, specifically phoneme segmentation and oral reading fluency, as a progress monitoring tool with 1st Grade students. In studying these CBM results, it will prove the benefits

of using CBMs, as well as show student growth and progress through the scores. It will also potentially exhibit the need to have a better intervention system in place for those struggling readers, but what types of interventions? Who administers these interventions and when are they done? There are so many things to think about, some of which are more general, and some which are more specific, with varying answers, depending upon grade level, need, school district, availability of staff, etc.

This topic came to mind because in 1st Grade, when most students are learning to read, there are so many areas to work on, examine, and track. It is such an incredible year for learning and growth, but challenging to look at and teach everything with fidelity, from sight word recognition to fluency, mastery of spelling words to handwriting, and everything in between. Reading is ever-changing and evolving, with new buzzwords all the time, including, but not limited to: emergent literacy, guided reading, gradual release of responsibility, whole language approach, and most recently, the science of reading.

An opposing viewpoint worth considering is potentially over testing students. For example, students are often screened in the fall, winter, and spring at a minimum, using the STAR tests (Early Literacy, Math, & Reading) through Renaissance Learning to garner results. In 1st Grade, due to students being at varying reading levels, students are given the STAR Early Literacy and STAR Math tests five times a year (data points are the beginning of the school year, along with the end of each of the four quarters). The STAR Reading Test is administered three times, beginning with the 2nd quarter (followed by a 3rd and 4th quarter test). Therefore, students are taking thirteen STAR tests throughout the course of their 1st Grade year. This does not include any formative or summative assessments, such as end of topic/chapter tests in math

or reading, weekly spelling tests, or quarterly sight word checks. It also does not include the CBMs that students are completing with their teacher regularly (i.e.-monthly or quarterly).

When it is presented in this way, one could argue the amount of testing is excessive, and does not allow students to learn properly, but rather be taught to master specific skills they will be tested on. While this is a valid concern, it is important to keep in mind the intentions of testing, and how it is a form of checking for understanding and mastery with our students. It also helps educators know where to progress next in their students' learning.

The resources used for this action research study were compiled from the DeWitt Library at Northwestern College. Primarily, studies done within the last 10 years and published in a peer-reviewed journal were considered. Studies regarding curriculum-based measurement, progress monitoring, reading, interventions, and professional development were reviewed. Ultimately, 20 sources were selected based on relevance and support given to the present study. Resources selected were used to understand the current knowledge base, as well as identify existing gaps, in using phoneme segmentation and oral reading fluency CBM, looking specifically at progress and correlation between students' ability to segment successfully and read fluently.

The literature review will delve deeper into curriculum-based measurement. An examination of the components of these assessments will be explored, along with analyzing CBM results as a progress monitoring tool to guide decisions in the classroom. Taking a closer look at other reading interventions will be examined, and finally, providing adequate professional development and training in regards to CBM and reading will be investigated.



## **Review of the Literature**

### **The Components of Curriculum-Based Measurement**

Curriculum-based measurement, or CBM, is an ongoing assessment tool, giving educators the opportunity to monitor their students' progress and basic skills in a particular subject area, such as reading, math, or writing, as well as examine whether further adaptations or interventions are needed to ensure success (Gesel & Lemons, 2020; January, et al., 2019; Missall, et al., 2019; Snyder & Aires, 2020). CBM were developed in the 1980's (Snyder & Aires, 2020) and are typically 1 minute in length (Thornblad & Christ, 2014). There are many different CBM available to educators via print, online, or mixed format through various learning platforms. The most common/well-known CBM in the United States today include AIMSweb (Pearson), DIBELS (University of Oregon), STAR (Renaissance Learning), Intervention Central (created by Jim Wright), and EasyCBM (Behavioral Research & Teaching). CBM can often predict success on standardized testing, as well as student achievement and performance throughout the year (Gesel & Lemons, 2020; January, et al., 2019; Missall, et al., 2019; Snyder & Aires, 2020; Thornblad & Christ, 2014).

While student achievement and performance are important on assessments, such as CBM, sometimes there are other indicators present worth investigating. Teacher ratings/rankings in comparison to CBM performance were examined in Missall, et al.'s (2019) study. Missall and her associates looked closely at the relationship between teacher judgment through rating/ranking students, and whether this lined up to results found in DIBELS, a curriculum-based assessment focusing primarily on different varieties of reading fluency, including: letter naming fluency (LNF), nonsense word fluency (NWF), phoneme segmentation fluency (PSF),

and oral reading fluency (ORF), just to name a few. Missall, et al.'s (2019) findings showed concurrency between teacher judgment and student proficiency. This was proven through the use of CBM.

Using CBM can be beneficial for all types of learners, including our youngest students. In Clemens, et al.'s study (2018) about Stage 2 research on Kindergarten reading progress, Kindergarten students were progress monitored every 2 weeks using AIMSweb. Over the course of 12 weeks, students took part in a variety of tests, including letter sound fluency (LSF), phoneme segmentation fluency (PSF), word reading fluency (WRF), nonsense word fluency (NWF), highly decodable passages (HDP), and spelling. While it was somewhat surprising to give this many reading fluency CBM to Kindergarten-aged students, as they are still developing basic skills, such as segmenting and blending words, identifying letters by name and sound, decoding words, and finally, reading basic texts, according to Clemens, et al. (2018), the findings supported implementing these CBM across the second half of the school year, combining letter sound fluency (LSF) with a word or passage reading.

CBM has also proven effective in working with and providing support for our diverse learner population. Snyder & Ayres (2020) examined assessing students' reading skills and reading progress through the use of CBM, along with implementation of proper interventions. Similarly to Missall, et al.'s (2019) study, Snyder & Ayres (2020) used DIBELS, as well as AIMSweb and Easy CBM to garner their results, which concluded that while using CBM to aid in assessing students with intellectual abilities is an efficient way to measure their reading performance, other considerations must be made, including looking at the students' current reading level, thinking about their potential frustration level, and the need for possible modifications.

CBM has not only been researched in the United States, but in other countries as well. Grima-Farrell (2015) examined the effects of utilizing oral reading fluency CBM for 2nd Grade students living in Wales. Findings showed how reading progress can be successfully monitored efficiently using CBM approaches. In addition, the knowledge gained from giving these assessments can be transferred from one teacher to the next, allowing teachers to follow individual student reading progress over time, rather than collecting new reading data every school year. This may help with the potential concern of over testing students.

In taking a closer look at the potential for too much testing, this concept was proven in a study by Gesel & Lemons (2020), which examined progress monitoring through the use of CBM and found using CBMs provides good data for data-informed decision making, but the success rate was greater when the progress monitoring was more intermittent (every three weeks), rather than weekly. Similarly, in a study by Jenkins, et al. (2009), modifications within monitoring progress were examined, as well as how it affects growth. Results of this study showed teachers may be able to obtain what they need from assessments given once every three weeks, or even once every nine weeks.

With Ford, et al.'s study (2017), rather than compare the frequency of administering CBM testing, albeit weekly, monthly, or another set time frame, Ford and his colleagues administered three different varieties of CBM (AIMSweb, DIBELS, and FASTBridge) to students in various locations across the United States. Interestingly, students read the fewest words with DIBELS, followed by AIMSweb, and finally, FASTBridge, garnering the opposite results of a similar study by Ardoin & Christ (2009) that it modeled itself after. In addition, results determined schools should consider the use of CBM publisher-provided, criterion-referenced scores (or scores comparing to a cut score or body of knowledge), for making

screening decisions, rather than using norm-referenced scores (or scores comparing to other students).

While administering CBM, maintaining consistency is important, as is echoed in Taylor, et al.'s study (2016). Using AIMSweb as their CBM of choice, Taylor and his fellow researchers looked at test design and characteristics, as well as verbal directions and how they relate to CBM progress in students. For example, the person administering the test would follow one of two sets of directions-Set 1, which was more about speed, and delivered more matter-of-factly, using phrases within, like “Be sure to do your fastest reading, meaning you should read as many words as you can, as fast as you can,” and Set 2, which offered more encouragement and reminders, using phrases like “Be sure to do your best reading. Are there any questions? Remember, you’re doing your best reading” (Taylor, et al., 2016, pg. 59). Results from this study showed students responded more positively to the second set of directions, producing significantly higher words read correctly, or WRC, on their CBM than with the first set of directions. However, neither set of verbal directions were found to influence the relation between CBM performance and reading comprehension.

### **Analyzing Results and Progress Monitoring with CBM**

Many studies have been conducted on the usefulness of CBM, particularly in progress monitoring. Progress monitoring assists teachers in meaningful decision-making (Clemens, et al., 2018; Espin, et al., 2021; Gesel & Lemons, 2020; Jenkins, et al., 2009), allowing them to make changes to instruction as needed, all for the betterment of their students. In their study about this topic, Espin, et al. (2021) state the importance of using CBM, encouraging teachers,

through education and professional development, to learn how to read and interpret CBM graphs, and to link, identify, select, and implement effective adjustments to their classroom instruction.

In January et al.'s study (2019), both 2nd Grade and 4th Grade students had their oral reading fluency (ORF) progress monitored over the course of ten weeks in the spring. Each time, researchers administered three FASTBridge passages for data collection and analysis. In their research, January et al. (2019) mentions often, progress monitoring is done once a week. However, other options were presented and discussed, including monthly bi-monthly, daily, doing three probes instead of one, etc. Each of these options would have their advantages, as well as disadvantages; therefore, the researchers landed on once weekly and twice weekly data collection. Findings showed the data collection schedule of twice a week exhibited similar results to its once a week counterpart, but the increased testing frequency would further prove if a student is needing intervention, or experiencing success, as there is a larger amount of data to review.

Length of time needed to prove student progress and success, rather than testing frequency, was investigated in Thornblad & Christ's study (2014). Like January, et al. (2019), they also used FASTBridge as their CBM of choice, using Level B oral reading fluency (ORF) passages, which are leveled for 2nd and 3rd Graders. These CBMs were given to 2nd Grade students every morning for six weeks. Findings supported students responding well to consistency, showing the average growth of words read correctly per minute (or WRCM) went up five points, increasing from 46 WRCM to 51 WRCM within the six week time frame.

Duration of progress monitoring was a topic examined by Klingbeil et al. (2019). In this study, CBMs were given to students for varying lengths of time (i.e.-two weeks, five weeks, etc.)

to explore the correlation between an intervention and a student's reading skills over time. Klingbeil and his colleagues dove deeper statistically into data, looking at students' CBM-R fluency scores, as well as their standard error of measurement (SEM), standard error of estimate (SEE), and standard error of the slope (SEb). Findings from their statistical analysis indicated that CBM meets many requirements for teachers to use with students, but they should not rely solely on data, due to potential validity concerns.

Validity was also reviewed by Jenkins, et al. (2009), who examined modifications within monitoring progress and how growth is affected. Results suggest progress monitoring can be used more efficiently without losing assessment validity. The idea of an intermittent progress monitoring model, perhaps only administering CBM every three weeks, six weeks, or even nine weeks, would free up more time for instruction for teachers, ensuring even more student success. Similarly, Gesel & Lemons (2020) also investigated the idea of intermittent progress monitoring and its effectiveness. Their findings indicated intermittent progress monitoring schedules were at least as accurate as the traditional, weekly schedule; in fact, in some situations, intermittent progress monitoring was more accurate than traditional models. Their hypothesis on the reason for these findings were intermittent progress monitoring uses multiple data points, whereas traditional progress monitoring uses a single data point each week.

A progress monitoring concern of a different sort was looked at in Van Norman & Parker's study (2016); specifically, it looked at when discontinuous growth begins, as well as the relationship between discontinuous growth and initial performance. From randomly selected 2nd and 3rd Grade students, this research involved collecting one grade level CBM-R probe per week, over the course of 34 weeks. To further support students' reading instruction and potential results, they also received 20 minutes of one-on-one intervention each day. Through their

research, Van Norman & Parker concluded most students experience rapid growth during the first half of the school year, followed by more slow and steady growth the second half of the year. These results are the opposite of Clemens, et al., (2018), who recommended implementing progress monitoring across the second half of the school year, combining LSF (letter sound fluency) with word or passage reading. However, it should be noted that Clemens, et al.'s research (2018) was done on Kindergarten-aged students, whereas Van Norman & Parker's study (2016) was done on 2nd and 3rd Grade students, who would likely have more existing basic reading skills.

Growth in utilizing and implementing CBM, rather than student growth, or lack thereof was one of the research topics considered in Van Norman, et al.'s study (2018). In this study, Van Norman and his colleagues questioned strategies to improve the implementation of CBM, as well as any potential next steps. Nearly 2000 3rd Grade students were monitored once a week using AIMSweb testing. They were also part of a supplemental Tier 2 reading intervention program for the year, receiving 20 minutes of one-on-one intervention each day, similar to his earlier study (Van Norman & Parker, 2016). Van Norman, et al., (2018) found students with scores below the fall benchmark struggled to show sufficient growth by the end-of-year target, while students scoring in the average range most accurately showed growth toward their goal line/target. These results challenge the thought of using CBM data for day-to-day decision making, but suggest teachers use CBM to support decisions made gradually throughout the year and to help categorize student performance and progress.

### **Other Reading Interventions to Consider**

While CBM is an extremely effective intervention tool for reading, there are other interventions worth considering. Monitoring Kindergarten reading progress through the use of CBM, as well as predicting year-end reading skills were researched in a more recent study by Clemens, et al. (2019). In this study, letter identification (LID) and phonological awareness (PA) tests were administered in October prior to the first administration of the progress monitoring measures. The fall progress monitoring (October through December) included letter naming fluency (LNF), letter sound fluency (LSF), and phoneme segmentation fluency (PSF). The spring progress monitoring (January through April) included the same tests from the fall-LNF, LSF, and PSF, as well as word reading fluency (WRF), decodable word reading (DWR), and nonsense word fluency (NWF), to assess students' progress with word reading. Students were also given progress monitoring measures once every 2 weeks (5 times across the fall and 8 times across the spring). STAR, a computer-adaptive test through Renaissance Learning, was administered in October, December, February, and April. Year-end testing was administered in late April/early May. Clemens, et al., (2019) found that in October of Kindergarten, STAR was the most dominant predictor of year-end reading outcomes. By December, LSF had become the most dominant predictor of year-end reading skills. Finally, in January, February, and April, WRF and DWR were the strongest predictors, with LSF still holding its own; therefore, supporting the idea of using CBM, particularly LSF, with Kindergarten students.

Ford et al. (2017) also compared a variety of intervention tools; namely, different CBM, including DIBELS, AIMSweb, and FASTBridge. Students were given one oral reading fluency passage from each of the three CBM companies to complete. While success amongst the different CBM varied (i.e.-of the three CBM surveyed, the two differing the most were



AIMSweb and FASTBridge, particularly in grades 5 & 6), Ford et al. stated that “schools should strongly consider the use of CBM publisher-provided, criterion-referenced cut scores for making screening decisions...rather than using norm-based cut scores not developed to predict meaningful outcomes” (Ford, et al., 2017, pg. 377).

While not relating to CBM, but meeting the needs of learners through Universal Design for Learning (UDL), which is an approach to teaching and learning, giving all students equal opportunity to succeed, Evmenova’s study (2018) examined how to better prepare teachers to use UDL to support their students. Teachers were observed teaching a variety of lessons/units with embedded UDL strategies, from argumentative writing to exploring equality in equations, just to name a few. In examining which UDL strategies were implemented most frequently, the two used most were activating or supplying background knowledge and fostering collaboration and community. Findings showed obvious gains were made by teaching staff, who saw the value of UDL as a way to support the learning of students with diverse needs and learning styles. Similarly, Brownell et al.’s study (2017) found teachers receiving training in Literacy Learning Cohorts (LLC’s) were better able to meet the needs of their students in the areas of word study, word reading, and fluency building.

In a study by Marchand & Furrer (2014), the correlation between CBM and reading performance was investigated. This was done through the use of MAZE tests, which are multiple choice tests completed by students, while reading to themselves. The first sentence of the story is left intact, and then every seventh word is replaced with three words in parentheses, leading students to decide which of the three choices fits the original passage. Findings showed, of the 3rd-5th Grade students participating in the study, 76% had proficient data on the four key variables (student-reported engagement, teacher-reported engagement, reading competence, and

reading performance), proving engagement is more important for struggling readers than students who have a higher competence in reading.

Administering CBM remotely with diverse learners; specifically, students with autism, was a topic analyzed by Mire & Jellinek (2023). Traditional CBM were not designed to be administered remotely, so changes were necessary to complete their research. Due to the COVID-19 pandemic changing the course of the study, each 2nd-5th Grade student selected participated in three 30-min remote learning study sessions from June to August, via Zoom. These sessions were held approximately two weeks apart, with students completing reading, math, and written expression CBM probes during each session. Behavioral observations during the study indicated eleven instances of inattention, overactivity, or noncompliance. These behavioral concerns, however, did not affect participation in the study. Many of these behaviors occurred during the written portion of the CBM, likely due to writing being a more challenging task for students with autism. Ultimately, this study showed adequate progress was made in both practicality and acceptability of remote CBM administration for autistic students, which is certainly a promising sign, not only in using CBM, but in the importance of flexibility and meeting the needs of all learners, something Missall, et al.'s study (2019) also explored, through the use of CBM in conjunction with state assessments and teacher ratings/rankings. Additionally, they proved how CBM can be an effective tool to use with students with learning disabilities or difficulties. This point is driven home in a study by Espin, who states if CBM are “rarely used to guide teachers’ instructional decision-making, it is unfortunate. It means that the field is missing out on a potentially powerful tool for helping teachers to build effective individualized instructional programs for students with or at risk of LD” (Espin, et al., 2021, pg. 267).

### **Professional Development & Training**

CBMs are a highly effective progress monitoring tool, but similar to other reading interventions and assessments, they are only as fruitful and productive as the professional development and training provided to staff. In Espin, et al.'s study (2021), researchers sought to examine if educators are given enough instruction in how to properly implement CBM, as well as adequately analyze the data collected. Through careful observation, it was determined many educators do not know how to read and interpret the CBM graphs, which affects instructional decision-making and how to meet the needs of all students. However, Espin, et al. (2021) hypothesized if educators were to receive proper instruction on how to successfully use CBM as a tool for data-based decision making, it would benefit their instruction with their students.

A recent study was conducted by van den Bosch, et al. (2019) who found teachers need to improve their graph comprehension. This can be done, according to van den Bosch, et al., through “reading the data (extracting data from the graph), reading between the data (integrating and interpreting the graphed data), and reading beyond the data (evaluating and interpreting data within a given context)” (van den Bosch, et al., 2019, pg. 415). Findings from this study show, in particular, CBM video instruction can be used to improve teachers’ CBM graph comprehension, along with linking data to instruction.

In Brownell, et al.'s study (2017), the idea of instruction, through Literacy Learning Cohorts (LLC's), were investigated and compared to standard professional development for teachers as a means to improve special education students’ reading instruction and success. Students impacted by the study were diverse learners in 3rd-5th Grade, with 94 of those students taught by LLC (literacy learning cohort) teachers, and 76 students taught by teachers receiving PD (professional development) only. The study’s results by Brownell, et al. (2017) varied,

depending upon the research question, as well as the subject. In examining the quality of instruction, within the word study and fluency with connected text subjects, LLC teachers were more successful. However, within word-level fluency, there was no significant difference between the LLC teachers and PD-only teachers. In examining the time spent engaged in evidence-based practices, within the word study and fluency with connected text subjects, LLC teachers were significantly more successful. Interestingly, within word-level fluency, the LLC teachers were still more successful, but the discrepancy was much smaller than the other two subjects. Another compelling piece of data was the knowledge of teaching survey, which showed both groups made gains, so this data was less conclusive to proving the need for LLC instruction, rather than PD only. Finally, in examining student achievement measures through two types of DIBELS testing-Woodcock word attack (WA) and nonsense word fluency (NWF), both of these tests showed significantly higher scores for students taught by LLC teachers, rather than PD only teachers. However, in looking at the DIBELS oral reading fluency (ORF), scores showed only a minimal difference between LLC and PD only, with Brownell, et al. (2017) concluding that any PD, whether general or specific, is better than limited or no PD at all.

Training in Universal Design for Learning (UDL) is a topic that Evmenova (2018) examined, finding that teachers and students benefit from its usability and successful implementation. This successful implementation of engagement, representation, action, and expression would likely lead to gains in formal and informal assessments within the classroom, such as CBM. A teacher who took part in Evmenova's study was quoted as saying, "Implementing UDL in future lessons is something that will become a necessity for me. Differentiation occurs with every move educators make in the classroom; but not all students can benefit by the same differentiation. So UDL is my answer" (Evmenova, 2018, pg. 166).

Through studying all of these articles, it is evident while CBM have been researched in various ways, it has primarily been through the teacher's perspective and what could potentially be improved upon, whether through professional development (Espin, et al., 2021), frequency of progress monitoring (Gesel & Lemons, 2020), or data analysis/graph comprehension (van den Bosch, et al., 2019). However, there are very few studies available examining the success or failure of CBM from the standpoint of the student, as well as the possible correlation between phoneme segmentation fluency and oral reading fluency. While many studies examined using DIBELS (Brownell, et al., 2017; Ford, et al., 2017; Grima-Farrell, 2015; Missall, et al., 2019; Snyder & Ayres, 2020; Thornblad & Christ, 2014;), AIMSweb (Clemens, et al., 2018; Clemens, et al., 2019; Ford, et al., 2017; Gesel & Lemons, 2020; Marchand & Furrer, 2014; Mire & Jellinek, 2023; Taylor, et al., 2016; Thornblad & Christ, 2014; Van Norman & Parker, 2016; Van Norman, et al., 2018), and FASTBridge (Clemens, et al., 2019; Ford, et al., 2017; January, et al., 2019; Thornblad & Christ, 2014) as their CBM of choice, only one study (Clemens, et al., 2019) utilized STAR as a data collection tool, and even so, only used the STAR assessments, rather than STAR CBM. Furthermore, none of these studies looked only at phoneme segmentation fluency (PSF) and oral reading fluency (ORF) separately, and then comparatively, supporting the need for further research in this particular area.

### **Research Questions**

The following questions shaped this action research, including:

*Question 1:*

How does the STAR phoneme segmentation CBM benefit 1st Grade students throughout the course of the school year?

*Question 2:*

Is there a correlation between students' phoneme segmentation fluency score and their oral reading fluency score?

### **Participants & Research Site**

This action research study took place in two 1st Grade classrooms, with a total of 38 students participating. These classrooms were located at Winsted Elementary in Winsted, Minnesota, a small, rural town located about an hour west of the Twin Cities metropolitan area, with a population of 2,355 people. Winsted Elementary is part of Independent School District 2687, which includes two elementary schools, along with a middle school, and high school. This elementary school consists of four sections of preschool, with two sections of each grade-Kindergarten through Grade 4, and 48.44% of students eligible to receive free and reduced lunch. Students ranged in age from 6-8 years old. There were 22 males and 16 females included in the study. Classes are predominately white and neurotypical, with two students receiving EL services, eight students receiving speech and language support, and six students on current IEPs for special education services.

**Variables, Intervention, & Timeline**

The two variables of this action research include the independent variable of implementation of the STAR phoneme segmentation fluency CBM and the STAR oral reading fluency CBM and the dependent variable of student response and correlation between scores. These variables are being observed in the 1st Grade classroom settings, particularly during Reading Block, which is a 30 minute block of time where students are ability grouped, based on reading level. Reading instructional content during this time is guided by reinforcing the reading curriculum all students receive during their traditional Reading class, along with specialized phonics and spelling practice, writing prompts, leveled decodable readers, and other intervention strategies. Students participating in this study will complete quarterly progress monitoring, where they will segment a word into three parts (PSF), and read a short passage (ORF) while they are assessed for fluency and accuracy. Both assessments are one minute in length.

All CBM student data will be stored on the STAR digital record book, where collection takes place, and will only be shared for educational purposes. When analyzing the data, student scores, growth, and the difference in scores from beginning of the study to the completion will be examined, along with comparative data.

In regards to validity and reliability, the teachers giving the CBM have been properly trained in administering these assessments. These educators will use the scripted instructions provided by STAR to ensure all students are hearing the same information. Furthermore, if there is any question of discrepancy, or subjectivity, particularly with the STAR phoneme segmentation fluency CBM (i.e.-it is difficult to hear whether a student said c-a-t or c-at during their timing, which could result in an error), the CBM will be readministered.

### **Anticipated Statistical Analysis**

For the first research question of “How does the STAR phoneme segmentation CBM benefit 1st Grade students throughout the course of the school year?”, the statistical plan is to run a Chi-square test to determine if there is a relationship between being at the CBM benchmark and the testing window students took the tests in. For the second research question of “Is there a correlation between students’ phoneme segmentation fluency score and their oral reading fluency score?”, the intent is to use a Pearson correlation test between the students' phoneme segmentation score and oral reading fluency scores from the end of the year.

### **IRB**

An application for exemption for this action research project was approved and permission to conduct the study was granted by the Northwestern College Institutional Review Board. This research involved normal educational practices by conducting classroom assessments typically given as part of grade-level SMART goal. The researcher recognizes the importance of maintaining the confidentiality of data collected, respecting the research site, ensuring the safety and privacy of the participants, and accurately interpreting and presenting the data collected.

### **Data Collection**

For this action research study, the data collected was largely quantitative. The data includes baseline scores, quarterly scores, end of year scores, growth, and comparative data. 1st Grade students participated in quarterly CBM progress monitoring through STAR, created by Renaissance Learning. Phoneme segmentation fluency (PSF) checks began in September, and continued in the months of November, January, March, and May, consisting of five total data



points for all students, with some students receiving more frequent monthly checks, due to Title I staff using gathered data as a possible Tier 2 intervention for necessary students. Since 1st Grade students are not typically fluent readers at the beginning of the year, oral reading fluency (ORF) checks began halfway through the year, in January, and continued in the months of March and May, with three data points.

The testing was conducted by both 1st Grade teachers in their classrooms during Reading Block, when other students were working on independent phonics skills, either via paper/pencil or on SplashLearn, a reading and math website. The teachers ensured objectivity and accuracy by reading test directions aloud to the students verbatim, and following test directions (i.e.- making sure students were segmenting each word, like d-o-g, rather than providing the word in an onset and rime style, like d-og). Timings were one minute, and time was kept on STAR, a gentle chime indicating when time had expired.

Another data collection tool being used is the STAR digital record book. Scores from the CBMs are stored and color-coded in this record book, which will assist in data analysis. The colors consist of green being at benchmark (meeting or exceeding the goal), blue being on watch (or below the goal), and red being in the intervention category (significantly below the goal). The 1st Grade end of year benchmarks for the STAR phoneme segmentation fluency CBM are as follows: green=24 words or above, blue=20-23 words, and red=0-19 words. The 1st grade end of year benchmarks for the STAR oral reading fluency CBM are as follows: green=49 words or above (with a 40th percentile ranking or higher), blue=35-48 words (with a 20th-39th percentile ranking), and red=0-34 words (with a 1st-19th percentile ranking).

## Findings

### Data Analysis

In examining the first question of “How does the STAR phoneme segmentation CBM benefit 1st Grade students throughout the course of the school year?”, a Chi-square test was used to determine if a relationship exists between being at the CBM benchmark and the testing window students took the tests in. To help ease the analysis process, all values not At/Above Benchmark were changed to Not At Benchmark, meaning students either met the benchmark or not in each of the testing windows-fall (data collected in September-November), winter (data collected in December-March), and spring (data collected in April-June). Please note while data was collected in sequential order, all figures shared (i.e.-Chi-squares, balloon plots, etc.) display the data in alphabetical order.

Here is a brief breakdown of those numbers in a table format. The numbers on the left are the percentage of students who were at the benchmark while the numbers on the right are the students who were not.

### Figure 1

*Percentage of students at/above benchmark or not at benchmark for each testing window*

	At/Above	Not
Fall Testing Window	0.41	0.59
Spring Testing Window	0.58	0.42
Winter Testing Window	0.51	0.49

The next table has a similar breakdown, but rather than showing the percentage of students who met or did not meet the benchmark, this table showcases the number of CBMs

collected in each testing window that met or did not meet the benchmark. This table may be slightly easier to read, particularly leading into the Chi-square.

**Figure 2**

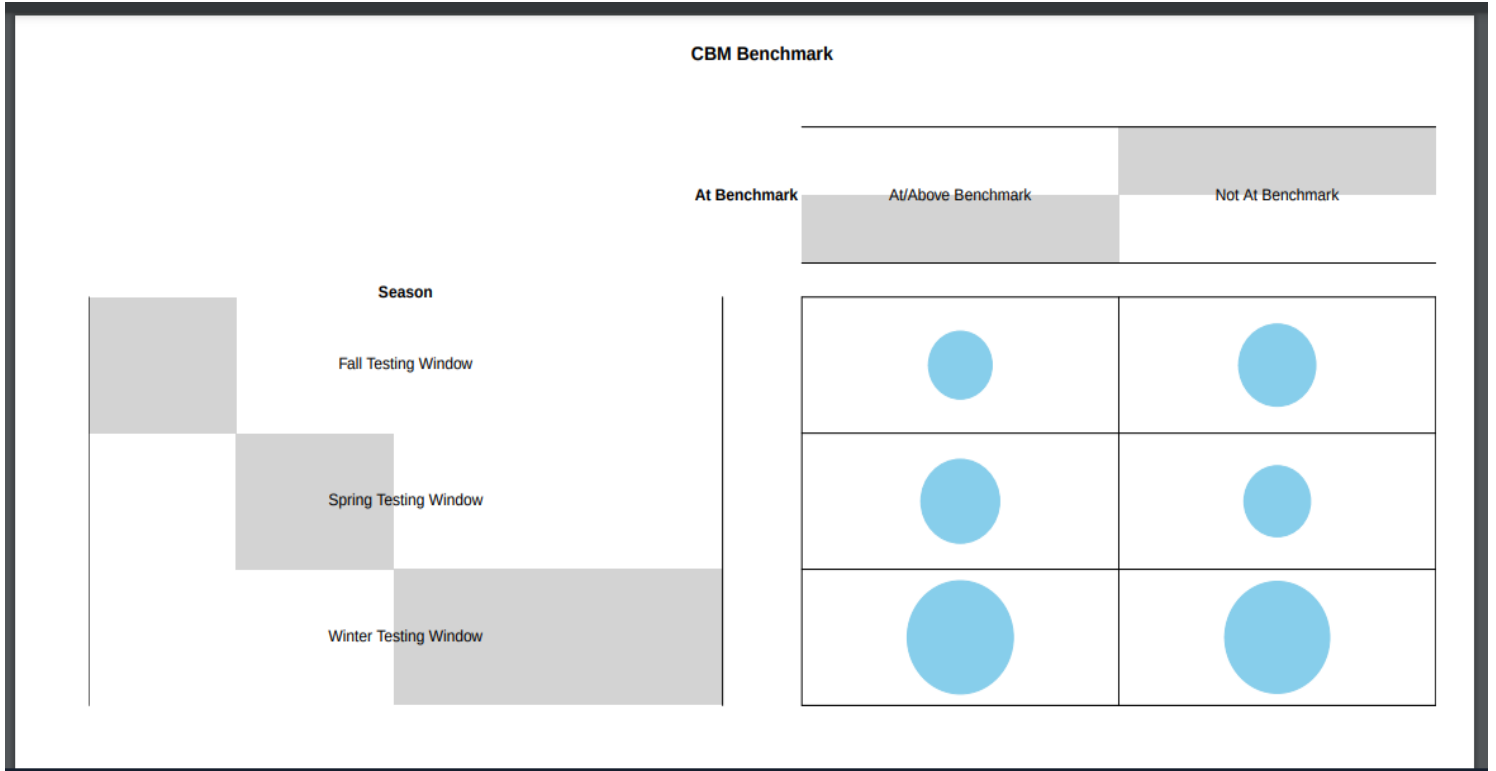
*Number of student CBMs collected at/above benchmark or not at benchmark for each testing window*

	<b>At/Above</b>	<b>Not</b>
Fall Testing Window	32	47
Spring Testing Window	49	35
Winter Testing Window	89	87

After this step was completed and data was further analyzed through the Chi-square test, findings indicated there was little to no relationship between the two categories, with values of  $\chi^2$  (Chi-squared) = 5.20, df (degrees of freedom) = 2, and p (p-value) = 0.07. It should be noted, however, since the p-value, which is used to determine the statistical significance of the data, is greater than 0.05, it is considered statistically insignificant.

In examining the Chi-square tables, as well as the balloon plots, it is clear some phoneme segmentation and oral reading fluency progress was made throughout the school year. The fall testing window circles show many students not meeting the benchmark, since that circle is larger than the circle indicating proficiency. The winter testing window offers a closer comparison in data collection and circle size, as there were a number of students who met the benchmark, as well as many students who did not meet the benchmark and needed further practice. The circles are also particularly large in the winter testing window, due to the amount of winter CBM data collected. However, in looking at spring benchmarks, there were more students who were

successful in meeting their CBM benchmarks, as indicated by the larger circle on the left, showing students met or exceeded the benchmark.

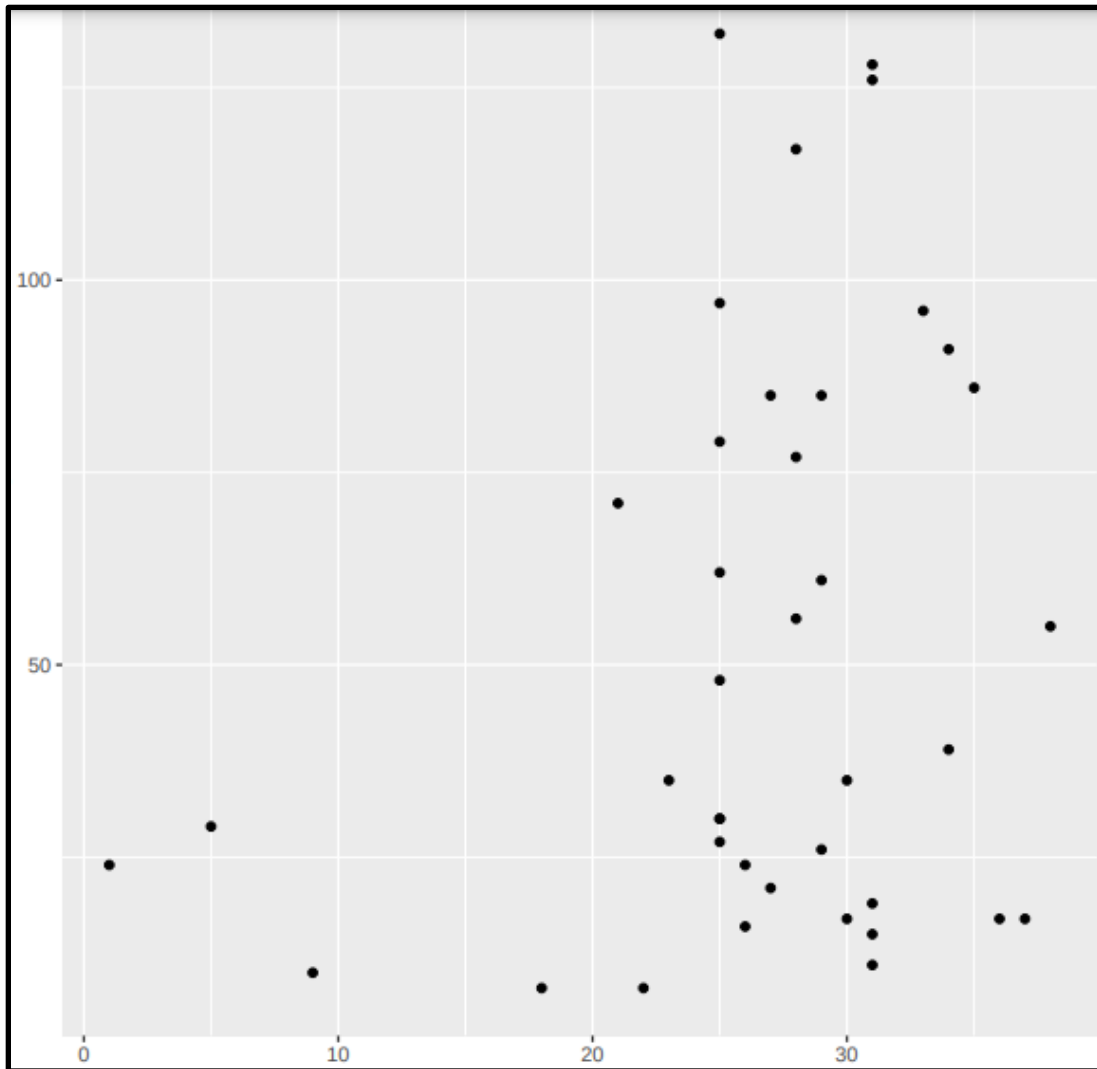


**Figure 3**

*Chi-square test distribution tables and balloon plots*

Overall, the data collected over the course of the school year did show some growth in students’ phoneme segmentation fluency. However, this small amount of growth was not enough to justify its significance. It is believed more frequent CBM data collection (perhaps daily, weekly, or even monthly, rather than quarterly) might give more insight as to when the students are mastering phoneme segmentation skills and showing growth, due to their newfound confidence and comfortability.

For the second research question of “Is there a correlation between students’ phoneme segmentation fluency score and their oral reading fluency score?”, a Pearson correlation test between the students' phoneme segmentation scores and oral reading fluency scores from the end of the year were utilized.



**Figure 4**

*Correlation between oral reading fluency score (left-y axis) and phoneme segmentation score (bottom-x axis)*

From this graph, findings indicated a weak positive correlation between phoneme segmentation and oral reading fluencies with  $R$  (correlation) = 0.24. This number shows there is a small correlation, where having a high phoneme segmentation score also indicated having a high oral reading fluency score. However, the results were not statistically significant since  $p$  (p-value) = 0.14. In examining the graph provided, the analyzed research showed a mean of 26.61 for the phoneme segmentation scores and a standard deviation of 7.75. Meanwhile, the oral reading fluency scores showed a mean of 51.34 and a standard deviation of 37.50.

This comparative data indicates more of a linear relationship and likelihood of students having proficiency in both phoneme segmentation and oral reading fluency. However, as previously stated, since the  $p$ -value is greater than 0.05, it is not considered significant in the study.

## **Discussion**

### **Summary of Major Findings**

This action research study, which examines the effectiveness of using curriculum-based measurement (CBM), specifically phoneme segmentation and oral reading fluency with 1st Grade students, found while there are benefits of using CBMs, showing student growth and progress through the scores, this progress is not as evident as hypothesized. The study does suggest utilizing these CBMs more often, such as daily, weekly, or even monthly, as well as using these CBMs as a Tier 2 intervention for struggling readers. The implementation of using CBMs did show a correlation between having a higher phoneme segmentation fluency and having a higher oral reading fluency; however, the statistical significance is not conclusive enough to support the research questions completely. It is evident students did show an increase

in fluency over the course of the school year. However, the rate of increase, and whether the oral reading fluency increase was in tandem with their phoneme segmentation fluency was not largely significant.

These findings were similar to the results of a research study by Clemens, et al. (2018), which was performed with Kindergarten students. In their findings, Clemens et al. states phoneme segmentation fluency showed less promise as a progress monitoring tool in the spring of Kindergarten, as the statistics were not significant enough (Clemens, et al., 2018). Furthermore, other issues with using PSF as a progress monitoring tool may stem from the fact that, unlike oral reading fluency, students do not interact directly with print. Any interaction with the words is done auditorily, meaning the test proctor (which, in most cases, is the students' classroom teacher) will say the word and the student must segment the word into the correct phonemes, based on what they heard. Therefore, if a student struggled to hear the word correctly, they might segment it incorrectly as well. It is suggested by the researchers additional attention to students' patterns of responding might be warranted, something that could also be considered in this study, or any future studies utilizing curriculum-based measurement as a data collection tool.

### **Limitations of the Study**

The data collected does show some growth, as well as a correlation between having a higher phoneme segmentation fluency and having a higher oral reading fluency. However, one limitation includes not beginning oral reading fluency with the 1st Grade students until January, eliminating a minimum of two additional data points. Another limitation would be the majority of the students were progress monitored quarterly. Only students who were receiving Title I or

Reading Intervention services were checked monthly, which could be a change to consider for next time.

### **Further Study**

Increasing progress monitoring from quarterly benchmarks to daily, weekly, or monthly CBM checks would likely be more telling, as results might show when the gains are made, and could correlate with certain reading lessons taught, or students receiving more Title I/Reading intervention services. It might be interesting to see if a particular skill (i.e.-long vowels, 3 letter blends -h consonant digraphs, etc.) leads to more growth.

Another future study idea would be to extend this research down to Kindergarten, likely more for letter and sound identification, nonsense word fluency, or even phoneme segmentation fluency. It might also garner more results to extend research across grade levels as high as 3rd or 4th Grade, to see when oral reading fluency, in particular, sees the biggest jump, potentially yielding some great results.

Finally, potentially comparing CBM results to students' STAR Early Literacy and/or Reading test scores, or Minnesota Comprehensive Assessment (MCA) scores might also garner some interesting findings. Overall, continuing to study this process and its effects for a longer period of time, with a larger grade range, and using additional testing would be beneficial to potentially see stronger outcomes, particularly with student success and growth.



### **Conclusion**

This study provided students with reading skills practice through the use of curriculum-based measurement, specifically phoneme segmentation fluency (PSF) and oral reading fluency (ORF). Students participated in quarterly CBM progress monitoring in both areas of PSF and ORF, which did not garner significant results. However, it did show a slight correlation between having a high phoneme segmentation score and having a high oral reading fluency score. Increasing the frequency of CBM progress monitoring in future studies would likely exhibit more statistically significant results.

### References

- Ardoin, S. P., & Christ, T. J. (2009). Curriculum-based measurement of oral reading: standard errors associated with progress monitoring outcomes from dibels, aimsweb, and an experimental passage set. *School Psychology Review, 38*(2), 266-283.  
<http://ezproxy.nwciowa.edu/login?url=https://www.proquest.com/scholarly-journals/curriculum-based-measurement-oral-reading/docview/219656384/se-2>
- Brownell, M., Kiely, M. T., Haager, D., Boardman, A., Corbett, N., Algina, J., Dingle, M. P., & Urbach, J. (2017). Literacy learning cohorts: content-focused approach to improving special education teachers' reading instruction. *Exceptional Children, 83*(2), 143-164.  
<https://doi.org/10.1177/0014402916671517>
- Clemens, N. H., Hsiao, Y.-Y., Simmons, L. E., Kwok, O.-man, Greene, E. A., Soohoo, M. M., Henri, M. A., Luo, W., Prickett, C., Rivas, B., & Otaiba, S. A. (2019). Predictive validity of kindergarten progress monitoring measures across the school year: application of dominance analysis. *Assessment for Effective Intervention, 44*(4), 241–255.  
<https://doi.org/10.1177/1534508418775805>
- Clemens, N. H., Soohoo, M. M., Wiley, C. P., Hsiao, Y.-Y., Estrella, I., Allee-Smith, P. J., & Yoon, M. (2018). Advancing stage 2 research on measures for monitoring kindergarten reading progress. *Journal of Learning Disabilities, 51*(1), 85–104.  
<https://doi.org/10.1177/0022219416688171>
- Espin, C. A., van den Bosch, R. M., van der Liende, M., Rippe, R. C. A., Beutick, M., Langa, A., & Mol, S. E. (2021). A systematic review of cbm professional development materials: are

- teachers receiving sufficient instruction in data-based decision-making? *Journal of Learning Disabilities*, 54(4), 256–268. <https://doi.org/10.1177/0022219421997103>
- Evmenova, A. (2018). Preparing teachers to use universal design for learning to support diverse learners. *Journal of Online Learning Research*, 4(2), 147-171. <https://files.eric.ed.gov/fulltext/EJ1184985.pdf>
- Fisher, D. and Frey, N. (2010). *Enhancing rti: how to ensure success with effective classroom instruction & intervention*. (1st ed.), Alexandria: ASCD.
- Ford, J. W., Missall, K. N., Hosp, J. L., & Kuhle, J. L. (2017). Examining oral passage reading rate across three curriculum-based measurement tools for predicting grade-level proficiency. *School Psychology Review*, 46(4), 363–378. <https://www.proquest.com/docview/2087743678?parentSessionId=sIv6E0rg8ASA1ou3LaG9IX3vRO%2Bj%2BG2zbhQXd5HEBOU%3D&accountid=28306>
- Gesel, S. A., & Lemons, C. J. (2020). Comparing schedules of progress monitoring using curriculum-based measurement in reading: a replication study. *Exceptional Children*, 87(1), 92–112. <https://doi.org/10.1177/0014402920924845>
- Grima-Farrell, C. (2014). Curriculum-based measurement of oral reading fluency (cbm-r): an objective orientated evaluation study. *Support for Learning*, 29(4), 370–393. <https://doi.org/10.1111/1467-9604.12067>
- Hosp, M. K., Hosp, J. L., & Howell, K. W. (2016). *The abc's of cbm: a practical guide to curriculum-based measurement*. (The Guilford Practical Intervention in the Schools Series). The Guilford Press.

- January, S.-A. A., Van Norman, E. R., Christ, T. J., Ardoin, S. P., Eckert, T. L., & White, M. J. (2019). Evaluation of schedule frequency and density when monitoring progress with curriculum-based measurement. *School Psychology, 34*(1), 119–127. <https://doi.org/10.1037/spq0000274>
- Jenkins, J. R., Graff, J. J., & Miglioretti, D. L. (2009). Estimating reading growth using intermittent cbm progress monitoring. *Exceptional Children, 75*(2), 151–163. <https://doi.org/10.1177/001440290907500202>
- Klingbeil, D. A., Van Norman, E. R., & Nelson, P. M. (2017). Precision of curriculum-based measurement reading data: considerations for multiple-baseline designs. *Journal of Behavioral Education, 26*(4), 433–451. <https://doi.org/10.1007/s10864-017-9282-7>
- Marchand, G. C., & Furrer, C. J. (2014). Formative, informative, and summative assessment: the relationship among curriculum-based measurement of reading, classroom engagement, and reading performance. *Psychology in the Schools, 51*(7), 659–676. <https://doi.org/10.1002/pits.21779>
- Mire, S. S., & Jellinek, E. R. (2023). Evaluating the feasibility of remotely administered curriculum-based measurement for students with autism: a pilot study. *Psychology in the Schools, 60*(2), 345–363. <https://doi.org/10.1002/pits.22668>
- Missall, K. N., Hosp, M. K., & Hosp, J. L. (2019). Reading proficiency in elementary: considering statewide testing, teacher ratings and rankings, and reading curriculum-based measurement. *School Psychology Review, 48*(3), 267–275. <https://doi.org/10.17105/SPR-2017-0152.V48-3>

- Snyder, S. M., & Ayres, K. (2020). Investigating the usage of reading curriculum-based measurement (cbm-r) to formatively assess the basic reading skills of students with intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 55(1), 60–74. <https://www.jstor.org/stable/26898714>
- Taylor, C. D., Meisinger, E. B., & Floyd, R. G. (2016). Disentangling verbal instructions, experimental design, and sample characteristics: results of curriculum-based measurement of reading research. *School Psychology Review*, 45(1), 53–72. <https://www.proquest.com/docview/1802749476/fulltextPDF/A88137DEA1AF4F69PQ/1?accountid=28306>
- Thornblad, S. C., & Christ, T. J. (2014). Curriculum-based measurement of reading: is 6 weeks of daily progress monitoring enough? *School Psychology Review*, 43(1), 19–29. <https://www.proquest.com/docview/1536853432/fulltextPDF/42FBD75E3B2B4C0FPQ/1?accountid=28306>
- van den Bosch, R. M., Espin, C. A., Pat-El, R. J., & Saab, N. (2019). Improving teachers' comprehension of curriculum-based measurement progress-monitoring graphs. *Journal of Learning Disabilities*, 52(5), 413–427. <https://doi.org/10.1177/0022219419856013>
- Van Norman, E.R., Nelson, P. M., & Parker, D. C. (2018). Curriculum-based measurement of reading decision rules: strategies to improve the accuracy of treatment recommendations. *School Psychology Review*, 47(4), 333–344. <https://doi.org/10.17105/SPR-2017-0089.V47-4>

Van Norman, E. R., & Parker, D. C. (2016). An evaluation of the linearity of curriculum-based measurement of oral reading (cbm-r) progress monitoring data: idiographic considerations. *Learning Disabilities Research & Practice, 31*(4), 199–207. <https://doi-org.ezproxy.nwciowa.edu/10.1111/ldrp.12108>

Vaughn, S. R., Bos, C. S., & Schumm, J. S. (2017). *Teaching students who are exceptional, diverse, and at risk in the general education classroom*, Pearson Education.