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## Effect of Heggerty Phonemic Awareness Program on Fourth Graders' Foundational Reading Skills

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# Walden University

College of Education and Human Sciences

This is to certify that the doctoral dissertation by

Kathleen Fox

has been found to be complete and satisfactory in all respects, and that any and all  
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Walden University  
2024

Abstract

Effect of Heggerty Phonemic Awareness Program on Fourth Graders' Foundational  
Reading Skills

by

Kathleen Fox

MPhil, Walden University, 2022

MA, Notre Dame of Maryland University, 1999

BA, Notre Dame of Maryland University, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Education

Walden University

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## Abstract

The problem is that fourth-grade students in the United States are not meeting reading proficiency benchmarks. Phonemic awareness is a strong predictor of reading success; however, few studies have investigated its effectiveness for intermediate elementary students who are at risk or struggling readers. The purpose of this quantitative quasi-experimental causal-comparative study was to find whether fourth-grade students who are identified as at-risk or struggling readers will show improvement in phonemic awareness and word recognition skills when taught with the Heggerty Phonemic Awareness Program as a supplement to regular reading instruction as compared to students who received traditional core reading instruction. The theory that grounds this study is Watson's theory of behaviorism. Research questions explored the effectiveness of the Heggerty Phonemic Awareness Program on fourth graders phonemic awareness and word recognition skills. Archival data were analyzed. Results indicated that there was a statistically significant difference in the phonemic awareness and word recognition skills of fourth-grade students who were taught with the Heggerty Phonemic Awareness Program as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. The findings of this study have the potential to create positive social change for fourth-grade students, teachers, and school administrators to provide the Heggerty Program as a supplement to their core reading instruction.

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## Dedication

I dedicate this dissertation to my family. To my husband, Rik, thank you for always supporting my dreams: you are my rock. To my children, Curtis, Maddie, and Doug, thank you for sharing this journey with me: you answered my questions, calmed me down, and offered your support always. I love all of you with my whole heart and appreciate the life we are building together.

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## Chapter 1: Introduction to the Study

There are many reading skills that students need to possess to be proficient readers, such as phonics, phonological awareness, reading fluency, phonemic awareness, vocabulary, and comprehension (National Institute of Health, 2000). Since sharing the National Reading Panel Report by the U.S. Department of Education in 2000, many initiatives, programs, and education acts have been created. The report is central to federal literacy policy (National Institute of Health, 2000). The report brought phonemic awareness to the forefront of reading instruction. Phonemic awareness is an early literacy skill that predicts academic reading success (Meeks et al., 2020; National Institute of Health, 2000). Phonemic awareness skills are directly related to reading achievement and are necessary skills to teach children how to read (Peltier et al., 2020). Historically, reading programs have focused on teaching primary-aged children phonemic awareness and phonological awareness (Altinkaynak, 2019; Melesse & Enyew, 2020; National Institute of Health, 2000; Rachmani, 2020). However, few studies have investigated strategies for teaching phonemic awareness as part of any core reading program for intermediate elementary readers, and none as a stand-alone supplementary program (Birgisdottir et al., 2020). Though phonemic awareness instruction is beneficial for both primary and intermediate students (Rehfield et al., 2022), there is a gap in the research for incorporating phonemic awareness strategies for children beyond emergent and early reading development stages and demonstrating difficulties with word recognition skills stemming from problems with phonemic awareness. The purpose of this study was to find whether fourth-grade students who are identified as at-risk or struggling readers

(AR/SR) showed improvement in phonemic awareness and word recognition skills when taught with the Heggerty Phonemic Awareness Program (HPAP) as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness.

Chapter 1 contains the study purpose and problem statement from which the research questions were developed. The theoretical framework for the study can also be found in Chapter 1. The nature of the study is described in depth to explain how the research questions were investigated. The study's limitations and significance are also part of Chapter 1. Chapter 1 concludes with a summary.

### **Background**

Phonemic awareness is an early literacy skill that predicts reading achievement (Meeks et al., 2020; Peltier et al., 2020). Core reading programs that incorporate systematic and explicit instruction in foundational reading skills, including phonemic awareness, focus on instruction for primary-aged students. Open Court and other phonics-based programs have been identified as evidence-based approaches for primary-aged students (What Works Clearinghouse, 2014). Similarly, many strategies that can be incorporated into other core reading programs, such as using manipulatives as a multi-sensory approach and interactive book readings, are effective in teaching phonemic awareness and phonics to primary-aged children at the emergent or early stages of reading development (Altinkaynak, 2019; Melesse & Enyew, 2020; Rachmani, 2020).

When provided with direct instruction, interventions can positively impact intermediate students' literacy skills (Wanzek et al., 2018). Children's early literacy skills

support reading achievement up to 5 years later and future studies should investigate the phonemic awareness skills of intermediate students (Birgisdottir et al., 2020). Further research is needed that looks at intervention programs for phonemic awareness and how students who are at-risk for reading difficulties respond to such interventions (Donegan et al., 2020). There is a gap in research for incorporating phonemic awareness strategies for children beyond emergent and early reading development stages and demonstrating difficulties with word recognition skills stemming from problems with phonemic awareness. A substantial body of research literature has shown the effectiveness of strategies and techniques for improving phonemic awareness skills during early childhood (Altinkaynak, 2019; Bdeir et al., 2022; Bratsch-Hines et al., 2020; Majorano et al., 2021; Melesse & Enyew, 2020; Rachmani, 2020). However, few studies have involved the investigation of strategies or programs for teaching phonemic awareness as part of any core reading program for intermediate students who have been identified as AR/SR (Birgisdottir et al., 2020). This study added to this body of literature.

### **Problem Statement**

National reading data indicated that in 2022, 37% of 4<sup>th</sup> graders read below the basic level and therefore are not attaining reading achievement benchmarks (National Assessment for Education Progress, 2022). According to the National Assessment for Educational Progress (2022), the percentage of students scoring below the basic level has consistently increased on the fourth-grade reading assessment over the past 6 years (Table 1). Long-term trend assessment data comparing the 2019–2020 and 2021–2022 school years' reading scores showed the largest drop in scores since the 1989–1990

school year, with a drop of three points. This most recent data reflects a sharp decline attributed to remote learning during the first 2 years of the COVID-19 pandemic. Many school districts also showed an increase in the percentage of fourth graders performing below the basic level in reading (National Assessment for Educational Progress, 2022; Sabatini et al., 2019; Scammacca et al., 2020).

**Table 1**

*Fourth-Grade Reading Scores*

| Year | Percentage of 4 <sup>th</sup> graders below basic |
|------|---|
| 2022 | 37%   |
| 2019 | 34%   |
| 2017 | 32%   |
| 2015 | 31%   |

*Note* Adapted from "The National Assessment for Educational Progress Nation's Report Card," 2022, *NAEP report card: Reading*.

<https://www.nationsreportcard.gov/reading/nation/achievement/?grade=4>

Since sharing the National Reading Panel report by the U.S. Department of Education in 2002, many initiatives and programs have been created. However, it is not known if supplementary instruction using the HPAP contributes to improvements in phonemic awareness and word recognition skills for children identified as AR/SR. This study addresses this problem.

**Purpose of the Study**

The purpose of this quantitative quasi-experimental causal-comparative study was to use archival data to find whether fourth-grade students who are identified AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who

received traditional core reading instruction but received no supplementary instruction in phonemic awareness. The instruction for the control group involved regular reading instruction with a core reading program during the 2021–2022 school year, and the instruction for the treatment group involved the same regular reading instruction with the addition of the supplementary HPAP during the 2022–2023 school year. During the 2021–2022 school year, fourth-grade students did not receive the HPAP because it was not yet implemented at the school. Students in the 2022–2023 school year received HPAP based on their scores of below 80% on the Phonological Awareness Screening Test (Kilpatrick, 2016).

### **Research Questions**

The problem for this study was addressed by the following research questions (RQs):

RQ 1: What is the difference in the overall phonemic awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk/struggling readers who did and did not receive supplementary instruction with Heggerty Phonemic Awareness Program while controlling for their pre-intervention Phonological Awareness Screening Test score?

*H*<sub>0</sub>1: There is no statistically significant difference in phonological awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program



while controlling for their pre-intervention Phonological Awareness Screening Test scores.

*H<sub>A1</sub>*: There is a statistically significant difference in phonological awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Phonological Awareness Screening Test scores.

RQ 2: What is the difference in the overall word recognition skills as measured by the Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency between fourth-grade students identified as at-risk/struggling readers who did and did not receive supplementary instruction with Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores?

*H<sub>02</sub>*: There is no statistically significant difference in the word recognition skills as measured by Dynamic Indicators of Beginning Early Literacy Skills Oral Reading Fluency between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores.

*H<sub>A2</sub>*: There is a statistically significant difference in the word recognition skills as measured by Dynamic Indicators of Beginning Early Literacy Skills Oral Reading Fluency between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores.

### **Theoretical Framework**

The theory that grounded this study was Watson's theory of behaviorism. According to Watson (1913), behaviors can be learned and controlled. The learning environment can influence learning behaviors through modeling, reinforcement, and practice of skills that help students develop learning habits. Watson's theory of behaviorism is centered around learning and controlling behaviors through the learning environment, including responses from others, various stimuli, reinforcement, and the formation of habits. The constructs of Watson's theory of behaviorism directly relate to how students learn.

The logical connections between the framework presented and the nature of the study included the constructs of Watson's theory of behaviorism: observable behaviors, modeling, repetition, making connections, reinforcement, feedback, step-by-step learning, and habit formation (Watson, 1913). The construct of observable behavior means that student behaviors can be analyzed objectively. Watson (1913) described the construct of repetition and how memory learning is focused on the presentation of

information many times over. Memory learning allows learners to connect to what they already know and have learned, which describes the construct of making connections. These connections allow learners to use their memories to recall information and connect it to the new information being taught. These connections are made through teacher and student modeling, repetition, and reinforcement of the information until the student begins to form habits and are able to transfer their learning. Watson described step-by-step learning as a way to reach a learning goal. Skill learning occurs when lessons are divided into parts that allow the learner to master each part before moving on.

HPAP incorporates each of these constructs as they underlie the program's teaching guidelines. The program demonstrates Watson's construct of observable behavior by recommending that teachers observe and listen to student responses to monitor student progress. While observing students, teachers are looking to see that students are using the various strategies that have been presented multiple times throughout the HPAP curriculum. The next construct is modeling. HPAP instruction is explicit, and the curriculum provides teacher tips explaining how to demonstrate the phonemic awareness skills being taught. At the beginning of the program, teachers model each skill before having the students respond. It also explains how hand motions are used for various phonemic awareness skills. Watson's construct of repetition is part of the HPAP that allows students to practice skills until they are learned and displayed independently. HPAP lessons provide multiple practice opportunities for students through the incorporation of 12 weeks of daily lessons that focus on the same eight phonemic awareness skills (VanHekken and Bottarim, 2020). HPAP's use of hand motions supports

Watson's construct of making connections by allowing students to use multiple modalities of learning to help them remember the skills and connect them to their prior learning. The curriculum structure builds on previously learned skills that increase in difficulty level as students master the target skills. The constructs of reinforcement and feedback work hand in hand in HPAP. HPAP reinforces student learning by providing immediate feedback to students. The program provides teacher tips and ways to scaffold lessons to allow students to master a skill before moving on to the next skill. This practice supports the construct of step-by-step learning. HPAP curriculum provides systematic instruction within each lesson. Lessons are separated into eight phonemic awareness skills that are practiced and reinforced daily. This supports Watson's construct of habit formation because students are forming habits about how they work with phonemes. The HPAP curriculum provides short twelve to fifteen minute lessons that are to be done daily.

### **Nature of the Study**

To address the RQs in this quantitative study, the specific research design included a quasi-experimental causal-comparative research design using archival data. This research design is used when investigating the relationship between independent and dependent variables after an action, such as an intervention, has already occurred (Brewer & Kuhn, 2010). It is also used to compare the performance of two or more groups.

I investigated whether AR/SR students in the treatment group receiving supplemental instruction with HPAP perform significantly better on measures that assess their phonemic awareness and word recognition skills than those in the control group that

received only the traditional core reading program. The measures used were the Phonological Awareness Screening Test (PAST; Kilpatrick, 2016) and the Dynamic Indicators of Basic Early Literacy Skills: Oral Reading Fluency Subtest (DIBELS: ORF) (University of Oregon, 2020). In this quasi-experimental causal-comparative design, the independent variable was the HPAP intervention, and the dependent variables were the PAST and DIBELS: ORF scores. The 31 students in the control group were administered the PAST and DIBELS: ORF at the beginning and end of the 2021–2022 school year. The 31 students in the treatment group were administered the PAST and the DIBELS: ORF at the beginning and end of the 2022–2023 school year. The pretest scores are relevant to measure students' growth within one school year. These scores were used to determine if students who received HPAP demonstrated more growth in their phonemic awareness and word recognition skills than those students who did not receive supplemental instruction using HPAP. The selection criteria of both groups were based on scoring below 80% on the PAST.

A power analysis was chosen because other parameters, such as sample size and alpha, were already set. The known sample size is 62 total students and cannot be changed based on the selection criteria that were used. The significance level was set at the commonly accepted alpha .05. A medium effect size of 0.48 was calculated for the minimum known sample size of 68 (Faul et al., 2007).

### **Definitions**

Definitions of the following terms are provided to support readers' understanding of the study as a whole.

*Dynamic Indicators of Basic Early Literacy Skills: Oral Reading Fluency Subtest (DIBELS ORF)*: Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency, which measures a student's ability to read grade-level text with accuracy and fluency (University of Oregon, 2020).

*Phonemes*: The smallest units of sound in spoken language. The English language has approximately 41 phonemes (National Institute of Health, 2000).

*Phonemic awareness*: The ability to identify and manipulate phonemes in spoken words. Phonemic awareness (PA) consists of identification, isolation, blending, manipulation, segmenting, and deleting of phonemes (National Institute of Health, 2000).

*Phonics*: Letter-sound correspondence that allows students to read, spell, and see the connection between letters and sounds in order to read words (National Institute of Health, 2000).

*Phonological awareness*: An umbrella term that includes phonemic awareness skills in addition to larger spoken units of language such as syllables and rhyming words (National Institute of Health, 2000).

### **Assumptions**

Several assumptions are meaningful to this study and were believed to be true but could not be verified. The first assumption was that the Heggerty Phonemic Awareness Program was implemented with fidelity and following the procedures outlined in the program curriculum. The second assumption was that the data were collected by school staff following all informal testing procedures.

### **Limitations**

A challenge I faced was that the study was conducted within the district and school where I worked. This was addressed by not being involved in selecting the use of HPAP and data collection. Another limitation was that the planned data analysis was only able to determine significance for medium to large effect sizes.

### **Significance**

This study was significant in that it provided information about the use of HPAP as an intervention for intermediate students. It also provided an understanding about whether fourth-grade AR/SR who receive instruction with the HPAP perform significantly better than a comparison group of peers in phonemic awareness and word recognition after 1 year of instruction. This study has the potential to contribute to positive social change by supporting the HPAP as a supplement to any core reading program for providing focused instruction in phonemic awareness and word recognition skills.

### **Conclusion**

Reading achievement scores of fourth graders in the United States continue to decline. In 2022, 37% of fourth graders were reading below the basic level (National Assessment of Educational Progress Nation's Report Card, 2022). This study examined the effects of the HPAP on the phonemic awareness and word recognition skills of fourth graders. Chapter 1 described the purpose of this study, the nature of the study, and the conceptual framework on which the study was based. Chapter 2 provides the literature review to support this study, and the conceptual framework and showed the gap in the

literature as it applies to phonemic awareness instruction for intermediate readers.



## Chapter 2: Literature Review

The specific research problem that was addressed in this study was that it is not known if supplementary instruction using the HPAP contributes to improvements in phonemic awareness and word recognition skills for children identified as AR/SR. Many studies have found that students who begin their educational careers behind their classmates continue to remain behind as they progress to their intermediate school years (Sabatini et al., 2019; Scammacca et al., 2020). Basic reading skills need to be addressed with all learners in elementary school to ensure successful readers. Many programs and interventions address the basic reading skills of children and focus on phonemic awareness and word recognition skills. Several studies have shown an improvement in the phonemic awareness skills of early childhood learners (Altinkaynak, 2019; Bdeir et al., 2022; Bratsch-Hines et al., 2020; Majorano et al., 2021; Melesse & Enyew, 2020; Rachmani, 2020). But few studies have addressed the phonemic awareness and word recognition skills of intermediate learners identified as AR/SR. Therefore, this study aimed to address this gap in literature. The purpose of this study was to find whether fourth-grade students who are identified as AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. The HPAP focuses on eight phonemic awareness skills that build a student's knowledge of individual sounds in words (VanHekken & Bottari, 2020).

This chapter provides a review of the literature for the research problem and the

purpose of this study, which was to address the use of HPAP as a supplement to regular reading instruction to improve the phonemic awareness and word recognition skills of AR/SR. This chapter includes the search strategies and databases that were used to conduct the extensive literature review. Then the chapter provides the current literature that was researched to establish the research problem and the topics that were used to establish the purpose and show the gap in current research.

### **Literature Search Strategies**

The peer-reviewed articles used in this literature search were found using the Walden University Library search tools. The articles for this exhaustive literature review were current from the last 5 years. Walden University's Library provided access to articles from ERIC, SAGE Journals, Taylor and Francis Online, and Education Source. To ensure that this was a thorough literature review Google Scholar was also used to obtain the most current articles on the following topics: *phonemic awareness, at-risk and struggling intermediate readers, reading strategies, reading interventions, phonemic awareness strategies, phonemic awareness interventions, phonological awareness, early and basic reading skills, and Heggerty Phonemic Awareness.*

### **Theoretical Framework**

The theoretical framework used for this study was Watson's theory of behaviorism. Learning theory refers to the habits, reinforcements, and responses of the students that are being observed (Malone, 2014). Watson's theory focuses on the learning environment and how stimuli, modeling, repetition, and memory impact learning (Watson, 1913). The learning environment and the environment in everyday lives are

primarily social, with many interactions with objects and people (Bergmann, 1956).

Watson noted that these learning factors could be made into habits through the students' consciousness. He explained how learning takes place in human beings and how learning behaviors are influenced and created (Rilling, 2000). Watson's theory thus focuses on the importance of the learning environment its influence on learning (Bergmann, 1956; Gewirtz, 2001; Horowitz, 1992; Yarbrough, 2018) through responses from others, various stimuli, reinforcement of behaviors, and the formation of habits (Moore, 2017; Watson, 1913, 1925). The interactions between a learner and their environment were referred to by Watson as the environmental-behavior interaction process of learning behaviors (Gewirtz, 2001).

Watson built on the functionalists' movement in psychology, bringing learning to the forefront of the psychological world. Watson shifted the world of psychology from a focus on consciousness to a focus on learning behaviors and habit formation (Rilling, 2000). Habit formation occurs when an action is repeated over time, is done with meaning for a desired outcome, and is consistent in that repetition (Malone, 2014). Watson's shift in focus helped promote research on emotional responses, which are central to child development (Moore, 2017).

### **Literature Review**

This literature review is a synopsis of key information from recent studies that focused on the following topics: phonemic awareness and its role in reading achievement, phonemic awareness and the intermediate elementary student, programs and interventions for teaching phonemic awareness skills, information about the HPAP, components of

successful interventions, intermediate reading interventions, and reading strategies that have been used with at-risk and struggling readers. I present information from peer-reviewed articles to support the purpose of this study, which was to address whether address fourth-grade students who are identified as AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. I explained how the topics researched in the literature support intermediate at-risk and struggling readers. Current research evidence also showed the gap in the literature for phonemic awareness practices for intermediate students.

### **Phonemic Awareness**

Reading skills can be divided into three main categories: alphabetic, fluency, and comprehension. Phonemic awareness is under the category of alphabetic, which is considered an early literacy skill (National Institute of Health, 2000). Phonemic awareness is a skill that involves listening to the smallest part of words, the phonemes, and being able to identify and manipulate those sounds in spoken words, not written words (Heggerty, 2023). Phonemic awareness is a subset of phonological awareness, an early literacy skill where the knowledge that sounds make up word parts that make up words, which make up sentences. Phonemic awareness can be taught and is a critical component in learning to read (National Institute of Health, 2000; Skibbe et al., 2016). Phonemic awareness skills can be taught directly to students, by various school professionals, and in a variety of learning environments (Rehfield, 2022). Instruction

should include teaching children how to identify and manipulate sounds within the spoken language (Skibbe et al., 2016).

Several studies have shown that phonemic awareness skills are good predictors of future reading success (Ciesielski & Creaghead, 2020; Godoy et al., 2017; Meeks et al., 2020; Porta & Ramirez, 2020; Skibbe et al., 2016). Direct teaching of phonemic awareness skills in early childhood positively affects children's reading skills (Kjeldsen et al., 2019). A strong platform of early literacy skills, including phonemic awareness, is critical to a child's reading and spelling success in their later school years (Burns et al., 2018; McNeill, 2018). The phonemic awareness skills of young children impact their ability to learn how to read, impacting their future reading skills (Thangarajathi & Menaha, 2020). Students who struggle with early literacy skills and cannot read in first grade remain behind their peers in reading and other curriculum areas that require reading (Melesse & Enyew, 2020). Early reading skills lay the foundation for reading success in comprehension, which requires phonemic awareness, phonics, sight vocabulary, and fluency (Clemens et al., 2019). Students in kindergarten through Grade 2 who do not possess early literacy skills remain behind their peers during their intermediate elementary years and do not score within the grade level benchmark range (Foorman et al., 2017). Conversely, students who received phonemic awareness instruction during their early elementary school years scored higher on Grades 1-9 tests that measured their word reading and reading comprehension (Kjeldsen et al., 2019). Further, kindergarten students whose phonemic awareness skills improved with direct instruction scored better on reading and writing tasks in first grade than students who did not receive direct

phonemic awareness instruction (Burns et al., 2018; Justi et al., 2021). A supplemental phonemic awareness curriculum can improve preschool students' early literacy skills and resulted in fewer reading struggles in kindergarten (Goldstein et al., 2017). The phonemic awareness skills of phoneme isolation, blending, and segmenting have shown a significant relationship to the acquisition of early literacy skills (McNeill, 2018).

Explicit instruction in phonemic awareness is an important component of literacy instruction (Ciesielski & Creaghead, 2020). Wanzek et al. (2018) found that students in kindergarten through grade three made the greatest gains in their reading skills when provided interventions through explicit instruction delivered by highly trained teachers and instructional assistants. Foorman et al. (2017) found that early intervention programs are most successful when they incorporate explicit instruction in phonemic awareness and other early literacy skills. Soto et al. (2019) concluded that students' phonemic awareness skills increased the most when they received direct instruction through a phonemic awareness intervention. According to Melesse and Enyew (2020), primary students who were given direct instruction in phonemic awareness skills showed significant gains in their overall reading skills. Gesel et al. (2021) found that intervention programs that provide explicit and systematic phonemic awareness instruction are the most effective in improving early literacy skills. Also, early explicit interventions in phonemic awareness have been researched and proven to improve reading skills during the primary school years and support reading skills throughout elementary school (Bratsch-Hines et al., 2020; Melesse & Enyew, 2020; Thangarajathi & Menaha, 2020). Similarly, Rachmani (2020) found that students who were taught phonemic awareness

skills directly showed more improvements in their early literacy skills than those who were taught phonemic awareness skills indirectly through home support and a literature-rich early childhood classroom. Bdeir et al. (2022) taught students direct phonemic awareness skills using the Phonemic Awareness in Young Children: A Classroom Curriculum and concluded that the intervention program increased students' rhyming, blending, segmenting, and deletion skills as measured by their growth from baseline to post-intervention. In a study by Bratsch-Hines et al. (2020), kindergarten and first-grade students were taught using the Targeted Reading Intervention, which provides professional development to teachers on how to differentiate phonological awareness skills. Students were given small group direct instruction in phonemic awareness based on their individual needs (Bratsch-Hines et al., 2020). Bratsch-Hines et al. concluded that students who received direct phonemic awareness instruction in small groups through an intervention showed higher gains in word attack, letter-word identification, comprehension, and vocabulary skills than those who did not receive the intervention. Carson et al. (2019) provided a 10-week phonemic awareness intervention to preschool children and found that they outperformed their peers who did not receive the phonemic awareness intervention. The students scored significantly higher on post-test measures of rhyming, phoneme identification, phoneme blending, phoneme segmentation, and letter-sound knowledge (Carson et al., 2019). Melesse and Enyew (2020) found that teaching students using phonemic awareness strategies positively impacted their phonemic awareness performance, as evidenced by a significant increase in their pre-and post-test scores on phonemic awareness tests. Goldstein et al. (2017)

found that preschool children instructed using the PAtH to Literacy program scored significantly higher on phonemic awareness tests than students taught using the Story Friends intervention.

Students who are struggling readers or at risk for reading difficulties or reading disabilities need instruction in phonemic awareness during their early years in school. Kjeldsen et al. (2019) found that children who received phonemic awareness interventions in kindergarten and were found to have reading disabilities later in their school careers were at an advantage over their peers who did not have phonemic awareness interventions in elementary school. However, many students do not receive instruction in phonemic awareness at this early age. Hill et al. (2022) found that phonemic awareness instruction was only present in 1% of interventions that they observed in their study with dyslexic children in grades 2-4 and that most of the instruction targeted phonics and spelling skills. Gesel et al. (2021) stated that students who are at risk for future reading issues or disabilities require more direct teaching of phonemic awareness skills to reduce their reading risk during their intermediate school years. Children who possess early reading skills tend to show more improvements in their overall reading skills than children who do not have those early reading skills. Siegelman et al. (2022) examined what predicts a student's gains in reading ability when given a phonological intervention as measured by pretest and post-test data. Their data showed that students with reading difficulties whose pretest data showed that they had early reading skills showed greater gains in their reading skills as measured by post-test reading scores (Siegelman et al., 2022).



Teachers need knowledge about early literacy skills and how to teach phonemic awareness to students. Peltier et al. (2020) found that there is a strong relationship between special education pre-service teachers' knowledge of the NRP's five reading components and elementary students' gains in their foundational skills. Meeks et al. (2020) stressed the importance of concise teaching of early literacy skills that provide a solid reading base for students. In agreement, Rehfield et al. (2022) found that phonemic awareness instruction was effective when taught directly to students by a variety of school professionals, such as general education teachers, special education teachers, reading specialists, and paraprofessionals. Teachers need training on phonemic awareness skills and how to teach them to their young learners (Melesse & Enyew, 2020). Goldstein et al. (2017) conducted teacher ratings about a phonemic awareness intervention, and they stated that the interventions need to become part of the classroom routine and should be presented in a game format to keep children interested. Becker and Sylvan (2021) found that collaborative teaching between speech and language pathologists and preschool teachers was beneficial for students whose scores increased on phonemic awareness assessments. When teachers receive targeted feedback on their implementation of phonemic awareness interventions, it improves their teaching of the skills and also the early literacy skills of preschool students (Albritton et al., 2018). Aiken et al. (2021) found that Targeted Reading Instruction, or TRI, is effective in helping teachers learn how to differentiate their lessons to meet the needs of their struggling readers and to provide them with phonemic awareness skills, phonics skills, fluency skills, and comprehension skills. TRI provides teachers with lesson plans to be used as guides. TRI

is unique because it provides instruction on letter sounds not letter names which help teachers focus on the teaching of phonemic awareness skills (Aiken et al., 2021).

Ciesielski and Creaghead's (2020) research found that scripted phonemic awareness programs that provided teachers with detailed, sequential, and comprehensive lessons were the most successful in improving students' early literacy skills. Porta and Ramirez (2020) found that when intervention programs include scripted instructions within each lesson, teachers were more comfortable teaching phonemic awareness skills to their students.

There are many ways to teach phonemic awareness skills to young learners. Altinkaynak (2019) used interactive book-reading activities to develop kindergarten students' phonemic awareness skills. Students were exposed to books that contained repetition, rhyme, open-ended questions, and discussions about the books related to their everyday lives. Altinkaynak (2019) concluded that children who participated in the interactive book-reading activities had more developed phonemic awareness and print awareness skills than students who were read to using the traditional method. Campbell (2021) recommended the sharing of rich-literature picture books as a way to teach phonemic awareness skills to preschool students. Majorano et al. (2021) used the Talk-Program intervention that includes a school and home component to teach early literacy skills through play activities and found that students who participated in the Talk-Program scored significantly higher in their phonemic awareness skills than non-participating students. Melesse and Enyew's (2020) study focused on teaching phonemic awareness skills such as phoneme manipulation to intervention groups of first graders and

found phonemic awareness strategies used for the intervention group improved children's phonemic awareness performance on post-test measures. Boost is an explicitly taught phonemic awareness intervention that focuses on blending and segmenting phonemes in words and was found to be effective in increasing early literacy skills in students with reading disabilities (Gesel et al., 2021). Campbell (2021) found that preschool students learned phonemic awareness skills through shared reading time in their classrooms. When students are exposed to several phonemic awareness skills during intervention lessons instead of just one skill at a time, their improvements from the pretest to the post-test are significant (Porta & Ramirez, 2020).

### **Heggerty Phonemic Awareness Program**

Phonemic awareness skills are an important part of literacy instruction in both primary and intermediate classrooms. VanHekken and Bottari (2020) recommended teaching students directly using various strategies within the HPAP. HPAP is a phonemic awareness curriculum that can be used in PreK – intermediate grade classrooms. HPAP recommends the teaching of phonemic awareness skills, explicitly, in whole groups, small groups, one-to-one, and as an intervention program (Heggerty, 2023). The curriculum provides background information about the differences between phonemic awareness and phonics since this is often a misconception for teachers (VanHekken & Bottari, 2022). The program consists of 12 weeks of daily lessons that focus on syllable work and phoneme work, and it is all orally presented so that students are using their auditory skills (Heggerty, 2023). The curriculum is broken down into skill chunks that are taught explicitly and then come back around again in future lessons for review. The

scope and sequence show how each skill is extended once students have practiced. For example, blending phonemes starts in the early lessons with 3 phonemes and later extends to up to 6 phonemes. HPAP is a great warm-up before teaching phonics because it allows students to activate the part of their brain that is responsible for auditory information (VanHekken & Bottari, 2022). This is especially helpful since HPAP is all about oral language, not print. Students are asked to segment, blend, and manipulate syllables and phonemes during lessons. According to Heggerty (2023), the curriculum allows students to practice the skills throughout the school year. As the lessons progress, the curriculum introduces more advanced skills that build upon the previously learned skills. It also includes hand motions to provide students with multi-sensory techniques to help them commit the skills to memory. The Heggerty curriculum provides systematic instructions within each lesson and provides a script for teachers. Lessons are separated into eight phonemic awareness skills that are practiced and reinforced daily and are intended to take about 15 minutes to complete. The curriculum provides a lesson overview grouped into weeks. Also included in the overview are learning objectives, the focus for each phonemic awareness skill, and what to expect for those weeks. HPAP is aligned with Common Core State Standards for phonological awareness (Heggerty, 2023).

The Heggerty Phonemic Awareness Curriculum was written by Dr. Michael Heggerty in 2003 because he was concerned about the lack of reading progress (Heggerty, 2023). Dr. Heggerty taught first grade and when he assessed the students in his school, he found that they had phonological and phonemic awareness deficits.

According to VanHekken (2020), Dr. Heggerty also used information from the National Reading Panel Report to create a curriculum focused on building students' phonemic awareness skills early on in their schooling. Dr. Heggerty saw the need for schools and teachers to have something that was scripted that they could use to teach children using multiple modalities and making learning fun. Heggerty (2023) reported that Dr. Heggerty's passion for educating children motivated him to create the curriculum to provide educators with the proper tools to help give students the skills they would need to become future readers. His lessons included engaging strategies, and systematic lessons, which focused on rhyming, phoneme isolation, blending, segmenting, and manipulation (VanHekken, 2020). His lessons were intended to be used daily to provide practice and repetition of skills. According to Al-Bataineh and Sims-King (2013), the use of HPAP resulted in 89% of students maintaining or improving their phonemic awareness skills as measured by pretest and post-test gains. These students also showed improvements in their MAP test scores within their basic literacy skills (Al-Bataineh & Sims-King, 2013).

VanHekken and Bottari (2022) stressed that HPAP was created to be used during whole-group instruction to provide students with a foundation in early literacy skills. They also recommended that HPAP be used with students in intermediate elementary grades who have reading deficits or are AR/SR. Often students who are AR/SR have difficulties with their phonemic awareness skills, and since HPAP is presented auditorily, it is often very effective in improving the skills of students within this population (VanHekken & Bottari, 2022). HPAP provides teachers with additional support through QR codes with additional resources and videos, links to hand motion videos, explicit

teacher directions, skill activity examples, and scaffolded suggestions to meet a variety of learner needs. VanHekken and Bottari (2022) also stressed the importance of teaching phonemic awareness skills to whole groups, small groups, as an intervention, and even one-to-one to meet the needs of all types of learners. HPAP can be used any way it is needed to help students obtain phonemic awareness skills. Foorman et al. (2017) found that phonemic awareness programs that are used as a stand-alone intervention led to improvements in the word reading and phonemic awareness skills of early childhood students.

### **Components of Successful Interventions**

Successful interventions contain many common components that lead to student achievement gains in reading skills. Henry (2020) found that interventions that are provided with consistency are most successful for struggling readers. Interventions should allow for flexibility to meet student needs (Clemens et al., 2019). This includes measuring student needs during pretest measures to determine which skills need to be taught or remediated. Kent et al. (2017) examined reading instruction that was provided to fourth graders to find which components made it successful. They found that students who received additional reading instruction as an intervention showed higher gains in reading fluency than those who did not receive the interventions (Kent et al., 2017). The amount of time and intensity of an intervention has been shown to impact achievement gains. Vaughn et al. (2019) suggested that students who receive, on average, about forty-four hours of an intervention show gains in their reading skills. Donegan et al. (2020) found that students who received a more intensive intervention showed greater gains in

their word reading, fluency, and comprehension skills than those who received a less intensive intervention. They also found that students who received longer intervention sessions and smaller groups outscored the control group in word reading (Donegan et al., 2020). Similarly, Van Norman et al. (2020) indicated that a student's time in an intervention is an important factor to consider. They suggested that students who receive an intervention for a short time and then exit do not maintain their skills as measured by post-testing as students who received that same intervention for a longer period of time (Van Norman et al., 2020). Kent et al. (2017) suggested that interventions should focus on specific student needs, such as basic reading skills, comprehension, and vocabulary. Wanzek et al. (2019) found that interventions that contain many reading skills should be broken down into specific lesson skills such as phonics, vocabulary, and comprehension. These lessons focus on specific reading skills that are directly taught and then practiced. Lessons in the Passport intervention program have dedicated time for each reading skill being addressed (Wanzek et al., 2019). This allows for specific skills to be taught to meet students' specific reading needs (Wanzek et al., 2019). Clemens et al. (2019) also suggested the use of tailored intervention programs to meet student needs. Successful interventions provide targeted skills for students and allow for flexible groupings. Many interventions are multicomponent to address many reading skill deficits. Clemens et al. (2019) found that the most successful interventions allow teachers to individualize the skill set so that students' individual weaknesses can be addressed through alignment, direct teaching, guided practice, and in-text practice. Similarly, Vaughn et al. (2019) found that interventions that focused on specific skills, such as sight vocabulary within

curriculum-based texts, effectively improved students' skills in the specified area.

Donegan et al. (2020) found that interventions that provided intensive work on foundational skills, such as word reading were most successful for at-risk or disabled students. In contrast, Daniel et al. (2021) found that interventions that provided multiple reading skills were successful at improving reading skills post-intervention and at as much as six weeks post-intervention. Saqui et al. (2019) examined the perceptions of fourth and fifth-grade students who received a multisyllabic word reading intervention using curriculum-based science texts. The students indicated that they found the intervention using science texts more interesting and engaging (Saqui et al., 2019). This study indicated that student perceptions are an important component of the success of an intervention. In addition, Henry (2020) found that students benefited from interventions that were engaging. Successful interventions provide explicit teaching of word attack skills for multisyllabic words with modeling, practice, and feedback (Vaughn et al., 2019). Henry (2020) found that successful phonics interventions provide multi-sensory learning strategies.

Wanzek et al. (2021) added a mindset intervention to a reading intervention to examine if students increased their reading achievement and found that the mindset intervention did not show a statistically significant increase in reading achievement scores (Wanzek et al., 2021). A reading intervention focused on phonological awareness, phonics instruction, and text reading increased students' phonological skills. Wanzek et al. (2021) also concluded that explicit instruction and systematic instruction are successful components of interventions. Similarly, Toste et al. (2019) examined the



impact of a multisyllabic word reading intervention with a motivation component to determine if fourth and fifth grade struggling readers' reading skills would improve after this intervention. Data showed that students who participated in the intervention outperformed their peers who did not receive the intervention in the areas of multisyllabic word reading, spelling, and comprehension (Toste et al., 2019).

Several studies address the effects of reading interventions immediately after they have been implemented. However, Daniel et al. (2021) wanted to examine the effects of reading interventions for struggling intermediate readers immediately and several times post-intervention to see if students maintain their gains. The synthesis of studies found that reading interventions successfully improve reading comprehension immediately after an intervention and at several other times (Daniel et al., 2021). Daniel et al. (2021) found that the gains from reading interventions were present at three weeks and six weeks post-intervention. The studied reading interventions focused on several reading skills, including comprehension, vocabulary, and word reading development. Daniel et al. (2021) stressed the importance of collecting follow-up data to determine the effectiveness of the intervention on students' reading development and the persistence of reading difficulties. Similarly, (Wanzek et al., 2019) also examined the retention of skills gained following a reading intervention. Students in this study were fourth graders with reading difficulties who were given a reading intervention and were tested immediately after the intervention and again when they were fifth graders. Students made gains in their reading comprehension skills immediately after the intervention and maintained those skills into the fall of fifth grade after a summer break (Wanzek et al., 2019). Van Norman et al.

(2020) recommended measuring student reading skills well after exiting an intervention program to determine the long-term impacts of the intervention.

### **Intermediate Students**

National reading data showed that 37% of fourth-grade students read below the basic level and do not meet grade-level benchmarks (NAEP, 2022). Phonemic awareness and word reading are skills that are important when learning how to read, and these early reading skills impact reading comprehension skills. Daniel et al. (2022) found that word reading significantly impacted student performance on reading comprehension assessments. Also, Toste et al. (2019) study results showed the importance of teaching multisyllabic word reading to intermediate struggling readers since word reading skills are necessary for reading comprehension success. Henry (2020) examined the impact of a multi-sensory phonics intervention on fifth and sixth-grade students' decoding skills and reading accuracy. She found that students who participated in the intervention made significant gains in their word reading skills following the intervention (Henry, 2020).

Many studies that involve intermediate students are focused on reading achievement as measured by students' reading comprehension skills. Kent et al. (2017) examined the instruction provided to struggling fourth-grade readers in 22 classrooms and found that comprehension and vocabulary were the main skills being taught. Preast et al. (2019) examined a class-wide partner reading intervention with fourth and fifth-grade students in an urban elementary school and the interventions' impact on reading comprehension. Partner reading interventions were shown to improve the student's overall science reading comprehension skills (Preast et al., 2019). Goodwin et al. (2021)

examined the use of talk in fourth and fifth-grade classrooms to improve student reading achievement scores. The talk that was included in this study was teacher explanations, teacher questions, encouragement of student talking, and class discussions of the main ideas. Deliberate talking that included teacher explanations, teacher questioning, and student talking within the language arts classroom was shown to improve reading achievement in the area of comprehension (Goodwin et al., 2021). Ahmed et al. (2022) conducted a study to examine the reading comprehension skills of intermediate elementary students and found that interventions that focused on background knowledge and inferencing impacted reading comprehension skills when the instruction was provided explicitly. Vaughn et al. (2022) conducted a 2-year study to examine the impact of a reading intervention on the reading comprehension skills of third and fourth-grade students. Students who were given the intervention showed significant improvement in their reading comprehension skills when compared to students who did not receive the intervention as measured by increases from pretest to post-test standardized tests (Vaughn et al., 2022). Stevens et al. (2020) compared the effects of an aligned and nonaligned vocabulary and comprehension intervention on the reading skills of fourth-grade struggling readers and found that students in the aligned intervention performed better than their peers who participated in the nonaligned intervention. These findings show the importance of using aligned interventions for the skills that need remediation. Clemens et al. (2019) investigated whether a multicomponent reading intervention would moderate the effects on the reading comprehension skills of sixth, seventh, and eighth-grade students. They found that students whose pretest skills in the areas of word

identification and vocabulary did not moderate the effect of the intervention in comprehension (Clemens et al., 2019). They also found that students whose pretest skills in the area of oral reading fluency did moderate the effect of the intervention in comprehension.

### **At-Risk and Struggling Readers**

Concern about at-risk and struggling readers was not a new research concept. Many studies have been conducted to examine ways to help at-risk or struggling readers improve their reading skills. Siegelman et al. (2022) examined what predicts a student's gains in reading ability when given a phonological intervention as measured by pretest and post-test data. Their data showed that students with reading difficulties whose pretest data showed that they had early reading skills showed greater gains in their reading skills as measured by post-test reading scores (Siegelman et al., 2022). Pretest data are important when examining if an intervention was successful or not. Students who have a higher pretest score on word reading tests score higher on their post-test comprehension measures than students whose pretest scores were lower on their word reading tests (Daniel et al., 2022). According to Schmidt et al. (2021), intermediate students who are at-risk or struggling readers have deficits in phonemic awareness skills. They concluded that these students continue to have deficits in their phonemic awareness skills throughout their elementary school year (Schmidt et al., 2021). The deficits were found to be the worst in the areas of phoneme manipulation. Wanzek et al. (2018) conducted a study with struggling readers in grades kindergarten through third and found that students in the intensive early intervention groups made significant gains in their reading scores

on standardized tests. When providing reading interventions to struggling readers, the intervention being used, the intervention group size and the time of the intervention are factors that need to be considered. Wanzek et al. (2021) found that intermediate struggling readers need skill-based and intensive interventions to improve their overall reading achievement scores. Interventions for at-risk or students with disabilities need to be more intense and need to focus on specific skill deficits to improve the foundational reading skills of intermediate students (Donegan et al., 2020). Hill et al. (2022) examined The Multi-sensory Teaching Approach and the Reading RULES! Program and found that these two programs both provided explicit and systematic instruction using multi-sensory techniques to address decoding and encoding. Struggling readers who were provided interventions that were not intensive did not show improvements in their reading skills (Wanzek et al., 2018). Filderman and Toste (2022) examined the impact of a multisyllabic word reading intervention on fourth and fifth graders' reading skills. They found that students who were provided the multisyllabic word reading intervention with individualized components based on their needs showed improvement in their word reading and decoding skills (Filderman & Toste, 2022). Saqui et al. (2019) examined the impact of a multisyllabic word reading intervention using science texts to determine if students using curriculum-based materials would show improvement in their overall multisyllabic word reading skills. They found that students showed gains in their word reading and fluency skills on science texts and gains in fluency skills on other grade-level passages (Saqui et al., 2019). Vaughn et al. (2019) conducted a study to determine the efficacy of a word- and text-based reading intervention that focused on word reading,

fluency, and comprehension skills of students with reading difficulties. They found that students in the intervention group made statistically significant gains in their word reading and fluency skills than students who did not receive the intervention (Vaughn et al., 2019).

### **Summary and Conclusions**

In summary, the literature review yielded information about phonemic awareness and its role in reading achievement, programs, and interventions for teaching phonemic awareness skills, information about the Heggerty Phonemic Awareness Program, components of successful interventions, intermediate reading interventions, and reading strategies that have been used with at-risk and struggling readers. These major themes that emerged from the literature review showed that phonemic awareness is an important skill for reading success. There are many components that make interventions successful for students. Many studies have shown the importance of providing interventions to at-risk and struggling students. Most studies examining intermediate students' reading skills focus on reading comprehension. Little was known about the use of strategies or programs for teaching phonemic awareness as part of any core reading program for intermediate students who have been identified as AR/SR (Birgisdottir et al., 2020). This present study found whether fourth-grade students who are identified AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received regular core traditional instruction but received no supplementary instruction in phonemic awareness. This study filled a gap in research for incorporating phonemic

awareness strategies for children beyond emergent and early reading development stages and demonstrating difficulties with word recognition skills stemming from problems with phonemic awareness.

### Chapter 3: Research Method

The purpose of this quantitative quasi-experimental causal-comparative study was to use archival data to find whether fourth-grade students who are identified AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. In Chapter 3, I present the methodology for this study by stating the variables of the study, identifying the research design and how it connects with the research questions, describing the research design, and the rationale for the research methodology. The population used for the study is described as well as the power analysis to determine the sample size. The HPAP that was used as the intervention in this study is described in detail. Procedures for gaining access to the archival data are included. The data analysis plan is explained in detail for this study. Chapter 3 also includes threats to validity. Lastly, I also include the ethical procedures that were used in this study. A summary of design and methodology concludes Chapter 3.

#### **Research Design and Rationale**

In this section the research design and how it is connected to the research questions is presented. Time and resource constraints with this research design choice are also explained. Other methods of consideration are also discussed as well as the rationale for choosing this research design and the intervention.



## **Research Questions and Hypotheses**

RQ 1: What is the difference in the overall phonemic awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk/struggling readers who did and did not receive supplementary instruction with Heggerty Phonemic Awareness Program while controlling for their pre-intervention Phonological Awareness Screening Test score?

*H<sub>01</sub>*: There is no statistically significant difference in phonological awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Phonological Awareness Screening Test scores.

*H<sub>A1</sub>*: There is a statistically significant difference in phonological awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Phonological Awareness Screening Test scores.

RQ 2: What is the difference in the overall word recognition skills as measured by the Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency between

fourth-grade students identified as at-risk/struggling readers who did and did not receive supplementary instruction with Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores?

*H<sub>0</sub>2*: There is no statistically significant difference in the word recognition skills as measured by Dynamic Indicators of Beginning Early Literacy Skills Oral Reading Fluency between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores.

*H<sub>A</sub>2*: There is a statistically significant difference in the word recognition skills as measured by Dynamic Indicators of Beginning Early Literacy Skills Oral Reading Fluency between fourth-grade students identified as at-risk or struggling readers who received supplementary instruction with the Heggerty Phonemic Awareness Program and those who did not receive supplementary instruction with the Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores.

### **Research Design**

The purpose of this quantitative quasi-experimental causal-comparative study was to use archival data to find whether fourth-grade students who are identified AR/SR will show improvement in phonemic awareness and word recognition skills when taught with

the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. The instruction for the control group involved traditional reading instruction with a core reading program during the 2021–2022 school year, and the instruction for the treatment group involved the same regular reading instruction with the addition of the supplementary HPAP during the 2022–2023 school year. During the 2021–2022 school year, fourth-grade students did not receive the HPAP because it was not yet implemented at the school. Students in the 2022–2023 school year received HPAP based on their scores of below 80% on the Phonological Awareness Screening Test (Kilpatrick, 2016).

Watson’s Theory of Behaviorism was the lens used to view the HPAP and the student achievement scores. I had planned to use ANCOVA to compare the post-intervention scores with the pre-intervention scores being used as the covariate. This test would account for any variability from the level the students enter the school year. To ensure that the preliminary data were clean and proper, the data records were reviewed several times to make sure that no data was missing. All assumptions of the ANVOCA test were checked to ensure that the data could be run, and the results could be interpreted. The assumptions were not met for the ANOVA, so the Shapiro-Wilks test was used to analyze the normality of each group. If the analysis reveals that the data are not normally distributed, then Mann-Whitney U or Kruskal-Wallis Tests are the recommended test to use. The skewness and Kurtosis were calculated.

### **Design Choice and Rationale**

For this study, I considered a qualitative design. Qualitative studies are used to gather insights into the experiences and perceptions of participants (Tenny et al., 2022). However, this study used pre-and post-test scores to determine if supplementary instruction using the HPAP program will improve phonemic awareness and word recognition skills of fourth-grade students. Therefore, a qualitative study would not be appropriate. An ANOVA was also considered for the data analysis since the differences among means for multiple groups were examined. Since this study has pre-test scores, an ANCOVA was the more appropriate data analysis since the pre-test scores were used as the covariate.

A quantitative research design was chosen because it is consistent with examining the effects of an intervention. It is used when investigating the relationship between independent and dependent variables after an action, such as an intervention, has already occurred (Brewer & Kuhn, 2010). The current study addresses a gap in knowledge of the use of the HPAP with intermediate students as an intervention and the program's effect on the phonemic awareness and word recognition skills of intermediate students. A quasi-experimental design is used when there is a set group of participants, and the researcher does not assign the group of participants (Burkholder et al., 2020; Vogt, 2007). Instead, the participants are part of a preexisting group, such as a classroom or group of at-risk students. In this study, a set criterion was used for the participants to receive HPAP.

### **Time and Resource Constraints**

This study had no anticipated time constraints since archival data was used for the

2021-2022 and the 2022-2023 school years when analyzing phonemic awareness and word recognition pre- and post-intervention scores with and without the use of HPAP. Data was used from one suburban school in the Mid-Atlantic United States. The school used the PAST and DIBELS to assess all fourth-grade students twice a year: once in the fall and once in the spring. The instruction for the control group involved regular reading instruction with a core reading program during the 2021-2022 school year, and the instruction for the treatment group involved the same regular reading instruction with the addition of the supplementary HPAP during the 2022-2023 school year. During the 2021-2022 school year, fourth-grade students did not receive the HPAP because it was not yet implemented at the school. Students in the 2022-2023 school year received HPAP based on their scores of below 80% on the Phonological Awareness Screening Test.

### **Intervention Rationale**

The intervention chosen for this study was The Heggerty Phonemic Awareness Program. HPAP is a phonemic awareness curriculum that is used with PreK – intermediate students. HPAP explicitly teaches phonological awareness skills using multi-sensory techniques (Heggerty, 2023). HPAP provides a curriculum consisting of twelve weeks of daily lessons focusing on orally presented and practiced syllables and phonemes (VanHekken and Bottari, 2022). HPAP curriculum allows students to practice phonological awareness skills throughout the year since the scope and sequence provide basic skills and move on to more complex ones (Heggerty, 2023). HPAP is aligned with Common Core State Standards for phonological awareness skills. This program was chosen for this suburban school because fourth-grade students did not meet grade-level

standards in word reading and phonological awareness skills.

### **Methodology**

This section gives the population, criteria, and power analysis used for this study. The procedures for gaining access to the archival data was also shared. This section also explained the instrumentation and operationalization of constructs.

### **Population**

The population for this study consisted of 31 fourth-grade students in the control group and 31 fourth-grade students in the treatment group. Students in the control group were administered the PAST and DIBELS ORF two times during the 2021-2022 school year. Students in the treatment group were administered the PAST and DIBELS ORF two times during the 2022-2023 school year. The two assessments were administered as part of the school's normal data collection procedures. The criteria for inclusion in this study were students whose scores on the PAST were below 80%. Thus, the known sample size is 62 total students and cannot be changed based on the selection criteria that were used. A power analysis was chosen because other parameters, such as sample size and alpha were already set. The significance level is set at the commonly accepted alpha .05. A medium effect size of 0.48 was calculated for the minimum known sample size of 68 (Faul et al., 2007). G\*Power statistical software was used to calculate this sample effect size. Effect sizes are reported using small, medium, and large descriptors. Vogt (2007) suggested that researchers report statistical significance, effect size, and confidence intervals.

**Access to Archival Data**

Archival data was used for the 2021-2022 and 2022-2023 school year. This data was made available from the individual schools with permission from the IRB of the school system. This approval was given once the IRB at Walden University approved my proposed study. The individual school used PAST data as part of their school-wide data collection to monitor student progress in grades PreK- 4. The individual school used DIBELS ORF data as part of their school-wide data collection to monitor student progress in grades K-5. These data points were part of the school's progress plan. The data were used to create Tier intervention groups within the school. The data were de-identified by the school system's IRB and password protected access was given.

**Instrumentation and Operationalization of Constructs**

For this study, an Analysis of Covariance (ANCOVA) was planned to analyze the fourth graders achievement data on the Phonological Awareness Screening Test (PAST) (Kilpatrick, 2019) and the Dynamic Indicators of Basic Early Literacy Skills: Oral Reading Fluency Subtest (DIBELS ORF), (DIBELS, 2020). These assessments were used to analyze data to answer research questions.

The PAST can be used to evaluate a student's phonological awareness skills in the areas of syllables, onset-rime, basic phonemes, and advanced phonemes (Kilpatrick, 2019). The PAST can be administered several times a year to track student progress. The assessment is administered individually to students with feedback being provided throughout the administration. Kilpatrick (2016) recommended that administrators review the directions and proper pronunciation of sounds before administering the assessment.

Scores are reported as automatic based on the time the student responds to each given item however, scores are also reported as correct even if not automatic (Kilpatrick, 2016). The total scores for each section are reported, and scores of 80% or better are considered as passing (Kilpatrick, 2016). Kilpatrick (2016) stated that the PAST is not a normed test. The PAST is used to determine if phonological awareness is a concern for the student. The PAST is typically used with students from PreK to grade 5.

DIBELS: ORF is used to measure the acquisition of basic early literacy skills in kindergarten through eighth-grade children. According to the University of Oregon (2023), DIBELS is a reliable and valid measure of early literacy development and provides data that can be used to evaluate student achievement toward reading objectives. DIBELS subtests are compatible with Common Core State Standards in reading and are a reliable predictor of student reading proficiency (University of Oregon, 2023). The Oral Reading Fluency (ORF) subtest measures word attack skills in phonics and sight vocabulary as well as reading accuracy and fluency (University of Oregon, 2023). Students read a passage at their grade level for one minute and errors are counted. Each grade level has a benchmark for the fall, winter, and spring that students are expected to achieve determining whether they need any additional services to improve their reading skills (University of Oregon, 2023).

### **Data Analysis Plan**

In this section, a detailed data analysis plan was presented. This plan included the software used for the analysis, an explanation of the data procedures, and the research questions with hypotheses. Suggested statistical tests that might be used to test the



hypotheses and the procedures were explained. Alternative testing measures were identified if test assumptions are not met. Finally, the rationale for the covariates and how the results were interpreted were presented in this section.

An ANCOVA was planned to examine the influence of the HPAP on DIBELS ORF and PAST with the pre-intervention scores as the covariate factor. Statistical Package for Social Sciences (SPSS) software will be used to analyze and interpret data. Since the data was not normally distributed and the ANCOVA assumptions were not met, therefore, the Kruskal-Wallis Test was used to analyze the data. The data were prepared for analysis by creating a data file spreadsheet with pre-intervention and post-intervention scores of the fourth-grade students from the 2021-2022 school year and the 2022-2023 school year for PAST scores and another spreadsheet for DIBELS scores. According to Burkholder et al. (2020), it is important to clean the data to ensure that no mistakes are made when creating the data spreadsheets. This can be done by carefully checking the data for mistakes or missing data. It is also possible to identify any data errors by looking at the descriptive statistics (Burkholder et al., 2020). The plan was to use one ANCOVA to find the difference in the means of the dependent variable, PAST scores, with the pre-intervention scores as the covariate; and a second ANCOVA to find the difference in the means of the dependent variable, DIBELS ORF scores, with the pre-intervention scores as the covariate. Since the assumptions were not met for a parametric test, a non-parametric test was performed. The Shapiro-Wilks test was used to analyze the normality of each group. This analysis revealed that the data were not normally distributed, so the Kruskal-Wallis Tests were utilized for the data analysis. The skewness and Kurtosis were

also calculated.

### **Threats to Validity**

Validity is the accuracy of the study and the ability to replicate it (Vogt, 2007). Similarly, Burkholder et al. (2020) described validity as the truth in the research and the findings as they connect to the study's research question. External validity is an important factor in research studies as it allows other researchers to assume that the study results will be true in other contexts (Burkholder et al., 2020). Burkholder et al. (2020) presented the following threats: interactions of the observed causal relationships, treatment variations, types of outcome measures, treatment settings, and context-dependent mediation. These threats to external validity can impact a study but can be addressed. When considering threats to external validity, it is important to consider how study findings can be generalized to other settings. It should be noted that all fourth-grade classes were in the same school, which addresses the treatment setting. Study assumptions for this study addressed the possibility of treatment variations. It was assumed that the Heggerty Phonemic Awareness Program was implemented with fidelity and following the procedures outlined in the program curriculum. These parameters were set by the school administration. To address context-dependent mediation, the fourth-grade teachers were given on-going professional development throughout the 2022-2023 school year to make sure they were implementing the HPAP with fidelity.

Internal validity refers to the relationship between the study's findings and the research question being asked (Vogt, 2007). Burkholder et al. (2020) compared internal validity to a causal inference when a researcher looks at whether an independent variable

will impact a dependent variable. According to Burkholder et al. (2020), threats to internal validity can be addressed by having a quasi-experimental research design that provides a comparison group who did not receive the intervention being studied. In this study, a control group did not receive intervention. The control group consisted of 31 fourth-grade students from the 2021-2022 school year who were not given the HPAP intervention because the school had not yet implemented the program. The treatment group consisted of 31 fourth-grade students who did receive HPAP in the 2022-2023 school year. To address the threat of group selection, the participants in this study were selected based on criteria that they scored below 80% on the PAST in the fall of the school year.

Construct validity refers to how well a test measures what it is intended to measure (Vogt, 2007). According to Burkholder et al. (2020), a researcher must be sure of two main things when using pre and postintervention scores. First, they must ensure that the intervention being used measures what it is intended to measure. In this study, the HPAP program was used. HPAP is a program used to improve literacy scores and phonemic awareness skills. The second thing that Burkholder et al. (2020) stated was to ensure that the test being used measures what is being studied. In this study, phonemic awareness was assessed using the PAST which is a test that measures phonological awareness skills. This study also used DIBELS ORF to measure word reading skills. These assessments were specifically used because they measure what was being studied, phonemic awareness and word recognition skills. According to Burkholder et al. (2020), in order for results to be valid and reliable, the intervention and measurements must do

what they are intended to do.

### **Ethical Procedures**

To maintain ethical procedures for this study, no actions were taken until the IRB approved the proposal at Walden and the IRB of the school district where the archival data will be obtained. Since archival data was used, no participants were contacted. The school chose student participants for this study based on their criteria for participation in the HPAP, which was a score of 80% or lower on the PAST in the fall of the fourth-grade school year. Student participants were given numbers so they cannot be identified. The IRB application was included once this proposal had been reviewed and approved. Then the proposal was sent to the school system's IRB for review and approval. These documents were included in the IRB application.

### **Summary**

To summarize, the research design for this study was a quasi-experimental, causal-comparative design using the Kruskal-Wallis Test to examine the influence of the HPAP on DIBELS ORF and PAST with the pre-intervention scores as the covariate factor. In this study, the independent variable was the HPAP, and the dependent variables were the PAST and the DIBELS ORF scores. This study used archival data for the control group of fourth graders from the 2021-2022 school year and for the treatment group of fourth graders from the 2022-2023 school year.

Chapter 4 reviewed the purpose of the study, research questions, and hypotheses. Chapter 4 described the data collection procedures. Data were reported, and the results of the study were explained in detail.

## Chapter 4: Results

The purpose of this quantitative quasi-experimental causal-comparative study was to use archival data to find whether fourth-grade students who are identified AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. The following research questions guided this quantitative quasi-experimental causal-comparative study:

- RQ 1: What is the difference in the overall phonemic awareness skills as measured by the Phonological Awareness Screening Test between fourth-grade students identified as at-risk/struggling readers who did and did not receive supplementary instruction with Heggerty Phonemic Awareness Program while controlling for their pre-intervention Phonological Awareness Screening Test score?
- RQ 2: What is the difference in the overall word recognition skills as measured by the Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency between fourth-grade students identified as at-risk/struggling readers who did and did not receive supplementary instruction with Heggerty Phonemic Awareness Program while controlling for their pre-intervention Dynamic Indicators of Basic Early Reading Skills Oral Reading Fluency scores?

### **Data Collection**

Based on the archival data received, there are 31 students in the control group and 31 students in the treatment group, as were proposed in Chapter 3. There were no other discrepancies in the data collection from the plan presented in Chapter 3. Potential threats to external validity included treatment variations. No information about instruction for teachers were verified or provided with archival data. There was no information given if fidelity checks were done during the implementation of the HPAP. Therefore, it was not possible to confirm that the HPAP was implemented with fidelity and the results may reflect this variation in intervention implementation.

### **Data Analysis**

Data analysis involved several steps. First, I ran tests to determine if the ANCOVA assumptions were met. A Shapiro-Wilk Tests of Normality was conducted, which checks the normality of each group in the study data and if the data are not normal then a parametric test, such as ANCOVA cannot be used and instead a non-parametric test will be used such as the Kruskal Wallis. The Shapiro-Wilkes test is used to determine if the data follow a normal distribution (Aslam, 2021). It is most commonly used when using multivariate statistical analysis and when data were collected using a random grouping (Gonzalez-Estrada & Villasenor, 2022). The analysis showed that Fall PAST for the treatment group  $p = .522$ ; Spring ORF for the control  $p = .103$  and treatment group  $p = .690$ , and those were normally distributed with statistical significance above the set alpha of .05. The other data are not normally distributed with significance below the set alpha of .05; Fall ORF for the control group  $p = .002$ , Fall ORF for the treatment

group  $p = .025$ ; Fall PAST for the control group  $p = .004$ ; Spring PAST for the control group  $p = .027$ ; and Spring PAST for the treatment group  $p < .001$ .

**Table 2**

*Tests of Normality Shapiro-Wilkes*

|             | Group     | p     |
|-------------|-----------|-------|
| Fall ORF    | Control   | .002  |
| Fall ORF    | Treatment | .025  |
| Fall PAST   | Control   | .004  |
| Fall PAST   | Treatment | .522  |
| Spring ORF  | Control   | .103  |
| Spring ORF  | Treatment | .690  |
| Spring PAST | Control   | .027  |
| Spring PAST | Treatment | <.001 |

Next, I looked at the Skewness and Kurtosis of the data. Statistical summaries are used to look at the distribution of the data; if the data are on a normal curve, then they are not skewed and would have a skewness of zero (Vogt, 2007). If there is a positive skewness then the distribution of the data is skewed to the right, and if there is a negative skewness then the distribution of the data is skewed to the left (Vogt, 2007). Kurtosis shows how flat or peaked the distribution of data is; a kurtosis of zero indicates a normal curve (Vogt, 2007). Fall PAST data were symmetric with a skewness of  $-.488$ ; Spring PAST data were highly skewed with a skewness of  $-1.612$ ; Fall ORF data were moderately skewed with a skewness of  $.875$ ; and Spring ORF data were moderately skewed with a skewness of  $.846$  (see Table 3). This is problematic when using a parametric test such as an ANCOVA because the data are not normal.

**Table 3***Skewness and Kurtosis of Distributions*

|            | Skewness | Kurtosis |
|------------|----------|----------|
| Fall ORF   | .875     | -.323    |
| Spring ORF | .846     | .454     |
| Fall PAST  | -.488    | -1.056   |
| Fall PAST  | -1.612   | 1.825    |

The ANCOVA is a parametric test with assumptions that need to be met in order for the data to be clean and proper. The Shapiro-Wilk Test of Normality and the Skewness and Kurtosis tests indicate that the assumptions have not been met to use a parametric test. Therefore, it is necessary to use a non-parametric test. I chose the Kruskal-Wallis Test because it is a non-parametric test that is used to determine if there are statistically significant differences between two or more groups (Vogt, 2007).

### **Results**

Archival data were used for this study. All 62 students were fourth graders. There were 31 students in the control group and 31 in the treatment group. The Kruskal-Wallis Test was used to analyze the data. This test is used to determine if there are statistically significant differences between two groups of an independent variable on a continuous dependent variable. In this study the independent variable was the HPAP, and the dependent variables were the PAST and DIBELS ORF scores. I analyzed the data for each test to determine if there were differences between the fall scores for both the control and treatment groups and the spring scores for both the control and treatment groups. Table 4 shows the Kruskal Wallis test results.



**Table 4***Kruskal Wallis Test*

|                 | <i>p</i> |
|-----------------|----------|
| Fall ORF        | .725     |
| Spring ORF      | .030     |
| ORF difference  | <.001    |
| Fall PAST       | <.001    |
| Spring PAST     | .197     |
| PAST difference | <.001    |

RQ 1 addressed the differences in reading achievement as measured by the PAST between fourth-grade students who received HPAP during the 2022–2023 school year compared to fourth-grade students who did not receive HPAP during the 2021–2022 school year while controlling for the pre-intervention PAST scores. The Kruskal Wallis Test results for the difference between the Fall PAST scores and the Spring PAST scores between the control group and treatment group were  $p < .001$ . Since  $p$  is less than .05, the null hypothesis is rejected, meaning there was a statistically significant difference between the PAST scores of fourth-grade students who received HPAP during the 2022–2023 school year compared to fourth-grade students who did not receive HPAP during the 2021–2022 school year.

RQ 2 addressed the differences in reading achievement as measured by the DIBELS ORF between fourth-grade students who received HPAP during the 2022–2023 school year compared to fourth-grade students who did not receive HPAP during the 2021–2022 school year while controlling for the pre-intervention DIBELS ORF scores. The Kruskal Wallis Test results for the difference between the Fall ORF scores and the Spring ORF scores between the control group and treatment group were  $p < .001$ . Since  $p$

is less than the set .05, the null hypothesis is rejected, meaning there was a statistically significant difference between the ORF scores of fourth-grade students who received HPAP during the 2022–2023 school year compared to fourth-grade students who did not receive HPAP during the 2021–2022 school year.

Descriptive statistics were used to calculate the means for both the control group and treatment group for Fall ORF, Spring ORF, Fall PAST and Spring PAST. Data showed that the fall scores for the control group were higher than the treatment group (see Table 5). The data also showed that the treatment group’s gains were higher than the control group when looking at their word recognition skills. Finally, the treatment group’s gains were higher than the control group’s when looking at their phonemic awareness skills.

**Table 5**

*Descriptive Statistics*

| Test        | Group     | Mean  | Standard Deviation |
|-------------|-----------|-------|--------------------|
| Fall ORF    | Control   | 47.23 | 33.184             |
| Fall ORF    | Treatment | 41.68 | 26.280             |
| Fall PAST   | Control   | 62.10 | 15.254             |
| Fall PAST   | treatment | 47.00 | 17.224             |
| Spring ORF  | control   | 66.23 | 36.975             |
| Spring ORF  | treatment | 88.94 | 46.401             |
| Spring PAST | control   | 68.97 | 17.350             |
| Spring PAST | treatment | 73.16 | 21.149             |

### Summary

In this chapter, I summarized the results of the data for the control group of 2021–2022 fourth graders and the treatment group of 2022–2023 fourth graders. Results of this study indicate that there was a statistically significant difference in the oral reading

fluency and phonemic awareness skills between the control group and treatment group. The Kruskal Wallis Test results for the difference between the Fall PAST scores and the Spring PAST scores between the control group and treatment group were  $p < .001$ . Both the control group and treatment group increased their oral reading skills as measured by their DIBELS ORF score increases from the fall to the spring and phonemic awareness skills as measured by their PAST score increases from the fall to the spring. The treatment group who received supplementary instruction using the HPAP made higher gains in their word recognition skills and their phonemic awareness than the control group who did not receive supplementary instruction using the Heggerty Phonemic Awareness Program. In Chapter 5, I interpret the findings, describe study limitations, offer recommendations for future research, and present implications for positive social change.

## Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative quasi-experimental causal-comparative study was to use archival data to find whether fourth-grade students who are identified AR/SR will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received regular core reading instruction but received no supplementary instruction in phonemic awareness. This study is significant because reading achievement scores of fourth graders in the United States are declining. According to the National Assessment of Educational Progress Nation's Report Card (2022), in 2017 32% of fourth-grade students scored below the basic level and in 2022 37% of students scored below the basic level. Researchers have found that students who receive instruction in phonemic awareness at an early age have shown improvements in their overall basic reading skills (Bdeir et al., 2022; Bratsch-Hines et al., 2020; Majorano et al., 2021; Melesse & Enyew, 2020). However, few studies have investigated the impact of phonemic awareness instruction with intermediate learners. Intermediate students who are at-risk for reading concerns have deficits in their phonemic awareness skills and if they are not provided with instruction in that area, which continue to have deficits in their phonemic awareness and reading skills (Schmidt et al., 2021). This study addresses this gap in literature.

### **Interpretation of Findings**

This study showed that phonemic awareness instruction can be taught to older students through a supplemental program and improve their word recognition skills and their phonemic awareness skills. The fourth graders in this study's treatment group were

directly taught phonemic awareness skills using the HPAP as a supplement to their regular core reading instruction. The findings of this study were that fourth graders who were directly taught phonemic awareness skills showed higher gains in their word recognition skills and phonemic awareness skills than fourth graders who did not receive the direct teaching. These results aligned with research presented in Chapter 2 about the importance of explicit teaching of phonemic awareness skills as an important component to reading instruction and the gains in reading skills (Ciesielski & Creaghead, 2020; The National Institute of Health, 2000; Rehfield et al., 2022; Wanzek et al., 2018). When students are given direct instruction using a phonemic awareness intervention program, their reading skills improve the years they are given that instruction and continue to improve throughout their elementary years (Bratsch-Hines et al., 2020; Melesse & Enyew, 2020; Siegelman et al., 2022; Thangarajathi & Menaha, 2020).

This study's findings add to the current base of research literature on how at risk or struggling readers improved their phonemic awareness and word recognition skills after receiving the Heggerty intervention. Specifically, at risk students often have difficulties with their phonemic awareness skills, and since Heggerty is presented auditorily, it is often very effective in improving the skills of students within this population (VanHekken & Bottari, 2022). Study results can be used by school districts to determine if the HPAP should be used as a supplement to the core reading program of older elementary aged students as a way to increase their overall reading achievement scores.

The results of this study add to the body of literature about the impact of

phonemic awareness instruction on the word recognition and phonemic awareness skills of older elementary aged learners. The findings of this study support the use of interventions with older elementary aged students to improve their word recognition skills. Older struggling readers who receive skill-based interventions that focus on early literacy skills such as phonemic awareness and word recognition make greater gains in their overall reading skills than students who did not receive such interventions (Donegan et al., 2020; Hill, 2022, & Wanzek et al., 2021). Fourth and fifth grade struggling readers who participated in an intervention that focused on multi-syllabic words outperformed their peers who did not receive such an intervention (Toste et al., 2019). Typically, reading interventions for older students focus on comprehension skills. The findings of this study did not measure the impact of the Heggerty Program on students' comprehension skills; however, studies have shown that phonemic awareness and word recognition skills impact reading comprehension skills (Daniel et al., 2022; Schmidt et al., 2021). Students who received interventions in word reading, fluency, and comprehension made statistically higher score gains than students who received interventions in comprehension alone (Vaughn et al., 2019). Teaching multi-syllabic and other phonemic awareness and word recognition skills to intermediate struggling readers are necessary skills for successful reading comprehension (Toste et al., 2019). Interventions for older struggling readers need to be aligned with student needs in order to be effective in improving reading achievement (Stevens et al., 2020).

This study's results are also supported by several components of Watson's theory of behaviorism related to the learning environment. Students in this study received daily

supplemental phonemic awareness instruction, which helped them form learning habits. The HPAP is a phonemic awareness curriculum that can be used in PreK–intermediate grade classrooms. Heggerty recommends the teaching of phonemic awareness skills, explicitly, in whole groups, small groups, one-to-one, and as an intervention program (Heggerty, 2023). It is a great warm-up before teaching phonics because it allows students to activate the part of their brain that is responsible for auditory information (VanHekken & Bottari, 2022). According to Heggerty (2023), the curriculum allows students to practice the skills throughout the school year and this allows them to develop habits to help them know how to attack words in print. Heggerty reported that the curriculum to provide educators with the proper tools to help give students the skills they would need to become future readers that contains engaging strategies, and systematic lessons, which focused on rhyming, phoneme isolation, blending, segmenting, and manipulation. Heggerty lessons were intended to be used daily to provide practice and repetition of skills, which supports Watson’s theory about learning environments and how stimuli, modeling, repetition, and memory impact student learning (Watson, 1913). This study supports Watson’s theory of behaviorism because fourth grade students were provided with an intervention program that changed their learning environment. Instruction using the Heggerty Program was provided daily to help create learning habits. These habits were established through systematic lessons that included direct instruction, modeling, repetition, and practice of phonemic awareness skills.

### **Limitations of the Study**

In this study, I investigated the difference in fourth graders’ phonemic awareness

and word recognition skills as measured by the DIBELS ORF, and the PAST assessments between students who received the HPAP as a supplement to their core reading instruction and students who did not receive the supplemental program. Fourth-grade students who participated in this study were considered at risk or struggling readers based on their pre-test score of 80% or less on the PAST. In Chapter 1, a possible limitation was that this study was conducted on a small population of students in one particular school in a suburban area of the northeastern United States. Therefore, this population limited generalization to other grade levels of students. The results also only represent a specific population of fourth-grade students.

Another limitation that was presented in Chapter 1 was that this study was conducted in the school system which I work. This limitation was addressed because I was given access to the archival data with permission from the IRB of the school system. I had no involvement in the selection of the HPAP being used with this group of students, nor did I have involvement in the collection of the data. The data were de-identified by the school system's IRB and was password protected. The individual school uses the PAST and the DIBELS: ORF Subtest as a school-wide data point to create intervention groups within the school. It is assumed that the HPAP was implemented with fidelity and following the procedures outlined in the program curriculum. These parameters were set by the school administration. The school reported that the fourth-grade teachers were given on-going professional development throughout the 2022-2023 school year to make sure they were implementing the HPAP with fidelity, which addressed the validity of the study.



## **Recommendations**

The findings of this study add to the body of research on the use of the HPAP intervention with older elementary students and its effect on word recognition and phonemic awareness skills of fourth grade students. The results showed that there were statistically significant differences between the word recognition skills and phonemic awareness skills of fourth grade students who received supplemental instruction using the HPAP and those who did not receive supplemental instruction in phonemic awareness. One recommendation for future research would be to conduct research on fourth graders from other demographic areas of the United States. This study was conducted in a suburban public school located in the northeastern United States. Another recommendation would be to study the impacts of the Heggerty Program on students' overall reading skills over several years after the implementation of the intervention in year one. Further research should be conducted to analyze the effects of the Heggerty Program on student's reading achievement on other reading achievement scores such as the Nation's Report Card that measures fourth grade overall reading achievement when compared to other fourth-grade students across the United States. A quantitative quasi-experimental approach was used for this study. Future research should be done to collect quantitative data about the teachers' opinions about the use of the Heggerty Program and its impact on student attitudes towards reading. It should also be done to gain more insight into teacher perceptions about the Heggerty Program and ease of use as a supplement to their core reading instruction.

### **Implications for Social Change**

The findings of this study have the potential to create positive social change for fourth-grade students who are at risk or struggling readers. Positive social change may occur if schools choose to use the Heggerty Program as a supplement to their core reading instruction to improve reading achievement scores of their students. This could also improve teacher knowledge about the importance of phonemic awareness skills for reading achievement. It also provides information about the importance of teaching intermediate students phonemic awareness as a way to improve their overall reading skills. Positive social change may occur if teachers realize that it is not too late to provide direct instruction to intermediate students who have gaps in their early literacy skills.

### **Conclusion**

This study investigated whether fourth-grade students who are identified as at risk or struggling readers will show improvement in phonemic awareness and word recognition skills when taught with the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. This study showed that there was a statistically significant difference in the phonemic awareness and word recognition skills of fourth-grade students who were taught with the HPAP as a supplement to regular reading instruction as compared to students who received traditional core reading instruction but received no supplementary instruction in phonemic awareness. Fourth-grade students who were taught with the Heggerty Program made higher gains between their pre-intervention and post intervention scores on the

PAST and the DIBELS: ORF Subtest.

## References

- Ahmed, Y., Miciak, J., & Taylor, W. P. (2022). Structure altering effects of a multicomponent reading intervention: An application of the Direct and Inferential Mediation (DIME) model of reading comprehension in upper elementary grades. *Journal of Learning Disabilities, 55*(1), 58–78.  
<http://dx.doi.org/10.1177/0022219421995904>
- Aiken, H. H., Bratsch-Hines, M., Amendum, S., & Vernon-Feagans, L. (2021). Targeted reading instruction: Four guiding principles. *Reading Teacher, 74*(5), 505–515.  
<https://doi.org/10.1002/trtr.1975>
- Al-Bataineh, A. T., & Sims-King, S. (2013). The effectiveness of phonemic awareness instruction to early reading success in kindergarten. *International Journal of Arts & Sciences, 6*(4), 59–76.
- Albritton, K., Patton, T.N., & Truscott, S.D. (2018). Examining the effects of performance feedback on preschool teachers' fidelity of implementation of a small-group phonological awareness intervention. *Reading & Writing Quarterly, 34*(5), 361–378. <https://doi.org/10.1080/10573569.2018.1456990>
- Altinkaynak, S. O. (2019). The effect of interactive book reading activities on children's print and phonemic awareness skills. *International Journal of Progressive Education, 15*(1), 88–89. <http://doi.org/10.29329/ijpe.2019.184.6>
- Bdeir, M., Bahous, R., & Nabhani, M. (2022). Improving reading readiness in kindergarten children through early phonological awareness interventions. *Education 3-13, 50*(3), 348–360. <http://doi.org/10.1080/03004279.2020.1851740>

- Becker, R., & Sylvan, L. (2021). Coupling articulatory placement strategies with phonemic awareness instruction to support emergent literacy skills in preschool children: A collaborative approach. *Language, Speech & Hearing Services in Schools*, 52(2), 661–674. [https://doi.org/10.1044/2020\\_LSHSS-20-00095](https://doi.org/10.1044/2020_LSHSS-20-00095)
- Bergmann, G. (1956). The contribution of John B. Watson. *Psychological Review*, 63(4), 265–276. <https://doi.org/10.1037/h0049200>
- Birgisdottir, F., Gestsdottir, S., & Geldhof, G. J. (2020). Early predictors of first and fourth grade reading and math: The role of self-regulation and early literacy skills. *Early Childhood Research Quarterly*, 53, 507–519. <http://doi.org/10.1016/j.ecresq.2020.05.001>
- Bratsch-Hines, M., Vernon-Feagans, L., Pedonti, S., & Varghese, C. (2020). Differential effects of the targeted reading intervention for students with low phonological awareness and/or vocabulary. *Learning Disability Quarterly*, 43(4), 214–226. <http://doi.org/10.1177/0731948719858683>
- Brewer, E. W., & Kuhn, J. (2010). *Encyclopedia of research design*. Sage Publications.
- Burkholder, G. J., Cox, K. A., Crawford, L. M., & Hitchcock, J. H. (2020). *Research design and methods an applied guide for the scholar-practitioner*. Sage Publications.
- Burns, M., Maki, K. E., & Helman, L. (2018). Contributions of the components of phonemic awareness to letter-sound knowledge with kindergarten students in high-poverty urban elementary schools. *Reading & Writing Quarterly*, 34(5), 409–418. <https://doi.org/10.1080/10573569.2018.1448835>

- Campbell, S. (2021). What's happening to shared picture book reading in an era of phonics first? *The Reading Teacher*, 74(6), 757–768.  
<https://doi.org/10.1002/trtr.2004>
- Carson, K. L., Bayetto, A. E., & Roberts, A. F. B. (2019). Effectiveness of preschool-wide teacher-implemented phoneme awareness and letter-sound knowledge instruction on code-based school-entry reading readiness. *Communication Disorders Quarterly*, 41(1), 42–53. <http://doi.org/10.1177/1525740118789061>
- Ciesielski, E. J. M., & Creaghead, N. A. (2020). The effectiveness of professional development on the phonological awareness outcomes of preschool children: A systematic review. *Literacy Research and Instruction*, 59(2), 121–147.  
<https://doi.org/10.1080/19388071.2019.1710785>
- Clemens, N. H., Oslund, E., Kwok, O., Fogarty, M., Simmons, D., & Davis, J. L. (2019). Skill moderators of the effects of a reading comprehension intervention. *Exceptional Children*, 85(2), 197–211.  
<https://doi.org/10.1177/00144029187873339>
- Daniel, J., Capin, P., & Steinle, P. (2021). A synthesis of the sustainability of remedial reading intervention effects for struggling adolescent readers. *Journal of Learning Disabilities*, 54(3), 170–186. <http://doi.org/10.1177/0022219420972184>
- Daniel, J., Vaughn, S., & Roberts, G. (2022). The importance of baseline word reading skills in examining student response to a multicomponent reading intervention. *Journal of Learning Disabilities*, 55(4), 259–271.  
<http://dx.doi.org/10.1177/00222194211010349>

- Donegan, R. E., Wanzek, J., & Al Otaiba, S. (2020). Effects of a reading intervention implemented at differing intensities for upper elementary students. *Learning Disabilities Research & Practice, 35*(2), 62–71.  
<https://doi.org/10.1111/ldrp.12218>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191.
- Filderman, M. J., & Toste, J. R. (2022). Effects of varying levels of data use to intensify a multisyllabic word reading intervention for upper elementary students with or at risk for reading disabilities. *Journal of Learning Disabilities, 55*(5), 393–407.  
<http://dx.doi.org/10.1177/00222194211048405>
- Foorman, B., Herrera, S., & Dombeck, J. (2017). The relative effectiveness of two approaches to early literacy intervention in grades K-2. *Regional Educational Laboratory Southeast, 1*–57.
- Gesel, S. A., LeJeune, L. M., & Lemons, C. J. (2021). Teaching phonological awareness to preschoolers with Down Syndrome: Boosting reading readiness. *Young Exceptional Children, 24*(1), 39–51. <http://doi.org/10.1177/1096250619865953>
- Gewirtz, J. L. (2001). J.B. Watson's approach to learning: Why Pavlov? Why not Thorndike? *Behavioral Development Bulletin, 10* (1), 23–25.  
<https://doi.org/10.1037/h0100478>
- Godoy, D.M.A., Pinheiro, A.M.V., & Citoler, S.D. (2017). Initial literacy: Influence of phonemic awareness and teaching method. *Psicologia: Teoria e Prática, 19*(3),

226-241. <https://doi.org/10.5935/1980-6906/psicologia.v19n3p226-241>

Goldstein, H., Olszewski, A., & Haring, C. (2017). Efficacy of a supplemental phonemic awareness curriculum to instruct preschoolers with delays in early literacy development. *Journal of Speech, Language, and Hearing Research*, 60, 89–103. [https://doi.org/10.1044/2016\\_JSLHR-L-15-0451](https://doi.org/10.1044/2016_JSLHR-L-15-0451)

Goodwin, A. P., Cho, S. J., Reynolds, D., Silverman, R., & Nunn, S. (2021). Explorations of classroom talk and links to reading achievement in upper elementary classrooms. *Journal of Educational Psychology*, 113(1), 27–48. <https://doi.org/10.1037/edu0000462>

Heggerty. (2023). <https://heggerty.org/about-us/>

Henry, E. (2020). A systematic multi-sensory phonics intervention for older struggling readers: Action research study. *Networks: An Online Journal for Teacher Research*, 22(1). <https://doi.org/10.4148/2470-6353.1281>

Hill, C., Dahl-Leonard, K., & Cannon, G. (2022). Observing two reading intervention programs for students with dyslexia. *Exceptionality*, 30(2), 109–125. <http://doi.org/10.1080/09362835.2021.1938067>

Horowitz, F. D. (1992). John B. Watson's legacy: Learning and environment. *Developmental Psychology*, 28(3), 360–367. <https://doi.org/10.1037/0012-1649.28.3.360>

Justi, C. N. G., Henriques, F. G., & Justi, F. R. dos R. (2021). Phonological awareness tasks: Accuracy in predicting reading and writing difficulties. *Psicologia: Teoria e Prática*, 23(3), 1–20. <https://doi.org/10.5935/1980-6906/ePTPPA13791>



- Kardaleska, L., & Karovska-Ristovska, A. (2018). Revisiting the view of phonological and phonemic awareness as early predictors in reading difficulties. *Vizione*, 29, 23–30.
- Kent, S. C., Wanzek, J., & Otaiba, S. A. (2017). Reading instruction for fourth-grade struggling readers and the relation to student outcomes. *Reading & Writing Quarterly*, 33(5), 395–411. <https://doi.org/10.1080/10573569.2016.1216342>
- Kilpatrick, D. A. (2019). *Phonological Awareness Screening Test*. <https://thepasttest.com/>
- Kilpatrick, D. A. (2016). *Equipped for Reading Success: A Comprehensive, Step-By-Step Program for Developing Phonemic Awareness and Fluent Word Recognition*. Casey & Kirsch.
- Kjeldsen, A. C., Educ, L., & Saarento-Zaprudin, S. K. (2019). Kindergarten training in phonological awareness: Fluency and comprehension gains are greatest for readers at risk in grades 1 through 9. *Journal of Learning Disabilities*, 52(5), 366–382. <http://doi.org/10.1177/0022219419847154>
- Lichtenstein, P. E. (1995). Modern perspectives on John B. Watson and classical behaviorism. *The Psychological Record*, 45 (3). 505–507.
- Malone, J. (2014). Did John B. Watson really ‘found’ behaviorism? *Behavior Analyst*, 37 (1), 1–12. <https://doi.org/10.1007/s40614-014-0004-3>
- Majorano, M., Ferrari, R., Bertelli, B., Persici, V., & Bastianello, T. (2021). Talk-an intervention programme for enhancing early literacy skills in preschool children: A pilot study. *Child Care in Practice*, 1–17.

<http://doi.org/10.1080/13575279.2021.1929844>

- Meeks, L., Madelaine, A., & Stephenson, J. (2020). New teachers talk about their preparations to teach early literacy. *Australian Journal of Learning Difficulties*, 25(2), 161–181. <http://doi.org/10.1080/19404158.2020.1792520>
- McNeill, B.C. (2018). Improving preservice teachers' phonemic awareness, morphological awareness and orthographic knowledge. *Australian Journal of Teacher Education*, 43(1), 28–41. <https://doi.org/10.14221/ajte.2018v43n1.2>
- Melesse, S., & Enyew, C. (2020). Effects of reading strategies on grade one children's phonemic awareness performance. *Journal of Education and Learning*, 14(3), 385–392. <https://doi.org/10.11591/edulearn.v14i3.14271>
- Moore, J. (2017). John B. Watson's classical S—R behaviorism. *Journal of Mind & Behavior*, 38 (1), 1–34.
- The National Assessment for Educational Progress Nation's Report Card NAEP. (2022). *NAEP report card: Reading*. <https://www.nationsreportcard.gov/reading/nation/achievement/?grade=4>
- National Institute of Health. (2000). *Report of the National Reading Panel: Teaching children to read*. <https://www.nichd.nih.gov/sites/default/files/publications/pubs/nrp/Documents/report.pdf>
- Peltier, T. K., Washburn, E. K., Pulos, J. M., & Peltier, C. (2020). Measuring special education preservice teachers' knowledge, reflective ability, and tutored student outcomes on foundational literacy skills. *Insights on Learning Disabilities*, 17(1),

1–33.

- Petrova, Z., Zapotocna, O., & Urban, K. (2020). Development of early literacy skills: A comparison of two early literacy programmes. *Journal of Pedagogy*, *11*(2), 51–72. <https://doi.org/10.2478/jped-2020-0011>
- Porta, M. E., & Ramirez, G. (2020). The impact of an early intervention on vocabulary, phonological awareness, and letter-sound knowledge among Spanish-speaking kindergarteners. *International Journal of Schools & Educational Psychology*, *8*(1), 65–79. <https://doi.org/10.1080/21683603.2018.1558137>
- Preast, J. L., Burns, M. K., & Brann, K. L. (2019). Class-wide partner reading intervention for science comprehension. *School Psychology Forum*, *13*(1), 29–40.
- Rachmani, R. (2020). The effects of a phonological awareness and alphabet knowledge intervention on four-year-old children in an early childhood setting. *Australasian Journal of Early Childhood*, *45*(3), 254–265. <http://doi.org/10.1177/1836939120944634>
- Rehfield, D. M., Kirkpatrick, M., & O’Guinn, N. (2022). A meta-analysis of phonemic awareness instruction provided to children suspected of having a reading disability. *Language, Speech, and Hearing Services in Schools*, *53*(4), 1177–1201. [http://doi.org/10.1044/2022\\_LSHSS-21-00160](http://doi.org/10.1044/2022_LSHSS-21-00160)
- Rilling, M. (2000). How the challenge of explaining learning influenced the origins and development of John B. Watson’s behaviorism. *American Journal of Psychology*, *113* (2), 275–302. <https://doi.org/10.2307/1423731>
- Sabatini, J., Wang, Z., & O’Reilly, T. (2019). Relating reading comprehension to oral

- reading performance in the NAEP fourth-grade special study of oral reading. *Reading Research Quarterly*, 54 (2), 253–271. <https://doi.org/10.1002/rrq.226>
- Saqui, S., Mercer, S. H., & Cheng, M. P. (2019). Enhancing student access to science curricula through a reading intervention. *Psychology in the Schools*, 56(4), 510–525. <https://doi.org/10.1002/pits.22240>
- Scammacca, N., Fall, A., Capin, P., Roberts, G., & Swanson, E. (2020). Examining factors affecting reading and math growth and achievement gaps in grades 1-5: A cohort-sequential longitudinal approach. *Journal of Educational Psychology*, 112 (4), 718–734. <https://doi.org/10.1037/edu0000400>
- Schmidt, C., Brandenburg, J., & Busch, J. (2021). Developmental trajectories of phonological information processing in upper elementary students with reading or spelling disabilities. *Reading Research Quarterly*, 56(1), 143–171. <https://doi.org/10.1002/rrq.299>
- Siegelman, N., Rueckl, J. G., & van den Bunt, M. (2022). How you read affects what you gain: Individual differences in the functional organization of the reading system predict intervention gains in children with reading disabilities. *Journal of Educational Psychology*, 114(4), 855–869. <http://doi.org/10/1037/edu0000672>
- Skibbe, L. E., Gerde, H. K., & Wright, T. S. (2016). A content analysis of phonological awareness and phonics in commonly used Head Start curricula. *Early Childhood Education Journal*, 44(3), 225–233. <https://doi.org/10.1007/s10643-015-0703-8>
- Soto, X., Olszewski, A., & Goldstein, H. (2019). A systematic review of phonological awareness interventions for Latino children in early and primary grades. *Journal*

of *Early Intervention*, 41(4), 340–365. <http://doi.org/10.1177/1053815119856067>

Stevens, E. A., Vaughn, S., & Swanson, E. (2020). Examining the effects of a tier 2 reading comprehension intervention aligned to tier 1 instruction for fourth-grade struggling readers. *Exceptional Children*, 86(4), 430–448.

<http://doi.org/10.1177/0014402919893710>

Tenny, S., Brannan, J. M., & Brannan, G. D. (2023). *Qualitative Study*. StatPearls Publishing.

Thangarajathi, S., & Menaha, P. (2020). Effect of cognitive strategies on enhancing phonemic awareness of children with dyslexia. *Shanlax International Journal of Education*, 9(1), 133–137. <https://doi.org/10.34293/education.v9i1.3415>

Toste, J. R., Capin, P., Williams, K. J., Cho, E., & Vaughn, S. (2019). Replication of an experimental study investigating the efficacy of a multisyllabic word reading intervention with and without motivational beliefs training for struggling readers. *Journal of Learning Disabilities*, 52(1), 45–58.

<https://doi.org/10.1177/0022219418775114>

University of Oregon. (2023). *What is DIBELS?* <https://dibels.uoregon.edu/about-dibels>

University of Oregon. (2020). *Dynamic Indicators of Basic Early Literacy Skills (8<sup>th</sup> edition)*. <https://dibels.uoregon.edu>

Van Norman, E. R., Nelson, P. M., and Kingbeil, D. A. (2020). Profiles of reading performance after exiting tier 2 intervention. *Psychology in the Schools*, 57(5), 757–767. <https://doi.org/10.1002/pits.22354>

VanHekken, A. (2020). The legacy of Dr. Michael Heggerty.

<https://heggerty.org/resources/blog-post/michael-heggerty-legacy/>

VanHekken, A., & Bottari, M. (2020). *Bridge the gap: Phonemic awareness intervention lessons*. Literacy Resources.

VanHekken, A. & Bottari, M. (2022). *Phonemic awareness primary extension curriculum*. Literacy Resources.

Vaughn, S., Grills, A. E., & Capin, P. (2022). Examining the effects of integrating anxiety management instruction within a reading intervention for upper elementary students with reading difficulties. *Journal of Learning Disabilities*, 55(5), 408–426. <http://dx.doi.org/10.1177/00222194211053225>

Vaughn, S., Roberts, G. J., & Miciak, J. (2019). Efficacy of a word- and text-based intervention for students with significant reading difficulties. *Journal of Learning Disabilities*, 52(1), 31–44. <http://doi.org/10.1177/0022219418775113>

Vogt, W. P. (2007). *Quantitative Research Methods for Professionals*. Pearson Education, Inc.

Wanzek, J., Otaiba, S. A., Petscher, Y. (2021). Comparing the effects of reading intervention versus reading and mindset intervention for upper elementary students with reading difficulties. *Journal of Learning Disabilities*, 54(3), 203–220. <http://doi.org/10.1177/0022219420949281>

Wanzek, J., Petscher, Y., Al Qtaiba, S., & Donegan, R. E. (2019). Retention of reading intervention effects from fourth to fifth grade for students with reading difficulties. *Reading & Writing Quarterly*, 35(3), 277–288. <http://doi.org/10.1080/10573569.2018.1560379>

- Wanzek, J., Stevens, E. A., & Williams, K. J. (2018). Current evidence on the effects of intensive early reading interventions. *Journal of Learning Disabilities, 51*(6), 612–624. <http://dx.doi.org/10.1177/0022219418775110>
- Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review, 20*(2), 158–177. <http://doi.org/10.1037/h0074428>
- Watson, J. B. (1925). *Behaviorism*. New York: People's Institute.
- What Works Clearinghouse. (2014). *Open Court Reading: What Works Clearinghouse intervention report*. <https://ies.ed.gov/ncee/wwc/Intervention/232>
- Yarbrough, J. R. (2018). Adapting adult learning theory to support innovative, advanced, online learning—WVMD model. *Research in Higher Education Journal, 35*, 1–15