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The Impact of Supplemental Phonemic Awareness Lessons on Phonological Awareness and Spelling Development Among Kindergarten and First Graders

Crystal Olinger

The Annsley Frazier Thornton School of Education, Bellarmine University

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There is no greater feeling than reaching the pinnacle of an educational journey. The pursuit of PhD is an enduring daring adventure that requires grit, tenacity, and a willingness to learn how to understand advanced level statistics beyond a foreign level. I am humbled and grateful for the encouragement and support I have received on my educational journey, especially during this doctorate program. First, I would like to thank Dr. Robert and Dr. Kathy Cooter both who sparked my love for early literacy. They guided me to and through the research to deepen my understanding of how social issues include but not limited to prenatal care, socioeconomic status, and parental educational level are instrumental to the development of early literacy skills or the lack thereof. The Cooters helped me to comprehend how early literacy acquisition skills were much like the game of Life. Children from high socioeconomic households often start 20 spaces ahead, while children from lower socioeconomic households often start so far away from the game board that many don't know how to choose their game pieces or play the game at all. The 30 Million Word Gap research by Hart and Risley has and always will be at the center of my research when discussing early literacy acquisition skills and I have you both to thank for that important piece of research. Thank you, Dr. David Paige, for molding my passion for early literacy into recognizable topics of research to add to and challenge previous research. Dr. Paige, your guidance transformed me from a passionate educator into an educational researcher. You provided me the opportunity to become a published researcher by allowing me aid in collecting and analyzing the data from the Bellarmine Literacy Project. My current dissertation is a slight replica of our published study and I have you and your mentoring skills to thank for igniting my excitement for literacy research. Dr. Grant Smith, my gratitude to you is a full circle moment. I would not have made it to the finish line without your

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Abstract

Reading is a developmental process that builds on complex cognitive processes and starts long before children enter school. This present study investigated the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders. The Comprehensive Test of Phonological Processing (CTOPP-2) measured phonological awareness. The Kindergarten Inventory of Developmental Spelling (KIDS) measured spelling development in kindergarten students. The Developmental Spelling Analysis (DSA) measured spelling development in first grade. Participants in the treatment group received 16 weeks of weekly word study instruction and 10-15 minute daily phonemic awareness instruction. A mixed design full factorial ANOVA with one 2-level within factor (fall and spring) and one 2-level between factor (treatment - control) was used to estimate the main effects and interaction. Results showed measurable phonological awareness and spelling development growth for both kindergarten and first-grade students. The effect of the intervention was unclear. Despite random assignment, there were significant differences between groups in the pretest measures violating the assumption of heterogeneity. Correlation results indicated that each measure had a significant positive relationship for phonological awareness and spelling development. Two conditions may have impacted the lack of evidence supporting the efficacy of supplemental phonemic awareness instruction. Treatment and control groups started at various levels. The researcher lacked the experimental controls to prevent bleed-over effects.

Keywords: phonemic awareness, phonological awareness, alphabetic principle, letter sound-correspondence, spelling development, vocabulary

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The Impact of Supplemental Phonemic Awareness Lessons on Phonological Awareness and Spelling Development Among Kindergarten and First Graders

Becoming a competent reader is critical to academic achievement (Duncan et al., 2007). Research shows that children who struggle to read are at greater risk of inequalities in educational attainment, vocational opportunities, socio-economic prospects, and health and well-being (Cree, Kay, & Steward, 2012). Several skills play an essential role in learning to read; one powerful predictor of early reading success is phonological awareness (Gillon, 2004). Reading is a developmental process that builds on complex cognitive processes and starts long before children enter school. The seminal work of Perfetti (1985) suggested that when students lack the essential cognitive processes or have underdeveloped processes, students have difficulty reading and comprehending grade-level texts. The development of the reading sub-components of orthographic knowledge, acquisition of letters, phonemic awareness, acquisition of sight word reading, spelling memory, and vocabulary determines the level of reading proficiency in children. Many researchers suggest phonological awareness and spelling development are essential processes in early reading development (Adams, 1990; Foorman et al., 2003; Moats, 2000; Torgesen et al., 2005). Additionally, researchers have identified alphabetic knowledge (letter-name and letter-sound knowledge) and phonological awareness as critical skills for developing reading skills. Therefore, this study investigates the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders.

Phonological awareness is a precursor to success in the ability to decode words (Adams, 1990). Reading programs that include phonological awareness training have proved successful in classrooms (Blachman, 1989; Wise, Ring, & Olson, 1999). The alphabetic principle is the

knowledge that letters, and letter combinations represent sounds in the oral language (Moats, 2000). The association between sounds and letters is an early literacy skill necessary to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Students who struggle to gain control of the alphabetic principle fail to develop early, successful word-reading skills (Stanovich, 1986).

A 16-week pre-posttest quantitative study explored the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders from a small rural school in Eastern Kentucky. 2 assessments were administered to all kindergarten and first-grade students on a pre-posttest basis. The Comprehensive Test of Phonological Processing (CTOPP-2) assessed the phonological awareness skills of all participants. CTOPP-2 is a comprehensive instrument with three subtests to assess phonological awareness, phonological memory, and rapid naming. Elision is the subtest of the CTOPP-2 measured phonological awareness. The Elision subtest measured the ability to remove phonological segments from spoken words to form other words. The Kindergarten Inventory of Developmental Spelling (KIDS) measured the spelling development of kindergarten students. The KIDS measured students' ability to hear and identify letters and sounds. The Developmental Spelling Analysis (DSA) assessed first-grade students' ability to hear and identify letters and sounds. A stratified random assignment of classrooms selected and assigned classrooms to a treatment or control group. Data were analyzed, and findings are reported in this dissertation.

Problem Statement

Conclusive research exists on how the reading process works and effective practices for teaching reading. Unfortunately, educators find that many upper elementary students lack essential reading foundational skills that develop in early elementary school. In light of this

knowledge, the importance of teaching foundational skills is both an education issue and a matter of social justice. There is an endless list of initiatives, reforms, and policies to improve the educational outcomes of children, particularly those in high poverty. However, the "band-aid approach" has seen little progress toward remediating these issues. The lack of reading foundational skills has continued to impede educational success in other areas of education. Besides a slight improvement in elementary school, Lee (2010) noted that the U.S. reading growth curves have improved little over the past three decades, with high school seniors losing an entire year since the 1990s. In 1992, the National Assessments of Educational Progress (NAEP) data showed that 23% of fourth-grade students in Kentucky scored proficiently. By 2015, Kentucky reported 40% at the proficient level, supporting the findings noted by Lee (2010). The progress has remained stable, yet 60% of the students tested are performing below proficient. The percentage of students in Kentucky who performed at or above the NAEP Proficient level was 38% in 2017. The most recent NAEP data in 2022 revealed that the average reading score for the fourth grade was lower than all previous assessment years going back to 2005 and was similar to 1992 (NAEP, 2022). According to NAEP (2022), 38% of fourth students in Kentucky performed below basic. This percentage was not significantly different from the national average of 39%. NAEP Basic denotes partial proficiency in the knowledge and skills that are fundamental for proficient work at a given grade. Black students had an average score of 20 points lower than white students. Hispanic students had an average score of 13 points lower than white students. Students who were eligible for the National School Lunch Program (NSLP) had an average score of 26 points lower than those who were not eligible. Moreover, children from low-SES backgrounds consistently underperform their higher-SES peers (Reardon, 2011).

Existing empirical research examines the growth of letter naming, phonological awareness, and spelling knowledge of children in large urban or suburban school districts. Paige et al. (2018) investigated the growth of letter naming, phonological awareness, and spelling knowledge in 2,100 kindergarten students attending schools within a large, urban school district where an emphasis was placed on teaching phonological awareness and letter-sound correspondence. While research has examined the development of the reading sub-components to enhance the reading proficiency level in children, the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders has been under-researched. Therefore, investigating the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders in rural Appalachia will contribute to existing research.

Purpose of the Study

A stratified random assignment of classrooms to select and assign classrooms to a condition related to the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among beginning readers. This dissertation aims to broaden the research by investigating the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders. The specific goal of this dissertation is to evaluate the significance of growth between a control and treatment group. The reading sub-components of orthographic knowledge, acquisition of letters, phonemic awareness, acquisition of sight word reading, spelling memory, and vocabulary are well-researched topics (Foorman et al., 2003; Hart & Risley, 2003; Moats, 2000; Paige et al., 2018; Perfetti, 1985; Torgesen et al., 2005). Research has repeatedly shown that the development of the reading sub-components determines children's reading proficiency level. More

importantly, phonological awareness and spelling development are essential processes in early reading development (Adams, 1990; Foorman et al., 2003; Moats, 2000; Torgesen et al., 2005). When students lack the essential cognitive processes or have underdeveloped processes, students have difficulty reading and comprehending grade-level texts (Perfetti, 1985).

Several reading theories support the importance of phonological awareness and spelling development in beginning readers and provide a foundation for this work. The Verbal Efficiency Theory provides a set of organized principles of how we read and how the variances in developing efficient operations of local processes produce discrepancies in reading comprehension development (Perfetti, 1985). According to the Verbal Efficiency Theory, mere word recognition accuracy is not, in itself, sufficient to enable fluent reading comprehension. Instead, word-coding skills must be increased to a high level of efficiency and automaticity for the reader to devote attention to meaning and comprehension. The alphabetic principle is the knowledge that letters, and letter combinations represent sounds in the oral language (Moats, 2000). The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Students who struggle to gain control of the alphabetic principle fail to develop early, successful word-reading skills (Stanovich, 1986). Henderson & Templeton (1986), presented information on the five stages of spelling knowledge. In stage I, spelling reflects the understanding of the concept of the form and function of print. In stage II, children understand the first ordering principle, the alphabetic principle, also known as the letter-name stage. Children will start connecting with salient features such as short-vowel phonograms or beginning consonant digraphs (Henderson & Templeton, 1986). Students rely heavily on sound in painstaking processes (Ganske, 2000). On a sound-by-sound basis, alphabetic letter names are matched to the salient phonemes in written

words; when there is no direct letter-name match, the letter closest to the point of articulation is used (Read, 1971). Analyzing spelling patterns continues to give insight into phonological awareness skills. Phonological awareness is a general knowledge of the sound speaker system, word boundaries, stress patterns, syllables, onset-rime units, and phonemes (Moats, 2000). As this skill develops, children learn that these phonemes are connected to particular consonants and vowel combinations in words. For preliterate children and beginning readers, individual differences in phonological awareness are strongly predictive of word reading outcomes over the first few years of schooling (Ball & Blachman, 1991; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Johnson, Pennington, Lee, & Boada, 2009). Therefore, investigating the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders will add to existing research.

Research Questions

The research questions guiding this study are:

1. How do the supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first graders?
2. How do the supplemental weekly word and phonemic awareness lessons impact spelling development among kindergarten and first graders?

Key Terms

1. Phonemic Awareness – Phonemic awareness refers to isolating and manipulating phonemes in spoken words. (Ehri & Roberts, 2006). Phonemes are the smallest units of sound in spoken language. The English language consists of about 41 phonemes. Phonemes combine to form syllables and words (Ehri et al., 2001). Phonemic awareness

is present in the individual when they can isolate and manipulate individual sounds within words (Yopp, 2012). Simply discriminating phonemes in words, for example, recognizing that tan sounds different from Dan, is not phonemic awareness (Ehri et al., 2001). Children proficient in phonemic awareness can identify, isolate, segment, blend, and delete phonemes in spoken language (Ehri & Roberts, 2006).

2. Phonological Awareness – Phonological awareness is a general knowledge of the speech sound system, word boundaries, stress patterns, syllables, onset-rime units, and phonemes (Moats, 2000). Phonological Awareness (PA) is the purposeful ability to attend to and manipulate the sound structure of spoken words at the syllable, onset-rime, and phoneme levels (Gillon, 2004). PA is the ability to engage with the sounds of a language through recognition and manipulation independent from semantic meaning (Anthony et al., 2011). An individual has phonological awareness when they are aware that words have constituent sounds and do not always hold meaning within a word (Goswami, 2000; Harris & Hodges, 1995). Phonological awareness is a precursor to success in the ability to decode words (Adams, 1990).
3. Alphabetic Knowledge – The alphabetic principle is the knowledge that letters, and letter combinations represent sounds in the oral language (Moats, 2000). The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Foorman et al. (2003) recommended that alphabetic principle instruction is more effective when combined with phonemic awareness instruction. Students who struggle to gain control of the alphabetic principle fail to develop early, successful word-reading skills (Stanovich, 1986). Many researchers have identified alphabetic knowledge (letter-name and letter-sound

knowledge) and phonological awareness as critical skills for developing reading skills.

Young-Suk, Petscher, Foorman, & Chengfu (2010), examined the contribution of phonological awareness to facilitating letter-sound acquisition from letter names and the probabilities of letter-sound acquisition as a function of letter characteristics. Many theorize that alphabetic knowledge is a primary driving force in introducing phonological sensitivity at the phoneme level (Ouellette & Haley, 2013). These capabilities enable them to successfully transition into letter sounds and spellings (Schatschneider et al., 2004).

4. Spelling Development - According to Levesque, Breadmore, & Deacon (2021), a defining feature of language is its capacity to represent meaning across oral and written forms. Morphemes, the smallest units of meaning in a language, are the fundamental building blocks that encode meaning, and morphological skills enable their effective use in oral and written language. Increasing evidence indicates that morphological skills are linked to literacy outcomes, including word reading, spelling, and reading comprehension. Developmental spelling stems from studying the phonetic logic behind a child's spelling strategies. The more experience children have with print and knowledge of the spelling system, the greater their ability to form complete letter-sound connections and use blending to decode unfamiliar words. These repeated exposures to a particular word help strengthen it in memory until, finally, the spelling is sufficient to elicit word pronunciation (Ganske, 1999). Therefore, this dissertation uses the alphabetic principle to determine if sound-letter correspondence and phonological awareness contribute to spelling development.

5. Vocabulary - The primary impetus for considering the role of vocabulary in the emergence of phonemic awareness can be derived from the oft-cited lexical restructuring model (LRM). LMR suggests that children first store words in their mental lexicon holistically; as more items are added, increased segmental representation becomes necessary so that similar-sounding items are not confused (Metsala & Walley, 1998; Walley, Metsala & Garlock, 2003).

Literature Review

This literature review aims to explore research on the relationship between phonological awareness and spelling development of beginning readers. Topics include language acquisition, phonemic awareness, phonological awareness, the alphabetic principle, letter sound correspondence, spelling development, early reading, and vocabulary. Scholarly (peer reviewed) journal searches were conducted on the EBSCOhost journal databases, including ERIC and JSTOR. To investigate phonological awareness, letter sound correspondence, and spelling development, the search terms *early language acquisition*, *phonological awareness & emergent literacy*, *phonological awareness & beginning reading*, *phonological awareness & alphabetic principle*, and *phonological awareness & spelling development* yielded 120, 298, 112, 39, and 105 journal articles respectively. Additionally, as other articles and books were read, their sources were examined, located, and cited in this dissertation.

Research questions guided the evaluation of the articles and studies regarding relevance and overall merit. Articles that provided explicit and explanatory information about the constructs were included, and those studies explored the relationship between various components of language and literacy development in early readers. Specifically, research related to the development of cognitive and language skills of children in early childhood. Additionally, a broad overview of specific theories of language acquisition skills, orthographic knowledge, and phonemic awareness were researched because they also contribute to the reading foundational skills in emergent readers. Finally, several articles were excluded because they focused on other concepts regarding reading foundational skills. The research questions of this dissertation were to evaluate the impact of an instructional intervention (phonemic awareness instruction) designed

to promote skill development on reading foundational skills (phonological awareness and spelling development) between the control and treatment groups.

Phonemic Awareness

The importance of sound blending and phonetic decoding for reading has long been established (Richardson et al., 1977), but its role in teaching reading has been contentious. Phonemic awareness refers to isolating and manipulating phonemes in spoken words. (Ehri & Roberts, 2006). Phonemes are the smallest units of sound in spoken language. (Leu and Kinzer, 2011). The English language consists of about 41 phonemes. Phonemes combine to form syllables and words (Ehri et al., 2001). Phonemic awareness is present in the individual when they can isolate and manipulate individual sounds within words (Papadopoulos et al., 1988; Yopp, 2012). Simply discriminating phonemes in words, for example, recognizing that “ton” sounds different from “Dan,” is not phonemic awareness (Ehri et al., 2001). Children proficient in phonemic awareness can identify, isolate, segment, blend, and delete phonemes in spoken language (Ehri & Roberts, 2006). Phonemic awareness is grounded in oral language and is the foundation for reading development. Children who cannot hear and work with the phonemes of spoken words will have difficulty relating them to graphemes (a letter or a number of letters that represent a phoneme in a word) when they see them in written words. This pre-phonics problem interferes with learning letter and sound connections (Brown, 2014). Phonological awareness develops on a continuum of phonemic awareness that moves from large to increasingly smaller units of sounds within words. This awareness ends with identifying phonemes, the smallest unit of sound in the English language (Paige et al., 2018). Phonemic awareness is a subset of phonological awareness (Paige et al., 2018). Children's experiences with written language dramatically influence phonological awareness development, especially the development of

phonemic awareness. Most children achieve minimal levels of phonemic awareness prior to literacy instruction. Learning the names of letters and the sounds they represent provides a concrete way to attend to phonemes, given that phonemes do not have a physical reality independent of each other (Anthony & Francis, 2005).

Phonemic awareness is among the best predictors of how well children learn to read. The focus of the so-called 'reading wars' has been whether phonemic awareness—that is, the understanding of the relationship between letters (graphemes) and phonemes (sounds)—is an essential precursor to the teaching of reading or whether reading should instead first be taught at the whole-word level (Pearson, 2004; Kim, 2008). Early research identified a strong connection between phonemic awareness and learning to read (Ball & Blachman, 1988; Blachman, 1989; Fox & Routh, 1976; Lundberg, Olofsson, & Wall, 1980; Stanovich, Cunningham, & Cramer, 1984; Tunmer et al., 1988; R.K. Wagner & Torgesen, 1987). Share et al. (1984) assessed kindergartners on many measures when they entered school, including phonemic segmentation, letter name knowledge, memory for sentences, vocabulary, father's occupational status, parental reports of reading to children, and TV watching. They examined which measures best predicted how well the children would be reading at the end of kindergarten and first grade. Results showed that phonemic awareness was the top predictor, along with letter knowledge. Phonemic awareness correlated $r = 0.66$ with reading achievement in kindergarten and $r = 0.62$ in first grade.

Recent studies have shown that systematic phonemic awareness instruction positively affects young children's developing literacy skills (Adams, 1990; Moats, 2000; Snow et al., 1998; Torgesen, 2002). Foorman et al. (2003) examined the extent to which curricular choice and incorporation of phonemic awareness (PA) into the kindergarten curriculum affects growth

in kindergarten literacy skills and first-grade reading and spelling outcomes; in 114 classrooms and 32 Title 1 schools for 4,872 children (85% African American). Literacy curricula were described as having more or less teacher choice and more or less PA instruction. The curricula were implemented with ongoing professional development. Observations of curriculum fidelities and ratings of student behavior were also obtained. Alphabetic instruction without PA was not as effective as alphabetic instruction with PA. However, effective instruction in PA and alphabetic coding appeared to be as much a consequence of ongoing professional development as it was a function of prescribed PA activities. Results provided large-scale classroom support on PA instruction reported by the National Reading Panel (2000). Several studies have cited the lack of phonemic awareness skills as a reason for reading failure (Fletcher et al., 1994; Foorman, Francis, Fletcher, & Lynn, 1996; Liberman, Shankweiler, & Liberman, 1989; Mody, 2003; Stanoich & Siegel, 1994; Wagner, Torgesen, & Rashotte, 1994). Proficiency in phonemic awareness promotes the connection between speech and print (Ehri & Roberts, 2006).

There is evidence that phonics interventions are more effective at improving reading performance during the early stages of reading development. For example, Ehri et al. (2001) found that the effect of phonics interventions was moderate ($d = 0.55$) when performed before first grade but only small when performed after first grade ($d = 0.27$). According to Ehri et al. (2001) one should use the following tasks to assess children's phonemic awareness and to improve their phonemic awareness through instruction and practice: 1. Phoneme isolation, which requires recognizing individual sounds in words; for example, "Tell me the first sound in paste." (/p/). 2. Phoneme identity requires recognizing the familiar sound in different words; for example, "Tell me the sound that is the same in bike, boy, and bell." (/b/). 3. Phoneme categorization requires recognizing the word with the odd sound in a sequence of three or four

words; for example, "Which word does not belong? bus, bun, rug." (rug). 4. Phoneme blending requires listening to a sequence of separately spoken sounds and combining them to form a recognizable word; for example, "What word is /s/ /k/ /u/ /l/?" (school). 5. Phoneme segmentation, which requires breaking a word into its sounds by tapping out or counting the sounds or by pronouncing and positioning a marker for each sound; for example, "How many phonemes are in the word ship?" (3: /s/ /i/ /p/). 6. Phoneme deletion requires recognizing what word remains when a specified phoneme is removed; for example, "What is smile without the /s/?" (mile). Children are often able to complete phonemic tasks without being considered a reader or being able to write the given words. In considering developmental influences on phonemic awareness, two areas have been repeatedly proposed as critical: alphabetic knowledge and oral vocabulary (Ouellette & Haley, 2013). Although phonological processing is essential even for skilled readers, phonics plays a vital role when children first develop reading skills (Castles et al., 2018).

Alphabetic Knowledge. Knowledge of the alphabet and phonological awareness are strong predictors of later decoding and comprehension. Teaching these in combination consistently improves students' later decoding and reading comprehension abilities (Shanahan & Lonigan, 2013). Many theorize that alphabetic knowledge is a primary driving force in the emergence of phonological sensitivity at the phoneme level (Ouellette & Haley, 2013). These capabilities enable children to successfully transition into letter sounds and spellings (Schatschneider et al., 2004). Across a large body of research, scientists have shown that alphabetic knowledge (letter-name and letter-sound knowledge) and phonological awareness are critical for students' reading acquisition in languages with alphabetic orthographies (Adams, 1990; Ehri, 1998; Kim, 2009; Levin et al., 2006; McBride-Chang, 1999; Muter et al., 2004;

Schatschneider et al., 2004; Storch & Whitehurst, 2002). Some evidence suggested that the relationship between letter name knowledge and letter sound knowledge may be causal.

Kindergartners' and first graders' letter-name knowledge predicted their later letter-sound knowledge, whereas the reverse (letter-sound knowledge predicting letter-name knowledge) was not found. Children also learned associated sounds more readily when they knew letter names than when they did not (Ehri, 1983; Treiman et al., 1998). (Share, 2004) conducted an experimental study with Israeli kindergartners. Experimental group children were taught letter names and letter sounds for letter-like symbols (names for some letters contained letter sounds, whereas others did not). In contrast, control group children were taught phonologically unrelated but meaningful real-word labels. Results showed that children in the experimental group knew more letter sounds than those in the control group and performed better on the letter names that contained relevant letter-sound information than those that did not. A critical question concerning letter-sound acquisition as a function of letter-name knowledge involves individual differences in how children accrue letter-sound knowledge from letter-name knowledge (Treiman & Kessler, 2003).

Ziegler and Goswami (2005) argued that a child must first learn orthographic representations where the sounds of a language are connected to a printed symbol before an explicit awareness of individual speech sounds can take place. Similarly, Vihman (1996) proposed that as children acquire early literacy skills and establish orthographic knowledge, phonological representations may become more precise as a result, thus allowing direct access to phonemic representations. Upon entering kindergarten, children lacking competent alphabet knowledge need explicit instruction focused on letter identity, letter naming, and the writing of letters. Alphabet knowledge in kindergarten and first grade predicts later literacy achievement.

Alphabet knowledge includes identifying letter names (LN) and letter sounds (LS) and knowing how to form letters. Knowledge of letter-sound associations or the ability to match a letter with the sound it makes is related to the ability to sound out and spell words (Huang et al., 2014).

Letter naming knowledge (LNK) requires children to master the recognition of upper- and lowercase shapes of each of the 26 graphemes of the alphabet and is a landmark accomplishment for successful reading acquisition (Adams, 1990; Gibson & Levin, 1975). As LNK acquisition typically occurs before phonemic awareness (Worden & Boettcher, 1990) the child must make the connection that printed letters represent the sounds in speech, a concept called the alphabetic principle (Byrne, 1998; Stuart & Coltheart, 1988). Letter names provide critical cues about letter sounds (McBride-Chang, 1999; Treiman & Kessler, 2003) that, in turn, are critical for word decoding. Children's letter-name knowledge also directly relates to word reading, such that letter names link letters and print and help children understand that spellings are not arbitrary strings of letters (Treiman & Kessler, 2003; Treiman & Rodriguez, 1999).

Vocabulary. The primary impetus for considering the role of vocabulary in the emergence of phonemic awareness can be derived from the oft-cited lexical restructuring model (LRM). LMR suggests that children first store words in their mental lexicon holistically; as more items are added, increased segmental representation becomes necessary so that similar sounding items are not confused (Metsala & Walley, 1998; Walley et al., 2003). As a result, lexical entries become more fully specified at the level of the phoneme. Increased breadth of oral vocabulary causes a restructuring, whereby more phonemic-level representation is specified (Ouellette & Haley, 2013). Ouellette & Haley (2013) evaluated possible sources of individual differences in early explicit, smaller segment phonological awareness. In particular, the unique contributions of oral vocabulary and alphabetic knowledge to phonemic awareness acquisition were examined

across the first year of school. Fifty-seven participants were tested in kindergarten (mean age 5 years, 8 months) and again one year later midway through Grade 1. Results revealed that oral vocabulary and alphabetic knowledge were correlated with concurrent larger segment phonological awareness and phonemic blending in kindergarten. In contrast, oral vocabulary was the only measure that predicted unique variance in phonemic awareness into Grade 1. Further, this pattern of results was most pronounced for analytic (segmenting), as opposed to synthetic (blending) phonemic awareness. These results highlight the importance of different component processes to explicit, smaller segment awareness depending upon the developmental period under study and accentuate the need to separate analytic from synthetic phonemic awareness in literacy research.

Phonological Awareness

Phonological Awareness is the purposeful ability to attend to and manipulate the sound structure of spoken words at the syllable, onset-rime, and phoneme levels (Gillon, 2004). Phonological Awareness is the ability to engage with the sounds of a language through recognition and manipulation independent from semantic meaning (Anthony et al., 2011). An individual has phonological awareness when they are aware that words have constituent sounds and do not always hold meaning within a word (Goswami, 2000; Harris & Hodges, 1995). Four decades of research have established the relationship between phonological awareness and literacy skills, which is evident in all alphabetic languages studied. Numerous definitions of phonological awareness have been offered, each with relatively well-developed theoretical underpinnings and some empirical support. Alternative definitions vary in generality from highly exclusive to highly inclusive of different phonological awareness skills. Multiple meta-analyses have found that Phonological Awareness skills are essential for children's reading development

(Bus & van Ijzendoorn, 1999; National Reading Panel, 2000). Children with lower phonological awareness skills have difficulty with contrasting and segmenting sounds within words (Bishop & Snowling, 2004) thereby compromising their ability to decode and read written words and text (Boscardin et al., 2008; Carlson et al., 2013; Juel, 1988).

Phonological awareness skills are distinguished by the task performed and the size of the unit of sound that is the focus of the task (Anthony & Francis, 2005). Gombert (1992) defined phonological awareness as being either epilinguistic or metalinguistic. Epilinguistic awareness refers to an implicit or unconscious awareness of linguistic organization that allows for similarities and differences between words and syllables to be detected; others have suggested that this can be accomplished through the perception of global acoustic parameters at the word level (Carroll & Snowling, 2001; Morais, 2003). Metalinguistic awareness is later developing conscious control over sub-lexical representations, primarily phonemes. Regardless of the terminology involved, the emergence of explicit awareness allows processing to be directed toward individual phonemes embedded within words. Metalinguistic awareness is the most critical skill in learning to read (Hulme et al., 2002). The debate over which phonological skills belong to the construct of interest has directly influenced literacy curriculum and instruction, with some curricula emphasizing phonemic awareness and reading by sound–letter correspondences and other curricula emphasizing onset–rime awareness and reading by rime analogies (e.g., reading a new word, like string, by analogizing from familiar words that have the same rime unit, like sing and wing) (Anthony & Francis, 2005).

Methodologically sound studies used large samples, multiple measures, and advanced statistics to support a unified phonological awareness construct; phonological awareness is a single cognitive ability that manifests behaviorally in various skills (Anthony & Francis, 2005).

Anthony et al. (2002) used confirmatory factor analysis and a factorial design that crossed word structure and task to demonstrate that a one-factor model best characterized the phonological awareness skills of 258 2- to 5-year-old children. Anthony and Lonigan (2004) reported four independent confirmatory factor-analytic studies that yielded similar findings with over twelve hundred 2- to 8-year-old children. Two recent studies employing item response theory supported a unified phonological awareness ability. One studied 945 elementary school children (Schatschneider et al., 1999) and another studied over 1,100 preschool children (Anthony et al., 2003). Moreover, latent-variable longitudinal research using structural equation modeling consistently reports near-perfect stability of individual differences in phonological awareness across time and phonological awareness skills (Anthony & Lonigan, 2004). According to Anthony et al., (2003) research has uncovered the general sequence of phonological awareness development. Many phonological awareness tests have been administered to people of different ages, reading levels, and languages. Two overlapping patterns of development are evident. First, children become increasingly sensitive to smaller and smaller parts of words as they grow older. Children can detect or manipulate syllables before they can detect or manipulate onsets and rimes, and they can detect or manipulate onsets and rimes before they can detect or manipulate individual phonemes within intrasyllabic word units. Second, children can detect similar and dissimilar sounding words before manipulating sounds within words. Children can generally blend phonological information before segmenting phonological information of the same linguistic complexity (Anthony et al., 2003). Finally, children refine phonological awareness skills they have already acquired while learning new phonological awareness skills (Anthony et al., 2003) contrary to a strict stage theory of development. Indeed, there is some empirical evidence that language awareness at the lexical level (e.g., words) may significantly influence

language awareness at the sublexical level (e.g., phonemes). A well-documented phenomenon wherein children's expanding vocabulary promotes phonological awareness (i.e., the isolation and manipulation of the sound structure of language) led to the formulation of the lexical restructuring hypothesis (Bowey, 2001; Goswami, 2001; Walley, 1993). According to this model, phonological representations become more fully specified to avoid confusion with similar-sounding lexical items as an individual increases their repertoire of words (Khan et al., 2021).

Spelling Development

According to Levesque et al. (2021) a defining feature of language is its capacity to represent meaning across oral and written forms. Morphemes, the smallest units of meaning in a language, are the fundamental building blocks that encode meaning, and morphological skills enable their effective use in oral and written language. Increasing evidence indicates that morphological skills are linked to literacy outcomes, including word reading, spelling, and reading comprehension. Despite this evidence, the precise ways in which morphology influences the development of children's literacy skills remain largely underspecified in theoretical models of reading and spelling development (Levesque et al., 2021). What children know about written words as they begin school predicts their early literacy development and long-term academic success (Kaefer, 2016). Readers must incorporate three key elements into their knowledge of a written word: orthography (spelling), phonology (pronunciation), and semantics (meaning) (Coltheart et al., 2001; Jackson & Coltheart, 2013; Perfetti et al., 2013; Plaut & Booth, 2000; Wang et al., 2005). Reading and spelling are language skills. To be successful with reading and spelling, children

must have adequate linguistic knowledge, such as phonological awareness and orthographic knowledge (e.g., Apel et al., 2012; Ball & Blachman, 1988; Bus & van IJzendoorn, 1999; Nagy et al., 2003; Rothe et al., 2014).

Kaefer (2016) examined the development of orthographic knowledge as it interacts with phonological knowledge in early readers. Forty-five Kindergarten students were presented with two different nonwords on screen, and their gaze was tracked. In the first task, they were asked to choose the best "word," and in the second task, they were asked to choose the best "word" for a specific pronunciation, requiring phonological decoding of the stimuli. Their findings indicate that early readers show explicit awareness of some orthographic conventions and an implicit awareness of others. However, they only showed implicit awareness when they did not have to decode the stimuli additionally. These results suggest that early orthographic knowledge may be fragile and easily masked by phonological knowledge. Historically, research has focused on lexicalized orthographic knowledge. Therefore, it has often been considered a relatively later developing knowledge system, emerging after children receive direct instruction in written language, usually in the kindergarten or early elementary years (Frith, 1986; Gentry, 1982). Many researchers have historically considered orthographic knowledge to stem directly from phonological knowledge. Researchers once considered early orthographic representation (i.e., spellings) as random until it became linked with early phonological knowledge (Gentry, 1982). When considering more generalized orthographic knowledge, however, some researchers have long argued that preschool aged children demonstrate early knowledge in their early spelling but may look random because it may not be related to their phonological knowledge (Ferreiro & Teberosky, 1982; Kaefer, 2012).

Henderson (1981) identified five stages that he labeled preliterate, letter name, within-word, syllable juncture, and derivational constancy. Henderson and Templeton (1986) describe the stages where the preliterate stage finds that children may scribble freely and attempt to match certain sounds with marks. In the letter name stage, children attempt to spell alphabetically by matching letters to sounds. As they acquire an increasing inventory of sight words, spellings become more accurate as the child learns to examine words systematically around specific, salient features. Students in this stage recognize initial and final consonants, blends, diagraphs, short vowels, affricates, and final consonant blends and diagraphs. In the early within-word stage, students can correctly represent short vowels, including words containing both a sounded and silent vowel (e.g., "take"). Also, in this stage, students begin to read silently. Cognitively, this stage is an enormous leap forward as students move from letter-to-letter analysis to reading units or groups of letters. Students learn more complex letter features in the syllable juncture stage, including consonant doubling, e-drops for ed and ing, and r-controlled vowels. The final stage, derivational constancy, consists of silent and sounded consonants and Latin-derived suffixes and prefixes. Understanding and mastering these various combinations of developmental spelling patterns suggests the phonological and orthographic knowledge acquired by the reader, which is related to becoming a fluent reader (Zutell, 1986).

Phonological Awareness, Spelling Development, and Literacy Outcomes

Phonological awareness is a precursor to success in the ability to decode words (Adams, 1990). Persuasive evidence now exists that concludes phonological awareness is hetero-typically continuous. That is, phonological awareness is a single, unified ability during the preschool and early elementary school years that manifests itself in different skills throughout a person's development (Anthony & Francis, 2005). Phonological awareness is recognized as one of the

most robust predictors of early literacy success and hence has been at the forefront of literacy research and teaching practices over the past two decades, with explicit, smaller segment awareness identified as particularly integral to learning how to read (Bus & van Ijzendoorn, 1999; Caravolas et al., 2005; Ehri et al., 2001). Phonological awareness skills develop at preschool ages and support reading skills during school. Adams (1990) used five levels to describe the developmental progression of phonological awareness. The first begins with hearing the sounds of words, followed by the ability to compare and contrast like-sounding words in the oddity task. For example, the teacher might ask the student, "Which word sounds different? /cat/, /mat/, or /dog/?" The third dimension is the awareness that words can be split into syllables (today) and blended back together. The fourth is the ability to split words into phonemes and put them back into a word (/dog/ into /d/ /o/ /g/ and then back to /dog/). The fifth and final dimension is the most difficult: isolate a phoneme within a word, delete it, and then replace it with another phoneme to form a new word. Schatschneider et al. (1999) add a sixth dimension where children develop sensitivity to alliteration, the ability to identify the beginning of words. Studies on phonological awareness show a great relationship with reading skills development (Turan & Gul, 2008). Anthony & Francis (2005) emphasized that randomized intervention studies demonstrate that there is a causal relationship, as intensive instruction in phonological awareness improves literacy. Research suggests that reading programs that include phonological awareness training have proved successful in classrooms (Blachman, 1989; Wise et al., 1999). Reading instruction can help children learn the components of phonological awareness. Emergent readers acquire phonological awareness through instruction in a fairly predictable manner that begins at the syllable level, progresses to the recognition of onset and rimes (as in c-at), and ends with the awareness of phonemes as in /c/ /a/ /t/ (Snow & Burns, 1998).

Understanding how to effectively and efficiently integrate phonological awareness instruction into everyday classroom environments is critical for supporting initiatives that aim to elevate reading achievement and reduce inequality in reading outcomes. The scientific evidence surrounding the benefits of phonological awareness instruction for literacy growth is well researched (Carson et al., 2013). Most evidence supporting the benefits of phonological awareness instruction comes from studies conducted in individual or small-group frameworks under controlled research settings outside of the classroom (Ehri et al., 2001; Gillon, 2000, 2005). Less is known about the effectiveness of phonological awareness instruction, in particular, optimal duration and intensity, when exported to the heterogeneous classroom environment. Integrating teacher-delivered PA instruction into beginning reading curricula requires consideration of several classroom logistics. One key consideration is the time efficiency of the program. According to McLeod et al. (2003) the time required to implement classroom programs is critical in determining whether specific programs can be implemented successfully in classroom practice. Teachers may omit activities that are too time consuming in an attempt to balance a busy classroom schedule. Frequent and intensive sessions are essential to effective PA instruction (Elbaum et al., 1999; Gillon, 2004).

Research into the effectiveness of classroom-based literacy programs focusing on phonological awareness has varied in duration and intensity. Shapiro and Solity (2008) demonstrated a significant reduction in the prevalence of reading disorders using a long-duration, high-intensity classroom program focused on phonological awareness at the phoneme level. For two years, 251 British schoolchildren were provided with explicit instruction in phoneme blending and segmentation, high-frequency phoneme-grapheme correspondences, and sight vocabulary over three 12-min sessions per day as part of the classroom reading program. This

instruction equated to 110 hours of instruction. The prevalence of reading disorders reduced from 20% among the children who received the regular classroom program to 5% among the children who received instruction in phonemic awareness as part of their classroom literacy curriculum. These results suggest that teaching a broad range of phonological awareness skills with low intensity (i.e., 45-min per week) over a short period is ineffective in achieving sustained literacy improvements (Carson et al., 2013).

In a short duration, a low-intensity program focused on a wide range of phonological awareness skills (Paige et al., 2018). Justice et al. (2010) demonstrated the importance of including specific teaching in phonological awareness at the phoneme level for children who are vulnerable to reading disorders. Sixty-six children between the ages of three and five were provided with literacy and language instruction using a program called Read It Again (RIA) (Justice et al., 2006). The program involved two 20- to 30-min classroom sessions per week for 30 weeks that targeted phonological, print, vocabulary, and narrative knowledge. Phonological awareness instruction targeted syllable, onset-rime, and phonemic awareness and was taught at least once per week, equating to 10-15 hours of instruction. The children who received the RIA instruction performed significantly higher than the comparison children (n = 71) on language and literacy measures immediately following the instruction. For children with low language skills, this program did not advance their phonemic awareness and alphabetic knowledge to the same extent as it did for children with average to high language skills.

McIntosh et al. (2007) investigated the benefits of a short-duration, high-intensity, broad phonological awareness program on the literacy outcomes of 97 preschool children from low SES localities. The children in this study received ten weeks of daily phonological instruction targeting syllable segmentation, onset-rime identification, and initial sound identification.

Although significant improvements were identified in phonological awareness knowledge immediately following instruction, follow-up indicated that initial gains in phonological awareness in preschool did not support accelerated literacy development in the early school years. This study showed that a short 10-week high-intensity instruction focused on a broad range of phonological awareness skills did not generate sustained improvements for literacy outcomes (Carson et al., 2013). The benefits of a short-duration, high-intensity, teacher-delivered phonological awareness program focused on the phoneme level for children in the first year of formal schooling. Shorter programs are more cognizant than extended programs to the time demands of the classroom environment and can help educators ensure that children have essential foundation skills to take advantage of reading instruction (Carson et al.; McLeod et al., 2003). Furthermore, research shows that larger sound units (e.g., syllables) may develop from general classroom instruction, but awareness of smaller sound units (e.g., phonemes) may require more explicit and direct instruction (Fletcher et al., 2010).

Researchers have established that readers acquire spelling knowledge along a developmental continuum (Gentry & Gillet, 1993; Templeton, 1992; Ehri, 1993; Ganske, 2010; Treiman, 1993; Wild, 1991). Invented spelling occurs when one uses a self-directed attempt to write words using print (Read, 1991). As their reading development progresses, the student uses the knowledge of phonology and orthography to write increasingly accurate word spellings. Evidence suggests that invented spelling may independently predict literacy outcomes, because the same lexical system is used in reading and spelling (Ouellette & Senechal, 2017; Perfetti, 1993) readers apply their orthographic knowledge to both tasks (Ehri, 1997). Consequently, analyzing students' spelling gives insight into their orthographic knowledge and their understanding of reading (Templeton, 1992; Ehri, 1993; Ganske, 2010). However, the

contribution of these processes to effective spelling is not equal, as when children grow in their spelling knowledge, they shift their reliance from phonological to orthographic and morphological information (Henderson & Beers, 1980; Templeton, 1992; Ehri, 1982; Ehri, 1987; Patterson et al., 1995; Roman et al., 2009; Stage & Wagner, 1992).

In learning to read, we ask children to match sounds to letters to learn graphophonemic relationships (Paige et al., 2018). When encountering sounds in a word, readers can tap their knowledge of letter-sound correspondences to identify letters and letter combinations (Ball & Blachman, 1991). This skill builds a helpful foundation as children learn to recognize letter patterns repeated across words (Seymour et al., 2003). Unsurprisingly, children who are taught to segment words into their phonological parts acquire word-reading skills faster than children without these skills (Share et al., 2014). Additionally, the effect of phonological training has recently been found to continue through elementary school and into the sixth grade, with effects extending to ninth-grade comprehension (Kjeldsen et al., 2014).

Theoretical Framework

Multiple theoretical frameworks guide research on the relationship between phonological awareness and spelling development. Although each framework lends itself to a specific aspect of the research, all act as a catalyst to connect phonological awareness and spelling development as they relate to developing proficient reading skills in early readers. The alphabetic principle guides the majority of this research.

The Alphabetic Principle. The alphabetic principle is the knowledge that letters, and letter combinations represent sounds in the oral language (Moats, 2000). The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Awareness of the alphabetic principle forms the developmental boundary between being an emergent reader who pretends- to read and being a novice reader who is bound to the print on the page (Stahl & Garcia, in press). The National Reading Panel (NICHD, 2000) determined that it was beneficial for letter work and phonological awareness training to support each other simultaneously. A child's letter sound knowledge is reliant on phonological sensitivity. Both rhyming ability and onset-rime awareness facilitate the child's ability to connect letter names and the sounds of particular letters. For example, the beginning sound of b is /b/, and many alphabet letters rhyme, causing their only distinction to be the beginning sound (b, c, d, v). Having phonological awareness enables children to extract the letter sounds from within the letter names that they know. The ability to separate the onset from the rime or segment /b/- /e/ enables the child to hear and associate b with /b/ (Stahl, 2014). In a literature review, many researchers have identified alphabetic knowledge (letter-name and letter-sound knowledge) and phonological awareness as critical for developing reading skills. Young-Suk, Petscher, Foorman, & Chengfu (2010) investigated critical factors in letter-sound acquisition (i.e., letter-name knowledge and phonological awareness) with data from 653

English-speaking kindergartners at the beginning of the year. The authors examined (a) the contribution of phonological awareness to facilitating letter-sound acquisition from letter names and (b) the probabilities of letter-sound acquisition as a function of letter characteristics (i.e., consonant–vowel letters, vowel–consonant letters, letters with no sound cues, and vowel letters). The results show that letter-name knowledge had a significant impact on letter-sound acquisition. Phonological awareness had a larger effect on letter-sound knowledge when letter names were known than when letters were unknown. Furthermore, students were more likely to know the sounds of consonant–vowel letters (e.g., b and d) than vowel–consonant letters (e.g., l and m) and letters with no sound cues (e.g., h and y) when the letter name was known, and phonological awareness was established. Sounds were least likely to be known for letters with no sound cues. However, reliable differences from other groups of letters depended on students' phonological awareness and letter-name knowledge levels.

The past several decades represent a watershed period in research on the alphabetic principle and word reading development (Duncan & Seymour, 2003; Perfetti & Bolger, 2004). However, many important questions remain regarding how students acquire initial skills in the alphabetic principle and how most students successfully transition to more advanced word reading proficiency and later to proficient reading (Harn, Stoolmiller, & Chard, 2008). Foorman et al. (2003) recommended that alphabetic principle instruction is more effective when combined with phonemic awareness instruction. Research demonstrates that reading and understanding a connected text depend on acquiring automaticity to read words (Adams, 1990; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Torgesen, 2000). Students who struggle to gain control of the alphabetic principle fail to develop early, successful word-reading skills (Stanovich, 1986). Research demonstrates that to read and understand connected text is dependent on acquiring

automaticity in the alphabetic principle, the understanding that letters of the alphabet and the phonemes to which they correspond can be used to read words (Adams, 1990; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Torgesen, 2000).

A major hurdle for beginning readers is learning to read words from memory accurately and automatically in or out of the text. The sight of the word activates its pronunciation and meaning immediately in memory, allowing readers to focus on comprehension rather than word recognition (Ehri, 2014). Another theoretical framework that guides this research and emphasizes the importance of understanding how children learn to read words from memory accurately and automatically is Ehri's (2005) orthographic mapping. Orthographic mapping (OM) explains how children learn to read words by sight, spell words from memory, and acquire vocabulary words from print (Ehri, 2005a). Orthographic mapping (OM) involves the formation of letter-sound connections to bond the spellings, pronunciations, and meanings of specific words in memory OM involves the formation of letter-sound connections to bond the spellings, pronunciations, and meanings of specific words in memory (Ehri, 2014). Furthermore, one of the most widely accepted theories of reading development that demonstrates the complex and multidimensional nature of reading acquisition is Ehri's phase theory (Ehri, 2002, 2005a).

Phase Theory. Ehri's phase theory (Ehri, 2002, 2005a) of word reading development postulates that students master multiple word reading phases on the path to proficient reading. Ehri (2005a) specifically stated that students might use multiple approaches to reading words but that the predominant approach determines the reader's phase the reader uses at a given time. Ehri articulated how in each phase, bonds of specific word features (e.g., letter sounds, syllables, words) are encoded in memory through experience, instruction, practice, and repetition (Harn, Stoolmiller, & Chard, 2008). Pre-alphabetic phase occurs prior to any alphabetic knowledge.

Identification does not involve making any letter-to-sound connections. Connections are made between some visual features (called cues by Ehri) of the word and their pronunciation or semantic representation. In the partial alphabetic phase, the reader uses a combination of reading some letters in words and using these to attempt pronunciation; the first and final letters are usually the most important within this phase. Ehri coined 'phonetic cue reading' to characterize the phase (Beech, 2005). As students become more familiar with printed letters and sounds, they enter the complete alphabetic phase. Now, even without prior exposure, students can read short words through their learned strategy of using common letter sounds and blending. Students in this phase, typically in first grade, often display a "painstaking decoding" approach to reading unknown words (Ehri & Snowling, 2004). After multiple successful word-reading experiences, readers will soon identify simple word types without attending to the individual letter-sound associations, beginning the unitization process and making word reading much more efficient (Harn, Stoolmiller, & Chard, 2008). With continuing practice at reading in this final phase, the consolidated alphabetic phase, recurring letter patterns become consolidated or unitized. In this phase, unitization becomes the common approach to reading unknown words. In addition to storing known words as units for automatic recognition and understanding, repeated encounters with words allow a reader to store frequently encountered letter patterns across different words. For example, once a student learns the word "light" if he or she develops an instant recognition of the unit "-ight" he or she can use this knowledge to quickly decode new words such as flight, tight, and so on (Beech, 2005; Harn, Stoolmiller, & Chard, 2008). Ehri discusses the advantages of this process for reducing memory load; for example, the word 'chest' might be processed only as two units "ch" and "-est" in the consolidated phase compared with four (ch, e, s, t) in the full alphabetic phase (Beech, 2005). Students with this skill could decode nonwords with the same

approach. If the nonword were "symight" the student would connect the two units "sym" and "–ight" (Harn, Stoolmiller, & Chard, 2008). Perfetti and Hogaboam (1975) found that the most prominent characteristic of proficient third- and fifth-grade readers was their reading multisyllabic nonwords and not their skills in reading sight words or more complex actual words.

A central argument in Ehri's theory is that subtle changes in word reading skills carry important instructional implications that are accurate and represent a missed opportunity in most students' reading instruction. Furthermore, the theory emphasizes developing unitization and automaticity impacting instruction and assessment. Schools need data that can be readily gathered and are instructionally relevant to support more efficient instruction (Harn, Stoolmiller, & Chard, 2008). Furthermore, Researchers need standardized and validated measures that elucidate critical changes in word reading development to understand better reading proficiency, which has yet to be identified or agreed upon (Ehri, 2005a; Fuchs, Fuchs, & Compton, 2004; Verhoeven & Perfetti, 2003).

Simple View of Reading. Finally, Hoover and Gough (1990) Simple View of Reading identifies decoding and linguistic comprehension as necessary for skilled reading. The simple view hypothesizes that the combination of decoding ability and linguistic comprehension substantially contributes to explaining variations in reading comprehension. According to the authors, decoding does not necessarily have to precede linguistic comprehension. Decoding is defined as efficient word recognition: the ability to rapidly derive a representation from printed input that allows access to the appropriate entry in the mental lexicon and, thus, the retrieval of semantic information at the word level. Furthermore, linguistic comprehension is taking lexical information and deriving sentence and discourse interpretations. The authors felt that one of three conditions results in poor reading, decoding is adequate but linguistic comprehension is

weak. Linguistic comprehension is adequate, but decoding is weak. Both linguistic comprehension and decoding are weak. Therefore, the simple view established a trajectory for developing phonemic awareness and letter identification to predict phonological outcomes for kindergarten students.

Summary

Phonological awareness is a precursor to success in the ability to decode words (Adams, 1990). Reading programs that include phonological awareness training have been shown to be successful in classrooms (Blachman, 1989; Wise, Ring, & Olson, 1999). Reading instruction can help children learn the components of phonological awareness. Some studies have found a direct link between the growth of vocabulary and phonological awareness (Beattie & Manis, 2014). Phonological awareness is on a continuum but separate from phonemic awareness. Phonemic awareness refers to isolating and manipulating phonemes in spoken words. (Ehri & Roberts, 2006). Phonological awareness focuses on the sounds in speech. For this dissertation, the task for assessing phonological awareness will include the ability to remove phonological segments from spoken words to form other words. For example, "Say toothbrush. Now say toothbrush without saying tooth." This dissertation focuses on the growth of phonological awareness, the ability to remove phonological segments from spoken words to form other words, and its contribution to letter sound correspondence.

The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Foorman et al. (2003) recommended that alphabetic principle instruction is more effective when combined with phonemic awareness instruction. Students who struggle to gain control of the alphabetic principle fail to develop early, successful word-reading skills (Stanovich, 1986). Many

researchers have identified alphabetic knowledge (letter-name and letter-sound knowledge) and phonological awareness as critical skills for developing reading skills. Young-Suk, Petscher, Foorman, & Chengfu (2010) examined the contribution of phonological awareness to facilitating letter-sound acquisition from letter names and the probabilities of letter-sound acquisition as a function of letter characteristics. Cummings et al. (2011) researched the relationship between initial skills and rate of progress on a measure of the alphabetic principle, Nonsense Word Fluency (NWF), to first grade reading outcomes as measured by Oral Reading Fluency (ORF). Developmental spelling stems from studying the phonetic logic behind a child's spelling strategies. The more experience children have with print and knowledge of the spelling system, the greater their ability to form complete letter sound connections and use blending to decode unfamiliar words. These repeated exposures to a particular word help strengthen it in memory until, finally, the spelling is sufficient to elicit word pronunciation (Ganske, 1999).

Method

A quantitative research design was used to evaluate the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders.

Research-Questions

The research questions guiding the study:

1. How do the supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first graders?
2. How do the supplemental weekly word and phonemic awareness lessons impact spelling development among kindergarten and first graders?

From these questions, it was hypothesized that supplemental phonemic awareness instruction directly affects phonological awareness and spelling development.

Setting

A 16-week pre-posttest quantitative study was conducted with 150 kindergarten and first grade students; to explore the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development. One elementary school in a small rural school district in Eastern Kentucky was selected for inclusion in this study. Because existing empirical research examined the growth of letter naming, phonological awareness, and spelling knowledge of kindergarten students attending schools within a large, urban school, it is vital to investigate the growth of phonological awareness and spelling development of children in rural Appalachia to contribute to existing research. The school selected for the study is part of a small independent school system in Eastern Kentucky's mountains. Much of the economy in Hazard, with a population of 5,000, is powered by the coal industry. Many jobs have been lost in the past

several years because mines have shut down. Some families were forced to relocate for work. Others were forced to seek assistance from public assistance agencies, drastically affecting the school's free/reduced lunch numbers and increasing the number of students and families using the Family Resource Center. With the increased number of free and reduced lunch recipients, the selected school participated in the Community Eligibility Provision under the National School Lunch Program. The school was designated as a school-wide title one school, meaning at least 40 percent of its students live in poverty and require financial assistance. With a total enrollment of 484 students in grades K-4, 63% qualify for free lunch (Kentucky Department of Education, 2018).

Sampling

Previous research have revealed phonological awareness and letter sound correspondence are essential processes in early reading development (Adams, 1990; Foorman et al., 2003; Moats, 2000; Torgesen et al., 2005). Additionally, researchers have identified alphabetic knowledge (letter-name and letter-sound knowledge) and phonological awareness as critical skills for developing reading skills. Therefore, this study investigates evaluate the impact of supplemental phonemic awareness lessons on phonological awareness and spelling development among kindergarten and first graders. The superintendent and building principal agreed to allow all kindergarten and first grade students to participate in this study. An informational meeting was conducted, and classroom teachers were provided with an information packet, including explanatory letters describing the dissertation project and parental consent forms. A total of 155 informational packets were distributed to teachers, administrators, instructional coaches, and students. Students were incentivized to return the consent form within a week of distribution. 144 consent forms were returned within a week for a response rate of 98%. The final three were

returned after the homeroom teachers sent Dojo messages. All 144 students in kindergarten and first grade participated in the study. The school within which the study occurred had three kindergarten classes and four first-grade classes, totaling 144.

Participants

Participants of this study were in kindergarten and first grade. Kindergarten was selected because many kindergarten children from disadvantaged backgrounds often enter formal schooling lagging behind others in their early literacy development. As a result, they are at risk of later reading difficulties (National Research Council, 1999). Upon entering kindergarten, children lacking competent alphabet knowledge need explicit instruction focused on letter identity, letter naming, and the writing of letters. These capabilities enable them to successfully transition into letter sounds and spellings (Schatschneider et al., 2004). First grade was selected because research syntheses (Foorman et al., 2016) have found that success in early literacy subskills such as letter naming knowledge and phonological awareness requires explicit instruction. That may be essential to closing the early literacy development gap. The school within which the study is occurring has three kindergarten and four first-grade classes totaling 150. A stratified random assignment of classrooms was used to select and assign classrooms to condition.

A stratified random assignment of classrooms was used to select and assign classrooms to condition. Four classrooms, two from kindergarten and two from first grade were assigned treatment, and the three remaining classrooms continued regular instructional activities. The three control group classes included two kindergarten classes and one first-grade class. The teachers from each grade were sorted, alphabetized, and numbered; a random number generator was used twice to select two numbers for each grade. The classrooms assigned those numbers

were then chosen for the treatment in the study of 82 students, 39 kindergarten students and 43 first grade students. The remaining 62 students, 39 kindergarten and 23 first grade students, continued with regular instruction. Teachers in the control group continued regular instructional practices. Teachers in the treatment group received training and guided lessons implementation of practical, weekly word study lessons (Words Journeys) and 10-15 minute daily phonemic awareness instruction (Phonemic Awareness in Young Children).

Throughout the 16-week study, there was some participant attrition. Three kindergarten students in the treatment group did not participate in the post-test because they had moved to the county school district. One kindergarten student in the treatment group and two first grade students in the control group did not participate in the post-test because they were absent during the week of the post-test. The analysis did not include data for the six partially assessed students. Therefore, at the end of the study, 144 total students participated, 82 in the treatment group and 62 in the control group. Of the total students participating in the study, 48% were female, and 52% were male. The researcher was given access to each participating class's roster from Infinite Campus. The roster included the student's first and last name, identification number, and birthday. At the first pre-test session, the mean age for the kindergarten students was six years ten months, and first grade students were seven years four months. It is important to note that 24 participating kindergarten students were repeating kindergarten.

Data Collection

The researcher was the only examiner for this study. The researcher had previously completed coursework in reading assessment, including training with CTOPP-2, KIDS, and DSA. The researcher completed the pre-test before conducting the random selection and was blind to which classrooms had a smaller mean on each assessment. Before the pre-test

administrator, the examiner met to review the testing procedures with the dissertation chair, who also had previous training and administered all the previously mentioned assessments multiple times. The examiner administered the tests in one classroom of kindergarten students and one classroom of first grade students in another school not included in the study. Additionally, the examiner reviewed the directions, procedures, and assessment protocols on the morning of each testing session before working with the students. It took two weeks to administer all assessments to every student participating in the study. All students in kindergarten were assessed the first week, and all the students in first grade were assessed the following week.

Measures

The assessment battery included phonological awareness and spelling development measures. Two assessments were administered to all kindergarten and first grade students on a pre-posttest basis throughout the 16-week study.

Phonological Awareness. The Comprehensive Test of Phonological Processing (CTOPP-2) assessed phonological awareness in all participants. CTOPP-2 is a comprehensive instrument to assess phonological awareness, phonological memory, and rapid naming. The CTOPP-2 measures the ability to remove phonological segments from spoken words to form other words. For this study, only one of the CTOPP-2 subtests, the Elision subtest, was administered.

Spelling Development. Letter sound correspondence, or the relationship of the letters in the alphabet to the sounds they produce, is a key component of the alphabetic principle and learning to read. Letter sound correspondence is the initial stage of spelling development. The Kindergarten Inventory of Developmental Spelling (KIDS) was administered to measure the spelling development of kindergarten students. The KIDS

measures the student's ability to identify letters and sounds. The Developmental Spelling Analysis (DSA) was administered to assess first grade students' spelling development. The words were designed to show students' knowledge of key spelling features related to the different spelling stages.

Assessment Procedures

CTOPP-2. For this study, only one of the CTOPP-2 subtests, the Elision, was administered. The CTOPP-2 measures the ability to remove phonological segments from spoken words to form other words. The student was asked to repeat a word and then asked to say the word without saying either the first or last phonological segment. For example, "Say toothbrush. Now say toothbrush without saying tooth." The student was given practice items prior to starting the assessment. Students received one point for a correct answer and a zero for an incorrect answer, for 20 possible points. The assessment was stopped once the student missed three items in a row.

KIDS. Form A was used for the pre-test, and Form B was used for the post-test. Each test consisted of five words; the examiner dictated each word in order and used a short sentence to describe the word. For example, "We are going to write some words. Listen to me and watch what I do as I write a word. First, I will say the word I want to spell, map. Now I will repeat it, but this time I will say it slowly to stretch it out, just like I can stretch out this rubber band. That way, I can try to hear all of the sounds. Mmmm-aaaa-ppp (Stretches the rubber band while saying the word.) Now I need to think about all of the sounds I hear. Let us listen carefully. Mmmm. I hear an /m/ sound at the beginning, so that I will write the letter m. Mmmm-aaaa. After the /m/, I hear an /ā/ sound so. I will write the letter a. Mmmm-aaaa-p, mmm-aaa-ppp. At the end of the word, I hear a /p/ sound, so I will write "p." I think "map" is spelled m-a-p. Now, I

was hoping you could write some words that I am going to say. Stretch out the word and listen carefully. Then do your best to put down the sounds you are unsure of. If you forget how to write a letter, use the alphabet strip at the top of your paper." If students were stalled on a word, they were prompted with, "What other sounds do you hear?" Each word was analyzed individually. The examiner used the KIDS score guide to score the spellings and award points as follows: 6 = Correct Spelling (Jam), 5 = Phonetically correct beginning, middle, and ending sounds (Gam, Jem, Gem, Jame, Game), 4 = Phonetically correct beginning and ending sounds (Jm, Gm, Jma, Gma), 3 = Phonetically correct beginning sound (J, G, or random letters), 2 = Phonetically correct ending sound (M or random letters), 1 = Random letters or letter from the name: no sound connection (random letters), and 0 = scribbles, waves, letter-like symbols.

DSA. The Developmental Spelling Analysis (DSA), Form A letter name feature list, was administered to assess first grade students' letter sound correspondence. The Developmental Spelling Inventory Screener is a 25-word spelling test administered to the examiner. To complete this test, the examiner administered it to small groups of students, one word at a time. For example, the examiner would say aloud to the group that the first word is "hen, the hen laid an egg. hen." The students then printed the word on a DSA response sheet. The examiner then proceeded to the next word. When a student could not spell three words in a row, the test was discontinued to minimize student frustration.

Analysis Design

The research questions were examined with a mixed design full factorial ANOVA with one 2-level within factor (fall and spring) and one 2-level between factor (treatment -control) and the interaction of time by the group. The sample was separated by grade resulting in replicated models for phonological awareness and separate models for spelling development.

Students were assessed in December and again in April during the 2018 school year using the same testing procedures. All assessments occurred between 7:00 am-11:00 am for 15 consecutive school days. To administer the C-TOPP-2, students were taken individually from their classrooms for approximately 10-15 minutes at different times throughout the morning. To administer the KIDS, students were taken in groups of 4 for approximately 10-15 minutes at different times throughout the morning. To administer the DSA, students were taken in groups of 6 for approximately 20-30 minutes at different times throughout the morning. The examiner went to the classroom to greet each participant or group of participants and generally talked about his or her interests while walking to the examination room. Students were assessed in a quiet room with tables and chairs away from their regular classroom. The examiner sat across from the student(s) and read a prepared script with the standardized CTOPP-2, KIDS/DSA. This CTOPP-2 was given to an entire class first, followed by the KIDS/DSA. This sequence was chosen to separate the tasks to maintain student engagement.

In each testing session, as directed by the assessment protocol, the examiner administered practice tasks with students to ensure that children understood the tasks. On sample tasks, students were prompted and given feedback. For example, on the CTOPP-2, students were prompted with a word, "Say toothbrush. Now say toothbrush without saying tooth." The practice tasks for the KIDS/DSA were similar. For example, "First, I will say the word I want to spell, map. Now I will repeat it, but this time I will say it slowly to stretch it out, just like I can stretch out this rubber band. That way, I can try to hear all of the sounds. Mmmm-aaaa-ppp (Stretches the rubber band while saying the word.) Now I need to think about all of the sounds I hear. Let us listen carefully. Mmmm. I hear an /m/ sound at the beginning; I will write the letter m. Mmmm-aaaa. After the /m/, I hear an /ā/ sound and will write the letter a. Mmmm-aaaa-p, mmm-

aaa-ppp. I hear a /p/ sound at the end so I will write p. I think "map" is spelled m-a-p." Once formal testing began, students were no longer given specific feedback, and when students asked the examiner to repeat a word, the examiner did repeat the word; however, the examiner only replied with general encouragement such as "try your best," when asked specific questions about each assessment.

Four classrooms were assigned as the treatment group and received the intervention, two kindergarten classrooms with 39 students and two first grade classrooms with 43 students. The three control group classes included two kindergarten classes of 39 students and one first-grade class of 23 students. The control group was much smaller than the treatment group because 24 previous kindergarten students were repeating kindergarten, making four classrooms for kindergarten and leaving only three for first grade. The three remaining classrooms continued regular instructional activities and received no intervention.

SPSS 26 was used to analyze the impact of supplemental phonemic awareness lessons on phonological and spelling development among kindergarten and first graders. Independent sample t-tests were used to analyze the difference between the control and treatment groups. An ANOVA was used to compare variances across the means of the control and treatment groups.

Summary

Quasi-experimental design featuring treatment and control groups was used to evaluate the impact of an instructional intervention on the growth of phonological awareness, letter sound correspondence, and spelling development. This chapter discussed the participants, setting, data collection, reliability, and validity of measures employed and analysis. Data were collected from 144 kindergarten and first grade students from an eastern Kentucky elementary school. The results of the analysis are presented in chapter four.

Results

This study aimed to evaluate the impact of an instructional intervention of phonemic awareness on the growth of phonological awareness and spelling development; a 16-week pre-posttest quantitative study was conducted with a sample of 150 kindergarten and first grade students from a small rural school in Eastern Kentucky. A stratified random assignment of classrooms was used to select and assign classrooms to a condition. Classes were randomly assigned to a treatment group that received supplemental instruction on word study and phonemic awareness or a control group that did not receive the supplemental instruction. Pre-intervention and post-intervention assessments were used to determine changes in the two groups. Raw scores on the CTOPP-2 assessment were used to measure phonological awareness. Raw scores on the KIDS or DSA assessments were used to measure letter sound correspondence. Each research question was initially examined with independent t-tests to identify differences between treatment and control groups for the fall and spring scores. The research questions were examined with a mixed design full factorial analysis of variance (ANOVA) with one 2-level within factor (fall and spring) and one 2-level between factor (treatment -control) and the interaction of time by group. The sample was separated by grade resulting in replicated models for phonological awareness and separate models for spelling development. These relationships were examined through the following research questions.

1. How do the supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first graders?
2. How do the supplemental weekly word and phonemic awareness lessons impact spelling development among kindergarten and first graders?

The results of the independent sample t-test and ANOVA for 144 kindergarten and first grade students are presented in this chapter. The descriptive data presented in tables 1 – 10 and figures 1-4 indicate there is measurable growth from the Fall to the Spring in each measure for both groups.

Research Question One

How do the supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first graders?

The results for the impact of supplemental weekly word and phonemic awareness lessons on phonological awareness among kindergarten and first grade students found that in kindergarten, the mean test score for the treatment group for fall ($M = 3.08$, $SD = 2.06$). The mean test score for the treatment group for the spring ($M = 4.85$, $SD = 2.29$). In kindergarten, the mean test score for the control group for fall ($M = 4.21$, $SD = 2.72$) The mean test score for the control group for spring ($M = 6.46$, $SD = 2.85$). There was variance between the means of the treatment and control groups. In the fall, the control group's mean was higher than the treatment group. A paired-sample t-test conducted to compare the means of the two groups' revealed statistical significance between the treatment and the control group in both the fall ($p = .042$) and the spring ($p = .007$). The effect size for the difference between the groups was calculated using Cohen's d. The ANOVA results ($p = .001$) revealed a statistical significance for Time (Fall-Spring) with a medium effect size ($\eta_p^2 = .42$). The ANOVA results ($p = .007$) revealed a statistical significance for the group (treatment-control) with a small effect size ($\eta_p^2 = .09$). The ANOVA results ($p = .372$) revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .01$). Both groups grew.

In first grade, the mean test score for the treatment group for fall ($M = 4.72$, $SD = 3.73$). The mean test score for the treatment group for spring ($M = 10.47$, $SD = 5.00$). The mean test score for the control group for spring ($M = 3.00$, $SD = 1.68$). The mean test score for the control group for spring ($M = 8.91$, $SD = 5.21$). There was variance between the means of the treatment and control groups. In the fall, the treatment group's mean was higher than the control group. A paired-sample t-test conducted to compare the means of the two groups p-value in the t-test results revealed there is statistical significance between the treatment and the control group in both the fall ($p = .01$). However, there is no statistical significance in the spring ($p = .24$). The effect size for the difference between the groups was calculated using Cohen's d. The ANOVA results ($p = .001$) revealed a statistical significance for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .63$). The ANOVA results ($p = .087$) revealed no statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .045$). The ANOVA results ($p = .879$) revealed no statistical significance for Time X Group interaction with a small effect size ($\eta_p^2 = .00$). Both groups grew.

Table 1

Kindergarten Phonological Awareness t-test Results Between Treatment and Control Groups

CTOPP-2	Treatment		Control		<i>p</i>	<i>t</i> (76)	<i>Cohen's d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Fall	3.08	2.06	4.21	2.72	.042	-2.07	.47
Spring	4.85	2.29	6.46	2.85	.007	-2.76	.62

*** $p < .05$.

Table 2

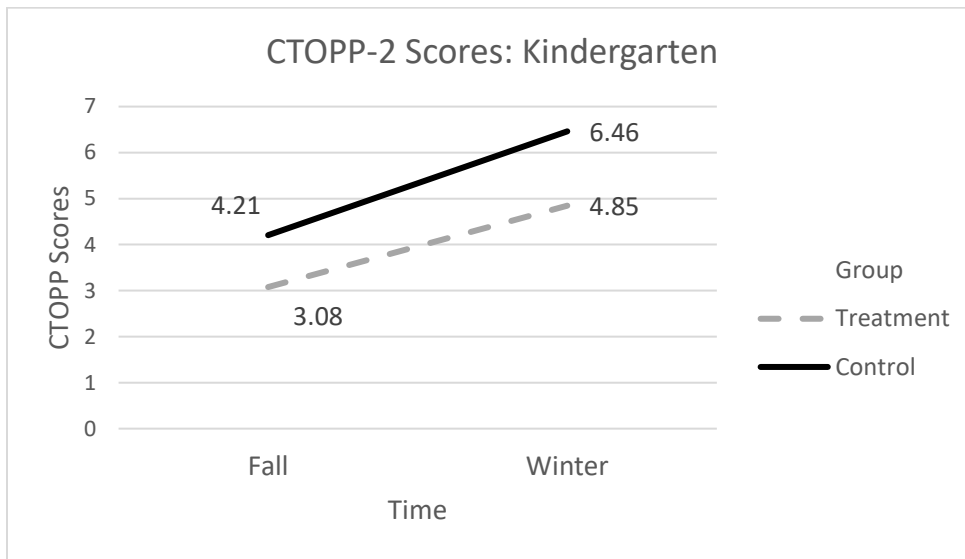
First Grade Phonological Awareness t-test Results Between Treatment and Control Groups

CTOPP-2	Treatment		Control		<i>p</i>	<i>t</i> (64)	<i>Cohen's d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Fall	4.72	3.73	3.00	1.68	.01	2.10	.54
Spring	10.47	5.00	8.91	5.21	.25	1.84	.31

****p* < .05.

Figure 1

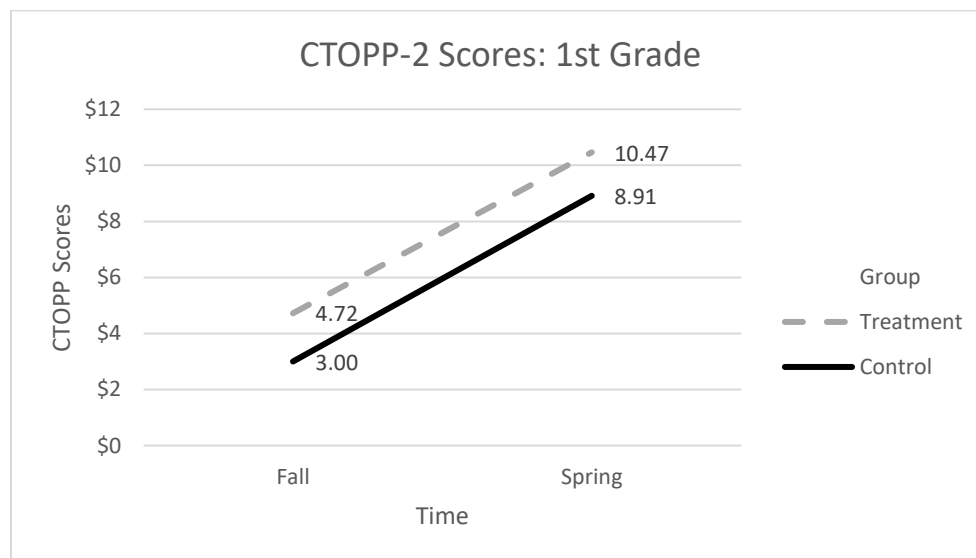
Phonological Awareness (CTOPP-2) Mean Scores for Kindergarten



Note. Heterogeneity exists between the treatment group and control group.

Table 3*Kindergarten Phonological Awareness (CTOPP-2) ANOVA Effects*

Predictor	df	F	<i>p</i>	η_p^2
Time	1, 76	55.04	.001	.42
Group	1, 76	7.62	.007	.09
Time x Group	1, 76	.81	.372	.01

****p* < .05.**Figure 2***Phonological Awareness (CTOPP-2) Mean Scores for First Grade*

Note. Heterogeneity exists between the treatment group and control group.

Table 4*First Grade Phonological Awareness (CTOPP-2) ANOVA Effects*

Predictor	df	F	<i>p</i>	η_p^2
Time	1, 64	110.4	.001	.63
Group	1, 64	3.01	.087	.045
Time x Group	1.64	.023	.879	.00

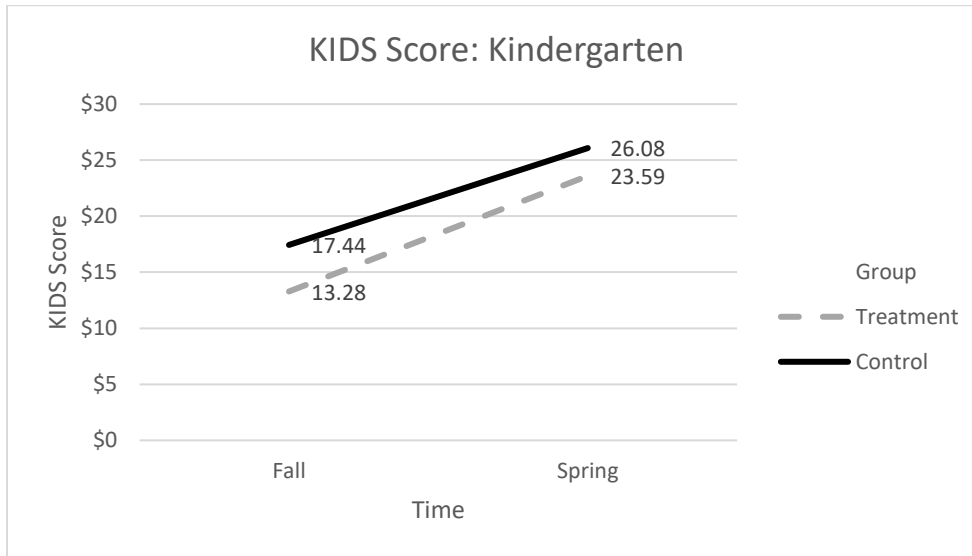
****p* < .05.**Research Question Two**

How do the supplemental weekly word and phonemic awareness lessons impact spelling development among kindergarten and first graders?

The results for the impact of supplemental phonemic awareness spelling development among kindergarten and first grade students found that in kindergarten, the mean test score for the treatment group for fall ($M = 13.28$, $SD = 7.72$). The mean test score for the treatment group for the spring ($M = 23.59$, $SD = 7.49$). In kindergarten, the mean test score for the control group for fall ($M = 17.44$, $SD = 8.92$) The mean test score for the control group for spring ($M = 26.08$, $SD = 7.67$). There was variance between the means of the treatment and control groups. In the fall, the control group's mean was higher than the treatment group. A paired-sample t-test conducted to compare the means of the two groups' revealed there is statistical significance between the treatment and the control group in both the fall ($p = .03$). However, no statistical significance in the spring ($p = .15$). The effect size for the difference between the groups was calculated using Cohen's *d*. The ANOVA results ($p = .001$) revealed a statistical significance for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .63$). The ANOVA results ($p = .041$) revealed a statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .05$). The ANOVA

results ($p = .32$) revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .01$). Both groups grew.

In first grade, the mean test score for the treatment group for fall ($M = 12.12$, $SD = 7.23$). The mean test score for the treatment group for spring ($M = 20.21$, $SD = 4.97$). The mean test score for the control group for spring ($M = 6.22$, $SD = 3.18$). The mean test score for the control group for spring ($M = 17.48$, $SD = 5.86$). There was variance between the means of the treatment and control groups. In the fall, the treatment group's mean was higher than the control group. A paired-sample t-test conducted to compare the means of the two groups p-value in the t-test results revealed there is statistical significance between the treatment and the control group in both the fall ($p = .001$) and the spring ($p = .05$). The effect size for the difference between the groups was calculated using Cohen's d. The ANOVA results ($p = .001$) revealed a statistical significance for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .72$). The ANOVA results ($p = .001$) revealed a statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .15$). The ANOVA results ($p = .038$) revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .065$). Both groups grew.

Figure 3*Kindergarten Inventory of Developmental Spelling (KIDS) Mean Scores*

Note. Heterogeneity exists between the treatment group and control group.

Table 5*Kindergarten Inventory of Developmental Spelling (KIDS) ANOVA Effects*

Predictor	df	F	<i>p</i>	η_p^2
Time	1, 76	127.51	.001	.63
Group	1, 76	4.32	.041	.054
Time x Group	1, 76	.97	.32	.013

****p* < .05.

Table 6

KIDS t-test Results Between Treatment and Control Groups

KIDS	Treatment			Control			<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>		
Fall	39	13.28	7.72	39	17.44	8.92	.03	.50
Spring	39	23.59	7.49	39	26.08	7.66	.15	.33

****p* < .05.

Figure 4

Developmental Spelling Assessment (DSA) Mean Scores for First Grade

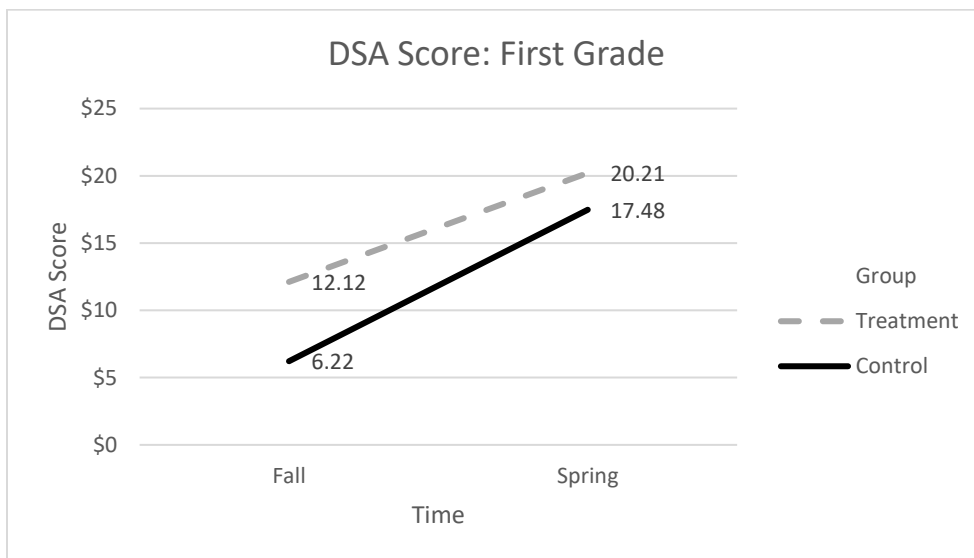


Table 7*First Grade Spelling Development (DSA) ANOVA Effects*

Predictor	df	F	<i>p</i>	η_p^2
Time	1, 64	166.77	.001	.72
Group	1, 64	11.39	.001	.15
Time x Group	1, 64	4.47	.038	.065

****p* < .05.**Table 8***First Grade DSA t-test Results Between Treatment and Control Groups*

DSA	Treatment			Control			<i>p</i>	Cohen's d
	n	M	SD	n	M	SD		
Fall	43	12.12	7.23	23	6.22	3.18	.001	.96
Spring	43	20.21	4.97	23	17.48	5.86	.065	.56

Pearson's correlation coefficient was computed to determine the relationship between fall kindergarten CTOPP-2 scores and fall KIDS scores, between spring kindergarten CTOPP-2 scores and spring KIDS score, between fall first grade CTOPP-2 scores and fall DSA scores, and between spring first grade CTOPP-2 scores and spring DSA scores. Among the kindergarten students there are significant positive linear relationship between all 4 of the measures: CTOPP-2 fall and CTOPP-2 spring ($r = .57, p < .001$), there is also a positive linear relationship between CTOPP-2 fall and KIDS fall ($r = .67, p < .001$), CTOPP-2 fall and KIDS spring ($r = .49, p < .001$), CTOPP-2 spring and KIDS fall ($r = .64, p < .001$), CTOPP-2 spring and KIDS spring ($r = .56, p < .001$), and KIDS fall and KIDS spring ($r = .59, p < .001$).

Among the first grade students there are significant positive linear relationship between all 4 of the measure, between CTOPP-2 fall and CTOPP-2 spring ($r = .55, p < .001$). There is also a positive linear relationship between CTOPP-2 fall and KIDS fall ($r = .72, p < .001$), between CTOPP-2 fall and KIDS spring ($r = .53, p < .001$), between CTOPP-2 spring and KIDS fall ($r = .55, p < .001$), between CTOPP-2 spring and KIDS spring ($r = .64, p < .001$), and between KIDS fall and KIDS spring ($r = .54, p < .001$).

Table 9

Pearson Correlation Coefficients for Kindergarten

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4
CTOPP-2_Fall	78	3.64	2.46	-			
CTOPP-2_Spr	78	5.65	2.70	.57**	-		
Kids_Fall	78	16.05	8.70	.67**	.64**	-	
Kids_Spring	78	25.25	7.63	.49**	.56**	.59**	-

^aCorrelation is significant at the 0.01 level (2-tailed).

Table 10

Pearson Correlation Coefficients for First Grade

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4
CTOPP-2_Fall	66	4.12	3.26	-			
CTOPP-2_Spr	66	9.92	5.09	.55**	-		
Kids_Fall	66	10.06	6.73	.72**	.55**	-	
Kids_Spring	66	19.26	5.42	.53**	.64**	.54**	-

^aCorrelation is significant at the 0.01 level (2-tailed).

Assumptions

It is important to note that when measuring phonological awareness and spelling development in kindergarten, the treatment group started slightly higher than the control group. When measuring the phonological awareness and spelling development in first grade, the control group started slightly higher than the control group. In no instance was the pre-intervention measure in the fall equal between the treatment and control groups. The ANOVA results for kindergarten phonological awareness revealed a statistical significance for Time (Fall-Spring) with a medium effect size and a statistical significance for the group (treatment-control) with a small effect size, and no statistical significance for Time X Group interaction with a small effect size. The ANOVA results for first grade phonological awareness revealed a statistical significance for Time (Fall-Spring) with a large effect size, no statistical significance for groups (treatment-control) with a small effect size, and no statistical significance for Time X Group interaction with a small effect size. The ANOVA results for kindergarten spelling development revealed a statistical significance for groups (treatment-control) with a small effect and no statistical significance for Time X Group with a small effect size. The ANOVA for first grade spelling development revealed a statistical significance for Time (Fall-Spring) with a large effect size, a statistical significance for groups (treatment-control) with a small effect, and no statistical significance for Time X Group with a small effect size.

In all instances, the gains made by the treatment group were not significant enough to eliminate the gap between the treatment and control groups. Except for the first grade DSA results, the interaction term was insignificant. The low effect indicates the magnitude of the gains made from fall to spring in both groups. Treatment and control groups started at different levels violating the assumption of homogeneity. The researcher lacked the experimental controls with

the potential sharing of intervention materials could not control the bleed-over effect. A threat to the internal validity is acknowledged in the sequencing of the assessments, which comprise the CTOPP-2, the KIDS, and the DSA was administered to each classroom in one setting.

Summary

The results for supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first grade students. Results found that the kindergarten control group saw a 53% growth in phonological awareness from fall to spring. The treatment group saw a 57% growth in phonological awareness from fall to spring. In first grade, the control group saw a 197% growth in phonological awareness from fall to spring. The treatment group saw a 122% growth in phonological awareness from fall to spring. For spelling development for each grade, kindergarten, the control group saw a 50% growth in spelling development from fall to spring. The treatment group saw a 78% growth in spelling development from fall to spring. In first grade, the control group saw an 181% growth in spelling development from fall to spring. The treatment group saw a 67% in spelling development from fall to spring.

Discussion

This dissertation study aimed to examine the impact of supplemental phonemic awareness instruction on phonological awareness and spelling development. The goal was to evaluate how supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first graders. Furthermore, to examine if the supplemental weekly word and phonemic awareness lessons impact spelling development among kindergarten and first graders. Weekly observations revealed that phonemic and word study instruction were consistently implemented in all four-treatment group classrooms.

The quantitative study was conducted using a 16-week intervention, treatment and control groups, and pre-posttest measures, with a sample of 150 kindergarten and first grade students from a small rural school in Eastern Kentucky. The significance between a control and treatment group was examined in phonological awareness and spelling development. This dissertation addressed two specific research questions:

1. How do the supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first graders?
2. How do the supplemental weekly word and phonemic awareness lessons impact spelling development among kindergarten and first graders?

From these questions, it was hypothesized that phonemic awareness would directly affect phonological awareness and spelling development. Further, it was expected that letter sound correspondence and phonological awareness would directly affect students' spelling development. Two assessments were administered to evaluate the hypothesis; the Comprehensive Test of Phonological Processing (CTOPP-2) was used to assess phonological awareness in all kindergarten and first grade students. The Kindergarten Inventory of

Developmental Spelling (KIDS) was administered to measure spelling development in kindergarten students. The Developmental Spelling Analysis (DSA) was administered to assess first grade students' letter sound correspondence.

Key Findings

The treatment and control groups showed significant phonological awareness and spelling development growth. This present study investigated the impact of supplemental phonemic awareness lessons on phonological and spelling development among kindergarten and first graders. In this present study, two assessments were administered to all kindergarten and first grade students on a pre-posttest basis. The Comprehensive Test of Phonological Processing (CTOPP-2) assessed phonological awareness. The Kindergarten Inventory of Developmental Spelling (KIDS) was administered to measure spelling development for kindergarten students. The Developmental Spelling Analysis (DSA) was administered to assess first grade students' letter sound correspondence. A stratified random assignment of classrooms was utilized to select and assign classrooms to a treatment or control group. The results for supplemental weekly word and phonemic awareness lessons impact phonological awareness among kindergarten and first grade students.

The impact of phonological awareness among kindergarten and first grade students was calculated with using an ANOVA. The effect size for the difference between the groups was calculated using Cohen's *d*. The ANOVA results for kindergarten revealed a statistical significance for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .63$). The ANOVA results revealed a statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .05$). The ANOVA results revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .00$). In first grade, the ANOVA results revealed a statistical significance

for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .72$). The ANOVA results revealed a statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .15$). The ANOVA revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .065$).

The impact of spelling development among kindergarten and first grade students was calculated using an ANOVA. The ANOVA results for kindergarten revealed a statistical significance for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .63$). The ANOVA results revealed a statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .05$). The ANOVA results revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .01$). Both groups grew. In first grade, the ANOVA results revealed a statistical significance for Time (Fall-Spring) with a large effect size ($\eta_p^2 = .72$). The ANOVA results revealed a statistical significance for group (treatment-control) with a small effect size ($\eta_p^2 = .15$). The ANOVA results revealed no statistical significance for Time X Group interaction, with a small effect size ($\eta_p^2 = .065$). Both groups grew.

These findings are consistent with the Alphabetic Principle (Moats, 2000). The alphabetic principle is the knowledge that letters, and letter combinations represent sounds in the oral language (Moats, 2000). The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Awareness of the alphabetic principle forms the developmental boundary between being an emergent reader who pretends- to read and being a novice reader who is bound to the print on the page (Stahl & Garcia, in press).

Theoretical Framework

The alphabetic principle, Ehri's phase theory, and Hoover and Gough's simple view of reading were combined to create a conceptual framework for this study. The alphabetic principle is the knowledge that letters, and letter combinations represent sounds in the oral language (Moats, 2000). The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Ehri's phase theory (Ehri, 2002, 2005a) of word reading development postulates that students master multiple word reading phases on the path to proficient reading. Ehri (2005a) specifically stated that students might use multiple approaches to reading words, but the predominant approach determines the reader's phase at a given time. Hoover and Gough (1990) simple view of reading identifies decoding and linguistic comprehension as necessary for skilled reading. The simple view hypothesizes that the combination of decoding ability and linguistic comprehension substantially contributes to explaining variations in reading comprehension.

Relationship between Phonological Awareness and Spelling Development

Phonological awareness is the purposeful ability to attend to and manipulate the sound structure of spoken words at the syllable, onset-rime, and phoneme levels (Gillon, 2004). An individual has phonological awareness when they are aware that words have constituent sounds and do not always hold meaning within a word (Goswami, 2000; Harris & Hodges, 1995). Phonological awareness was correlated with letter sound correspondence in both measurement periods, fall and spring. In the fall, growth trajectories for phonological awareness and letter sound correspondence were lowest; there was a significant correlation between phonological awareness and letter sound correspondence with a correlation (.717) and (.674). This supports the findings of previous researchers regarding a strong correlation between phonological awareness

and letter sound correspondence. The National Reading Panel (NICHD, 2000) determined that it was beneficial for letter work and phonological awareness training to support each other simultaneously. A child's letter sound knowledge is reliant on phonological sensitivity. Both rhyming ability and onset-rime awareness facilitate the child's ability to connect letter names and the sounds that letters make. For example, the beginning sound of b is /b/, and many alphabet letters rhyme, causing their only distinction to be the beginning sound (b, c, d, v). Having phonological awareness enables children to extract the letter sounds from within the letter names that they know. The ability to separate the onset from the rime or segment /b/- /e/ enables the child to hear and associate b with /b/ (Stahl, 2014). In addition, when growth trajectories for both phonological awareness and letter sound correspondence were highest, the correlation between the two was slightly less (.368) and (.555). This supports the work of earlier researchers, as both skills become more robust, the correlation between the two weakens. More importantly, phonological awareness and letter sound correspondence are essential processes in early reading development (Adams, 1990; Foorman et al., 2003; Moats, 2000; Torgesen et al., 2005). When students lack the essential cognitive processes or have underdeveloped processes, students have difficulty reading and comprehending grade level texts (Perfetti, 1985).

Furthermore, these findings also support what researchers have concluded about phonemic awareness's influence on letter sound correspondence. Phonological awareness develops on a continuum that moves from large to increasingly smaller units of sounds within words. This awareness ends with identifying phonemes, the smallest unit of sound in the English language, also called phonemic awareness (Paige et al., 2018). Children's experiences with written language dramatically influence phonological awareness development, especially the development of phoneme awareness. Children proficient in phonemic awareness can identify,

isolate, segment, blend, and delete phonemes in spoken language (Ehri & Roberts, 2006).

Phonemic awareness is grounded in oral language and is the foundation for reading development.

Children who cannot hear and work with the phonemes of spoken words will have difficulty relating them to graphemes (a letter or a number of letters that represent a phoneme in a word) when they see them in written words. This pre-phonics problem interferes with learning letter and sound connections (Brown, 2014).

Overall, the range of observed scores suggests a statistically significant growth in all variables from fall to spring. Developmental Spelling Assessment (DSA) means reveal significant gains from fall to spring in both the treatment and control group with a large effect Size, while both CTOPP-2 and Kindergarten Developmental Spelling Assessment (KIDS) revealed medium effect sizes. These findings contribute to the earlier research regarding the causal relationship between phonological awareness and spelling development. Phonological awareness is a precursor to success in the ability to decode words (Adams, 1990). Persuasive evidence now exists that concludes phonological awareness is hetero-typically continuous. That is, phonological awareness is a single, unified ability during the preschool and early elementary school years that manifests itself in different skills throughout a person's development (Anthony & Francis, 2005). Phonological awareness is recognized as one of the most robust predictors of early literacy success and hence has been at the forefront of literacy research and teaching practices over the past two decades, with explicit, smaller segment awareness identified as particularly integral to learning how to read (Bus & van Ijzendoorn, 1999; Caravolas, Volin & Hulme, 2005; Ehri et al., 2001). Phonological awareness skills develop at preschool ages and support reading skills during school. Adams (1990) uses five levels to describe the developmental progression of phonological awareness. The first begins with hearing the sounds

of words, followed by the ability to compare and contrast like-sounding words in the oddity task. For example, the teacher might ask the student, "Which word sounds different? /cat/, /mat/, or /dog/?" The third dimension is the awareness that words can be split into syllables (to-day) and blended back together. The fourth is the ability to split words into phonemes and put them back into a word (/dog/ into /d/ /o/ /g/ and then back to /dog/). The fifth and final dimension is the most difficult: isolate a phoneme within a word, delete it, and then replace it with another phoneme to form a new word. Schatschneider et al. (1999) add a sixth dimension where children develop sensitivity to alliteration, the ability to identify the beginning of words.

In learning to read, we ask children to match sounds to letters to learn graphophonemic relationships (Paige et al., 2018). When encountering sounds in a word, readers can tap their knowledge of letter-sound correspondences to identify letters and letter combinations (Ball & Blachman, 1991). This skill builds a helpful foundation as children learn to recognize letter patterns repeated across words (Seymour et al., 2003). Unsurprisingly, children who are taught to segment words into their phonological parts acquire word reading skills faster than children without these skills (Share et al., 2014).

Implications for Teaching

The current study illustrated that beginning readers, specifically those in kindergarten and first grade, is a time for the rapid growth of phonological awareness, letter sound correspondence, and spelling development. The development of the reading sub-components of orthographic knowledge, acquisition of letters, phonemic awareness, acquisition of sight word reading, spelling memory, and vocabulary determines the level of reading proficiency in children. Acquisition of these skills is essential to becoming a competent reader and is strongly correlated with one another in the development stages of each. Together these findings make a

compelling argument that phonological awareness and letter sound correspondence are essential in early reading development. Additionally, alphabetic knowledge (letter-name and letter-sound knowledge) and phonological awareness are critical for developing reading skills. Students need direct instruction and embedded instruction with phonological awareness and letter sound correspondence to strengthen their ability to decode words and develop their reading.

Primary classrooms must be language-rich environments, and reading programs include phonological awareness training. Reading programs that include phonological awareness training have proved successful in classrooms (Blachman, 1989; Wise, Ring, & Olson, 1999). Teachers must provide explicit instruction to enrich students' phonological awareness and letter sound correspondence skills. Students should be encouraged to listen to the individual phonemes and sounds in words and learn how to determine when words do not follow a specific rule in the English language. Furthermore, teachers should expose students to written words when explicitly teaching letter sound correspondence. Children's experiences with written language dramatically influence phonological awareness development, especially the development of phoneme awareness. Most children achieve minimal levels of phoneme awareness prior to literacy instruction. Learning the names of letters and the sounds they represent provides a concrete way to attend to phonemes, given that phonemes do not have a physical reality independent of each other (Anthony & Francis, 2005). Upon entering kindergarten, children lacking competent alphabet knowledge need explicit instruction focused on letter identity, letter naming, and the writing of letters. Alphabet knowledge in kindergarten and first grade predicts later literacy achievement. Alphabet knowledge includes identifying letter names (LN) and letter sounds (LS) and knowing how to form letters. Knowledge of letter-sound associations or the ability to match a letter with the sound it makes is related to the ability to sound out and spell words (Huang,

Tortorelli, & Invernizzi, 2014). Students cannot improve their phonological or letter sound correspondence skills if they are not provided daily direct instruction and practicing the skills.

Limitations

One limitation of this study is that the treatment and control groups could not randomly be selected from multiple schools. The school district where the study took place is small and only had one elementary school. There were a total of four kindergarten classrooms and three first grade classrooms. Therefore, there was equality in the number of students in both the control and treatment groups. The unbalanced design featured a more significant number of classrooms and students in the treatment group.

Another limitation of this study is that the data revealed a small effect size and no significance between the treatment and control groups. This could be attributed to one of four factors, the limited sample size, the sharing of materials between the treatment group and control group, the length of the study, or the significant inequalities between the groups on the pretests. Prior to the study, teachers and the principal at the participating school signed a consent to implement instruction to fidelity and refrain from sharing instructional materials with the control group. Weekly observations revealed that phonological instruction and word study instruction was consistently implemented in all four-treatment group classrooms; however, no further evidence was collected to monitor the sharing of instructional materials between the teachers in the control and treatment groups. The length of the study could have also resulted in a historical effect on the significance between the control group and the treatment group.

Finally, a threat to the internal validity is acknowledged in the sequencing of the assessments, which comprise the CTOPP-2 and the KIDS and DSA, which were administered to each classroom in one setting. Even though it added to a limitation of the study, the tests were

administered in a manner to minimize the loss of instructional time for each classroom. When multiple tests are administered in the same order, it can result in deflated scores on one of the tests; this phenomenon is known as administration order effects (Ryan, Glass, & Brown, 2010).

Future Research

This study examines phonological awareness, letter sound correspondence, and spelling development of kindergarten and first grade students. Future research might investigate students' phonological awareness, letter sound correspondence, and spelling development in grades 2-5. According to Anthony et al., (2003) research has uncovered the general sequence of phonological awareness development. Many phonological awareness tests have been administered to people of different ages, reading levels, and languages. Two overlapping patterns of development are evident. First, children become increasingly sensitive to smaller and smaller parts of words as they grow older. Children can detect or manipulate syllables before they can detect or manipulate onsets and rimes, and they can detect or manipulate onsets and rimes before they can detect or manipulate individual phonemes within intrasyllabic word units. Second, children can detect similar and dissimilar sounding words before manipulating sounds within words. Children can generally blend phonological information before segmenting phonological information of the same linguistic complexity (Anthony et al., 2003). Finally, children refine phonological awareness skills they have already acquired while learning new phonological awareness skills (Anthony et al., 2003), contrary to a strict stage theory of development. Future research might consider how these skills are developed in older children who lack phonological awareness and letter sound correspondence skills considering the alphabetic principle presents stages for spelling development. Knowledge of the alphabet and phonological awareness are strong predictors of later decoding and comprehension. Teaching these in combination

consistently improves students' later decoding and reading comprehension abilities (Shanahan & Lonigan, 2013). Many theorize that Alphabetic knowledge is a primary driving force in the emergence of phonological sensitivity at the phoneme level (Ouellette & Haley, 2013). These capabilities enable them to successfully transition into letter sounds and spellings (Schatschneider et al., 2004).

Additionally, literacy instruction outside of the treatment was considered a variable in the current study. The type and quality of literacy instruction play a significant role in students learning and development. Therefore, future research should consider how phonological awareness and letter sound correspondence are embedded in-whole group instruction to provide explicit instruction for all students during literacy. This does not include a guided reading group because, if implemented correctly, it is already differentiated to meet students' individual needs.

Conclusion

This study's results showed a significant positive relationship between phonemic awareness, phonological awareness, and spelling development. The theoretical frame of this study combines the Alphabetic Principle, Phase Theory, and the Simple View of reading, which gives a more complex assessment of the early reading process and affirms the need for incorporating phonemic awareness instruction to strengthen phonological awareness and spelling development. The association between sounds and letters is an early literacy skill needed to establish a foundation for decoding (Foorman et al., 2003; Torgesen et al., 2005). Foorman et al. (2003) recommended *that alphabetic principle* instruction is more effective when combined with phonemic awareness instruction. Students needing help to control the alphabetic principle fail to develop early, successful word reading skills (Stanovich, 1986). The results of the independent t-test and analysis of variance establish a significant positive linear relationship between all 4 of

the measures in both kindergarten and first grade students. It is unclear if the intervention of phonemic awareness supplemental lessons had an impact. Intentionally training teachers on how to teach early reading foundational skills is key to building competent readers and increasing reading achievement.

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Appendix

The Comprehensive Test of Phonological Processing (CTOPP-2)

Purpose: Use CTOPP-2 to assess phonological awareness, phonological memory and rapid naming in order to identify individuals who need help in developing phonological skills. The CTOPP-2 is a comprehensive instrument designed to assess phonological awareness, phonological memory, and rapid naming. People with deficits in one or more of these areas may have more difficulty with reading than those who do not. CTOPP-2 identifies individuals ages 4 through 24 who may benefit from instructional activities to enhance their phonological skills.

Academic Skills Areas

- Elision measures the ability to remove phonological segments from spoken words to form other words
- Blending Words measures the ability to synthesize sounds to form words
- Sound Matching measures the ability to select words with the same initial and final sounds
- Phoneme Isolation measures the ability to isolate individual sounds within words
- Blending Nonwords measures the ability to synthesize sounds to form nonwords
- Segmenting Nonwords measures the ability to segment nonwords into phonemes

Kindergarten Inventory of Developmental Spelling

Administration

1. We're going to write some words. Listen to me and watch what I do as I write a word.
First, I am going to say the word I want to spell, map.
2. Now I am going to say it again, but this time I am going to say it slowly so that I can stretch it out, just like I can stretch out this rubber band.
3. That way I can try to hear all of the sounds. Mmmm-aaaa-ppp (Stretches the rubber band while saying the word.)
4. Now I need to think about all of the sounds I hear.
5. Let's listen carefully. Mmmm. I hear an /m/ sound at the beginning, so I'm going to write the letter m. Mmmm-aaaa. After the /m/, I hear an /ă/ sound, so I'm going to write the letter a. Mmmm-aaaa-p ... mmm-aaa-ppp. At the end I hear a /p/ sound, so I am going to write p.
6. I think map is spelled m-a-p.
7. Now I want you to write some words that I am going to say. Stretch out the word and listen carefully. Then put down the sounds you're not sur, just do the best you can.
8. If you forget how to make a letter, you can use the alphabet strip at the top of your paper."
9. If students were stalled on a word, they were prompted with, "What other sounds do you hear?"

10. Say, Now I want you to spell some words. Put down a letter for each sound you hear.

You can use the alphabet strip at the top of your sheet if you forget how to make a letter. Ready?

Scoring

1. Each word was analyzed individually. The examiner used the KIDS score guide to score the spellings and award points as follows:
 - a. 6 = Correct Spelling (Jam)
 - b. 5 = Phonetically correct beginning, middle, and ending sounds (Gam, Jem, Gem, Jame, Game)
 - c. 4 = Phonetically correct beginning and ending sounds (Jm, Gm, Jma, Gma)
 - d. 3 = Phonetically correct beginning sound (J, G, or random letters)
 - e. 2 = Phonetically correct ending sound (M or random letters)
 - f. 1 = Random letters or letter from name: no sound connection (random letters), and 0 = scribbles, waves, letter-like symbols.

Developmental Spelling Assessment

DSA Form A: Letter Name Feature List

1. jet The jet made a safe landing.

2. ship The ship sailed across the water.
3. bet I bet you will finish the book today
4. got The boy got a new dog.
5. cap The new baseball cap was red.
6. drum We could hear the drum beat.
7. bump The bump on his head hurt.
8. much The boy didn't have much homework.
9. with My brother will come with us.
10. map The woman looked at a map of the city.
11. hop A rabbit can hop.
12. plan The class will plan a party.
13. that What is making that noise?
14. slid The player slid into second base.
15. mud There was mud on the floor.
16. grab She had to grab her hat in the wind
17. chop Please chop the carrots into pieces.
18. fast The girl is a fast runner
19. dish The dish fell and broke.
20. went The car went past our house.
21. win Let's try to win the game.
22. fed The farmer fed the cow hay.
23. trip The family took a trip to the beach.
24. rub I will rub the penny to make it shine.

25. Fit

The dress did not fit the girl.

Observation Tool

Teacher's Name: _____ Date: _____

Time: _____ Grade Level: _____

Observation Checklist: Phonological Awareness

Content	Observed (√)
Discriminating words or sounds	
Rhyming	
Blending syllables	
Blending phonemes	
Isolating initial sounds	
Isolating medial sounds	
Isolating final sounds	
Segmenting words in sentences	
Segmenting syllables in words	
Segmenting phonemes in words	
Deleting or substituting syllables/phonemes in words	
Lessons/Activities	
Whole group instruction/practice	
Teacher-led same-ability small group instruction/practice	
Center or mixed-ability small group practice	
Partner work	
Independent work	
Materials Used	
Oral language	
Manipulatives	
Pictures	
Connected to print?	
Other: _____	
Total Time Spent on Phonological Awareness	