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## Does systematic phonological awareness in the early primary grades impact student learning beyond primary grades

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## Does systematic phonological awareness in the early primary grades impact student learning beyond primary grades

### Abstract

This meta-analysis literature review was conducted by examining 24 scholarly articles to investigate the effects of systematic phonological awareness in the early primary grades and beyond. Children in these studies ranged from preschool, and in some studies continued to be monitored through fourth grade and beyond. The articles were gathered from APA Psycinfo and ERIC with search terms that included phonological awareness instruction in kindergarten aged students. The effects of these studies varied with the extent of the classroom's rich phonological awareness and their intentional scaffolding.

This review was set up to investigate the correlation between phonological awareness and the ability to read and write as the children progressed through preschool and in some cases through the fourth grade and beyond.

Through this investigation it was found that intentional systematic phonological awareness instruction can and has improved a child's ability to read and write. The study also provides data that proves that having an intentional systematic phonological awareness program with highly trained teachers provides the child with life long skills that follows them throughout their life.

Does Systematic Phonological Awareness  
In The Early Primary Grades  
Impact Student Learning Beyond Primary Grades

A Graduate Research Paper

Submitted to Division of Literacy Education  
Department of Curriculum and Instruction

In Partial Fulfillment Of the Requirements  
of the Degree Master of Arts in Education

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University of Northern Iowa  
May 2023

### **Abstract**

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This Graduate Research Paper submitted by: Renee L. Sorenson

Titled: Does systematic phonological awareness in the early primary grades impact student learning beyond primary grades?

Has been approved as meeting the department requirements for the Degree of Master in Arts in Education

3-15-23

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Date Approved

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3-15-23

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Head, Department of Curriculum and Instruction

## Table of Contents

Introduction	5
Methods	13
Results	21
Discussion	48
References	54

## Introduction

Previous studies of meta-analysis show that children who participate in high quality literacy instruction at a young age have significant advantages in reading and writing. It is evident that the interest in both the researcher and the teacher need to move beyond the study's short term effects. Teachers need to understand that intentional literacy interventions have the greatest effect on long term reading and writing skills success. In this meta-analysis study it is clear that the teachers involved have the passion to produce intentional interventions at each child's ability level so the child can gain long term effect in the area of reading and writing. A major factor in this relationship of reading and writing is the correlation between phonological awareness.

As stated by Byrne and Fielding-Barnsley (1991) children vary in how well they can manipulate phonological segments of speech. This practice has a defining relationship in a child's later success in reading and writing. Therefore it is important to include phonological awareness instruction in the early stages of a child's reading curriculum. In this meta-analysis paper we will evaluate the effectiveness of phonological awareness instruction in young children who have just begun their literacy training.

### Phonological Awareness

Phonological Awareness is the understanding and awareness that spoken words are made up of different units of sound. (Kennedy et al. 2013, Phillips et al. 2015, Santi et al. 2004, Stahl and Murray 1994, Ukrainetz et al 2000, Ukrainetz 2010, Woldmo, Zygouris-Coe 2001). The development of Phonological Awareness starts with the largest units of words and gradually progresses to syllables and the smallest units of phonemes. (Zygouris-Coe 2001) These sounds

can be separated into different sub-skills (phonemes) such as separating words in sentences, breaking up syllables, generating rhymes, alliteration, blending and segmenting, substituting phonemes at the beginning and the end as well as segmenting words into phonemes (Zygouris-Coe 2001). Phonological Awareness is one of the central components to learning to read and write (Ukrainetz et al. 2010) that entails no print, yet it can be developed through activities that involve print (Alison).

Subsequently phonological awareness is the precursor to being able to perform reading and writing tasks successfully. Direct instruction in phonological awareness and phoneme practice paves the way for children to have success throughout their learning career (Ukrainetz et al. 200 & Ukrainetz et al 2010).

Phonological awareness and alphabetic knowledge, which are the building blocks of early literacy, play an intricate part in acquiring how to read and write (Brennan & Irerson 1997). This craft of learning to read starts with a phonological awareness base, that as the child learns and understands that words can be manipulated into individual phonemes. When the children learn that the sounds can be blended into printed words for reading. (Chard & Dickson, 2021). Learning to read print encompasses this ability to decode written words from the child's prior knowledge of being able to manipulate sounds verbally (phonological awareness) and being able to translate them into print. Some of the skills that are required include breaking words into syllables, rhyme awareness and production, alliteration: initial and final sound sorting, onset-rime segmentation, initial & final sound identification, blending words into sounds and deleting & manipulating sounds. (Santi, et al. 2004 & Woldmo, 2018)



Phonological Awareness, the thought process and the ability to manipulate spoken syllables and words, (Santi et al., 2004) is the basis of the building blocks for reading and literacy skills. Findings from several decades of research conclude that if children do not have a strong grasp on phonological awareness their chance of being deficient in reading and perhaps other processing skills is very high. (Phillips et al., 2008).

Chard and Dickson (2021) state that phonological awareness is the knowledge to understand that the oral language can be broken up into smaller components and the child has the ability to manipulate the sounds. Children at a very young age listen to others and they typically pick up on sounds and patterns that they hear. This is the beginning of children engaging themselves in the print they see in their environment even before they begin to read (Rodgers, 2019).

There are many components of phonological awareness that need to be noted in order for young learners to become successful readers and writers. The components of phonological awareness include: breaking words into syllables, rhyme awareness and production, alliteration: initial and final sound sorting, onset-rime segmentation, initial & final sound identification, blending words into sounds and deleting & manipulating sounds. (Woldmo, 2018). Phonological awareness is the thought process and the ability to manipulate spoken syllables and words (Santi et al., 2004).

Many studies have concluded that if a child is behind on their phonological awareness skills when in kindergarten, they will require more explicit instruction later to obtain these skills so they can be successful readers and writers. (Chard & Dickson, 2021; Santi, et al. 2004). Thus it is important for teachers to have the access to instructional

strategies, materials and curricula to effectively teach children the foundational skills they need to be successful lifelong readers and learners.

The main purpose of this meta-analysis is to research a variety of peer reviewed articles in the area of phonological awareness and review if there is an impact on systematic phonological awareness in the early primary grades and the impacts of student learning beyond primary grades. Some determining factors in this research include: are the teachers highly trained in phonological awareness, are the children immersed in a rich phonological awareness environment, is there intentional scaffolding present and what is the correlation between phonological awareness and the ability to read and write.

#### *Highly Trained Teachers in Phonological Awareness*

In this study there were a variety of ways that teachers were considered highly trained. Examples of this include classroom teachers who attended additional training, as well as university students who worked closely with their professional consultants.

Some classroom teachers had the opportunity to receive additional training in the area of phonological awareness, according to Albritton et al. (2018), Bode and Content (2011) and Lyster (2002). Examples of these courses included training sessions to dig deeper into phonological awareness and its link to reading and writing with additional monthly organized meetings (Bode and Content, 2011). Bratsch-Hines et al. (2020), Nevo and Breznitz (2012) and Snider (1997) involved coaches, trained adults along with a group involving a graduate student and five undergraduate assistant aides. These professionals were specifically trained in administering, coaching and evaluating their work to ensure fidelity and accuracy.

With these additional training it was evident that the teachers had the resources and guidance to conduct successful lessons to the children. It can be concluded that with highly trained teachers who are receiving continual feedback and who are following a coaching program where they are needing to be accountable for what they teach the student, the student's overall scores do indeed improve.

### *Rich Phonological Awareness Environment*

When looking at classrooms that have a rich phonological awareness environment there are many areas in which need to be examined. It is necessary for the teacher to identify evidence-based instruction as to effectively support the early learning of children so they can implement these interventions into their daily life (Albritton et al. 2018). These areas include intentional instruction by the teacher as well as having teacher and student constructed experiences. According to Craig and College (2006) having access to those child constructed experiences and teacher directed instruction can intensify the learning taking place within the school. This ongoing variety of support encourages the child to learn in a multitude of different ways. Brennan and Ireson (1997) and Lyster (2002) encouraged phonological awareness to be taught with metalinguistic games and activities that are play-like that stimulate a child's phonological structure of language. In many instances these activities can be executed with small groups vs individually to establish the effectiveness of those early phonological awareness skills. Also as noted by Cassady and Smith (2004) and Bode and Content (2009) these experiences in the child's environment can be heightened by having targeted specific phonological awareness goals that are developmentally appropriate for each individual child. These phonological awareness goals generally follow the following progression: phoneme counting, phoneme

deletion, phoneme substitution, blending CVC words, providing rhymes and isolating the first and last sounds in single syllable words.

### *Intentional Systematic Scaffolding*

Many studies including Bode & Content (2011), Moyle et al. (2013) and Schneider et al. (1997) explained that the students participating in a pretest to determine where the children needed to begin with their systematic phonological instruction. With that being noted there was an array of studies that showed that there was a need for specific targeted interventions in the area of phonological awareness. (Bratsch-Hines et al. 2020, Cassady and Smith 2003, Craig 2006, Kjeldsen 2014, Moyle et al. 2013, Nevo and Breznitz 2012, Otaiba et al. 2008 and Torgesen et al. 1992. These studies focused on individual and small group interventions.

Some examples of systematic scaffolding included tutoring individuals who needed practice in comparing beginning, ending and middle sounds (Grennan and Ireson 1997). Also some articles stated that they focused their training by having the children play phonological games and activities that included rhyme, alliteration, syllable sound blending and sound segmenting (Lyster, 2002). It is important for the children to learn the relationship between phonological and morphological awareness which was focused on by Casalis and Cole (2009) where the children were trained thirty minutes for 1-2 times a week.

Like the above training sessions who focused on in person systematic scaffolding the following articles also worked on phonological awareness skills, but they focused on the skills, but they focused on the skills with a computer based training program. Kartal

et al, (2016) and Segers and Verhoeven (2005) focused on these computer based phonological awareness programs where the children met targeted goals.

These articles noted that there was greater success in phonological awareness growth when there was systematic scaffolding in place.

*Correlations between Phonological Awareness and the ability to read and write*

According to Bode and Content (2011), Bratsch-Hines et al. (2020), Brennan and Ireson (1997), Casalis and Cole (2009), Cassady and Smith (2003), Craig and College (2006), Furnes and Samuelsson (2001), Hogan et al, (2005), Kartal et al, (2016), Kirby et al. (2003), Kjeldson et al, (2014), Moyle et al, (2013), Schneider et al. (1997) and Snider (1997) there is a direct correlation between phonological awareness training and the successful achievement in reading and writing. For example the early intervention by Moyle et al. (2013), Bratsch- Hines et al, (2020), and Cassady and Smith (2003) have proven that when focusing on children's phonological awareness skills in preschool and kindergarten it is more effective when there is any type of remediation needed. According to Moyle et al, (2013) and Bratsch- Hines et al, (2020) who focused on Targeted Reading Intervention when accurately identifying a child's needs and tailoring to those needs the child will have significant improvement and will be able to connect their phonological awareness skills to reading and writing. This backs the studies from Casalis and Cole (2009), Craig and College (2006), Furnes and Samuelsson (2011)m Kartal et al, (2016) and Kirby et al. (2003) where they each stated that when children are taught to manipulate spoken words, syllables and songs they are better able to manipulate the speech sounds when transferring their phonological awareness knowledge to print. Having a strong phonological awareness base is a critical part of becoming a successful

reader and writer as these are long term effects that will affect the child all through their learning career.

*Does systematic phonological awareness in the early primary grades impact student learning beyond primary grades?*

Research has shown that when students are taught phonological awareness with a systematic approach at an early age it impacts their learning beyond the primary grades.

When looking at the data, many articles prove that when teaching in a systematic way there are significant life long impacts such as from Bode & Content (2009) stating that such a systematic approach to instruction accelerates the learners reading acquisition along their development of phonological awareness. This effectiveness was taught by playing developmentally appropriate games such as rhyme and syllable awareness. Then these phonological awareness skills were tightly linked to poems, songs, letter forms, names and sounds. This was then tied into learning explicit phonics and spoken language skills.

To be sure that a child is retaining the information that is being taught the teachers need to be sure to assess the child frequently. Much like Bode & Content (2009), Brennan & Ireson (1997), Casalis & Cole (2009), Cassady & Smith (2004), Craig & Colledge (2006), Furnes & Samuelsson (2011), Kim et al. (2010), Law & Ghesquiere (2017), Nevo & Breznitz (2012), Oudeans (2003), Schneider et al. (1997) and Segers & Verhoeven (2005) they assessed before instruction in the form of a pretest, and then performed a posttest at the end of the training. Some articles stated that they assessed each individual child during a pre and post test as well as multiple times throughout the training to give the teachers a concrete direction to make sure the child understands the learning target. These articles included pre and post tests as well as testing throughout the training Albritton et al. (2010), Bratsch-Hines et al. (2020), Nogan et al. (2005),

Kartal et al. (2016), Kirby et al. (2003), Kjeldsen et al. (2014), Lyster (2002), Moyle et al. (2013), Otaiba et al. (2008), Snyder (1997) and Torgesen et al. (1992).

## Methods

### **Data collection, inclusion, criteria and reliability**

When looking at data systematically we need to look at how the process will play out. In Figure 1 it is described how a database is chosen, then the search becomes more narrowed by looking at more specific keywords. These specific keywords that were chosen for this data included phonological awareness in kindergarten with key words that included impact, effects, retention, effectiveness, indicators and predictors. This process makes it possible to analyze the differences between the studies and the effects that it has on young children.

Citations for the review were dated from 1992 through 2022. With these findings the following journals were noted: American Speech- Language- Hearing Association, Early Education and Development, Eur J Psychol Educ, First Language, The Journal of Educational Research, Journal of Educational Psychology, Journal of Experimental Child Psychology, Journal of Computer Assisted Learning, Journal of Literacy Research, Journal of School Psychology, The Journal of Educational Research Learning Disability Quarterly, Learning and Individual Differences, Learning Disabilities Quarterly, Reading and Writing: An Interdisciplinary Journal, Reading and Writing Quarterly, Research in Developmental Disabilities & Scientific Studies of Reading.

Preestablished search terms were set to specify acceptable measures such as impact, effects, retention, effectiveness, indicators and predictors in phonological awareness in the kindergarten. These terms were focused on as studies showed that they

were major influences in phonological awareness. Studies were focused on phonological awareness that started in kindergarten and followed up at the end of kindergarten and beyond.

### **Search Strategy**

To ensure the rigor of my research, a strategic method was designed. This was started by searching literature for meta-analysis from academic journals. To locate these articles I first identified the databases I was going to use, I searched APA Psycinfo and ERIC. The studies of phonological awareness and kindergarten were added to the key words. Then the search terms were deliberately decreased to identify more specific articles. The initial searches produced anywhere from 576 to 9 articles. These needed to be refined, so I started entering more keywords. The first search I performed with phonological awareness, kindergarten and impact yielded 167, then I filtered through and to have the title requiring phonological awareness, then I was down to 28 articles. When I assessed the articles I was left with 3 that fit my requirements of having phonological awareness and impact in the title, these included Albritton & Truscott (2018), Cassady & Smith (2003/2004) and Kim et al. (2010). The articles were excluded if they included bilingual or focused on another language, they focused on dyslexia, they were a thesis, they focused on deaf or hard of hearing or I couldn't access the article.

When looking at articles that included the words phonological awareness, kindergarten and effects it yielded 576 articles. When filtering all keywords in the title there were 15 articles remaining. Once I assessed the articles there were 6 that fit my criteria that included children in kindergarten and primarily English speaking. The articles were excluded if they included bilingual or focused on another language, I could



not access them and if they were not related to the topic, these included Brenna & Ireson (1997), Casalis & Cole (2009), Craig & College (2006), Oudeans (2003), Schneider, et al. (1997) and Torggeson et al. (1992).

There are studies that are worth looking into in phonological awareness retention. There were 9 articles that included retention, and when I set filters to be sure they were academic journals there were 6 remaining. After assessing the articles I had 3 remaining: Nevo (2012), Snider (1997) and Segers & Verhoeven (2005). The others I could not access or they were not related to the topic.

Effectiveness of phonological awareness at the kindergarten level is an important part of beginning reading. When looking at phonological awareness, kindergarten students, and effectiveness there were 213 articles that came up. When the filters were set to have scholarly articles, and phonological awareness in the title there were 28 articles remaining. When I reviewed the articles I was left with 8 Bode (2009), Bratsch-Hines et al. (2020), Hogan et al. (2005), Kartal & Ercetin (2016), Kjeldsen, et al. (2014), Lyster, (2002), Otaiba, et al. (2008) and Smith, et al. (2001). Excluded from the articles were ones that I couldn't access, ones that were not related to the topic and ones that focused on speech and language deficits.

Indicators (indicating that phonological awareness was a contributing factor in the success of children learning to read and write) was the next category that was looked into. When I did the initial search I found 115 that fit the description of including phonological awareness, kindergarten and indicators in the search. When I set the filter to scholarly journals and required phonological awareness in the title I came up with 18 articles. Of the eighteen articles there were 2 that fit my description Furnes & Samuelsson (2010) and

Moyle et al. (2013). They were eliminated if I could not access them, or they were not related to the topic, or if the children were English language learners and finally there were a few that were excluded if I already had the article.

Lastly I searched phonological awareness, kindergarten and predictors. There were a total of 346 articles found, of these 346 I filtered them to state that they were scholarly articles with phonological awareness and predictors in the title. Of the articles that I had to exclude were ones that I could not access, or they were focused on speech and language children. With these filters in place I had only had 2 remaining articles (Kirby et al., 2003; Law & Ghesquiere (2017)).

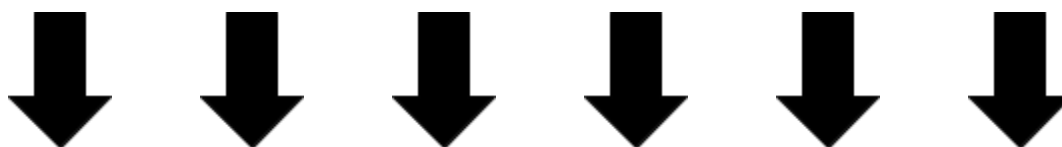
**FIGURE 1**

*Study selection process*

- Databases searched with search terms APA, Psycinfo and ERIC.
- Manual search of phonological awareness and kindergarten then including impact, effects, retention, effectiveness, indicators and predictors.
- Excluded from the searches were bilingual or articles focused on another language, dyslexia, thesis papers, deaf or hard of hearing children, unable to access, off topic and speech & language learners as well as duplicated articles

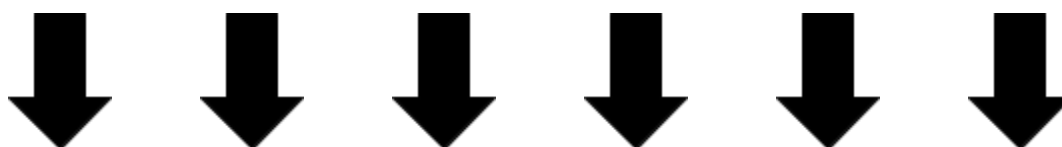


Identified Articles 1,426



Limits/Refinements/ Filters

Phonological awareness, kindergarten & impact	Phonological awareness, kindergarten & effects	Phonological awareness, kindergarten & retention	Phonological awareness, kindergarten & effectiveness	Phonological awareness, kindergarten & indicators	Phonological awareness, kindergarten & predictors
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Limits/Refinements/ Filters

3 articles found	6 articles found	3 articles found	8 articles found	3 articles found	2 articles found
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Note: This table shows the way that I selected the articles for my review. I started with an overwhelming 1,426 articles and was able to systematically filter it down to 25 articles that fit into my specific classification.

### **Article coding**

When reviewing the articles that I selected for my systematic review there were some common themes that were evident throughout many of the papers. The themes that I noticed included the correlation between phonological awareness and the ability to read and/or write, highly trained teachers in phonological awareness, rich phonological awareness environment and last intentional systematic scaffolding.

When looking at Table 1 it is noted that many of the articles noted the strong correlation between phonological awareness and the ability to read and/or write. This was evident when many of the articles emphasized using targeted phonological awareness as their foundation for learning to read later in the child's learning process. Having a strong phonological awareness foundation and being able to hear and manipulate sounds auditorily has been proven to have strong connections between later reading and writing skills. As you will read in the preceding paragraphs, working with children with phonological awareness at a young age will ultimately set them up for success as they begin to read and write.

Another major contributing factor to having children successful in phonological awareness is having teachers who are vested and are highly trained in teaching phonological awareness. This was an important part because typically when the teachers are highly trained they are more likely to produce higher achieving students.

Yet with having highly trained teachers also comes another factor, which is having classrooms that are rich in a phonological awareness environment. This can be produced in a variety of ways. Some of the examples that were discussed in the reviewed articles include instructing the children in a multitude of methods, also having a variety of phonological awareness activities to choose from at center/free choice time.

Having all the above mentioned codes in place is another important factor that needs to be considered in having intentional systematic scaffolding. Children need to be taught from where they are developmentally and then proceeding after that. Many start with the largest units of speech and then start breaking them down into smaller units as they can developmentally handle it.

Having these codes in place allow the reader to navigate the importance of phonological awareness and the effects it has on the student as they learn to read and write.

A coding process was created that looked at the effects of phonological awareness

**Table 1.** *Article Coding*

Article Title	Highly trained teachers in phonological awareness	Rich Phonological awareness environment	Intentional systematic scaffolding	Correlation between Phonological Awareness and ability to read and/or write
Albritton et al. (2018)	X			
Bode & Content (2011)	X	X	X	X
Bratsch-Hines et al. (2020)			X	X
Brennan & Ireson (1997)		X		X
Casalis & Cole (2009)			X	X
Cassady & Smith (2003)		X	X	X
Craig & Content (2006)			X	X
Furnes & Samuelsson (2011)				X
Hogan, Catts & Little (2005)				X
Kartal et al. (2016)			X	X
Kim et al. (2010)				
Kirby et al. (2003)				X
Kjeldsen et al (2014)			X	X
Law (2017)				
Lyster (2002)	X	X	X	
Moyle et al. (2013)				X
Nevo & Breznitz (2012)				
Otaiba et al. (2008)				
Oudeans (2003)			X	

Schneider et al. (1997)	X	X
Segers & Verhoeven (2005)	X	
Smith et al. (2011)		
Snider (1997)		X
Torgesen et al. (1992)	X	

Note: This table shows the way that the articles that were selected for the review were categorized. The articles were categorized in four different areas. These areas include highly trained teachers in phonological awareness, rich phonological awareness environment, intentional systematic scaffolding and correlation between phonological awareness and ability to read and/or write.

## Results

Overall findings of the analysis of the selected articles were that highly trained teachers are an important part of conducting a rich phonological awareness environment where intentional systematic scaffolding is present as it has a strong correlation between phonological awareness and reading and writing skills later in the child's learning career.

Therefore, this section discusses the findings in terms of 4 themes that arose from the data analysis process. These themes include: having a correlation between phonological awareness and the ability to read and write, highly trained teachers in phonological awareness, creating a rich phonological awareness environment and intentional scaffolding. The methods and findings of individual articles are described under the adjacent themes.

*Correlation between Phonological Awareness and ability to read and/or write*

There are many research articles that prove that there is a correlation between phonological awareness and beginning reading and writing. These forthcoming articles provide evidence that teaching phonological awareness has a direct effect on children learning to read and write. The articles that will be reviewed include Bode & Content (2011), Bratsch-Hines et al. (2020), Brennan & Ireson (1997), Casalsis & Cole (2009), Cassady & Smith (2003), Craig & Content (2006), Furnes & Samuelsson (2011), Hogan et al. (2005), Kartal et al. (2016), Kirby et al. (2003), Kjeldsen et al. (2014), Moyle et al. (2013), Schneider et al. (1997) and Snider (1997).

Starting with Bode & Content (2011), they stated that the purpose of their study was to assess the effectiveness of phonological awareness training in at-risk children. These same children were assessed after 6 months of reading and writing in the first grade and it was concluded that these children did not fall into the at risk category any more. It was also noted that these children, when tested in the first grade, performed higher on their spelling performance assessments as well. The researchers believe that this early phonological awareness training that the children had in kindergarten is to be credited for their long term success in reading and writing.

Much like the previous article Bratsch- Hines et al. (2020) had a similar goal. According to the article from Bratsch-Hines et al. (2020) their goal was to examine whether Targeted Reading Intervention (TRI) was an effective program that promotes reading gains for students that have low scores in phonological awareness and or vocabulary skills. It was concluded that children who have had the TRI training in kindergarten and first grade showed significantly higher scores compared to children who did not receive the training. This is in part because the teachers that participated in the TRI have ongoing coaching support for professional



development to assist the children with the needs that they required along the way.

Brennan and Ireson (1997) were similar to the previous article, as they explained the connection between phonological awareness and the connection between reading and spelling. Brennan & Ireson (1997) explained that the connection between phonological awareness skills and learning to read and spell are very important. They feel that providing an early intervention is crucial to young children. They succeeded in doing this with children in small groups consisting of metalinguistic games and activities and being able to focus on the phonological structure of language. The training group received consistent training in games and activities that were designed to develop phonological awareness skills. By the end of the training period the children in the study out performed the control group significantly on phoneme manipulation, word and syllable manipulation, phoneme segmentation and had considerably higher scores on reading and spelling.

Like in the previous study Casalis & Cole (2009) examined intentional training in phonological awareness. According to Casalis & Cole (2009) their study examined the correlation between phonological awareness and morphological awareness in kindergarten and how it influences children as they begin to read in first grade. This study examined one group of children receiving phonological awareness training, while the second group received morphological awareness training and yet a third group did not receive any additional training. In the conclusion of this study it was found that the morphological awareness training was effective at the kindergarten level, there was no clear finding of its effectiveness in the first grade. On the other hand when looking at the phonological awareness effects it was clear that it had positive effects on reading in the first grade. Clear phonological awareness can be found in Casalis & Cole (2009) as well as in the next article from Cassady & Smith (2003).

In the article from Cassady & Smith (2003) it was mentioned that phonological and phonemic awareness has been a strong predictor of children being able to read. These findings are made true by having successful reading intervention programs that focus on phonological and phonemic awareness, especially programs that are interactive in phonology and orthography. This was made possible in this research because there was an increase in effective educational technology implementation where the teachers were supported in a constructive learning environment. One way this was made possible was with the Integrated Learning Systems (ILS) where it was a standardized computer assisted instructional program that recorded the children for completing the activities in a game-like format.

Like in the study from Cassady & Smith (2003) Craig and Content (2006) investigated the effects of phonological awareness and early reading skills. As stated by Craig & Content (2006) the goal of this article was to investigate instructional approaches of phonological awareness, alphabetic knowledge, and early reading in kindergarten aged children. An instructional base was adapted that integrated writing with metalinguistic games. The children took part in pre and post tests to provide data that was used to place them in small intervention groups with other children of like needs. Then the children were instructed with a trained literacy tutor in four sessions of 20 minutes each. The children who participated in this systematic program exceeded the children that did not participate in the metalinguistic activities.

Much like the previous article, Furnes & Samuelsson (2011) researched the correlation of phonological awareness and reading. Furnes & Samuelsson (2011) stated that there is a relationship between phonological awareness and rapid automatized naming that contributes to the success of reading and spelling in children learning to read in a different alphabetic writing system ( in this case Norwegian/Swedish vs. English). The results stated that rapid automatized

naming was more related to reading than spelling across the orthographies. It also showed that measurements of phonological awareness were the same across the United States and Australia and Scandinavia. There were also findings that early literacy development is highly transferable across many languages.

Like in the article by Furnes & Samuelsson (2011), Hogan et al.(2005) proved that there was a high correlation between phonological awareness and reading success. Hogan et al. (2005) noted that phonological awareness is a major predictor of reading in children who were followed from late preschool through first grade. This was true as phonological awareness is highly correlated with word reading as it offers a unique way to manipulate sounds and teaches a base for children to combine the sounds into the words that they are reading. Research has shown that the correlation between phonological awareness and reading highlight a child's performance to become future readers. In this study it was found that phonological awareness that was measured in kindergarten had a strong correlation with the measures in second grade and the measures in the second grade assessment strongly correlated with the reading assessments that were performed in fourth grade.

Like in the previous article Kartal et al. (2016) studied the importance of phonological awareness and the development of reading. According to Kartal et al. (2016) phonological awareness skills are an important part of development that is needed for children to be good readers. In this study children who obtained these systematic skills scored significantly higher on posttests scores compared to the children who did not receive the systematic phonological awareness instruction. It is said that when children are taught to manipulate spoken words, syllables, onsets and rimes they are better able to manipulate speech sounds. This helps the children learn to read real words with more ease. This study also stated that in their computerized

study the lessons were tailored to each specific child and it was able to target the needs of that child as they progressed through the training.

Much like Kartal et al. (2016), Kirby et al. (2003) concluded that phonological awareness and developing strong reading skills are significantly correlated. In the article from Kirby et al. (2003) it was stated that kindergarten students that did well with phonological awareness and naming speed developed good reading skills through the fifth grade and beyond. There was considerable evidence that phonological awareness and sound processing is a key component to developing strong reading skills. Early intervention processes that are tailored to each individual child's needs sparks their potential to lessen the gaps that may appear later in their reading career. In this article it stated that kindergarten phonological awareness had the most impact on the child in the early grades and naming speed was stronger in the later grades. This was relevant in reading scores as well. Like Kirby et al. (2003), the next article takes a look at the success of word decoding and the success of reading comprehension.

Kjeldsen et al. (2014) stated that success with word decoding development and reading comprehension are strongly tied with a child's strong base with phonological awareness practices that are provided when they are in kindergarten. This was proven in their study with kindergarten students and was followed up with the same children when they were in ninth grade. In this study the intervention group scored marginally better on the decoding assessment in grades three and six. By the time the children were in fourth grade and ninth grade the intervention groups scored higher on reading comprehension compared to the control group.

Much like the previous article, Moyle et al. (2013) performed effective interventions to solidify phonological skills at a young age. Moyle et al. (2013) explained that in their study they wanted to prevent reading difficulties during the preschool years as it is more effective if there is

remediation needed during the early school-aged years. After administering PALS-PreK and IGDIs it was found that there was a need for implementing response to intervention (RTI) as this accurately identified the child's needs and tailors to those needs. This study focused on the metalinguistic skills of phonological awareness to teach the children how to break sounds, recognize rhyming and alliteration which is the base of emergent literacy skills. These skills have a direct impact on the relationship in learning to read, much like the next article.

Schneider et al. (1997) had conducted a study that compared a six month long metalinguistic training to a regular kindergarten program. They assessed phonological awareness along with other metalinguistic and cognitive skills prior to the study in kindergarten. The training resulted in higher levels of performance in alliteration and rhyming. In the first and second grades they were also assessed on reading and spelling skills. The study proved that short and long term effects were consistent. At the end of the study it was found that there were long term effects of the training program that were moderately strong in spelling and the findings were stronger in the area of reading.

Much like the previous article, Snider (1997) conducted studies that showed a strong relationship between phonological awareness and reading success. According to Snider (1997) they conducted two longitudinal studies that compared the relationship between phonemic awareness and the success of reading development in primary aged children. The assessment administered to kindergarten students were compared to the standardized reading achievement scores that were given to second grade students. This was conducted in a stepwise manner to analyze a significant correlation between performance on sine phonemic awareness tasks in reading achievement in the second grade. This study concluded that kindergarten aged children who have low phonological awareness skills need to be provided the appropriate instruction to be

successful in reading and spelling.

*Highly trained teachers in phonological awareness*

When looking at highly trained teachers in phonological awareness there was a variety of criteria that was needed. The teachers that qualified as highly trained were ones that partook in extra phonological awareness training including Albritton et al. (2018), Bode and Content (2011) and Lyster (2002). All of these teachers that were considered highly trained went above and beyond the traditional teaching requirements in phonological awareness. I will review each of the articles that were found that included highly trained teachers in phonological awareness.

In the article written by Albritton et al. (2018) it was stated that there were six teachers that were initially considered to participate in conducting this study. Because of funding and employee staff changes during the time there were five teachers that remained. Of these selected teachers they were required to demonstrate high-quality language and literacy instruction to all students in their Head Start preschool program. This high quality language and literacy instruction was determined by the teacher's scores on the Early Language and Literacy Classroom Observation Pre-K, this included rich language environment, exposure to books and book reading as well as exposure to print and early writing skills instruction. After the assessments were completed it was discovered that all the teachers obtained a mean score of basic language and literacy knowledge.

Like in Albritton et al. (2018), Bode & Content (2011) noted that the teachers needed to be highly trained. The study from Bode & Content (2011) wanted to assess the effectiveness of a phonological awareness training program. Bode & Content (2011) stated that the teachers in their study were gathered for a one hour informational training session prior to conducting the study that provided background information of the study they were going to be performing. The study

focused on phonological training as well as its link to reading and writing. This phonological awareness training consisted of listening skills, rhyme recognition, rhyme production, playing with spoken sentences and words, syllable synthesis and syllable analysis, phoneme identification and deletion, and synthesis and phoneme analysis skills all in increasing difficulty. The informational meeting also showed them the structure they were to follow. With this training they received booklets describing the training and were given the option to participate in monthly organized supervision meetings which consisted of 2 hour meetings with the first author of this article (Bode). The purpose of the ongoing meetings was to touch base with the teachers and provide solutions for any difficulties that they may be experiencing. This is much like the next article in which it had multiple meetings with the teachers to enhance their teaching skills.

Lyster (2002) investigated the long term effects of two training programs where one group received phonological awareness training and the other group focused on morphology. Lyster (2002) stated that the teachers in these groups attended their specific training. This entire group of preschool teachers did in fact have more than 10 years of teaching experience and were highly interested in playing out this experiment. There were three groups of learners, the first group focused on phonological awareness, the second focused on morphological awareness and the last group was the control group who did not receive any particular training. In the two experimental groups they also focused on upper case letters. With these results it was proven that the phonological group performed significantly higher than the other groups.

#### *Rich Phonological awareness environment*

Having a rich phonological awareness environment is an important part of a child's learning experience like in the articles by Bode and Content (2011), Brennan and Ireson (1997), Cassady and Smith (2004) and Lyster (2002). Examples of this include

having rhyming games and syllable activities during free choice center time. We will take a closer look at the articles that show a rich phonological awareness environment.

Bode and Content (2011) felt that it was important to allow the children to have games and activities that focused on phonological awareness that they can freely choose from during their free choice center time. There were games that included rime and syllable awareness. There were also games that introduced letter formation, letter names and letter sounds. These games ensured that the children could learn phonological awareness in a multitude of non intimidating ways. The teacher also taught explicit phonic structure to solidify these phonological awareness skills. These students showed that they can develop these specific skills in a multitude of intentional learning environments instructed by the teacher. In this study the largest increase was found in the phoneme synthesis and there was a moderate increase in the syllable deletion task. These examples were much like the activities from Brennan and Ireson (1997).

Brennan and Ireson (1997) explained that the teachers conducting this study would spend around two hours a day teaching language activities. These language activities included whole groups, small groups and individual activities that focused on word reading, vocabulary, rhyme, segmentation, syllable synthesis, syllable segmentation and deletion of initial phonemes. The activities included phonological awareness acquisitions where the students were guided to discover and attend to the phonological structure of language. The students were also introduced to reading, writing, games, comprehension and sequencing. Children were encouraged to discuss their findings with their teachers. It was emphasized that when teaching phonological awareness children need to be exposed to both print and sound so they can acquire these skills successfully.



If a stepwise approach to achieving full phonemic awareness is taught in a classroom it may prevent children from experiencing reading failure. In this study it was proven that the phonological skill training group with reading integration was more effective than the other training groups.

The article from Cassady & Smith (2004) explains that teaching children to read in a systematic and structured way promotes successful reading as they progress through school. This can be obtained through promoting phonological awareness skills, alphabetic knowledge as well as contextualized reading activities. These can be obtained through print materials, computer programs, and exposure to experienced tutors on a regular basis. Teachers in this study focused on activities that covered phonological awareness, decoding, fluency, vocabulary, and comprehension. In the phonemic awareness area, letter sounds, letter by letter and onset-rime were emphasized. During this study the schools promoted small and large group instruction to relay the instruction. As a result of this intervention grouping the students scored higher in work attack, letter-word identification, spelling of sounds, and passage comprehension.

Like in the article from Cassady & Smith (2004), Lyster (2002) designed groups of students to compare the effects of phonological awareness teaching. Lyster (2002) designed two groups of preschool aged children plus a preschool aged control group to look at the long term effects of reading development. In the first group (the phonological awareness group) the children participated in rhyme, alliteration, syllable, sound blending onset and rime and sound segmentation activities in a work/play environment. In the second group (the morphological group) children learned about compound words and grammatical elements. The second group of children were also exposed to written forms of words. Both of these groups practiced lowercase

and uppercase letter experiments. The control group did not receive any additional training. The results of these groups concluded that the phonological group performed significantly higher than the morphological group on the phoneme counting and syntactic awareness which gives the children competence in developing their reading skills.

### *Intentional systematic scaffolding*

Intentional systematic scaffolding consists of a training program that is tailored to each individual child's needs. In this case the scaffolding is targeted on phonological awareness needs. The following articles explained how systematic scaffolding can be successfully taught Bode & Content (2011), Bratsch-Hines et al. (2020), Casalis and Cole (2009), Cassady & Smith (2003), Craig & College (2006), Kartal et al. (2016), Kjeldsen et al. (2014), Segers & Verhoeven (2005), Torgeson et al. (1992).

Bode & Content (2011) stated that the kindergarten students in this study participated in a pretest, the training program and then a posttest. The students were administered a series of non-verbal intelligence, vocabulary short-term memory, active vocabulary, and a pretest phonological awareness assessment. Then the students were placed into phonological training groups that included six metalinguistic training units from easiest to most difficult including: listening skills, rhyme recognition, rhyme production, play with spoken sentences and words, syllable synthesis and syllable analysis, phoneme identification and deletion, and synthesis and phoneme analysis skills. These skills were introduced to the children in a systematic format that was developmentally appropriate for them at that particular time. The training sessions consisted of metalinguistic exercises and games for 10 minutes a day for twenty weeks. These lessons were examined through an intervention practice where the children were taught in a systematic way that was targeted to each child's developmental needs. These trainings are much like in the

following article Bratsch-Hines et al. (2020).

As stated by Bratsch-Hines et al. (2020) it was stated that there is a need to accurately identify particular skills with students who struggle to learn to read, so teachers were instructed to provide differentiated instruction to help students become successful readers. This was played out in this study by including specific targeted interventions that combined phonological awareness and phonics instruction with a study called Targeted Reading Intervention (TRI) where the the teachers integrate fluency, phonological awareness, decoding, oral language and comprehension into fifteen minute sessions every day with individual students or children who were are reading related risks. This was done with kindergarten students starting with phoneme segmentation skills, integrating alphabetic and phonological awareness training blended together and as a result these children increased their phoneme segmentation, letter sound fluency as well as their word reading skills.

Like in the above article, Casalis and Cole (2009) studied the effects of systematic scaffolding with phonological awareness. Casalis & Cole (2009) studied the relationship and effects between phonological and morphological awareness in kindergarten conducted through an experimental training program with three different groups of children. One group was trained in phonological awareness, one in morphological awareness and the other did not receive any additional training. The training consisted of a nine week period where the children were trained 30 minutes one to two times a week. Each group was trained collectively and the trainer was to follow the program precisely. The lessons were taught in a progression from large units to smaller phonological units as the child was developmentally ready. An example is such as segmenting syllables then when that is mastered the teacher moves onto phonemes.

Like in the study from Casalis and Cole (2009), Cassady & Smith (2003) based their

instruction on each child's needs as well. In the study from Cassady & Smith (2003) they followed the Waterford Early Reading Program's computer based instruction that adapts to each individual child 's needs. The program is a three leveled curriculum that focuses on these five essential reading areas: phonemics, phonics, vocabulary, fluency and comprehension. This program takes 15 minutes a day for the first level and 30 minutes for the second and third levels. This program is self paced where the learner receives immediate feedback before continuing. The teachers chose the specific lesson for each child that matched their current ability. This allowed for each child to have an opportunity to learn at their own pace. The program started with targeted phonological awareness instruction such as phoneme counting, phoneme deletion, phoneme substitution, blending cvc words, rhyming, isolating beginning and ending sounds and progressed as the child built their phonological awareness skills.

Craig & College (2006) used explicit instruction much like Cassady & Smith (2003). As stated by Craig & College (2006) using an interactive writing framework the study was able to contextualize instruction integrating explicit explanations, demonstrations and practice of phonological awareness which included rhyming, syllable segmentation, phoneme analysis, synthesis and letter-sound instruction and alphabetic skills with reading, writing and word building. This approach is considered interactive writing plus. This approach has weekly sessions that include shared text, written responses to readings and word building activities that were designed to maximize the child's involvement while building the child's development. During each lesson the teacher would identify each skill and differentiate the lessons by accommodating the lesson to where the child needed explicit instruction. These lessons were much like the following article where Kartal et al. (2016) intentionally trained the students in phonological awareness.

In the study completed by Kartal et al. (2016) it was found that children who have been trained in phonological awareness retain more information when it is combined with letter-sound training. This computer generated experiment was developed with fourteen models. The phonological awareness skills that were targeted include rhyming, identification of initial, medial and final phonemes, recognizing letter-sound correspondences, blending and eliding syllables and phonemes. These targets were also practiced in a game-like format within the classroom. The children who were exposed to these targeted teachings obtained significantly higher scores than those who did not participate in the training. The computer based training group made the most immediate progress, which confirms that computer based learning can be effective if used in the correct way. Kartal et al. (2016) targeted rhyming, identifying phonemes, sound correspondences, blending and phonemes much like the following article by Kjeldson et al. (2014).

Kjeldsen et al (2014) stated in their study that by following the training program which started with kindergarten aged children for an eight month period for 15-20 minutes a session 5 days a week had significantly higher test scores than the control group that did not follow this regime. The students in the study followed a structured sequence that consisted of six groups of tasks that increased in difficulty. The sessions consisted of learning targets in the form of games that were repetitive as to engage the children in supporting their learning. In some instances there were small groups formed who focused on phonological awareness skills, reading and spelling in the 1st and second grades. During the study there were three factors that were constructed including which are phonological sensitivity to rhyme, syllables and phonemes. These can be emphasized by deploying a wide range of rhymes to phonemic awareness exercises.

Like in the previous article Lyster (2002) designed experimental groups to explore the

benefits of phonological awareness in early learning instruction. In the article from Lyster (2002) the phonological group was taught phonological awareness involving rhyme, alliteration, syllable, sound blending and sound segmenting. The children were also taught a selection of sound letter correspondences to help the children discover the connections between speech and print. These were taught in a way that was developmentally appropriate for the children. It was shown that the phonological awareness group performed significantly higher than the morphological awareness group on both the phoneme counting and syntactic awareness in the post tests. It was also found that in conclusion of the study the phonological awareness group and the morphological awareness group outperformed the control group in identifying word length, rhyme identification, initial phoneme matching, phoneme counting, segmenting of sentences into words, analyses of compound words and listening comprehension. These results conclude that phonological awareness processing plays a critical role in morphological learning. This is much like the next article which looks at the effectiveness of explicit and systematic instruction.

Oudeans (2003) explained in her study that it included eight kindergarten classrooms. The classrooms taught a variety of phonological awareness skills. Two of the classrooms included typical learning students, one classroom included children with low phonological awareness skills where the instruction included a variety of phonological awareness activities and print activities. Four other classrooms involved children with low phonological awareness and were evaluated on word reading tasks that required alphabetic skills, especially sound correlation. To meet certain outcomes the children were taught the skills until they mastered them in a specific order. A concluding result from this study concludes that initial Phoneme Segmentation Fluency scores were a significant predictor of the posttest performance on the Phonemic Segmentation Fluency measure. While investigating the study from Oudeans (2003) it

was clear that the students mastered many phonological awareness skills, much like the following article.

In the study from Schneider et al. (1997) there were 205 children in 11 different kindergarten classrooms. The training program consisted of 15-20 minutes of metalinguistic exercises and games on a daily basis. The training program consisted of six metalinguistic exercise units that started easy and progressed to harder tasks. Examples of these exercises include listening games, identifying rhymes, identifying sentences and words, syllable segmentation and analysis, phonemes and last was phoneme analysis and synthesizing phonemes within words. The control group in this instance followed the regular kindergarten program, which consisted primarily of social events and games with no formal cognitive and linguistic training. After the post test was concluded it was found that the training program children had substantially higher skills in alliteration and rhyming skills. The effect size was .72 higher in alliteration and .60 in rhyming skills.

Schneider et al. (1997) showed much improvements much like Segers & Verhoeven (2005). Segers & Verhoeven (2005) stated that there were positive effects of children learning phonological awareness skills by using a computer intervention program. This program took place in kindergarten classrooms in a 40 week time period minus 5 weeks for holiday vacations including fall, Christmas and spring breaks. The children were in small groups that met one time a week for 15 minutes, during the last week of school the children were able to play language games on the computer up to three times. The intervention proved a significant increase in rhyming and grapheme knowledge after a four month training period. The phonological awareness training skills that were tested included rhyming, phonemic segmentation and auditory blending.

Like the previous article Torgesen et al. (1992) performs training focused on phonological awareness. Torgesen et al. (1992) performed two oral language training programs that focused on phonological awareness and word learning. They provided explicit instruction in analytic and synthetic phonological tasks. In the training programs there were 3-5 children in each group that met 20 minutes three times a week. These meetings consisted of teaching the children to identify and pronounce the beginning, ending and medial sounds in two and three phoneme words. From this study it was concluded that teaching segmenting and blending skills have a significant improvement in a child's ability to read new words at a faster rate.

*Table 2*

*Ages of Research Participants*

<b>Article Title</b>	PreK	K	1st	2nd	3rd	4 grade & beyond
Albritton et al. (2018)	X					
Bode & Content (2011)		X	X			
Bratsch-Hines et al. (2020)		X	X			
Brennan & Ireson (1997)		X				
Casalis & Cole (2009)		X	X			
Cassady & Smith (2003)		X				



Craig & College (2006)		X				
Furnes & Samuelsson (2011)		X	X	X		
Hogan, Catts & Little (2005)		X		X		X
Kartal et al. (2016)		X	X			
Kim et al. (2010)		X				
Kirby et al. (2003)		X	X	X	X	X
Kjeldsen et al. (2014)		X	X	X	X	X
Law (2017)		X	X	X		
Lyster (2002)	X	X				
Moyle et al. (2013)	X					
Nevo & Breznitz (2012)		X	X			
Otaiba et al. (2008)		X				
Oudeans (2003)		X				
Schneider et al. (1997)		X				
Segers &		X	X			

Verhoeven (2005)	
Smith et al. (2011)	X
Snider (1997)	X
Torgesen et al. (1992)	X

Note: This table was put together to demonstrate the different age groups that the articles focused on in their reviews. The age groups consisted of kindergarten, first grade, second grade, third grade and fourth grade and above.

### *Discussion of the ages of the participants*

In the articles that were reviewed, the students that participated were as young as preschool age and in some studies the students were followed beyond the fourth grade as shown in Table 2. Here we will look at each age category and how phonological awareness was implemented into their instruction.

The first area reviewed include preschool aged children. There were three articles that focused on children who were in preschool. These articles include Albritton et al. (2018), Lyster (2002) and Moyle et al. (2013).

In the study from Albritton et al. (2018) the preschool aged children participated in screenings that included the TOPEL, the GRTR!-R and IGDIs. These assessments were used to guide the teacher's targeted small group instruction on the child's phonological awareness skills. It was shown in this particular study that the students increase their performance in the average words correct on the IGDI-Alliteration from the

baseline through the interventions. As noted by Albritton et al. (2018) that it is necessary to identify children early so the teacher can implement early language and literacy instruction to the struggling readers.

Lyster (2002) focused on preschool and kindergarten. In the article from Lyster (2002) the participants were involved in pre and post tests that consisted of linguistic and metalinguistic knowledge. The assessments in this study were driven by vocabulary, naming speed, syntactic knowledge and memory of sequences. The children in the study showed improvements in phonological, morphological and reading skills. These post test results proved that having phonological awareness training plays a vital role in morphological learning.

Much like in the previous study, which focused solely on preschool, Moyle et al. (2013) is much like the previous studies, where they focused only on the preschool aged children, except it focused on Head Start children, plus other community based preschool classrooms. Like in the study from Albritton et al. (2018) the IGDIs assessments were administered as well as the PALS-PreK. This study concluded that early literacy skills are important for identifying children with delays and these interventions provide the appropriate data to systematically teach the children in the areas that need to be strengthened.

Like the previous articles, who had intentional phonological teaching, the next articles also focused on phonological awareness, but the upcoming articles focused solely on kindergarten aged students. These articles include Brennan & Ireson (1997), Cassady & Smith (2003), Craig & College (2006), Kim et al. (2010), Otaiba et al. (2008),

Oudeans (2003), Schneider et al. (1997), Smith et al. (2011), Snider (1997) and Torgesen et al. (1992).

Brennan & Ireson (1997) focused on kindergarten phonological awareness training. They assessed an array of other phonological and early reading skills including word reading, vocabulary, metaphonological, rhyme, segmenting sentences into words, syllable synthesis, syllable segmentation, deletion of initial phonemes, phoneme segmentation and synthesis of phonemes. These assessments were tracked using a one way analysis of variance (ANOVA) on all testing categories. The only significant difference between the groups was that the phonological training group demonstrated a stronger effect on the phonological awareness assessments. This showed that phonological awareness training has a strong connection to learning to read and spell.

In the article from Cassady & Smith (2004) they focused on a systematic phonological awareness instruction in kindergarten using the Integrated Learning System (ILS). This promoted phonological awareness, alphabetic principles, vocabulary and contextualized reading activities. This showed that there was a difference in the rate of growth in phonological awareness and concepts about print.

Craig & Colledge (2006) also focused solely with kindergarten students. They focused on phonological awareness, an adapted interactive writing program that also integrated metalinguistic games. The children participated in shared texts, written responses, word-building activities as well as interactive writing-plus activities. These activities emphasized spelling, writing, phonemic analysis and word-letter building. The children who participated in the phonological awareness with writing produced higher reading results as they completed the study.

Kim et al. (2010) was the next article that examined solely kindergarten children. This article examined the contributions of letter-name knowledge, phonological awareness, letter characteristics and interactions between letters and sounds. These were assessed with a phonological awareness assessment in the fall, and a letter-name & letter sound assessment was administered. These assessments were examined through the cross-classified multilevel models (CCMLMs). By the end of kindergarten it was proven that alphabetic knowledge and phonological awareness are essential for building early literacy acquisition in reading and writing. Phonological awareness is a significant contributor to letter to sound knowledge which provides a solid foundation for later reading success.

Otaiba et al. (2008) also worked with only kindergarten students. The assessments that were conducted through this study included the statewide assessment of the Florida Progress Monitoring and Reporting Network (PMRN), the Dynamic Indicators of Basic Early Literacy Skills (DIBELS), and the Peabody Picture Vocabulary Test-III (PPVT-III). With these assessments it was important to note that students made adequate gains from fall to spring in letter naming, decoding fluency and phonological awareness.

Odeans (2003) also focused on only kindergarten aged children during this study. The Word Identification Subtest of the Woodcock Reading Mastery test-Revised (WRMT-R), Dynamic Indicators of Basic Early Literacy Skills (DIBELS) as well as the Letter naming Fluency (LNF) were administered and used to measure the child's knowledge and growth. The findings showed that letter-sound fluency is a critical component for efficient and accurate decoding and reading skills.

Schneider et al. (1997) conducted a study that also focused on phonological awareness in kindergarten students. They were assessed at the beginning and the end of the school year in phonological awareness in deletion of initial phonemes, phoneme synthesis, phoneme analysis, sound categorization, phonological memory and rapid naming. These assessments showed that early training of phonological awareness yields substantial short term effects regardless of the language that it is taught in.

Another article that focused on only kindergarten was Smith et al. (2011). Their focus was on analyzing four commercial basal reading programs. The criteria in choosing a basal reader were coded with the presence of phonological awareness activities, dimensions of phonological awareness, conspicuousness of instruction, presence of scaffolds to support students and the instructional practice examples.

Snider (1997) was yet another article that focused on phonological awareness effectiveness at the kindergarten level. The assessments that were administered in this study include the Iowa Test of Basic Skills and the California Achievement Test. The students were also given the phonological awareness test that consisted of 5 subtests with 10 items in each area. These subtests include phoneme segmentation, substitute initial consonant, initial consonant, rhyme and inertial consonant. The results of these assessments showed that educators should intervene quickly with children who may be struggling with phonological awareness as when a good phonological awareness program is in place the children will succeed in their reading career.

Torgesen et al. (1992) also focused on kindergarten aged children. The assessments in this article consisted of the phoneme-segmentation, phoneme-blending and alphabetic reading. The posttest measures consisted of segmenting and blending

measures as well as a reading analogue task. These assessments showed that with combining blending and segmenting skills students will be more successful in reading.

The next 6 articles focused on kindergarten and first grade aged students. These articles include Bode & Content (2011), Bratsch-Hines et al. (2020), Casalis & Cole (2009), Kartal et al. (2016), Nevo & Breznitz (2012) and Segers & Verhoeven (2005).

Bode & Content (2009) stated that the kindergarteners and first grade assessments that they administered were: non-verbal intelligence, verbal short-term memory, active vocabulary and phonological awareness. The study started with the kindergarten children and followed them through the first grade. The posttest that was administered immediately after the training showed that the program was most effective in the area of phonological awareness.

Bratsch- Hines et al. (2020) also focused on kindergarten and first grade students with the following assessments: the Comprehensive Test of Phonological Processing (CTOPP) and the Test of Language Development- 4th edition (TOLD). These assessments allowed the teachers to use Targeted Reading Intervention (TRI) to effectively produce reading gains for those students who scored lowest on their reading assessments. The purpose of the TRI was to promote rapid reading gains for the at risk students. This study showed that the TRI was effective in producing higher gains for the students that scored lower at the beginning of the study.

Casalis & Cole (2009) conducted similar investigations in the area of phonological awareness in the kindergarten and first grade realm. The materials that were used to assess the children included nonverbal cognitive ability, vocabulary, syntactic comprehension, and the phonological awareness screeners include syllable deletion,

phoneme deletion, phoneme oddity, morphological awareness, morphological segmentation, derivation in sentence content and inflectional task. In this study it was found that there was a significant improvement from the pre to post test in the area of vocabulary. When looking at the control group, the morphological group and the phonological group, the phonological group scored higher than the other groups.

Kartal et al. (2016) also conducted a study with kindergarten and first grade students. The study investigated the effects of an experimental program that was designed to develop phonological awareness skills of beginning readers. Their program was 6 weeks long, where the software group & in-class groups met 2 times a week during that time and the control group conducted regular instruction. The findings showed that the software and in-class groups had consistent improvement in phonological awareness as the control group did not.

Nevo & Breznitz (2012) conducted a study that investigated working memory development starting in kindergarten and followed the children through first grade. This study showed that it is important to teach beginning reading skills and reinforce working memory skills to maximize future reading achievement.

Segers & Verhoeven (2005) focused on kindergarten and first grade students. They examined the long term effects of a computer intervention program that helped develop phonological awareness skills. The study started with kindergarten students who took a 4 month training program, then retested in the first grade. The results showed that rhyme had a significant impact on reading as well as grapheme knowledge.

There were 2 articles that included kindergarten, first and second grade. These articles include Furnes & Samuelsson (2011) and Law (2017).



Furnes & Samuelsson (2011) focused on the relationship between phonological awareness (PA) and rapid automatized naming (RAN) starting with kindergarten children and followed them through the second grade. The results showed that strong phonological awareness is a predictor of early spelling development.

Law (2017) also focused on kindergarten through second grade. The study looked retrospectively at children who had literacy difficulties that were observed in second grade. The study looked at the two way measures of ANOVA and studied the differences in the three grades to see the correlation between later spelling and reading.

These articles included kindergarten and grades beyond the second grade. These articles include Hogan et al. (2005), Kirby et al. (2003) and Kjeldsen et al. (2014).

Hogan et al. (2005) studied the path of kindergarten phonological awareness and letter identification to use as a predictor of second grade reading. This information in second grade therefore offered information to use as predictors of reading in fourth grade. Even though this study specifically focused on phonological awareness, it could be extended to determine the underlying nature of reading challenges or the process of teaching reading.

Kirby et al. (2003) investigated how well kindergarten students could manipulate phonological awareness and naming speed in account for reading development through upper elementary. This study showed that low phonological awareness by itself in kindergarten was associated with lower achievement in the following few years, but not after that. It also showed that children with weak phonological awareness in the first few years were not able to catch up with their peers by the time they reached the 5th grade.

This explains why we need to have international phonological awareness teaching where the children are taught it in a variety of ways.

Kjeldsen et al. (2014) followed children like in the above article, but Kjeldsen et al. (2014) followed the children from kindergarten through the 9th grade. The study stated that children who scored higher on the phonological awareness and letter knowledge scored higher on the decoding and reading comprehension assessments. When looking at the scores the intervention group scored significantly better on decoding in fourth grade and scored higher in comprehension in the ninth grade.

## Discussion

When looking at the findings from this meta-analysis study it is important to synthesize what the results are showing. The findings showed that when teachers are highly trained in phonological awareness, the teachers intentionally systematically scaffold their teaching as well as having a rich phonological awareness classroom, the children have higher scoring on reading and writing assessments.

When looking over the meta-analysis results it is important to look at teachers that are highly trained in phonological awareness, giving the children a rich phonological awareness environment, assuring that the teaching is intentionally systematically scaffolded as well as looking at the correlation between phonological awareness and the ability to read and write.

Having teachers that are highly trained in teaching phonological awareness is a foundational part of the process to learn to read and write. Teachers need to be trained and up to date on these phonological awareness skills as they are teaching this critically

important foundational skill. The teachers also have to continue taking part in these training sessions.

These teachers know that having a rich phonological awareness environment is a crucial part of learning to read. With having a rich phonological awareness environment the children are exposed to a variety of phonological awareness skills that are available throughout a classroom. Along with having a rich phonological awareness environment the classroom needs to provide an intentional systematic scaffolding program to help cement the objectives that the teacher has implemented.

When looking at the above areas a teacher can conclude that there is a strong correlation between phonological awareness and the ability to read and write. This is emphasized in the articles from Bratsch- Hines (2020) and Brennan & Ireson (1997) where they both stated that there is a strong correlation between phonological awareness and the connection between reading and spelling.

The first area that will be investigated is preschool through early primary ages. When looking at these students there was a trend that the children who were taught phonological awareness were able to read and/or write better than the children who were not taught phonological awareness. These articles provided evidence that teaching phonological awareness has a direct effect on children learning to read and write.

Like in the articles from Bode & Content (2011) and Brennan and Ireson (1997) they studied children who were considered at risk in the areas of reading and writing. When these children went through an intentional systematic phonological awareness program it was proven that after a six month period that these children no longer fell into the at risk category.

Bratsch-Hines et al. (2020) had a similar effect, as they implemented a targeted reading intervention (TRI) in the area of phonological awareness and these children made significant gains in the areas of reading and writing. Casalis & Cole (2009) and Cassady & Smith (2003) also taught phonological awareness in an intentional way and it made a huge influence on the children who participated. It was also stated by Furnes & Samuelsson (2011) that having a strong phonological awareness foundation results in scores across other orthographies.

Many of these articles show that having taught and exposure to systematic phonological awareness at a young age guides the children to success in reading, spelling and writing through grade school and beyond.

From these studies we can also imply that having a strong phonological awareness system in place early in a child's career and enforcing it throughout their learning that they will be set up for literacy success well beyond grade school. It is critical to have continuous support and training for educators so that they can set children up for success. Many of these training can be done through the support of the local schools where they focus on those foundational skills. Also having frequent teacher meetings to enforce the training were noted to be successful according to Albritton et al (2018), Bode & Content (2011) and Lyster (2002). Studies not only emphasized the importance of continuous teacher training, but also having a rich phonological awareness environment for the children. This immersion in phonological awareness activities throughout the day in many areas of the classroom were shown to be successful by Bode & Content (2011), Brennan & Ireson (1997), Cassady & Smith (2004) and Lyster (2002). These immersion activities included rhyming and syllable games during the child's free choice/center time.

These articles also had developmentally appropriate activities that included letter formation, letter names and letter sounds. These activities ensured that the child could learn their phonological awareness skills in a multitude of non threatening ways. Having access to an array of these phonological awareness resources allows the teacher to teach phonological awareness and phonics to solidify what each child's goals were. With this knowledge and these resources the teacher is able to include activities that are whole group, small groups and individualized.

There is an array of data showing that systematic phonological awareness has short-term and long-term effects for children in the areas of early language development and literacy skills. Given the previous data showing that it is necessary to have teachers who are highly trained in teaching and implementing phonological awareness skills. It is also important to immerse the children in a rich phonological awareness environment, which smoothly leads to ensuring that not only is the environment rich in phonological awareness content, but making sure that the instruction is being taught in an intentional and systematic way.

With all of the above criteria in place it should ensure that each child involved in this process will become successful in phonological awareness. When looking at this criteria from an education viewpoint it is encouraging to know that many of these implications can easily be integrated into any classroom. We can infer that when implementing a systematic phonological awareness program tailored to each individual child, teachers can detect the children who are not responding and therefore the lessons may be altered to that specific need. These actions then provide the trained teacher with the information to adjust their training to scaffold to what the child can developmentally

be successful with. These implications show that children can achieve at higher levels when taught phonological awareness in an intentional systematic manner.

When looking at studying phonological awareness my suggestion would be to investigate which areas on the continuum are most age appropriate for each particular age/grade. I feel that when reviewing many of the articles that if some of the areas were introduced earlier the children may have success later in their reading and writing career.

Looking at the data that was collected, the focus was on kindergarten aged children. For future studies it would be ideal to look at this age group, as there were more studies found. There were a few studies that focused on preschool aged children. Starting to introduce the phonological awareness foundation early can allow the children to become aware of how to listen and manipulate the sounds they hear. It is developmentally appropriate for children to move on the phonological awareness continuum as they are exposed to intentional scaffolding instruction.

Phonological awareness instruction was heavy at the kindergarten level and then it quickly tapered off in first grade and beyond. The age groups that were reviewed the least included third grade and above. It would be interesting to dig into intentional instruction with phonological awareness in the older grades as the phonological awareness instruction could become in depth with more blending and manipulating.

After looking at all the information gathered it can be concluded that highly trained teachers are an important part of teaching phonological awareness. It is also important to have a rich phonological awareness environment in conjunction with intentional systematic scaffolding to promote success in later reading and writing skills.

When classrooms are equipped with a teacher that is highly trained in phonological awareness they tend to exhibit more knowledge in the process of teaching phonological awareness to a variety of students and have the background knowledge to adapt to each child's needs.

With that being said these highly trained teachers are able to implement a rich phonological awareness classroom in conjunction with promoting systematic scaffolding interventions. With all of these factors in place it shows that there is success in reading and writing

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