IMPACT OF TARGETED INTERVENTIONS FOR ENGLISH LEARNERS IN THE DOMAINS OF WORD RECOGNITION, LETTER SOUND, AND PHONOLOGICAL AWARENESS

A Dissertation

by

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ABSTRACT

In recent years, the number of English learners (ELs) in U.S. public schools has rapidly grown, with Hispanic children accounting for more than half of Texas public school students, including pre-kindergarten and early childhood education. ELs continue to demonstrate lower reading achievement in comparison to their native English-speaking peers. Students with academic and/or linguistic achievement gaps, who do not receive early intervention, are at risk for reading failure and often continue to struggle with reading and academics. Providing evidence that research-based intervention strategies implemented with ELs can improve the necessary tools and skills to read, can attract the attention of administrators and lawmakers to put more emphasis on the support and development of academic interventions for EL students struggling to read in two languages.

This study was based on data from a randomized controlled trial (RCT) federal grant project, English Language and Literacy Acquisition-Validation (ELLA-V, PR/Award Number U411B120047) that was designed to validate the intervention components from an earlier project, English Language and Literary Acquisition (ELLA, PR/Award Number R305P030032). The present study included 76 first-grade ELs from an urban district in the Houston area, with 33 in treatment (15 girls and 18 boys) and 43 in control (25 girls and 18 boys). The study offers evidence of the efficacy of instructional interventions (Story Telling and Retelling and Higher Order Thinking for English Language and Literacy Acquisition [STELLA] and academic oral language in science [AOLS]) targeted toward improving ELs' English literacy skills, including word recognition, letter-sound correspondence, and phonemic awareness, and therefore, overall reading ability. Treatment students received 2 years of supplemental English direct reading

instruction provided by highly-trained bilingual paraprofessionals during Grades K-1, while control students received standard district-provided English as a second language (ESL) instruction.

Student test scores on the Woodcock-Muñoz Language Survey-Revised (WMLS-R) and the Test of Phonological Awareness (TOPA) for English phonological awareness, letter-sound correspondence, and word recognition were used to compare growth over time and to compare students across conditions using descriptive statistics and multiple regression. Students who received the treatment demonstrated statistically significant gains over time in the aforementioned reading components.

DEDICATION

This dissertation is dedicated to my family. To my wife, who supported me during all this time, even when things got complicated. To my beautiful children, Victoria and Alex, who accompanied me through the duration of my program since they were born. To my parents, who have always been supportive and pushed me to always give my best, even now that they are in heaven.

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The archive data analyzed for Chapter 3 was obtained from the original ELLA-V project. All other work conducted for the dissertation was completed by the student independently.

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NOMENCLATURE

AOL	Academic oral language
AOLS	Academic oral language in science
CALP	Cognitive academic language proficiency
CTOPP	Comprehensive Test of Phonological Processing
DMG	Direct mapping of graphemes
EFL	English as a first language
EL	English learner
ELLA	English Language and Literacy Acquisition
ELLA-V	English Language and Literacy Acquisition-Validation
ESL	English as a second language
NRP	National Reading Panel
RCT	Randomized controlled trial
SEI	Structured English immersion
STAAR	State of Texas Assessments of Academic Readiness
STELLA	Story Telling and Retelling and Higher Order Thinking for English Language and Literacy Acquisition
TBE	Transitional bilingual education
TELPAS	Texas English Language Proficiency Assessment System
TOPA	Test of phonological awareness
WLPB-R	Woodcock Language Proficiency Battery-Revised
WMLS-R	Woodcock-Muñoz Language Survey-Revised

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER 1

INTRODUCTION

Background of the Study

The rapid globalization of society and the exponential increase of multicultural communities have brought abundant challenges to education in the United States. The results of the 2000 Census showed that the U.S. population is becoming increasingly diverse (Lee et al. 2001). This trend continued in the 2010 Census with an increase of 27.3 million people (or 9.7%) between 2000 and 2010, where more than half of the growth in the total U.S. population was due to an increase in the Hispanic population. This pattern is particularly prominent among K-12 students. In 2017, the Texas Education Agency (TEA) reported that Hispanic students accounted for 52.4% of the state's 5.3 million children enrolled in public schools, including pre-kindergarten and early childhood education. Therefore, Hispanic children are an essential component of this country's future. Considering their growing numbers, these children will become a major part of the workforce when they reach adulthood. Nevertheless, Hispanic youth have a high dropout rate, which will have negative personal, social, and economic consequences not only for them, but also for their families in the future. Additionally, large numbers of teens not graduating causes serious societal issues (Fry, 2003).

English Learners and Academic Achievement

In the state of Texas, many students come from diverse linguistic backgrounds. Immigrants, who speak an assortment of languages and come from all over the globe, are attracted to the United States for multiple reasons, such as financial security, political concerns, educational opportunities, and safety (i.e., refugees seeking asylum), among many others. In

2013, nearly 61.6 million people in the United States spoke a language other than English at home, including U.S. and foreign-born individuals. Out of this 61.6 million, nearly 60% spoke English fluently, and approximately 21 million were considered English learners (ELs) (Camarota & Zeigler, 2014). Currently, approximately 20% of the U.S. K-12 student population speaks another language than English at home, and it is predicted that by the year 2030 nearly 40% of the student population will come from language minority backgrounds, speaking English as a second language (National Assessment of Educational Progress [NAEP], 2011). Presently, over 75% of this group speaks Spanish as their primary language, and Hispanic students are the fastest growing sector of the U.S. population (Hemphill et al., 2011).

According to August and Hakuta (1997), students identified as EL when they enroll in public school have a higher chance of being at-risk for school failure. Additionally, EL students with Spanish as their first language have been found to score significantly lower in reading and mathematics than other language minority students with comparable economic disadvantage levels (Moss & Puma, 1995). Moreover, previous Texas Assessment of Knowledge and Skills (TAKS) reading results indicated that high school Hispanic and EL students do not perform close to native English-speaking students (TEA, 2009). Additionally, while the federal and state governments have attempted to close the academic gap via language support programs, ELs continue to score lower than native English-speaking students on the State of Texas Assessments of Academic Readiness (STAAR) exams (TEA, 2015). Unfortunately, the academic gap endures between ELs and native English speakers nationwide. Less than 10% of fourth-grade ELs and less than 5% of eighth-grade ELs achieve proficiency on reading evaluations as compared to close to 40% of their native English-speaking peers (NAEP, 2011).

According to the U.S. Department of Education (2019), the EL graduation rate increased 10 percentage points from 2010–2011 to 2015–2016 nationwide. In 31 states, the graduation rate of ELs was at least 5 points higher in 2015–2016. In California and Texas, the two states with the largest EL populations, the graduation rate increased by more than 10 percentage points. Proficiency in core academic subjects such as reading and mathematics is a key indicator that students are learning what is expected at their grade level. A high school diploma demonstrates students' readiness for postsecondary activities and can lead to more successful employment outcomes than without a diploma. While nationally, ELs have experienced some small gains in reading and mathematics proficiencies, as well as increases in on-time high school graduation rates, their performance still lags far behind their non-EL peers.

Definitions of Key Terms

- *English learners* (ELs) are "individuals who come from language backgrounds other than English and whose English proficiency is not yet developed to the point where they can fully profit from English-only instruction" (August & Shanahan, 2006. p. 21).
- *L1* refers to the first language. In this study, L1 is Spanish.
- *L2* refers to second language. In this study, L2 is English.
- *Letter-sound correspondence* refers to a phoneme (sound) associated with a letter that is comprised initially of individual letter sounds and progresses to more complex letter combinations. Letter-sound knowledge is a prerequisite to effective word recognition. A primary difference between good and poor readers is the ability to use letter-sound correspondence to identify words (Juel, 1991).

- *Phonemic awareness* is defined as one's access to, and handling of, the sound structure of words at the phoneme level (Anthony & Francis, 2005).
- *Phonological awareness* refers to the capacity to recognize and control linguistic sounds apart from their significances; it is an essential skill in learning to read in alphabetic languages, such as English and Spanish (National Reading Panel [NRP], 2000).
- *Word recognition* is a main constituent of reading fluency and encompasses a combination of language structure, orthography, and metalinguistic skills (Caravolas et al., 2013).

Theoretical Framework

The theoretical framework for this study was grounded in second language acquisition theories associated with the links between children's first language (L1) and their second language (L2), specific components of the early stages of reading (i.e., phonological awareness, letter-sound correspondence, and word recognition), and children's ability to read in their L2. Cummins' (1984) interdependence hypothesis states that both L1 and L2 have a common cognitive area, or common underlying proficiency, meaning that cognitive academic knowledge and skills learned in one language can be transferred to a second language. This hypothesis indicates that being a good reader in one language is a valuable skill when learning to read in another language. Moreover, learning to read in English and Spanish follow a similar process, including phonemic awareness, decoding, fluency, and comprehension (August et al., 2002).

The current argument around early reading instruction, particularly at the first-grade level, is consistent with more than 50 years of debate over the best approach to developing young readers' skills, and a major portion of the recent debate on first-grade reading development has

been polarized between individuals who advocate for clear, methodical instruction of beginning reading skills, particularly the teaching of phonics, and those who promote student immersion in literacy tasks, the complete language philosophy (Adams, 1990; Chall, 1967). Individuals who support clear, methodical reading instruction are able to call attention to experimental evidence demonstrating that when students struggling with word recognition are provided with intense instruction on decoding skills, their performance on standard measurements of word recognition or reading increases (Adams, 1990; Chall, 1967).

Phonological awareness is described as the capacity to recognize and control linguistic sounds apart from their significances; it is an essential skill in learning to read in alphabetic languages, such as English and Spanish (NRP, 2000), as well as nonalphabetic languages with no immediate correspondence between phoneme and symbol, such as Chinese (Ho & Bryant, 1997; Hu & Catts, 1998). The role of phonological awareness in literacy acquisition and reading development has been widely studied since the early 1980s, commonly concentrating on the relation between phonological awareness at the phoneme level (Gough & Hillinger, 1980); at the level of speech units, such as onsets and rimes (Goswami, 1993); and reading measured as decoding (Wagner et al., 1997). Researchers have found evidence of a relation between phonological awareness and reading ability, suggesting that the more phonologically aware students are, the better they tend to be at reading (Adams, 1990; Wagner et al., 1997).

Statement of the Problem

Spanish language acquisition has been found to support phonological awareness as a predictor of reading success in Spanish, as well as in English (Stahl & Murray, 1994). Students who struggle in reading have been shown to have inconsistencies in phonological and phonemic awareness (Bravo-Validivieso, 1995; NRP, 2000).

Of the various components involved in emergent reading, the development of phonological awareness requires special attention. Although it is evident from years of exploration and classroom observations that, through formal and informal teaching, students learn letter knowledge, the developmental background of young students' phonological awareness is intangible (Bialystok et al., 2005). Comprehending the role of phonological awareness in ELs' development brings a new set of challenges as two language schemes are involved.

Current investigations support the idea that phonological awareness skills transfer across languages (Comeau et al., 1999; Geva et al., 1997; Lindsey et al., 2003; Oller & Eilers, 2002). Students learn letter knowledge, for example, primarily through formal and informal instruction, but the developmental roots of students' phonological awareness are largely hidden. However, detecting these roots is significant since phonological awareness is an essential component of children learning to read and write in their first and second language (Adams, 1990; Comeau et al., 1999; Gottardo et al., 2001; Lindsey et al., 2003; Shaywitz, 1996).

There has been immense effort to increase student reading achievement nationwide (Adams, 1990; Snow et al., 1998). To achieve this goal, researchers have shown that providing high-quality instruction to students in the early grades can prevent adverse long-term repercussions from reading failure (Adams, 1990; Snow et al., 1998). Over 30 years ago, researchers began to warn that students with low third-grade reading test scores were less likely to graduate from high school than students with higher reading scores (Fiester & Annie E. Casey Foundation, 2010). Third grade is a pivotal point in students' education. This is the moment when children shift from learning to read and begin reading to learn. Interventions for struggling readers after third grade are seldom as effective as those in the early years (Lloyd, 1978).

Additionally, the American Literacy Council tells us that students who read below grade level at the end of third grade are four times more likely to leave school before graduating; two-thirds of struggling fourth-grade readers, if the numbers are to be believed, are headed for jail or welfare (Connelly, 2015).

General trends in experimental research syntheses about literacy development in alphabetic languages are apparent in the studies cited by August and Shanahan (2006). August and Shanahan (2006) highlighted results for six components of literacy skills: phonological awareness, phonics, reading fluency, vocabulary, reading comprehension, and writing. Results of this examination largely corroborated those of the previous review: The same principles of methodical and clear phonologically-based interventions that sustain instruction for English-proficient students also seem to boost ELs' reading growth. These advantages were demonstrated through numerous measures, including evaluations of reading comprehension, word reading, and word attack skills. Furthermore, the NRP (2000) revealed that alphabetic knowledge, phonemic instruction, and phonological awareness are improved when teachers effectively use an assortment of literacy instruction techniques. Additionally, researchers indicated that there is also much emphasis on syllabic and phonemic instruction in Spanish (NRP, 2000).

Spoken word recognition is assimilated through listening and speaking, and written word recognition is developed through reading and writing. A printed word is identified with such clues as letters, syllables, and articulation (Tuncay & Dedeoglu, 2019). As said by Güneş (2013),

> Recognizing the written words is a critical stage in the process of learning to read. It is impossible to read without recognizing the words. The skill of recognizing the written words is developed through special work in the process of teaching

> literacy. First, voices and letters are taught; alphabetical relationships are discovered, and gradually syllables and words are recognized. (p. 232)

The automaticity of the word recognition process becomes an important piece in knowing the meaning of words needed in producing a text and in achieving fluency in reading a text.

Purpose of the Study

The purpose of this study was to determine if instructional interventions addressing phonological awareness, word recognition, and letter-sound correspondence in first grade predict stronger reading ability in English among Spanish-speaking ELs in an urban district in the Houston area with data collected from a federal grant, English Language and Literacy Acquisition-Validation (ELLA-V, PR/Award Number U411B120047; Lara-Alecio et al., 2013). The project was federally funded by a grant from the U.S. Department of Education's Investing in Innovation (i3) Fund. The objective of Project ELLA-V was to implement a thorough evaluation of educational interventions for ELs whose first language is Spanish.

Research Questions

This study included four research questions:

1. What were the initial differences between Grade 1 ELs in treatment and control conditions regarding their English achievement in the measures of word recognition, letter-sound correspondence, and phonological awareness?
2. Were ELs' English letter-sound correspondence and phonological awareness, as measured by the TOPA, statistically significant predictors of their word recognition as measured by the WMLS-R?

3. Did Grade 1 ELs' participation in the treatment or control condition predict their letter-word recognition as measured by WMLS-R when pre-interventions were controlled?
4. Among students who received the intervention, was there a significant difference between male and female students' performance?

Significance of the Study

Phonological awareness has been found to be one of the primary indicators of how students will develop reading skills in English in their first couple of years of school (NRP, 2000). Phonemic awareness in Spanish has been found to be a predictor for successful readers (Stahl & Murray, 1994). Furthermore, researchers have demonstrated that low-performing readers have inconsistencies when it comes to phonological and phonemic awareness (August & Shanahan, 2006; Bravo-Valdivieso, 1995). Snow et al. (1998) also found phoneme segmentation to be a predictor of reading results in alphabetic languages.

Moreover, word recognition ability is one the first skills a person acquires when learning how to read, and it is critical for students to identify words correctly in the process of learning to read, because it is impossible to read without recognizing words (Tuncay & Dedeoglu, 2019). However, word recognition is not the only skill needed to read, but word recognition can be seen as the first stage in making sense of the words on a page. Additionally, children who struggle in reading are noticeably unresponsive to rhyme and alliteration (Bradley & Bryant, 1983). Consequentially, they are at a disadvantage when classifying words based on familiar sounds. Classifying words in this way encompasses attending to their fundamental sounds, and so does learning to use the alphabet in reading and writing. Therefore, the experiences that students have

identifying letter-sounds at the early stages might have a considerable effect on their success later on in learning to read and write (Bradley & Bryant, 1983).

The 2004 No Child Left Behind (NCLB) Act stipulated that language minority students must meet the same state academic standards as native English-speaking students (Rebora, 2004). Additionally, federal legislation has required the annual reporting of academic progress for each individual student to his or her respective state. Consequently, meeting required standards to satisfy the learning needs of ELs and provide equitable educational opportunities has become a major challenge to the U.S. public school system.

Providing evidence that research-based intervention strategies implemented with ELs can improve the necessary tools and skills to read, can attract the attention of administrators and lawmakers to put more emphasis on the support and development of academic interventions for EL students struggling to read in two languages. This study offers evidence of the efficacy of these instructional interventions designed to improve ELs' literacy skills (i.e., word recognition, letter-sound correspondence, and phonological awareness) and therefore overall reading ability.

Limitations

The current study had several limitations that should be considered when interpreting the results. First, as archived data were used, the sample size is small, and therefore, the likelihood of a Type II error increases. A Type II error can skew the results, which may decrease the power of the study. Second, the study's generalizability is limited, as the sample was from a single district and restricted to first-grade, Spanish-speaking ELs who were identified as struggling readers in English. Third, both treatment and control classrooms were only observed during ESL instruction.

Delimitations

The current study had the following delimitations. First, this study was confined to measure-specific aspects of early stages of reading limited to phonological awareness, word recognition, and letter-sound correspondence. Second, data were collected from participants from the same geographic location, limiting the generalizability of the study. Third, participants were English learners whose first language is Spanish, reducing generalizability for all ELs who speak a different language.

Assumptions

The following assumptions were made regarding this study. First, teachers participating in the study were properly trained and delivered the interventions with fidelity. Second, teachers were engaged in the virtual professional development sessions that were provided as part of ELLA-V. Third, all materials and resources for interventions were available during the course of the study.

Organization of the Study

Chapter 1 includes the background of the study, definition of terms, theoretical framework, statement of the problem, purpose of the study, research questions, significance of the study, limitations, delimitations, assumptions, and summary. Chapter 2 contains an introduction, descriptions of key literacy skills, a section on phonemic and phonological awareness, word recognition, letter-sound correspondence, effective reading inventions for ELs, ELLA-V research, other relevant interventions, and a summary. Chapter 3 includes an introduction, the context of the study, research design and sampling, intervention, instrumentation, research questions, data collection, data analysis, and a summary. Chapter 4

includes the results and a summary while Chapter 5 has a discussion of findings, recommendations, implications, conclusions, and a summary.

Summary

This chapter presents a compelling case regarding the importance of providing specific educational interventions to support ELs, especially in the early grades when reading fluency and alphabetic principles are developed. Background of the study, definition of key terms, theoretical framework, statement of the problem, purpose of the study, significance of the study, research questions, limitations, delimitations, and assumptions are included in this chapter.

CHAPTER 2

REVIEW OF THE LITERATURE

A significant portion of the studies in the area of effective reading programs for monolingual English- and Spanish-speaking children covered phonological and phonemic awareness (August et al., 2002). Despite the debate and split viewpoints in regard to the best practices for early literacy acquisition, extensive data have been gathered on the development of early literacy acquisition and instructional approaches in both English (NRP, 2000) and Spanish (August & Shanahan, 2006). In this chapter, I present an extensive literature review on effective literacy interventions for ELs, phonological awareness, word recognition, and letter-sound correspondence in ELs' second language.

Components of Reading Development

Phonemic Awareness

Anthony and Francis (2005) defined phonemic awareness as one's access to, and handling of, the sound structure of words at the phoneme level; for example, the identification and blending of individual speech sounds. Phonemic awareness has been noted to be one of the main components of phonological awareness in reading and spelling development in alphabetical orthographies (Caravolas et al., 2013).

Reading is a widely used and versatile skill, upon which countless daily life tasks are hinged, in a contemporary, technologically advanced society. It is an ability that must be clearly explained and taught (NRP, 2000). Additionally, inappropriate mastery of the introductory skills of reading in the initial stages of life may considerably reduce the likelihood of learning them at all (Moats, 1999). Reading is an intricate skill that comprises word recognition processing in

both the auditory and visual modalities—in other words, listening, identifying, and recognizing word forms (Cunningham & Stanovich, 1993). While the majority of young students learn how to read, many children do not acquire proficient reading skills. Furthermore, according to the NAEP (2018), about 35% of students in fourth grade in 2017 were at or above grade level in reading; that is to say, approximately only one-third of students in fourth grade read at or above grade-level standards. Average reading score of fourth-grade students in 2017 not significantly different compared to 2015. Moreover, Catts et al., (2003) estimated that about 10% of students in the nation struggle with learning to read and will need intervention.

In learning to read, students must understand graphemes, which are the smallest functional unit of a writing system, in other words, a grapheme is a letter or letters that spell a sound in a word. Direct mapping of graphemes (DMG) in the context of reading intervention refers to clearly and methodically utilizing the taught knowledge of grapheme-phoneme correspondence to decode authentic text (Yeung & Savage, 2020). In other words, phoneme-grapheme mapping is a research-based activity that helps readers build word recognition skills. Phonological awareness seems to be a significant precondition of generating these mappings since it requires students to examine and break complete word forms into fundamental parts. Children cannot begin to generate grapheme-phoneme mappings until they are able to recognize separate phonemes and identify the part-whole relation between phonemes and words. Consequently, researchers have found phonemic awareness to be the most solid antecedent to, and predictor of, reading achievement outcomes, for both students with and without reading disabilities (Anthony & Lonigan, 2004; Bradley & Bryant, 1983; Snowling, 1980; Verhagen et al., 2008). Starting with the premise that phonemic awareness is a significant antecedent to proficient reading, it is essential to study the development of this element. Attention should be

directed toward thoughtful review of increasing development of phonemic awareness and related instruments, which could give us a better perspective on reading readiness.

With reference to English phonemic awareness, investigators have used diverse measures of phonemic and/or phonological awareness, such as (a) differentiation of acoustically similar sounds with different frequency, duration, and/or intensity when the information carried by the sound depends on these differences (Brice et al., 2004); (b) the word has or ends with a sound that corresponds to another (Cisero & Royer, 1995); (c) the manipulation of spoken words by deleting specific phonemes (Dickinson et al., 2004); and (d) the reader quickly names aloud a series of familiar items on a page (Chiappe et al., 2002). Researchers have given little theoretical attention to phonemic awareness and phonological awareness in Spanish. Some studies have included a subcategory of Spanish speakers (Chiappe et al., 2002; Cisero & Royer, 1995), while other investigations have included Spanish-English bilinguals (Brice et al., 2004). Additionally, Dickinson et al. (2004) concentrated on phonemic awareness exclusively in Spanish.

Phonological Awareness

Both practical and theoretic examination suggest that early literacy encompasses four significant areas (Senechal et al., 2001; Whitehurst & Lonigan, 1998). These areas include (a) alphabetic knowledge and concepts about print, or the ability to identify and generate letter names and sounds, and comprehend writing principles (McBride-Chang, 1999); (b) comprehension, or the ability to acquire information and make inferences from written and/or spoken language (Snow et al., 1998); (c) oral language, or a student's expressive and receptive vocabulary (Dunst et al., 2006); and (d) phonological awareness, or the ability to identify and operate utterances at the level of phonemes, the smallest units of spoken language (Anthony et al., 2007). Phonological awareness has a special significance in education due to its direct

connection to future reading achievement (Anthony & Lonigan, 2004; Muter et al., 2004). Wagner et al. (1997) showed that children with solid phonological awareness in the early stages of their reading development are more likely to become proficient readers by third grade. Moreover, their study identifies specific skills of phonological awareness, such as rhyming, alliteration, and blending, which contribute to strong reading achievement. For instance, children's ability to separate and recognize phonemes at four and five years of age has been a predictor of children's word reading and comprehension skills in second grade (Muter et al., 2004). Furthermore, the development of blending skills during early childhood is associated with stronger performance on reading assessments at the end of first grade (Lonigan et al., 2007)

Phonological awareness is a significant element of phonological processing (Wagner & Torgesen, 1987). Phonological awareness is frequently evaluated by having students manipulate the order of sounds in a word or to combine the sounds to create a word. Researchers of early childhood reading have determined that the normative developmental progression of phonological awareness skill is from larger to continuously smaller units of sound (Jordan et al., 2010; Simmons et al., 2008), given that children typically begin to practice the pronunciation of number words with the aid of verbal code representations (Krajewski & Schneider, 2009; Simmons et al., 2008).

Porta and Ramirez (2020) observed the effect of two different interventions including phonological awareness in which one intervention focused only on phonological awareness while the second intervention focused on phonological awareness, vocabulary, and morphological awareness on Spanish-speaking kindergarteners' language and literacy skills. Students who participate in the second and more inclusive treatment group demonstrated significant growth by the end of the study on all measures and a general vocabulary knowledge

improvement over students who participated in the first treatment, which included only phonological awareness intervention. This study demonstrated that even though, the more comprehensive intervention drew a higher growth in multiple areas, both treatments improve in the area of phonological awareness.

Word Recognition

Word recognition is a main constituent of reading fluency and encompasses a combination of language structure, orthography, and metalinguistic skills (Caravolas et al., 2013). Coltheart (1978) defined literacy as the ability to communicate well in writing and reading; in other words, literacy involves a person being able to read and write effectively and efficiently. He also identified word recognition as a component of literacy, and defined word recognition as the process of changing a series of characters into sounds for the identification of a word. This decoding procedure can initially be fairly slow. Nevertheless, as readers come upon characters more regularly, word recognition becomes quicker and more instinctive. Specific patterns of letters and words are directly related to their representations in the mental vocabulary and therefore recognized with considerable speed (Coltheart, 1978).

Wilfong (2015) conducted a study to improve fluency, comprehension, and word recognition of struggling ELs by using poetry. In her study, she used a 3-minute reading assessment (Rasinski & Padak, 2005) to measure participants' reading fluency, word recognition, and comprehension on a grade-level passage. At the end of a 12-week intervention period, participants were reassessed on the names test and 3-minute reading assessment. Students in the study made growth in the three targeted areas. Due to the fact that there was no control group to compare student growth, it is difficult to know how much of the students' growth was due to the intervention. Nevertheless, based upon the fact that participants had previously been showing

insignificant improvement and after the intervention they were making considerable progress, the researcher concluded that intervention must have had an impact. The progress in letter-sound correspondence, as measured by the names test and the increase in fluency and word recognition, as measured by the 3-minute reading assessment, indicated considerable student growth.

Letter-Sound Correspondence

The significance of methodical and clear phonics instruction in kindergarten and first grade to develop children's word recognition, spelling, and reading comprehension were indicated in the results from the NRP (2000). Letter-sound correspondence is an exceptionally crucial ability in the lower elementary grades. Letter-sound correspondence is a consistent predictor of improved reading skills on standardized reading assessments in the upper grades (Pickart et al., 2007). Methodical and clear reading interventions are predominantly advantageous for struggling readers in the early grades (NRP, 2000). For example, Vellutino et al. (2006) conducted a study in which kindergarten and first-grade students who were provided with targeted reading interventions showed higher achievement on emergent literacy instruments in comparison to similar children who were not provided with the intervention support.

Roberts et al. (2018) examined the effect of alphabet instructional interventions on letter-names only, letter-sounds only, and both for English-speaking and EL students. Researchers found that students receiving treatment for letter-names only grew significantly in the area of rapid letter name identification surpassing students in other treatments. The letter-names only contained more visual-verbal paired associate learning, articulation-referencing learning and orthographic learning noting that measures of rapid letter naming indicate a connection to the direct applicability of letter-sounds to learning to read words.

Furthermore, in a separate study by Al Otaiba and Torgeson (2007), the authors concluded that supporting children with methodical and clear reading interventions, in addition to a robust and explicit fundamental reading program, can decrease the percentage of struggling readers by the end of first or second grade. The significance of emergent reading interventions in the lower grades has been investigated substantially (Stein et al., 1999).

Emergent reading interventions for ELs have an insufficient or inadequate representation in the research literature (Klingner & Edwards, 2006). Incoming ELs in kindergarten are presented with added challenges due to the fact they have to learn to comprehend, speak, and read a second language. EL students may also experience more significant obstacles when learning to read since they have to deal with acculturation, linguistic isolation, and lack of prior literacy experiences in their native language or English (August & Shanahan, 2006).

Remediation for Struggling Readers

Scholars conducting comparison research regarding the processing profiles of EL and native English speakers with reading difficulties have shown similar groups lacking cognitive and linguistic processes as being related, despite the native language status (G. D. A. Brown & Hulme, 1992; Doctor & Klein, 1992; Lipka et al., 2005). Along with homogenous reading and spelling achievement assessment, evaluation of reading disorders in EL students must contain very similar classes of phonological processing, syntactic awareness, and working memory measures as would be used with native English speakers (Geva & Yaghoub-Zadeh, 2006; Lipka et al., 2005). Nevertheless, regardless of the significance of comparable cognitive and linguistic processes in the development of reading skills for ELs, limited research has been conducted on what interventions are the most effective for struggling EL readers (Vaughn et al., 2005). As the number of EL students referred for special education services rises (McCardle et al., 2005), the

necessity also increases for assessment of interventions for EL students with a reading deficit (Vaughn et al., 2006). Moreover, in addition to the elements previously mentioned as significant for reading remediation for native English speakers, Vaughn et al. (2005) proposed that intervention should also encompass instruction related to language development of EL students and application of the most proven reading practices during instructional delivery.

Additionally, Bedore et al. (2020) studied whether grammatical skills of struggling EL students on language and/or reading improve with structure intervention, highlighting grammatical components. Results of their study showed that ELs receiving the structure intervention improved in both languages, English and Spanish as evidenced by significant increases in sentence repetition accuracy measured by the Bilingual English Spanish Oral Screener Morphosyntax subtest increasing ELs responsiveness and skills to generate morphosyntactic goals in the framework of grammatical prompts.

Effective Reading Inventions for English Learners

Lovett and colleagues (2008) examined whether struggling readers from various primary language backgrounds vary in response to phonologically based remediation. Their study included 166 participants identified with reading disabilities and as ELs. All participants met criteria for reading disability, were below average in oral language and verbal skills, and varied in English as a first language (EFL) versus EL status. Information was accumulated over the course of 4 years in 16 elementary schools from a large, multicultural, linguistically diverse, urban school district in Canada. Participants were strategically selected to represent similar socioeconomic conditions and cultural backgrounds; they were referred by educators concerned about their reading performance. Participants had to perform one standard deviation (SD) or more below age norm expectations on the average standard score obtained from three reading

achievement tests—Woodcock Reading Mastery Tests–Revised (WRMT-R) word identification and word attack subtests (Woodcock, 1987), Wide Range Achievement Test, Third Edition (WRAT-3; Wilkinson, 1993), and reading subtest, blue form (Wilkinson, 1993)—in order to meet criteria for participation in the study. Groups were arbitrarily assigned to a phonologically based remedial reading program or to a special education course control condition. All participants were provided with 60 minutes of intervention daily, 4 to 5 days per week, for a total of 105 hours of remedial reading instruction emphasizing phonologically based word attack and word recognition training, whereas the control group received general special education instruction. A full series of examinations were given to all participants, including standardized achievement tests, measures of cognitive abilities, word recognition, non-word reading, passage comprehension, visual naming speed and phonological processing, language-based tests, and experimental measures of letter-sound knowledge and transfer of learning in the word recognition domain. The researchers found that the phonologically based interventions were more successful. Findings on all indicators, with the exception of one, showed that participants who received the intervention surpassed the students who received a corresponding quantity of reading remediation. Additionally, participants in the treatment group displayed superior rates of growth in their reading and reading-related skills (e.g., rapid automatized naming, phonological awareness, and language ability).

Caravolas et al. (2013) studied the different patterns, but equivalent predictors, of reading growth in consistent and inconsistent orthographies. English has the least consistent alphabetic orthography phonologically among English, Spanish, and Czech. Therefore, students learned to read slower in English than in languages with more consistent orthographies. Researchers found that the development of reading skills was slower and took a different course in English than in

Spanish and Czech. However, phonological awareness, letter-sound correspondence, and rapid naming assessed at the beginning of reading instruction did not vary as predictors of variations in reading growth among the three languages. The reading skills of students in three different countries (England, Czech Republic, and Spain) were measured every 6 months over a period of three school years from kindergarten to second grade. A total of 523 students participated in the study: 185 English participants (97 males, 88 females), 150 Czech participants (74 males, 76 females), and 188 Spanish participants (103 males, 85 females). All participants in each group had similar levels of primary reading skills. A battery of parallel assessments for letter knowledge, phonological awareness, and rapid automatized naming, as well as administration procedures, were created in order to ensure uniformity in the measures used across languages.

Caravolas et al. (2013) revealed that the rates of reading development in all three orthographies were considerably similar even though formal instruction in Spanish and Czech did not begin until after the first 8 months of kindergarten. Nonetheless, after Spanish and Czech participants began to receive proper reading instruction, they demonstrated a precipitous growth in reading, followed by a reduction in speed. Conversely, English students demonstrated a slower rate of growth in reading during their first 8 months when receiving formal reading instruction, and their reading skills continued to develop at a relatively slow and steady rate over an extended period of time. In conclusion, researchers found strong evidence that learning to read in English is significantly harder than in Spanish and Czech, which have more consistent orthographies.

Notwithstanding persistent group variances in reading speed, a common outcome in all three orthographies was the absence of substantial disparities in progress within the groups after the first 8 months and until the end of the study. This conclusion is consistent with the implication that once a child's primary reading cognitive structure is constructed, longitudinal

stability is more likely to be developed (Lervåg et al., 2009). Additionally, a student's previous reading skills (or lack thereof) predict if he or she is likely to continue on the same path (Parrila et al., 2005). These findings from the cross-linguistic study indicated that even though students may learn to read faster in more consistent orthographies, there may nonetheless be universal cognitive prerequisites for learning to read in all alphabetic orthographies.

Teachers' ability to develop ELs' oral English language proficiency has not been explored in much detail. Hence, what is known should be considered carefully when it comes to school staff examining interventions for their ELs. Saunders and O'Brien (2006) identified a handful of studies regarding oral proficiency results in the second language (Howard et al., 2003; Lindholm-Leary, 2001; Medina & Escamilla, 1992; Thomas & Collier, 2002), arguing that oral proficiency in English is essential for academic achievement, successful social interactions, and future employment opportunities.

Gender Differences in Language and Reading Interventions

Gender issues in the field of second language acquisition have been studied heavily from different angles, including performance on assessments (Farhady, 1982), second language proficiency (Boyle, 1987), acculturation (Tran, 1988), learning strategies (Green & Oxford, 1995), vocabulary (Scarcella & Zimmerman, 1998), reading strategies (Brantmeier, 2003), and phonemic awareness (Major, 2004). Gordon (2008) provided a general review of gender issues in L2 socialization and discussed the effect of gender identity within the context of schools, such as access to education, the influence of gender on opportunities for interaction in a variety of classroom settings and the influence of gender ideology on L2 learning. Gender differences in L2 learning have also extended into teaching approach (Richards & Rodgers, 2001).

However, despite multiple studies regarding gender in L2 acquisition, there is still controversy over whether male students learn English at a faster rate than their female peers (Bornstein et al., 1998; Karmiloff & Karmiloff-Smith, 2001). Uchikoshi (2006) found male Latino students to have higher rates of English acquisition than female Latino students; boys scored higher on expressive and receptive English vocabulary at the beginning of kindergarten, and the trend continued throughout the academic year. On the other hand, Duursma et al. (2007) reported higher expressive English vocabulary acquisition among female Spanish-speaking ELs. These fifth-grade students received their initial instruction in Spanish. Intriguingly, Thomas and Collier (2002) did not find gender to be a factor in student English reading achievement; rather, in their longitudinal study, the two researchers showed that the type of language program implemented with native Spanish speakers (i.e., English immersion, two-way dual language, transitional bilingual program, or English only) was the decisive factor. Likewise, Medina and Escamilla (1994) found no gender differences between male and female Spanish-speaking ELs in English oral proficiency and reading performance.

Additionally, Tong et al. (2010) examined an adapted version of Early Interventions in Reading provided to a group of K-2 Spanish-speaking ELs. In their study, the scholars also explored gender differences in response to the reading intervention with 196 ELs, where 84 students (40 girls and 44 boys) were randomly assigned to treatment and 112 students (48 girls and 64 boys) were randomly assigned to control, which was regular ESL instruction. Overall, students who participated in the treatment group showed more improvement over time than control students in L2 phonological awareness, receptive L2 oral language, and L2 reading skills. There were some divergences concerning gender. Female students outperformed male participants in the area of segmenting. However, male students showed more favorable results in

the area of oral vocabulary, and both girls and boys gained comparable levels in L2 decoding and reading.

Similarly, on a different longitudinal study, Tong, et al. (2011) studied the effects of a didactive intervention on dual language growth on Spanish speaking EL students in first grade with a focus on gender. Researchers found that overall female students did not differ from male students in L2 development of oral language including receptive and expressive vocabulary and knowledge in phonology and syntax during the first year of their study. However, female students exhibited a more accelerated growth than male students in the area of comprehension during the second year of their study. While these findings support the literature, to a certain degree, that female students develop first or second language at a faster rate than male students (Burman et al., 2008), these results also corroborate that both male and female students develop similar levels of oral language in both languages when instruction is presented in the ELs L1 for a bigger fraction of the academic day (Medina & Escamilla, 1994). It is also important to highlight the female students only exceed their development in one of eight areas measured in their study and on average, both, male and female students grew at or above the standard on the evaluations.

The studies focusing on gender differences in native speakers of different languages have extended to various languages, such as English (Tannen, 1990), Vietnamese (Tran, 1988), Japanese (Gass & Varonis, 1986), and Swedish (Henry, 2009). Furthermore, Vygotsky (1978) proposed that sociocultural aspects, such as language, values, religious beliefs, and historical background, influence how children acquire language and concepts because of multifaceted connections with more experienced persons, such as educators, older family members, etc. Through those interactions, children develop knowledge structures concerning the different roles

and expectations for males and females (Tenenbaum & Leaper, 2002). Individuals from Hispanic background set specific roles based on gender stereotypes where females are raised to be compliant, family-oriented, and humble, while males are raised to be forceful, manly, and self-sufficient (Raffaelli & Ontai, 2004).

English Language and Literacy Acquisition and English Language and Literacy Acquisition-Validation Studies

Project English Language and Literacy Acquisition

From 2003 to 2008, Project ELLA (sponsored through the Institute of Education Sciences under PR/Award Number R305P030032) was conducted to examine the efficacy of structured English immersion (SEI) and transitional bilingual education (TBE) models in teaching English language and literacy skills to ELs in lower elementary grades (Lara-Alecio & Irby, 2003). ELLA was a longitudinal, field-based, large-scale research project carried out in one large urban school district in southeastern Texas. Researchers followed the same cohort of Hispanic EL students starting in kindergarten through the end of third grade.

ELs who receive formal phonological awareness interventions in the early stages of their education can accelerate their second language acquisition, regardless of the students' English language proficiency level (Tong et al., 2008). In their 2-year study stemming from Project ELLA, Tong et al. (2008) examined an oral English intervention with 534 Spanish-speaking ELs in TBE and SEI programs in 23 schools and 60 classrooms. Outcomes were measured with the Woodcock Language Proficiency Battery-Revised (WLPB-R) using picture vocabulary and listening comprehension subtests. Interventions in the TBE and SEI enhanced/experimental settings encompassed a three-tier implementation, including a daily tutorial with Santillana Intensive English; STELLA, in which selected culturally relevant literature was combined with

Bloom's taxonomy for higher order thinking; and academic oral language (AOL) question of the day in kindergarten and academic oral language in science (AOLS) in first grade. Professional development was also provided in which teachers reviewed upcoming lessons, reflected and discussed student progress, assessed their own pedagogical progress, and were instructed on ESL strategies. Tong et al. (2008) showed that the SEI enhanced group acquired greater gains in oral English, and were able to catch up with and attain equivalency with the SEI control group. The treatment students had lower proficiency in English at the beginning. Additionally, students in the TBE enhanced group, who were comparable to control students at the beginning, outperformed the control group at the end of the second year.

In a separate ELLA study, EL students provided with intervention exhibited a higher increase in their oral English development, specifically, on five measures, including phonological awareness, knowledge of phonology and syntax, receptive oral language, letter and word recognition, and reading comprehension (Tong et al., 2010). The 3-year longitudinal study included 196 students in a SEI program, with 84 treatment students, 112 control students, and 76 teachers. A complete series of language and literacy assessments were individually implemented outside the classroom by previously trained professionals. The measures allowed researchers to monitor students' English language development in the areas of phonological awareness, oral proficiency, and reading-related skills. The Comprehensive Test of Phonological Processing (CTOPP) was used to assess phonological awareness, phonological memory, and rapid naming, focusing on two specific subtests: blending and segmenting words. The blending subtest included 20 items involving listening to sounds produced on an audiocassette recording and then combining the phonemic sounds of strings into words. The segmenting subtest had 20 items that required the student to recognize the isolated phonemes that constitute the intended word. The

WLPB-R was used as a measurement tool to evaluate oral language skills using the picture vocabulary and listening comprehension subtests. Tong et al. (2010) reported that the interventions administered to treatment students were effective because ELs responded favorably on the five measures.

Furthermore, Tong et al. (2017) studied the direct influence of sustained, rigorous, and regulated professional development provided to treatment teachers in ELLA. They were interested in (a) teachers' instructional time allocation to activities that promote cognitive academic language proficiency (CALP) and (b) Spanish-speaking ELs' CALP development from the second to third grade. Tong et al. found that quality instruction that targets and supports cognitive development and growth of academic English language and literacy proficiency is fundamental to the academic success of ELs.

Project English Language and Literacy Acquisition-Validation

Project ELLA-V (sponsored through the Office of Innovation and Improvement [i3]. U.S. Department of Education under PR/Award Number U411B16001) validated and expanded the findings of the aforementioned project starting in 2013 (Lara-Alecio et al., 2013). ELLA-V was a randomized controlled trial (RCT) study designed to validate the distinct interventions of Project ELLA and determine the degree of impact on English acquisition for native Spanish-speaking students in the lower elementary grades. The evaluation of ELLA-V was a multisite cluster randomized trial designed to meet the What Works Clearinghouse (WWC) criteria for laborious education research (U.S. Department of Education, 2017). The study used a mixed method design to estimate program impacts on student and teacher outcomes and document the fidelity of implementation and perceived quality of the program. Project ELLA-V was carried out in 10 school districts in Texas, with close to 500 teachers and roughly 6,000 students in grades K-3

across the state of Texas. ELLA-V had a backward design and started in third grade, moving backward one grade level per year.

ELLA-V participants were selected from Texas districts with enrollments of 6,000+ students and 50+ ELs rated on the 2011–2012 *Texas English Language Proficiency Assessment System* (TELPAS). Schools were categorized by prior English achievement based on TELPAS scores. Afterwards, schools were clustered in groups of three by district, percentage of economically disadvantaged students, and percentage of ELs. Finally, schools were randomly assigned to condition.

ELLA-V featured two levels of implementation and two conditions. Level 1 was associated with teacher professional development, and Level 2 with direct student intervention. On Level 1, the experimental condition included high-quality professional development (PD) provided for teachers through virtual PD using Blackboard, Tegrity, Citrix GotoMeeting, and ThereNow classroom cameras. The control condition featured typical PD provided by the districts to the control group teachers. Student interventions included researcher-designed curricula and direct English intervention delivered to treatment ELs to determine the degree of impact that each intervention component independently had on ELs' English oral language and reading.

Level 2 was broken in two different treatments. The curricula for Treatment 1 varied across grade levels and concentrated on oral language and phonemic awareness in kindergarten, oral language and learning to read in Grade 1, learning to read in Grade 2, and reading to learn (or content-area reading) in Grade 3. The curricula for Treatment 1 included Santillana Intensive English (SEI) for kindergarten and Grade 1, Early Interventions in Reading (EIR-I and EIR-II) for Grades 1 and 2, and Content Reading Integrating Science for English Language and Literacy

Acquisition (CRISELLA) for Grade 3. The curricula for Treatment 2 mostly concentrated on students' oral language development and was somewhat diverse across grade levels depending on students' development. For Treatment 2, interventions included STELLA for kindergarten to Grade 3, AOLS for kindergarten and Grade 1, and Academic Oral and Written Language in Science (AOWLS) for Grades 2 and 3. The focus of the current study was on the student interventions of Project ELLA-V in Level 2 and Treatment 2.

A recent study on inter-rater reliability using classroom observation instruments as a fidelity measure and the effect of virtual professional development on bilingual teachers came from Project ELLA-V (Tang et al., 2020). In their study, Tang et al. (2020) assessed the use of an evaluation tool and the outcomes of a continuing, thorough, and organized virtual professional development based on the fidelity of implementation with 116 bilingual classrooms in Texas. They found that virtual professional development impacted bilingual teachers' fidelity of implementation considerably. Additionally, they showed that teachers who were part of the treatment group and received the virtual professional development outperformed those who did not receive the virtual professional development in the areas of student involvement, leveled questioning, applying ESL strategies, providing affective and cognitive feedback, and presenting more English material to encourage ELs to participate in classroom activities.

Additionally, Tong et al. (2020) also researched and developed a practical outline to establish and observe inter-rater reliability of classroom observation tools as a measure of fidelity of implementation. In their framework, researchers (a) addressed the procedural obstacles of measuring fidelity of implementation through classroom observation in intervention research that focuses on ELs and (b) outlined a detailed procedure of establishing and

supervising inter-rater reliability of two observation tools used as fidelity of implementation measures in a year-long, large-scale RCT study.

The Center for Research and Reform in Education in affiliation with Johns Hopkins University's School of Education (Wolf et al., 2018) conducted an i3 evaluation on ELLA-V. Researchers found ELLA-V to have positive impact on oral language development in K-1 students where the ELLA-V curricula emphasized oral language for kindergarten in both, Treatments 1 and 2, and Grade 1 in Treatment 2 only. Correspondingly, kindergarten students in Treatment 1 emphasizing phonemic awareness surpassed control group in phonemic awareness. On the other hand, researchers found that ELLA-V generated negative average effects on EL students' oral language for Grade 1 students in Treatment 1. No difference was observed between Treatment 2 and control.

Regarding phonological awareness, researchers found kindergarten students in Treatment 1 to have considerably higher growth in phonological awareness in comparison with control group. However, no difference was observed in phonological awareness for Grade 1 students in Treatment 1 or 2.

Summary

In this chapter, I presented an extensive literature review in the area of phonological awareness, word recognition, letter-sound correspondence, and their connection to appropriate interventions for ELs and overall reading ability. In the literature review, I found that there has been much research in the area of Spanish phonemic awareness skills and the components of successful reading development in both Spanish and English. The literature also indicated that phonological awareness tends to develop from larger to smaller units of sound, and phonological awareness tasks vary in difficulty, depending upon the unit of sound they assess. Additionally, I

presented literature regarding gender differences in language and reading interventions indicating differences and similarities regarding gender among different cultures and languages. Finally, projects ELLA and ELLA-V were discussed along with the interventions and measurements used.

CHAPTER 3

METHODOLOGY

In this chapter, I explain the methodology of my study, including the context of the study, research design and sampling, intervention, instrumentation, data collection, and data analysis.

The purpose of this study was to determine if instructional interventions addressing phonological awareness, word recognition, and letter-sound correspondence in first grade predict stronger reading ability in English among Spanish-speaking ELs with data collected from a federal grant, ELLA-V (Lara-Alecio et al., 2013).

Context of the Study

The data for the present study originated from a U.S. Department of Education, Investing in Innovation (i3) project, ELLA-V. ELLA-V was designed to validate the intervention components from an earlier project, ELLA (Lara-Alecio & Irby, 2003). From 2003 to 2008, ELLA was conducted to examine the efficacy of structured English immersion and transitional bilingual education models in teaching English language and literacy skills to ELs in the lower elementary grades. From 2013 to 2017, ELLA-V was conducted by Lara-Alecio, Irby, and Tong to validate the distinct interventions of Project ELLA and to determine the degree of impact on English acquisition for native Spanish-speaking students in lower elementary grades. The purpose of Project ELLA-V, a randomized controlled trial study, was to implement a thorough evaluation of educational interventions for ELs. Project ELLA-V was carried out in 79 elementary schools in 10 districts with almost 500 teachers and approximately 6,000 students in grades K-3 from urban, suburban, small town, and rural school sites across the state of Texas.

Research Design and Sampling

The ELLA-V design was a multisite cluster randomized trial created to meet the WWC standards for rigorous education research (U.S. Department of Education, 2017). ELLA-V used a mixed methods design to evaluate program impacts on ELs and teacher outcomes and to document the fidelity of implementation and observed quality of the program.

The purpose of ELLA-V was to validate the intervention components of the original Project ELLA. ELLA-V participants were selected from Texas school districts with enrollments of 6,000+ students and 50+ ELs rated on the 2011–2012 TELPAS. Schools were categorized by prior English achievement based on TELPAS scores. Afterward, schools were clustered in groups of three by district, percentage of students from low socioeconomic status, and percentage of ELs. Finally, schools were randomly assigned to condition, with classrooms nested within schools, and children and teachers nested within classrooms. Just as schools were randomly assigned to the experimental or control group, teachers were randomly assigned at the grade level to participate in the project.

ELLA-V featured two levels of implementation and two conditions. Level 1 was associated with teacher professional development and Level 2 with direct student intervention. The two conditions were experimental/treatment and control (business as usual). The focus of the present study was the student intervention of Project ELLA-V. The experimental condition included high-quality PD provided for teachers through virtual PD using Blackboard, Tegrity, Citrix GotoMeeting, and ThereNow classroom cameras. The control condition featured typical PD provided by the districts to the control group teachers. Student intervention included researcher-designed curricula and direct English intervention delivered to treatment ELs to

determine the degree of impact that each intervention component independently had on ELs' English oral language and reading.

The present study was conducted with archived data drawn from a single district that participated in ELLA-V in 2011–2012. This is a large urban district in the Houston area. The present study included one treatment school and one control school. Access to information on students' first or home language was not available. However, all the participants in the sample were ELs. Participants in the grant were not matched at the participant level. Instead, the matching process was conducted at the school level based on the following three variables: (a) percentage of ELs, (b) percentage of economically disadvantaged students, and (c) previous scores on an English language proficiency test (i.e., the school's average TELPAS ratings in 2011–2012). All participating schools within the district were matched to produce pairs of closely matched schools that were then randomly assigned to treatment or control. A total of 76 first-grade students participated in the current study, with 33 in treatment (15 girls and 18 boys) and 43 in control (25 girls and 18 boys) for a total of 40 girls and 36 boys. All participants in both the treatment and control groups received ESL instruction.

Intervention

For the virtual teacher PD, a comprehensive list of topics covered and the order in which they would be taught was provided to lead teacher participants in the application of the diverse instructional interventions. Educators and instructional aides received virtual PD twice a week for 6 hours per month in order to (a) analyze and preview forthcoming lessons, (b) reflect on and debate student learning, (c) evaluate teachers' professional growth in the intervention, and (d) receive training on ESL strategies that were included in the researcher-developed lessons. Some of the strategies included, but were not limited to, visual scaffolding, modeled talks, bridging, the

use of realia, flexible grouping, preview and review, partner work and tutoring, vocabulary word dramatization, word walls, language experience approach, and free voluntary reading, among others. Moreover, during the professional development sessions, educators were coached on how to create a teaching portfolio and how to conduct self-reflections (G. Brown & Irby, 2001).

For the direct student intervention, the control group received the district's regular first-grade language arts, math, science, and social studies curriculum in Spanish. During their ESL block, the treatment group received two strands: STELLA and AOLS. Each is detailed in the following subsections.

Story Telling and Retelling and Higher Order Thinking for English Language and Literacy Acquisition

Students received 40 minutes of STELLA (Irby et al., 2004), in which culturally relevant, authentic literature was integrated with Bloom's taxonomy for tiered probes categorized as easy, moderate, and difficult. Teachers were provided with STELLA scripts prior to the week of story introduction, giving teachers ample time to prepare themselves. One storybook was introduced weekly during instruction, supplemented by a script containing six to eight key vocabulary words along with preselected ESL strategies associated with the lesson.

Academic Oral Language in Science

Students received 10-minute, teacher-conducted sessions on the question of the day for AOLS (Irby et al., 2004). For low-performing students, 20 minutes of the Santillana Intensive English program was also provided. This intervention consisted of communication games conducted by highly trained paraprofessionals. The Santillana Intensive English (Ventriglia & González, 2000) program is a research-based course for teaching Spanish-speaking students content-area subjects, including math, science, and social studies, in English. Santillana Intensive

English provides a sequence of lessons based on effective reading practices in phonemic awareness, phonics, vocabulary development, reading fluency, and reading comprehension. Each subject included a 4-day cycle. Participants were presented with vocabulary words from a lesson card included in the Santillana curriculum. The lesson card signified one instructional unit. During the lessons, participants listened to a story read by the educator, responded properly to leveled questions for comprehension, and practiced new vocabulary with the teacher. Additionally, participants were arranged in pairs or small groups to roleplay conversation and to work on their supplementary Santillana workbooks, first individually and then collaboratively with partners. Day 5 was utilized as a makeup day or extension.

A regular session of AOLS included a diagram with preprinted questions that teachers used to engage students in conversation on an assortment of subjects. The teacher displayed the preselected question of the day in a pocket chart along with three or four possible answer choices. Each participant answered the question by responding in a whole sentence, placing students' names under each answer choice selected and creating an instantaneous diagram utilized to compare and generalize, prompting further questions for students.

Instrumentation

Governmental policies, such as the Individuals with Disabilities Education Act of 1975 and No Child Left Behind Act of 2001, address the pressing need for administering linguistically and culturally valid assessments to multilingual students. The 2014 Standards for Educational and Psychological Testing supported high-quality assessment and stated that language-related factors, such as assessing students with a test that is not in their first language, can considerably decrease the reliability and validity of results (American Educational Research Association et al., 2014). Therefore, using the proper assessment tool to evaluate EL students' growth is critical,

especially when implementing interventions. This study included two instruments: the Woodcock-Muñoz Language Survey-Revised and the Test of Phonological Awareness.

Woodcock-Muñoz Language Survey-Revised

A norm-referenced instrument, the WMLS-R English version is composed of subsections targeted toward academic language acquisition (Alvarado et al., 2005). Since its early release, the WMLS-R has been extensively used in research and practice to assess students' proficiency in English and Spanish (Hammer et al., 2012). In school settings, the outcomes of the WMLS-R aid teachers and administrators in deciding which students may be placed in ESL classrooms and which students may have a language disability that needs evaluation and special education services (Alvarado et al., 2005).

The WMLS-R was created to measure test takers' CALP, allowing examinees to be classified into one of five levels of proficiency (Woodcock et al., 1993). The WMLS-R is designed to be administered in Spanish and/or English, so that an examinee's proficiency in either or both languages can be evaluated and compared. Woodcock et al. (1993) recommended the following uses for test scores: (a) determining eligibility for bilingual services; (b) classifying students by language ability for instruction; (c) assessing progress or readiness for English-only instruction; (d) evaluating ESL program effectiveness; (e) classifying the subject's English or Spanish language proficiency; and (f) assessing language proficiency of participants in research studies. The seven subtests of the WMLS-R English form include picture vocabulary, verbal analogies, letter-word recognition, dictation, understanding directions, story recall, and passage comprehension.

In the current study, I focused on measuring participants' broad English reading ability. Therefore, the letter-word recognition subtest was selected from WMLS-R English. Letter-word

recognition measures letter and word recognition skills requiring the subject to identify letters of the alphabet. Later, words are presented, and examinees are required to fluently read the words. Participants are not required to know the meaning of the words. Letter-word recognition has a median reliability of .97 in the age range of 5 to 19 and .98 in the adult range. Letter-word recognition was administered to access participants' English decoding skills.

Test of Phonological Awareness

The TOPA is a brief, norm-referenced test of young children's ability to isolate phonemes in orally presented words; it is administered individually or in groups (Torgesen & Bryant, 1994). It was developed to assist with identifying students who are behind in their phonological awareness skills. Bird et al. (1995) indicated that students with low phonological awareness are at risk of becoming struggling readers in the future. Moore (1998) explained in that students scoring in the lowest quartile of the TOPA are struggling readers.

There are two versions of the TOPA, one for students in kindergarten and another for the early primary grades. Both versions consist of two subtests, each one containing 10 probes. Subtests include images used to symbolize utterances. The first subtest for each version deals with sounds that are the same while the second subtest covers sounds that are different. The main difference between the TOPA Kindergarten and TOPA Early Elementary is that the kindergarten assessment covers beginning sound responsiveness while the early elementary version covers word-sound endings. The TOPA Early Elementary, for students in first and second grades, is similar in structure to the kindergarten version; however, children must identify final sounds in words, which is a more complex task. The 10 ending sound-same items require children to identify which of three words ends with the same sound as a target word, and the 10 ending sound-different items prompt children to mark which of a group of four words ends in a different

sound than the others. As with the kindergarten version, the number correct on both item types is summed to get one total score for phonological awareness. The letter-sounds test for the TOPA Early Elementary requires children to spell simple pseudowords that are given as the names of "funny animals." The words vary from two to five phonemes in length, and they are all single syllable. The examinee's score is based on the total number of words spelled correctly. The assessment can be administered in a group, preferably with six to eight students, or individually for both test versions.

The TOPA does not contain written words; instead, it has pictorial representations. The proctor reads the prompt and possible answer choices that correspond to the images in the student's assessment. The creators of the TOPA designed it to take into consideration sounds at the beginning and end of words and the differences or similarities of sounds that make up words. These aspects provide evidence of face validity. In the TOPA manual, the authors provided evidence of internal consistency reliability, test-retest reliability, and inter-rater reliability, all of which met or exceeded .80 across all ages (Torgesen & Bryant, 1994). Evidence was also provided for content-descriptive validity, criterion-prediction validity, and construct-identification validity. The authors also offered evidence that the TOPA subtests are nonbiased in regard to gender, race, and ethnicity. Qualifications for those who administer the TOPA include an examiner who has a background in educational assessment, ability to pronounce individual phonemes clearly, and ability to speak the same language as the students being tested.

Research Questions

This study included four research questions:

1. What were the initial differences between Grade 1 ELs in treatment and control conditions regarding their English achievement in the measures of word recognition, letter-sound correspondence, and phonological awareness?
2. Were ELs' English letter-sound correspondence and phonological awareness, as measured by the TOPA, statistically significant predictors of their word recognition as measured by the WMLS-R?
3. Did Grade 1 ELs' participation in the treatment or control condition predict their letter-word recognition as measured by WMLS-R when pre-interventions were controlled?
4. Among students who received the intervention, was there a significant difference between male and female students' performance?

Data Collection

For this study, I analyzed archival data from Project ELLA-V for 76 Grade 1 EL students. The data included WMLS-R and TOPA scores from assessments administered at the beginning of first grade (Fall 2012) and at the end of first grade (Spring 2013). Trained testers or paraprofessionals administered each of the tests.

Data Analysis

To answer the research questions, I compared initial differences on the pretest regarding the ELs' English achievement on the measures of word recognition, letter-sound correspondence, and phonological awareness. I examined the relationships between different variables and how the assessment results might have been affected by these variables.

Therefore, I utilized an independent *t*-test and multiple regression. I used Stata Version 16 to conduct the independent *t*-test and multiple regression analyses to answer the research questions.

Research Question 1

The first research question asked the following: What were the initial differences between Grade 1 ELs in treatment and control conditions regarding their English achievement in the measures of word recognition, letter-sound correspondence, and phonological awareness? For this inquiry, I conducted an independent *t*-test analysis to compare the initial differences between Grade 1 ELs in the treatment and control conditions regarding their English achievement on the measures of word recognition, as measured by the WMLS-R, and letter-sound correspondence and phonological awareness, as measured by the TOPA. The purpose of this research question was to identify if there were any significant differences on these outcomes before the intervention. If no significant differences were detected, we could assume that control and treatment groups were roughly similar and started at a similar level.

Research Question 2

The third question asked the following: Were ELs' English letter-sound correspondence and phonological awareness, as measured by the TOPA, statistically significant predictors of their word recognition as measured by the WMLS-R? To address Research Question 3, I used a multiple regression analysis to determine if the TOPA phonological awareness pretest, TOPA letter-sound pretest, and WMLS-R letter-word pretest scale scores significantly predicted the WMLS-R letter-word scale score on the posttest. The purpose of this research question was to see if these reading precursors predicted the reading outcome, specifically in the area of word recognition.

Research Question 3

Research Question 4 posed the following query: Did Grade 1 ELs' participation in the treatment or control condition predict their letter-word recognition as measured by WMLS-R when pre-interventions were controlled? In answering this question, I conducted a multiple regression analysis to determine if the WMLS-R letter-word pretest, TOPA phonological awareness pretest, TOPA letter-sound pretest scale scores, and the condition significantly predicted the WMLS-R letter-word posttest scale score. Answering the first two progressive research questions provided evidence to reach to my third research question, which asked if providing targeted interventions to ELs effectively impacted their reading skills, particularly in the area of word recognition.

Research Question 4

Research Question 5 asked the following: Among students who received the intervention, was there a significant difference between male and female students' performance? To address this inquiry, I conducted a multiple regression analysis to determine if gender was a significant factor in the participants' performance at the end of the study. The purpose of this research question was to see if the interventions were consistently effective for all participants or if gender plays a role in the student outcomes.

I analyzed the data under the assumption that they were normally distributed. The assumption of normality was assessed by conducting a skewness/kurtosis test for normality to show that gender as the dependent variable was normally distributed, Pr (Kurtosis) 0.69. Regarding the independent variables, phonological awareness and letter-sound correspondence were not normally distributed; therefore, the data violated the normal distribution assumption. Nevertheless, when I generated the distribution plots of the residuals, the probability of skewness

was 0.2187, implying that skewness was asymptotically normally distributed (*p*-value of skewness > 0.05). Similarly, Pr indicated that kurtosis was also asymptotically distributed with 0.5430 (*p*-value of kurtosis > 0.05). Finally, the chi-square value was 0.3771, which is greater than 0.05, indicating its significance at a 5% level. Consequently, the null hypothesis could not be rejected. Therefore, according to the skewness test for normality, residuals showed a normal distribution (Sajwan & Chetty, 2018). I also assumed that the observations between groups were independent; in other words, that participants were purposefully randomly selected. Finally, I used Lavene's test to determine if the two groups had equal variances. The assumption of homogeneity was met with the *p*-value being less than 0.05. This indicated that there was not a statistically significant difference in the variance with Pr > *F* = .0327.

Summary

In this chapter, I presented the study methodology, including descriptions of the research design, intervention, instruments, data collection, and analytical methods. Archival data, including WMLS-R and TOPA scores from pre-assessments given during the first-grade intervention, and WMLS-R scores from post-assessments were analyzed by examining the relationships between different variables and how the assessment results might have been affected by these variables.

CHAPTER 4

RESULTS

In this chapter, I report the statistical findings from the current study. I organize my results based on each research question and briefly describe each data analysis followed by the findings.

Research Question 1

The first research question asked the following: What were the initial differences between Grade 1 ELs in treatment and control conditions regarding their English achievement in the measures of word recognition, letter-sound correspondence, and phonological awareness? To answer this, I conducted an independent samples *t*-test to compare the initial differences between Grade 1 ELs in the treatment and control conditions in the areas of phonological awareness (PA), letter-word recognition (LW), letter-sound correspondence (LS) regarding their English achievement in the measures of letter-word recognition. The descriptive statistics and the results of inferential analyses for these variables are listed in Table 1.

No significant differences were found in the scores for letter-word recognition using the WMLS-R pretest for the control group (M = 91.55, SD = 17.79) and treatment group (M = 89.54, SD = 24.38); $t(74) = -.042$, $p = .679$. Likewise, no significant differences were detected for letter-sound correspondence using the TOPA pretest for the control group (M = 5.06, SD = .98) and treatment group (M = 5.06, SD = 1.22); $t(74) = -.0306$, $p = .971$. There were also no significant differences between the treatment group (M = 5.54, SD = 1.6) and control group (M = 5.67, SD = 2.0) in phonological awareness using the TOPA pretest [$t(74) = -.0302$, $p = .763$]. These results suggest that before implementing any intervention to the treatment group, both

groups were similar in regard to letter-word recognition, letter-sound correspondence, and phonological awareness. In other words, students in both control and treatment groups were roughly at same level before any intervention was administered.

Table 1

Descriptive Statistics From Pretest Measures

Measure	Condition	N	Mean	SD	*t*	*df*	*p*
LW pre	Treatment	33	89.55	24.39	-0.42	74	0.68
	Control	43	91.56	17.80			
PA pre	Treatment	33	5.55	1.60	-0.30	74	0.76
	Control	43	5.67	2.01			
LS pre	Treatment	33	5.06	1.22	-0.04	74	0.97
	Control	43	5.07	0.99			

Note. LW pre = letter-word recognition pretest. PA pre = phonological awareness pretest. LS pre = letter-sound correspondence pretest.

Research Question 2

The second question asked the following: Were ELs' English letter-sound correspondence and phonological awareness, as measured by the TOPA, statistically significant predictors of their word recognition as measured by the WMLS-R? I conducted a multiple regression analysis to predict students' posttest performance as measured by the LW subtest from their PA, LS, while controlling for LW pretesting scores. The multiple regression model predicted statistically significant LW scores (F (3, 68) = 53.08, $p < .001$, $R^2 = 0.7$), implying that

70% of the variation in LW is explained by its linear relationship with the predictors. However, neither PA nor LS scores were significant predictors of LW post scores. Regression coefficients and standard errors for this analysis can be found in Table 2.

Table 2

Regression Analysis Summary for LW, PA, and LS Predicting Letter-Word Recognition Scores

Measure	Coef.	Std. error	*t*	*p*	95% conf. interval	
LW pre	0.75	0.08	8.71	<0.001	0.57	0.92
PA pre	0.60	0.70	0.86	0.391	-0.79	2.00
LS pre	2.58	1.38	1.87	0.066	-1.76	5.35
_cons	19.24	7.37	2.61	0.011	4.52	33.95

Note. LW pre = letter-word recognition pretest. PA pre = phonological awareness pretest. LS pre = letter-sound correspondence pretest.

Research Question 3

Research Question 3 posed the following query: Did Grade 1 ELs' participation in the treatment or control condition predict their letter-word recognition as measured by WMLS-R when pre-interventions were controlled? A hierarchical multiple regression was run to determine if the addition of *condition*, the binary variable corresponding to group assignment, improved the prediction of students' word recognition. The full model with pretest scores of LW, PA, LS, as well as condition was statistically significant $R^2 = 0.72$, $F(4, 67) = 42.81$, $p < .001$. Condition was found to be a significant predictor of word recognition ($p = 0.042$). Furthermore, the

addition of condition to the model resulted in a statistically significant 2% increase $R^2 = 0.72$. Regression coefficients and standard errors can be found in Table 3.

Table 3

Regression Analysis Summary for Control Treatment Condition Predicting Letter-Word Recognition Scores

Measure	Coef.	Std. error	*t*	*p*	95% conf. interval	
Condition	5.09	2.45	2.07	0.042	0.180	10.00
LW pre	0.73	0.08	8.70	<0.001	0.560	0.90
PA pre	0.68	0.68	0.99	0.326	-0.690	2.05
LS pre	2.78	1.35	2.05	0.044	0.074	5.48
_cons	17.12	7.27	2.35	0.021	2.600	31.64

Note. LW pre = letter-word recognition pretest. PA pre = phonological awareness pretest. LS pre = letter-sound identification pretest.

Research Question 4

Research Question 4 asked the following: Among students who received the intervention, was there a significant difference between male and female students' performance? Gender and its interaction with condition were added to the full model in Research Question 5 Collectively, the predictors statistically significantly predicted letter-word recognition post-test, $F(6, 65) = 30.08$, $p < .001$, $R^2 = .74$. To answer the fifth question, I first looked at the interaction between gender and condition, which came out to be nonsignificant ($p = .16$). This means that the effect of the intervention does not depend on gender. Then we analyzed the main effect of each one of

those variables and those also came out nonsignificant for gender (p = .89) and for condition (p = .76). In other words, when controlling for the effects of the pretest, as well as gender, the intervention does not have an effect on letter-word recognition. Furthermore, condition is no longer a significant predictor of word recognition. Regression coefficients and standard errors can be found in Table 4.

Table 4

Regression Analysis Summary for Gender Predicting Letter-Word Recognition

Measure	Coef.	Std. error	T	*p*	95% conf. interval	
LW pre	0.72	0.08	8.48	<0.0010	0.55	0.89
PA pre	0.77	0.69	1.12	0.2670	-0.61	2.16
LS pre	2.60	1.35	1.96	0.0540	-0.04	5.34
Gender	0.43	3.27	0.13	0.8940	-6.11	6.98
Condition	1.03	3.47	0.30	0.7660	-5.90	7.97
Gender* condition	7.07	5.04	1.40	0.1650	-2.99	17.14
_cons	18.19	7.28	2.50	0.0150	3.64	32.73

Note. LW pre = letter-word recognition pretest. PA pre = phonological awareness pretest . LS pre = letter-sound identification pretest. *Interaction.

Summary

In this chapter, I reported the results of the analyses in the following order: (a) descriptive statistics and (b) multiple regressions. These analyses were conducted to determine the impact of

language and literacy interventions (i.e., Santillana Intensive English, STELLA, AOLS) on letter-word recognition.

I compared the initial differences between Grade 1 ELs in treatment and control conditions and found that there were no statistical differences between treatment and control students at the beginning of the research. Participants in the two groups were comparable in their phonological awareness, letter-word recognition, and letter-sound identification scores before any intervention was provided. Next, I examined the predictive relationship of phonological awareness and letter-sound correspondence and letter-word recognition abilities at the beginning of first grade on reading ability (letter-word recognition) at the end of first grade. The results indicated that phonological awareness and letter-sound correspondence were not significant predictors of letter-word recognition. Then, I explored the predictive relationship of phonological awareness, letter-sound correspondence, and letter-word recognition for the control group's reading achievement, finding that students who received the interventions performed significantly better than their control group counterparts in word recognition. Finally, I explored whether these results depended on gender, finding that the addition of gender to the prediction of students' posttest performance measured by LW subtest is not significant, having female and male student performing similarly. Moreover, I found that addition of gender renders the difference between control and treatment nonsignificant .

In the next chapter, I will present the discussion, limitations, recommendations, and conclusions of this research study.

CHAPTER 5

DISCUSSION, LIMITATIONS, RECOMMENDATIONS, AND CONCLUSIONS

Many students struggle with learning to read. As educators, parents, and other education stakeholders will attest, reading failure has serious, long-term consequences for student self-confidence and motivation to learn, along with their future school performance. When teachers examine the elements of effective programs to teach students to read, phonological awareness, letter-word recognition, and letter-sound identification receive much attention (NRP, 2000).

The primary purpose of the study was to examine ELs' responses to instructional interventions (i.e., teacher virtual PD, Santillana Intensive English, STELLA, AOLS) in terms of student English language and literacy acquisition from Project ELLA-V. Specifically, I looked at first-grade EL students' phonological awareness, letter-sound identification, and letter-word recognition, as measured by the TOPA and WMLS-R. In this chapter, I discuss the results of my dissertation, the limitations, and my recommendations. The research questions that guided this study are as follows:

1. What were the initial differences between Grade 1 ELs in treatment and control conditions regarding their English achievement in the measures of word recognition, letter-sound correspondence, and phonological awareness?
2. Were ELs' English letter-sound correspondence and phonological awareness, as measured by the TOPA, statistically significant predictors of their word recognition as measured by the WMLS-R?

3. Did Grade 1 ELs' participation in the treatment or control condition predict their letter-word recognition as measured by WMLS-R when pre-interventions were controlled?
4. Among students who received the intervention, was there a significant difference between male and female students' performance?

This study's findings suggested that the instructional interventions provided to ELs were effective, as students in the treatment group responded on letter-word recognition. Furthermore, instructional interventions provided to ELs were effective similarly for boys and girls.

Discussion

A discussion of the results organized by each research question follows.

Research Question 1

The first research questions asked the following: What were the initial differences between Grade 1 ELs in treatment and control conditions regarding their English achievement in the measures of letter-word recognition, letter-sound identification, and phonological awareness?

A total of 76 first-grade students participated in this study, with 33 in treatment and 43 in control. The results indicated that at the beginning of Grade 1, there were no statistically significant differences between the ELs in the treatment and control conditions regarding their English achievement on the TOPA letter-sound identification and phonological awareness pretests and the WMLS-R letter-word recognition pretest. This means that that before implementing any interventions with the treatment group, both groups were similar in terms of their achievement on each of these measures and were comparable. This finding set the basis for the research questions that followed given the fact that we are started with balanced groups,

treatment and control, prior to any intervention being given, which implies that any differences observed post-intervention can only be attributed to the treatment.

R. S. Brown and Harrigan (1983) presented the idea that there is a clear distinction between assessing the fidelity of different processes (i.e., fidelity to the treatment and fidelity to the research design). Both are important for research findings. Fidelity to the treatment relates to evaluating implementation in relation to the convention of the intervention. On the other hand, fidelity to the research design relates to how cautiously the research design convention was monitored. Regarding the fidelity to research design, we have to pay close attention to the participants before implementation of intervention when working with an RCT in which participants are randomly assigned into a treatment group or a control group. Due to the random assignment, the resulting control and treatment groups should encompass qualified entities that on average are comparable at the time of the administration on any examined or unexamined attribute. This lack of pre-existing differences between treatments and controls implies that the control group yields reliable estimates of what would have happened to participants in the absence of the intervention, and when these estimates are compared to outcomes for participants, reliable estimates of intervention impacts are obtained.

Additionally, the 2011 WWC (U.S. Department of Education) used the phrase *baseline equivalence* when determining whether the intervention and comparison groups had key observed characteristics that were similar enough (*equivalent*) before the start of the intervention (at baseline). Differences between the two groups at the start of the intervention could bias the estimated impact of the intervention. However, significant differences between the groups could result by chance. Only empirical analysis of the data can reveal whether either sampling error or procedural mistakes have produced nonequivalent treatment and control groups.

In the framework of evaluation studies, reporting on the fidelity to the research design protocol is significant and can be carry out by the same evaluation methods as used for examining the instrument of interventions (Siddiqui et al., 2018). Siddiqui et al. (2018) discussed two RCTs in which school administration managed the trials themselves in their campus with professional advice from independent evaluation consultants. The main outcome results of the trials presented potential from the interventions. Nevertheless, there were some suggestions that there was not full compliance with the randomization process, and this might have resulted in initial imbalance of pretest s scores between the treatment and control groups in one trial.

Research Question 2

The next research inquiry asked the following: Were ELs' English letter-sound correspondence and phonological awareness, as measured by the TOPA, statistically significant predictors of their word recognition as measured by the WMLS-R?

I found that the TOPA letter-sound pretest and phonological awareness were not significant predictors of the WMLS-R letter-word posttest scale score. Lovett and colleagues (2008) demonstrated that children who were relatively stronger in phonological processing skill and naming speed at entry ended the intervention period with superior reading achievement in every dimension of reading skill tested including three WRMT-R subtests (word attack, word identification, and passage comprehension), WRAT-3 reading, and the CTOPP blending words subtest. This aligns with my findings of how providing interventions supporting reading skills, such as, letter-word recognition can predict student growth in the area where interventions are provided. Additional investigation evaluating the results from the TOPA phonological awareness and TOPA letter-sound could provide a clearer view on the advantages and progress on phonological awareness and letter-sound correspondence.

Research Question 3

Research Question 3 was as follows: Did Grade 1 ELs' participation in the treatment or control condition predict their letter-word recognition as measured by WMLS-R when pre-interventions were controlled?

The results of the posttest showed that, when controlling for all the baseline measures, students who received the interventions from trained staff members in the areas of phonological awareness, letter-sound identification, and letter-word recognition scored 5.09 units higher than their control counterparts in word recognition. This difference was significant. Nevertheless, addition of condition only accounted for an extra 2% of variation in word recognition, corresponding to a small effect size (Cohen, 1988). Hence, results of this analysis imply that even though the intervention can improve reading ability, its effects can be small.

Tong et al. (2008) presented results from their 2-year study stemming from Project ELLA in which students in the TBE enhanced group, who were comparable to control students at the beginning, outperformed the control group at the end of the second year. Interventions in the TBE and SEI enhanced/experimental settings encompassed a three-tier implementation, including a daily tutorial with Santillana Intensive English, STELLA, and AOL question of the day in kindergarten and AOLS in first grade. This demonstrates that when appropriate reading interventions are provided to ELs when they are young, their second language acquisition can be enhanced despite the students' original English language proficiency level.

Similar to these findings, Tong et al. (2010) reported that interventions administered to treatment students consisted of ongoing professional development and structured and systematic English intervention during an ESL block were effective because ELs responded favorably on five measures, two of them being phonological awareness and letter and word recognition. The

structured and systematic English intervention during an ESL block included daily tutorials in the Santillana Intensive English program, STELLA, and AOL in kindergarten, modified by the researchers to AOLS in first grade and AOWLS in second grade to elicit students' writing. These findings support my research question because students in the treatment group who received the interventions also responded favorably on letter-word recognition when the posttest was administered.

Research Question 4

The final research questions asked the following: Among students who received the intervention, was there a significant difference between male and female students' performance?

I observed that gender was not a significant predictor of the WMLS-R letter-word posttest scale score, suggesting that interventions provided to treatment group during the study supported all students similarly regardless of their gender. These results appear to be consistent with Thomas and Collier (2002) who did not found gender to be a factor on the outcome of English reading achievement, instead the type of language program implemented was the significant factor. Similarly, Medina and Escamilla (1994) found no gender differences between male and female Spanish-speaking ELs in English oral proficiency and reading performance. On the studies aforementioned, gender differences were not present, or at least not in a significant way, suggesting that the intervention supported both male and female students in their language learning.

On the other hand, there are a number of studies that do show gender differences in language acquisition such as Uchikoshi (2006) who found male Latino students to have higher rates of English acquisition than female Latino students. Additionally, Duursma et al. (2007) reported higher expressive English vocabulary acquisition among female Spanish-speaking ELs.

Similarly, Tong et al. (2010) explored gender differences in response to the reading intervention founding some discrepancies. Female students outperformed male participants in the area of segmenting. However, male students showed more favorable results in the area of oral vocabulary, and both girls and boys gained comparable levels in L2 decoding and reading.

It is important to address the issue that there seems to be discrepancy in the results on Questions 3 and 4. First, I examined data to see if there was a multicollinearity problem, but, based on the ratio of males and females in the study being similar in both groups, gender and condition are not associated with each other. Additionally, after running the variance inflation factor (VIF), considering all variables for multicollinearity (Table 5), none of the values is greater than 10; therefore, I can assume that multicollinearity is not the problem.

Furthermore, on Q3, the model shows P value for condition to be .042, being significant but close to be nonsignificant, and the effect size is small. In other words, if the condition does affect word recognition, it is not practically significant. Furthermore, by adding more predictors (gender and its interaction with condition) on Q4, the power of the test decreases and makes results less significant, pushing the *p* value beyond the threshold of 5%.

As previously mentioned, the total number of participants in the study was 76, relatively low for the number of predictors. This lack of power could explain the discrepancy in the model for Q3 and Q4.

In summary, I can assume that gender is not interacting with the condition. Given how many predictors are involved in Q4 and the small sample size, we simply do not have enough power to detect the small effect that condition has. It could be an effect, but the sample size was not big enough.

Table 5

Multicollinearity Statistics

Variable	VIF	1/VIF
LW pre	1.67	0.59
PA pre	1.18	0.85
LS pre	1.48	0.67
Gender	2.08	0.48
Condition	1.90	0.52
Gender* condition	3.25	0.30
Mean VIF	1.92	

Note: * Interaction

Limitations

The results of this study should be interpreted in light of the following limitations. First, as archived data were used, the sample size is small, and therefore, the power of tests is low (Banerjee et al., 2009). Second, as archived data were used in this study, access to data was limited. Results demonstrated to be a strong correlation between intervention in word recognition and the results of the word recognition posttest, but did not show a correlation between phonological awareness and letter-word recognition with scores of word recognition at the end of the treatment. Access to posttest scores in the area of phonological awareness and letter-word recognition may give a better idea on the effectiveness of the interventions in the aforementioned areas. Third, the research was conducted focusing on one particular time of the day. Both treatment and control classrooms were only observed during ESL instruction. Therefore, it is

possible that treatment students received additional English literacy instruction at other times that was not observed but could still impact student outcomes. It is important to maintain fidelity of the implementation during the time observed but also ensure that neither condition obtain additional assistance outside the ESL instruction block or the time observed.

Recommendations for Future Research

Findings derived from this study indicated that phonological awareness has a predictive relationship with reading ability. Because empirical evidence is lacking, it is recommended that further testing be done to evaluate the strongest relation between the different skills of phonological awareness and reading ability in English. Further testing also should occur in Spanish to evaluate if a stronger relationship exists between phonemic awareness and reading ability for specific grade levels in the students' first language.

Additionally, in this study, letter-sound identification, letter-word recognition, and phonological awareness skills were developed in first grade that potentially have a relationship with student abilities at the beginning of second grade. As students develop more academic language and teachers deliver more academic content instruction as ELs advance in the upper grades, research to investigate the longitudinal growth curve is an option to see if there is a time where ELs' academic English language increases at an accelerated pace.

One of the interventions provided in this study was virtual PD for teachers and instructional aides biweekly for a total of 3 hours per month. Further investigation of the effectiveness of highly trained bilingual instructional aides providing supplementary reading support is also needed. Additionally, future studies should compare teachers and instructional aides as tutors with struggling EL readers.

Regarding gender and its importance in equity education, as previously mentioned, great debate is going on whether girls learn at an accelerated pace than boys or vice versa. Future research should focus on what strategies are equally beneficial for both groups to ensure all students are equally academically successful. Perhaps external factors must need to be considered depending on the socio-cultural circumstances, such as, poverty, geographical isolation, minority status, disability, gender-based violence, etc. Nevertheless, research points to the direction that structured researched-based interventions implemented with fidelity can be successful for both male and female students in their L1 and L2.

Implications

The current findings may have multiple implications for practice. For example, results provide initial validation of target interventions for ELs who were selected for additional support with reading skills, particularly with phonological awareness, letter-sound identification, and word recognition. In addition, results also demonstrate the importance of paying close attention to the fidelity of the participant selection before implementation of intervention when working with a randomized control trail to avoid differences between the two groups at the start of the intervention that could bias the estimated impact of the intervention. Finally, results demonstrate to be a strong correlation between intervention in word recognition and the results obtained at the end of the time of the intervention being implemented. On the other hand, results did not show a correlation between phonological awareness and letter-word recognition with scores of word recognition at the end of the treatment. Further investigation analyzing direct relation between scores of phonological awareness and letter-word recognition at the end of the treatment may provide additional evidence of the effectiveness of reading interventions for ELs.

Conclusions

ELs increasingly encounter the challenge of acquiring English proficiency and literacy in order to be successful in school, while teachers face the need to deliver quality instruction to ELs under No Child Left Behind (August & Shanahan, 2006; Thomas & Collier, 2002). With the current Every Student Succeeds Act, the challenge continues. This study has addressed the crucial topic of instruction that can stimulate EL students' English language growth in the primary levels of education. As Kieffer (2008) mentioned, these results underscore the need to deliver intervention to ELs in the primary grades in order for them to accomplish reading readiness and to eliminate any literacy difficulties at an early stage.

Due to native English speakers significantly outperforming ELs on the NAEP (2018) over the past 10 years, administrators and other stakeholders may potentially be more involved in addressing EL students' reading skills (August et al., 2014). Incessantly low levels of reading achievement, combined with the fact that ELs are growing at a rapid speed in the US (August et al., 2014) have educators considering this a crucial issue and putting more emphasis on improving the reading achievement of EL students (Slavin & Cheung 2005). This study addressed the importance and benefits of providing EL students' interventions to enhance their reading achievement overall. The interventions provided to ELs during the course of the study were highly effective. Such promising interventions reflect highly desired quality instruction for ELs. Regrettably, not all ELs are fortunate to receive this kind of instructional intervention that will foster their reading skills in early years.

On their ELLA-V evaluation, Wolf et al. (1998) concluded that, with one exception, ELLA-V did not impact EL students' English language development, reading, writing, or self-esteem. Some causes directly affecting the outcome could include the fact that each grade level

was exposed to the intervention for only one school year not having enough time for implementations and missing the benefits of the cumulative effect of the intervention, and the numerous assessments used, ranging from state mandated norm reference assessments to low stake assessments designed for monolingual students only. The objective now is to continue to research different avenues on how to guarantee that those who need quality instruction receive it on a regular basis and implemented with fidelity.

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