The Emergent Literacy Development of Spanish-Speaking Preschool Children with Specific Language Impairment

Dissertation

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By

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Abstract

This dissertation portfolio is comprised of three first-authored pieces of writing that investigate the oral language and emergent literacy development of Spanish-speaking children with specific language impairment (SLI). Each piece features a unique but complementary aim. The first study investigates group differences on a battery of emergent literacy skills between 15 preschool-aged children with SLI in Mexico and a control group of 15 typically developing children matched for age and socio-economic status. The second study explores aspects of the home literacy environment, including parents' explicit teaching of literacy and children's print interest, which may explain some of the variance in children's emergent literacy ability that was observed in the previous study. The third piece of writing is a grant proposal that describes a parent-child book reading intervention seeking to improve children's emergent literacy skills.

Collectively, the studies provide a normative reference for the early literacy development of children with SLI in Spanish. Results showed that, as a group, children with SLI performed significantly worse than their peers on tasks of print knowledge and phonological awareness. Although no significant group differences were uncovered on classic home literacy variables, an interaction was observed between children's language ability and their print interest, with implications for print knowledge. Implications for a Spanish language intervention that addresses these findings – both with respect to their emergent literacy skills, as well as their home literacy environment – are discussed.

Dedication

Dedicated to my family.

Acknowledgments

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*

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Field of Study

Major field: Speech and Hearing Science

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Chapter 1 – Introduction

There are approximately 430 million Spanish-speakers in the world today (Simons & Fenig, 2017). In addition to Spain, Spanish is the official language in Mexico, most of South and Central America, and several Caribbean islands. In most of these countries Spanish makes up the majority language; however, even in countries like the U.S., where Spanish is considered a minority language, there are many communities in which a majority of residents speak Spanish as the primary language at home (Shin & Bruno, 2003). In fact, Spanish is used by about 37 million people in the U.S., making it the second most frequently spoken language after English (US Census Bureau, 2015). Such a prominent demographic presence highlights the need to better understand language development in young Spanish-speakers. A critical component of this work involves investigating how children's language development might affect their long-term outcomes across other developmental domains, like reading.

The portfolio of studies presented here explores the interface between children's language and literacy development in Spanish. The participants were preschool-aged children in Mexico with specific language impairment (SLI), a diagnosis characterized by impaired language ability in the absence of cognitive deficits, neurological disorders, or hearing impairment (Catts et al., 2002; Leonard, 2014). We purposefully recruited children with SLI, given these children's high propensity for long-term reading

difficulties in English. For instance, English-speaking children with SLI in the U.S. are significantly more likely than their typically developing peers to struggle with reading as they get older, with approximately 40% of children with a diagnosis of SLI in kindergarten experiencing reading difficulties when they reach elementary school (Catts et al., 2002).

The nature of the predictive relationship, if any, between children's language ability and future reading difficulties in Spanish is unclear. The following chapters seek to contribute to our knowledge of this topic by focusing on children's emergent literacy. The term *emergent literacy* refers to the knowledge and skills that develop between birth and age five, before a child begins formal schooling, and are strongly predictive of children's later reading ability in English (Clay, 1993; Whitehurst & Lonigan, 1998). While the research on language and early literacy development in Spanish is comparatively scarce (Goldstein, 2011), the body of work about emergent literacy in English has considerable breadth and depth. It encompasses descriptive research about the child-level factors that affect early literacy, such as language ability (e.g. Griffin, Hemphill, Camp & Wolf, 2004); correlational studies that identify relationships between environmental variables and emergent literacy skills (e.g. Weigel, Martin, & Bennett, 2006); and intervention studies that experimentally manipulate a particular child-level or environmental variable, in an attempt to improve literacy development and ameliorate long-term reading difficulties (e.g. Wasik, Bond, & Hindman, 2006).

The studies in my dissertation portfolio span a similar range of aims and methodologies, but with a population of monolingual children who speak Spanish. When considered together, the studies comprise three successive and complementary aims:

First, to determine whether preschool children with SLI in Mexico experience deficits in their emergent literacy skills, when compared to typically developing children of the same age and socio-economic status; second, to determine whether there are environmental factors that explain the observed differences in emergent literacy ability; and third, to propose a home book-reading program to intervene on the skills that are most problematic for children with SLI in Spanish. The relevant linguistic differences between English and Spanish are discussed for each study.

Considering each study in turn, Chapter 2 features a general replication of Boudreau and Hedberg's (1999) study that showed that English-speaking children with SLI exhibit significant lags in their emergent literacy ability compared to their typically developing peers. Our version of this study describes the emergent literacy skills of 15 Spanish-speaking preschoolers with SLI, and then compares their performance to a group of 15 age- and income-matched controls with typical language development. Significant group differences on oral language, print knowledge, and phonological awareness abilities between groups are discussed. Chapter 3 examines the home literacy environment of children in the same sample comprised of SLI and typically-developing children, in an attempt to identify additional contextual factors that may explain the variability observed in children's emergent literacy skills in the previous chapter. Predictors that are typically associated with the home literacy environment were entered into a regression model, variables like frequency of book-reading and availability of books, as well as more nuanced parent reports of the instances of explicit teaching of literacy principles and children's interest in print. The contribution of these predictors on children's emergent literacy, as well as interactions between predictors, are reported and

discussed. Finally, Chapter 4 presents a grant proposal for an intervention study with parents of children with SLI, based on pilot work completed in 2014 in Mexico (Pratt, Justice, Perez, & Duran, 2015). The proposed intervention targets children's print knowledge and is embedded in a shared book reading activity. The rationale for the intervention, the scope and sequence of intervention activities, the hypothesized results, and the significance of the work are described in detail in this chapter.

Collectively, the following studies seek to add to the scientific knowledge of language and literacy development in Spanish, with particular attention paid to children with language impairment who may be at increased risk for reading difficulties over time. Implications of this work and future directions are discussed in Chapter 5.

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Chapter 2 – The relationship between oral language and early literacy skills for Spanish-speaking children with and without SLI

For years, professionals in the field of speech language pathology have observed a connection between young children's oral language ability and the subsequent ease with which they learn to read. A substantial body of empirical research spanning three decades confirms this relationship; notably, that nearly one half of U.S. children with a diagnosis of specific language impairment (SLI) at ages five and six will go on to experience reading difficulties once they reach second grade (Catts, Fey, Tomblin, & Zhang, 2002). Additional research seeking to understand the origins of reading disability has identified significant gaps in the emergent reading and writing skills of children with impaired language ability as compared to children with normal language ability – gaps that are detectable as early as preschool (e.g., Boudreau & Hedburg, 1999). Without intervention, these gaps are often sustained or amplified over time (Duff, Reen, Plunkett, & Nation, 2015; Skibbe et al., 2008; Justice, Bowles, Pence, & Skibbe, 2009).

What is less clear is how the relationship between language and literacy manifests for children who speak languages other than English. Although there is considerable research about the characteristics of language impairment in languages besides English, as well as a growing body of work on the nature of reading disability across languages (Ziegler & Goswami, 2005), research into the early relationship between these

developing skills is limited. Given wide-ranging linguistic and orthographic differences between diverse language systems, there is reason to suspect that the degree to which emergent literacy skills are affected by a co-morbid diagnosis of SLI could vary with respect to the language spoken. The present study aims to provide an initial exploration of the relationship between language ability and emergent literacy skills for children who speak Spanish – a language which, unlike English, has a nearly one-to-one, sound-to-symbol correspondence – and to compare the emergent literacy skills of children with SLI and those who are typically developing.

Emergent literacy skills and later reading

The development of reading is preceded in young children by a set of foundational abilities collectively referred to as emergent literacy skills. Emergent literacy skills tend to develop before a child receives formal reading instruction and are consistently predictive of his or her later reading ability (Whitehurst & Lonigan, 1998). In 2008, the National Early Literacy Panel conducted a meta-analysis to assess the strength of various emergent literacy skills as predictors of future reading success in English. Their analysis included thousands of studies of English-speaking children that evaluated the longitudinal relationships between the emerging knowledge and skills that children exhibited from birth through age five and their later reading outcomes. Some of the most salient predictors of word reading to come out of this report included alphabet knowledge (R = .50), print concept knowledge (R = .34), name-writing ability (R = .49) and phonological awareness (R = .40) (National Early Literacy Panel: NELP, 2008).

The first three aforementioned emergent literacy skills – alphabet knowledge, print concept knowledge, and name-writing ability – are known collectively as print

knowledge. As a construct, print knowledge refers to children's awareness of print as a symbol that carries certain communicative meaning. In her extensive work on the topic in English, Justice has called print knowledge a "watershed event" in children's literacy development (Justice & Sofka, 2010, p. 9) – that is, an important event upon which future development depends. Children must first acquire a wealth of information about the forms and functions of print before they can become successful readers, including knowledge about the letter names and the relationship between sounds and letters, as well as knowledge about how books are held, print directionality, and word boundaries (Justice & Ezell, 2004). Failure to acquire this foundational knowledge may lead to significant challenges when formal reading instruction commences. Indeed, because one of the first steps in learning to read is understanding that written letters correspond to spoken phonemes, children's print knowledge has been a robust predictor of individual differences in children's later reading ability in English (Christopher et al., 2015; de Jong & van der Leij, 2002; Schatschneider, Fletcher, Francis, Carison, & Foorman, 2004; Storch & Whitehurst, 2002).

Relevant to the current study, research by Bialystok and colleagues has shown that print knowledge is a cognitive prerequisite for reading that is common to all children learning to read, irrespective of the language in which their learning takes place. Bialystok and Luk (2007) compared four-year-old children learning to read Cantonese in Hong Kong and four-year-old children learning to read English in Canada on multiple experimental tasks that measured their understanding of the symbolic function of print and how print encodes meaning. There were no significant group differences between children learning to read in Cantonese and children learning to read in English, implying

an important universality in the development of literacy for all children, which later becomes diverse and specialized (Bialystok & Luk, 2007).

In addition to print knowledge, robust evidence links children's early phonological awareness to their later word reading in English (e.g., Dickinson, McCabe, Anastasopoulous, Peisner-Feinberg, & Poe, 2003). Phonological awareness refers to children's sensitivity to the sound units of oral language, including their awareness of words in sentences, of syllables in words, of the beginning and end parts of words, and of phonemes (Adams, 1990; Anthony & Lonigan, 2004). Phonological awareness has been observed in children as young as two years of age and plays a critical role in the acquisition of subsequent emergent reading skills in English. This is likely because children must first recognize the sounds that form words before being able to map those phonemes to graphemes, which in turn supports word decoding ability and subsequent reading comprehension (Gillon, 2004). Of the multiple ways in which phonological awareness is tested – rhyming, syllable segmentation, phoneme deletion – the ability to isolate phonemes is often the strongest unique predictor of future word reading in English (Hulme et al., 2002).

Literacy development in children with language impairment

Children with language impairment represent a very heterogeneous group (Catts et al., 2002; Fey, 1986). In an attempt to control for some of this heterogeneity, the present study investigates the emergent literacy skills of children with specific language impairment (SLI). Unlike the broader diagnoses of non-specific language impairment, in which children with impaired language ability may also experience general cognitive deficits, SLI is marked by a significant delay in language abilities in children who do not

otherwise present intellectual disability, hearing impairment, autism, or neurological conditions. Research has uncovered a critical relationship between these children's early language development and the subsequent ease, or difficulty, with which they learn to read. Of particular concern, children with SLI appear to be roughly four to five times more likely than children with typically developing (TD) language to struggle with reading acquisition (Catts et al., 2001). Indeed, Catts and colleagues (2002) found that only 14% of the roughly 120 kindergarten children with SLI they followed longitudinally scored above the 50th percentile on reading measures in fourth grade.

These challenges in reading are observable as early as preschool on tasks that measure emergent literacy skills (see Schuele, Spencer, Barako-Arndt & Guillot, 2007, for a review). One of the first studies to systematically evaluate the emergent literacy skills of children with SLI was conducted by Boudreau and Hedberg (1999). They compared 18 children with SLI and 18 TD peers matched for age, gender, and socioeconomic status, and found that children with SLI scored significantly worse than peers on measures of emergent print concepts and alphabet knowledge. Specifically, they reported that the children in the SLI group knew an average of 11 letters, whereas the children in the typically developing group knew 19 letters – a notable finding, given the strength of alphabet knowledge as a predictor of children's later literacy (NELP, 2008). More recently, these results have been replicated in larger studies of preschool children with depressed language ability, finding significant deficits for children with language impairment in print concept knowledge (Justice, Bowles, & Skibbe, 2006), letter and word identification (Skibbe et al., 2008), and emergent name writing (Cabell et al., 2009). The lags in print-related emergent literacy skills were maintained on tests of fifth grade

reading (Skibbe et al., 2008).

In addition to print knowledge, poor phonological awareness ability in kindergarten has long been linked to increasingly larger gaps in reading outcomes in first and second grade (Torgesen, Wagner, Rashotte, 1994). With respect to children's emergent literacy, studies have found that children with SLI are significantly less proficient at dividing words into syllables than TD peers (Kamhi, Lee, & Nelson, 1985) and perform worse than TD peers on tasks measuring rhyme and phoneme identification (Boudreau & Hedberg, 1999).

Emergent literacy development in Spanish

Researchers speculate that over two-thirds of all research on reading has been conducted in English (Ziegler, Perry, Ma-Wyatt, Ladner, & Schulte-Korn, 2003). This may prove problematic when we try to generalize the findings from English to other languages, because the highly irregular orthography of English makes it an outlier among other European languages (Seymour, Aro, & Erskine, 2003). Irregularity in English orthography can be seen when one spelling pattern takes on multiple pronunciations, such as *–ough* in the words *rough, dough,* and *thought*; and when one phoneme / f / can be represented by multiple spelling patterns, as in the words *first, tough,* and *philosophy*. This differs drastically from Spanish, which has a highly regular, nearly one-to-one ratio of letters to sounds – or what is known as a transparent orthography (Ziegler & Goswami, 2005). Cross-language investigations suggest that the relative importance of emergent literacy skills to later reading may be moderated by the transparency of the letter-sound mappings in a language's orthography (Ziegler et al., 2010). Empirical evidence from Seymour and colleagues (2003) supports this theory. They compared the time it took

child speakers of 13 different European languages to reach ceiling levels on tasks of word and nonword reading accuracy. Their results showed that children in Spain became accurate and fluent in foundation level reading in Spanish before the end of the first school year. In contrast, word and nonword reading accuracy was only about 40% for English children at the end of grade 1. The authors argued that their results could be attributed to fundamental differences in the orthographies of the languages (Seymour, Aro, & Erskine, 2003).

Insufficient research in Spanish precludes sweeping claims about the relative strength of each emergent literacy skill on children's later reading ability, as the NELP report (2008) does in English. However, individual studies can provide some initial evidence as to how well certain skills predict future literacy in Spanish. For instance, work on alphabet knowledge in Chile supports the theory that reading acquisition in Spanish is aided by the transparency of the Spanish orthography (Kim & Pallante, 2012). Specifically, Kim and Pallante (2012) found that individual differences in letter-naming fluency by 164 kindergarteners in Chile was a unique predictor of both word reading at first grade and reading growth across the academic year. In their discussion, they attributed the relationship between letter-naming fluency and later reading to the fact that letter names in Spanish provide clear, consistent, one-to-one cues to letter sounds, which is a crucial factor in the decoding of alphabetic print. Additional longitudinal work by Rolla San Francisco and colleagues (2004) in Costa Rica found that letter knowledge in first grade was highly correlated with later decoding (R = .81), suggesting that children who could identify more letters in kindergarten were better readers in later years.

In contrast, there is mixed evidence as to the effect of children's phonological

awareness on their future reading in Spanish. Whereas some studies have found a predictive relationship between Spanish-speaking children's early phonological awareness and their later word reading ability (e.g., Carrillo, 1994; Jiménez González & García, 1995; Jiménez & Ortiz, 1993; Goikoetxea, 2005), others have found that the significance diminishes after one year of formal reading instruction (Goikoetxea, 2005) or that it was not predictive of future reading in Spanish at all (Villalon et al., 2003). Once again, researchers attributed the differences between phonological awareness in English and Spanish to the fact that the Spanish language has a mostly transparent orthography. They also described the clear syllabic boundaries in Spanish, which may make certain phonological awareness tasks easier and less critical to reading (Gorman & Gilliam, 2003).

The existing work on literacy development in monolingual Spanish has been conducted almost exclusively with typically developing children. Nonetheless, there may be reason to believe that Spanish-speaking children's language ability is related to their emergent literacy development. Research by Guevara and colleagues (2007, 2008) with preschoolers in Mexico showed that children's performance on emergent literacy tasks, including alphabet knowledge and name-writing, was significantly predicted by their language ability, such that children who scored lower on a language task comprising vocabulary knowledge, narrative recall, and listening comprehension, scored lower on tasks of basic literacy. Additional work has investigated the emergent literacy skills of children with a clinical diagnosis of language impairment in Spanish. Pratt, Justice, Perez and Duran (2015) reported that preschool children receiving therapy for language delay in Mexico knew an average of 7.58 letters (SD = 8.59), a finding that is comparable to the

results reported in Cabell et al. (2009) for English-speaking children with SLI who knew, on average, 7.47 letters (*SD* = 8.66). Still, the Pratt et al. (2015) study did not systematically compare the results of the children with language impairment to a group of TD controls, so it is difficult to conclude how well children with SLI performed relative to same-age peers.

Research Aims

The present study seeks to systematically investigate the relationship between language ability and emergent literacy development in children who speak Spanish during the early school-age period. Given the differences in the transparency of the orthographies of the two languages, and given the lack of research about norms within a Spanish-speaking population, we will compare the emergent literacy skills of children with a diagnosis of SLI to a group of age- and income-matched typically developing controls. The project encompasses two exploratory research questions: (1) What is the relationship between language measures and emergent literacy measures in Spanish? (2) How do Spanish-speaking children with SLI differ from typical peers on emergent literacy knowledge and skills known to be important to later reading development?

Methods

Participants

Thirty children participated in this study. The participants included 15 monolingual Spanish-speaking children with a diagnosis of SLI, as well as 15 age- and income-matched controls with typical development (TD) (see Table 1). There were 10

boys and 5 girls in each of the groups. All children were recruited from private preschools and kindergartens located in a mid-size city in southeastern Mexico during the 2015 – 2016 school year. Children between the ages of 3;6 and 6;11 were invited to participate, with an average age of 4;11 (*SD* = 8.48 months).

Table 1. Demographic characteristics of children in SLI and TD groups

	SLI:			TD:		
	Median	*Mean*	*SD*	*Median*	*Mean*	*SD*
Chronological age (months)	59.00	58.40	9.45	57.52	60.27	7.60
Family income (pesos)	20,000	22,778	11,421	20,000	28,090	17,466
No. of children at home	2.00	1.56	.527	2.00	1.82	.982
No. of children's books in home	10.00	11.44	7.75	15.00	19.91	22.54

The average monthly income of families in our sample was 25,700 Mexican pesos (*SD* = 14.928), which was equivalent to roughly $1300 U.S. dollars at the time of publication ($1 US = 19.65 Mexican pesos). Although the mean income of our sample represents the top quartile of earners in Mexico, according to Mexico's Instituto Nacional de Estadística y Geografía [National Institute of Statistics and Geography] (INEGI, 2013) families at this percentile should only be considered moderate earners, as they are likely to struggle to pay day-to-day living expenses.

Independent samples *t*-tests between the groups showed no statistical group differences on income (p = .443) nor age (p = .556). All parents were literate; the majority of fathers (n = 19) completed highschool, with 14% having also attended

university. The most common level of education attained for mothers was highschool. Families reported varied levels of reading in the home. Half of mothers reported that they read an average of 1 to 4 times per week, though 38% reported that they read fewer than once a month. Still, 100% of mothers asserted that they wanted their child to value books. Regarding children's reading practices, families reported that they had, on average, 16 children's books in the home (*SD* = 17.65, after one outlier was removed who reported over 1200 books in the home). Half of parents reported that their children read books independently at least once a week, though many families also reported that children read weekly with mom (95%), dad (65%), older siblings (30%) and grandparents (40%).

Procedures

Children in the SLI group were referred to participate in the study based on school psychologists' report of delayed language development. Parents of these children received a flier explaining the study, outlining participation expectations, and inviting them to participate. Parents who were interested in participating subsequently received a consent form, which they talked over with research staff, and then opted to sign or not. All recruitment and consent activities were approved by an Institutional Review Board.

Recruitment and consent of children with SLI occurred first. A diagnosis of SLI was confirmed following the conventional conditions outlined in Leonard (2014). Specifically, children were considered to have SLI if they met the following inclusionary and exclusionary criteria: (a) normal non-verbal intelligence; (b) a standard score 1.25 SD below the mean on a test of normed expressive and receptive language; (c) normal hearing; (d) no history of recurring otitis media with effusion; (e) no comorbid neurological, sensory, social or emotional disorders; and (f) no obvious oral structural

abnormalities. Given that one of the aims of our research was to evaluate children's ability to produce letter names and letter sounds, we also excluded children with severe articulatory difficulties. All diagnostic measures are described in detail in *Measures.*

Once a child was admitted to the SLI group, a child with typical language development was recruited to serve as his or her control. Efforts were made to match the children in the control group to the children in the SLI group based on age and income; and, when possible, TD controls were recruited from the same classroom as the child with SLI. Similar to the recruitment procedures for children with SLI, parents of TD controls were given a flier and the opportunity to discuss the study with research staff before consenting. At the end of the study, all parents who consented to participate (regardless of whether they were eventually excluded based on the results of our diagnostic assessment battery) were given a report of their children's performance.

Data Collection

Once recruited and consented, most assessments were administered in a quiet room in the child's school. Assessment of children who were recruited from speech and language clinics (n = 3) was scheduled in the clinic at a time that did not conflict with the child's existing program of therapy. All assessments were performed by research staff fluent in the regional dialect of Mexican Spanish and all assessors had prior experience working in Spanish with young children with communication disorders.

Children's assessments were delivered in two stages to both those children ultimately identified as having SLI and the TD control group: First, assessors administered a diagnostic battery in order to determine eligibility; second, assessors administered an experimental battery of language and emergent literacy measures. (See

Table 2). All children had the right to refuse to be tested and could stop at any time or decline to respond. If a child appeared uncomfortable, assessors returned the child to the classroom. All children received stickers for participating. Two children did not complete the battery.

Table 2. Assessments delivered by battery

I. Diagnostic Battery
Batería de Evaluación de Lengua Española (Rangel et al., 1988)
Elicited Production
Definitions
Comprehension
Riddles
Kaufman Brief Intelligence Test (Kaufman, 1997)
Matrices
Phonological Repetition task
Pure-tone hearing screen
Parent questionnaire
II. Emergent Literacy Battery
Phonological Awareness Literacy Screen – PreK (Ford & Invernizzi, 2009)
Name-writing
Uppercase Letter Names
Uppercase Letter Sounds
Beginning Sounds
Print and Word Awareness
Rhyme
III. Non-diagnostic Language Measure
Clinical Evaluation of Language Fundamentals – P2 (Wiig, Secord, & Semel, 2009)
Sentence Structure
Expressive Vocabulary
Word Structure

Measures

Diagnostic measures. The following battery of assessments was administered to children to confirm the presence of SLI. As is customary of SLI, most criteria were exclusionary. First, children were given an experimenter-created phonological screen consisting of 20 two-syllable nonwords that follow that CVCV or CVCVC phonotactic patterns of most Spanish verbs. Children had to correctly reproduce 75% of the nonwords in order to be included in the study. Likewise, children with obvious oral structural abnormalities were excluded from the study, as determined by visual examination by assessors. Next, children completed the matrices subtest of the Kaufman Brief Intelligence Test (KBIT; Kaufman, 1997); a standard score of 85 or higher was the cutoff for participation. Subsequently, children's language ability was evaluated using four subtests of the Batería de Evaluación de Lengua Española (BELE; Rangel et al., 1988), a test of language ability developed and normed in Mexico. Children with a standard score 1.25 SD below the mean on at least one test measuring receptive language (Comprensión Gramatical [Grammatical Comprehension] or Adivinanzas [Riddles]) and at least one test measuring expressive language (Producción Dirigida [Elicited Production] or Definiciones [Definitions]) were considered to have language impairment. As determined by parent report, children in the SLI group had no history of recurring otitis media with effusion and no comorbid neurological, sensory, social or emotional disorders. Finally, a pure tone hearing screening was conducted using a mobile phone application Audiogram (Cocciolo, 2016), which functions like an audiometer, and Bose Around Ear (AE2) headphones. Using the app, children were presented with pure tones at 4000Hz, 2000Hz, 1000Hz and 500Hz at 20 decibels in each ear. Occasionally, because of ambient noise in

the school, the intensity was turned up to 30dB for the lowest frequency. When children heard a tone, they placed a bean into a cup. Children who heard all four tones in each ear were included in the study; children who did not hear all tones (n = 1) were referred for further assessment. Hearing tests were performed on 12 of 15 children with SLI; however, parents and schools reported no history of ear infections or reported hearing loss for all of the children in the sample, including for the three children whose hearing was not screened due to school absence and ambient noise.

Diagnostic measures for children in the control group were identical to those used with the SLI group, with one important distinction: language performance of the TD group needed to be within 1.25 SD of the mean on all subtests of the BELE. Additionally, given the parent report of no recent episodes of otitis media with effusion and children's normal language development, the TD children did not receive a hearing screening.

Emergent Literacy Battery. On a separate day, children were assessed on various measures of early literacy as measured by a Spanish version of the Phonological Awareness Literacy Screening – PreK (PALS-PreK; Ford & Invernizzi, 2009) including Name Writing, Alphabet Knowledge (comprising both letter name and letter sound knowledge), Beginning Sound Awareness, Print and Word Awareness, and Rhyming Awareness. The entire emergent literacy battery lasted approximately one hour.

Children's ability to write their names was assessed using the Name Writing procedure outlined in PALS-PreK. Children were given a sheet of paper and instructed to draw a self-portrait and write their name beneath it. Children's responses were scored on a seven-point scale, ranging from a scribble with no distinction between the name and the picture, to a name written correctly without any backwards or mirror image writing. The

complete scoring manual is available from PALS-PreK (Ford & Invernizzi, 2009).

The construct of alphabet knowledge was evaluated by measuring children's knowledge of letter names and letter sounds. Letter names were assessed using the uppercase Alphabet Recognition subtest of the PALS-PreK, during which the examiner shows the child 29 letters arranged on an 8.5-by-11" sheet of paper and asks the child to name one letter at a time. Letters that are not being tested may be covered with a piece of scrap paper. Children are scored on each letter with either a 0 (indicating an incorrect response or no response) or a 1 (indicating a correct response). The test has a maximum possible score of 29. Letter sounds were assessed in a similar fashion; however, for this subtest children were asked to produce the sound the letter makes. The Letter Sounds subtest has a maximum possible score of 25, as sounds that cannot be produced in isolation in Spanish (H, Q, Ñ) were not included on the test, nor was the example (M).

The Print and Word Awareness subtest of the PALS-PreK is embedded in a shared reading activity. The assessor read a short book with the child and asked the child print-related questions. The questions targeted children's knowledge about topics such as print directionality (for example, "Muéstrame dónde empiezo a leer." / "Show me where I start to read."), word identification ("Veo dos palabras que son iguales. ¿Cuáles son?" / "I see two words that look the same. Where are they?"), letter identification ("Veo la letra U en esta página. ¿Dónde está la U?" / "I see a letter U on this page. Where is the U?"), and children's ability to track print with their finger while reading ("Mira como señalo a cada palabra mientras leo 'A la escuela verdadera.' Ahora te toca a ti leer 'A la escuela verdadera' y tocar cada palabra como yo hice." / "Watch how I touch each word as I read, 'A la escuela verdadera.' Now it's your turn to read 'A la escuela verdadera' and

touch each word like I did.") The subtest consisted of ten questions in total.

Children's phonological awareness was measured using the PALS-PreK Rhyming Awareness subtest and the Beginning Sounds Awareness subtest. The Rhyming subtest asked children to choose which of three corresponding pictures rhymed with the target word. The Beginning Sounds subtest asked children to sort a group of picture cards by their initial phoneme (/m/, /l/ or /p/). Each task had a maximum of 10 possible points

Language Measures. An additional standardized language measure was collected, independent of the language evaluation administered in the initial diagnostic battery. Three subtests of the Clinical Evaluation of Language Fundamentals – Preschool 2 in Spanish (CELF-P:2; Wiig, Secord, & Semel, 2004) were administered: Word Structure, Expressive Vocabulary, and Sentence Structure. The Word Structure subtest measured children's ability to produce grammatical morphemes when shown a picture and given a verbal model. The Expressive Vocabulary subtest measured children's ability to name objects and actions. The Sentence Structure subtest measured children's understanding of simple, compound and complex sentence structures, as well as verb tense and negation. The Spanish CELF-P:2 can be administered to children through age 6;11.

Home literacy questionnaire. Finally, caregivers completed a background questionnaire that provided information about caregivers and their children, including questions about the number of children in the home, educational attainment of caregivers, and income, as well as home literacy activities and attitudes about reading. This survey has been used in prior research with children in Mexico with language impairment (Pratt et al., 2015).

Results

We sought to determine the extent to which children's language ability affected their emergent skills in Spanish. Prior to running any analyses, raw data and residuals were evaluated according to central tendencies based on means, standard deviations, histograms, skewness and kurtosis values, and Q-Q plots. Next, normality, independence and homogeneity of variance were reviewed, assumptions that underlie multivariate analysis of variance (MANOVA). Although there was slight negative skew on the Name Writing task within the control group and some slight positive skew for the Letter Sounds task within the SLI group, skewness and kurtosis statistics for all of the dependent variables and their residuals fell between the recommended range of -2 to 2. Levene's Test of homogeneity of variance was significant ($p < .001$) for rhyming, likely because TD children had both higher means and greater variability; however, MANOVA is relatively robust to heterogeneity and non-normality provided group sizes are equal (Finch, 2005). Additional assumptions for linear regression were also met. A review of profile plots for each predictor were mainly linear and gave no indication of homoscedasticity. Tolerance values were greater than .5 and all VIF value were less than 2, thus reducing potential issues with multicollinearity.

Research Aim 1. Our first research aim was to characterize the predictive relationship between children's performance on a language assessment and their performance on a battery measuring emergent literacy skills, given the transparent nature of the Spanish orthography. Language ability was measured using three subtests of the Spanish version of the CELF-P:2 (Wiig, Secord, & Semel, 2004) and emergent literacy skills were measured using six subtests of the Spanish version of the PALS-PreK (Ford &

Invernizzi, 2009). Partial correlations, controlling for age, between raw scores of children's performance on all measures for all participants are presented in Table 3.

Table 3. Partial correlations for all participants, controlling for age

		Language Measures				Emergent Literacy Measures			
		1. WS	2. EV	3. SS	4. NW	5. LN	6. LS	7. BS	8. PA
Language – CELF									
1.	Word Structure	--							
2.	Expressive Voc	.585**	--						
3.	Sentence Structure	.420**	.252	--					
Emergent Literacy – PALS									
4.	Name Writing	.368	.123	.312	--				
5.	Letter Names	.337	.293	.497**	.720**	--			
6.	Letter Sounds	.474*	.280	.605**	.723**	.802**	--		
7.	Beginning Sounds	.282	.215	.547**	.462*	.490*	.633**	--	
8.	Print and Word Awareness	.462*	.499**	.753**	.407*	.525**	.618**	.601**	--
9.	Rhyming	.428*	.229	.394*	.521**	.66**	.783**	.399*	.472*

Note: * = $p < .05$, ** = $p < .01$

Multiple significant correlations are worth highlighting. First, moderate correlations were found between all of the subtests of the standardized language measure and at least one of the emergent literacy skills. The Word Structure subtest, which measured morphology, was moderately correlated to Letter Sounds ($R = .474$), Print and Word Awareness ($R = .462$), and Rhyming ($R = .428$) at an alpha of .05. The Expressive Vocabulary subtest was moderately correlated to Print and Word Awareness (*R*

= .499). Finally, moderate to strong correlations were found between the Sentence Structure subtest, which measured syntax, and all measures of emergent literacy except for Name Writing, ranging in strength from .394 to .753, with the largest correlation to Print and Word Awareness ($R = .753$, $p < .001$).

Because Print and Word Awareness (PWA) was correlated to all three language measures, we also ran a forced entry linear regression to determine the unique variance in PWA explained by each language measure, controlling for age. The resulting model was significant, $F(4, 23) = 22.16$, $p < .001$ and explained over 75% of the variability in PWA (adjusted $R^2 = .758$). The Sentence Structure subtest was the most statistically significant predictor of PWA ($B = .583$, $t = 5.11$, $p < .001$), uniquely accounting for 23.32% of the variance in PWA when all other variables were held constant. Although they were less powerful, Expressive Vocabulary ($B = .311$, $t = 2.39$, $p = .026$) and age in months ($B = .253$, $t = 2.42$, $p = .024$) were also significant predictors of PWA. The Word Structure subtest was not significant ($B = -.006$, $t = -.042$, $p = .967$).

It is also worth highlighting that all emergent literacy measures were significantly correlated with each other, with correlation coefficients ranging from .399 to .802 after controlling for age. This suggests that children acquire these skills in tandem, for children who scored highly on one skill tended to score highly on all of the others, and vice versa. As expected, some of the strongest correlations were between the subtests that measure print knowledge, with children's performance on the Letter Names task correlating to their performance on Letter Sounds ($R = .802$), Name-writing ($R = .720$), and PWA ($R = .525$). In contrast, the two subtests that measured phonological awareness were only moderately correlated to each other, with a correlation coefficient of .399 between

Beginning Sounds and Rhyming subtests.

Research Aim 2. Our second research aim was to compare children's emergent literacy skills across SLI and TD groups. Descriptive data for each group is presented in Table 4. In general, there was considerable variability in both groups on emergent literacy skills, as evidenced by large standard deviation values relative to mean scores. Across all emergent literacy skills, the means of the children in the TD group were higher than the means for children in the SLI group. For instance, children with SLI knew, on average, nearly 7 letter names (*SD* = 5.24) whereas children in the TD group knew, on average, 16 letter names (*SD* = 9.12). A similar finding was true for letter sounds, where children in the TD group outpaced children in the SLI group by about 9 letters sounds.

We assessed the statistical significance of these group differences using a two-group MANOVA with six dependent measures: Name-writing, Letter Names, Letter Sounds, Beginning Sounds, PWA and Rhyming. The omnibus test statistic was significant, Wilks' $\Lambda = .511$, $F(6, 21) = 3.65$, $p = .012$ with strong power (.879) and a large effect size ($\eta_p^2 = .511$), indicating important differences between the SLI group and TD group on emergent literacy skills in Spanish.

Table 4. Results of language and emergent literacy skills of children in SLI and TD groups

Measure	SLI:		TD:		
	Mean	*SD*	*Mean*	*SD*	η_p^2
Language – CELF					
Word Structure (0 – 24)	15.29	5.66	19.13	2.69	.171*
Expressive Vocabulary (0 – 36)	30.79	4.39	33.13	1.96	.116
Sentence Structure (0 – 22)	15.14	2.91	18.20	3.36	.202*

Continued

Table 4. Continued

Emergent Literacy – PALS					
Name Writing (0 – 8)	4.79	1.48	6.07	1.27	.190*
Letter Names (0 – 25)	6.93	5.24	16.00	9.12	.286**
Letter Sounds (0 – 23)	5.07	5.33	14.00	6.48	.379**
Beginning Sounds (0 – 10)	6.14	2.11	8.64	1.91	.294**
Print and Word Awareness (0 – 10)	5.50	2.14	8.57	1.40	.437**
Rhyming (0 – 10)	4.57	1.34	6.71	2.84	.200**

Note: * = $p < .05$, ** = $p < .01$

Next, we conducted post-hoc univariate comparisons for each of the dependent variables. The results showed that the TD controls performed significantly better than the children with SLI on all print knowledge and phonological awareness literacy tasks, including Name Writing, F (1, 26) = 6.10, p = .020; Letter Names, F (1, 26) = 10.41, p = .003; Letter Sounds F (1, 26) = 15.86, $p < .001$ Beginning Sounds F (1, 26) = 10.84, p = .003; Print and Word Awareness, F (1, 26) = 20.21, $p < .001$ and Rhyming F (1, 26) = 32.24, p = .017. Effect sizes for each univariate test are reported in Table 4.

Discussion

The present study sought to improve our understanding of how literacy develops in Spanish-speaking children, particularly those with specific language impairment who may be at increased risk for reading difficulties. There are remarkably few empirical studies that examine the emergent language and literacy skills of young Spanish-speaking children (Carrillo, 1994; Goikoetxea, 2005; Guevara et al., 2007; Kim & Pallante, 2012) and fewer still that include children with language impairment (Goldstein, 2011). We

know from research in English that preschool-aged children with SLI perform more poorly on tasks of emergent literacy than their typically developing peers (e.g., Boudreau & Hedberg, 1999) and that these skill deficits often manifest as reading disabilities when children reach primary school (e.g., Catts et al., 2002). However, a systematic investigation into the performance of Spanish-speaking children with SLI on tasks of emergent literacy has not previously been conducted.

Our aims were two-fold: first, to examine the relationship between children's performance on a standardized test of language ability and their emergent literacy skills, and second, to determine whether there were significant group differences between children with SLI and a group of TD age- and income-matched peers on a battery of emergent literacy skills theorized to be important for future literacy development. With respect to the first aim, our results indicate that language is a significant predictor of emergent literacy skills in young children in Spanish. Specifically, children's grammatical language ability, as measured by the Sentence Structure subtest of the CELF (Wiig, Secord, & Semel, 2004), was moderately-to-highly correlated with five of the six emergent literacy skills that were assessed. What is particularly interesting is that children's ability to understand spoken sentences that increase in length and complexity was strongly associated with emergent literacy tasks that are more sound-based, like Beginning Sounds (R = .456) and Letter Sounds (R = .503). It is possible that these correlations are due to an underlying phonological processing deficit that manifests on both types of tasks: on the language task, processing demands increase with increasingly complex sentences, and on the phonological awareness task, children may lack the processing capability to manipulate discrete sounds. Additional research could

disentangle this relationship and its implications for future reading in Spanish.

Additionally, our results showed a lot of variability in children's performance across all emergent literacy skills, as evidenced by the fact that standard deviations were almost as large as the means on subtests measuring alphabet knowledge. We also observed that children's emergent skills were highly correlated to each other, suggesting that these skills develop in tandem. Therefore, a child with high print knowledge tended to have high phonological awareness, and vice versa. Future research with larger sample sizes should investigate whether distinct profiles of emergent literacy skills exist in Spanish; for instance, perhaps there are subgroups of children whose lags in emergent literacy are limited to phonological awareness while their print knowledge skills are spared.

With respect to the second research aim, we found that children with SLI performed significantly worse than peers matched for age and income on all six emergent literacy tasks. This echoes findings from English, which have shown similar deficits for children with SLI when compared to controls (e.g Boudreau & Hedberg, 1999; Cabell et al., 2009). Indeed, despite the relatively small size of the sample, univariate effect sizes for group differences were quite robust, with η_p^2 values ranging from .190 to .437.

Importantly, any longitudinal research in Spanish investigating the impact of these skills on long-term reading should include outcomes in both reading comprehension and word decoding, for it is possible that this is where English and Spanish may diverge. Research in English has shown that children with deficits in grammatical language ability are at increased risk for difficulties in reading comprehension (e.g., Catts et al., 2002), and that children with low phonological awareness and alphabet knowledge are slower to

map phonemes onto graphemes, which, in turn, places them at increased risk for difficulties in decoding (e.g., Gillon, 2004). Given the relative ease with which children learn to decode in Spanish, it's possible that long-term reading deficits for children with SLI in Spanish are limited to the domain of reading comprehension, though this merits further research.

There are important theoretical and practical implications of this research. First, our results point to some universality regarding how language impairment affects reading. Despite the more transparent orthography and clearer phonological patterns in Spanish than English, children with impaired language ability in Spanish still struggled significantly with many of the foundational concepts that underlie reading. Additional cross-linguistic and longitudinal research is necessary to explore whether these early deficits manifest as reading disability as children get older. Clinically, our results underscore the importance of targeting emergent literacy skills in young children who speak Spanish, in particular among those with SLI. Interventions that target print knowledge (Piasta et al., 2014) and phonological awareness (Gillon, 2010) have had widespread success in English. Empirical validation of interventions that target these skills in Spanish is needed.

This research should be interpreted with caution, due to the following limitations. First, the sample size was relatively small, so generalizations to larger populations of children with SLI should be done with care. Relatedly, we tried to control for classroom instruction by choosing TD controls from the same school and, when possible, from the same classroom as the children with SLI; however, replication with a larger sample size would further eliminate any possible environmental confounds between groups. Second,

both of the measures of language and literacy that we used in the analysis were developed in the U.S. Though we did not attempt to interpret the findings normatively, subsequent research should seek to use tools developed for use in a Latin American context.

Chapter 2 References

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Chapter 3 – The effect of the home literacy environment on the early literacy development of Spanish-speaking children with and without SLI

Chapter 2 established that significant differences in emergent literacy skills exist between preschool-aged children with specific language impairment (SLI) and typically developing controls in Spanish. This chapter explores various environmental factors that might explain some of the variability in emergent literacy skills within this population.

Identifying what sorts of home activities support early literacy development for certain at-risk populations is critical to understanding children's reading development. Previous work on the home literacy environment (HLE) of typically-developing children and children with language impairment has explored the construct of the HLE in an effort to find sources of individual variability in reading skills using several home- and child-level variables, such as parents' explicit literacy teaching, children's print interest, and children's oral language ability. The present study adds to that body of work by examining the role that these variables play in the print-related emergent literacy skills of 15 Spanish-speaking children with SLI and 15 of their typically developing controls.

Specific language impairment is a disorder that affects roughly 7% of the population (Tomblin, Records, Buckwalter, Zhang, et al, 1996). It is characterized by significant limitations in language ability among children who do not exhibit comorbid intellectual, neurological or developmental delays, or hearing loss. Understanding how

SLI manifests in young children has gained renewed attention over the past 15 years, as large-scale studies have shown that 40% of children with SLI will go on to experience difficulties when they learn how to read (e.g., Catts, Fey, Tomblin, & Zhang, 2002). These deficits in reading become apparent from an early age. Preschool children with SLI often show delays in the early literacy skills that are foundational for future reading achievement (Boudreau & Hedberg, 1999; Justice, Bowles & Skibbe, 2006).

One such early literacy skill is print knowledge. Print knowledge refers to a child's awareness of print as a symbol that carries communicative meaning. The construct of print knowledge comprises children's knowledge of the names and features of the alphabet (letter-name and letter-sound knowledge), their understanding of fundamental concepts of print (print concept knowledge) and their ability to write their name (Justice & Ezell, 2004). Children's knowledge of print is critical to their future reading, because children need to be able to recognize print as its own entity, distinguishable from pictures, before they are able to understand the basic concepts that underlie formal reading instruction (Christie, Enz, & Vukelich, 2003). Empirical studies of early reading have shown that print knowledge in preschool is consistently predictive of later reading ability (National Early Literacy Panel, 2008; Justice, Bowles, Pence, & Skibbe, 2009; Storch & Whitehurst, 2002). Of particular importance to the present study is the notion that print knowledge is universally related to subsequent literacy (Bialystok, Luk, & Kwan, 2012). That is to say, print knowledge is a key precursor to reading regardless of the language that a child speaks and the language in which a child will eventually be taught to read. Studies by Bialystok and colleagues (Bialystok & Luk, 2007; Bialystok et al., 2012) have investigated diverse linguistic contexts of reading and

found important universalities regarding how children learn how to read; namely, that children's early knowledge about print develops in a similar way across different writing systems and cultures.

Given the contribution of print knowledge to early literacy, it is troubling that young children with SLI seem to experience lags of one to two years in their development of this fundamental skill (Cabell, Justice, Zucker, & McGinty, 2009), lags which exist for children who speak languages other than English, as well (see Pratt, Justice, Perez, & Duran, 2015 for research in Spanish). Thus, there is a push to understand sources of variability in the print knowledge skills of young children with language impairment. The home literacy environment (HLE) has been hypothesized as a potential source of variability for early reading development. However, meta-analyses by Scarborough and Dobrich (1994) and Bus, van IJzendoom, and Pellegrini (1995) have shown that the relationship between frequency of book reading and early literacy achievement varies in strength across studies and, on average, accounts for only about 8% of the variance in children's early literacy (Bus, et al, 1995). Recent efforts have been made to investigate whether specific aspects of the HLE may mitigate the relationship between HLE and children's literacy development, investigating such phenomena as the role of parents' teaching language (e.g., Sènèchal, 2006), children's print interest (e.g., Frijters, Barron, & Brunello, 2000) and children's oral language ability (e.g., Lonigan, Burgess & Anthony, 2000). However, all of the cited studies were conducted with typically developing children in English. We only identified three studies that directly investigated the role of HLE variables on the early literacy skills of children who have language impairment (McGinty & Justice, 2009; Skibbe, Justice, Zucker & McGinty,

2008; Sawyer, et al, 2014) and no studies to date have examined the HLE of Spanish-speaking children with SLI.

Constructs of HLE

As previously stated, the role of the home literacy environment on children's early literacy development is complex. Adding to that complexity is the fact that the home literacy environment is often conceptualized in very distinct ways. Nonetheless, there are some salient environmental predictors that emerge from the extant literature and show some indication of being related to children's later reading achievement, including the frequency of book reading and the availability of materials to read. Regarding the former, multiple studies of the HLE have included a question (or composite of questions) asking about the frequency of book reading at home. Many have found significant associations between the amount of joint book reading occurring at home and children's early literacy skills (e.g., Dickinson & DeTemple, 1998). A meta-analysis by Scarborough and Dobrich (1994) found improved literacy outcomes for children whose parents read to them at least 4.5 times per week. Additionally, Sénéchal and colleagues (Sénéchal, 2006; Sénéchal, LeFevre, Hudson, & Lawson, 1996; Sénéchal, Thomas, & Monker, 1995) showed that the frequency of shared book reading was positively associated with children's emergent literacy skills.

Previous studies have combined the frequency of book reading with other home literacy variables in order to create a composite variable comprising the HLE (e.g. Frijters, Barron, & Brunello, 2000). One variable that is often included in such a composite corresponds to the availability of reading materials in the home. Books, print materials, and educational toys support the development of children's early literacy skills,

as well as their motivation and positive attitudes toward learning, which regularly predict later achievement in school (Gottfried, Fleming, & Gottfried, 1998). Questionnaires that ask parents to survey the amounts and types of literacy materials in the home have been correlated to children's literacy skill development (Christian, Morrison, & Bryant, 1998; Elliott & Hewison, 1994). Additional studies have found that parents' ability and willingness to provide their children with opportunities to engage in literacy at home, which they defined in part by the availability of literacy materials, was positively associated with children's emergent literacy skills, including print knowledge (Burgess, Hecht, & Lonigan, 2002).

The present study conceptualizes the HLE as a combination of frequency of reading and availability of literacy materials. However, recent research has expanded the HLE in order to explore other factors at home that have the potential to affect children's early literacy development. A construct encompassing parents' explicit teaching about literacy has shown itself to be a powerful predictor of early literacy skills for typically-developing children. The body of work by Sénéchal and colleagues (2006; Martini & Sénéchal, 2010; Sénéchal & LeFevre, 2002) makes a distinction between informal and formal literacy activities, such that casual storybook exposure is informal, whereas explicit teaching about literacy concepts is formal. They theorize that informal literacy activities will have an effect on children's language skills, but not their literacy ability per se. In contrast, they posit that formal teaching will have a direct effect on emergent literacy, which then directly affects later reading. A meta-analysis by Sénéchal and Young (2008) found that interventions that used storybook reading as the primary means for improving young children's literacy had null effects on children's literacy. This is in

contrast to formal teaching about literacy, in which Sénéchal (2006) found that parents' explicit teaching of basic concepts (such as letter names and letter sounds) was a unique predictor of children's early reading development.

In addition to these aspects of the HLE, yet other studies have investigated whether there are specific child-level factors that may moderate the relationship between the home environment and children's print knowledge, including children's interest in print and their oral language ability (Justice, Chow, Capelinni, Flanigan & Colton, 2003; Sawyer et al, 2014). Children's print interest can be operationalized using a number of variables, including the frequency with which children look at books alone, ask to be read to, go to the library, receive books as gifts, or children's own indication of whether they enjoy reading (Harter & Pike, 1984). Using a composite of literacy interest comprised of such items, Fritjers et al. (2000) reported that children's print interest accounted for 6% of variance in letter-name and letter-sound knowledge. Scarborough and Dobrich (1994) summarized seven studies and found that the median correlation between print interest and literacy skills was somewhat higher than the correlation between frequency of reading at home and literacy skills (Mdn $R = .37$).

Finally, children's oral language ability is a strong child-level factor that functions as a predictor of future success in learning to read. Models of reading show that oral language is both directly and indirectly implicated in the acquisition of reading (Lonigan, Burgess & Anthony, 2000; Storch & Whitehurst, 2002). Some investigations of the HLE have theorized that the effect of the HLE on later literacy development works through children's oral language ability (Farver, Xu, & Lonigan, 2013; Sénéchal, 2010).

HLE and language impairment

The body of work on the relationship between HLE and the print knowledge skills of children with impaired language ability is very limited. McGinty and Justice (2009) used Hierarchical Linear Modeling to assess the impact of HLE and oral language on children's print knowledge skills. They found that individual differences in children's oral language abilities did not significantly explain variability in print knowledge for children with non-specific language impairment in their study. Although the quality of home literacy was a significant predictor of print knowledge, it was moderated by children's attention difficulties. A second study by Sawyer et al. (2014) examined the effects of frequency of book reading, explicit teaching of literacy concepts, print interest and oral language on the print knowledge skills of children with language impairment. They found that frequency of book reading was a significant predictor of children's print knowledge, explaining 4% of the variance in children's print knowledge skills, as was children's oral language, which explained 14% of the variance. The present study is largely a replication of their exploratory analyses, in order to examine the relationships among these variables for a population that is similar in its diagnosis of language impairment, but distinct in that it is Spanish-speaking.

Literacy development in Spanish-speaking contexts

Relatively little is known about either the print knowledge skills, oral language ability or home literacy environments of young monolingual Spanish-speaking children. A limited number of studies have shown that print knowledge is correlated with later reading ability in monolingual Spanish-speaking contexts. Rolla San Francisco, Arias and Villers (2005) found a correlation between letter-name knowledge and later decoding

ability among Spanish-speaking kindergartners in Costa Rica. A study by Kim and Pallante (2012) found that an intervention targeting instruction of letter names (in addition to instruction on word segmentation) was positively related to word reading skills for first grade students in Chile. Importantly, they investigated how the growth trajectories of 162 children's letter-name knowledge were related to word reading, after accounting for other emergent literacy skills, such as oral language. The researchers found that individual differences in letter-naming fluency in kindergarten were a unique positive predictor of word reading at first grade. These longitudinal analysis suggest that, similar to English, letter-name knowledge is part of a critical foundation of emergent literacy skills in Spanish. Interestingly, Kim and Pallante (2012) also found that children with higher letter-naming fluency had a faster rate of growth in word reading skills across the academic year, which they attributed to the clear one-to-one relationship between letters and letter sounds in Spanish, a crucial factor in the decoding of alphabetic print.

There is also some indication that oral language is predictive of future literacy development in Spanish, as it is in English. Longitudinal research by Guevara and colleagues in Mexico found that that over half of the 165 six-year-old children in their sample scored at floor levels on an assessment of basic literacy principles at first grade entry. However, children's growth throughout the school year was predicted by their language skills (as measured on an experimental task of narrative language ability) at the onset of the study. That is to say, children with lower language skills had significantly lower early literacy skills at first grade entry and made smaller gains throughout the school year in literacy skills than their peers (Guevara, Rugerio, Delgado, Hermosillo, & López, 2010).

Data regarding the HLE of Mexican families is limited, however, there is evidence that families in Mexico read less frequently and have fewer literacy materials than their counterparts in the U.S. and Canada (OECD, 2012). Additional studies that were qualitative in nature compared the family literacy practices of families living in Los Angeles with those of siblings who remained with their families in Mexico (Reese, 2002). Open-ended interviews covered topics ranging from child-rearing practices, to future goals for their children, and parent involvement in schoolwork. Reese found that the schools and families living in the U.S. were more likely to stress the importance of reading with children at home, as compared to the families in Mexico. Additional studies indicate that parents of Mexican descent may not see the need for certain home literacy practices such as learning the alphabet (Reese & Gallimore, 2000).

Research Aims

This study investigates the relationship between the home literacy environment and the print knowledge of Spanish-speaking children with and without SLI, in addition to potential home- and child-level factors that may mitigate that relationship. Given that this is the first study of its kind with this particular population, the study is largely exploratory. We have three aims: (1) to describe the various environmental- and child-level variables of the home literacy environment as they relate to Spanish-speaking children with and without language impairment, (2) to explore whether parental report of explicit teaching of literacy principles at home on the print knowledge skills of Spanish-speaking children explains variability in children's print knowledge, above and beyond what is explained by the HLE and their oral language ability, and (3) to explore to what

extent children's print interest explains variability in their print knowledge skills, above and beyond what is explained by the HLE and their oral language ability.

Methods

Participants

Participants were 15 children with specific language impairment recruited during the 2015 – 2016 school year and 15 typically developing controls matched for age and income. When possible, typically developing controls were recruited from the same classrooms as children with SLI. All participants with SLI were referred to participate in the study by speech-language pathologists and school psychologists in Southeastern Mexico. Recruitment activities were targeted towards caregivers whose children were between the ages of 42 and 84 months. All study activities – including recruitment, consent and data collection – were carried out in Spanish by project staff who were fluent in the regional dialect of Spanish.

The children with SLI who participated in the study represented a clinically identified sample; all were receiving treatment for a diagnosis of language impairment at their school or a private language clinic at the time of the study. Presence of SLI was confirmed using the following diagnostic criteria: First, children were given an experimenter-created phonological screen consisting of 20 two-syllable nonwords that follow that CVCV or CVCVC phonotactic patterns of most Spanish verbs. Children had to correctly reproduce 75% of the nonwords in order to be included in the study. Next, children completed the matrices subtest of the Kaufman Brief Intelligence Test (KBIT; Kaufman, 1997); a standard score of 85 or higher was the cutoff for participation.

Subsequently, children's language ability was evaluated using four subtests of the Batería de Evaluación de Lengua Española (BELE; Rangel et al., 1988), a test of language ability developed and normed in Mexico. Children with a standard score 1.25 SD below the mean on at least one test measuring receptive language (Comprensión Gramatical [Grammatical Comprehension] or Adivinanzas [Riddles]) and at least one test measuring expressive language (Producción Dirigida [Elicited Production] or Definiciones [Definitions]) of the BELE were considered to have language impairment. As determined by parent report, children in the SLI group had no history of recurring otitis media with effusion and no comorbid neurological, sensory, social or emotional disorders. Visual examination by assessors excluded children with obvious oral structural abnormalities.

Diagnostic measures for typically developing children were identical to those used with the SLI group, with one important distinction: language performance of the TD group needed to be within 1.25 SD of the mean on all subtests of the BELE.

In total, the sample included 10 boys and 5 girls with SLI, and 10 boys and 5 girls who were typically developing. The children ranged in age from 45 months to 81 months; the average age of children was 4 years, 11 months (SD = 8.5 months). Independent samples t-tests between the groups showed no statistical group differences on age (p = .556). Per parental report, 100% of the children were monolingual Spanish speakers.

Mothers were the primary caregiver informants in the study. All mothers reported that they were native speakers of Spanish. All but two mothers were high school graduates and three had completed at least some university. The sample was middle class, with an average monthly household income of 25,700 Mexican pesos (SD = 14.928), which was equivalent to roughly $1300 U.S. dollars at the time of publication ($1 US =

19.65 Mexican pesos). Independent samples *t*-tests between the groups showed no statistical group differences on income ($p = .443$). Although the mean income of our sample represents the top quartile of earners in Mexico, according to Mexico's Instituto Nacional de Estadística y Geografía [National Institute of Statistics and Geography] (INEGI, 2013) families at this percentile should only be considered moderate earners, as they are likely to struggle to pay day-to-day living expenses.

Procedures

Participating mothers signed consent forms and were asked to fill out a caregiver questionnaire. When giving out the questionnaires, project staff reminded mothers that there was no correct answer, that their answers would be confidential and to answer honestly. Mothers were given the option of filling out the questionnaire at the school or in the clinic while their children attended speech therapy, or of taking the questionnaire home. 70% of mothers returned the questionnaire, while the remaining mothers ($n = 9$) returned the questionnaire only partially completed or failed to return it.

Child assessments occurred between December of 2015 and March of 2016. Most assessments took place in the school psychologist's office at the children's school. For children who were referred from speech language clinics, assessments were administered at the clinic at a time that did not interfere with children's typical therapy appointments. The assessment battery included measures of oral language and print knowledge and were split over two sessions. Assessments of oral language lasted around 30 minutes and were given by an assessor who is a psychologist and native speaker of Spanish from the region where the study took place. Assessments of print knowledge lasted around 30 minutes and were also conducted by research staff fluent in Mexican Spanish and with

experience working with children with disabilities. Assessors completed an online training module on research with human subjects provided by the U.S. National Institutes of Health prior to assessing children.

Measures

Child print knowledge measures. Children's print knowledge was based on a composite comprised of four subtests from the Spanish version of the *Phonological Awareness Literacy Screening- Espanol* (PALS Espanol; Ford & Invernizzi, 2009), including: Name Writing, Letter Names, Letter Sounds, and Print and Word Awareness. The Name Writing subtest examines children's ability to write their name. The assessor asks the child to draw a picture of him- or herself and then write their name. The name is scored on a rubric based on a range of criteria (such as, "the name is separate from the picture" or "the name contains letters from the child's actual name"), and scores range from zero to seven. The Letter Names subtest examines children's knowledge of the upper-case alphabet letters. An assessor shows the child 29 letters arranged on an 8.5-by-11" sheet of paper and asks the child to name one letter at a time. Children are scored on each letter with either a 0 (indicating an incorrect response or no response) or a 1 (indicating a correct response), for a maximum possible score of 29. The Letter Sound e subtest is similar; children are asked to produce the sound the letter makes. Sounds that cannot be produced in isolation in Spanish (H, Q, Ñ) are not included; the test has a maximum possible score of 25. The Print and Word Awareness subtest is embedded in a shared reading activity. The assessor reads a short book with the child and asks the child print-related questions (e.g., "Muéstrame dónde empiezo a leer" / "Show me where I start to read"). The test includes ten questions; each is scored as correct/incorrect, for a total of

ten maximum possible points. After converting all raw scores to *z* scores, the composite of these four subtests reached statistically appropriate levels of reliability for our sample, with a Cronbach's alpha of .90.

Child oral language measure. Children's oral language ability was measured using three subtests (Word Structure, Expressive Vocabulary Sentence Structure) of the Spanish version of the *Clinical Evaluation of Language Fundamentals-Preschool-2 Spanish* (CELF-P2 Spanish; Wiig, Secord, & Semel, 2009). The three subtests were converted to z-scores and put into a composite score with a Cronbach's alpha of .77, which was used in the analyses in the present study. The Word Structure subtest measures children's ability to produce grammatical morphemes when shown a picture; the Expressive Vocabulary subtest measures children's expressive language skill through their spoken responses to a stimulus picture; and the Sentence Structure subtest measures children's understanding of simple, compound and complex sentence structures, as well as verb tenses and negation.

Home literacy measure. Home literacy was measured using a caregiver questionnaire. The questionnaire comprised 70 questions spanning a range of demographic variables, as well as questions pertaining to literacy practices and beliefs. Given the focus of the present study, only the questions that theoretically mapped onto our two particular constructs of interest were used. The first construct, frequency of book reading, was measured using a composite of two items: how frequently the mother read to the child in the past week and how frequently others read to the child in the past week. Reliability estimates for this construct were somewhat low (Cronbach's $\alpha = .44$); however, the alpha is likely due to the restricted variability in our small sample. The

second construct was explicit teaching of literacy. This construct was derived from three items: how often during the past week the mother spoke with the child about letter names, how often the mother during the past week spoke with the child about letter sounds, and how many children's book were in the home. The alpha of this construct was higher (Cronbach's $\alpha = .62$). Finally, children's print interest was measured using four items from the caregiver questionnaire (Cronbach's $\alpha = .51$). Two of the items asked parents how many times during the past week their child read alone and how many times the child wrote alone. The final two questions were part of a checklist that asked whether their child looked at books independently and whether he/she asked to read the same book over and over again, with 0 indicating no and 1 indicating yes.

Results

Preliminary data analysis was conducted to assure that our data was normally distributed and did not violate assumptions of linear regression. With the exception of the Name Writing subtest, about a third of children in our sample scored near floor level on each of the measures of children's print knowledge, resulting in positive skew. However, when children's scores were converted to *z* scores and combined into a composite print knowledge variable, scores followed a normal distribution and statistics for skewness and kurtosis fell within the acceptable range of -2 and 2. We are confident that multicollinearity will not be a problem for this analysis, as all tolerance values were greater than .76, all eigenvalues were above .008, and condition indices were less than 30. To combat multicollinearity, all composites scores were standardized and centered.

Research Aim 1. The first research question sought to describe the HLE for

children with language impairment and their TD peers. Descriptive statistics for all variables are presented in Table 5. As we established in the previous chapter, our sample is characterized by high variability in emergent literacy skills both within and across groups, particularly within their children's letter name and letter sound knowledge.

Table 5. Print knowledge, oral language, and HLE descriptors for SLI and TD groups

		SLI		TD		
	Measure Range	*Mean*	*SD*	*Mean*	*SD*	*p*
Child age in months	42 – 83	58.40	9.45	60.27	7.60	.556
Oral language ability – CELF	0 – 82	65.11	6.49	71.91	4.91	.008
Children's print knowledge – PALS						
Letter Names	0 – 29	6.93	5.24	16.00	9.12	.003
Letter Sounds	0 – 25	5.07	5.33	14.00	6.48	.000
Name Writing	0 – 7	4.79	1.48	6.07	1.27	.021
Print and Word Awareness	0 – 10	5.50	2.14	8.57	1.40	.000
Home-level factors						
Mom read to child last week (HLE)	0 – 7	5.00	.756	5.33	.500	.647
Other read to child last week (HLE)	0 – 7	5.50	.535	4.89	.928	.308
Children's books at home (HLE)	0 – 80	11.44	7.75	19.91	22.54	.298
Mom talked with child about letter names (teaching)	0 – 7	4.25	1.91	5.22	.667	.247
Mom talked with child about letter sounds (teaching)	0 – 7	5.13	.641	5.11	.601	1.00
Child-level factors						
Child interacted with a book last week (print interest)	0 – 7	4.38	1.30	3.67	1.87	.468
Child wrote independently last week (print interest)	0 – 7	2.30	1.89	2.90	2.00	.552
Child asks to read same book again (print interest)	0 – 1	.67	.500	.82	.405	.947
Child reads alone (print interest)	0 – 1	.90	.316	.91	.302	.549

Note: * = $p < .05$, ** = $p < .01$

Some general trends in emergent literacy are worth highlighting. First, as we established in the previous chapter, children with SLI scored significantly worse than their typically developing peers. Children with SLI knew an average of 6.93 letter names (*SD* = 5.24) and 5.07 letter sounds (*SD* = 5.33), whereas TD children knew 16 letter names (*SD* = 9.12) and 14 letter sounds (*SD* = 6.48). The mean name-writing score was approximately 5 and 6 for children in the SLI and TD group, respectively, which indicates that most children were able to write their name separately from the picture and use many correct letters and no filler letters. Children with SLI answered approximately half of the items on the Print and Word Awareness subtest correctly (*M* = 5.50, *SD* = 2.15), indicating some initial knowledge about print concepts.

With respect to the home literacy environment, mothers indicated that the number of children's books in their homes ranged from 1 to 80, with a majority of households (52%) having between 11 and 20 books. All mothers reported reading with their child at least three times during the past week. Collectively, children in our sample also read with other adults on average 5.00 times per week (*SD* = .837). Of note, the means across the SLI and TD group on all HLE variables are relatively similar, as mothers from both groups reported that they read with their child, that another adult read with the child, they discussed letter names, and they discussed letter sounds between 4 and 5 times over the past week. For the sake of thoroughness, we ran independent samples' *t*-tests on each of the five environmental-level variables and found no significant group differences between the SLI and TD group, with significance values ranging from .273 to .647. The same was true for the child-level factors. We assessed four variables that comprise a print interest construct. No significant group differences were found on the print interest

variables, either. Interestingly, mothers reported that children in the SLI group looked at books more frequently ($M = 4.33$) than children in the TD group did ($M = 3.80$), although these differences did not reach statistical significance.

Next, we assessed zero-order correlations between all of the main variables in our composite in both groups, in order to explore potential group differences. Table 6 shows the correlation coefficients for children in the SLI group, while Table 7 shows these values for children in the TD group. Given the small sample size, the correlation coefficients may be more informative than the significance values.

Table 6. Zero-order correlations among HLE variables for children with SLI

	1. Age	2. OL	3. PK	4. HLE	5. Tea	6. Int
1. Child age	1					
2. Child oral language ability	.474	1				
3. Print knowledge	.621*	.487	1			
4. HLE	.477	.157	-.410	1		
5. Explicit teaching	-.225	-.121	-.097	.390	1	
6. Child print interest	.212	.425	.121	.417	.217	1

Note: * = $p < .05$, ** = $p < .01$

Table 7. Zero-order correlations among HLE variables for children with TD

	1. Age	2. OL	3. PK	4. HLE	5. Tea	6. Int
1. Child age	1					
2. Child oral language ability	.333	1				
3. Print knowledge	.500	.586*	1			

Continued

Table 7. Continued

	1. Age	2. OL	3. PK	4. HLE	5. Tea	6. Int
4. HLE	-.187	.496	-.062	1		
5. Explicit teaching	-.563	-.469	-.279	.058	1	
6. Child print interest	.415	.879**	.852**	.678**	-.151	1

Note: * = $p < .05$, ** = $p < .01$

There are notable differences in correlations across the two populations of children. Let's consider first the correlations to print knowledge. In the SLI group in Table 6, the strongest predictor of print knowledge was age ($R = .621$, $p = .018$), followed by oral language ability ($R = .487$, $p = .091$), though this did not reach statistical significance. For the typically developing group in Table 7, age was not among the strongest predictors of print knowledge. In this group, the strongest predictors of print knowledge were print interest ($R = .852$, $p = .004$) and oral language ability ($R = .586$, $p = .028$), both of which were statistically significant. Second, the variable of print interest appeared to behave differently across the groups. For children with SLI, print interest was not significantly related to any other variables. While there were moderate correlation coefficients to both oral language ($R = .425$, $p = .254$) and HLE ($R = .417$, $p = .264$), the correlation between print interest and print knowledge was very weak ($R = .121$, $p = .756$). This contrasts plainly to TD children. In the TD group, print interest was significantly correlated ($p < .01$) with print knowledge ($R = .852$), oral language ($R = .879$) and HLE ($R = .678$), with very large effects. Third, it is worth noting that explicit teaching of letter names and letter sounds had negative correlations with age, oral language, and print knowledge in both groups. This means that as children got

older, as their print knowledge scores got higher, and as their oral language improved, mothers engaged in less explicit teaching in both groups.

Research Aim 2. The remaining research questions sought to identify whether environmental- and child-level variables accounted for meaningful variability in children's print knowledge in Spanish. Specifically, the second research aim sought to explore the effect of explicit teaching of literacy principles at home on the print knowledge skills of Spanish-speaking children, above and beyond what is explained by the HLE and their oral language ability.

This analysis was conducted with a four-step linear regression using forced entry of predictors. The print knowledge composite was used as the DV. All children were included in the model and missing data was excluded list-wise, resulting in a complete data set of 21 children. At blocks 1 and 2, child age and their oral language ability were entered into the model in order to statistically control for these factors. At block 3, the HLE composite was entered into the model, in order to identify the general contribution of home literacy environment. At block 4, the explicit teaching composite was entered into the model, so that we could assess what the impacts of explicit teaching are on print knowledge, controlling for HLE. Results are shown in Table 8. At block 1, child age independently accounted for 20.6% (adjusted R^2 = .162) of the variation in children's print knowledge scores, F (1, 18) = 4.67, p = .044. The addition of oral language into the model at block 2 explained an additional 36.6% of variance, signifying a significant improvement in the overall proportion of variance accounted for, F (1, 17) = 14.55 , p = .001. The addition of the HLE composite to the model at block 3 also improved the R-square value significantly, F (1, 16) = 5.14, p = .038, as the addition of that predictor

explained an additional 10.4% of the variance in children's print knowledge abilities. Interestingly, the relationship between HLE and print knowledge was negative, such that the higher a child's print knowledge score was, the less frequently the child was read to at home. At the final step, block 4, explicit teaching was added to the model. The change in the model from block 3 to block 4 was not statistically significant F (1, 15) = 2.30 , p = .150), although it did account for an additional 4.3% of variance in children's print knowledge when controlling for child age, oral language ability, and HLE.

Table 8. Summary of regression models evaluating the contribution of explicit teaching and print interest on children's print knowledge

		Part		Change Statistics		
	β	correlate	R^2	ΔR^2	ΔF	df
Block 1			.206	.206	4.67*	1, 18
Child age	.454*	.454				
Block 2			.572	.366	14.54**	1, 17
Oral language	.622**	.605				
Block 3			.676	.104	5.14*	1, 16
HLE	-.326*	-.322				
Block 4			.719	.043	2.30	1, 15
Explicit teaching	.225	.207				
Block 4			.688	.012	.569	1, 15
Print interest	.153	.191				
Block 5			.787	.099	6.47*	1, 14
Print interest*Oral language	.326*	.314				

Note: * = $p < .05$, ** = $p < .01$

Research Aim 3. The third research aim was to explore the additional variability explained by print interest, a composite variable measuring children's interest in literacy. Given that the first three blocks containing age, oral language, and HLE were significant

predictors of literacy in the first model, we left them in the second model. At block 4, we added print interest into the model and saw negligible improvement in overall variance accounted for (R^2 change = .012, p = .462).

Because of the discernible differences in the relationship between print interest and print knowledge across the SLI and TD groups, we decided to test for an interaction between children's print interest and oral language. You will recall that print interest was strongly related to typically developing children's print knowledge when conducting zero-order correlations (R = .852, p = .004) but that it was not related to print knowledge for children with SLI (R = .121, p = .756). Therefore, at block 5 we entered an interaction term to see if print interest might be moderated by children's oral language ability. The interaction was a statistically significant predictor of print knowledge F (1, 14) = 6.47 , p = .023), accounting for nearly 10% of additional variability in children's print knowledge scores. This signifies that the role of print interest on print knowledge was moderated by children's oral language ability, such that print interest was a stronger predictor of print knowledge when oral language scores were high; yet, when oral language scores fell below the centered mean, the relationship between print interest and print knowledge disappeared. Results from this model are reported in Table 8.

Discussion

The present study represents an important first step towards understanding the complex role that the home literacy environment plays in children's early literacy skill development. On an international level, efforts are being made to prevent reading difficulties through early intervention of children's literacy skills, efforts which extend

into Mexico (e.g. SEP, 2013). Understanding what sorts of home activities support early literacy development for certain at-risk populations is critical to the success of these preventative efforts. Previous work on the HLE has found significant predictive effects for the frequency of book reading (e.g. Bus et al, 1995) as well as the availability of literacy materials (Elliot & Hewison, 1994); however, researchers have also found null effects for these same constructs (Sénéchal &Young, 2008). Recent research has further examined the construct of the home literacy environment, seeking sources of individual variability through additional home- and child-level variables. A limited but growing body of research is emerging about the relationship of the HLE with early literacy for special populations of children, including children with language impairment (McGinty & Justice, 2005; Sawyer et al, 2014) as well as children who speak languages other than English at home (Farver, Xu, & Lonigan, 2013). The present study adds to that body of work by examining the role that specific home- and child-level variables in the home literacy environment play on the print knowledge skills of Spanish-speaking children with specific language impairment. Given the increased potential for future reading difficulties that young children with SLI face, the contribution of this work is important.

This study had three aims. The first aim was to describe the various home- and child-level variables of the home literacy environment as they relate to Spanish-speaking children with and without language impairment. While Chapter 2 established significant differences between SLI and TD children on emergent literacy, we found no significant differences between groups on the home- and child-level HLE variables: frequency, explicit teaching, and print interest. For instance, group means on variables measuring frequency of book-reading and explicit teaching all fell within a range of four to five

times per week, both for children with SLI and those without. Nonetheless, exploration into the relationship between the HLE variables and children's print knowledge did reveal some noteworthy differences across groups. The most obvious difference was with respect to print interest. The correlation between print interest and print knowledge among children with SLI was very small (R = .121, p = .756). In contrast, print interest was significantly correlated to children's print knowledge (R = .852), oral language (R = .879) and HLE (R = .678) among typically developing children. This relationship was explored further in subsequent analyses.

The second aim was to determine the effect of the HLE on children's print knowledge skills, and then determine if that effect was amplified through parents' explicit teaching of literacy skills. Multiple studies have shown that parents' direct explicit teaching of basic literacy concepts, such as letter names and letter sounds, is highly predictive of children's early literacy achievement (Sénéchal, 2006). Similar to results of other analyses with children with impaired language ability (Sawyer et al, 2014), our findings revealed that parents' explicit teaching was not a significant predictor of children's print knowledge. This is slightly surprising, given the large correlations observed between these two constructs in Sénéchal's prior work. Indeed, both the HLE construct and explicit teaching had negative coefficients in our model, suggesting that as children's print knowledge increases, parents' frequency of reading and their explicit teaching of literacy concepts decreases. Future research should investigate this relationship more closely using causally interpretable methods, and when possible, should include direct observation of parents' teaching in order to further probe this relationship.

The third aim of this study was to explore to what extent children's print interest explained variability in their print knowledge skills, above and beyond what was explained by their age, oral language ability, and HLE. Previous research has found that print interest has positive predictive relationship with children's emergent literacy skills, both in typically developing (Justice et al., 2003) and language-impaired (Sawyer et al., 2014) English-speaking populations. Our results showed that the addition of print interest into the model did not significantly explain any additional variance. However, when we added print interest as an interaction, we found that the interaction of print interest and oral language accounted for nearly 10% of variance in print knowledge. This tells us that the relationship of print interest to print knowledge is moderated by oral language, such that for children with high oral language ability, print interest and print knowledge are highly correlated, but this correlation weakens as children's oral language ability declines.

There are some important practical implications of this research. First, our results underscore the importance of building oral language skills. Oral language ability was the strongest predictor of children's print knowledge, maintaining its significance even as additional variables were added to the model. At the final block in both regression models, oral language accounted for over 30% of the variability in children's print knowledge. Longitudinal models of reading demonstrate that, over time, oral language skills play a larger, more direct role in reading comprehension (Storch & Whitehurst, 2002), though it bears noting that oral language skills are also directly related to children's code-related skills at preschool and kindergarten. As seen in the research presented here, the relationship between oral language and print knowledge was also

significant for children who speak Spanish, with a wide variety of language ability. Second, the results showed that the HLE construct, comprised of two variables measuring the frequency of adult-child book reading and one variable measuring literacy materials, accounted for over 10% of the variability in children's print knowledge when controlling for age and oral language ability. The significance of these home-level variables are encouraging, because they may be malleable to intervention. Given that our study is correlational in nature and does not allow for causal conclusions, we recommend that future research involve teachers and speech language professionals in administering intervention techniques that target these specific aspects of the HLE in such a way that causal relationships can be drawn.

The following limitations should be considered when interpreting these results. First, the study was small and exploratory, resulting in reliability levels for the HLE construct that fall below acceptable levels. Future research should involve larger sample size with at least five participants per variable, such that a factor analysis can be conducted to identify constructs of HLE. Second, the study relied on parent questionnaires to assess the HLE. While this is a common practice, it is also known that parents' responses on questionnaires may be biased and their estimations of HLE may be inaccurate (Farver et al, 2013). Future research should investigate direct versus indirect measures of these constructs.

Chapter 3 References

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Chapter 4 – Grant application: Parent-implemented book reading intervention for Spanish-speaking children with SLI

The United Nations states that literacy is a "universal human right" and is "an instrument of empowerment to improve one's health, one's income, and one's relationship with the world" (UNESCO, 2014, p. 4). Although progress has been made toward eradicating illiteracy, nine countries account for over 70% of the illiterate population worldwide (UNESCO, 2012). One of these countries is Mexico, where 5.3 million people lack basic reading and writing skills (INEGI, 2012). Given the ramifications of illiteracy, there is a push among scientists and policy-makers to better understand the foundations of early literacy and to identify preventative steps that can be taken during the preschool years –both in schools and in homes– to fend off reading difficulties before chronic underperformance in reading occurs (NELP, 2008). This body of work includes descriptive research, aimed at describing which early literacy skills are most difficult for children at risk of reading difficulties, as well as experimental research, seeking to establish evidence-based treatments to intervene on those literacy skills.

Large-scale studies have uncovered a complex relationship between young children's language ability and their later literacy ability. Most models of skilled reading identify language ability as an important predictor of later reading skills (e.g.,

Kintsch & Kintsch, 2005; Whitehurst & Lonigan, 2007). Indeed, one of every two children with language impairment in preschool will struggle with reading when they reach primary school (Tomblin et al., 1997). These early years are particularly crucial in Mexico, where millions abandon formal schooling before 3rd grade and consequently fail to reach proficiency in reading (Carranza, 2006).

Much of the existing research on early literacy development has been conducted only in English. My proposed study will improve our understanding of how early literacy develops in Spanish-speaking children, particularly those who are at-risk for reading difficulties, and will add to the body of evidence-based early literacy interventions that have been shown to ameliorate reading difficulties for this population. Specifically, my research has two objectives: (1) to describe the language and early literacy skills of a group of 30 preschool-aged children with language impairment who are at-risk for reading difficulties, as well as a comparison group of 30 typically-developing Spanish-speaking children matched for age and income, and (2) to evaluate the effectiveness of an 8-week, parent-implemented book-reading intervention that targets the early literacy skills of these children.

Relationship to Existing Research

Early literacy skills comprise a set of foundational abilities that develop prior to reading and are consistently predictive of later reading ability (Whitehurst & Lonigan, 1998). These abilities include both language-related skills and print-related skills, and are thought to develop in an inter-connected fashion. My research study will focus on children's print knowledge, which is among the strongest and most reliable predictors of later reading ability for English-speaking children (NELP, 2008; Storch & Whitehurst,

2002). As a construct, print knowledge refers to a child's awareness of print as a symbol that carries certain communicative meaning and includes children's knowledge of the names and features of the alphabet, their understanding of fundamental concepts of print, and their ability to write their name. Children's knowledge of print is critical to future reading, because children need to be able to recognize print as its own entity before they are able to understand the concepts that underlie formal reading instruction (Christie et al., 2003). Of particular importance to my proposed study is the notion that print knowledge is universally related to subsequent literacy regardless of the language that a child speaks and the language in which he or she will eventually learn to read (Bialystok & Luk, 2007).

Young children who suffer from language impairment (LI) tend to have worse print knowledge than their typically-developing peers, creating a "vicious cycle" of language and literacy in English-speaking children. Boudreau and Hedberg (1999) compared the print-related skills of preschoolers with LI to peers matched for age and income, and found that children with weak language skills scored significantly worse on measures of emergent print concepts and alphabet knowledge. Justice et al (2009) examined the print knowledge of English-speaking preschoolers with LI and found similar deficits; notably, when left untreated, these children's early literacy deficits were maintained and/or amplified through second grade.

Most of the research on print knowledge has been conducted in English. Given key orthographical differences between English and Spanish – Spanish has a relatively clear one-to-one, letter-to-sound correspondence, whereas English is highly orthographically irregular (Ziegler & Goswami, 2005) – the relationship between

children's language ability and their early literacy skills in Spanish merits investigation. Some emerging evidence from Costa Rica (Rolla San Francisico et al., 2005) and Chile (Kim & Pallante, 2012) suggests that print knowledge may also be important for later reading ability among Spanish-speaking children. However, researchers in Mexico who study early literacy development have found that many Mexican children in preschool lack basic print knowledge. For instance, Guevara showed that a majority of the 5-year-old children they evaluated near Mexico City were unable to write their name by the end of preschool (Guevara et al., 2010), and longitudinal research by this group found that that over half of the 165 six-year-old children in their sample scored at floor levels on an assessment of basic literacy principles at first grade entry (Guevara et al, 2008). Two findings about these young children's language and literacy skills are particularly important: First, children with weak language skills in kindergarten had significantly worse print knowledge skills at first grade entry. Second, children with weak language skills developed less quickly than their peers in reading throughout the school year. These findings are an important first step toward understanding the relationship between language and early literacy development in Spanish. However, there is a now even greater cause to delve deeper with a targeted sample of children who have been identified as language-impaired.

Children's lags in early literacy skills can be improved with systematic, evidence-based interventions. A common intervention approach that targets print knowledge uses shared book reading as a context for adults to increase children's knowledge about print by explicitly referencing print while they read together. Evidence gathered from English-speaking children suggests that shared book reading interventions can significantly

improve print knowledge (e.g., Lovelace & Stewart, 2007). Notably, longitudinal work shows that shared book reading interventions that improve children's print knowledge in preschool continue to contribute to improved reading performance in primary school (Piasta, Justice, McGinty, & Kaderavek, 2012). My dissertation proposes to involve parents in a shared book reading intervention at home with their children. Given that book reading at home is infrequent in much of Latin America, and particularly in Mexico – Mexico took the penultimate spot out of 108 countries in an international assessment of reading habits (UNESCO, 2013) – this study presents an opportunity to positively affect parents' attitudes about reading and their frequency of reading.

Contribution

Theoretically, my research will improve our understanding of how literacy emerges in a language other than English, in particular for children at increased risk of reading difficulties, and will allow us to make between-group comparisons about the literacy development of Spanish-speaking children with LI and their typically-developing peers. Even for a language as widely spoken as Spanish, there are few empirical studies that examine the relationship between language and early literacy skills of Spanish-speaking children and none that examine the deficits of children with LI at risk for reading difficulties (Goldstein, 2011).

The applied nature of my research also has practical implications for regional policy aimed at improving literacy. Experts in Mexico have been critical of existing policy, noting that "government strategies to eradicate illiteracy have not had the expected success given the resources invested," (Narro Robles & Moctezuma, 2012, p. 6). My proposed book reading intervention represents a novel approach to engaging

children and their families in literacy activities in a culturally-informed and culturally-responsive manner. This could serve as a model for other locations in Latin America, where policy-makers seek evidence-based, low-cost interventions that could prevent reading difficulties among children most at-risk.

Methods

Design. The proposed research has two parts. Part 1 is a descriptive study of the language and emergent literacy skills of thirty (30) Spanish-speaking children with LI as they compare to thirty (30) typically developing children who will serve as a comparison group. Part 2 is a pre-test/post-test, randomized control trial evaluating the effectiveness of an 8-week parent-implemented early literacy intervention on children with LI.

Participants. 30 parent-child dyads will be recruited from the Instituto Nacional de Rehabilitación (INR) in Mexico City, Mexico. The INR is a national rehabilitation institute that serves as an in-patient hospital, out-patient clinic, teaching college, and research institute, where I have conducted research with children with LI in the past with my advisor, Dr. Grinstead. Children between the ages of 36 and 72 months who are currently receiving therapy for a primary diagnosis of LI will be eligible to participate in the study. 30 age- and income-matched control children will be recruited from the nearby Colegio Watson & Crick in Mexico City. This is a privately owned school serving low-income children.

Part 1. My first research question asks: What are the early literacy skills of Spanish-speaking children with LI and how do they compare to typically developing controls*?* To answer this question, all consented children will be given an initial assessment of language and literacy skills, including two assessments that have been

piloted for use in monolingual Spanish contexts. The first, the *Batería de Evaluación de la Lengua Española* (BELE; Rangel et al., 1998) will evaluate children's language ability in Spanish, including knowledge of expressive vocabulary, syntax and morphology. The second assessment, the *Phonological Awareness Literacy Screening - Español* (PALS; Ford & Invernizzi, 2009) will assess children's emerging literacy knowledge, including print knowledge, alphabet knowledge, letter sound knowledge, and emergent writing. In addition, parents will be asked to complete a home literacy questionnaire requesting demographic information, as well as information regarding their home reading practices and beliefs about reading. Based on my previous research at the INR, I plan to allow two (2) months to recruit and consent participants, beginning the first week of October 2015. Child language and literacy assessments will take place in December and January. For Part 1, I hypothesize that there will be great individual variability across language and literacy skills; however, as a group, I expect children with LI to perform significantly worse than typically-developing controls on all early literacy measures.

Part 2. My second research question asks: What are the impacts of an 8-week, parent-implemented book reading intervention on the early literacy skills of Spanish-speaking children with LI*?* Following the assessment of baseline language and early literacy ability given in *Part 1*, in February each parent-child dyad in the LI group will be randomly assigned to one of two conditions: immediate treatment vs. delayed treatment. Assuming a 20% rate of attrition in the immediate treatment group, 17 parent-child dyads will be assigned to immediate treatment and 13 dyads will be assigned to delayed treatment (who will serve as a control group initially, but will be offered the intervention in May-July 2016).

Parent-child dyads in the treatment group will be given one children's book per week for eight weeks and be instructed to read it 3x during the week with their child, beginning February 1st. While reading the books at home, parents will be asked to embed explicit discussion of print-related, early literacy objectives related to each book. These objectives adhere to a specific scope and sequence of print-related early literacy (see Appendix A and B) that has been piloted in Mexico in Spanish with committee member and mentor Dr. Lillian Duran (Pratt et al., 2015) including: (a) Book and Print Organization, (b) Print Meaning, (c) Letters, and (d) Words. Within each domain are 3-5 corresponding objectives, which were derived from research on the development of knowledge about print-related concepts in young English-speaking children (Justice et al, 2008). To support parent implementation of the intervention, cards will be placed inside each book that explain the objective being targeted, with examples of parent-child dialogue for each reading session (See Appendix C). Parents will be asked to keep track of the number of minutes their child reads each week. In April and May, following the intervention, all children will be re-assessed on the literacy measures, parents will answer surveys, and parent-child dyads will be recorded reading together.

The research design that I've proposed will allow me to make causal claims about the effectiveness of the intervention on early literacy skills while controlling for children's pre-test scores. A power analysis shows that an intervention with an effect size of $d = .50$ (the mean effect size for the piloted version of this intervention) with a sample size of 30 participants, has an estimated observed power of .75, indicating that the study is sufficiently powered to detect significant differences using a repeated measures

MANOVA[1] analysis. For Part 2, I hypothesize that the children with LI who receive the intervention will show improved early literacy knowledge, as compared to the children who did not receive the intervention. I also hypothesize that parents in the immediate treatment group will report increased frequency of reading, improved attitudes regarding reading, and greater instances of literacy-related conversation during shared book reading following the intervention.

Preliminary Research and Area Studies

As an undergraduate Spanish major, I specialized in the region of Latin America and built a foundation in area studies with courses in Latin American culture, history, literature, and language. These courses helped shape my interest in the region and my subsequent desire to work with this population. Although my current field is communication disorders, I have taken coursework in Hispanic linguistics with Dr. John Grinstead. I have also consistently sought opportunities to apply my area studies knowledge to class projects in an effort to make the clinical research more relevant to a Latin American context.

I am confident that my Spanish language skills will permit me to conduct this research. I began formally studying Spanish 20 years ago and have spent the past 10 years using Spanish in my work with native Spanish-speaking children and their families. My Spanish level is near-native; I'm able to identify and treat children with LI in Spanish. In addition to Spanish, I directed a family literacy project in Mexico in 2014 with bilingual Mayan/Spanish-speaking families with a non-profit organization that, as part of its mission, does literacy outreach for at-risk groups. I lived in Mexico for 4

[1] MANOVA stands for multivariate analysis of variance, a statistical test procedure for comparing group means. Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences.* Mahwah, NJ: Lawrence Erblaum

months as I oversaw data collection, during which time I took private lessons in Mayan. Although Mayan is not a LCTL, it was the native language of many of the families with whom I worked and was critical for building rapport with mothers. I will continue my independent study of indigenous language during my time in Mexico, since a plausible "future direction" of my proposed research is the language and literacy development of multilingual children living in indigenous communities.

Finally, I've spent extensive time living in Mexico and I have directed three separate research projects there (in January to September of 2007, January to May of 2012, and August of 2013 to December of 2014). As such, I have experience in all aspects of human subjects research in the proposed country, including: IRB approval, concept development, creation of materials, recruitment of participants, parent training, assessments, data analysis, and publishing in peer-reviewed journals. One research project I directed was an efficacy trial of a similar book reading intervention that was completed in 2013. The project was met with much enthusiasm, both by participants (95% of eligible parent-child dyads opted to participate) and by the scholarly community, as the project won recognition from the American Speech and Hearing Association.

Host Country Sensitivities

My time in Mexico has taught me that honesty and open-mindedness are the best ways to interact with people. Most unpleasant situations can be avoided by thoughtful preparation and surrounding oneself with trustworthy people—which I have done. I've also learned important lessons about many nuances of Mexican culture related to education and child-rearing, such as: a deference for teachers that is often misjudged by Americans as disinterest, and a child-rearing style that can appear authoritative if not

understood correctly.

The applied nature of my research dictates that it must be conducted in a setting where monolingual Spanish-speaking children reside. I am requesting funding for 10 months (October of 2015 through July of 2016). The purpose of conducting research in this setting is to combat the anglo-centric tendencies in much of the evidence-based research in the U.S., which often assumes that interventions implemented in English will generalize to international contexts, even though the cultural practices –and the language itself– are substantially different. I have secured affiliations with the Instituto Nacional de Rehabilitación (INR) and the Colegio Watson & Crick, where recruitment and assessments will take place, and the Universidad Nacional Autonoma de Mexico (UNAM). All my affiliate institutions expressed interest in my research and a willingness to assist me.

Plans to Share Research

I have publications in international journals that feature research on child development (such as the *International Journal of Language and Communication Disorders* and *Educational Psychology Review*) and plan to publish the results of my dissertation in the same high-caliber journals. I will also present this research in relevant Spanish-language journals, such as the *Revista Mexicana de Psicologia Educativa,* and at conferences in Latin America. I will provide a copy of my dissertation to all my host institutions. Dr. Rugerio of the UNAM has invited me to present the results of this research with his lab. I will seek opportunities to engage families and policy-makers in discussions about the research, and will participate in collaborative professional development with speech therapists and teachers at the INR and throughout Mexico City.

Faculty Support

My committee members have been supportive of my research and have guided me through all the phases of its development. My doctoral co-advisor, Dr. John Grinstead, is a Latin American area studies specialist with expertise in child language in Spanish. He has traveled with me to Mexico on multiple occasions and introduced me to my affiliates in Mexico City, with whom he still collaborates. We will have weekly skype meetings while I am abroad. My co-advisor, Dr. Rebecca McCauley, is in social and behavior sciences and an expert in language development and language interventions. She has been instrumental in thinking through all stages of the intervention. Dr. Lillian Durán studies child development in Latin American contexts and adapted and piloted this study with me from Dr. Laura Justice's work, who has also been of great assistance to the conceptualization of the project. Finally, Dr. Juan Pablo Rugelio is a professor at the UNAM in Mexico and will serve as my in-country advisor.

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Chapter 5 – Conclusions

The research presented in this dissertation portfolio sought to improve our understanding of the earliest stages of children's literacy development in Spanish. It focused on children with specific language impairment (SLI), a group of children for whom reading difficulties are significantly more prevalent than they are for typically developing children, when assessed in English-speaking populations (Catts et al., 2002). What is unique about the present studies is the participants. By recruiting a sample of children with SLI who speak monolingual Spanish, as well as individually-matched typically developing children to serve as controls, we were able to make draw preliminary practical and theoretical conclusions about literacy development for children who speak languages other than English.

The studies followed a deliberate progression of aims. First, we established empirically that children with SLI do experience lags in their emergent literacy development, as compared to a group of typically developing controls. This question was unsettled prior to this study, for previous research had suggested a connection between children's language ability and their literacy development in Spanish (e.g. Guevara et al., 2010; Pratt, Justice, Perez, & Duran, 2015) but no study had systematically examined the relationship for children with SLI. While we hypothesized that it was possible that some emergent literacy skills might be more affected by a diagnosis of SLI in Spanish than

others – for instance, perhaps given the less complex phonological structure of Spanish, children with SLI would not noticeably struggle with phonological awareness – our results did not bear that out. In fact, children with SLI were significantly worse than TD peers on every construct of emergent literacy that we tested, including: name-writing, alphabet knowledge, alphabet sound knowledge, beginning sounds, print concept knowledge, and rhyming.

Given these deficits, Chapter 3 sought to examine the home literacy environment (HLE) of children with and without SLI, in an attempt to identify sources of individual variability in children's print-related emergent literacy skills. The rationale for this line of investigation contended that, if correlational relationships existed between literacy behaviors at home and children's emergent literacy skills, then perhaps we can speculate that the HLE is what is driving the variability in emergent literacy skills. We chose to focus on print knowledge as the dependent variable for this study, because there are no proposed theories of SLI that account for deficits in print knowledge. That is, there is no clear theoretical justifications for why children with SLI should do more poorly on print-related tasks such as writing their name, knowing the names of the letters of the alphabet, or identifying the title of a book. Additionally, experimental studies targeting print knowledge in both English (Piasta, Justice, McGinty, & Kaderavek, 2012) and Spanish (Pratt et al., 2015; Valdez-Menchaca & Whitehurst, 1992) have shown that the skills comprising print knowledge are particularly responsive to intervention when environmental variables are manipulated, indicating that the environment may be an important factor in children's development of this knowledge.

Initial results from Chapter 3 seemingly showed that the home literacy

environment for all children in our sample was similar. There were no significant differences between children with SLI and TD controls on any of the HLE variables when each variable was measured independently. Indeed, all mothers reported that they read with their children with similar frequency, that their children read independently with similar frequency, and that they owned between 10 and 20 books. The same null results were found when examining group differences on variables measuring mothers' explicit teaching of letter names and letter sounds, and children's interest in print.

Why, then, were children of the same age and socioeconomic status, with similar non-verbal intelligence, from the same classrooms, with comparable home literacy environments, scoring so differently on tasks of print-related emergent literacy? Given that the children in our sample differed, intentionally, in their oral language ability, we examined possible interactions between kids' oral language skills and the HLE variables. Our results showed a significant interaction between children's oral language and their interest in print. Specifically, while the addition of a composite variable measuring print interest by itself into the model did not significantly explain any additional variance in print knowledge, when we added print interest as an interaction with oral language, we found that the interaction term accounted for nearly 10% of variance in print knowledge. This tells us that the relationship of print interest to print knowledge is moderated by oral language, such that for children with high oral language ability, print interest and print knowledge are highly correlated, but this correlation disappears as children's oral language ability declines.

Based on these findings, Chapter 4 proposed a shared book reading intervention for parents and children in SLI that targeted children's print knowledge. The intervention

asked parents to embed explicit discussion of print-related, early literacy objectives related to each book. These objectives would adhere to a specific scope and sequence of print knowledge, including: (a) Book and Print Organization, (b) Print Meaning, (c) Letters, and (d) Words. In addition to targeting children's print-related emergent literacy skills, the intervention would aim to bolster children's curiosity about and interest in print. Importantly, the methodology included direct observation of children's book reading with parents at baseline and after the intervention, so that more precise measures of parents' explicit teaching of print knowledge, as well as child-initiated conversations about print, could be evaluated within a causally-interpretable methodology.

In sum, the studies presented here represent initial findings into the relationship between children's language and early literacy ability at a static time-point. While we found that significant differences exist in emergent literacy skills for children with SLI in preschool, a novel finding, additional research is necessary to understand what that means for children over time. For instance, future longitudinal research should unpack some of the relationships that we observed – such as the significant correlation between children's grammatical language ability and their phonological awareness – to determine if and how those variables are related to children's reading comprehension and/or decoding ability as children approach reading age. Given the transparent orthography of Spanish, it is possible that the long-term predictive validity of these emergent literacy measures will be different in Spanish than what has been found in English, particularly with respect to decoding.

A limitation of the current studies is that they were formulated by borrowing from existing research in English. Future research should consider variables that may not have

been previously examined in English, due to the linguistic differences between Spanish and English. For example, if longitudinal research shows that phonological awareness is a weak predictor of later word reading in Spanish (as some extant research has suggested; e.g., Goikoetxea, 2005), then perhaps we should explore children's sensitivity to discrete units of sound in Spanish in a different way. Given the rich inflectional morphology of Spanish language, it is possible that children's awareness of morphological units, instead of phonemic units, would be a stronger predictor of their later literacy. Avenues for future research that are specific to Spanish, such as this, should be explored.

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Appendix A: Objectives Addressed in Print Knowledge Intervention

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Domain 1: Print Organization

1. **Page Order**: Knows the order in which pages are read in a book
2**. Role of Author:** Knows the role of the author.
3. **Page Organization:** Knows that reading occurs from the top to bottom of the page.
4. **Title of Book:** Knows the role of the title of the book.
5**. Print Direction*:*** Knows that reading must occur from left to right.

Domain 2: Print Meaning

1. **Role of Print:** Understands the relationship between meaning and print.
2**. Environmental Print:** Knows the purpose of print embedded within the environment.
3. **Role of Reading**: Understands the meaning behind reading and the contexts in which reading occurs

Domain 3: Letters

1. **Upper-and Lower-Case Letters:** Knows that letters come in two forms, one of which is the upper-case letter.
2**. Names of Letters:** Knows the names of the majority of upper-case letters.
3. **Noticing Letters:** Knows that letters are a symbol used in written language.

Domain 4: Words

1. **Identifying Words:** Identifies some written words in familiar contexts.
2**. Short v. Long Words**: Knows that the number of letters in words can vary from many to few
3. **Letters v. Words:** Knows that letters are different than words.
4. **Noticing Words:** Knows that words are a symbol used in written language.

Appendix B: Scope and Sequence by Week and Book

	1st Read	2nd Read	3rd Read
Week 1: *El Gato Splat*	**Domains: Print Organization, Print Meaning**		
	Environmental Print	Print Direction	Role of the Author
Week 2: *Chica Chica Bum Bum*	**Domains: Words, Letters**		
	Noticing Letters	Noticing Words	Uppercase vs. Lowercase letters
Week 3: *El Diario de una Lombriz*	**Domains: Print Organization, Print Meaning**		
	Title of Book	Role of Print	Page Organization
Week 4: *Se lo Comió un Oso*	**Domains: Words, Letters**		
	Letters vs. Words	Short vs. Long Words	Names of Letters
Week 5: *Los Mercados*	**Domains: Print Organization, Print Meaning**		
	Role of Print	Page Order	Print Direction
Week 6: *Lily, La Ruidosa*	**Domains: Words, Letters**		
	Names of Letters	Short vs. Long Words	Uppercase vs. Lowercase Letters
Week 7: *Hogares*	**Domains: Print Organization, Print Meaning**		
	Title of Book	Role of Reading	Page Order
Week 8: *No es una Caja*	**Domains: Words, Letters**		
	Noticing Letters	Letters vs. Words	Identifying Words

Appendix C: Example of Reading Cards in Print Knowledge Intervention

Lea *El Gato Splat* tres veces esta semana con su hijo. Mientras lee, hable con su hijo sobre el siguiente tema:

Leamos Juntos

SEMANA 1:
El Gato Splat

PRIMERA LECTURA
Tema: "Letras por todos lados"
Enseñe a su hijo que hay letras y palabras por todos lados: en letreros, etiquetas, etc.

Aquí encuentra ejemplos sobre como hablar de este tema mientras lee:

En esta página, puede **preguntar:**

"Acá arriba veo muchas palabras y letras. ¿Me puedes mostrar donde ves más palabras y letras en esta página?"

En esta página, puede **decir:**

"En esta página leo las palabras 'Hola, Splat!" ¿Dónde está la palabra 'hola'? ¿Sabes como se llaman algunas de las letras en la palabra 'hola'?"

Use Estas Técnicas Para Enseñar a Su Hijo:

Pregunte
sobre el texto

Señale
letras y palabras

Comente
sobre el texto

Siga el texto
con su dedo mientras lee