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Contributions of Oral Narrative Skills to English Reading in Spanish–English Latino/a Dual Language Learners

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ABSTRACT

Purpose: The study examined the contributions of Spanish and English oral narrative skills to English reading among 95 early elementary dual language learners (DLLs) from Spanish-speaking homes in the United States. This sample of first- and third-grade DLL children attended Spanish–English dual language immersion programs and received language and literacy instruction in both English and Spanish.

Method: All participants completed a storytelling task in both languages and two English reading tests in decoding and reading comprehension. The story narratives were analyzed for microstructures (number of different new words, lexical diversity [D], mean length of utterance, subordination index [SI]) using the Computerized Language ANalysis program. The narrative samples were also evaluated for macrostructures (i.e., discourse-level features) using the Narrative Scoring Scheme.

Results: Grade, English D, and Spanish SI significantly predicted English reading. Grade level was the strongest predictor of the three for both decoding and comprehension. However, Spanish SI was more robust than English D for decoding whereas English D was a stronger predictor than Spanish SI for comprehension.

Conclusions: Young DLL children's oral narrative skills in English as well as in their home language Spanish contributed to their English reading outcomes. The study further specified the contributions of narrative elements to different reading skills. Microstructural elements appeared to play a stronger role in English reading than macrostructural elements for DLLs in dual language programs in early elementary grades. The results provided support for the *simple view of reading* and the *linguistic interdependence hypothesis*. The results also implicated that maintaining young DLL children's home language skills may be beneficial, rather than harmful, to their English reading development.

Reading is inherently a language-based skill, and many models of reading development thus include oral language as a critical component (e.g., Gough & Tunmer, 1986; Hoover & Gough, 1990). The language–reading connection has received substantial support from empirical evidence. Longitudinal studies with monolingual English-speaking children have shown significant and positive relationships between oral language proficiency in kindergarten and later reading outcomes in elementary grades (e.g., Catts et al., 2006; Storch & Whitehurst, 2002). The past decade has also witnessed an increase in research on the language–reading connection for the rapidly growing population of school-age dual language learners (DLLs; e.g., Davis et al., 2017; Huang, 2019; Huang et al., 2020; Silverman et al., 2015). School-age DLLs face double challenges of simultaneously learning a

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second oral language and learning to read in the second language. Thus, DLLs' reading development differs fundamentally from monolingual readers who have already acquired basic oral language skills (Paradis et al., 2011). The emerging body of research about the language–reading relationship for DLLs has corroborated the positive effect of English oral language on English reading outcomes (e.g., Geva & Farnia, 2012; Huang et al., 2020; Silverman et al., 2015), as shown in the monolingual reading literature. Some studies comparing monolinguals and DLLs have even shown a stronger relationship between English oral language and English reading in DLLs than observed in monolingual English-speaking children (Davis et al., 2017; Geva & Farnia, 2012).

In contrast to monolingual children, DLLs also bring to the reading acquisition task the linguistic resources in their home language and, in some cases, home literacy skills. Researchers have argued that bilinguals are not two monolinguals in one, and bilingualism should thus be viewed as "an inherently holistic phenomenon" (Grosjean, 1989; Proctor et al., 2017). However, relatively little research has taken on this holistic view of DLLs to examine the contributions of DLLs' oral language proficiency in both languages to the development of reading in English, and results from these existing studies are also quite mixed (Kieffer, 2012; Miller et al., 2006; Proctor et al., 2017). Understanding the effects of DLLs' English oral language as well as home language proficiency on their English reading outcomes would not only inform reading development theories but also yield practical implications for the instruction and education of DLLs. This study thus adopted this holistic view of bilingualism to investigate the relationship between Spanish–English DLLs' two languages and their English reading development. We focused on Spanish–English Latino/a DLLs from Spanish-speaking homes, because they are the largest DLL population in the United States, making up 75% of all DLL students who received an English learner (EL) designation and 7.6% of all public K-12 students in the United States (National Center for Education Statistics, 2020). The majority of our sample of Latino/a DLLs have family origins in Mexico, which reflects the demographic characteristics of the research site (i.e., Southwestern United States; Murphey et al., 2014). We also targeted DLLs in Spanish–English dual language programs who received instruction in both languages to explore the effect of dual language proficiency on the relationship between DLL students' two languages and English reading.

Connections Between Oral Language and Reading

Research on monolingual children learning to read in their native language has shown a robust role of oral language in reading development. According to the Simple View of Reading (SVR), reading comprehension is best predicted by the combination of decoding and oral language comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990). Hoover and Gough measured decoding through a nonword decoding task and oral comprehension through a listening comprehension task. However, recent conceptualizations of the SVR model have expanded the construct of oral language comprehension from listening comprehension to include other oral language components, such as vocabulary and syntactic/grammatical knowledge (Language and Reading Research Consortium [LARRC], 2015; Silverman et al., 2015). The expansion of the construct of oral language has also been accompanied by the use of both receptive and productive oral language measures in empirical studies that adapted SVR as their theoretical framework (e.g., LARRC et al., 2019; Proctor et al., 2017).

Research on children with developmental language disorders has provided further support for the language-reading connection. The comorbidity rate is high for developmental language disorders and reading difficulties (Snowling et al., 2020). In a meta-analysis of four longitudinal studies, Larney (2002) found that children with expressive language difficulties also experienced difficulties with reading comprehension. There is also a growing body of reading intervention research supporting a causal relationship between oral language and reading (Clarke et al., 2010; LARRC et al., 2019; Proctor et al., 2020). Clarke et al. (2010) conducted a randomized controlled trial study to improve reading comprehension in 8- to 9-year-old children with reading difficulties. Compared with children in the control group without any intervention and the other two intervention groups who received text-comprehension training or text-comprehension and oral-language combined training, those who received oral language intervention performed better on reading comprehension tests. In a recent study by LARRC et al. (2019), the authors investigated the effect of a language-focused intervention, *Let's Know!*, on the language and reading comprehension of children in early elementary grades. *Let's Know!* focuses on improving both lower and higher level language skills. Targeted lower level skills included grammar and vocabulary, whereas higher level skills referred to text-structure knowledge, making inferences and comprehension monitoring. Children in the intervention group significantly outperformed those in the business-as-usual control group in comprehension monitoring, vocabulary, narratives, and reading comprehension as mediated by vocabulary.

The growing DLL population in the United States and worldwide has led to an ever-increasing body of research on DLL children's reading development, and much of this nascent body of work adapted the SVR model, particularly the expanded version of SVR (Huang et al., 2020; Silverman et al., 2015). The majority of these studies

also focused on school-age sequential bilingual/DLL children who spoke a home language other than the societal language, that is, English in the case of the United States and Canada, who started learning the societal language upon school entry and who were educated in predominantly English with limited home language support. These empirical research on DLL children's English reading development has shown a robust contribution of English oral language proficiency (e.g., Huang et al., 2020; Silverman et al., 2015), and some studies comparing monolingual and DLL children have also revealed a stronger language–reading relationship in DLL children than in monolingual English-only children (Davis et al., 2017; Geva & Farnia, 2012).

Contributions of English Oral Narrative Skills to English Reading

As the quality of the language assessments directly impacts the inferences made from these assessments about DLL children's language development, researchers have advocated for the use of language sampling methods over standardized tests in studying DLL children, especially in the investigation of language competence in both of their languages (Huang & Ramírez, forthcoming; Miller et al., 2006). Although both standardized tests and language sampling can be used to evaluate various components of oral language production from single sounds to discourses and narratives, language sampling typically involves eliciting and voice-recording children's speech production and interaction with other individuals either naturalistically or in a structured task and is thus less rigid and more sensitive to DLL children's cultural and linguistic backgrounds (Huang & Ramírez, forthcoming). This method allows for control of the task content and direct comparisons between DLLs' competence in their two languages by using the same task stimuli, procedure, and analytical techniques (Miller et al., 2006). In particular, storytelling and story retell tasks have been widely adapted in cross-language studies. Both types of tasks require children to construct sentences and organize their stories based on the sequence of wordless pictures (storytelling) or a given story model (story retell). Children's narrative samples are then analyzed for macrostructures, microstructures, or both (Frizelle et al., 2018; Huang & Ramírez, forthcoming; Lucero, 2015, 2018; Miller et al., 2006; Peña et al., 2014; Shivabasappa et al., 2018). Macrostructural elements, also known as "story grammar" (Heilmann et al., 2010; McCabe & Peterson, 1984), refer to higher order, discourse-level organizational features, such as the "setting," "initiating event," "attempt," "consequence," "resolution," and "ending." Microstructural elements, on the other hand, relate to language features, such as vocabulary and syntactic complexity. Vocabulary skills are generally indexed by calculating the total number of words and lexical diversity measures such as the number of different uninflected words, whereas the average length of an utterance is a widely adopted measure of syntactic complexity.

Previous work on the contribution of oral narrative abilities to reading revealed a significant role of English macrostructural elements in English reading in monolingual English-speaking children as well as DLLs (e.g., Kieffer, 2012; Miller et al., 2006; Reese et al., 2010). Reese et al. (2010) conducted a two-part study with children in early elementary grades in New Zealand who are predominantly of European descent. The authors used a story retell task to examine the relationship between English oral narrative skills and English reading. All participants were asked to retell a story, and the story retells were analyzed for story memory (i.e., the number of original text propositions included in their retells) and narrative quality. Specifically, narrative quality was measured by narrative orientation (i.e., character introductions, temporal terms, and causal terms) and narrative evaluations (i.e., person or object evaluation and internal states). To illustrate, "at hospital *because* she. . ." was coded as an instance of narrative orientation because of the use of the causal term and "he was a wee bit *naughty*" was considered an instance of narrative evaluation because it reflected the child's evaluation of the character's personality trait. Results from the Part-One study showed that oral narratives, particularly narrative orientation and evaluations, correlated with decoding skills for children with 1 year of reading instruction. Part-Two study replicated Part-One study's results for children with 2 years of reading instruction and highlighted the important role of narrative orientation as a narrative quality measure.

In contrast, research on the connections between microstructural elements in oral narratives and reading is relatively limited (Miller et al., 2006; Spencer & Petersen, 2020), but there is some evidence for positive results. In a study with exclusively Spanish–English bilingual children in transitional bilingual education programs in Texas, Miller et al. (2006) assessed the oral narrative retells of over 1,500 Latino Spanish–English bilinguals attending kindergarten through third grade in both English and Spanish. Although all children were ELs enrolled in transitional bilingual programs where they also received instruction in their home language Spanish, there were variations in the amount of Spanish instruction that they received.

To examine the within- and cross-language relationships as well as their contributions to English and Spanish reading measures, the authors analyzed the narrative retells for both macro- and microstructural elements, and word reading efficiency and reading comprehension were also assessed in both English and Spanish. For macrostructural elements, the Narrative Scoring Scheme (NSS;

Heilmann et al., 2010) was used for evaluating the narratives in seven categories (*introduction*, *character development*, *mental states*, *referencing*, *conflict resolution*, *cohesion*, and *conclusion*). Each category is rated on a 0–5 Likert scale with a maximum score of 35. For microstructural elements, the authors derived three indices using the Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2015): mean length of utterance (MLU), number of different words (NDWs), and words per minute (WPM). Results from the study showed that controlling for the effect of grade level, the four English oral narrative measures indexing both macrostructure (NSS) and microstructure (MLU, NDW, and WPM) significantly added to the prediction of both English word reading and English reading comprehension scores.

Contributions of DLL Children's Home Language Skills to English Reading

Given the critical role of oral language in reading and the fact that young DLL children's oral language skills are distributed across their two languages, measuring DLL children's English oral language skills alone may not capture their full linguistic proficiency. The *linguistic interdependence hypothesis* (LIH; Cummins, 1979, 1991) argues for transfers of skills that are fundamental for reading acquisition in any language, such as phonological awareness and oral language. It is thus plausible that home language proficiency may compensate for underdeveloped second language oral proficiency and/or contribute to L2 reading (Kieffer, 2012). However, empirical research on the contributions of home language oral skills to L2 reading has yielded equivocal results.

In a study with Spanish–English DLLs in the United States, Kieffer (2012) analyzed longitudinal data of a subsample of a nationally representative set of Spanish–English DLLs who were designated as ELs upon school entry. Information on the language of instruction was relatively limited. The author examined the contributions of Spanish and English vocabulary, listening comprehension, and story retell in kindergarten to their levels and rates of growth in English reading comprehension between Grades 3 and 8. Participants' oral English skills were assessed with three subtests from English Pre-Language Assessment Scales (Duncan & DeAvila, 1998). Specifically, story retell was measured with the "Let's Tell Stories" subtest and was holistically scored using both macro- (coherence and elaboration) and microstructural (accuracy and complexity of grammar) criteria on a scale of 0–5. Results from the latent growth models showed that, when entered individually and not in the same step, both English and Spanish oral proficiency in kindergarten significantly predicted their Grade 3 English reading comprehension. However, English and Spanish oral skills were highly correlated with each other. While English oral skills remained to be significant predictors of English reading comprehension, the contributions of Spanish oral language proficiency were no longer significant when controlling for English oral language proficiency.

In contrast, in the study by Miller et al. (2006) that was discussed in the previous section, the authors also examined the contributions of Spanish oral narratives to English word reading and English reading comprehension in DLLs in early elementary grades. After controlling for the effects of grade level and English oral narratives, the four Spanish oral narrative measures (NSS, MLU, NDW, and WPM) made a small, albeit significant and unique, contribution to predicting English word reading scores as well as English reading comprehension scores. In another recent study, Proctor et al. (2017) also examined the effects of home language (i.e., Spanish) vocabulary and syntactic skills on English reading comprehension and English oral language skills in Spanish–English DLL children in second through fifth grade who were receiving English-only instruction in school. The authors used standardized oral language measures in English and Spanish rather than language sampling methods. Results from the study showed that Spanish syntax, but not Spanish vocabulary, predicted Grade 5 English reading comprehension as well as growth in English language skills. It is worth noting that, unlike Miller et al., the authors did not include English oral language measures in the predictive models for English reading comprehension.

In contrast to these positive findings, other researchers have found that the effect of home language skills on English reading was no longer significant when controlling for the effect of English language skills (Kieffer, 2012; Proctor et al., 2012; Swanson et al., 2008). The mixed results may be attributed to the methodological differences in the samples' backgrounds and language measures in the existing literature. While the DLL children in most of these previous studies received English-only instruction, some of the DLL children in Miller et al. (2006) received some instruction in their native language Spanish. The predictive power of Spanish oral language may thus be greater for the DLL children in Miller et al., as they received language and literacy instruction in Spanish and likely were more advanced in Spanish skills. Furthermore, except for Miller et al. (2006) who used the language sampling method and conducted detailed analyses of story narratives, the majority of previous studies used standardized language tests to measure DLL children's language proficiency in both of their languages (cf. Kieffer [2012] used a composite score that included scores from standardized language tests as well as examiners' ratings of the coherence, elaboration, and grammaticality of story retells). The two categories of assessments vary in their sensitivity and reliability for measuring DLL children's language competence, thus impacting the validity of inferences made from the measures and potentially

accounting for these divergent results (Huang and Ramírez, forthcoming; Miller et al., 2006).

This Study

In light of the mixed results in the existing literature, this study focused on specifying the effect of oral narrative skills on English reading outcomes in young Spanish–English DLL children, using a culturally sensitive language sampling method. Situated within the SVR and LIH theories, this study examined the contributions of their oral narratives in both Spanish and English to their English reading outcomes as indexed by decoding and comprehension. As mentioned previously, we specifically focused on Spanish–English Latino/a DLLs because they are the majority of school-age DLLs in the United States. We also targeted the ELs subgroup so results from the study can inform instruction and education policy for this at-risk subgroup of DLLs. A unique feature of the sample is that, unlike most previous studies where DLL children only received English instruction in school, the current sample consisted of DLL children enrolled in 50/50 dual language immersion programs who received content area instruction in English and their home language Spanish.

The study was pragmatically motivated to address the broad requirement of education accountability for DLL children's English reading development. Most of the DLL children in the United States receive schooling in English only or some supplementary home language instruction with the purpose to transition to English as soon as possible, as in the case of early exit transitional bilingual education programs (Baker & Wright, 2017). The education accountability system also imposes monolingual English standards, mandating DLLs who are classified as ELs to show yearly progress in English language proficiency and to meet content area standards via standardized assessments in English (Hess & Eden, 2017). However, imposing monolingual instruction may decrease exposure to the child's stronger first language (L1) and monolingual standards may not reflect the child's full competence, which could be detrimental to DLLs' language development. This study's focus on DLLs in dual language programs can thus provide preliminary information about the language and reading development of DLLs in this alternative education program.

To control for the effect of socioeconomic status, home language background, and overall English language proficiency, we included DLL children from Spanish-speaking homes who were enrolled in dual language programs in Title One schools and classified as ELs by the school district at the time of testing. The specific research questions are as follows:

1. Do measures of macroelements and microelements in English narrative skills predict English Decoding?
2. Do measures of macroelements and microelements in English narrative skills predict English Reading Comprehension?
3. Do measures of macroelements and microelements in Spanish narrative skills predict English Decoding?
4. Do measures of macroelements and microelements in Spanish narrative skills predict English Reading Comprehension?

Because of the formal support and instruction that they received in their home language Spanish, we expected them to be more advanced in their home language proficiency and literacy than the DLLs in most previous studies who were mainly schooled in English only. We thus hypothesized a positive contribution of home language proficiency (Spanish) to English reading outcomes in our group of young DLLs.

Method

Participants

Ninety-five participants were selected from a larger study that examined the language and reading relationship in first- and third-grade Spanish–English Latino/a DLLs from Spanish-speaking homes in the United States. All participants were recruited from Title One elementary schools in neighborhoods with high concentrations of Mexican immigrants in a Southwestern city. They were included only if they spoke both languages as determined by their home language survey responses (i.e., not monolingual speakers). On the basis of the home language survey and language proficiency assessment data provided by the schools, all participants were designated as ELs at the time of testing. Their average age was 7.7 years, and grade level (53 first graders and 42 third graders) and gender (51 girls and 44 boys) were approximately equally distributed in the sample. On the basis of teacher reports, none of them had significant speech, language, or cognitive developmental disorders. All participants were enrolled in 50/50 Spanish–English dual language immersion programs where they received content area and reading instruction in both Spanish and English. According to the school administrators, the dual language program adapted a biliteracy model and was available for students in PK-fifth grade. The goal was to develop bilingualism, biliteracy, cultural awareness, and high academic achievement.

Instruments and Procedure

Narrative Task

All students were audio-recorded telling a story in both Spanish and English based on a wordless picture

book, *Frog Where Are You?* (Mayer, 1969) on two separate sessions.[1] The two sessions were scheduled to be at least 4 days apart (i.e., a 4-day test interval between sessions in each language) to minimize cross-language influence and practice effects. The English reading measures (see details below) were always administered in the English sessions. The order of the two sessions was counterbalanced across all participants. Depending on the child's grade and proficiency level, the English sessions took between 1 and 1.5 hr whereas the Spanish session took approximately 1 hr. In each session, a native or heritage speaker research assistant of the target language (either English or Spanish) first provided directions in the target language of the testing session. See below for our initial directions in both languages.

> (English): Here is a book that does not have any words. We are going to look at the pictures in this book together. When we finish, I want you to tell the story to me in English. Ok? Let's look at the book. This book tells a story about a boy, a dog, and a frog.
> (Spanish): Aquí tengo un libro que no tiene palabras. Vamos a mirar las fotos en este libro. Cuando terminemos, quiero que me diga el cuento en español. Okey? Vamos a mirar el primer libro. Este libro nos cuenta un cuento sobre un niño, un perro, y una rana.

Research assistants used a designated list of verbal prompts, such as "Tell me more," "Just do your best," "You're doing great," "Keep going," and "What else?" They were trained to avoid modeling or providing any additional information or answering participants' questions in sessions.

English Reading Measures

Three reading subtests from the Woodcock-Johnson IV Tests of Achievement (WJ-IV ACH; Schrank et al., 2014) were used to measure English reading outcomes. The WJ-IV ACH has been developed with a nationally representative sample, has high reliability and validity, and is widely used in reading research. We used the Letter Word Identification (LWI) and Word Attack (WA) subtests to measure English word decoding skills. The LWI subtest evaluated the ability to decode written English words accurately, whereas the WA subtest assessed the ability to decode made-up words. The Passage Comprehension subtest measured English reading comprehension. Participants were shown a brief written passage consisting of one or multiple sentences with a missing word and were requested to tell the researcher a word that goes into the blank. The published reliability estimates for the LWI, WA, and Passage Comprehension subtests for children ages 6–10 years are 0.94–0.98, 0.92–0.96, and 0.89–0.98, respectively.

Data Processing

All narrative audio recordings were transcribed verbatim by trained bilingual research assistants. The NSS (Heilmann et al., 2010) was used to evaluate the macrostructural elements of the narratives. This rubric included seven categories, and each category was rated on a 0–5 Likert scale with a maximum point of 35. For illustration/reliability purposes, we incorporated specific examples from children's narratives in the rubric for the raters. Two bilingual researchers from the research team rated all narrative samples in both Spanish and English. The correlations of their ratings were strong (ρ = .78 for Spanish and .72 for English). To examine interrater reliability, we calculated consistency agreement using two-way random intraclass correlation coefficients (ICCs). The ICCs were high for both Spanish (0.85; 95% CI [0.78, 0.90]) and English (0.80; 95% CI [0.70, 0.87]). We thus averaged their ratings to create a macrostructure score for each child in each language. For the NSS rubric description and our narrative samples, see Appendix. For analysis of microstructural elements, we first segmented the transcripts into base units. Following previous studies that also examined Spanish–English bilingual children's narratives (Lucero, 2015; Rojas & Iglesias, 2013), we chose the modified communication units (MC-units) rather than the standard communication unit (C-unit; Loban, 1976) in order to account for the pro-drop ("pronoun-dropping") nature of Spanish. Verbs in Spanish are inflected for person and number, so subject pronouns are grammatically redundant and generally dropped. For example, in the sentence "Estudio el español," or "I study Spanish," the inflection -o on the verb "estudio" signals that the subject is the first person "yo," or "I." A C-unit includes a main clause and all of its subordinate clauses. Because the subject pronoun is encoded in the verb that follows in Spanish, using C-unit segmentation will result in a less overall number of utterances in Spanish and thus overinflate the grammatical complexity in the narratives. Although English is not a pro-drop language, we applied MC-unit segmentation in both languages to ensure segmentation consistency and equitable comparison between Spanish and English. We also coded for trailing off, retracing, filled and unfilled pauses, omissions, and errors. All segmented narrative transcripts were then converted into Codes for the Human Analysis of Transcripts conventions of the Child Language Data Exchange System, such as headers, main lines, and dependent tiers (MacWhinney,

[1]Both story generation and story retell techniques are commonly used with DLLs in the literature. See Bitetti and Hammer (2016), Bitetti et al. (2020), and Hipfner-Boucher et al. (2015) for example studies that used story generation to study DLLs' narrative skills.

2000). We then used the Computerized Language ANalysis (CLAN) program to generate three microstructural productivity measures that have been shown to be developmentally sensitive (Peña et al., 2014) and/or contributed positively to reading outcomes (Rojas & Iglesias, 2013): (a) NDWs (Spanish NDW; English NDW), (b) lexical diversity as measured by D (Spanish D; English D), and (c) MLU, a ratio of words over utterances (Spanish MLU; English MLU). NDW indices represented the frequency counts of total number of different English word types (English NDW) and Spanish word types (Spanish NDW) in each narrative sample. Although some studies used NDW as a lexical diversity measure, NDW is potentially problematic as a lexical diversity measure because it does not take into account the differences in sample size (Durán et al., 2004). We chose to use the D-index generated from the VOCD command rather than the type–token ratio (TTR) for lexical diversity because D represents how lexical diversity varies over different token sizes and is thus a more informative index than the traditional TTR (Durán et al., 2004).[2] MLU was derived from dividing the total number of word tokens over total number of utterances in each narrative sample. We opted for MLU in words rather than MLU in morphemes because previous studies showed that MLU in words is more appropriate than MLU in morphemes for children older than 48 months or once they can reliably produce full sentences (Frizelle et al., 2018). We also included the subordination index (SI), a measure of clausal density (Spanish SI; English SI), in addition to MLU to gain a comprehensive picture of their expressive syntactic skills (Bitetti et al., 2020; Lucero, 2015). SI was derived from dividing the number of clauses by the total number of utterances. Because CLAN did not automatically analyze SI, we hand-coded clauses and calculated the SI variable manually. Approximately 20% of the transcripts (half in Spanish and half in English) were randomly selected to determine transcription accuracy at the word level and the MC-unit segmentation level. The agreement between two independent transcriptions ranged from 91% to 97% in Spanish and from 90% to 99% in English. For the SI analysis, 20% of the transcripts (half in Spanish and half in English) were also randomly selected for checking accuracy in clause counting. Agreement between two independent coders was 96% in Spanish and 99% in English.

Data collection was completed in a 7-week timeframe. Approximately half of the participants were tested in English first, and the other half were tested in Spanish first. Independent-samples t tests were conducted for all 10 narrative measures and three reading measures to examine whether there was a practice effect between the two orders. Using .05 as the alpha value, a significant order effect was found for Spanish D; $t(91) = -2.201$, $p = .03$; $d = 5.98$. The effect size was large. DLLs who were tested in Spanish first produced higher lexical diversity than those who were tested in English first ($M = 17.75$, $SD = 7.18$ vs. $M = 15.02$, $SD = 4.50$). To prevent Type I error, we also used Bonferroni correction (i.e., alpha divided by the number of tests) to adjust the conventional cutoff alpha value from .05 to .003 per the formula and conducted the same t tests. None of the tests yielded a significant result. To sum up, the order effect was significant only for Spanish D without Bonferroni adjustment, but it was not significant after Bonferroni adjustment.

Results

We first presented the descriptive statistics for the narrative indices in each language and reading measures for the whole group and by grade level in Tables 1 and 2, respectively. For the three reading measures, we reported raw scores, standard scores, and W scores. For the ease of interpretation, we also reported percent correct scores, which were derived from dividing the raw scores by the total number of items in each subtest. We averaged raw and percent correct scores from the two decoding subtests (LWI and WA) to create a decoding variable. The W score is transformed from the raw scores using Rasch model of data analysis. It is different than other standard scores because the W scale from which the scores were

Table 1. Descriptive statistics (mean and standard deviation) for narrative measures for the whole group and by grade level.

Measure	Whole group (n = 95)	First grade (n = 53)	Third grade (n = 42)
Spanish			
NSS	16.51 (2.82)	15.71 (3.08)	17.55 (2.05)
NDW	89.54 (33.30)	82.15 (30.56)	99.10 (34.61)
D-index	16.37 (6.10)	14.66 (5.43)	18.55 (6.28)
MLU	6.80 (1.31)	6.33 (1.15)	7.40 (1.26)
SI	0.95 (0.39)	0.89 (0.35)	1.03 (0.42)
English			
NSS	16.93 (2.70)	16.02 (2.83)	18.08 (2.02)
NDW	82.27 (29.17)	74.19 (23.18)	92.51 (32.87)
D-index	16.97 (8.27)	14.80 (7.03)	19.73 (8.98)
MLU	6.66 (1.16)	6.21 (1.15)	7.24 (0.89)
SI	0.97 (0.24)	0.88 (0.21)	1.08 (0.23)

Note. NSS = Narrative Scoring Scheme; NDWs = number of different words; D-index = lexical diversity; MLU = mean length of utterance—ratio of word tokens over utterances; SI = subordination index—number of clauses divided by total number of utterances.

[2]According to Durán et al. (2004), D is derived from a mathematical model that "consists of a set of curves with TTR as the y axis and N as the x axis, which fall from the point (1,1) with decreasing slope within the space between the horizontal line TTR = 1 and the curve TTR = 1/N. In the model, each curve represents a language sample and lexical diversity is defined as the combination of properties which locate a curve in the space bounded by the two extremes—the higher the curve, the greater the diversity." (p. 239).

Table 2. Descriptive statistics (mean and standard deviation) for reading measures for the whole group and by grade level.

Measure	Whole group (n = 95)	First grade (n = 53)	Third grade (n = 42)
Decoding composite (raw scores)	25.66 (12.81)	17.39 (7.88)	36.10 (9.87)
Comprehension (raw scores)	16.74 (7.41)	12.21 (5.40)	22.48 (5.37)
Decoding composite (% correct)	48 (23)	33 (14)	66 (19)
Comprehension (% correct)	32 (14)	23 (10)	43 (10)
Decoding—LWI (standard scores)	95.57 (18.36)	89.35 (14.82)	103.29 (19.53)
Decoding—WA (standard scores)	104.41 (18.51)	100.50 (15.97)	109.26 (20.42)
Comprehension (standard scores)	86.70 (11.24)	89.87 (10.70)	82.79 (10.77)
Decoding—LWI (W scores)	435.55 (55.12)	399.21 (37.58)	480.55 (37.22)
Decoding—WA (W scores)	475.88 (29.82)	460.62 (24.95)	494.79 (24.12)
Comprehension (W scores)	440.34 (27.31)	423.73 (21.40)	460.90 (18.42)

Note. Decoding composite = an average of scores between Woodcock-Johnson IV, Letter Word Identification subtest (WJ-IV LWI) and Woodcock-Johnson IV, Word Attack subtest (WJ-IV WA); Comprehension = Woodcock-Johnson IV, Passage Comprehension subtest.

derived is an equal-interval scale. W scores are typically used in clinical practice and research to examine within-individual growth across time (Jaffe, 2009). It is worth noting that WJ-IV tests are not normed on the bilingual population (K. Genseke, personal communication, March 29, 2021), and as we argued previously, bilinguals are not two monolinguals in one. The W scores and standard scores should thus be interpreted carefully to avoid falling into the trap of comparing bilinguals against monolingual norms. Overall, this group of DLLs appeared to have a similar level of narrative skills in Spanish and English. The cross-linguistic similarities may be attributed to the selection criterion of the ability to speak both languages and the fact that they were all in dual language programs receiving instruction in both languages. However, the variation in performance is quite large for the reading measures (M = 25.66, SD = 12.81 for decoding; M = 17.39, SD = 7.88 for comprehension), the NDWs (Spanish: M = 89.54, SD = 33.30; English: M = 82.27, SD = 29.17), and D-index in both languages (Spanish: M = 16.37, SD = 6.10; English: M = 16.97, SD = 8.27).

We then conducted mixed analysis of variance to test the cross-linguistic and cross-grade differences in narrative measures using language (Spanish and English) as the within-subject factor and grade level (first and third) as the between-subjects factor. There was no significant interaction effect between language and grade for any of the five narrative measures, NSS: $F(1, 92) = 0.138$; $p = .711$, $\eta_p^2 = .002$; NDW: $F(1, 91) = .117$, $p = .733$, $\eta_p^2 = .001$; D-index: $F(1, 90) = 0.669$, $p = .415$, $\eta_p^2 = .007$; MLU: $F(1, 91) = 0.028$, $p = .866$, $\eta_p^2 = .000$; SI: $F(1, 91) = 0.309$, $p = .579$, $\eta_p^2 = .003$. The main effect of grade was significant for all five narrative outcomes, NSS: $F(1, 92) = 23.104$; $p = .000$, $\eta_p^2 = .201$; NDW: $F(1, 91) = 9.82$, $p = .002$, $\eta_p^2 = .097$; D-index: $F(1, 90) = 12.121$, $p = .001$, $\eta_p^2 = .119$; MLU: $F(1, 91) = 29.453$, $p = .000$, $\eta_p^2 = .245$; SI: $F(1, 91) = 11.954$, $p = .001$, $\eta_p^2 = .116$. Third graders scored higher than first graders across all narrative measures (see Table 1 for descriptive statistics). A main effect of language was also found for NDW, $F(1, 91) = 6.25$, $p = .014$, $\eta_p^2 = .064$, suggesting that DLL participants produced reliably more word types (NDW) in Spanish (M = 89.54, SD = 33.30) than in English (M = 82.27; SD = 29.17). However, the effect of language was not significant for the other four narrative measures, NSS: $F(1, 92) = 1.580$, $p = .212$, $\eta_p^2 = .017$; D-index: $F(1, 90) = 0.562$, $p = .455$, $\eta_p^2 = .006$; MLU: $F(1, 91) = 1.047$, $p = .309$, $\eta_p^2 = .011$; SI: $F(1, 91) = 0.038$, $p = .846$, $\eta_p^2 = .000$.

With regard to the cross-grade comparisons for English reading measures, given that the reading measures are standardized, grade-normed assessments and we used raw scores rather than the standard scores, and we collected data from all participants within a relatively short timeframe of 7 weeks, we expected that the two grade levels would perform differently. We conducted independent-samples t tests to test the grade-level differences. As expected, third graders outperformed first graders on both reading measures; $t(93) = -10.28$ for decoding, $t(93) = -9.23$ for comprehension, both ps < .001.

Turning now to our four research questions about the relationships between macro- and microelements in DLLs' two languages and DLLs' English reading outcomes, we first conducted bivariate correlational analyses to examine the relationships between the English reading measures and the oral narrative measures in both languages. As seen in Table 3, the bivariate correlational results showed a strong relationship between the two reading outcomes (r = .915; p < .01). Descriptively, grade level yielded the highest associations with the reading outcomes (r = .73 for decoding and r = .69 for comprehension; both ps < .01). All narrative measures in both languages were significantly correlated with decoding to varying degrees of strength (r = .21–.44). On the other hand, except for Spanish NDW and Spanish NSS scores, all narrative

Table 3. Pearson correlations between the narrative skill variables and reading outcomes (raw scores).

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Decoding	—											
2. Comprehension	.915**	—										
3. Grade	.729**	.691**	—									
4. Span NSS	.253*	.192	.326**	—								
5. Span NDW	.208*	.182	.254*	.644**	—							
6. Span D-index	.248*	.299**	.319**	.203	.544**	—						
7. Span MLU	.399**	.298**	.410**	.607**	.489**	.037	—					
8. Span SI	.282**	.288**	.175	.280**	.065	−.075	.513**	—				
9. Eng NSS	.440**	.503**	.382**	.259*	.302**	.220*	.177	.189	—			
10. Eng NDW	.334**	.403**	.313**	.256*	.571**	.407**	.309**	.048	.567**	—		
11. Eng D-index	.379**	.466**	.298**	−.036	.228*	.542**	.068	−.012	.374**	.740**	—	
12. Eng MLU	.406**	.415**	.447**	.212*	.133	.098	.496**	.361**	.427**	.451**	.316**	—
13. Eng SI	.351**	.381**	.412**	.049	.005	.217*	.297**	.387**	.395**	.365**	.461**	.714**

Note. Span = Spanish; NSS = Narrative Scoring Scheme; NDW = number of different word; D-index = lexical diversity; MLU = mean length of utterance; SI = subordination index; Eng = English.

*$p < .05$. **$p < .01$.

Table 4. Stepwise regression coefficients for analysis predicting English Decoding (raw scores).

Step no.	Variable	*B*	*SE*	β	*t*	*p*	Tolerance	VIF	Adj. R^2	R^2	ΔR^2	AIC	BIC
Step 1	(Constant)	8.023	1.999		4.013	.000			.518	.523	.523	400.020	405.041
	Grade	9.301	0.941	.723	9.886	.000	1.000	1.000					
Step 2	(Constant)	1.681	2.860		0.588	.558			.557	.567	.044	393.231	400.764
	Grade	8.647	0.928	.673	9.321	.000	.944	1.059					
	Spanish SI	7.692	2.575	.216	2.987	.004	.944	1.059					
Step 3	(Constant)	–3.183	3.153		–1.009	.316			.596	.610	.043	385.788	395.831
	Grade	7.684	0.939	.598	8.182	.000	.745	1.342					
	Spanish SI	8.624	2.477	.242	3.481	.001	.897	1.115					
	English D-index	.338	0.109	.219	3.084	.003	.823	1.216					

Note. *B* = unstandardized beta coefficient; *SE* = standard error of the unstandardized beta coefficient; β = standardized beta coefficient; VIF = variance inflation factor; AIC = Akaike information criterion; BIC = Schwarz Bayesian Criterion; SI = subordination index; D-index = lexical diversity.

measures in both languages were significantly and positively correlated with reading comprehension (r = .27–.49).

We then conducted two stepwise regression models using WJ-IV LWI/WA (decoding) and WJ-IV PC (comprehension) raw scores as the outcome variable and grade level and the 10 narrative skill variables as predictors (Spanish NSS, English NSS, Spanish D-index, English D-index, Spanish NDW, English NDW, Spanish MLU, English MLU, Spanish SI, and English SI). We decided to use stepwise regression method because of the exploratory nature of the study. Although we expected that narrative skills in both English and Spanish would contribute to English reading outcomes in our DLL sample, we did not have a specific hypothesis for the relative contributions of these narrative measures. We used the significance (probability) of the F value to determine which predictors to include in the model. A predictor was entered into the model if the significance level of its F value is less than .05 and was removed if the significance level is greater than .10. Results of the three different regression models for each of the two reading outcomes, yielded by the stepwise technique are presented in Tables 4 and 5. We examined Akaike information criteria across the models as well as the change in R^2 to select a model that best fits the data (Kline, 2011). The selected model for decoding was significant, $F(3, 87) = 45.34$, $p < .001$, and explained a decent percentage of the variance ($R^2 = .61$; adjusted $R^2 = .60$). The three significant predictors, in the order of their standardized regression weights (β), are grade (β = .60; $p < .001$), Spanish SI (β = .24; $p < .01$), and English D-index (β = .22; $p < .01$). The variance inflation factor (VIF; 1.00–1.19) and tolerance (0.89–1.00) statistics were acceptable for each predictor based on the criteria in the current literature (Salmerón Gómez et al., 2016), suggesting the absence of multicollinearity issues. The residuals were relatively normally distributed.

The selected model for reading comprehension was also significant, $F(3, 87) = 47.27$, $p < .001$, and explained a similar percentage of variance ($R^2 = .62$; adjusted $R^2 = .61$). The three significant predictors were grade (β = .53; $p < .001$), English D-index (β = .32; $p < .001$), and

Table 5. Stepwise regression coefficients for analysis predicting English Reading Comprehension (raw scores).

Step no.	Variable	*B*	*SE*	β	*t*	*p*	Tolerance	VIF	Adj. R^2	R^2	ΔR^2	AIC	BIC
Step 1	(Constant)	6.998	1.208		5.795	.000			.475	.481		308.251	313.27
	Grade	5.159	0.568	.693	9.079	.000	1.000	1.000					
Step 2	(Constant)	3.837	1.381		2.778	.007			.548	.558	.077	295.645	303.18
	Grade	4.477	0.555	.602	8.061	.000	.902	1.109					
	English D-index	0.261	0.067	.292	3.914	.000	.902	1.109					
Step 3	(Constant)	–0.904	1.802		–0.502	.617			.607	.620	.062	283.915	293.96
	Grade	3.949	0.537	.531	7.360	.000	.840	1.190					
	English D-index	0.289	0.063	.324	4.624	.000	.888	1.126					
	Spanish SI	5.328	1.416	.258	3.764	.000	.930	1.075					

Note. *B* = unstandardized beta coefficient; *SE* = standard error of the unstandardized beta coefficient; β = standardized beta coefficient; VIF = variance inflation factor; AIC = Akaike information criterion; BIC = Schwarz Bayesian Criterion; D-index = lexical diversity; SI = subordination index.

Spanish SI ($\beta = .26$; $p < .001$). The VIF (1.00–1.19) and tolerance (0.84–1.00) statistics were also acceptable for each variable in the model, and the residuals were normally distributed.

Discussion

The study set out to examine the contributions of narrative skills in young DLL children's two languages to their reading outcomes. A total of 95 Spanish–English DLL children in Grades 1 and 3 participated in the study. All participants were enrolled in one-way 50/50 dual language programs where they received content instruction in Spanish as well as in English. All of them told a story in both Spanish and English based on a wordless storybook and completed English decoding and reading comprehension tests. We transcribed and analyzed both the macro- and microstructural elements of their narratives to study their relationships with English reading. Overall, the results showed that grade level was the strongest predictor of English reading for both decoding and comprehension outcomes. Both English and Spanish microstructural skills, specifically English D and Spanish clause density, also contributed to English reading outcomes.

Development of Oral Narratives Among Young DLLs

Results from the study showed that this group of DLLs was fairly balanced in their narrative skills in Spanish and English. Except for the finding that they produced more word types (NDW) in Spanish than in English, there was no significant cross-linguistic difference in any other micro- or macrostructural elements. It is worth noting that the mean values for narrative productivity (i.e., MLU, NDW, SI, and macrostructures) generally converged with those reported in previous studies on Spanish–English DLLs of a similar age range, such as in the study of Miller et al. (2006) and more recently in the studies of Lucero (2015, 2018), with some minor divergences. For example, while Lucero (2018) found that the DLLs in her study performed significantly better in English NDW than in Spanish NDW, and better in Spanish macrostructures (NSS) than in English NSS, this study found the opposite trend in NDW and no significant cross-language difference in NSS. The divergent results may be attributed to the differences in DLLs' backgrounds, school instruction, and elicitation and analytic techniques. The DLLs in Lucero (2018) were slightly younger (i.e., kindergarten through second grade) than those in this study (i.e., first and third grades). Although the DLLs in both studies attended DL programs that adopted a 50/50 model, the DL program in Lucero (2018) was two-way (consisting of DLLs from Spanish-speaking homes and from English-speaking homes) whereas the DL program models in this study included both one-way (consisting of only DLLs from Spanish-speaking homes) and two-way. DLLs' language input and output in school may thus differ as a function of the makeup of the DLLs' backgrounds in the program (Lindholm-Leary & Genesee, 2014; Palmer et al., 2014). Furthermore, all three previous studies used the story retell method whereas this study used the story generation method. Although both elicitation methods were commonly used with DLLs, research showed that children of similar age ranges performed significantly better on measures of morphosyntax and lexical diversity in the story retell than in the story generation context (Westerveld & Gillon, 2010). As well, all three previous studies used the SALT software (Miller & Iglesias, 2015) whereas this study used the CLAN program. A recent comparison of language sample analysis programs showed that SALT and CLAN produced similar, but not identical results (Pezold et al., 2020), suggesting that the minor discrepancies between the current and previous results may also be attributed to, besides the sample and instructional differences, the use of different analytical software. On the other hand, the macrostructural NSS ratings involved human judgments, which were inherently subjective and require training and calibration to establish high reliability (Squires et al., 2014). Despite these methodological differences, the results converged, for the most part, demonstrating the general patterns of DLL children's narrative development.

It is also important to note that we used two vocabulary (NDW and D) and two syntactic complexity measures (MLU and SI) in this study, and the two measures were significantly correlated with each other in the two respective productivity domains and in both languages. The correlation between NDW and D-index were both above .50 ($r = .74$ and .54 for NDW and D-index in English and in Spanish, respectively). As mentioned previously, we opted for the D-index rather than the traditional TTR measure as a lexical diversity index given the variability in our token sizes in our sample (Durán et al., 2004). Some researchers also advocated for using NDW as a measure of lexical diversity (e.g., Miller et al., 2006). However, our results showed that D-index measures yielded, descriptively, higher correlations with the English reading outcomes than NDW measures did, and the pattern held true across both Spanish and English. The empirical evidence led us to choose D-index over NDW as the lexical diversity measure in the predictive models for English reading. Further research is needed to examine the relationships of different lexical diversity measures (e.g., NDW, TTR, and D-index) with standard language assessments and with reading measures, particularly among DLL children. Similarly, the two grammatical complexity measures were also significantly correlated in DLLs' two languages ($r = .71$ and .51 in English and Spanish, respectively), corroborating

previous studies on DLLs' narrative skills (Bitetti et al., 2020; Lucero, 2015).

Contributions of English Oral Narrative Skills to English Reading

Turning now to the contributions of oral narrative skills in English to the two English reading outcomes, the bivariate correlational results showed a strong and high correlation between the two reading outcomes, suggesting that decoding and reading comprehension are closely intertwined skills among DLL children in early elementary grades. This particular result corroborated reading research by García and Cain (2014), Mancilla-Martinez et al. (2020), and others. For English decoding skills, all English narrative measures yielded significant correlations with the English decoding variable. However, controlling for the effects of grade level and other narrative measures, only English D-index remained a significant English narrative predictor of English decoding as revealed by the regression model. Given the high correlation between the two reading outcomes, it is not surprising to find similar association patterns between the English narrative measures and reading comprehension. Although all English oral narrative measures were correlated with reading comprehension, the stepwise regression model revealed English D-index as the only significant English oral narrative predictor controlling for grade and other narrative measures.

The finding of the significant role of English vocabulary in English reading supported the well-established connection in the literature on monolingual reading (Beck et al., 1982; Storch & Whitehurst, 2002) as well as the growing body of research on DLLs' English reading development (e.g., Kieffer, 2012; Mancilla-Martinez & Lesaux, 2010; Proctor et al., 2012; Silverman et al., 2015). The current result also extended previous work on DLLs by showing that the vocabulary effect is also robust for DLL children receiving instruction in both English and their native language. We interpret this particular finding as providing support for the SVR model and the lexical quality hypothesis (LQH; Perfetti & Hart, 2001). The SVR argued for the contributions of language comprehension (broadly defined as oral language skills) in reading comprehension whereas LQH postulated that both vocabulary size and the quality of the readers' lexical representations can impact reading. The lexical diversity measure in our study was an index of DLL children's productive lexicon, and its significance in predicting English reading thus supported the SVR and the LQH.

Despite its significant correlation with English reading, the macrostructural element (i.e., NSS score) did not remain a significant predictor after controlling for the effect of grade and other narrative measures in the regression model. This finding contradicted previous work that showed an important role of macrostructure in English reading (e.g., Griffin et al., 2004; Reese et al., 2010). The discrepancies may be attributed to methodological differences. Our sample size was relatively small compared with previous work. The stepwise regression technique we used, although efficient for selecting a parsimonious set of explanatory predictors, may have oversimplified the model by prioritizing parsimony and thus missed other important predictors. Furthermore, the reading comprehension measure in this study consisted of single sentences and short, expository passages, which had different macrostructures from the fictional narratives elicited from the DLLs. For example, some of the categories in the NSS rubric that we used to measure macrostructures in oral narratives, such as character development and mental state, may not be relevant to the comprehension of expository passages. Given the lack of close alignment between the macrostructures of the reading measure and the oral narratives, it may not be surprising that macrostructural elements in oral narratives did not yield as robust contributions to reading comprehension as microstructural elements. Future research with larger sample size uses reading measures that also include narrative texts and compares different models using a variety of regression methods will help clarify the role of macrostructure and other microstructural elements that were not significant in this study.

Contributions of Spanish Oral Narrative Skills to English Reading

The correlation results also revealed significant associations between Spanish oral narrative skills and English reading. All Spanish oral narrative measures were significantly correlated with English decoding. In contrast, Spanish D-index, MLU, and SI, but not NSS and NDW, yielded significant correlations with English comprehension. The strength of correlations between English oral narrative measures and English reading was, descriptively, overall higher than that between Spanish narrative measures and English reading, and the patterns held across decoding and comprehension. The stepwise regression analyses further revealed Spanish SI, an index of DLLs' home language grammatical complexity, to be a significant predictor of their English reading outcomes controlling for the effects of grade and other narrative measures.

This finding corroborated previous work by Proctor et al. (2017) and Miller et al. (2006) but contradicted others (Gottardo & Mueller, 2009; Kieffer, 2012; Proctor et al., 2012; Swanson et al., 2008). The discrepancies may be attributed to sampling characteristics. In contrast to previous studies, which included DLL children receiving English-only instruction or limited Spanish language support, the current sample of DLL children were all enrolled in dual language programs receiving content and literacy

instruction in Spanish and English, as verified by teacher reports of classroom language use and literacy activities. The current sample's Spanish language and literacy skills were likely to be more advanced than DLLs in previous studies. We interpreted the current results to align with Cummins' (1979, 1991) linguistic interdependence hypothesis. For DLL children who receive some instruction in their home language like the current sample, the transfer is facilitated and enhanced (Lindsey et al., 2003). DLL children's advanced Spanish language skills, specifically their grammatical complexity, facilitated the cross-language transfers and contributed to their English reading. The particular finding that Spanish L1 grammatical complexity, but not vocabulary, contributed to English reading also aligned with recent cross-linguistic hypotheses that specified the nature of language skills that mediated the L1–L2 associations (Proctor et al., 2017). In Cummins's original model (1979), he proposed the distinction between L1 conceptual knowledge and the understanding of L1 sentence structures. On the basis of the distinction, recent cross-linguistic hypotheses, such as the *interdependence continuum* (Proctor et al., 2010) and *task-dependent bidirectional transfer hypothesis* (Prevoo et al., 2015, as cited in Proctor et al., 2017), operationalized L1 vocabulary as conceptual knowledge and L1 grammatical complexity as the ability to manipulate language structures. These recent theories also argued that the strength of cross-linguistic transfer is contingent upon the type of oral language skills. Specifically, given that syntax is quite consistent between English and Spanish for simpler sentence production at our target age/grade range, there is greater overlap in syntax than in vocabulary. The greater cross-linguistic overlap facilitates transfer from L1 to L2, and the transfer also extends to L2 reading.

Taken together, the results suggested that both Spanish and English microstructural elements, specifically Spanish morphosyntactic complexity and English lexical diversity, contributed to young DLL children's English decoding and comprehension skills. The current results also supported the distinction between macrostructural and microstructural elements in oral narrative research and potentially in relation to their contributions to different reading skills. LARRC (2015) examined the dimensionality of young children's language ability, and results from their study showed distinct dimensions of vocabulary, grammar, and discourse skills by third grade. The vocabulary and grammar dimensions mapped onto the microstructural elements whereas discourse skills aligned with the conceptualization of macrostructural elements. Results from this study extended the literature to show that microstructural elements are also strong predictors of English reading for DLLs in dual language programs. Although the macrostructural element was not found to be a significant predictor of English reading in the study, possibly due to the limitation of the methodology, it has been shown to play a prominent role in reading comprehension and deserves more attention in future work.

Limitations

Limitations of this study must be acknowledged. First, although the instrument we used for elicitation appeared to be age-appropriate, it may not tap into academic uses of language, which plays a critical role in reading development (Proctor et al., 2020). Future studies using multiple narrative tasks, such as personal narratives and storytelling and retelling tasks that elicit different language registers, would afford us a better understanding of the specificities of the contributions of children's narrative to reading (Huang & Ramírez, forthcoming). On a related note, as mentioned previously, future studies should also explore the associations between different narrative genres and comprehension of both narrative and expository texts. The reading comprehension measure in this study consists of single sentences and predominantly short, expository passages. Narrative and expository texts differ in structures, and given the closer alignment between personal and fictional narratives and narrative texts, it is likely that the associations would be stronger between personal narratives and comprehension of narrative texts than between personal narratives and expository texts. Investigating the relationships between the varieties of oral narratives and comprehension of different text types would not only inform reading theories but instruction and assessment for young readers.

Although we included children in two grade levels for cross-sectional, cross-grade comparison, we did not address the question about language and reading growth over time. Future longitudinal studies that track the same DLL children's narrative and reading development over time from Grades 1 to 3 would help document their language and reading developmental trajectories and provide answers to the question about the amount of time it takes for DLL children to develop and master narrative and reading skills (Hakuta et al., 2000). Relatedly, the correlational design did not allow us to directly test the linguistic interdependence hypothesis. Future research that utilizes an experimental design or think-aloud protocols to examine the English reading process would help confirm or shed light on the mechanism of cross-linguistic transfers. For example, in a series of think-aloud studies with bilingual Latina/o students, Jiménez et al. (1995, 1996) showed that Latina/o students who were successful English readers had an enhanced awareness of the relationship between Spanish and English, and they were able to use cognates or to translate from their home language to English to help them comprehend English text. Finally, the study focused on English reading but did not examine DLL children's Spanish reading skills. Future studies including a

Spanish literacy measure would help us better understand the effect of bilingualism on biliteracy as well as the contributions of native language literacy to L2 literacy.

Conclusions and Implications

To conclude, this study showed that young DLL children's oral narrative skills in English, as well as their home language Spanish, contributed to their English reading outcomes. The results further specified the contributions of narrative elements to different reading skills. Microstructural elements appeared to play a stronger role than macrostructural elements in predicting English reading. In light of the strong connections between oral narrative (particularly English lexical diversity and Spanish grammatical complexity) and reading in young DLLs, we concur with other researchers that reading instruction and curriculum would potentially benefit from a focus on oral language (LARRC et al., 2019; Mancilla-Martinez et al., 2020; Proctor et al., 2020; Silverman et al., 2015) or oral narrative instruction (Nicolopoulou et al., 2015; Petersen & Spencer, 2016; Spencer & Petersen, 2020). Although this study is correlational by nature and does not provide evidence for a causal relationship between oral language and reading, there are a growing number of studies on language-focused reading interventions that utilized randomized controlled trial designs and showed a causal role of language instruction in improving reading outcomes (e.g., LARRC et al., 2019). Furthermore, since oral narrative tasks can also be implemented by parents or caregivers, this finding elucidates a potential point of leverage, that is, including parents or caregivers as partners in their children's education by providing parents training in storytelling practices at home or out-of-school settings. It is worth noting that, although storytelling is a common practice in many cultures, the ways children are scaffolded in storytelling differ across cultures, and the differences in scaffolding styles influence children's narrative skills (Rochanavibhata & Marian, 2020). Although storytelling is also prevalent in the Mexican/Hispanic culture, which is the heritage of the DLL children in this study, the conventions of storytelling in Mexican/Hispanic cultures may not match the formal use of language expected in schools (Cheatham & Jimenez-Silva, 2011). Latina/o DLL children may not be able to showcase their linguistic capabilities through a narrative elicitation task due to this mismatch. It would thus be helpful to raise parents' awareness of this cultural mismatch and to include a variety of narrative genres and language registers in parent training.

Finally, the contributions of Spanish grammatical complexity to English reading also suggest that promoting DLL children's home language could potentially improve their reading development in English. This particular finding provides some support for the effectiveness of dual language programs that aim to develop bilingual proficiency and biliteracy in young DLL children. This finding further implicates that maintaining young DLL children's home language skills may be beneficial, rather than harmful, to their English reading development. Instead of placing DLL children in monolingual instructional programs and imposing monolingual standards on DLLs' language and reading development, parents and educators may want to consider alternative education programs such as dual language immersion to better support DLL children's language and reading development.

Author Contributions

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Appendix (p. 1 of 2)

Narrative Scoring Scheme and Examples

Characteristics	Proficient (5)	Emerging (3)	Minimal/immature (1)	Example
Introduction	• States general place and provides some detail about the setting (e.g., reference to the time of the setting, daytime, bedtime, and season) • Setting elements are stated at appropriate place in story.	• States general setting but provides no detail • Description or elements of story are given intermittently through story. • May provide description of specific element of setting	Launches into story with no attempt to provide the setting	(Rating = 4) "He was sleeping in his bed and the dog too. And the dog was sneaking out and the boy wake up. And the dog and the boy woke up the frog was not there. [...] they was um looking in the window."
Character development	• Main characters are introduced with some description or detail provided. • Main character(s) and all supporting character(s) are mentioned. • Throughout story it is clear child can discriminate between main and supporting characters. • Child narrates in first person using character voice.	• Characters of story are mentioned with no detail or description. • Both main and active supporting characters are mentioned. • Main characters are not clearly distinguished from supporting characters.	• Inconsistent mention of involved or active characters • Character(s) necessary for advancing the plot are not present.	(Rating = 1) "It's a boy that likes to see his frog always. [...] he was looking inside a hole and finded an animal and the dog find the bees. [...] and he just finded a owl. [...] and he got stuck on deer."
Mental states	• Mental states of main and supporting characters are expressed when necessary for plot development and advancement. • A variety of mental state words are used.	• Some use of evident mental state words to develop character(s)	• No use of mental state words to develop character(s)	(Rating = 4) "The little boy was mad but the dog was happy licking him. [...] The dog got scared of the bees. [...] the little boy was mad at the owl. He was annoyed. [...] They were all happy."
Referencing	• Provides necessary antecedents to pronouns • References are clear throughout story.	• Inconsistent use of referents/ antecedents • Excessive use of pronouns	• No verbal clarifiers used. • Child is unaware listener is confused.	(Rating = 1) "Frog where are you? One morning he woke up he fell asleep he woke up again the frog wasn't there. Where are you frog? Are you on my shoe? Are you are you at my house? Are you at are you did you get out the window? Woof. Oh no I dropped doggy. Hmm froggy is gone. [...] But he haven't been found yet. Are you in there? Ouch? Na na na na buzz."

(*table continues*)

Appendix (p. 2 of 2)

Narrative Scoring Scheme and Examples

Characteristics	Proficient (5)	Emerging (3)	Minimal/immature (1)	Example
Conflict resolution	Clearly states all conflicts	• Under developed description of conflicts and resolutions critical to advancing the plot of the story OR • Not all conflicts and resolutions critical to advancing the plot are present.	• Random resolution(s) stated with no mention of cause or conflict OR • Conflict mentioned without resolution OR • Many conflicts and resolutions critical to advancing the plot are not present.	(Rating = 4) "When they go to sleep umm the frog is going to escape. Then he went to found the the hid frog. The dog he uh break the home of the bees. The kid he fall down because the owl scare him. Then they found the frog and another frog and there have they have little froggies. He get the frog and the other frog they were saying bye to the kid."
Cohesion	• Events follow a logical order. • Critical events are included while less emphasis is placed on minor events. • Smooth transitions are provided between events.	• Events follow a logical order. • Excessive detail or emphasis provided on minor events leading the listener astray OR • Transitions to next event unclear OR • Minimal detail given for critical events OR • Equal emphasis on all events	No use of smooth transitions	(Rating = 1) "He play with a frog. And then he sleeping. He watching the window. He's check in the hole and he smell something and he look in the tree."
Conclusion	Story is clearly wrapped up using general concluding statements such as "and they were together again happy as could be."	Specific event is concluded, but no general statement made as to the conclusion of the whole story.	Stops narrating and listener may need to ask if that is the end.	(Rating = 3) "And the frog had a husband and then they had a babies. And then the boy, he took one of the baby frogs."