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Native Spanish-Speaking Children Reading in English: Toward a Model of Comprehension

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A structural equation model of second language (L2; English) reading comprehension was tested on a sample of 135 Spanish-speaking 4th-grade English-language learners (ELLs). The model included 2 levels: decoding and oral language. English decoding measures included alphabetic knowledge and fluency. English oral language measures included vocabulary knowledge and listening comprehension. The model had reasonable goodness of fit. Decoding skills played a less predictive role than oral language proficiency. L2 listening comprehension made an independent, proximal contribution to L2 reading comprehension, whereas L2 vocabulary knowledge assumed both proximal and distal relationships with L2 reading comprehension. Results suggest that, given adequate L2 decoding ability, L2 vocabulary knowledge is crucial for improved English reading comprehension outcomes for Spanish-speaking ELLs.

Keywords: English language learners, reading comprehension, vocabulary, simple view of reading, structural equation modeling

Educational outcomes among bilingual Latina/o students in U.S. schools is an area of interest and concern for educators and researchers (Donato, 1997; Saragoza, Juarez, Valenzuela, & Gonzalez, 1998). For children of immigration (i.e., children who are immigrants themselves or who have parents who are immigrants), an education in nascent 21st-century America is vastly different than it was for their early 20th-century counterparts. High school graduation is now a universal criterion for employability and is in many places denied to those who cannot pass high-stakes, linguistically complex texts. These tests require high levels of reading skill, much like most 21st-century jobs, using computers, accessing the Internet, and carrying out the responsibilities of citizenship. Thus, the challenge to the children of immigration who are English-language learners (ELLs) is a significant one as they work to not only master the acquisition of a second language (L2) but also its application in various schooling and societal domains (C. Suárez-Orozco & Suárez-Orozco, 2001). Accordingly, August and Hakuta (1997) have recommended that research on English learning populations focus on how this growing group of students approaches the task of English reading.

Although a great deal of reading research has been conducted on native English speaking populations, comparatively few studies have sought to explore the English (L2) reading comprehension of ELLs. Furthermore, those studies that have investigated the English reading of ELLs (Spanish speakers as well as other nonnative English speakers) have rarely sought to define and test a specific model of comprehension. Rather, most studies have sought to predict variation in comprehension by exploring sociocultural domains such as the roles of home and school literacy practices (Aarts & Verhoeven, 1999; Connor, 1983; Leseman & de Jong, 1998; Pucci & Ulanoff, 1998) and language attitudes and cultural background (Abu-Rabia, 1995, 1996, 1998; Beech & Keys, 1997; Droop & Verhoeven, 1998; Jiménez, 2000). Other work has examined metacognitive skills including the role of familiar story structure and text syntax (Bean, 1982), strategy use (García, 1998; Jiménez, 1997; Jiménez, García, & Pearson, 1995, 1996; Verhoeven, 1990), and metalinguistic awareness (Carlisle, Beeman, Davis, & Spharim, 1999). Finally, research in the domain of adolescent and adult English as a foreign language (EFL) development has explored similarities and differences between L2 learners and monolingual populations in the development of literacy and has highlighted the importance of L2 vocabulary acquisition for L2 reading comprehension (Coady, 1997; Laufer, 1997, 2001; Nation, 2001).

The goal of the current study is a limited one: to devise a research-based structural equation model of L2 reading to be

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applied to a sample of 135 intermediate–elementary bilingual Latina/o readers for whom Spanish is a first language (L1). We expect that this endeavor will result in a baseline model of L2 reading on which future analyses of this same data set will explore a more holistic paradigm that includes the role of L1 literacy skills in the L2 reading process. However, we believe there is great value in first constructing and analyzing an L2-only model of reading comprehension. We explain our rationale below.

L2 Learners and the Importance of an L2-Only Model

Current trends in research on bilingual populations, dating to Cummins's (1979, 1984) theories of a common underlying proficiency and L1 thresholds for adequate L2 acquisition, argue strenuously that L1 literacy skills are important, if not crucial, in understanding variation in L2 comprehension outcomes. Indeed, aspects of cross-linguistic transfer have been observed among elementary-aged bilingual students, especially in the arena of phonological awareness (Durğunoglu, Nagy, & Hancin-Bhatt, 1993; Lindsey, Manis, & Bailey, 2003; Verhoeven, 1994), certain aspects of vocabulary development (e.g., Nagy, García, Durğunoglu, & Hancin-Bhatt, 1993; Ordoñez, Carlo, Snow, & McLaughlin, 2002), comprehension (Royer & Carlo, 1991), and metacognitive strategy use (Jiménez et al., 1996). Koda (1997) has also argued that L1 orthographic knowledge can play an important role in L2 word recognition and lexical processing, depending on degree of orthographic similarity between the L1 and L2. Note that these studies of cross-linguistic transfer by necessity include students who have reasonably well-developed L1 literacy skills.

Similarly, many adolescent, and most adult, L2 learners typically have well-developed L1 literacy skills. Older L2 learners are also more likely to be experiencing foreign-language or L2 instruction, in which literacy is a mechanism as well as a target of instruction. However, unlike the literature on child L2 reading, adult L2 research has not investigated individual differences in L1 literacy as a determinant of L2 outcomes, focusing instead on the role of L2 lexical and grammatical knowledge (Haynes & Baker, 1993; Ulijn & Strother, 1990). As L2 lexical and grammatical knowledge improve, adult L2 reading increasingly resembles L1 reading processes, including the use of comprehension strategies developed in the L1 that can then be applied to L2 reading (Laufer, 1997; Nation, 2001). The result is a focus on L2-only models in this literature, which we find pertinent for the current study.

We choose in this article to focus only on L2 knowledge in explaining literacy outcomes for younger learners because L1 literacy cannot be presupposed; indeed, it is often limited or absent. In U.S. schools, with immigration trends bringing children from regions of the world where access to education is often sparse (C. Suárez-Orozco & Suárez-Orozco, 2001; M. Suárez-Orozco, 1989), many ELLs come to school with L1 oral proficiency but lacking adequate L1 literacy skills to facilitate the cross-linguistic transfer effects described above. Also, current political trends away from bilingual education are making it decreasingly likely that the native language of ELLs will be developed to levels sufficient to support transfer. Thus, we see the adult EFL perspective, with its focus on L2-only models, as particularly relevant to thinking about child L2 learning when L1 literacy skills are too underdeveloped to provide much direct support to L2 literacy. Results from such models can lead researchers and practitioners alike to understand which L2 predictors make the strongest contributions to reading comprehension, allowing for curricula that appropriately delegate instructional time and attention where they are most needed.

Literacy Development in Monolingual and Bilingual Populations

A great deal of research has been conducted among native English speakers and the processes that contribute to effective text comprehension. By contrast, fewer studies have documented the role of these components in the L2 reading behavior of bilingual populations. Despite the monolingual leanings of the research literature, there appear to be more similarities than differences between these groups in the arena of component skills' contribution to reading achievement.

Among monolingual populations, oral language competence has been strongly linked to reading comprehension outcomes (Biemiller, 2003). L2 theorists agree, arguing that oral proficiency assumes increasing importance as children become more facile decoders and enter into L2 text reading that is context reduced and cognitively demanding (Cummins, 1986; Nation, 2001). Arguably, the most prominent indicator of oral language proficiency is vocabulary knowledge, which is particularly important for comprehension of both spoken and written language (Stahl & Fairbanks, 1986) and has been shown to be an adequate proxy for background knowledge (Perfetti, 1998), interpretation (García, 1991), and even comprehension monitoring (Verhoeven, 2000), all vital components of facile text comprehension. The importance of vocabulary knowledge is well established in the monolingual research and has been strongly articulated by Freebody and Anderson (1983), who argued that general vocabulary knowledge is the single best predictor of reading comprehension.

L2 vocabulary knowledge also appears to be of critical importance for ELLs reading in English. Carlisle et al. (1999), working with primary-level struggling Latina/o readers, noted that both L2 vocabulary and phonological awareness made independent contributions to L2 reading comprehension. Carlo et al. (2004) demonstrated positive effects of systematic L2 vocabulary instruction among fourth- through fifth-grade Spanish-speaking ELLs. Over the course of a 2-year study, those ELLs who received English vocabulary instruction focusing on depth of vocabulary knowledge and word comprehension strategy use performed as well as or better than an English-only control group in areas of word knowledge and reading comprehension. Nagy et al. (1993) studied reading comprehension among fourth-, fifth-, and sixth-grade bilingual Latina/o students and found that those students who were attuned to cognate relationships between English and Spanish words posted better English reading comprehension outcomes than those students who were less aware of such similarities.

Among adolescent and adult biliterates, the role of L2 vocabulary knowledge becomes even more pronounced and is considered the most important, and therefore the most elaborately studied, component of L2 reading comprehension (Alderson, 1984; Laufer, 1997; Nation, 2001; Ulijn, 1981). Nation (2001) noted the interest in the vocabulary size of L2 readers as a potential "boundary between not having and having enough language knowledge for successful language use" (p. 144). L2 EFL research has accordingly focused on ways in which to maximize vocabulary growth

among L2 learners. In a series of experiments with adolescent and adult L2 learners, Laufer (2001) found that students who were required to interact with words (through writing) were significantly more likely to understand and retain a word's meaning after a delay in testing. The conclusion is that for L2 learners (and perhaps for most readers), the amount of cognitive energy expended to understand a word's meaning is directly related to its retention.

Listening comprehension is another important component of oral language skills for monolinguals. In testing the simple view of reading, discussed in more detail later, Gough and Tunmer (1986) used listening comprehension as a proxy for general oral language skill, which was shown to be a crucial component in the reading process (Aarnoutse, van den Bos, & Brand-Gruwel, 1998; Hoover & Gough, 1990; Juel, Griffith, & Gough, 1986). Hedrick and Cunningham (1995), working with intermediate elementary students, used hierarchical regression techniques to explore the unique variation in reading outcomes explained by listening comprehension. Their results suggested a bidirectional relationship between reading and listening comprehension, such that strong listening comprehension skills were associated with positive reading outcomes, whereas skilled readers also tended to display more strongly developed listening comprehension. This phenomenon has also been observed for phonological awareness (Ehri & Wilce, 1980; Perfetti, Beck, Bell, & Hughes, 1987) and vocabulary development (McKeown, Beck, Omanson, & Perfetti, 1983; Stanovich, 2000) among monolingual populations.

L2 listening comprehension skills have also been shown to be predictive of L2 reading comprehension outcomes, especially among Spanish-speaking ELLs. Royer and Carlo (1991) longitudinally explored the role of English listening comprehension among intermediate-level Spanish-speaking ELLs and found that it was an important predictor of English reading comprehension 1 year later. Hoover and Gough (1990) found similar results in their cross-sectional test of the simple view of reading, noting that, especially for intermediate-level elementary students, L2 listening comprehension was a powerful predictor of L2 reading comprehension.

The role of decoding skill as a necessary component of the reading process has been well established irrespective of language status (National Reading Panel, 2000). To decode texts accurately (Byrne, Freebody, & Gates, 1992; Hoover & Gough, 1990; Juel et al., 1986), a reader must first be phonologically and orthographically aware. In addition, word recognition skills must develop to the point where text can be rapidly decoded (Bowers, 1993). The combination of speed and accuracy of real-word recognition contributes to fluency, which has been shown to have a direct effect on reading comprehension (Blachman, 2000; Kame'enui & Simmons, 2001), and is a skill, Perfetti (1985, 1988) argued, crucial for effective local text processing.

Although studies of L2 oral language skills have documented a strong relationship with L2 reading comprehension, there are few studies in the literature that show a relationship between L2 oral language skills and L2 decoding skill. Indeed, it appears that, like monolingual English speakers, ELLs' word recognition processes are better predicted by component phonological processes, such as naming latency and alphabetic knowledge (Gholamain & Geva, 1999), and phonological awareness (Carlisle et al., 1999), suggesting that L2 oral language skills and decoding processes make independent contributions to L2 reading comprehension.

Although the lion's share of reading research has focused on monolingual English speakers, some notable work has been carried out on component L2 skills in explaining variation in L2 reading comprehension for bilingual ELLs. Indeed, as the monolingual reading research contends, it appears that, among elementary-level ELLs, L2 oral language skills (including listening comprehension and vocabulary knowledge) are crucial in explaining variation in L2 reading comprehension. Thus, the combination of decoding and oral language proficiency indicators should explain substantial amounts of variation in reading comprehension outcomes among both monolingual and bilingual readers.

The Simple View of Reading

Despite the informative investigations of component reading skill among ELLs, few studies have sought to hypothesize and test a comprehensive model of L2 reading comprehension among any group of ELL students. The most deliberate assessment of a working model of reading comprehension applied to a sample of ELLs was devised by Hoover and Gough (1990). Working with Spanish-speaking ELLs, Hoover and Gough tested the simple view of reading (Gough & Tunmer, 1986), which purports that reading comprehension is best predicted by the combination of decoding (measured through a pseudoword reading task) and linguistic comprehension (measured through a listening comprehension task) and their cross-product. The authors found support for this model, including the notion that, developmentally, decoding explains the bulk of variability in reading comprehension for younger children but that over time as children become more facile decoders, linguistic comprehension skills tend to predict an increasingly greater proportion of variation in reading comprehension.

It is the simple view of reading and Hoover and Gough's (1990) work that serves as the foundation for the current research. We build on the simple view in the following ways. First, we expand on the conceptualization of decoding skills to include not only alphabetic knowledge (pseudoword reading) but also real-word reading rate, which enables us to capture a construct of word reading fluency. Second, we elaborate on Hoover and Gough's measure of linguistic comprehension by including two discrete indicators of oral language proficiency: vocabulary knowledge and listening comprehension. By adding component skills to the model, we do not replicate the simple view of reading but rather create a new model that more closely adheres to the research on L2 oral language skills and reading comprehension among ELLs as well as to the various theoretical perspectives derived from the larger corpus of reading research on monolingual populations. Figure 1 displays the proposed model to be tested in the current study.

At the decoding level, the model proposes a proximal relationship between reading comprehension and decoding, represented by alphabetic knowledge and fluency. Oral language skills are represented by vocabulary knowledge and listening comprehension. We theorize that listening comprehension maintains a proximal effect on reading comprehension, whereas vocabulary knowledge assumes a more dynamic relationship with reading comprehension as both a proximal and distal (through listening comprehension) predictor of reading comprehension.

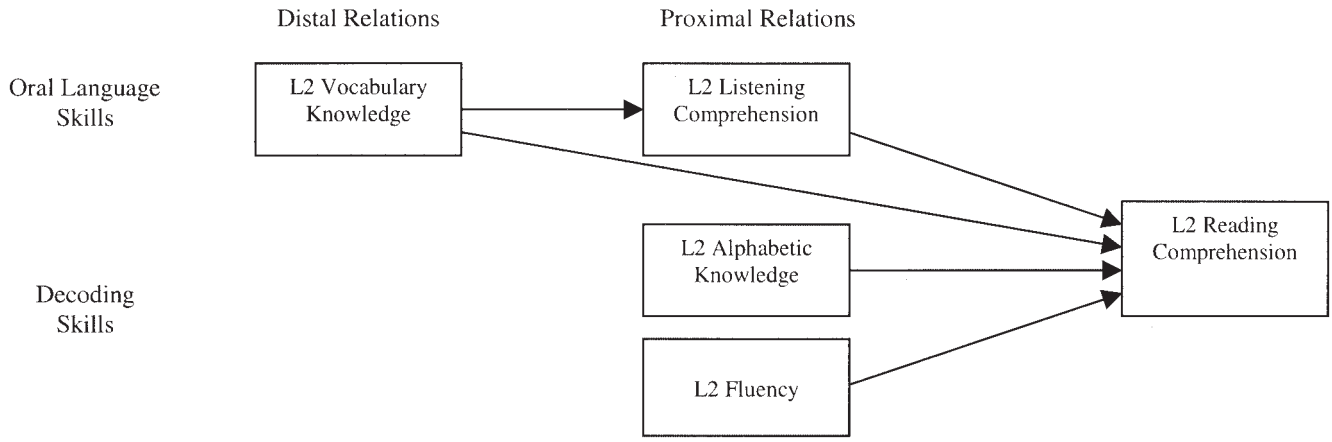

Figure 1. Model of second language (L2) reading comprehension.

Theoretically, if a reader has the appropriate alphabetic knowledge and is able to process words with the speed to model spoken language, he or she has some of the requisite skills for comprehending text. Successful reading comprehension also requires adequate levels of oral language proficiency so that the reader may take the graphic information presented, rapidly convert it to linguistic form, and integrate new with existing knowledge and thus create meaning from text.

Method

Participants

The participants were 135 Spanish–English bilingual Latina/o fourth graders from three large, urban elementary schools in Boston, Chicago, and El Paso, Texas. The data were collected in the 3rd year of a 4-year longitudinal study of the acquisition of English and Spanish literacy skills among bilingual Latina/o children. Of the 135 students, the majority (69%) were taught to read first in Spanish, whereas some (31%) received initial literacy instruction in English. Three cases were missing data for language of initial literacy instruction. Of the remaining 132, there were slight differences between the Boston school site and the Chicago and El Paso sites in the type of initial literacy instruction students received. Table 1 displays these data, which indicate that approximately two thirds of the participating students at the Chicago and El Paso schools received initial literacy instruction in Spanish, whereas approximately three quarters of the Boston students learned to read in Spanish before transitioning to English instruction. At the time of data collection, the average student's age was 10 years 1 month.

Table 1
Breakdown of Language of Initial Literacy Instruction by Participating School Site

Language of initial literacy instruction	Boston	Chicago	El Paso	Total
Spanish	29 (78)	30 (68)	32 (63)	91 (69)
English	8 (22)	14 (32)	19 (37)	41 (31)
Total	37 (28)	44 (33)	51 (39)	132 (100)

Note. $N = 132$. Numbers in parentheses represent percentages of the total.

In all, there were 37 students from the Boston site, 46 from the Chicago site, and 52 from the El Paso site. Students in the Chicago and El Paso schools were predominantly of Mexican origin, whereas the Boston students tended to be of Dominican Republic or Puerto Rican origin. Some students were immigrants, but a great many were born in the United States to immigrant parents. Still others were second- or third-generation Americans in whose homes Spanish continued to be spoken. Table 2 displays the demographic and socioeconomic characteristics for each school site. As shown in Table 2, the schools were largely segregated institutions with large populations of Latina/o students from low socioeconomic status backgrounds, school and demographic characteristics that frequently correlate with low academic achievement and challenges to English learning (C. Suárez-Orozco & Suárez-Orozco, 2001).

All three schools used the Success for All (SFA) curriculum (Slavin, Madden, Dolan, & Wasik, 1996), which served as a control for variation in literacy instruction. SFA literacy instruction, which has a Spanish as well as an English curriculum, is highly structured and therefore relatively consistent across sites, classrooms, and even languages. Children spend 90 min per day in literacy instruction, in either Spanish or English. Most students who received Spanish-language instruction spent between 2 and 3 years learning to read in Spanish before being transitioned into English language SFA literacy instruction.

It is important to note here the difference between the two groups described above. One set of students was taught to read in Spanish before being transitioned into English reading instruction. Another received only English reading instruction. The inclusion of both groups in a single sample, we believe, makes for a group of ELLs representative of the general population of ELLs in the United States, in that some possessed native language literacy skills and others did not. Because these students were not randomly selected to initial literacy instructional environments and might therefore differ in unknown ways, we replicated the path model analysis with the Spanish-instructed students alone to determine whether the model was indeed appropriate for the combined sample (see Results section below).

Measures of (L2) Decoding and Oral Language Proficiency

The Computer-Based Academic Assessment System (Sinatra & Royer, 1993) was used to measure decoding skills (alphabetic knowledge and fluency), and the Woodcock Language Proficiency Battery (WLPB) was used to measure vocabulary knowledge, listening comprehension, and reading comprehension. Assessments of these constructs were administered by trained graduate student research assistants at each of the three

Table 2
Demographic and Socioeconomic Indicators for Participating Schools

School site	Total enrollment	% LEP	% free and reduced lunch	% Anglo	% African American	% Latino/a	% Asian
Boston	741	48.3	87.9	3.5	19.4	76.1	0.7
Chicago	943	53.0	99.0	3.8	7.1	89.1	0.0
El Paso	642	69.2	74.8	0.5	0.2	99.3	0.0

Note. LEP = limited English proficient.

sites. The tests were administered individually in settings outside the classroom to minimize distractions. Detailed descriptions of each measure are provided below.

English alphabetic knowledge. A computer-administered test of pseudoword recognition was used as an indicator of a reader's alphabetic knowledge. The computer displayed a single pronounceable pseudoword (derived from the real words used in the fluency measure, described below, by altering one letter in each real word) to the student, who was to read it, using the phonological and orthographic conventions of English, into a microphone. The examiner then evaluated the student's answer as correct or incorrect. This pseudoword task comprised 240 possible items (60 three-, four-, five-, or six-letter nonwords). Of these, 40 words were presented to the student (10 words for each level) in random order (Cisero, Royer, Marchant, & Jackson, 1997). Descriptive output is reported as a percentage of correctly pronounced items. This measure was administered in the previous year of data collection as well. We therefore calculated a test–retest reliability, which was .51. Although this statistic represented only a moderate degree of reliability, the measure of alphabetic knowledge correlated .73 with the Woodcock (1991) Word Attack subtest, another pseudoword recognition assessment that was administered during the same data collection period.

English fluency. A response time measure for real-word recognition was used as an indicator of a reader's speed and accuracy of reading, or fluency. Real English words of varying difficulty were computer presented in random order to the student, who read them into a microphone. The computer recorded a response time (in milliseconds) from first exposure to the word to first utterance. Once a response was recorded, the examiner evaluated it as correct or incorrect. This real-word reading task comprised 240 possible items (60 three-, four-, five-, or six-letter words). Of these, 40 words were presented to the student (10 words for each level) in random order (Cisero et al., 1997). Real-word reading accuracy correlated $-.36$ ($p < .001$) with response time, suggesting that, on average, the faster a student read a word, the greater the likelihood that the word was accurately pronounced. Though this was only a moderate correlation, we concluded that the single variable of response time would serve as an adequate proxy for a fluency measure that took both rate and accuracy into account. Descriptive output is presented in seconds (see Tables 3 and 4). This measure was administered in the previous year of data collection as well. We therefore calculated a test–retest reliability, which was .69.

WLPB Measures

English reading comprehension (Woodcock, 1991). The measure of reading comprehension was the Woodcock Passage Comprehension test. On this cloze-type reading comprehension test, the student silently read passages in order of increasing difficulty and produced an oral response to an unfinished sentence. The examiner then marked the response as correct or incorrect. Descriptive output is presented in both raw score and grade equivalent form (see Tables 3 and 4). Raw scores were used for all analyses. A test–retest reliability of .90 was reported by Woodcock (1991) for this measure.

English listening comprehension (Woodcock, 1991). As recommended by Hoover and Gough (1990), analog measures of listening and reading comprehension were used. Thus, for listening comprehension, the Woodcock Listening Comprehension test was used. Like the reading comprehension test, this is a cloze-type assessment where the student listened to tape-recorded passages in order of increasing difficulty and produced an oral response to an unfinished sentence. The examiner then marked the response as correct or incorrect. Descriptive output is presented in both raw score and grade equivalent form (see Tables 3 and 4). Raw scores were used for all analyses. A test–retest reliability of .81 was reported by Woodcock (1991) for this measure.

English vocabulary knowledge (Woodcock, 1991). The Woodcock Picture Vocabulary test was used to assess children's vocabulary knowledge. This measure required the student to name both "familiar and unfamiliar pictured objects" (Woodcock, 1991, p. 10), ordered by increasing difficulty, with each response scored as correct or incorrect by the examiner. Descriptive output is presented in both raw score and grade equivalent form (see Tables 3 and 4). Raw scores were used for all analyses. A test–retest reliability of .86 was reported by Woodcock (1991) for this measure. The proposed structural equation model was fit using LISREL,

Table 3
Means, Standard Deviations, and Ranges for Path Model Variables

Variable	Raw scores			Grade equivalence		
	M	*SD*	Range	*M*	*SD*	Range
Decoding						
Fluency (s)	1.4	0.6	0.5–3.8			
Alphabetic knowledge (% correct)	73.9	19.0	13.3–100.0			
Comprehension						
Vocabulary knowledge	25.4	5.4	11.0–35.0	1.6	1.6	PK–6.3
Listening comprehension	17.7	6.2	1.0–29.0	2.1	3.0	PK–16.9
Reading comprehension	18.0	4.5	4.0–31.0	3.6	1.4	1.1–11.0

Note. $N = 135$. PK = prekindergarten.

Table 4
Means, Standard Deviations, and Ranges for Path Model Variables Disaggregated by Language of Initial Literacy Instruction

Variable	Spanish instruction			English instruction		
	M	*SD*	Range	*M*	*SD*	Range
Raw scores						
Decoding						
Fluency (s)	1.4	0.6	0.5–3.8	1.3	0.5	0.6–2.9
Alphabetic knowledge (% correct)	72.2	20.5	13.3–100.0	78.7	14.7	32.0–100.0
Grade equivalent						
Comprehension						
Vocabulary knowledge	1.0	1.3	PK–4.9	2.8	1.4	PK–6.3
Listening comprehension	1.3	2.2	PK–16.9	4.1	3.8	K–12.4
Reading comprehension	3.2	1.2	1.1–8.3	4.5	1.5	2.4–11.0

Note. $n = 91$ for Spanish instruction; $n = 41$ for English instruction. Three cases were missing data for language of initial literacy instruction ($N = 132$). PK = prekindergarten; K = kindergarten.

from which all standardized regression output, multiple squared correlations, and other model fit indices were derived.

Results

Tables 3 and 4 display the means, standard deviations, and ranges of all variables for the sample as a whole (see Table 3) and as a function of language of initial literacy instruction (see Table 4). For the entire sample, there was a rather wide distribution of scores for the alphabetic knowledge measure, as suggested by the standard deviation of 19.0. However, on average, these fourth graders showed reasonable L2 alphabetic knowledge, as indicated by the fact that three quarters of all presented items were correctly read. Furthermore, there were no significant differences between the English-instructed and Spanish-instructed students on this measure (72.2 for Spanish instructed, 78.7 for English instructed), $t(121) = 1.61$, $p = .11$. Indeed, there were individuals in both groups who displayed 100% accuracy on this measure.

On the fluency measure, the children took an average of 1.4 s to read a displayed word, and the distribution of response times was skewed to the right. Although the range was greater for students with initial Spanish instruction, means and standard deviations were virtually identical between the Spanish- and English-instructed groups (1.4 for Spanish instruction, 1.3 for English instruction), $t(118) = -1.02$, $p > .05$. From these initial data, then, it seemed clear that the students' English decoding skills were reasonable, with no difference between instructional groups.

The students' oral language and comprehension skills, by contrast, were relatively underdeveloped, and English-instructed children far outperformed those who received initial literacy instruction in Spanish. Furthermore, the WLPB measures have been standardized on a norming population of monolingual English speakers (Woodcock, 1991), which allowed us to analyze these descriptive statistics from a comparative perspective.

From the data presented in Table 3, it is clear that, for the entire sample, the children were performing below grade-level norms. The first item, Woodcock Picture Vocabulary, had an average raw score of 25.4, with the children in the sample performing at a high first-grade level on vocabulary knowledge. On the listening comprehension measure, the average raw score was 17.7; the children were comprehending spoken English at a second-grade level. The students performed best, though still not at grade level, on the reading comprehension measure, with an average raw score of 18.0 and grade equivalency scores approaching the fourth grade. The range of scores and corresponding grade levels, however, were very broad, with some students performing above 12th-grade proficiency and others at a prekindergarten level. Indeed, these diverse ranges of scores can be seen in the listening and reading comprehension of both Spanish- and English-instructed students, highlighting the linguistic heterogeneity that existed despite the relatively homogenous socioeconomic circumstances of these students.

Although this linguistic plurality remained consistent irrespective of language of instruction, those students who received initial literacy instruction in English outperformed their Spanish-instructed counterparts on all oral language and comprehension measures. The most notable difference between the two groups can be seen in listening comprehension, $t(129) = 4.72$, $p < .05$, but statistically significant differences between the groups were also present for vocabulary knowledge, $t(129) = 8.28$, $p < .05$, and reading comprehension, $t(129) = 6.00$, $p < .05$. In comparing these data, however, it is important to note the differences in sample sizes as well as the fact that some Spanish-instructed students in the sample were relatively recent arrivals to the United States and had therefore not received substantial amounts of English literacy instruction. Thus, length of residence and duration of English-language instruction were certainly contributing to the differences between the two groups. Despite these group differences, the ranges of data for both groups of students clarified the fact that, generally, low-socioeconomic status bilingual Latina/o students are capable of learning English to impressive levels.

Also noteworthy is the fact that, for the sample as a whole and disaggregated by language of instruction, reading comprehension scores were closer to expected levels for monolinguals of the same age than either oral language indicator. This may be due to the fact

that reading comprehension assessments for this age group are still quite sensitive to decoding ability. The fact that the children, on average, were decoding at reasonable levels may partly explain the differences between reading comprehension and the oral language measures. Furthermore, the reading comprehension measure was contextualized, unlike the vocabulary knowledge measure, which presented decontextualized pictured vocabulary. The reading measure also afforded students the opportunity to reread and process its content at their own pace, unlike the listening comprehension measure on which students listened to a tape-recorded sentence and gave an oral cloze response. The contextuality and processing time inherent to the reading comprehension measure and absent or reduced in the vocabulary and listening comprehension measures may also have contributed to the resultant differences between these variables.

Table 5 displays the correlations among the variables. The existence of strong correlations between the oral language measures and reading comprehension does not refute the arguments posited above about the discrepancies between oral language and reading comprehension outcomes. Indeed, variation in the oral language measures was strongly related to reading comprehension, consistent with the research on monolingual populations (Chall, 1996; Shanahan & Lomax, 1986). However, decoding was also significantly associated with reading comprehension, perhaps less so only because variation in that measure was far more constrained than for the oral language indicators.

The absence of significant correlations between fluency and the oral language variables supports the notion that these are separate constructs that make independent, additive contributions to reading comprehension (Gough & Tunmer, 1986). Alphabetic knowledge correlated significantly with reading comprehension, and reading fluency (time needed to read real words) had a significant, negative correlation with reading comprehension, suggesting that faster reading was associated with better comprehension. Although these local processes were indeed associated with skilled reading comprehension, the weak (though significant) relationship between a timed fluency measure and an untimed measure of reading comprehension replicates earlier findings with monolingual students (see Wolf & Katzir-Cohen, 2001, for a review) and suggests that a stronger relationship between the two constructs might be found when using a timed measure of reading comprehension.

Of further and final interest was the moderate correlation between alphabetic and vocabulary knowledge. This association provided some evidence for verbal efficiency theory (Perfetti, 1985, 1998), suggesting that those students who are decoding at adequate levels presumably have commensurate degrees of vocabulary knowledge, such that with increasingly difficult text, "minor problems with a single word" are less likely to "explode to disrupt the text representation" (Perfetti, 1988, p. 127).

Table 5
Correlations Among Structural Equation Model Variables

Variable	1	2	3	4	5
1. Reading comprehension	—				
2. Alphabetic knowledge	.48***	—			
3. Fluency	−.22*	−.43***	—		
4. Vocabulary knowledge	.73***	.33***	−.01	—	
5. Listening comprehension	.76***	.35***	−.06	.85***	—

Note. $N = 135$.
* $p < .05$. *** $p < .001$.

Figure 2 displays the standardized regression output and squared multiple correlations, derived from LISREL programming, for the hypothesized model. As expected, alphabetic knowledge and fluency played important roles in predicting reading comprehension, indicating that a stronger grasp of the alphabetic principle of English, coupled with speedy word recognition, was essential for the successful comprehension of text. However, these decoding skills were less predictive of reading comprehension than vocabulary and listening comprehension. Indeed, fluency's influence on comprehension was only approaching significance ($p = .06$), perhaps because of the fact that the measure of reading comprehension used was untimed.

In the top portion of the model, the interplay between vocabulary knowledge, listening comprehension, and reading comprehension was made clear through strong and significant relationships for all three pairs of variables. The importance of vocabulary knowledge was also noteworthy; it directly affected reading comprehension but also exerted an indirect effect through its strong relationship with listening comprehension. The model corresponded well with the expected relationships already well defined in the research literature and was found to have very reasonable goodness of fit, $\chi^2(2, N = 135) = 2.59, p = .27$.

When this model was applied to the subset of Spanish-instructed students only ($n = 91$), the results were quite comparable with those presented in Figure 2. Effects of alphabetic knowledge and fluency were similar (.18, $p < .05$, and −.19, $p < .05$, respectively), though fluency was somewhat more predictive for the Spanish-instructed students. Additionally, the effects of vocabulary on listening and reading comprehension were similar (.81, $p < .001$, and .22, $p < .05$, respectively), though vocabulary knowledge exerted a somewhat lesser effect on reading comprehension for the Spanish-instructed children than for the sample as a whole. The association between listening and reading comprehension (.51, $p < .001$) was also quite comparable. Finally, goodness of fit was appropriate for this model as well, $\chi^2(2, N = 91) = 3.70, p = .16$. The model was not tested on the English-instructed children, primarily because the small sample size would likely have resulted in instability among the structural equations (Maruyama, 1998). In light of these findings, it appeared that the model provided a relatively consistent and clear window on how L2 decoding and oral language proficiency contributed to L2 reading comprehension among a sample of elementary-aged bilingual Latina/o readers.

Discussion and Conclusions

As American schools receive increasing numbers of ELLs, it is imperative that more research investigate L2 reading processes among nonnative speakers of English. Indeed, teachers, administrators, researchers, and curriculum developers stand to benefit from research that informs our understanding of the similarities and differences between monolingual and bilingual populations. Although the current research did not directly compare a sample of bilingual children with monolinguals, it did endeavor to develop, for Spanish-speaking ELLs with varying levels of Spanish literacy skill, a model that would presumably fit with the reading behavior

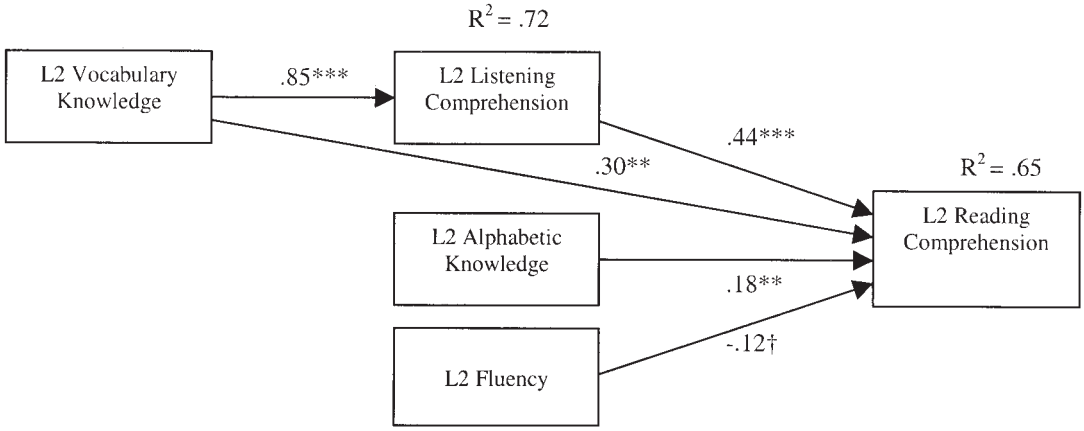

Figure 2. LISREL-derived structural equation model applied to students' English reading with standardized regression output and percentage of variation explained for each endogenous variable ($n = 135$). L2 = second language. † $p < .10$. ** $p < .01$. *** $p < .001$.

of native English speakers, while also drawing from existing research on L2 reading. That the model was a good fit with the data, for the entire sample as well as for the Spanish-instructed students, suggests that the same component skills explain comprehension outcomes for monolingual English speakers and for Spanish–English bilingual populations.

The simple view of reading proved to be a valuable starting point for theorizing a model of L2 reading comprehension. The simple view contends that orthographic knowledge is a key component in the decoding process. However, speed of real-word reading has also been shown to be an important factor in the reading process. Our results mirror those hypothesized and tested by Gough and Tunmer (1986) and Hoover and Gough (1990); that at the upper-elementary level, decoding variables will exert a lesser effect on reading comprehension, whereas oral language proficiency skills will exhibit much stronger associations with reading comprehension outcomes.

The effect of L2 listening comprehension on L2 reading comprehension was by far the strongest effect in the model. Thus, improvements in listening comprehension, combined with adequate L2 decoding skill, would be expected to produce better reading comprehension outcomes. This finding also lends support to the simple view as a viable theory of reading comprehension.

Hoover and Gough (1990) also found that the simple view was quite appropriate for predicting reading comprehension outcomes in Spanish–English bilinguals. However, in the current case, L2 vocabulary knowledge was included as a discrete predictor and exerted not only a significant proximal effect but also a distal effect on L2 reading comprehension. Thus, positive changes in vocabulary knowledge had direct effects on reading comprehension but also on listening comprehension, through which reading comprehension was further affected. Other studies using structural equation models of reading comprehension processes among monolingual students have shown similar effects of vocabulary on reading comprehension (see, e.g., Carver & David, 2001).

From a psycholinguistic perspective, these results point to more similarities than differences between bilingual and monolingual approaches to English reading, and between the models posited for child and adult ELLs. Indeed, Bialystok, Majumder, and Martin (2003) investigated the phonological development of monolingual English, bilingual Chinese–English, and bilingual Spanish–English children in kindergarten through second grade. The general conclusion from three studies of phoneme substitution and phonological effects on reading achievement was that differences between bilinguals and monolinguals were minimal. The authors astutely noted that understanding "how groups do *not* differ from each other is ultimately as important as knowing how they do differ if we are to understand the nature of language acquisition" (p. 42).

Similar findings have been noted in qualitative studies as well. Jiménez et al. (1995, 1996), in think-aloud research comparing the reading comprehension processes of Spanish–English bilingual and English monolingual readers, found that these two groups of students used very similar reading comprehension strategies with English language texts. However, the fundamental difference between the two groups was that the bilingual readers drew on additional comprehension strategies, notably translation and cognate awareness, to further enhance their comprehension outcomes.

If, psycholinguistically, bilinguals and monolinguals show little differences in their English reading, the Jiménez et al. (1995, 1996) studies clearly pointed out the fact that there is a variable unique to bilinguals: the native language. Quantitative analyses of the English reading of bilinguals using English-only variables are perhaps missing crucial information that may shed additional light on the English reading processes of bilingual readers. Studies have shown that, beyond transfer effects of phonemic and phonological awareness, various components of vocabulary knowledge are also transferable across language (e.g., Nagy et al., 1993; Ordoñez et al., 2002). Thus, future research in this arena would do well to consider the bilingual learner as a linguistic whole and attempt to tap the entirety of his or her language abilities as those skills are brought to bear on the task of English reading comprehension.

The noteworthy contribution of vocabulary knowledge to the reading comprehension of ELLs may seem unsurprising, given the wealth of information from monolingual research (e.g., Beck, McKeown, & Omanson, 1987; Freebody & Anderson, 1983; Nagy

& Scott, 2000) and the growing body of literature among L2 EFL researchers (Coady & Huckin, 1997; Huckin, Haynes, & Coady, 1993; Laufer, 1997, 2001; Nation, 2001), confirming the importance of vocabulary to reading comprehension. What is indeed surprising is that, since 1980, including dissertations, technical reports, and studies in peer-reviewed journals, only four quasi-experimental intervention studies on vocabulary knowledge and acquisition have been conducted with ELLs (D. August, personal communication, July 18, 2004). Clearly, more L2 intervention research should be building on the well-established link between vocabulary knowledge and reading comprehension in both L1 and L2 populations to explore ways to promote vocabulary knowledge for comprehension.

We have argued that bilingual and monolingual populations do not appear to differ substantially from one another in the statistical contribution of vocabulary knowledge (and other component skills) to reading comprehension. However, the means by which individual students acquire that knowledge may indeed be affected by their language status. Nagy and Herman (1985) proposed the incidental vocabulary learning hypothesis, which maintains that monolingual English-speaking students learn words through various literacy experiences, particularly reading. The curricular extension is that teachers ought to expand their students' reading opportunities as a vocabulary-teaching device. Though incidental learning is well established as one route to vocabulary acquisition for native speakers (Fukkink & de Glopper, 1998), there has been considerable discussion among L2 researchers and practitioners as to whether it occurs as robustly for students learning English as a second or foreign language (Coady, 1993; Laufer, 2001; Nation, 2001).

Coady (1997) has identified *the beginner's paradox*, inherent to vocabulary learning for ELLs and other L2 learners, which asks the question, "How can they learn enough words to learn vocabulary through extensive reading when they do not know enough words to read well?" (p. 229). Indeed, ELLs may be less able to (a) recognize unfamiliar words while reading and (b) in the case that an unfamiliar word is recognized, use the sentential context to disambiguate the meaning of the word (Carlo et al., 2004; Laufer, 2001). Texts become increasingly complex as students enter the upper-elementary grades (Chall, 1996). Even failure to recognize more than 2% of the words in a given text causes comprehension to suffer (Carver, 1994; Hirsh & Nation, 1992). Indeed, lack of grammatical knowledge as well as other linguistic cues and features will also affect incidental vocabulary learning in ways that distinguish ELLs from their English-only counterparts. Thus, although vocabulary knowledge plays a comparably predictive role in the reading comprehension process among ELLs and monolinguals, the means by which vocabulary is taught and acquired may vary depending on the language status of the learner.

If incidental vocabulary learning and extensive reading are not the instructional answers to improving vocabulary and reading comprehension outcomes for L2 readers, where do promising practices lie? Laufer (2001) found that adolescent and adult students who engaged in word-focused tasks were significantly more likely to retain word meanings than control students who simply read or looked words up in the dictionary. Among school-age children, however, these types of interventions are less common. Research on potentially effective practices in improving vocabulary knowledge among this population suggests targeting depth and breadth of vocabulary knowledge (Ordoñez et al., 2002), teaching cognate awareness (Nagy et al., 1993), and supplying engaging texts (Guthrie & Wigfield, 2000). Carlo et al. (2004) used these tenets in a recent vocabulary improvement intervention for ELL and monolingual English-speaking students. The intervention focused on five components of word knowledge: depth of meaning, polysemy, morphology, cross-linguistic features, and spelling and punctuation. By focusing on depth of vocabulary knowledge, fewer words were targeted in deference to learning "useful words and word-learning strategies" (p. 192). Results indicated that both vocabulary knowledge and reading comprehension were improved over the course of the 15-week intervention period.

The ability to read and comprehend English-language material is of major consequence for ELLs in American schools and society. Becoming a skilled English reader improves access to education and, by extension, the benefits of the larger society, a theme commonly echoed among immigrant parents and their children (C. Suárez-Orozco & Suárez-Orozco, 2001). The results presented here suggest psycholinguistic similarities between ELLs and their monolingual counterparts that give rise to certain pedagogical and curricular differences between these two groups. Given the growing linguistic heterogeneity of American schools and classrooms, recognizing similarities of process alongside the challenge of differentiated instruction is crucial if all children are to become successful readers in the 21st century.

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