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Effects of a paired bilingual reading program and an English-only program on the reading performance of English learners in Grades 1–3 ☆

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ABSTRACT

This longitudinal study examined the effects of a paired bilingual program and an English-only reading program on English reading outcomes for Spanish-speaking English learners (ELs) in first, second, and third grades. Participants were 214 ELs enrolled in first grade in 12 high-poverty, low-achieving schools at the beginning of the study. Results of piecewise growth modeling analysis indicated that ELs in the paired bilingual group made more growth on oral reading fluency in English than ELs in the English-only group across all grades. Conversely, regression analysis revealed that the difference in reading comprehension outcomes between these two groups was not statistically significant in first and third grades, independent of risk category, whereas in second-grade, at-risk ELs in the paired bilingual group had statistically significant higher scores in reading comprehension than ELs in the English-only group ($d = +0.51$). In general, ELs at risk for reading difficulties appeared to benefit more from the paired bilingual program than ELs with moderate or low-risk for reading difficulties. Implications of findings to advance theory and practice on the most effective program to teach reading to ELs are discussed.

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1. Introduction

The student population of English learners (ELs) [1] in the United States increased from 2 million in 1990 to more than 11 million in 2010 (Aud, Hussar, Planty, & Snyder, 2010). This rapid increase has added to the pressure on schools to find effective ways to teach students who are not yet proficient in English and who are more likely than other students to begin school without many of the academic-related experiences schools frequently assume students have when they begin school (Adams, 1990; Lee & Burkam, 2002). Data from the National Assessment of Educational Progress (NAEP) consistently confirms the challenge schools face. On a recent NAEP reading assessment (National Center for Education Statistics [NCES] [NCES], 2010a), for example, ELs scored more than one standard deviation below non-ELs in fourth grade (effect size $d = 1.03$) and eighth grade ($d = 1.38$). Although the NAEP does not begin testing students until fourth grade, other research studies indicate that the magnitude of these differences in the earlier grades is also substantial (August & Shanahan, 2006). The large NAEP differences, and the consistency of their size over time, suggest that efforts to close the achievement gap in the last several decades have been largely unsuccessful (NCES, 2010b).

English proficiency is necessary in the U.S. for long-term success in school and to participate fully after high school in postsecondary education opportunities or the workforce. ELs, by definition, face the dual challenge of simultaneously developing linguistic knowledge and skills (e.g., phonological ability, lexical ability, syntactic ability, and the ability to understand text) and academic content, increasing the difficulty these students face to meet school expectations successfully (Christian, 2006; Gersten, 1996; Verhoeven, 2011). In addition, as a group, ELs are also more likely than many other student groups to face additional risk factors associated with poor academic achievement including poverty, poor health, high mobility, and school absenteeism (Branum-Martin, Foorman, Francis, & Mehta, 2010; Chapa & De La Rosa, 2004).

Although ELs frequently encounter more barriers to successful school achievement than native English speaking students, there is widespread consensus that an essential component in preventing long-term academic difficulties among ELs is effective early literacy instruction (August & Hakuta, 1997; August & Shanahan, 2006). A pervasive issue regarding effective literacy instruction for ELs has been trying to determine whether effective early literacy instruction should be provided in the student's primary language or in English. Regarding this issue in early reading, three types of approaches have been used and investigated with ELs specifically, and particularly ELs whose primary language is Spanish.[2] The three approaches that have been used focus on (a) immersing students in English from the very beginning and teaching them reading only in that language; (b) teaching students in Spanish first, followed by English; and (c) teaching students to read in Spanish and English simultaneously (August & Shanahan, 2006; Genesee, Geva, Dressler, & Kamil, 2006).

In the first approach, immersing ELs in English reading and language instruction typically occurs through a strategic approach such as structured English immersion or sheltered instruction. In this model, language and content development is made accessible to students through instructional strategies and techniques that are intended for use specifically with ELs. English-only programs are frequently taught in schools where ELs from multiple language backgrounds attend (Christian, 2006; Short & Echevarria, 1999), partly because of the difficulties associated with providing primary language reading instruction in multiple languages in the same school. The popularity of the early immersion approaches has increased in the last decade, fostered by recent legislation that holds schools more accountable for early academic achievement outcomes for all students, including ELs (e.g., No Child Left Behind Act of, 2001), and as a way to integrate ELs into mainstream classrooms more quickly (Cheung & Slavin, 2005; Francis, Lesaux, & August, 2006; Goldenberg, 2008).

In the second approach, commonly referred to as the transitional bilingual model, literacy instruction is first provided in the student's primary language, with some degree of English instruction and support (e.g., providing

[1] English learners in the United States are defined as students "who come from language backgrounds other than English and whose proficiency is not developed enough where they can profit fully from English-only instruction" (August & Hakuta, 1997, p. 15). Other terms are also used to address this population of students such as language minority students, second language learners, and Limited English Proficiency (LEP) students. LEP continues to be the term used by the federal government to describe and identify ELs.

[2] Seventy-nine percent of ELs are Spanish-speaking (Fry & Passel, 2009). Thus, the languages used in most of the studies on the effects of bilingual programs have been Spanish and English.

English language development instruction). The degree of English support and instruction begins somewhat slowly and is gradually increased over time, until virtually all of the student's instruction is in English, typically between first and third grades in the early transition models, and in fourth or fifth grades in the late transition models (Genesee et al., 2006).

In the third approach, students simultaneously receive instruction in their native language and in English. In these paired bilingual programs, literacy instruction is provided at different times of the day in an effort to facilitate student content learning and literacy development in both their native language and English. In the National Literacy Panel report, Francis et al. (2006) indicated that, "English learners may learn to read best if taught in both their native language and English from early in the process of formal schooling. Rather than confusing children, as some have feared, reading instruction in a familiar language may serve as a bridge to success in English" (p. 397). Slavin and Cheung (2005) also concluded in their research synthesis that paired bilingual programs appear to provide more academic support to ELs than any other type of program.

The purpose of this study is to examine the effect of a paired bilingual program in Spanish and English compared to an English-only program on the reading performance in English[3] of Spanish-speaking ELs in first to third grades attending high-poverty schools in an era of standards-based reform and accountability. An important contextual factor in this study is that the schools implementing the paired bilingual approach or the comparison approach did so as participants in the Reading First program, a federally funded reading initiative that was part of the No Child Left Behind Act. Reading First was the largest federal investment in a specific education reform effort and represents an example of a reform policy based on an accumulated body of scientific evidence (Baker et al., 2011). Next, we present the theoretical and empirical evidence that supports bilingual instruction.

1.1. Theoretical Evidence Regarding the Language of Reading Instruction

Although many districts and schools want ELs to be able to function effectively in two languages (i.e., native language and English), the ultimate goal is English academic proficiency. Theoretical and empirical evidence suggests that language and reading proficiency in the native language fosters second language reading acquisition (Cummins, 1979; Durgunoglu & Goldenberg, 2011; Francis et al., 2006; Slavin & Cheung, 2005; Verhoeven, 2011). Two hypotheses explain the value of primary language instruction.

First, cross-language transfer, or using language skills in one language to understand the linguistic system in another language, is a resource bilingual children can use to navigate two linguistic systems. How well they are able to transfer skills from one language to another depends, in part, on their proficiency in both languages (Cummins, 1989; MacWhinney, 2005). For example, when a student has strong phonological awareness in her native language, she can use that knowledge to recognize phonemes in the second language by "transferring" what she knows about sounds in words in the first language to the second language. Being able to use transfer in this manner effectively allows the learner to speed up learning objectives, such as the process of letter–sound recognition in the second language. Another way of thinking about cross-language transfer is that being able to transfer knowledge and skills from one language to another enables the learner to free up cognitive attention to focus, for example, on the specific phonemes that do not exist in the native language (e.g., the different sounds of the vowel "a" in English as in the words *cap, coat, stream*, *art*), which could speed up learning. Empirical evidence indicates that bilingual children appear to develop high levels of phonological awareness at an early age, particularly when children also have strong vocabulary knowledge in the first and second languages (Carlisle, Beeman, Davis, & Spharim, 1999; Proctor, August, Carlo, & Snow, 2006; Verhoeven, 2011).

Second, although there are differences in linguistic systems (e.g., English has many more phonemes, letter diagraphs, and letter–sound correspondence rules than Spanish), there is an underlying language and literacy process common across languages, particularly alphabetic languages (Bialystok, Luk, & Kwan, 2005; Perfetti, 1999; Verhoeven, 2011), that supports second language acquisition. For example, children who are exposed to high levels of language and reading experiences in their native language before learning to read in a second language develop metalinguistic awareness more rapidly than other children.

[3] We did not examine the reading performance of ELs in Spanish because only students in the bilingual program were assessed in Spanish. To learn more about the outcomes on measures of Spanish literacy of students in the paired bilingual program, see D. L. Baker, Park, and Baker (2010); Baker et al. (2012).

This metalinguistic awareness facilitates their continued acquisition of literacy skills in their native language and in the second language. An example of metalinguistic awareness is the conscious recognition and manipulation of morphemes that change the meaning of words (e.g., recognizing that adding the suffix "-ed" to certain verbs changes them from the present tense to the past tense as in *painted, collected, developed*; Seymour, 2006).

Research indicates, however, that cross-language transfer and the development of an underlying metalinguistic awareness common to alphabetic languages can be affected by individual differences (Perfetti, 1999; Perfetti & Hart, 2002) and by the quality of the instruction (August & Shanahan, 2006; Lesaux & Siegel, 2003; Shanahan & Beck, 2006; Snow & Juel, 2005). Individual differences among linguistically and culturally diverse learners are much larger than among typical learners and exacerbate the differences between less skilled readers and more skilled readers. Multiple additional reasons help explain these differences, including poverty (e.g., 28% percent of Hispanics live in poverty compared to 16% of Whites; Fry & Gonzales, 2008), and background knowledge (i.e., different cultural schemata affect student understanding of the meaning of text; Goldenberg, 2011).

In addition, quality of instruction, exemplified by teaching the essential components of reading explicitly (i.e., providing clear models of learning objectives for students, including student response expectations, breaking tasks into important steps, and providing clear feedback) is strongly associated with (a) phonological awareness, (b) word reading, (c) reading fluency, (d) vocabulary, and (e) comprehension development (Carlo et al., 2004; Denton, Anthony, Parker, & Hasbrouck, 2004; Gunn, Biglan, Smolkowski, & Ary, 2000; Vaughn et al., 2006; Vaughn et al., 2006; Vaughn et al., 2006). Examples of an effective intervention in Spanish and in English for ELs who have been identified with a reading disability are the Vaughn and colleagues first grade studies (Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006). The interventions in these studies were provided in the language of the whole group reading instruction (i.e., struggling ELs attending schools that provided Spanish reading instruction received the intervention in Spanish and struggling ELs attending schools that provided only English reading instruction received the intervention in English). In both studies, daily lessons were composed of 6 to 10 short, repeated activities that gradually increased in difficulty. To facilitate student comprehension of connected text and the development of EL vocabulary knowledge, visuals, gestures, and facial expressions were used. In addition, students were given many opportunities to manipulate sounds in words, to read words in isolation and in connected text, and to provide elaborate responses to comprehension questions.

1.2. Empirical evidence regarding the language of reading instruction

A number of meta-analyses have summarized the studies comparing different bilingual models to English-only models to determine whether language of instruction has an effect on the reading performance of ELs. Findings from studies conducted before the beginning of the millennium indicate that, when compared to English-only approaches, bilingual approaches (i.e., transitional or paired bilingual) have been effective. Most of the comparisons have involved transitional bilingual models versus English-only models, and effect sizes have ranged from small ($d = 0.20$) to moderate ($d = 0.60$; Francis et al., 2006; Genesee et al., 2006; Goldenberg, 2011; Greene, 1998; Rolstad, Mahoney, & Glass, 2005; Slavin & Cheung, 2005; Willig, 1985). Overall, these transitional bilingual models consistently have produced positive and stronger outcomes compared to English-only models, although the overall quality of the research designs used in these comparison studies have been problematic (Francis et al., 2006), and community and school contexts in general tend to be omitted (Foorman, Goldenberg, Carlson, Saunders, & Pollard-Durodola, 2004).

Paired bilingual models are the least frequently used in schools (Slavin & Cheung, 2005), although they appear to be particularly promising. Indeed, of the 20 studies in the Francis et al.'s (2006) meta-analysis in which some significant degree of native language reading instruction was provided, only five studies used a paired bilingual approach (e.g., Alvarez, 1975; Campeau et al., 1975; Huzar, 1973; Maldonado, 1977; Plante, 1976). Two of these studies (i.e., Huzar, 1973; Plante, 1976) were randomized controlled trials (RCTs); although these two studies were never published, they are similar to the study we present in this paper in that they (a) followed students for more than one year and (b) used a paired bilingual model in the early grades and then transitioned students to all-English instruction in second or third grade.

Plante (1976) examined the impact of a paired bilingual program in first to third grade on reading and mathematics outcomes in English and in Spanish with 76 Puerto Rican children classified as low achievers.

Students were randomly assigned to the treatment group (i.e., paired bilingual program where they received two years of bilingual–bicultural education) or the comparison group (i.e., English-only program where they received typical classroom instruction supported by a tutorial or compensatory help). The major finding was that students in the treatment condition outperformed students in the comparison condition on measures of English reading performance. The effect size on English reading measures was $g = 0.78$ for the first- to second-grade cohort and $g = 0.26$ for the second- to third-grade cohort according to the effect-size summary provided in Francis et al. (2006). The amount of time students spent daily on Spanish and English reading instruction in the paired bilingual program and in English in the English-only program was not reported in the study.

Huzar (1973) involved 160 Spanish-dominant Puerto Rican children in second and third grades who were randomly assigned to a paired bilingual program or an English-only reading program. In the paired bilingual program, students received 45 minutes of Spanish reading instruction and 45 minutes of English reading instruction per day, while students in the comparison group received 45 minutes of daily English instruction only. The overall impact on English reading measures in second grade was not statistically significant, but was statistically significant for third grade with an effect size of $g = 0.31$.

In the last decade, only two longitudinal RCTs have been published that provide additional information about the effects of different language programs on the reading performance of ELs. Tong, Lara-Alecio, Irby, Mathes, and Kwok (2008) evaluated the effectiveness of an English intervention provided in a 70/30 (i.e., 70% of the instruction was in Spanish, and 30% was in English in kindergarten, 60% was in Spanish, and 40% was in English in first grade, and 50% was in Spanish and 50% was in English in second grade) late-exit bilingual program called the developmental bilingual education model (DBE), compared to the typical English reading instruction provided by the school in an 80/20 (i.e., 80% of the instruction was in Spanish, and 20% was in English in kindergarten, 70% was in Spanish, and 30% was in English in first grade, and 60% was in Spanish and 40% was in English in second grade) late-exit transitional bilingual model (TBE). Results indicated significant differences in English and Spanish reading outcomes at the end of second grade favoring the DBE program. Effect sizes ranged from 0.12 to 0.71 (Cohen's d) on measures of English phonological processing, letter–sound identification, vocabulary knowledge, and comprehension. Effect sizes in Spanish on similar measures ranged from 0.21 to 0.38 (Cohen's d).

Slavin, Madden, Calderon, Chamberlain, and Hennessy (2011) examined the effects of a RCT designed to compare English and Spanish reading outcomes of an early transition program (TBE) versus a structured English immersion program (SEI). Results indicated no significant differences in English and Spanish between students attending the TBE program or the SEI program by the end of fourth grade, with the exception of performance on measures of Spanish comprehension favoring students in the TBE program ($d = 0.39$). Both Tong et al. (2008) and Slavin et al. (2011) included enough information about the curriculum and the professional development that teachers received in the treatment and comparison groups to provide some evidence of the quality of instruction, a key factor as pointed earlier to obtain positive reading outcomes for all students. However, neither study reported outcomes based on student level of reading performance, and, in the case of the Slavin et al. (2011) study, no information was included about the amount of time students spent on Spanish reading instruction daily, and when and how students transitioned from Spanish to English-only instruction.

Although this current study is not a RCT, all the schools implementing the paired bilingual approach or the comparison approach were participants in the Reading First program. The goal of Reading First was for schools to ensure that all students could read at grade level by the end of third grade. To obtain this goal, schools were required to make substantial structural changes in K-3 reading instruction including: (a) providing 90 minutes of reading instruction using a common core reading program throughout K-3, (b) using explicit instruction strategies in essential areas of reading, (c) assessing students periodically on critical components of early literacy, (d) providing teachers with support systems to substantially improve classroom instruction such as reading coaches, (e) attending professional development trainings on the Schoolwide Reading Model, and (f) documenting the fidelity of implementation of the model for the Oregon Department of Education (Biancarosa & Snow, 2006; Gersten, Chard, & Baker, 2000; Kame'enui, Simmons, & Coyne, 2000; Simmons et al., 2002). In schools that used a paired bilingual approach to reading instruction, the goal was to help students attain grade-level reading outcomes in both English and Spanish by the end of third grade. The amount of instructional time allocated to Spanish and English reading instruction was based on the importance of including sufficient time for reading instruction to make sure students could meet key reading goals in their

native language and in English, and on the cross-linguistic research evidence suggesting that ELs who have strong native language skills can more easily transfer those skills to learning in their second language.

1.3. Purpose

In this study we hypothesized that ELs in the paired bilingual program would increase their oral reading fluency compared to ELs in the English-only program as an effect of cross-linguistic transfer and student development of metalinguistic awareness. The increase in oral reading fluency would, in turn, increase EL reading comprehension and overall reading performance given the substantive evidence of the moderate to strong association between oral reading fluency and comprehension in the early grades (Baker et al., 2008; Schilling, Carlisle, Scott, & Zeng, 2007; Speece & Ritchey, 2005). Specifically, we posed the following research questions:

1. Do Spanish-speaking ELs participating in a paired bilingual program have higher growth rates on oral reading fluency compared to Spanish-speaking ELs participating in an English-only program in first to third grades?
2. Do Spanish-speaking ELs participating in a paired bilingual program attain higher levels of overall reading performance, including reading comprehension, compared to Spanish-speaking ELs participating in an English-only program in first to third grades? Is this effect moderated by student oral reading fluency level?

2. Method

2.1. Participants

Participants in this study were 214 first-grade Spanish-speaking ELs enrolled in 12 Oregon elementary schools during the 2005–06 school year. We followed these students for three years (i.e., until the end of the 2007–2008 school year). All 12 schools met the criteria to participate in the Reading First initiative. These criteria included (a) having more than 21% of third-grade students, and more than 15 students total, score below the state reading proficiency standard; (b) having at least 50% of students qualify for free and reduced lunch (a common index of socioeconomic status); and (c) qualifying for Title 1 School Improvement funds (Baker, Smolkowski, et al., 2011). Three of the 12 schools chose to provide reading instruction in Spanish and in English (i.e., paired bilingual instruction) in kindergarten through third grade, and nine schools chose to provide reading instruction in English only. As shown in Table 1, the proportion of Hispanic students enrolled in the schools ranged from 48% to 69% for the bilingual schools

Table 1
Demographic description for participating schools in the study (as of the 2005–2006 school year).

School	School grade type	School size	School context	% Girls	% by Student Racial and Ethnic Identification					% in ESL Program	% Eligible for FRL
					White	Hispanic	African American	Asian/Pacific Islander	Native American		
English-only group schools											
Washington	(K-5)	424	Urban	49.5%	53.8%	25%	8.3%	9.0%	4.0%	19.2%	74.8%
Adams	(K-5)	259	Rural	44.8%	41.7%	48.7%	0%	1.9%	7.7%	32.5%	74.5%
Jefferson	(K-5)	274	Rural	47.1%	6.0%	36.9%	0.4%	0.7%	12.4%	27.4%	75.9%
Madison	(K-5)	307	Urban	44.9%	36.5%	22.1%	13.0%	26.1%	2.3%	25.8%	72.9%
Monroe	(K-5)	488	Urban	52.3%	7.0%	17.8%	69.9%	4.1%	1.2%	15.2%	92.6%
Jackson	(K-8)	336	Urban	48.8%	47.9%	13.7%	11.0%	24.1%	3.3%	29.0%	71.7%
Van Buren	(K-5)	439	Urban	49.0%	16.5%	47.6%	21.2%	13.0%	1.8%	43.2%	89.5%
Harrison	(K-5)	346	Urban	50.6%	43.6%	19.7%	14.7%	21.1%	0.9%	34.1%	58.1%
Tyler	(K-5)	440	Urban	47.5%	25%	70.2%	1.4%	1.1%	2.3%	59.0%	87.9%
Bilingual group schools											
Polk	(K-4)	316	Urban	48.7%	29.4%	69.3%	0.3%	0.9%	0%	52.0%	75.3%
Taylor	(K-3)	231	Rural	47.6%	45.9%	48.1%	2.2%	1.7%	2.2%	39.0%	74.0%
Fillmore	(K-5)	600	Rural	50.8%	36.5%	60%	2.8%	0.7%	0%	53.2%	83.3%

Note. Pseudonyms were used for schools. ESL = English as a Second Language; FRL = Free or reduced price lunch.

and from 14% to 70% for the English-only schools. Similarly, the percentage of ELs ranged from 39% to 52% for the bilingual schools and 15% to 59% for the English-only schools. All participating schools (bilingual and English-only) had more than 70% of students eligible for free and reduced lunch services. Two of the three schools providing bilingual instruction were rural, whereas only 2 of the 9 schools in the English-only program were rural.

ELs were included in the data analysis if (a) information about their Hispanic ethnicity was reported, and (b) they had been identified as Limited English Proficient (LEP) in the beginning of first grade. According to the Oregon Department of Education (ODE), students are identified as LEP and eligible to receive additional English language development services if they indicate in a home survey that they speak a language other than English at home and if they score below the proficiency level on the Language Assessment Survey (2007) or the Woodcock and Muñoz-Sandoval (1993). To exit the EL program provided by the district, ELs have to pass the English Language Proficiency Assessment (Oregon Department of Education, n.d.) at an advanced level of proficiency.

The total number of students included in the original sample was 83 in the paired bilingual schools, and 131 in the English-only schools. We excluded four ELs from the analysis because three of them were outliers (i.e., their scores on oral reading fluency were more than three standard deviations above the mean of all Spanish-speaking ELs in the study, and these scores were considered very high even for native English speaking students), and one Spanish-speaking EL in a paired bilingual school received English-only reading instruction. The final sample for the analysis included 82 students from the paired bilingual group and 128 students from the English-only group. Approximately 51% of students were girls, and 7% were eligible to receive special education services across groups. Student demographic information including gender and special education status was not significantly different between the paired bilingual group and the English-only group.

2.2. Reading instruction approaches

2.2.1. Paired bilingual schools

As shown in Table 2, all three schools provided 90 minutes of daily Spanish reading instruction to students in first and second grades and 60 minutes of daily Spanish reading instruction in third grade. The amount of Spanish reading instruction in third grade was reduced to increase the amount of English reading instruction given that, in all three schools, Spanish reading instruction was provided through the third grade only. The three schools used the *Houghton Mifflin Lectura* program (2003a) to teach reading in Spanish. In addition, ELs also received between 30 and 45 minutes of daily English reading instruction at a different time of the day in first and second grades. All three schools provided at least 60 minutes of English reading instruction in third grade.

Spanish reading instruction in first and second grades included a minimum of 30 minutes of daily small group instruction. The structure of small-group instruction was fluid and flexible, allowing ELs to move among groups based on their performance on Spanish progress monitoring assessments. The content of Spanish small group instruction depended on student skills. Generally speaking, for ELs who were struggling during whole group instruction, small-group instruction focused on re-teaching the content taught during whole group instruction and reading decodable text at their instructional level. For ELs who

Table 2
Amount of daily Spanish and English Reading Instruction in the bilingual schools and in the English-only schools.

	Spanish	English	Total amount of reading instruction for students not at risk	Total for Students at Risk
Bilingual Schools				
Polk and Taylor				
Grades 1–2	90	45	135	135
Grade 3	60	60	120	120
Fillmore				
Grades 1–2	90	30	120	120
Grade 3	60	60	120	120
English Only Schools				
Grades 1–3	0	90–120	90	120

were reading at grade level, the majority of small group instruction was spent reading passages at grade level with a fluent Spanish reading assistant.

ELs who were reading at grade level in English, received the majority of their English reading instruction in the school's core reading program, *Houghton Mifflin* (2003b) with English-only students. ELs reading below grade level received their English reading instruction using a supplemental intervention program such as *Horizons: Learning to Read* (McGraw-Hill/Science Research Associates, 1998), *Reading Mastery* (Engelmann & Bruner, 1995), or *Read Well* (Sprick, Howard, & Fidanque, 1998).

2.2.2. English-only schools

Reading instruction in English followed the same guidelines as the paired bilingual schools, but ELs and native English speakers in the English-only schools received 90 minutes of English reading instruction in English only. Students who were below grade level received an additional 30 minutes of reading instruction using a supplemental program similar to the programs used to teach English to ELs in the bilingual programs. Students (including ELs) who were substantially below grade level (i.e., two or more grades below) received all their English reading instruction in an intervention program such as *Reading Mastery* (Engelmann & Bruner, 1995). In addition to reading instruction in English, in both approaches ELs were also provided with 30 minutes of daily English language development (ELD) instruction using a language program approved by ODE such as *A Focused Approach to Systematic English Language Development Instruction* (Dutro & Ames, 2005) and *Avenues* (Hampton-Brown, 2003).

Teachers responsible for providing reading instruction received extensive training on how to use the reading programs adopted by their school with fidelity. They were also provided with classroom support in their delivery of instruction and classroom management by a full-time literacy coach and a regional coordinator who had extensive knowledge in the implementation of the Reading First initiative. The bilingual schools had a Spanish and an English literacy coach, and all Spanish teachers either were native Spanish speakers or had passed the Oregon language assessment test required to teach in Spanish. The majority of instructional assistants who provided small group Spanish reading instruction were also fluent native Spanish speakers, and they all were included in the trainings offered by the Oregon Reading First Center specifically targeting the improvement of the delivery of Spanish reading instruction. Literacy coaches were also responsible for planning monthly meetings where grade-level teams of teachers, coaches, regional coordinators, specialists, and the principal discussed and analyzed EL performance on formative reading assessments. These meetings were used to plan further professional development trainings and modify small group instruction.

2.2.3. Fidelity of implementation

As part of their commitment to the Reading First initiative, all schools (English-only and bilingual schools) were required to submit a report to ODE and to the Oregon Reading First Center documenting their adherence to the implementation of the major components of the Schoolwide Reading Model. The report included, for example, an explanation of the process the school used to adopt a core reading program in English and in Spanish for the bilingual schools, how grade-level teams used data to guide instruction, and a summary of the observation data used by the coach to determine the degree to which teachers were implementing the core reading program with fidelity.

In addition, schools submitted documentation on the minutes of instruction delivered in whole group and small group formats, group size, and instructional adjustments made based on student performance data. The Oregon Reading First Center also tracked the attendance of Spanish instructional assistants, teachers, principals, reading coaches, and district team leaders at required Reading First professional development functions, district leadership sessions, and reading coaches' meetings. An analysis of the fidelity of implementation documentation indicated that the range of implementation of the components of the Schoolwide Reading Model varied between .56 and 1.00 (i.e., perfect fidelity of implementation). Regional coordinators visited schools that received an implementation score below .75 more frequently to support their implementation of the Schoolwide Reading Model and to determine if these schools should continue receiving Reading First funds (Baker, Smolkowski, et al., 2011).

2.3. Measures

2.3.1. Oral reading fluency

The Oral Reading Fluency (ORF) subtest of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002) is a standardized, individually administered timed test of reading fluency and accuracy with connected text. During this subtest, students are asked to read a series of three passages for one minute each, and the median number of words read correctly across passages is used as an index of reading fluency. Alternate-form reliability coefficients for scores on the ORF subtest range from .89 to .99 in first to third grades. Its predictive validity coefficient estimates have been found to range from .58 to .79 with the tenth edition of the Stanford Achievement Test (Harcourt Brace & Company, 2003a) and the Oregon Assessment of Knowledge and Skills (OAKS) reading subtest (Baker et al., 2008; Good, Simmons, & Kame'enui, 2001). In this study, ORF was administered to students twice in first grade and three times per year in second and third grades.

2.3.2. Stanford Achievement Test — Tenth Edition (SAT-10)

The SAT-10 is a standardized, group-administered, multiple-choice test in English designed to measure various aspects of reading achievement (Harcourt Brace & Company, 2003a). Although the measure is not timed, guidelines for flexible time recommendations are provided for each grade level. The internal consistency reliability estimates have been found to range from .95 to .97 for the Total Reading Score, and the criterion-related validity coefficients with the Otis-Lennon School Ability Test are estimated to range from .61 to .74 for first and second grade (Harcourt Brace & Company, 2003b). In this study, we used the standard scores of the reading comprehension subtest to measure student comprehension skills at the end of first and second grades. A correlation between the SAT-10 at the end of second grade and the statewide reading test at the end of third grade was estimated to be .72 in Oregon Reading First schools (Baker et al., 2007).

2.3.3. Oregon Assessment of Knowledge and Skills (OAKS)

Student performance on the OAKS was used to determine grade-level reading proficiency in English in third grade. The OAKS is an untimed, computerized, multiple-choice test administered yearly to all students in Oregon beginning in third grade. Alternate-form reliability for OAKS scores has ben estimated to be .95, and criterion-related validity coefficient estimates have ranged from .75 to .78 with the California Achievement Test and the Iowa Test of Basic Skills (Oregon Department of Education, 2008).

2.4. Data analysis procedure

We used two types of analytic models: (a) piecewise growth curve modeling for reading fluency outcomes measured repeatedly across first to third grades and (b) multiple regression modeling for general reading comprehension outcomes measured once in each of the three grades (detailed descriptions of the model specifications are available upon request). The piecewise growth modeling was used to analyze the longitudinal data of student oral reading fluency. Piecewise growth curve modeling can be conceptualized as an extension of conventional growth curve modeling for the analysis of longitudinal data. Growth curve modeling allowed us to check for possible preexisting differences between comparison groups at the beginning of an intervention and explicitly examine intervention effects on change over time while controlling for those differences (Duncan, Duncan, & Strycker, 2006; Larzelere, Kuhn, & Johnson, 2004). Traditional growth curve modeling allows model specification only for a single growth profile or stage, whereas piecewise growth curve modeling takes into account multiple developmental stages in growth (Chou, Yang, Pentz, & Hser, 2004; Seltzer & Svartberg, 1998). With the use of the piecewise growth curve model, we were able to estimate student growth on reading fluency taking into account different stages or grades within one model, and also investigate the effects of bilingual versus English-only instruction on reading fluency development for each grade.

The typical regression modeling was used to examine the effects of reading approaches on our reading comprehension outcomes. We conducted the analyses separately for each grade because (a) reading comprehension was assessed only once, at the end of the school year and (b) the reading comprehension measures differed across grades (e.g., the SAT-10 was administered in first and second grades and the OAKS was administered in third grade). We also built these models by incorporating the interaction effects

Table 3
Percentage of variance between schools for reading fluency and comprehension outcomes.

	Percentage of variance between schools	
	Initial reading fluency	Comprehension
First grade	4.6	7.3
Second grade	4.8	11.3
Third grade	1.8	8.4

between reading fluency levels (i.e., risk status) and instructional approaches in the prediction of reading comprehension outcomes (Aiken & West, 1991; Jaccard & Turrisi, 2003).

We decided to use a parsimonious analytical model that did not take into account the nested nature of the data, (i.e., students nested within schools) because our school-level sample size was very small ($N = 12$) and unbalanced (3 bilingual schools versus 9 English-only schools; Hox, 2010; Richter, 2006). In addition, examination of the data revealed that the intraclass correlation coefficients (ICCs) were relatively small (.02 to .11) as presented by the percentage of variance between schools in Table 3. This indicates that school-level variance on the outcomes was negligible for participating schools. Moreover, we did not find any threats to the assumptions of normality, independence of errors, and homogeneity of variance (Gelman & Hill, 2007).

3. Results

Results of our analysis are presented in two sections. First, we compare the growth rates on oral reading fluency in English from first to third grades between ELs in the paired bilingual group and ELs in the English-only group. Second, we compare the general reading outcomes of ELs in the paired bilingual group with those of ELs in the English-only group, taking into account student-level of oral reading fluency performance.

Table 4 presents the descriptive statistics of reading fluency and comprehension outcomes across first through third grade. On average, ELs in first and second grades in the bilingual group started the year reading slightly fewer words correct per minute (WCPM) than ELs in the English-only group. At the subsequent assessment points, however, ELs in the bilingual group read more words correct per minute

Table 4
Descriptive statistics of reading fluency and comprehension outcomes across grades.

Grade	Assessment	Instructional group					
		English-only		Bilingual		All	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
1	Fluency						
	Winter	9.82	(10.90)	7.72	(10.69)	9.00	(10.84)
	Spring	28.51	(22.09)	29.95	(22.12)	29.10	(22.06)
	Comprehension						
	SAT-10 RC	512.28	(40.61)	510.87	(34.32)	511.72	(38.15)
2	Fluency						
	Fall	27.56	(21.78)	25.88	(20.25)	26.86	(21.11)
	Winter	47.55	(30.30)	55.63	(31.12)	50.77	(30.79)
	Spring	68.06	(34.45)	72.92	(33.39)	70.09	(34.00)
	Comprehension						
	SAT-10 RC	561.75	(35.47)	572.16	(34.29)	565.86	(35.27)
3	Fluency						
	Fall	56.27	(28.38)	62.80	(27.59)	58.94	(28.16)
	Winter	77.44	(33.66)	90.95	(32.26)	82.82	(33.66)
	Spring	93.92	(34.56)	109.08	(30.16)	100.05	(33.58)
	Comprehension						
	OAKS	203.23	(7.61)	203.73	(8.54)	203.42	(7.95)

Note. SAT-10 RC = Stanford Achievement Test — Tenth edition, reading comprehension subtest; OAKS = Oregon Assessment of Knowledge and Skills, reading subtest.

than ELs in the English-only group. In terms of general reading outcomes, as measured by the SAT-10 reading comprehension subtest (first grade) and the OAKS (third grade), the two groups performed equally well at the end of first and third grades. In second grade, however, ELs in the bilingual group outperformed ELs in the English-only group on the SAT-10 reading comprehension subtest.

3.1. Comparison of growth rates on oral reading fluency

Group differences on student reading fluency growth across first through third grade were examined by using multilevel piecewise growth modeling. Results of the unconditional model in Table 5 provide the estimated average initial level and growth rate for each grade, independent of language of literacy instruction. In first grade, on average, the estimated initial reading fluency level (winter, β_{00}) was about 8.81 words read correctly per minute and the estimated growth rate (β_{10}) was 19.86 WCPM between winter and spring. The estimated standard deviation of the growth rate was 12.92, implying that growth varied substantially across ELs. In second grade, estimated initial performance in the fall was approximately 27.51 WCPM (fall, β_{20}) and the average growth rate (β_{30}) was 21.26 WCPM between assessment time points (i.e., from fall to winter and from winter to spring). The standard deviation of the second-grade slope was 8.50.

In third grade, the average estimated initial reading fluency level (fall, β_{40}) was 59.00 WCPM, and the average growth rate (β_{50}) was 19.59 WCPM from fall to winter and from winter to spring. The growth rate standard deviation was 6.86. Overall, the average growth rates in reading fluency were relatively consistent across grades (20–21 WCPM), whereas the between-student variance in the growth rate decreased across grades (166.90 for first grade, 72.23 for second grade, and 47.03 for third grade).

Table 6 presents the results from the conditional model that compares student growth in reading fluency between English-only and paired bilingual instructional groups. In this model, the English-only instructional group was used as a reference group and thus the estimated coefficients for intercepts (β_{00}, β_{20}, and β_{40}) and slopes (β_{10}, β_{30}, and β_{50}) are for ELs in the English-only instructional group. The coefficients for the effect of bilingual instruction represent the differences for the paired bilingual instructional group over the English-only group in their initial reading fluency level (β_{01}, β_{21}, and β_{41}) and growth rate (β_{11}, β_{31}, and β_{51}) in each grade. Although ELs in the paired bilingual instructional group had a slightly lower level of reading fluency than ELs in the English-only instructional group at the first administration of the oral reading fluency measure in first grade (i.e., in the winter of first grade), the difference was not statistically significant, $\beta_{01} = -2.19$, $t(208) = -1.43$, $p = .155$. Similarly, no statistically significant differences were found between bilingual and English-only

Table 5
Results of the unconditional piecewise linear growth model for reading fluency growth across grades.

Fixed effect	Coefficient	Standard error	*t*	*df*	*p*
First grade					
Intercept, β_{00}	8.81	0.75	11.71	209	<.001
Slope, β_{10}	19.86	1.15	17.30	209	<.001
Second grade					
Intercept, β_{20}	27.51	1.56	17.67	209	<.001
Slope, β_{30}	21.26	0.75	28.30	209	<.001
Third grade					
Intercept, β_{40}	59.00	2.09	28.27	209	<.001
Slope, β_{50}	19.59	0.71	27.57	209	<.001
Random effect	**Standard deviation**	**Variance**	***df***	χ^2	***p***
First grade					
Intercept, r_{0j}	7.92	62.73	142	296.38	<.001
Slope, r_{1j}	12.92	166.90	142	317.82	<.001
Second grade					
Intercept, r_{2j}	20.86	435.01	142	1340.43	<.001
Slope, r_{3j}	8.50	72.23	142	446.15	<.001
Third grade					
Intercept, r_{4j}	27.88	777.47	142	2169.84	<.001
Slope, r_{5j}	6.86	47.03	142	345.87	<.001
Level-1 error, e_{ij}	8.14	66.19			

Table 6
Results of the conditional piecewise linear growth model for reading fluency growth between English-only and bilingual instructional groups across grades.

Fixed effect	Coefficient	Standard error	*t*	*df*	*p*
First grade					
Intercept, β_{00}	9.65	0.97	9.99	208	<.001
x Bilingual, β_{01}	−2.19	1.53	−1.43	208	.155
Slope, β_{10}	18.18	1.42	12.83	208	<.001
x Bilingual, β_{11}	4.17	2.36	1.76	208	.079
Second grade					
Intercept, β_{20}	27.69	2.02	13.69	208	<.001
x Bilingual, β_{21}	−0.44	3.16	−0.14	208	.890
Slope, β_{30}	20.02	0.96	20.85	208	<.001
x Bilingual, β_{31}	2.99	1.51	1.98	208	.049
Third grade					
Intercept, β_{40}	58.02	2.68	21.64	208	<.001
x Bilingual, β_{41}	2.36	4.26	0.56	208	.579
Slope, β_{50}	18.19	0.95	19.20	208	<.001
x Bilingual, β_{51}	3.52	1.38	2.54	208	.012
Random effect	*Standard Deviation*	*Variance*	*df*	χ^2	*p*
First grade					
Intercept, r_{0j}	7.90	62.41	141	296.57	<.001
Slope, r_{1j}	12.82	164.26	141	306.10	<.001
Second grade					
Intercept, r_{2j}	20.86	435.24	141	1346.04	<.001
Slope, r_{3j}	8.36	69.88	141	425.52	<.001
Third grade					
Intercept, r_{4j}	27.85	775.82	141	2158.96	<.001
Slope, r_{5j}	6.60	43.52	141	326.78	<.001
Level-1 error, e_{ij}	8.12	65.98			

Note. The reference group in the model is the English-only instructional group.

instructional groups in their initial levels of reading fluency at the beginning of second and third grades, $\beta_{21} = -0.44$, $t(208) = -0.14$, $p = .890$ for second grade, and $\beta_{41} = 2.36$, $t(208) = 0.56$, $p = .579$ for third grade.

ELs in the paired bilingual instructional group had consistently higher rates of reading fluency growth across grades compared to ELs in the English-only instructional group, as presented in Table 6. In first grade, the difference in their average fluency growth rates between the two groups was 4 WCPM, but the difference was not statistically significant, $\beta_{11} = 4.17$, $t(208) = 1.76$, $p = .079$. The instructional group variable explained about 2% of the between-student variance in the first-grade growth rate and the effect size (d) for the bilingual instructional group was in the small to moderate range ($d = +0.33$).

In second and third grades, the growth rates for the paired bilingual instructional group were higher than those for the English-only group and statistically significant ($p < .05$), $\beta_{31} = 2.99$, $t(208) = 1.98$, $p = .049$ for second grade and $\beta_{51} = 3.52$, $t(208) = 2.54$, $p = .012$ for third grade. In second grade, the instructional group variable explained about 3% of the between-student variance in the growth rate and the effect size was small to moderate (+0.36). In third grade, the instructional group variable explained about 7% of the between-student variance in the growth rate and the effect size was moderate ($d = +0.53$).

Given that the paired bilingual instructional group demonstrated more growth in reading fluency during each grade than the English-only instructional group, it might be expected that this group would have had higher initial levels of reading fluency, particularly in later grades. This was not the case, however. The reading fluency levels of the two groups at the beginning of second and third grades were not significantly different. Fig. 1 illustrates the estimated average reading fluency scores for the two groups across eight assessment points. Although the bilingual instructional group grew more in reading fluency during each grade, the ELs in that group also showed substantial drops in reading fluency between grades, possibly due to a lack of instruction during the summer months. Nevertheless, Fig. 1 indicates that, on

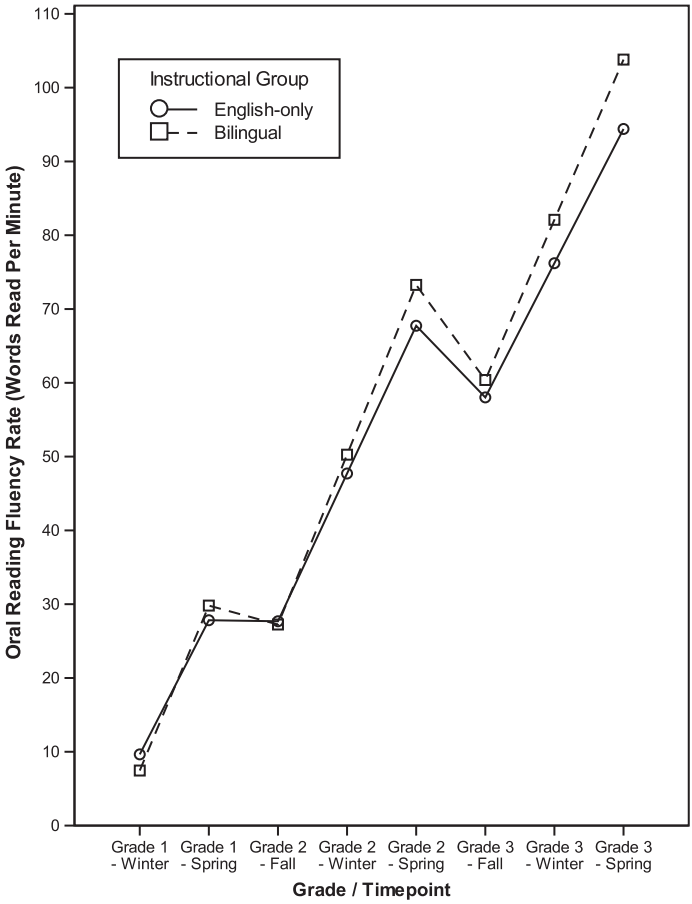

Fig. 1. Estimated growth in reading fluency for English-only and bilingual instructional groups across grades 1 to 3.

average, ELs in the bilingual instructional group developed reading fluency at a faster rate than ELs in the English-only group across grades.

3.2. Reading comprehension outcomes

Next, we investigated the effects of bilingual and English-only reading instruction on more general reading outcomes (i.e., reading comprehension). Given that student reading comprehension was assessed only once per year at the end of each grade, and different measures were used, the analyses were conducted separately for each grade and did not address longitudinal growth. Instead, we focused on interaction effects by examining if the effects of language of instruction on reading comprehension were moderated by student level of oral reading fluency performance. This level was decided based on student oral reading fluency scores at the first administration of the ORF subtest and its instructional recommendation (Good & Kaminski, 2002). Although some students did not participate in the reading comprehension assessment and attrition across grades was observed, our analysis revealed that missing data were not more prevalent in one group than another. However, given that total attrition was 15.7% in first grade (15.9% for the bilingual instruction group and 15.6% for the English-only instruction group), 23.8% in second grade (24.4% and 23.4% respectively), and 34.8% in third grade (37.8% and 32.8% respectively), we used multiple imputations (MIs) in the regression analyses for reading comprehension outcomes to better account for missing data (Baraldi & Enders, 2010; Enders, 2010; Rubin, 2004). Table 7 presents the number of students by grade and risk-status.

Table 7
Numbers of students with reading comprehension scores by grade, risk status, and instructional group.

Grade and risk status	Sample size by instructional group		Total
	English-only	Bilingual	
First grade			
At-risk	54	45	99
Some-risk	32	14	46
Low-risk	22	10	32
Total	108	69	177
Second grade			
At-risk	47	34	81
Some-risk	26	18	44
Low-risk	25	10	35
Total	98	62	160
Third grade			
At-risk	38	20	58
Some-risk	24	14	38
Low-risk	24	17	41
Total	86	51	137

Results for reading comprehension outcomes are presented in Table 8 by grade, student level of oral reading fluency performance (or risk status), and interaction effects between instructional group and risk status. We will explain results based on student risk status. The intercepts are for the at-risk ELs in the English-only instructional group and the other variables represent the average gap in reading comprehension scores for specific subgroups of ELs compared to this reference group.

In first grade, on average, the reading comprehension scores of at-risk ELs were higher for the bilingual instructional group ($M_{Adj} = 492.61$) than for the English-only instructional group ($M_{Adj} = 487.91$). The difference, however, was not statistically significant, $b_1 = 4.70$, $t(204) = 0.86$, $p = .389$, $d = +0.12$. ELs

Table 8
Results of the regression model for reading comprehension on instructional group, fluency risk status, and their interactions by grade.

Grade and variable	Coefficient	Standard Error	*t*	*df*	*p*
First grade					
Intercept (At-risk), b_0	487.91	3.56	137.144	204	<.001
Bilingual instruction, b_1	4.70	5.46	0.86	204	.389
Moderate-risk, b_2	37.79	6.00	6.29	204	<.001
Moderate-risk x Bilingual, b_3	−4.85	9.94	−0.49	204	.626
Low-risk, b_4	71.08	7.14	9.95	204	<.001
Low-risk x Bilingual, b_5	−5.69	12.06	−0.47	204	.637
Second grade					
Intercept (At-risk), b_0	540.89	3.82	141.54	204	<.001
Bilingual instruction, b_1	18.02	5.97	3.02	204	.003
Moderate-risk, b_2	26.99	6.87	3.93	204	<.001
Moderate-risk x Bilingual, b_3	−3.69	10.45	−0.35	204	.724
Low-risk, b_4	51.26	7.39	6.94	204	<.001
Low-risk x Bilingual, b_5	−10.47	13.87	−0.76	204	.450
Third grade					
Intercept (At-risk), b_0	198.51	1.15	171.97	204	<.001
Bilingual instruction, b_1	0.67	1.69	0.40	204	.692
Moderate-risk, b_2	5.31	2.04	2.60	204	.009
Moderate-risk x Bilingual, b_3	−1.15	2.78	−0.41	204	.679
Low-risk, b_4	9.44	2.47	3.83	204	<.001
Low-risk x Bilingual, b_5	−0.77	2.97	−0.26	204	.796

Note. The reference group in the model represents the students identified as having an at-risk level of reading fluency in the English-only instructional group.

identified as being at moderate-risk or low-risk showed systematically higher reading comprehension scores than ELs at high-risk, as shown in the coefficients for moderate-risk ELs, $b_2 = 37.79$, $t(204) = 6.29$, $p < .001$ and for low-risk ELs, $b_4 = 71.08$, $t(204) = 9.95$, $p < .001$. We found no statistically significant interaction effects between instructional groups and risk levels in the prediction of first-grade reading comprehension outcomes ($p > .10$ for both b_3 and b_5), although the estimated gap in the scores between the two instructional groups became smaller for ELs identified as being at moderate-risk ($b_1 + b_3 = -0.15$, $d = -0.004$) or low-risk ($b_1 + b_5 = -0.99$, $d = -0.03$).

In second grade, the average estimated reading comprehension score for at-risk students was higher for the bilingual instructional group ($M_{Adj} = 558.91$) than for the English-only instructional group ($M_{Adj} = 540.89$). The difference was statistically significant, $b_1 = 18.02$, $t(204) = 3.02$, $p = .003$, and the effect size was moderate ($d = +0.51$). ELs in second grade who were identified as moderate-risk or low-risk demonstrated significantly higher reading comprehension scores than at-risk ELs, $b_2 = 26.99$, $t(204) = 3.93$, $p < .001$ for moderate-risk and $b_4 = 51.26$, $t(204) = 6.94$, $p < .001$ for low-risk. The interaction between instructional group and risk status in predicting reading comprehension (i.e., moderate-risk or low-risk) was not statistically significant ($p > .10$ for both b_3 and b_5), although ELs at moderate-risk performed markedly better in the bilingual instructional group than in the English-only instructional group ($b_1 + b_3 = 14.33$, $d = +0.40$). Second-grade ELs at low-risk also performed better in the bilingual instruction group than in the English-only group ($b_1 + b_5 = 7.55$, $d = +0.21$).

In third grade, scores from the Oregon Assessment of Knowledge Skills (OAKS) were used as a measure of reading comprehension. The average estimated scores of at-risk children were 199.18 for the bilingual instructional group and 198.51 for the English-only instructional group, a difference that was not statistically significant, $b_1 = 0.67$, $t(204) = 0.40$, $p = .692$, $d = +0.08$. ELs identified as moderate-risk or low-risk performed significantly better on the OAKS reading test than ELs at-risk, $b_2 = 5.31$, $t(204) = 2.60$, $p = .009$ for moderate-risk and $b_4 = 9.44$, $t(204) = 3.83$, $p < .001$ for low-risk,. The interaction between instructional group and risk status in predicting reading comprehension was not statistically significant ($p > .10$ for both b_3 and b_5). Similarly to previous grades, however, the estimated gap between bilingual and English-only instructional groups became smaller for ELs at moderate-risk ($b_1 + b_3 = -0.48$, $d = -0.06$) and ELs at low-risk ($b_1 + b_5 = -0.10$, $d = -0.01$).

In all three grades, ELs at-risk in the bilingual instructional group performed better than ELs at-risk in the English-only instructional group on general reading outcomes, although this difference was only statistically significant in second grade. In contrast, as shown in Fig. 2, low-risk ELs in the bilingual instructional group performed equally well as ELs in the English-only instructional group. In the next section we discuss these results in the context of other similar studies, and in the current educational system in the U.S.

4. Discussion

Overall, results indicate that the paired bilingual reading approach appeared to work as well as, or better than, the English-only reading approach in terms of reading development and outcomes. Differences in results, however, varied based on (a) the reading outcome examined, (b) grade, and (c) student level of oral reading fluency performance.

4.1. Reading outcomes and grade

First, we found that the effects of the paired bilingual approach seemed to be more evident on reading fluency outcomes than on reading comprehension outcomes. Effects on fluency growth were statistically significant across grades favoring the paired bilingual approach. Effects on reading comprehension, however, were statistically significant in only second grade. A plausible reason for the differential effects may have been influenced by the constructs measured and the measures used to assess these constructs. For example, the oral reading fluency measure is a standardized, individually administered one-minute measure used for screening and progress monitoring, and it is sensitive to minor changes in the number of words read correctly (Baker et al., 2008). Conversely, the comprehension measures used in the present study (SAT-10 and OAKS) were multiple-choice, untimed, group administered, and less sensitive to small changes in comprehension levels. Moreover, the SAT-10 and the OAKS are very different types of comprehension measures. The SAT-10 is a commercially-developed and widely-used standardized

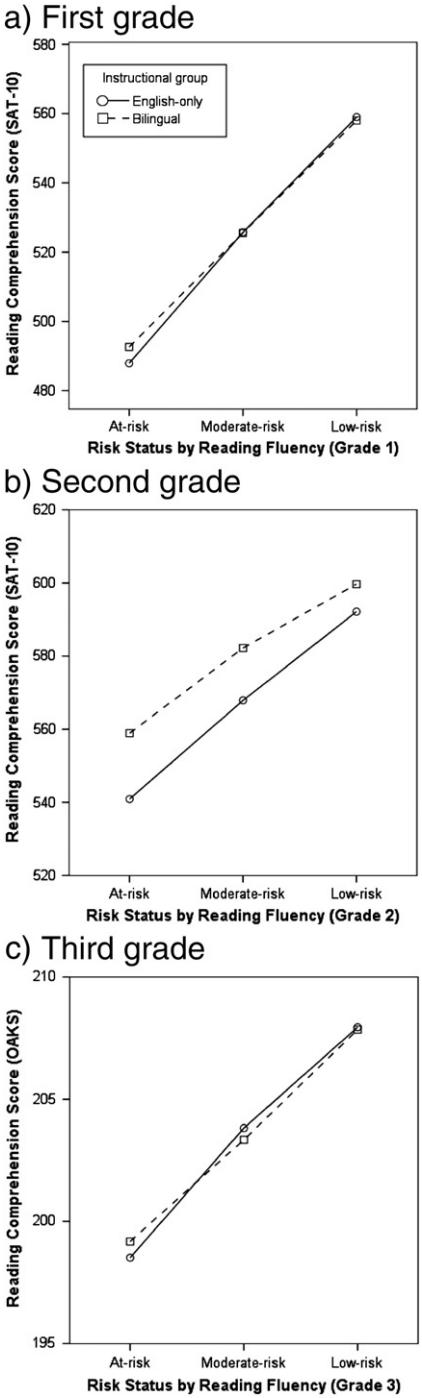

Fig. 2. Estimated reading comprehension scores by fluency risk status for English-only and bilingual instructional groups in grades 1 to 3.

measure, whereas the OAKS is a state-developed compulsory assessment. Given that both measures have different scaling and administration methods (see Harcourt Brace & Company, 2004; Parrish et al., 2008 for more details), it is plausible they could have resulted in different conclusions about reading comprehension performance (Cutting & Scarborough, 2006).

Second, results differ by grade level. The effect sizes on fluency growth of the paired bilingual approach compared to the English-only approach were +0.33 in first grade, +0.36 in second grade, and +0.53 in third grade, suggesting that the effects on oral reading fluency might become stronger over the years as students stay longer in the paired bilingual approach. Conversely, significant effects on reading comprehension favoring the paired bilingual approach were observed only in second grade. A plausible explanation for the differences in reading comprehension observed between first and second grades, for example, is that second-grade students, in general, are making the transition to becoming more automatic readers whereas first graders may still be experiencing decoding challenges that impede their comprehension. In the case of learning to read in Spanish and in English, ELs might be able to use their reading knowledge in their native language, Spanish, to support their reading fluency and comprehension growth and development in their second language, English.

In other words, it is plausible that second grade ELs in the paired bilingual program had acquired greater decoding, fluency, and comprehension skills in Spanish that made it possible for them to transfer these skills to support English reading comprehension. In a previous study (Baker, Park, & Baker, 2012) , we found that ELs attending a paired bilingual program (i.e., where Spanish reading instruction was taught for a longer period of time than English reading instruction) had significantly higher scores in Spanish than in English on reading fluency and on reading comprehension. This explanation would also be supported by Cummins (1979) threshold hypothesis and by studies examining the effects of cross-linguistic transfer of beginning reading skills (De Ramírez & Shapiro, 2007; Durgunoglu, Nagy, & Hancin-Bhatt, 1993; Manis, Lindsey, & Bailey, 2004). Students in the English-only program, however, had to rely solely on their English decoding and vocabulary skills to understand connected text. Given that we did not assess ELs in Spanish in the English-only schools, we can only speculate that their Spanish reading skills would be low because they did not receive any reading instruction in that language (Goldenberg, 2011; Hakuta, 2011; Oller, Jarmulowicz, Pearson, & Cobo-Lewis, 2011).

Finally, we found that ELs in the bilingual reading approach demonstrated greater oral reading fluency growth than their peers in the English-only approach within each school year, but experienced a larger drop in oral reading fluency scores between school years. In other words, ELs in both approaches started each grade with similar fluency levels, although ELs in the paired bilingual approach made more growth on oral reading fluency throughout the school year than ELs in the English-only approach. These findings corroborate other studies indicating that summer vacation tends to dilute the effects of instruction on student reading development, which appears to be particularly acute for ELs attending a bilingual program (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996; Kim, 2007).

4.2. Comparing the paired bilingual approach to the English-only approach

Our findings indicate that although ELs in the paired bilingual approach received less reading instruction in English, they made significantly more gains on English oral reading fluency compared to ELs in the English-only approach in second and third grades. Two possible explanations may have accounted for this larger increase in fluency benefitting ELs in the bilingual approach. First, ELs not at-risk in the bilingual approach received between 30 and 45 minutes more reading instruction than ELs not at-risk in the English-only approach. This increase in the amount of reading time may have provided ELs in the bilingual approach more time to practice reading connected text. Second, given that Spanish and English are both alphabetic languages and therefore the construct of fluency can be applied in both languages (Baker et al., 2012), it is plausible that ELs in the paired bilingual approach may have developed a higher metalinguistic awareness of the structure of languages that benefitted their fluency performance in English (Cummins, 1979; Seymour, 2006; Verhoeven, 2011).

On the other hand, reading comprehension outcomes across first through third grades were not statistically significant between the bilingual instructional group and the English-only instructional group, with the exception of second grade. Moreover, findings differed based on initial levels of oral reading fluency. For example, second-grade ELs at-risk for reading difficulties participating in the bilingual instructional group scored significantly higher on the SAT-10 at the end of second grade compared to ELs

at-risk in the English-only instructional groups. First- and third-grade ELs at-risk for reading difficulties in the bilingual instructional group also outperformed ELs at-risk in the English-only instructional group across grades in reading comprehension, although these differences were not statistically significant.

Thus, in spite of more instructional time for English and Spanish reading altogether, ELs not at-risk in the bilingual instructional group did not have significantly higher scores on reading comprehension outcomes compared to ELs not at-risk in the English-only instructional group. However, ELs at-risk in the bilingual instructional group had higher scores on reading comprehension compared to ELs at-risk in the English-only instructional group, although ELs at-risk received a similar amount of reading instruction in both groups. Our results are consistent with findings in another study by Maldonado (1994), who found that ELs identified as at-risk for experiencing reading difficulties benefited more from transitioning over a three year period from a Spanish to an English instructional approach than ELs who were taught to read in English only from the beginning.

We also obtained comparable effect sizes on oral reading fluency (+0.33 to +0.53) to those reported in other studies (i.e., +0.20 to +0.60; Francis et al., 2006; Goldenberg, 2011; Slavin et al., 2011; Tong et al., 2008). They indicate that a paired bilingual approach might benefit students whose native language is Spanish. However, in this study we did not confirm the suggestion put forth by Francis et al. (2006) and Slavin and Cheung (2005) that a paired bilingual program might be the best approach to teach ELs. It did, however, demonstrate that a paired bilingual approach is viable and does not appear to confuse students. In fact, at least in second grade, it appeared to benefit ELs at-risk for reading difficulties more than ELs at-risk in the English-only approach.

4.3. Limitations

Our results may have been affected by the following threats to internal and external validity. In terms of threats to internal validity, first, the small sample size led to low statistical power in our analyses. In the analyses of reading comprehension outcomes, for example, we had relatively small numbers of students in the low-risk and moderate-risk categories, which may have influenced the non-significant, moderating effects between risk status and instructional group in the prediction of student reading performance. Similarly, we did not take school-level structure into account because of the small number of participating schools. Second, we were unable to obtain student language proficiency information. Although all students were limited English proficient at the beginning of the study, it is plausible that some students may have acquired higher levels of English language proficiency faster than others moderating the effect of the language of instruction on their reading performance. Third, it is possible that the larger growth on reading fluency across the grades in the bilingual group was because ELs spent more time in reading instruction compared to ELs in the English-only group. However, it is important to point out that at-risk ELs received a similar amount of reading instruction in both groups, but they had higher reading comprehension scores across the grades in the bilingual group. Finally, given that our study was quasi-experimental, the lack of random assignment to the bilingual program or the English-only program precludes drawing causal inferences from the findings.

In terms of threats to external validity, our study compared ELs attending an English-only program and a paired bilingual program in schools that chose to participate in the Oregon Reading First initiative. We do not know if the same results would apply if we compared ELs attending schools that followed the same type of bilingual program but were not part of Oregon Reading First, or ELs attending schools implementing a different type of bilingual program such as an early or late transition program. Future research should address these limitations.

4.4. Implications for practice

Our study indicates that a paired bilingual approach to improve reading outcomes of Spanish-speaking English learners may be as effective as an English-only approach, with the added benefit of students becoming bi-literate and bilingual. This finding has important implications for teaching reading to Spanish-speaking English learners, who represent approximately 79% of the English learner population in the U.S. (Fry & Passel, 2009). First, the determination of which approach to use to teach ELs should be based, in part, by the resources available to implement a bilingual program, the school configuration (e.g., the number of Hispanics attending

the school and the number of certified and classified teachers proficient in the student native language and with pedagogical experience), and the idiosyncratic characteristics of the community in which a school is located (Hakuta, 1998). In our study, the schools that implemented the paired bilingual program had more than 48% of Hispanic students, all teachers had strong Spanish reading skills, and they all had been trained on the delivery of effective instruction in Spanish. In addition, schools were located in communities where, on average, 26% of the population was Hispanic compared to 12% across the state (U.S. Census Bureau, 2011).

Second, using data to determine student level of support in a paired bilingual approach and within an evidence based reform initiative such as Reading First is fundamental to ensure that all students (i.e., ELs and English-only students) are making progress towards meaningful reading goals (Baker, Stoolmiller, Good, & Baker, 2011; Parrish et al., 2006). Third, a paired bilingual approach or an English-only approach within a schoolwide reform initiative that is implemented consistently across time appears to be more effective to improve English reading outcomes for ELs than an approach that changes across years and grades. Students in our sample, on average, made more growth on oral reading fluency in third grade after they had participated in the Oregon Reading First initiative for three years, indicating that independently of the reading approach, time implementing an evidence based reform initiative has a significant effect on EL reading outcomes (Baker, Smolkowski, et al., 2011; Slavin et al., 2011). Fourth, providing professional development to all teachers ensures that ELs are supported during reading instruction, independently of the language in which they are taught to read (August & Shanahan, 2006; Parrish et al., 2006; Tong et al., 2008, Vaughn, Mathes, Linan-Thompson, & Francis, 2005).

4.5. Conclusions

This study compared a paired bilingual program to an English-only program in an era of standards-based reform and accountability. Although only 50% of ELs in the United States appear to attend schools that use a bilingual program, and fewer attend a paired bilingual program, our findings indicated that learning to read in two alphabetic languages such as English and Spanish in a paired bilingual program can also help ELs acquire reading skills in English in addition to supporting the development of their Spanish reading skills. More importantly, this study provides evidence that high-quality native language and second language reading instruction in the early grades within a schoolwide reading model can help ELs at high-risk for learning difficulties increase their reading outcomes.

Our findings also indicate that to ensure similar effects in English of a bilingual approach compared to an English-only approach, instruction needs to be delivered by experienced and knowledgeable reading teachers, and supported by school administrative staff and reading specialists in both languages. Future rigorous studies examining the specific factors that have a long term effect on reading outcomes for ELs taking into account school and community characteristics ought to be conducted, particularly in light of the need to improve the overall academic performance of ELs, who represent a substantial percent of the student population in many countries.

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